Draft Initial Environmental Examination

June 2015

Preparation for Tranche 3 of ADB Multi-tranche Financing Facility for the Power Transmission Investment Program in Viet Nam

Binh Long – Tay Ninh 220 kV Transmission Line

Binh Phuoc and Tay Ninh Provinces, Viet Nam

Prepared by
Central Viet Nam Power Projects Management Board:
Electricity of Viet Nam

NOTE

CURRENCY EQUIVALENTS
(as of 22 May 2015)

Currency Unit	–	Dong
D1.00	=	$0.00005
$1.00	=	D21,785

ABBREVIATIONS

ADB	Asian Development Bank
CPPMB	Central Vietnam Power Projects Management Board
CPC	Commune People's Committee
DCARC	District Compensation, assistance and resettlement committee
ECA	Environmental Compliance Audit
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
NPT	National Power Transmission Corporation
DONRE	Department of Natural Resources and Environment
IEE	Initial Environmental Examination
PECC3	Power Engineering Consulting J.S Company No.3
PTC4	Power Transmission Company No.4
ROW	Right of way
PPC	Provincial People's Committee
SPS	Safeguard Policy Statement (2009)
SS	Substation
TL	Transmission Line
UXO	Unexploded ordinance

WEIGHTS AND MEASURES

km:	kilometre
kg:	kilogram
kV:	kilovolt
ha:	hectare
mm:	millimetre

EXECUTIVE SUMMARY

The National Power Transmission Corporation (NPT) of Viet Nam requested the new 220 kV Binh Long - Tay Ninh Transmission Line be included in Tranche III of Multi-tranche Financing Facility (MFF) for the Power Transmission Investment Program (PTIP) for Viet Nam. The goal of the PTIP is to develop and improve the quality and reliability of power supply throughout Viet Nam. The Binh Long – Tay Ninh 220 kV Transmission Line is one of nine individual subprojects that comprise Tranche III. The subproject will meet the immediate power needs of the rapidly developing provinces of Binh Phuoc, and Tay Ninh.

Preliminary engineering designs, and safeguard requirements of the subproject have been completed including approval of the EIA for the inter-provincial subproject by the Ministry of Natural Resources and Environment (MONRE) according to Decision No.3041/QĐ-BTNMT dated 25 December 2014 by MONRE. The IEE presented herein was prepared pursuant to the ADB Safeguard Policy Statement (SPS 2009). The IEEs of the other eight subprojects of Tranche III were prepared separately.

Subproject Summary

The subproject is summarized below.

- Construction of a new 72.6 km 220 kV transmission line connecting the existing 220 kV Binh Long and 200 kV Tay Ninh substations in the provinces of Binh Phuoc and Tay Ninh.

Potential Impacts and Mitigations

The IEE was conducted using the preliminary subproject designs and available information on the affected environments. The results of the IEE indicate that the primary impact of the 72.6 km, 220 kV transmission line between the 220 kV Binh Long and 220 kV Tay Ninh substations will be the loss of an estimated 38.7 ha of perennial crop land of rubber, cashew, pepper, and annual crop land of rice.

The 22m wide ROW for the transmission line will occupy 155.8 ha. Agriculture activity can continue to occur in the ROW provided that safety distances to the transmission line are ensured. There are 48 households that will be affected by the ROW which will be compensated. Land ownership and compensation issues have been addressed by a Resettlement Plan which will be implemented by the Central Viet Nam Power Projects Management Board (CPPMB). All affected houses will be supported with required earthing and grounding technology.

The transmission line is not near a protected area such as a national park or nature reserve. The nearest national park is Lo Go-– Xa Mat National Park located 35 km west of the Tay Ninh substation. No critical habitat[4], or rare or endangered wildlife are reported in the area. There are no known avian migration flyways in the area with which the connector transmission lines could interfere. A short section of the preliminary alignment of the transmission line passes through the southern reach of the Dau Tieng Conservation Forest. The section of the alignment and ROW can be modified easily during the detailed design stage.

[4] As per SPS (2009)

Concerns of the health effects of EMF were identified during the public stakeholder meetings. This issue is addressed by the design of the transmission line, and also from the extensive review of the health effects of EMF conducted by the WHO which is appended to this IEE report. The sensitivity of the transmission line to climate change is considered to be Low because of the specific transmission tower designs, well drained plantation lands, and because of the inland location of the transmission line.

Other impacts of the 220 kV transmission line concern the short-term construction disturbances of increased traffic and risk of traffic accidents along the rural roads near the site. The construction phase will also potentially create dust and noise along the roads and in the general area from construction vehicles and operation of heavy civil works equipment. These construction impacts along with the common issues of construction solid and liquid waste pollution, worker camp issues, reduced access increased, and increased risk of worker and public injury can be managed with standard construction practices and management guidelines (e.g., IFC/World Bank Environmental health and Safety Guidelines 2007 for electric power transmission and distribution projects).

Environmental Compliance Audits (ECA) of the Binh Long 220 kV and Tay Ninh 220 kV substations were conducted because being endpoints of the new transmission line are associated facilities. The ECAs determined that both substations meet required laws and regulations governing the substations at their current states of operation.

An Environmental Management Plan (EMP) has been prepared for the implementation of the subproject which prescribes required impact mitigation and monitoring requirements. A Grievance Redress Mechanism has been developed to facilitate resolution of affected people's concerns.

Conclusions

The IEE concludes that the feasibility design of 220 kV Binh Long-Tay Ninh transmission line combined with available information on affected environments is sufficient to identify the scope of potential environmental impacts of the subproject. Providing that significant changes to the transmission line do not occur at the detailed design phase, and new sensitive environmental or cultural resources are not determined, further detailed environmental impact assessment (EIA) of the subproject is not required.

TABLE OF CONTENTS

I. INTRODUCTION

1. The National Power Transmission Corporation (NPT) of Viet Nam has requested the subproject defined by the new Binh Long – Tay Ninh 220 kV Transmission Line be included in Tranche III of the Multi-tranche Financing Facility (MFF) for the Power Transmission Investment Program (PTIP) for Viet Nam. The Binh Long – Tay Ninh TL subproject is one of nine individual subprojects that comprise Tranche III.

2. The goal of the PTIP is to develop and improve the quality and reliability of electrical power supply throughout Viet Nam. The Binh Long - Tay Ninh TL subproject will meet the immediate power needs of the rapidly developing provinces of Binh Phuoc, Binh Duong, and Tay Ninh. The NPT is the executing agency of the subproject with the Central Vietnam Power Projects Management Board (CPPMB) being the implementing agency.

3. The IEE presented herein was prepared pursuant to the requirements of the ADB SPS (2009). The IEEs of the other eight subprojects of Tranche III were prepared separately.

A. Assessment Context

4. The Binh Long - Tay Ninh TL subproject was assigned Environmental Category B pursuant to the ADB's Safeguard Policy[5] and recent good practice sourcebook guidance[6]. A category B project will have potential adverse impacts that are less adverse than the impacts of category A project, are site-specific, largely reversible, and can be mitigated with an environmental management plan[7]. The results of the rapid environmental assessment (REA) of the subproject which assign the subproject as Category B are in Appendix A.

5. The IEE was prepared for the Binh Long - Tay Ninh TL subproject in the feasibility design stage using available data and information on sensitive ecological and cultural receptors that exist for the subproject site. The EIA required by the Viet Nam Law on Environmental Protection LEP (2014) and Decree 18/2015/ND-CP has been completed and approved by the Ministry of Natural Resources and Environment (DONRE) according to Decision No.3041/QĐ-BTNMT dated 25th December 2014 by MONRE. MONRE, as opposed to provincial DONRE approval was required because the transmission line is interprovincial.

6. The detailed designs for the Binh Long - Tay Ninh TL subproject will follow subproject approval. The Environmental Management Plan (EMP) that has been prepared for the subproject (see section IX) will need to be reviewed to ensure it meets the final detailed designs of the subproject.

II. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

7. The Binh Long - Tay Ninh TL will be implemented according to the directives set down for use of Official Development Assistance (ODA) by GoV Decree No. 131/2006/ND-CP which was promulgated November 9, 2006, and in accordance with the provisions of the parent Sector Project.

[5] ADB, 2009. Safeguard Policy Statement, ADB Policy Paper.
[6] ADB, 2012, Environmental Safeguards, A Good Practice Sourcebook, Draft.
[7] Footnote 6, pg 19.

A. Viet Nam Regulatory Framework for Environmental Assessment

8. The recently revised Viet Nam Environment Protection Law No. 55/2014/QH13 of 23 June 2014 (LEP 2014) prescribes the requirements for environmental assessment for international and domestic project interventions that affect natural and social environments. Following the revised LEP (2014) the supporting Government Decree 29/2011/ND-CP on strategic environmental assessment (SEA), and environmental impact assessment (EIA) was replaced with Decree 18/2015/ND-CP, dated 14th February 2015. Supporting Circular 26/2011/TT-BTNMT remains unchanged. Decree 18 and Circular 26 are implemented in conjunction with Decree 80/2006/ND-CP, and Decree 21/2008/ND-CP.

9. The screening criteria of Decree 18 distinguish projects that require a full EIA from comparatively simpler projects that require an IEE [formerly EPC]. The difference between the government (GoV) EIA and IEE reflects the required level of assessment, and final review and appraisal that is required. The screening criteria for power transmission projects in the Decree 18 have changed and are now based on voltage. All projects undertaken with voltages exceeding 110 kV require EIAs.

10. Thus, the Binh Long - Tay Ninh TL subproject required a GoV EIA to satisfy the GoV regulatory framework. The EIA was prepared and approved in accordance with Viet Nam Law and approved by the Binh Phuoc PPC on 31 December 2014. The GoV Environmental Compliance Certificate (ECC) for the subproject is found in Appendix C.

B. Power Transmission Sector Regulatory Framework

11. Table 1 summarized key laws and policies governing the power sector in Viet Nam that apply to the subproject. Specific legal directives and required approvals for the subproject are summarized in Table 2.

Table 1. Legal and regulatory framework for power sector in Viet Nam

Law and Decree	Description
Law	
Law No.24/2012/QH13	Amends and supplements articles of the Law on Electricity
Electricity Law 28/2004/QH11, issued: 3 December 2004	Prescribes development planning and investment for all aspects of the sector
Decree	
No. 81/2009/NĐ-CP, issued 17/08/2005	On the safety protection of high-voltage power grids
Decree No. 14/2014/NĐ-CP, issued 26 February 2014	Details regulations enforcement power electrical safety
Decision	
Decision No. 854/QD-TTg dated July 10, 2012 of the Prime Minister	Approving the 5 year business and development investment plan from 2011 to 2015 of Electricity of Vietnam
Decision No. 5114 / QD-BCT dated July 23, 2013 of the Ministry of	Approving transmission grid development plan in 2013 taking

Law and Decree	Description
Industry and Trade	into account the next four years
Circular	
Circular No: 22/2010/TT-BXD, issued: 3 December 2010	Prescribes labour safety requirements in construction, maintenance, renovation, restoration, and decommissioning of sector facilities
Ministry of Industry and Trade Circular No. 03/2010/TT-BCT, issued: 22 January 2010	Regarding protection on high-voltage power network

Table 2. Legal documents and approvals required for the project

Documents and Approvals	Description
Decision No, 1208/QĐ-TTg dated 21/07/2011 by Prime Minister	The National Power Development Plan
Decision No. 2418/QĐ-BCT dated 17/05/2011 by Ministry of Industry and Trade	Power Development Plan of Binh Phuoc province for the 2011-2015 period with the vision to 2020
Decision No. 5905/QĐ-BCTdated 11/11/2011 by Ministry of Industry and Trade	Power Development Plan of Tay Ninh province for the 2011-2015 period with the vision to 2020
Document No. 0806/EVNNPT-QLĐT dated 07/03/2014 by National Power Transmission Corporation	On agreement of alternatives of 220kV Binh Long - Tay Ninh transmission line
Document No. 1573/UBND-KTN dated 08/07/2014 by the Tay Ninh PPC	On agreement of alternative of 220kV Binh Long - Tay Ninh transmission line
Document No. 3490/UBND-KHTH dated 16/10/2014 by Binh Phuoc PPC	On agreement of alternative of 220kV Binh Long - Tay Ninh transmission line
Documents of MONRE dated 25/12/2014	Approval of the EIA

Land Development and Construction Regulatory Framework.

12. Directives for land development and construction that are relevant to the power transmission sector are summarized in Table 3.

Table 3. Applicable land development and construction law and policy

Law and Decree	Description

Law and Decree	Description
Law	
Land Law No. 45/2013/QH13, date issue 29 Nov 2013	Governs powers and responsibilities of the State as owner of land and representative of the entire people for uniform administration of land and the rights and obligations of land users
Decree	
Decree No.43/2014/NĐ-CP, date issued 15 May 2014	Detailed rules for implementation of some articles of the Land Law
Decree No.47/2014/NĐ-CP, date issued 15 May 2014	Regulations on compensation, assistance and resettlement when the State acquires land
Decree No. 197/2004/ND-CP dated 03/12/2004	On comprensation support, and resettlement
Decree No.44/2014/NĐ-CP, date issued 15 May 2014	Regulations on land prices
Circulars	
Circular 14/2009/TT-BTNMT dated 01/10/2009	On detailed regulations on compensation, support, and resettlement.
Circular No: 22/2010/TT-BXD, date issued: 03 December 2010	Prescribes labour safety requirements in construction, maintenance, renovation, restoration, and decommissioning of sector facilities

C. ADB Safeguard Policy

13. The ADB Safeguard Policy Statement (ADB SPS, 2009) along with the recent good safeguard practice sourcebook clarify the rationale, scope and content of an EA and supported by technical guidelines (e.g., Environmental Assessment Guidelines 2003). Projects are initially screened to determine the level of assessment that is required according to the following three environmental categories (A, B, or C).

14. Category A is assigned to projects that normally cause significant or major environmental impacts that are irreversible, diverse or unprecedented such as hydroelectric dams (an Environmental Impact Assessment is required). Category B projects have potential adverse impacts that are less adverse than those of category A, are site-specific, largely reversible, and for which mitigation measures can be designed more readily than for category A projects (an Initial Environmental Examination is required). Category C projects are likely to have minimal or no negative environmental impacts. An environmental assessment for Category C projects is not required but environmental implications need to be reviewed.

D. Applicable Environmental Laws, Policy, Standards, and Guidelines

15. The following are additional applicable directives for environmental assessment and protection for domestic and international development in Viet Nam:

- Law on Water Resources No 08/1998/QH10.
- Biodiversity Law 20/2008/QH12 dated 13 November 2008
- Law on Cultural Heritage (Law No. 32/2009/QH12) supplementing the Cultural Heritage Law 28/2001/QH10 dated 29 June 2001
- Circular No. 26/2011/TT-BTNMT dated on 08/12/2011 by the Ministry of Natural Resources and Environment on Guidance for Strategic Environmental Assessment, Environmental Impact Assessment, and Environmental Protection Commitment.
- Decree No.12/2009/ND-CP which replaces Decree No. 16/2005/ND-CP and Decree No. 112/2006/ND-CP on Investment Management on Construction Projects.
- Decree No.59/2007/NĐ-CP dated on 09/4/2007 by the Government about Solid Waste Management.
- Decree No. 117/2009/ND-CP Regulation on sanctioning administrative violations in environmental protection, issued: 31/12/2009
- Decree No. 04/2009/ND-CP, Incentives and support for environment protection activities, issued 14/01/2009.
- Viet Nam Labour Code 10/2012/QH/13 – 18 June 2012
- Decision No.3733/2002/QĐ-BYT issued by Ministry of Health dated on 10/10/2002 About the Application of 21 Labour Health and Safety Standards
- Decree No.140/2006/NĐ-CP dated on 22/11/2006 by the Government which regulates Environmental Protection, Designing, Approval and Implementation of Development Strategies, Plans, Programs and Projects.
- Decree No.80/2006/NĐ-CP dated on 09/8/2006 about Guiding for the Implementation of Some Articles in the Law on Environmental Protection (2005).
- Decree No.149/2004/NĐ-CP dated on 27/7/2004 about Issuing Permits for Water Resource Exploration, Exploitation and Utilization and Permits for Discharge to Water Bodies.
- Decision No.16/2008/QĐ-BTNMT dated on 31/12/2008 by the Ministry of Natural Resources and Environment about Promulgation of the National Technical Regulations for the Environment.
- Decision No.18/2007/QĐ-BTNMT dated on 05/11/2007 about Promulgation of Statistic Indicator System for the Field of Natural Resources and Environment.
- Decision No.23/2006/QĐ-BTNMT dated on 26/12/2006 about Promulgation of the List of Hazardous Waste.
- Decision No.27/2004/QĐ - BXD dated on 09-11-2004 by the Minister of Ministry of Construction on the promulgation of TCXDVN 320:2004 "Landfill for hazardous waste – Design standards"
- Decision No.22/2006/QĐ-BTNMT dated on 18/12/2006 about Obligations to Apply Vietnamese Standards for the Environment.
- Decision No.233/2006/QĐ-TTg dated on 18/10/2006 about approving the National Program on Labor Protection, Safety and Sanitation up to 2010.

- Decision No.35/2002/QD-BKHCNMT dated on 25/6/2002 about Promulgation of Series of Vietnamese Standards for the Environment.

- Decision No.60/2002/QĐ-BKHCNMT dated on 07/8/2002 about Promulgation of the Guidance for Disposal of Hazardous Wastes.

- Circular No. 16/2009/BTNMT and No. 25/2009/BTNMT on Promulgation of Vietnamese National Standards.

- Circular No.10/2007/TT-BTNMT dated on 22/10/2007 about Guidance for Assurance and Control of the Quality of Environmental Monitoring.

Environmental Standards and Regulations

Water quality:

- QCVN 01:2008/BYT – National technical regulations on quality of drinking water
- QCVN 08:2008/BTNMT – National technical regulations on quality of surface water
- QCVN 09:2008/BTNMT – National technical regulations on quality of groundwater
- QCVN 10:2008/BTNMT – National technical regulations on quality of coastal water
- QCVN 14:2008/BTNMT – National technical regulations on quality of domestic wastewater
- QCVN 24:2008/BTNMT– Industrial wastewater discharge standards
- QCVN 02:2009/BYT - National standard of domestic water supply
- TCVN 5502:2003 – Supplied water – Requirements for quality
- TCVN 6773:2000 – Water quality – Water quality for irrigational purposes
- TCVN 6774:2000 – Water quality – Water quality for aquaculture protection
- TCVN 7222:2002 – Water quality for concentrated domestic WWTP
- TCVN / QCVN - Standard methods for analyzing environmental quality

Air Quality:

- QCVN 05:2008 – Standards for ambient air quality
- QCVN 06:2008 – Maximum allowable concentration of hazardous substances in the ambient air
- TCVN 6438:2001 – Maximum permitted emission limits of exhausted gases from vehicles

Solid Waste Management:

- TCVN 6696:2009 – Solid waste – Sanitary landfill. General requirements for environmental protection.
- QCVN 07:2009– National technical regulations for classification of hazardous wastes
- QCVN 25:2009 – National technical regulations for wastewater of solid waste sites
- QCVN 15:2008/BTNMT: - National regulation on allowable pesticide residues in soil
- QCVN 03:2008/BTNMT: - National regulation of heavy metals concentrations in soil

Vibration and Noise:

- QCVN 26:2010/BTNMT: National technical standard for noise
- TCVN 6962: 2001 Allowable vibration level for public and residential areas
- TCVN 6962:2001: - Allowable vibration and shock from construction activities

International Guidelines

- IFC/World Bank Group, 2007. EHS Guidelines, *for* Electric Power Transmission & Distribution
- AWWA Standard Methods for the Examination of Water and Wastewater

International Environmental Management Conventions

16. Viet Nam is signatory to the following relevant international conventions:

- Stockholm Convention on Persistent Organic Pollutants (2002) see link http://www.pops.int/documents/implementation/nips/submissions/nip_vietnam.pdf
- Ramsar Convention (formerly Convention on Wetlands of International Importance , especially as Waterfowl Habitat) (1971))
- Protocol to Amend the Convention on Wetlands of International Importance especially as Waterfowl Habitat, Paris, 1982
- Convention Concerning the Protection of the World Cultural and Natural Heritage (1972)
- Convention on International Trade in Endangered Species Wild Fauna and Flora (1973)
- FAO International Code of Conduct on the Distribution and Use of Pesticides
- Vienna Convention for the Protection of the Ozone Layer (1985)
- Montreal Protocol on Substances that Deplete the Ozone Layer (1987)
- Copenhagen Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer, Copenhagen (1992)
- Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (1989)
- United Nations Framework Convention on Climate Change (1992)
- Convention on Biological Diversity (1992)

III. SUBPROJECT DESCRIPTION

A. Scope of subproject

17. The 72.6 km Binh Long - Tay Ninh Transmission line starts at Binh Long substation in Thanh Luong commune, Binh Long town, Binh Phuoc Province and will terminate at the Tay Ninh substation in Ninh Thanh Ward, Tay Ninh City, Tay Ninh Province. The transmission line will be a double circuit, carried on horizontal arms of steel lattice towers. A 22 m wide right of way (RoW) i.e. 11m from either side and the ground for the home is located 25m from the edge of the outer conductor of the two sides.

18. A total of 224 galvanised steel lattice towers will be comprised of 40 tension towers and 182 suspension towers. The suspension towers will be located along straight sections. Tension towers will be located where the alignment changes direction. Tower height is determined by topography and the need for safe conductor sag height of 3m from conductor to the ground. The highest towers will be located at water crossings which will be crossed in a single span. No towers will be erected in any river channel. Towers will be supported on four evenly spaced reinforced concrete foundations set apart underneath tower height.

19. The transmission line alignment runs mostly east-west located roughly parallel to and about 30 km from the Vietnam - Cambodia border. As much as possible the alignment avoids developed infrastructure such as roads transmission lines etc. The 72.6 km transmission line occupies 20 km of Binh Phuoc province 52.6 km of Tay Ninh.

20. Figure 1 shows the alignment of the 72.6 km transmission line between Binh Long 220 kV substation and the Tay Ninh 220 kV substation. The points along the line in Figure 1 denote line section markers not towers which are summarized in Table 4. Technical details of the transmission line are summarized in Table 5.

1. Modification of existing substations

21. The existing, operational Binh Long 220 kV substation will be modified to accommodate the new 220 TL connection. The Tay Ninh 220 kV substation which is currently under construction and not operational will also accommodate the new 220 kV connection.

22. For the existing 220 kV Binh Long substation two new bays will be constructed on available land inside the substation property. Each bay includes 1 set of circuit breaker, 5 sets of disconnector, 3 sets of current transformers and 3 sets of voltage transformers. In addition to the bays control systems, measurement systems, busbars, system lightning earthing protection systems, illumination; building pillars, and building troughing networks will also be installed.

23. Similarly, at the existing 220 kV Tay Ninh substation two bays will be constructed on the substation property. Each compartment will be installed with 1 set of circuit breaker, 6 sets of disconnector, 3 sets of current transformer, and 3 sets of voltage transformer. Control systems, measurement systems, busbars, a lightning protection system, illumination; and building pillars and troughing network will be installed.

Figure 1. Alignment of 74.6 km 220 kV transmission line showing sections

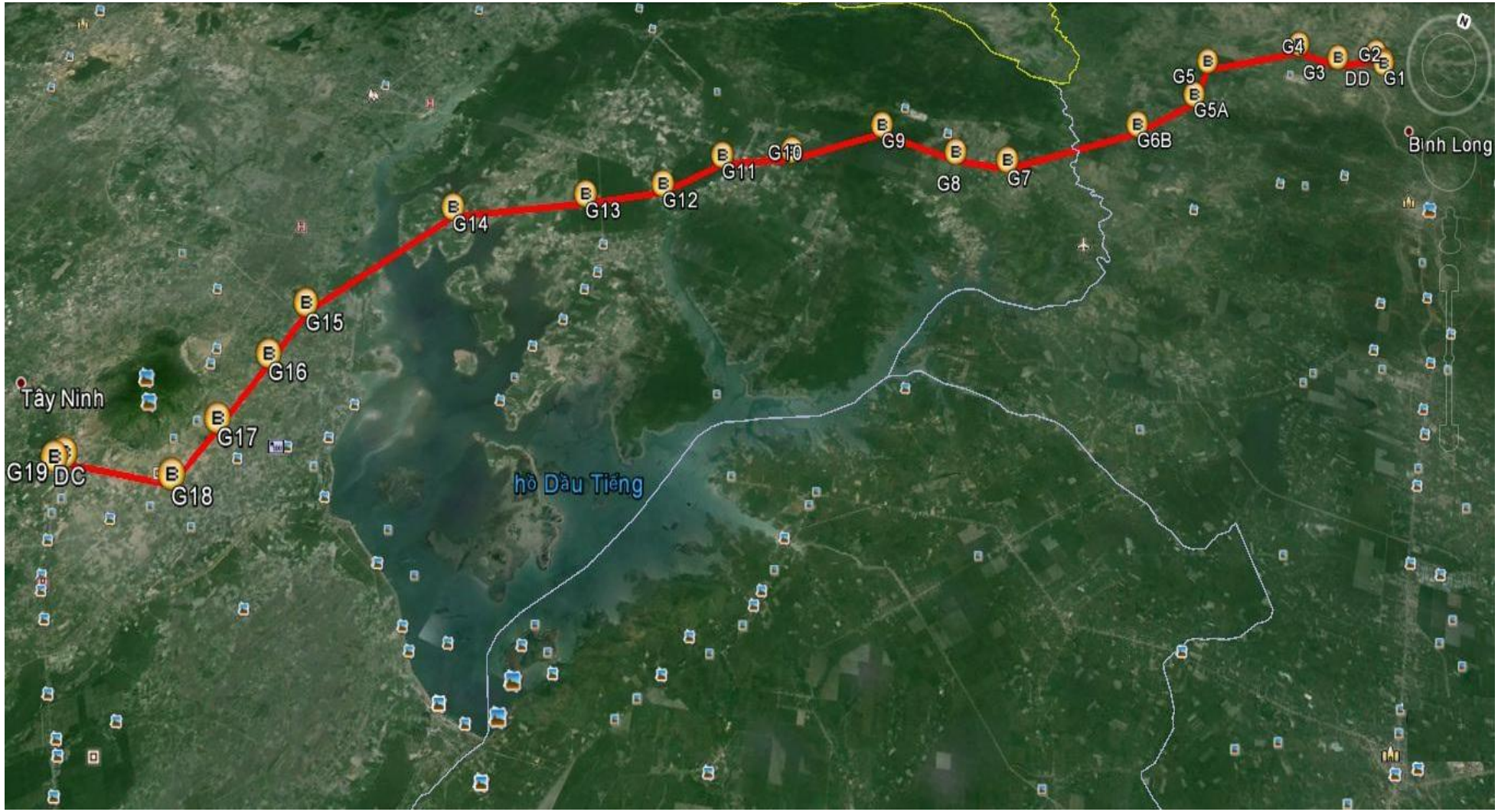


Table 4. Summary of transmission line sections

Section	Province	Length		Binh Long – Tay Ninh T/L crossings									Affected HHs
		Section (m)	Total (km)	110kV	35-0.4kV	telep lines	Hwy	prov. Rd	dirt road, asphalt road	lake	ponds, canals	river, stream	ROW
ĐD-G1	Binh Phuoc	224	0.224										
G1-G2	" "	694	0.918		2				2			2	1
G2-G3	" "	2,098	3.0	3	2		1		4			4	4
G3-G4	" "	1,978	5.0		1				11		3	1	5
G4-G5	" "	5,163	10.1		1				21	3	6	1	3
G5-G5A	" "	2,648	12.8						5		1		2
G5A-G6B	" "	3,793	16.6						13		2		6
G6A-G7	Binh Phuoc, Tay Ninh	7,009	23.6					1	10	1	8	1	1
G7-G8	Tay Ninh	2,463	26.0						5		7	1	
G8-G9	" "	3,817	29.8		3			1	6		9		1
G9-G10	" "	4,687	34.6		1			1	10		1	1	
G10-G11	" "	3,343	37.9		1	1			2				6
G11-G12	" "	3,255	41.1						9		1		1
G12-G13	" "	3,623	44.8		1				7		3	1	
G13-G14	" "	6,093	50.9		2	2			13		9	1	11
G14-G15	" "	7,695	58.5		1	2			21	1	5		3
G15-G16	" "	2,777	61.3		1				5		2		2
G16-G17	" "	3,346	64.7		2	2			5				3

Section	Province	Length		Binh Long – Tay Ninh T/L crossings									Affected HHs
		Section (m)	Total (km)	110kV	35-0.4kV	telep lines	Hwy	prov. Rd	dirt road, asphalt road	lake	ponds, canals	river, stream	ROW
G17-G18	“ “	2,723	67.4		1				7		1		3
G18-G19	“ “	4,657.8	72.0		2	1			8				4
G19-ĐC	“ “	524.5	72.6	2	1	1		1			1		

Source: Compiled from the 220 kV Bình Long – Tây Ninh Transmission line, PECC3, 2014.

Table 5. Summary of technical features of 220 kV transmission line

Starting point	At busbar 220kV of the 220kV Binh Long SS
Ending point	At busbar 220kV of the 220kV Tay Ninh SS
Length	72.6 km
ROW	22 m
Earth grounding width	25 m
Voltage	220 kV
Number of circuit	2
Conductor	ACSR-330/43, 2xASTER-366
Earthwire	PHLOX75.5
Fibre optical cable	OPGW-70
Insulator	Glass, ceramic or polymer
Suspension towers	182
Tension towers	40
Exceedance towers	2
Foundation	Site preformed steel reinforced
Total excavation requirement	90,848 m^3
Av. excavation requirement / tower	405.6 m^3
Total concrete requirement	8,532 m^3
Av. concrete requirement / tower	38 m^3
Area to be acquired for 224 towers	42.6 ha
Area to be acquired for 22 m wide RoW	155.8 ha
Houses to be removed from within the RoW	48 houses
Houses to be earthed inside	33 houses
Bình Long, Tây Ninh SS: extension	on land inside substation property

Source: FS of 220 kV Binh Long- Tay Ninh Transmission line, PECC3, 2014.

2. Summary of transmission line alignment

24. From Binh Long 220 kV substation the transmission line will extend west through mainly rubber, cashew, pepper, fruit and vegetable plantations. In Binh Phuoc province the 20 km of the transmission line (G6B and G6B-G7) traverses 110 kV transmission lines 3 times, and highway 13 times. There are 16 households inside ROW and 12 household outside the ROW (Figure 1).

25. In Tay Ninh province before reaching the Tay Ninh 220 kV substation the 52.6 km transmission line (G6B-G7 and G7-ĐC) traverses mainly flat terrain and low sloping terrain through rubber plantations and crops. The line crosses Dau Tien reservoir once, a 110kV transmission line twice, provincial road No.794 3 times, and provincial road No. 784 once. There are 32 households in the ROW and 21 households outside the ROW.

3. Right of way and land requirements

26. A 22 m wide right of way (ROW), i.e. 11m from centre line (Table 4) will be required for the 220 kV transmission line as well as an earth grounding zone for any houses that are situated from 11m to within 36m from the centre line. There are 48 households within ROW of transmission line.

27. Land acquisition will be temporary and permanent (Table 6). The total permanent land to be acquired for the tower foundations is 38.7 ha. Temporary land acquisition of 155.8 ha is required along the ROW during construction.

Table 6. Permanent and temporary land acquisition along ROW

Province	Permanent (ha)	Temporary (ha)
BInh Phuoc	10.6	42.9
Tay Ninh	28.2	112.9
Total	**38.7**	**155.8**

4. Construction Activities

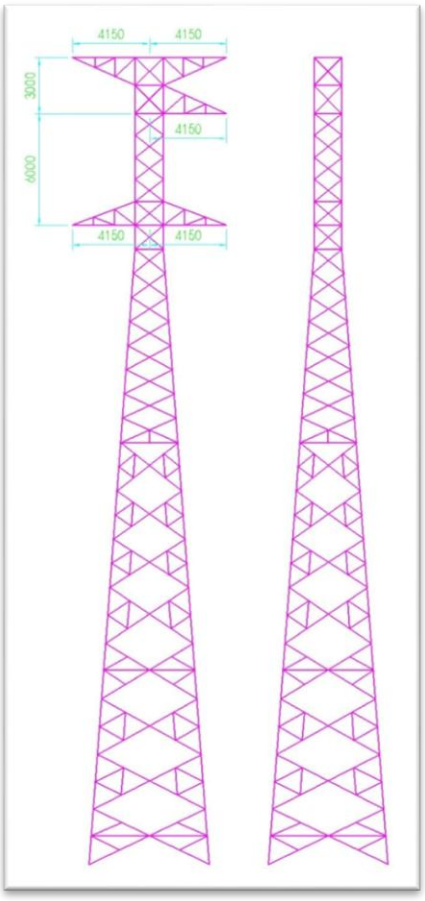
28. The construction of the transmission line involves the following activities that will occur simultaneously at several locations along the alignment to ensure that the transmission line is completed within 18 months:

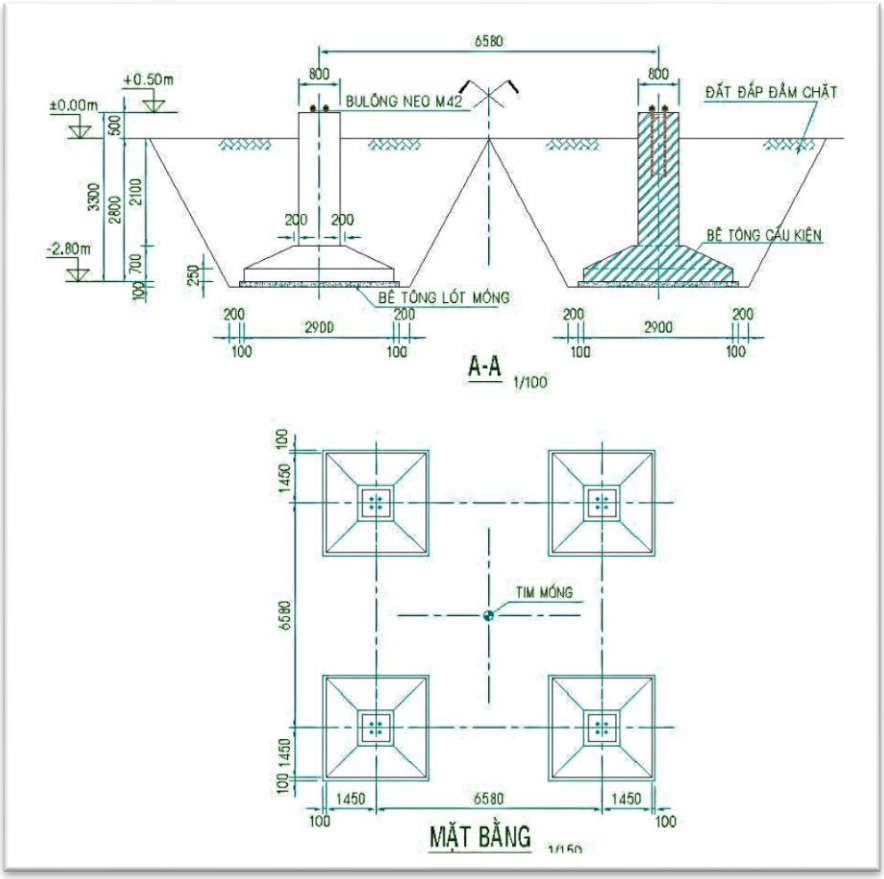
- Demarcation and clearing of ROW
- Compensation and assistance for site clearance
- Preparation of contractor's facilities
- Transport of materials to site for construction of the towers
- Providing access to the tower bases.
- Excavation of tower bases by machinery and construction of tower
- foundations
- Erection of towers and fitting tower equipment.
- Pulling the conductors, tensioning with winches and attaching to the
- insulators.
- Testing and energizing the transmission line.

29. Apart from noise none of the machinery will produce excessive and damaging vibration. Machinery that will have environmental consequences includes the use of a bulldozer though it is probable that an excavator will also be used to excavate the tower foundations and to form access roads as required.

30. Materials that will be used on the project includes: cement, aggregate and steel for tower foundations, steel framework for the tower, insulators and conductors. Construction forms are combined manual with machines. The project will use 5 building teams composed of 330 people, and the project is expected to be completed in the first quarter 2016. Profiles of 220 kV towers and foundations are shown in Figure 2.

Figure 2. Profile of 220 kV suspension tower and foundation





5. Associated facilities

31. The new 220 kV transmission line will connect two existing 220 kV Tay Ninh and 220 kV Binh Long substations which makes the substations associated facilities of the transmission line[8]. To protect the associated facilities from the new transmission line, and the transmission line from the ongoing operations of the substations an Environmental Compliance Audit (ECA) was prepared for the Binh Long substation pursuant to the requirements of the SPS (2009). The purpose of the ECA is to show that the operation of the existing substations comply with national regulations and guidelines for 220 kV substations.

32. Because the Tay Ninh substation is still under construction the Environment Compliance Certificate (ECC) and the content of the ECC that was filed for the new substation will take the place of the ECA. The ECA and ECC for the substations are located in Appendix E.

IV. DESCRIPTION OF THE ENVIRONMENT

A. Physical Environment

1. Climate

33. The subproject area is situated in the Southern Climate Zone which is typified by a tropical monsoon climate characterized by high temperature and high humidity. Annually the climate is divided into two seasons defined by: (i) rainy season from May to November; and (ii) dry season extending typically from December to April. Local weather is strongly influenced by the northeast monsoon rainfall, temperature, and low humidity. From the Statistical Yearbook 2013 of Binh Phuoc province the characteristics of the major weather variables are summarized below and in Tables 7-9.

a. Temperature

34. The average lowest (December) and highest (April) temperatures recorded are approximately 13 - 14^{o}C and 40 - 43^{0}C. Annual average temperature is 25 - 27^{o}C.

Table 7. Monthly air temperature (^{o}C) characteristic from 2008-2012

Month	1	2	3	4	5	6	7	8	9	10	11	12	Year
Tay Ninh station													
$T^{o}_{average}$	25.6	26.6	27.9	28.8	28.3	27.4	27.0	27.0	26.7	26.4	26.0	25.2	**26.9**
T^{o}_{kk} max	36.2	36.4	38.5	39.9	39.0	37.6	37.3	35.2	35.6	34.0	34.3	34.8	**39.9**
T^{o}_{kk} min	15.3	17.9	16.8	21.4	21.9	19.3	20.8	21.2	20.3	18.5	16.9	13.9	**13.9**
Phuoc Long station													
T^{o}_{kk} Average	24.1	25.3	26.9	27.5	27.0	26.0	25.5	25.3	25.2	25.0	24.7	23.7	**25.5**
T^{o}_{kk} max	35.4	38.0	38.4	38.5	38.0	43.4	34.9	36.0	34.3	36.0	34.7	35.2	**43.4**

[8] Associated facilities defined by Appendix 1 of SPS (2009)

Month	1	2	3	4	5	6	7	8	9	10	11	12	Year
$T^{o}_{kk}min$	13.0	14.6	15.0	15.0	19.8	17.1	15.4	19.9	19.9	16.5	13.2	13.0	**13.0**

Source: Meteorological stations: Binh Phuoc and Tay Ninh

b. Humidity

35. Average relative humidity of the region is 78% with the highest humidity occurring during the rainy season (May - November). The lack of evaporation during the dry season results in the lowest humidity levels (December - April).

c. Rainfall

36. The largest rainfalls commonly occur in September - October; with lowest rainfall from January to March. Rainfall in the rainy season accounts for about up 87% to 90% of annual rainfall. The total annual average rainfall is 1967mm (Tay Ninh Province). Average number of rainy days a year is 161 days.

Table 8. Annual humidity (%) characteristic, from 2008-2012

Month	1	2	3	4	5	6	7	8	9	10	11	12	Year
Tay Ninh station													
Average relative Humidity	70.5	70.8	70.2	73.2	79.7	83.5	84.1	84.5	85.9	85.0	79.4	72.8	78.3
Average minimum humidity	45.8	45.3	43.8	47.8	55.7	62.1	63.6	64.5	66.5	64.5	58.2	51.1	55.8
Phuoc Long station													
Average relative Humidity	71.3	69.1	69.5	73.6	81.4	85.3	87.3	88.8	88.7	86.8	80.4	74.8	79.8
Average minimum humidity	47.8	47.0	46.2	51.3	60.0	69.0	71.4	73.3	71.9	67.9	59.3	53.0	59.8

Source: Meteorological stations of Binh Phuoc and Tay Ninh

Table 9. Daily and monthly rainfall (mm) characteristics, from 2008-2012

Month	1	2	3	4	5	6	7	8	9	10	11	12	Year
Tay Ninh station													
Average rainfall	13	11	24	104	203	265	257	234	353	317	139	48	**1.967**
Maximum daily rainfall	60	57	80	119	156	149	119	114	169	145	186	140	**186**
Average number of rainy days	1.7	1.6	2.8	7.4	16.0	20.5	21.8	21.6	23.6	21.9	11.6	3.8	**154.4**
Phuoc Long station													

Month	1	2	3	4	5	6	7	8	9	10	11	12	Year
Average rainfall	14	16	41	121	290	382	401	462	468	322	119	31	**2.665**
Maximum daily rainfall	59	45	66	98	148	230	167	173	242	153	114	58	**242**
Average number of rainy days	2.0	1.7	4.7	10.8	18.9	21.6	23.8	24.5	24.2	20.9	10.4	3.9	**167.3**

2. Air quality

37. Air quality in the project area (Table 10) was evaluated and reported in the EIA report by Sac Ky Hai Dang Science Technology Services Joint Stock Company in September 2014. The selected sample locations will be affected by construction activities. The analysis results are shown in the table below:

Table 10. Ambient air quality in the subproject area

Location	Noise (dBA)	The concentrations of pollutants (mg/m^3)			
		Dust	SO_2	NO_x	CO
K1	57.3	0.056	0.079	0.068	4.81
K2	62.5	0.054	0.066	0.057	3.32
K3	60.5	0.069	0.084	0.076	4.11
K4	61.0	0.014	0.097	0.082	5.91
K5	59.8	0.028	0.116	0.094	7.42
QCVN 05:2013/BTNMT	**-**	**0.3**	**0.35**	**0.2**	**30**
QCVN 26:2010/BTNMT	**≤70**	**-**	**-**	**-**	**-**

Source: Services Science and Technology Sac Ky Hai Dang JSC, *09/2014*

Notes:

K1: At area of connection line into 220 kV Binh Long substation. Coordinates X = 1297537.012; Y = 536570.857

K2: At area where the line goes through the Tan Thanh commune, Tan Chau District, Tay Ninh. Coordinates X = 1274821.271; Y = 584640.463

K3: At area where the line goes through the Suoi Day commune, Tan Chau District, Tay Ninh Province. Coordinates X = 1271850.874; Y = 579320.654

K4: At area where the line goes through the Suoi Da commune, Dương Minh Châu district, t Tây Ninh Province. Coordinates X = 1258722.815; Y = 576136.968

K5: At area of connection line into 220 kV Tay Ninh substation. Coordinates X = 1254886.150; Y = 571166.053

38. The air quality results show that air quality in the subproject is good. The concentration of pollutants, noise and dust is below permissible standard of QCVN 05:2013/BTNMT, QCVN 26:2010/BTNMT.

3. Topography, Geology and Soils

39. The 220 kV transmission line aligns through low and flat terrain area with little elevation change. The alignment area is separated by many rivers and streams. The terrain and river crossings are commonly in erosion zones in rainy season. The ROW of the line passes through 3 main soil types:

- Ferral soil: Accounts for 60% of the length of the line with neutral pH, high aluminum and iron contents but low organic humus content. The soil is not suitable for rice and vegetable planting but appropriate for growing crops and trees such as pine, acacia, eucalyptus and fruit trees.

- Marshy soil: Occupies a small area, medium acidity (pH <6), high humus and organic matter content, it is suitable for rice cultivation mainly distributed in the line sections along the river.

- Acidic gley, gray soil: with low acidity (pH from 5.5 to 6.5), high humus and organic matter content, it is suitable for rice, vegetables and crops cultivation.

4. Water resources

40. The transmission line crosses the Can Le River, lower Saigon River, and the northern tip of Dau Tieng Reservoir. It also crosses many small and medium streams. Section G1 - G4 of the line (Figure 1, Table 5) crosses Le Can River (2 times) with an average width of 25m. Sections G6 - G7 cross Sai Gon River with an average width of about 50 meters. Low flow period of the rivers is from December to May. The upstream Sai Gon River flows to Dau Tieng Reservoir.

41. The 270 km^2 Dau Tieng reservoir stores 1.6 billion m^3 of water and is contiguous with the 3 provinces of Tay Ninh, Binh Phuoc and Binh Duong with the greatest area in Tay Ninh province. The catchment area of damsite is 2,700 km^2. The lake provides water for irrigation, industrial and domestic activities for Tay Ninh, Binh Duong provinces and part of the northern area of Ho Chi Minh City. The transmission line crosses Dau Tieng reservoir between sections G14 and G15 where the reservoir is 1.2 km wide at a height of 27m.

a. Water quality

42. Water quality in the project area (Table 11) was obtained for the EIA conducted by Sac Ky Hai Dang Science Technology Services Joint Stock Company in January 2014. The representative sampling locations are in rivers, lakes, ponds, canals in the subproject area,

Table 11. Analysis results of the surface water quality baseline in the project

Properties	pH	TSS	COD	BOD_5	Total N	Total P	Coliform
Unit	-	mg/l	mg/l	mg/l	mg/l	mg/l	MPN/100ml
N1	7.18	12	9	4	2.94	0.15	2,230
N2	7.34	14	12	6	2.35	**0.24**	2,760
N3	7.44	**44**	13	**7**	2.12	**0.21**	2,100
N4	7.38	**38**	12	**8**	2.84	**0.22**	3,400
N5	6.47	**32**	12	5	2.51	0.16	2,200
QCVN 08:2008/BTNMT, column A2	**6-8.5**	**30**	**15**	**6**	**5**	**0.2**	**5,000**

Source: Services Science and Technology Sac Ky Hai Dang JSC, 09/2014

Notes:

N1: Surface water sample in Can Le River. Coordinates X = 1297381.605; Y = 532416.714

N2: Surface water sample in Sai Gon River. Coordinates X = 1284184.176; Y = 602286.692

N3: Surface wate sample at Suoi Ngo commune, Tan Chau district, Tay Ninh Province. Coordinates X = 1279379.784; Y = 589605.468

N4: Surface water sample in Dau Tieng lake. Coordinates X = 1271850.874; Y = 579320.654

N5: Surface water sample Tan Hung canal. Coordinates X = 1262062.869; Y = 576206.873

43. The majority of the indicators are below allowable limits of QCVN 08:2008/BTNMT at column B1. However, some indicators (TSS, total P, and BOD_5) are higher than allowable limits of QCVN 08:2008/BTNMT. Surface water in the survey area is used by local people for domestic purposes. Therefore, surface waters at the subproject area show signs of pollution.

B. Biological Environment

1. Vegetation and Land Use

44. Vegetation and affected land use along the TL are shown in Table 12. Mainly industrial crops with high value such as rubber, cashew, coffee, pepper; some annual crops such as corn, wheat, and beans exist along ROW of transmission line. The feasibility stage transmission line crosses some conservation forest (Figure 3) which is allocated for water conservation. During detail design the alignment will be moved south to avoid the forest.

Table 12. Vegetation and land use within ROW of transmission line

District/commune	Affected land (m^2)							
	Residential	Rubber	Cashew	Pepper	Fruit trees	Crops	Woods	Total
BINH PHUOC PR.								
BInh Long Dis.								
Thanh Luong	1,350	103,576	3,344	-	38,256	5,868	-	151,044
Loc Ninh Dis.								
Loc Thinh	900	51,493	8,035	4,148	5,969	13,351	-	82,996
Hon Quan Dis.								
An Phu	100	135,432	2,666	-	-	-	-	138,098
Minh Tam	300	39,362	-	7200	8,096	-	-	54,658
TAY NINH PR.								
Tan Chau Dis.								
Tan Hoa	50	55,911	18,623	-	-	39,380	17,773	131,687
Suoi Ngo	520	250,677	-	-	-	49,049	-	299,726
Tan Thanh	2,520	110,476	-	-	-	37,789	1,628	149,893
Suoi Day	1,500	141,784	-	-	-	44,697	-	186,481
Tan Hung	100	26,648	-	-	37,820	10,764	-	75,232

District/commune	Affected land (m^2)							
	Residential	Rubber	Cashew	Pepper	Fruit trees	Crops	Woods	Total
Minh Chau Dis.								
Suoi Da	250	56,465	-	-	18,772	46,108	-	121,345
Phan	450	69,320	-	-	6,097	25,708	-	101,125
Bau Nang	100	19,621	-	-	-	-	-	19,621
Minh Chau Dis.								
Ninh Thạnh	95	32,527	-	-	5,767	-	-	38,294
TOTAL	**8,235**	**1,093,292**	**32,668**	**11,348**	**120,777**	**272,714**	**19,401**	**1,558,435**

Source: IOL of RP by PECC3, April 2015

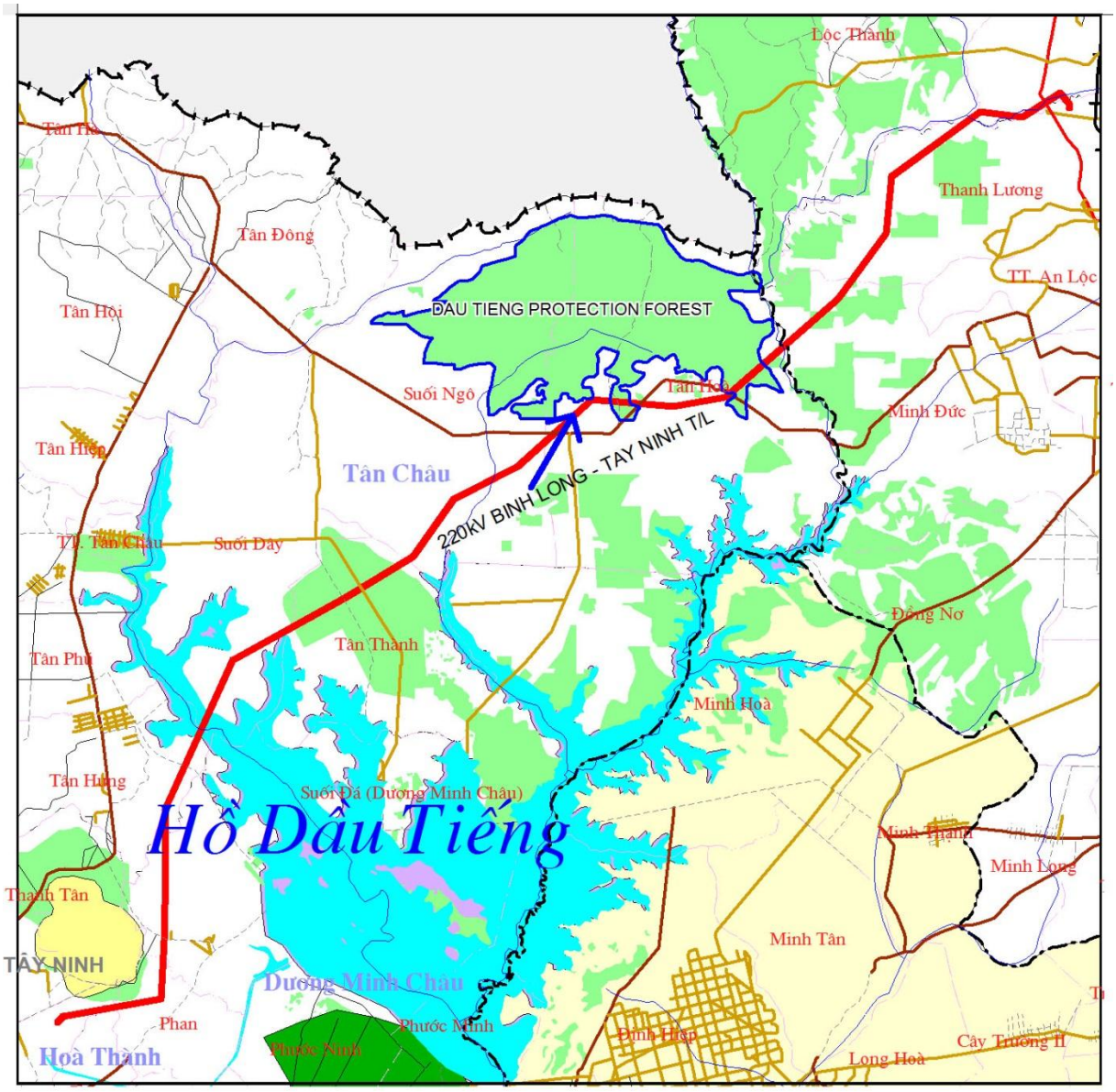
45. Vegetation and land use to be acquired at tower foundation positions are shown in Table 13.

Table 13. Vegetation and land use at tower foundations of transmission line

District/ commune	Affected land (m^2)						
	Rubber	**Cashew**	**Pepper**	**Fruit trees**	**Crops**	**Woods**	**Total**
BINH PHUOC							
BInh Long Dis.							
Thanh Luong	2,595	-	-	1,038	173	-	3,806
Loc Ninh Dis.							
Loc Thinh	1,038	173	173	173	346	-	1,903
Hon Quan Dis.							
An Phu	3,460	-	-	-	-	-	3,460
Minh Tam	1,038	-	-	346	-	-	1,384
TAY NINH							
Tan Chau Dis.							
Tan Hoa	2,768	865	-	-	1,903	865	6,401
Suoi Ngo	4,337	-	-	-	865	-	5,202
Tan Thanh	2,768	-	-	-	865	-	3,633
Suoi Day	2,422	-	-	-	865	-	3,287
Tan Hung	1,038	-	-	1,384	346	-	2,768
Minh Chau Dis.							
Suoi Da	1,211	-	-	346	1,038	-	2,595
Phan	1,730	-	-	173	692	-	2,595
Bau Nang	519	-	-	-	-	-	519
Minh Chau Dis.							
Ninh Thạnh	1,038	-	-	173	-	-	1,211
TOTAL	**25,962**	**1,038**	**173**	**3,633**	**7,093**	**865**	**38,764**

Source: IOl of RP by PECC3, April 2015

Figure 3. The transmission line crossing some water conservation forest



46. In general the transmission line traverse gradually sloping terrain where vegetation is mainly perennial crops such as rubber tree *Hevea Brasiliensis*, coffee *Rubiaceae*, Coffee tree *Anacardium occidentale L*, Pepper tree *Piperaceae*, Melaleuca trees *Acacia Acacia auriculiformis A.Cunn*, fruit trees such as jackfruit *Moraceae*, durian *Durio zibethinus*, vegetables.

2. Wildlife

47. The baseline indicated that no rare and endangered terrestrial and underwater species from Vietnam's Red Book are in the affected area. Terrestrial fauna in the subproject area are mainly domestic animal in the family. The numbers of poultry such as chickens, and ducks, cattle, pigs is large. Birdlife International does not identify any bird migration routes through Vietnam. The Asian Flyway does not pass through Vietnam and instead heads south through the Philippines. There are no any reports of bird strikes on majority of transmission lines.

3. Conservation Areas

48. The closest project protected area is the Lo Go - Xa Mat National Park which is 35 km west of the Tay Ninh substation. The park will not be affected by the construction or operation of the 220 kV transmission line

C. Socioeconomic condition

1. Population

49. The transmission line crosses 13 communes/ward in 6 districts/ town/ city in 2 provinces of Binh Phuoc, Tay Ninh. The population within the project area is 128,973 with an average population density is 138 persons /km^2. Population statistics for the subproject communes are shown in Table 14.

Table 14. Population distribution in the project area

Province	District	Commune/ward	Area (ha)	Total population (Person)	population density (person/km^2)
Binh Phuoc	Binh Long	Thanh Luong	6,965	11,756	169
	Loc Ninh	Loc Thinh	7,857	4,057	52
	Hon Quan	An Phu	4,137	5,829	141
		Minh Tam	7,369	5,132	70
Tay Ninh	Tan Chau	Tan Hoa	17,708	3,010	17
		Suoi Ngo	15,770	8,705	55
		Tan Thanh	6,580	11,080	168
		Suoi Day	11,410	9,340	82
		Tan Hung	5,883	12,583	214
	Dương Minh Chau	Suoi Đa	3,940	17,740	450
		Phan	2,405	11,950	496
		Bau Nang	1,837	14,455	787
	Tay Ninh	Ninh Thạnh	1,490	13,336	895
	Total		93.3	128,973	138

Source: Social and Economic Report 2013 of the communes in the project area

50. Among AHs available ethnic minority group, the group accounts for 7.1%, while the remaining 92.9% is Kinh group (Table 15).

Table 15. Ethnic composition of AHs

Commune/ward	Number						Total
	Kinh	Stieng	Khmer	Chăm	Tà Mun	China	
Thanh Luong	15						15
Loc Thinh	14						14

Commune/ward	Number						Total
	Kinh	Stieng	Khmer	Chăm	Tà Mun	China	
An Phu	12						12
Minh Tam	12	9					21
Tan Hoa	8		9				17
Suoi Ngo	16						16
Tan Thanh	26						26
Suoi Day	27			1			28
Tan Hung	43						43
Suoi Đa	22						22
Phan	16						16
Bau Nang	9						9
Ninh Thạnh	25						25
Total	**245**	**9**	**9**	**1**			**264**

Source: IOL of RP by PECC3, in April 2015

2. Social Infrastructure

a. Public Health.

51. The AHs have access to health services in communes (Table 16). The commune health centers in the affected areas meet local needs for the affected people to diagnose and treat common illnesses such as flu (68%), and respiratory diseases (20%).

Table 16. Indicators of health facilities of project communes

No.	Communes	Quantity			Total number of people requiring health care
		Medical aid station	Doctor	Medico	
	Binh Phuoc Province				
1	Thanh Luong	1	1	4	10,050
2	Loc Thinh	1	2	2	2,800
3	An Phu	1	1	4	4,700
4	Minh Tan	1	1	4	3,285.
	Tay Ninh Province				
5	Suoi Ngo	1	1	4	9,827
6	Tan Hung	1	1	2	892
7	Tan Thanh	1	0	4	9,720
8	Tan Hoa	1	1	3	11,200
9	Suoi Day	1	0	8	8,372
19	Suoi Da	1	1	4	9,810

No.	Communes	Quantity			Total number of people requiring health care
		Medical aid station	Doctor	Medico	
11	Phan	1	1	2	630
12	Bau Nang	1	1	6	15,966
13	Ninh Thanh	1	1	4	12,500

Source: IOL of RP by PECC3, in April 2015

52. Education is one of the priority sectors being carried out by the GOV in pursuing the country's development. All communes affected by the subproject have kindergarten, primary schools, secondary schools with facilities that are relatively better, and meet real requirement of local students.

3. Material facilities of the affected households

53. 100% of households use clean water. Drinking water is primarily from wells and piped water. There are 77 out of 264 households of communes (Thanh Luong, Tan Hung, Suoi Ngo, Tan Thanh, Ninh Thanh) using water from clean water system of localities. 90% of households affected using National Power Grid to serve lighting activities and 60% using National Power Grid to serve cooking activities.

4. Local Economy

54. The economy of the districts in the subproject area is primarily agriculture based. Recently there has been a limited diversification into other industries such as service and tourism industries. Industrial production is limited. Agriculture is the main labour source, and apart from providing food, selling produce from agriculture also generates small income for households through local markets. Rubber, cashew, and pepper are the main income source in the area.

5. Communications

55. Infrastructure for transport, communications, and electricity are being constantly improved to raise people's standard of living, and improve their access to services. The road network is reasonably well developed throughout the project area with several major highways including National Highway 13, provincial roads 794 and 784. The majority of the roads to the central communes have now been upgraded to concrete and asphalt though some communes and village roads still remain unpaved which creates problems for access to markets and services for these communes.

6. Cultural and Heritage Sites

56. There are no historical relics, cultural and religious or architectural monuments of local people in the project area.

7. UXO (unexploded ordnance)

57. UXO is a significant issue in Vietnam after decades of war. Therefore, it is necessary to conduct mine clearance in the subproject area before the project construction commencement. It is a legal requirement prior to construction to clear UXO by specialized army units to ensure the safety of construction workers[9].

[9] Details of landmine clearance are presented in the Circular 146/2007/TT-BQP by Ministry of Defense dated September 11 2007 guiding UXO clearance for project construction.

D. Project affected people

1. Permanent land loss

58. Local people will be affected by loss of land and loss of assets within the ROW (Table 17). All households affected permanently or temporarily will be compensated according to the Resettlement Plan established by PECC3 in April 2015. The permanent loss of land is estimated 38.7 ha for tower foundations. This land will be acquired by NPT and will affect 173 households.

Table 17. Households affected in the tower foundations

District/ commune	Number of AHs						
	Rubber	Cashew	Pepper	Fruit trees	Crop land	Shrub	Total
BINH PHUOC							
BInh Long							
Thanh Luong	15			4	1		15
Loc Ninh							
Loc Thinh	10	1	1	1	2		10
Hon Quan							
An Phu	12						12
Minh Tam	8			2			8
TAY NINH							
Tan Chau							
Tan Hoa	17	2			5	2	17
Suoi Ngo	16				3		16
Tan Thanh	20				5		20
Suoi Daây	19				5		19
Tan Hung	16			8	2		16
Minh Chau							
Suoi Da	16			2	6		16
Phan	14			1	4		14
Bau Nang	3						3
Minh Chau							
Ninh Thạnh	7			1			7
TOTAL	**173**	**3**	**1**	**19**	**33**	**2**	**173**

Source: IOL of RP by PECC3, in April 2015

2. Temporary land loss

59. The extent of temporary losses of land along the ROW during construction of the transmission line is estimated at 155.8 ha. Landholders will be compensated during conductor stringing when vehicle required along the ROW will damage crops and trees.

During the operation, farmers will be able to grow and cultivate crops under the ROW provided these do not intrude into the 3m safety height envelope. Details of the households affected by the project are shown in Table 18.

Table 18. Number AHs in ROW of the transmission line

District/ commune	Number of AHs by							
	Residential land	Rubber	Cashew	Pepper	Fruit trees	Crops land	Wood land	Total
BINH PHUOC								
BInh Long								
Thanh Luong	7	15	5	-	8	2	-	15
Loc Ninh								
Loc Thinh	6	14	4	2	3	5	-	14
Hon Quan								
An Phu	2	12	2	-	-	-	-	12
Minh Tam	1	21	-	4	6	-	-	21
TAY NINH								
Tan Chau								
Tan Hoa	1	17	10	-	-	15	9	17
Suoi Ngo	2	16	-	-	-	12	-	16
Tan Thanh	11	26	-	-	-	12	-	26
Suoi Daây	5	28	-	-	-	22	-	28
Tan Hung	1	22	-	-	43	12	-	43
Minh Chau								
Suoi Da	2	22	-	-	18	20	-	22
Phan	3	16	-	-	4	9	-	16
Bau Nang	1	9	-	-	-	-	-	9
Minh Chau								
Ninh Thạnh		25	-	-	4	-	-	25
TOTAL	**42**	**243**	**21**	**6**	**86**	**109**	**9**	**264**

Source: IOL of RP by PECC3, in April 2015

3. Affected houses

60. The ROW will not require removal of any houses. However, there are 48 households that will be affected who have houses or structures located within or beside the ROW. The houses are recorded in the census that their architecture is level 4.(Table 19).

Table 19. Affected house/ structures by project

District/commune	Area and housing type affected		Structures	Total AHs
	Area (m^2)	HHs		
BINH PHUOC				

BInh Long				
Thanh Luong	785.5	7		7
Loc Ninh				
Loc Thinh	683.5	6		6
Hon Quan				
An Phu	70	2		2
Minh Tam	288	1		1
TAY NINH				
Tan Chau				
Tan Hoa	24.5	1		1
Suoi Ngo	320	2	2	4
Tan Thanh	1,368.8	11	1	12
Suoi Daây	710	5		5
Tan Hung	55	1		1
Minh Chau				
Suoi Da	110	2		2
Phan	211.5	3	2	5
Bau Nang	78	1	1	2
Minh Chau				
Ninh Thạnh	0	0		0
TOTAL	**4,704.8**	**42**	**6**	**48**

Source: IOL of RP by PECC3, in April 2015

The primary occupation of AHs is agricultural production in rubber, pepper, cashew, rice, cassava, corn (Table 20). The secondary occupation of the heads of AHs reveal that they are growing livestock in their backyards as a secondary source of income. Only the 2 out of/264 AHs have secondary small businesses.

Table 20. Income source of household

Income of household from	HHs	Rate (%) of total number of surveyed households	Note
Livestock	263	99.6	
Cultivation	261	98	
handicraft			
Employee			
Services and trade	2	0.07	
Fishing			
Forest exploitation			
official	1	0.03	

Source: IOL of RP by PECC3, in April 2015

Figure 4. Features of 220 kV Binh Long – Tay Ninh Transmission Line

	Fig. 4a: 220 kV Binh Long substation.
	Fig. 4b: Point where TL will cross highway 14.

	Fig. 4c: Mixed agri-forestry ROW of TL
	Fig. 4d: 220 kV Tay Ninh substation under construction

V. INFORMATION DISCLOSURE AND PUBLIC CONSULTATION

A. Information disclosure

61. The formal disclosure on the Binh Long - Tay Ninh 220 kV transmission line to affected persons (AP) and stakeholders that occurred during the public consultations on the subproject is meant to form the beginning of continued information disclosure and stakeholder involvement as the subproject is implemented. As part of the stakeholder,

communication strategy regular information exchange meetings with stakeholders are strongly encouraged throughout implementation of the subproject.

62. The completed IEE must be easily available to contacted stakeholders in written and verbal forms in the local language. At a minimum, the Executive Summary of the IEE should be translated to local language and distributed to all APs. The IEE should be available on the CPPMB website, at the CPPMB offices, and at the subproject sites. Similarly, all subproject reporting with specific reference to stakeholder consultation minutes, environmental monitoring, and reports on EMP implementation released by the EA/IA should be available at the same offices and websites. The IEE will be available on the ADB website as well as EMP reporting that is prepared by the EA/IA after implementation begins.

B. Public Consultation

63. Stakeholder consultations were developed to meet the requirements of meaningful consultation as stipulated by the SPS (2009). The strategy included the principles of meaningful engagement, transparency, participation, and inclusiveness to ensure that affected and marginalized groups such as women, and the poor, were given equal opportunities to participate in the design of the subproject.

1. Identification of Stakeholders

64. Stakeholders were identified and engaged in a participatory manner. Stakeholder communication focused on institutional stakeholders, affected communities, and persons directly affected by proposed subproject interventions. The stakeholders of the subproject included:

1. Affected households and businesses living along the transmission line and near the substation site who may be directly and/or adversely affected, and who have an interest in the identification and implementation of measures to avoid or minimize negative impacts;

2. Mass organizations such as Womens Union, and Farmers Union which provided information for the design of the various subproject interventions, and which might participate in implementation of measures and interventions;
3. Institutional stakeholders such as: (ii) Commune leaders (ii) National Consultant; (iii) Project EA, (iv) Environmental and social consultant; and (v) PECC3; and
4. Other institutions or individuals with a vested interest in the outcomes and/or impacts of the subproject.

2. Public consultation meeting

65. Formal community consultation meetings were held to discuss the location and impact of the transmission line and substations for both environmental and social aspects. Public consultations were 13 commune/wards in 6 Districts/ town/city of the 2 provinces from 26 March 2015 to 8 April 2015.

66. The public meeting follows three component procedures:

1. The engineering consultant introduced the subproject including the substation location, and alignment of connection line;
2. The environmental consultant presented ADB's environmental policy, safety regulations in the Viet Nam power sector, anticipated environmental impacts and respective mitigation measures (to be developed in IEE), the grievance redress mechanism for environmental and resettlement problems; and

3. The social/resettlement consultants presented ADB's resettlement plan; impacts due to the acquisition of land and properties; policies of GOV and local authorities, the Project's policies in compensation for loss as the state acquired land and properties on land; and Potential impacts due to land acquisition/resettlement.

67. During the meeting people identified their questions and comments on the environmental issues. Consultants answered and explained all questions to the participants. The majority of the concerns that were raised were related to compensation of lost land and crops. The total number of people/groups consulted was 43 (Appendix B).

3. Results of Public consultations

68. The comments and questions of local authorities and people, and the response of subproject owners and national consultant are summarized in Table 21. The main concerns of the subproject are as follows:

1. The project owner and contractor are requested to implement strictly environmental protection measures during the construction stage of the subproject to avoid negative effects on life and livelihoods of the local community.
2. The project owner and contractor are requested to use specific construction methods to prevent/minimize noise during construction stage.
3. The project owner and contractor are requested that waste water, waste, noise, dust will not affect people's life.
4. The project owner is requested for detailed explanation of operation of transmission line to avoid affecting to local people health and safety.

Table 21. Summary of public concerns and response by project

Location and time	Comments/questions[7]	Response of project owners and environmental consultants	Project Response[8]
Tan Hoa commune, Tan Chau District, Tay Ninh Province 3/4/2015	Have measures to overcome the problem such as tower breakage?	TL design will follow regulations, and be approved by functional units.	Design of towers fully meets requirements for load and wind stress
	Will subproject in operation affect production and life of local people or not?	Aside from restricted use of land area within ROW, operation of project will not have any affect to production and life of the local people;	Construction of the towers and stringing of cable will b scheduled to minimize disturbance to local people
Bau Nang commune, Tay Ninh city, Tay Ninh Province 26/3/2015	When transporting materials loads need to be covered carefully to avoid spillage on roads.	The Project Owner will commit to implement fully impact mitigation measures to environment implementing the project.	The EMP prescribes specific mitigation sub-plans to manage common types of construction disturbance such as vehicle traffic and mandatory covered vehicle loads. As indicated above the selected alignment of line and construction schedule has been chosen to prevent harm to people and damage to houses. All unavoidable impacts will be compensated.
	Restrict construction so as not to affect local people, and damage houses.		
Phan commune Duong Minh Chau District Tay Ninh Province 7/4/2015	When in operation will new house construction under ROW be allowed?	House and structures will be allowed under ROW but owners must consult power unit and local authorities to ensure safety and operation of the transmission line.	The CPPMB will prescribe allowable activities under and near the TL according to law and regulations for safety

[7] Questions, issues raised during public consultation meetings recorded in table as received
[8] Issues addressed by EMP

Location and time	Comments/questions[7]	Response of project owners and environmental consultants	Project Response[8]
Tan Hung commune, Tan Chau District Tay Ninh Province 07/04/2015	Will effects on buildings, structures such as antenna, and communication towers be managed?	During survey and design the Project Owner and Consulting unit have agreed to impose reasonable economic and technical restrictions	The management of these features of the TL and other similar assets of community will be conducted fairly by CPPMB
	Excess soil volume at pillar foundation sites must be managed to prevent erosion	Construction unit will transfer exceed soil to disposal site at locality (the disposal site will be agreed with local authorities)	The EMP prescribes a specific mitigation sub-plan to prevent or contain excavated and loose soil erosion
Suoi Ngo commune, Tan Chau District, Tay Ninh Province 01/04/2015	Transportation of materials during construction will generate dust and can cause damages for roads system. The Project Owner is suggested to implement strictly mitigation measures as committed.	The Project Owner and contractor will apply pollution mitigation measures as promised and will repair roads if damaged due to material transport for the project construction.	The EMP prescribes a mitigation sub-plan for managing dust at construction sites and along all roads. Regular use of wetting agents is primary mitigation.
Ninh Thạnh ward Tay Ninh city Tay Ninh Province 02/04/2015	Information disclosure as soon as possible about the project to local authorities and residents.	The Project Owner will provide information of the project to local people so they can understand the project.	The IEE/EMP prescribes an explicit information Disclosure and Consultation Plan for affected community which is initiated during pre-construction phase.
Minh Tan commune, Hon Quan District, Binh Phuoc Province 31/03/2015	Whether safety is ensured when living under the transmission line?	Under the provisions of Decree No. 14/2014/NĐ-CP, the house and structure are allowed to exist in ROW of TL with a voltage of 220 kV or lower. Power unit is responsible in managing and operating the project and will guide and support technically and financially to implement safe measures as prescribed.	As dictated by the law and policy directives identified by Project Owner
	Whether construction will negatively affect property, tree and crops?	During construction stage could affect some land area of local people. Contractor work and deal with local people about compensation	The design and location of the transmission line along with the mitigation plan of EMP together loss and negative

Location and time	Comments/questions[7]	Response of project owners and environmental consultants	Project Response[8]
		activities before implementing the project.	effects on property, crops, and trees
An Phu commune, Hon Quan District Binh Phuoc Province 8/04/2015	During construction protect local roads	During construction stage if contractor damages local roads, the local roads will be repaired	The EMP prescribes specific mitigation measures to protect and restore damaged roads and fields from construction works.
Suoi Da commune, Duong Minh Chau District Tay Ninh Province 27/03/2015	Whether construction will negatively affect property, tree and crops?	Construction process will affect trees and crops at locations of temporary road, stockpile. Contractor will work and an agree with local people about compensation before implementing the project.	As above
	In ROW what trees will be planted?	Construction unit will agreements with people to lease land for the transport process.	The EMP prescribes replanting of like-for like trees for those lost
Thanh Luong commune, Binh Long town Binh Phuoc Province 08/04/2015	Will operating transmission line negatively affect health of the local people?	The project is designed under existing regulations and norms of the State. The transmission line alternative has been selected to avoid at maximum level cut through dense populated area, etc. Therefore, will not affect health of local people.	The design of the TL follows national and international code and guidelines for construction of high tension TLs. These directives protect people.
	During the construction will temporary roads, and material yard be used?	During construction stage temporary roads and material yard will be used. The Project Owner, and contractor will work directly with affected people to have consensus and will compensate satisfactorily for affected people before constructing.	As above

Location and time	Comments/questions[7]	Response of project owners and environmental consultants	Project Response[8]
Tan Thanh commune, Tan Chau District Tay Ninh Province 27/03/2015	Transportation of materials during construction will generate dust and can cause damages for roads system. The Project Owner is suggested to implement strictly mitigation measures as committed.	The Project Owner and contractor will apply pollution mitigation measures as promised, and will repair roads if damaged due to material transport for the project construction	As above specific mitigation measures for dust control prescribed by EMP during construction
	Transmission line section is designed to avoid maximum affecting to local people.	The Project Owner and consulting unit has survey and selected the transmission line alternative to affect to local people will be minimal. However, through comments from resident, the Project Owner and consulting unit will review and give feedback to local people through local authorities.	Yes, see above
Suoi Day commune, Tan Chau District Tay Ninh Province 26/03/2015	It is suggested to strictly comply with mitigation measures to protect environment.	The Project Owner will fully implement mitigation measures as committed;	The IEE and EMP together prevent or minimize negative impacts of the TL on the environment
	Satisfactory compensation and support for affected people.	Compensation and support will be implemented satisfactorily as regulation.	Yes, compensation will be applied. See RP and REMDP
Loc Thinh commune, Loc Ninh District Tay Ninh Province 26/03/2015	Ensuring electromagnetic field (EMF) from transmission line will not affect health of local people it will be implemented by how way?	The specific provisions on electromagnetic field intensity in Decree No.14/2014/NĐ-CP will be implemented strictly in the design and operation of the Project;	The ROW for the TL follows international guidelines and code to keep exposure to EMF at low levels. However, a recent extensive review of health effects of EMF by WHO indicates health effects of EMF are inconclusive. See Appendix F

VI. POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION

69. The assessment of potential impacts of the subproject is structured by the three development phases of the subproject defined by: *pre-construction*, *construction*, and *post-construction operational phase.* The structure is carried forward to the environmental management plan for the subproject (see section IX).

A. Subproject Benefits

70. The single comprehensive benefit of the subproject is the provision of needed electrical power to the provinces of Binh Phuoc, Tay Ninh, and Binh Duong to support the urban, commercial, and industrial development. Electricity will also become more reliable reducing power outages or brownouts that in the area.

B. Pre-construction Phase

71. Negative impacts associated with the pre-construction phase of the subproject concern land acquisition and compensation. Land acquisition will involve the loss of perennial crop land for rubber, cashew, and pepper, and annual crop land for rice. Forty eight houses will be affected, but none removed from the ROW of the line. The details of the land losses and compensation are found in the Land Acquisition and Resettlement Plan (RP) which has been prepared separately.

Updating Environmental Management Plans

72. The subproject EMP will need to be reviewed during the pre-construction phase to ensure that the EMP fully addresses the potential impacts of the final detailed design of the 220 kV transmission line. This will involve finalization of the Mitigation and Monitoring Plans of the EMP that will manage and measure potential impact areas such as erosion, noise, dust and air quality, construction waste and spoil disposal, construction traffic, and worker and public safety at the subproject sites.

73. During the pre-construction phase the government will have to review the potential of UXO at the substation site and along the two connector lines. The review must be done before any excavation work begins. The EMP will be used by the contractors to prepare their contractor environmental management plans (CEMP).

74. The key impact management measures to be implemented during the pre-construction phase are:

- Initiation of land acquisition and compensation for affected households;
- Screen 72.6 km of transmission line ROW for presence of UXO
- Completion of detailed designs of the subproject; and
- Updating and initiation of the subproject EMP.

C. Construction Phase

75. The environmental impacts of the subproject are associated primarily with the construction phase of the transmission line. In addition to agriculture lands for plantation rubber and acacia, cashew nut, pepper, and annual crops such as rice Table 4 and Figure 1 show the ROW of the transmission line will also cross roads, some telephone lines, streams, rivers, ponds, and the northern reach of the large Dua Tieng reservoir. However, the alignment of the line is not near a national protected area, and there are no documented rare or endangered wildlife in the area. The Lo Go Mat National Park in Tay Ninh province is over 30 km west of the Tay Ninh substation

1. Potential impacts of the Transmission Line

76. The potential construction-related impacts and disturbances are reduced and/or blocked public access, disrupted and lost agriculture, noise and dust created by construction truck traffic and heavy equipment use, plantation and crop land pollution caused by equipment operation and maintenance, public and worker accidents, increased traffic accidents, drainage and flooding problems, solid waste and domestic pollution from worker camps, social disease and community problems caused by migrant workers.

2. Mitigation measures

77. Construction management measures to mitigate the above common impacts associated with the construction phase of the substation and transmission line are itemized below. The mitigation measures are detailed in the subproject EMP.

- The entire ROW of the transmission lines must be reviewed, and surveyed if necessary for unexploded ordnance (UXO) by the military of Viet Nam prior to construction. If such ordnance is detected clearing work will need to be commissioned prior to undertaking civil works.
- Open excavations along ROW for tower foundations should be fenced, and covered where public walkways or vehicles must cross.
- A cultural chance find management sub-plan must be in place in the EMP for cultural artifacts and property.
- Regular use of wetting agents should be employed at tower sites, and along all construction roads, and access points to the connector line.
- All construction vehicles and gas powered equipment should be maintained in proper working order to minimize emissions, and not operated at night if possible to minimize noise.
- Enforced speed limits should be posted for construction vehicles. Ideally dedicated lanes or temporary roads are created for construction vehicles.
- Where possible construction vehicles should use different roads or dedicated lanes of roads shared by the public. Removal of all agricultural cropping must be minimized.
- Historic land use should be reviewed to assess whether excavated soils will be contaminated. Contaminated spoil should be disposed at a landfill or a location approved by DONRE.
- Berms and plastic fencing should be placed around tower foundations to prevent wind erosion in agricultural and homestead areas.
- As indicated in project description transmission line must span all surface waters without placement of any towers in or near any surface water.
- Berms and plastic fencing must be placed at the shoreline of all surface waters underneath line to prevent sedimentation from erosion from nearby tower foundation construction.
- At detailed design stage the short section of the feasibility alignment that crosses southern edge of the Dau Tieng conservation forest (Figure 3) should be moved south to outside boundary of forest.
- Local workers should be used as much as possible to prevent or minimize influx of migrant workers, and incidence of social disease and community unrest.
- Worker camps must have adequate domestic waste collection facilities and sufficient pit latrines that are located away from public areas and surface waters.
- Dedicated fuel storage areas must be established away from public areas and marked clearly.
- To minimize the risk of public and worker injury appropriate GoV regulations on Occupational, Safety, and Community Health must be applied[9], or the IFC/World

[9] e.g. Circular No: 22/2010/TT-BXD, date issued: 03rd December 2010

Bank Environment, Health, and Safety Guidelines (2007) for Power Distribution that govern the safe and orderly operation of civil works should be followed.

- Aggregates (e.g., sand, gravel) that are transported by truck should be covered.
- Prolonged use of temporary storage piles of file should be avoided, or covered, or wetted regularly to prevent dust and erosion.
- Storage of bulk fuel should be on covered concrete pads away from the public and worker camp. Fuel storage areas and tanks must be clearly marked, protected and lighted. Contractors should be required to have an emergency plan to handle fuel and oil spillage.

3. Protected Areas, Rare and Endangered Species, and Physical Cultural Resources (PCR)

78. The ROW of transmission line is not located near national protected area, and there are no documented rare or endangered wildlife in the area. No known avian migration flyways exist in the area. Thus, the new connector lines with specific reference to the 8.5 km 220 kV line will not create an obstacle for annual or seasonal bird migration.

D. Operation Phase

79. The potential impact of the completed and operational 220 kV transmission line is restricted to worker safety, the potential for the public gaining access and climbing tower foundations, and possible spills of hazardous waste such as transformer oils. The increase in local traffic caused by transmission line maintenance will not be significant.

E. Climate Change

80. There have been numerous recent reports and summaries, e.g.,[10],[11],[12], of climate change scenarios for Viet Nam based on the most recent climate change projections of the different Global Circulation Models (GCM). The fact sheet for Viet Nam[13] compiled by the MONRE of Viet Nam summarizes projected climate change for Viet Nam as follows.

81. By 2100 average annual air temperature in the country is expected to increase 2.3 C^o with the frequency of heat waves increasing by 100-180%, and cold surges decreasing by 20-40%. Total rainfall, and extreme rainfall events is expected to increase everywhere in the country with particular increases occurring in the mountainous northern areas. However, rainfall is expected to decrease during dry season. By 2100 mean sea level is expected to increase 1.0 m.

1. Climate Risk and Vulnerability[14]

82. The sensitivity of the 220 kV Binh Long - Tay Ninh TL transmission line to climate change is considered low as determined by the initial rapid environmental assessment of the subproject (Appendix A). The tower foundations by design will be well drained and not sensitive to increased lowland flooding from increased frequency and severity of rainfall events. Also, the transmission line location is not sensitive to increases in the frequency and severity of typhoons and storm surge due to the distant location from the ocean.

.

[10] ADB (2013). Viet Nam and Climate Change Assessment and Impacts, 31 pgs + Appendices

[11] MONRE, 2009. Climate Change and Sea Level Rise Scenarios, 15 pgs + Appendices

[12] UNEP, 2010. Assessment of Capacity Gaps and Needs of Southeast Asian Countries Addressing Impacts, Vulnerabilities, and Adaption to Climate Variability and Climate Change, 215 pgs + references

[13] MONRE 2010, Climate Change Fact Sheet for Viet Nam

[14] sensu, ADB (2014) Climate Proofing ADB Investment in the Transport Sector: Initial Experience, 88 pgs + Appendices

2. Contribution to Global Climate Change

83. Consideration of climate change includes measures to reduce the contribution of the subprojects to greenhouse gas production. Effort through design will be taken to reduce the carbon footprint of the project by ensuring for example that speed limits along upgraded roads are established and subsequently enforced, vehicles that use the upgraded roads are maintained in good working order, and all lighting installed at the subproject component sites use light bulbs that are energy efficient.

VII. ANALYSIS OF ALTERNATIVES

84. No alternative subproject designs or locations were available for the IEE. However, as indicated above an alternative alignment of the short section of the transmission line that crosses southern portion of the Dau Tieng conservation forest will be investigated at detailed design phase

VIII. GRIEVANCE REDRESS MECHANISM

A. Type of Grievances

85. Any affected person (AP) can submit a grievance with CPPMB or PTC4 if they believe a practice is having a detrimental impact on the community, the environment, or on their quality of life. Grievances may include:

- Negative impacts on a person or a community (e.g. health and safety issues, nuisances, etc.).
- Dangers to health and safety or the environment.
- Social impacts due to construction activities or impacts on social infrastructure.
- Failure to comply with standards or legal obligations.
- Improper conduct or unethical behavior of Contractor leading to nuisance of affected person(s).

B. Grievance Redress Mechanism

86. A subproject grievance can be defined as an actual or perceived subproject-related problem that gives ground for complaint by an affected person (AP). As a general policy, CPPMB (during construction) and PTC4 (during operation) will work proactively toward preventing grievances through the implementation of impact mitigation measures and community liaison activities that anticipate and address potential issues before they become grievances. Nonetheless, during construction and operation it is possible that unanticipated impacts may occur if the mitigation measures are not properly implemented, or unforeseen issues occur. In order to address complaints, a project grievance redress mechanism (GRM) will be developed in accordance with ADB requirements and Government procedures.

87. The GRM will be established to provide an effective and transparent channel for lodging complaints and for addressing grievances. The GRM will be established prior to the construction of the subproject and will be maintained during operation and maintenance.

88. For complaints received about the construction works, the CPPMB will involve the Contractor. When these are not resolved, any complaint is then facilitated by the CPPMB through the Environment and Social Unit (ESU) under the Compensation Department. For complaints about substation operation, the PTC4 will act on the complaint. These will be entry points to whom the AP could directly register their complaints. Contact details for the entry point of complaints will be publicly disseminated on information boards at the

substation. Mechanisms to contact the point of entry will be through face-to-face meetings, written complaint, telephone conversations, or email.

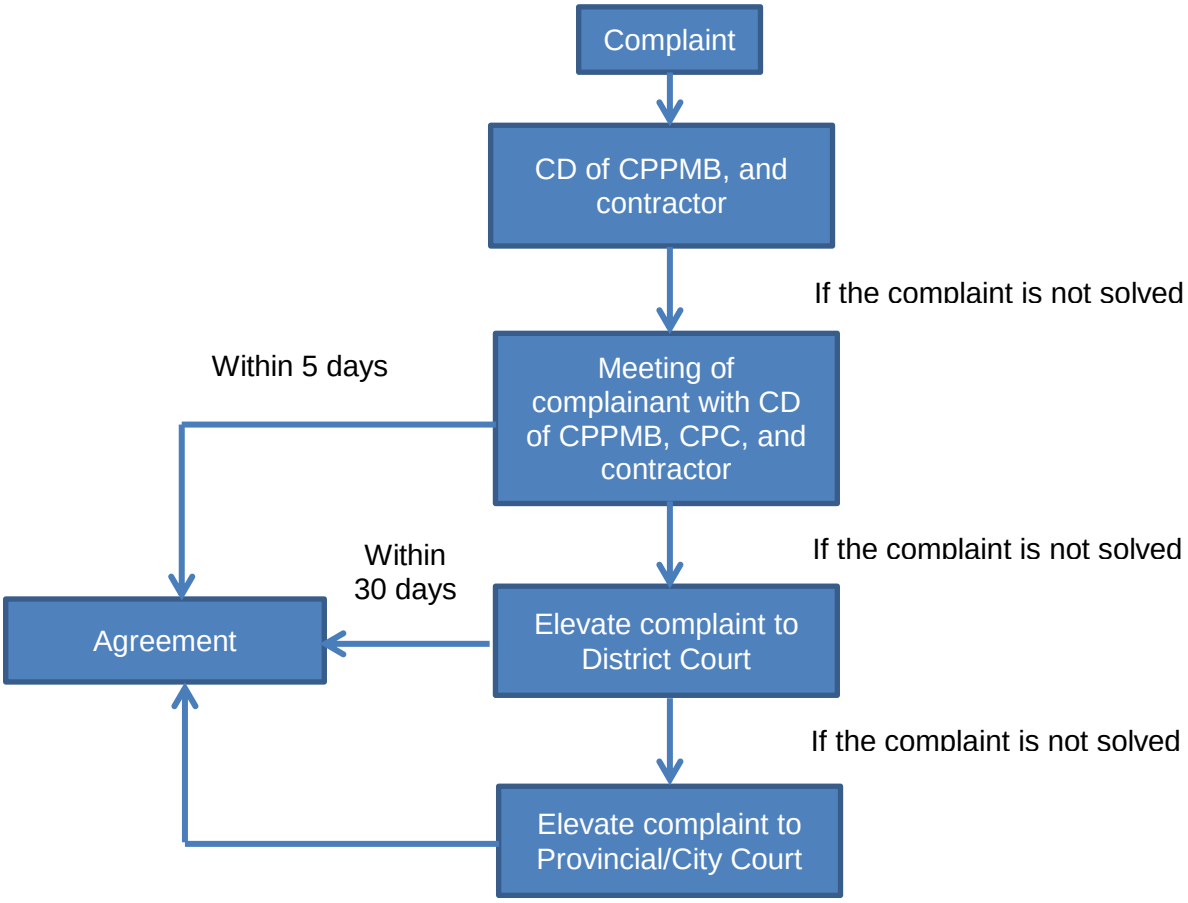
89. The following are the generic steps for the GRM (Figure 5):

Step 1: For complaints occurring during the construction phase, affected persons can register the complaint directly to the Contractor and the head of the commune by means of contact information prescribed in the information boards at the substation site. Upon receipt of the complaint, the Contactor is required to record/document all complaints and to coordinate with the complainant immediately and to provide mitigation actions to the complaint within two weeks. The Contractor is required to report complaints received, resolved, and unresolved to the CPPMB through the monthly progress report.

Step 2: If the complainant is not satisfied with the action(s) undertaken by the Contractor, the affected person can inform the head of the commune about the matter, which will document the complaint in the complaints register. The commune head/authority through the Commune People's Committee will then call a meeting of the complainant, CPPMB-Compensation Department and the Contractor to resolve the complaint. After discussion of the possible solutions, the CPPMB monitors the resolution of the complaint. The Contractor shall be required to report any action to the CPPMB in the monthly project progress reports.

Step 3: If the complainant is not satisfied with the action(s) undertaken at the level of Commune People's Committee, the affected person may elevate the case to the district level for resolution.

Figure 5. The Grievance Redress Mechanism



Step 4: Complaints not resolved at the district level is elevated to the People's Committee at the provincial level for resolution.

Step 5: When the complaint is not resolved at the People's Committee at the provincial level, the complaint is then elevated to the People's Court. The decision of the People's Court becomes the final legal basis for the decision on the complaint.

C. Legal Guarantees for Complaints and Grievances

90. Under the regulations in Viet Nam, APs having complaints or grievances will not be responsible for paying any administrative and legal fees in filing their complaints. Any site clearing is not allowed while the resolution of the complaint is still pending.

91. In cases where the AP is illiterate, the AP can ask assistance from one representative of his household who can then write all the complaints and grievances to be submitted to the district level for resolution.

92. Under the law, all meetings to resolve complaints and grievances should be documented and the minutes of meetings should be disclosed and posted at the Commune People's Committee.

IX. ENVIRONMENTAL MANAGEMENT PLAN

93. An Environmental Management Plan (EMP) has been prepared for the Binh Long - Tay Ninh 220 kV transmission line. The EMP integrates the results of the IEE into a formal plan for the implementing agency and contractor (see below) to implement in parallel with the subproject to prevent or minimize potential environmental impacts and issues of the line. The EMP addresses the results of the public consultations on the subproject that were convened as part of the IEE.

94. The EMP, *inter alia*, consists of an Impacts Mitigation Plan, a Monitoring Plan, and an Emergency Response Plan. The EMP also prescribes the institutional responsibilities for the implementation of the EMP. The EMP is a management tool that provides a set of directives and guidelines that the subproject owner follows to prevent or minimize unnecessary environmental impacts of the subproject.

A. Institutional Arrangements and Responsibilities

95. At the feasibility stage the primary management framework responsible for the implementation of the EMP for the new Binh Long - Tay Ninh TL is summarized as follows. The National Power Transmission Corporation (NPT) of the national Electrical Utility of Viet Nam is the executing agency (EA). The EA takes overall responsibility for implementing the EMP with executive support from the Central Power Project Management Board (CPPMB) which is the implementing agency (IA) of the subproject. The IA under the direction of the EA implements the subproject and EMP with an assigned environmental and social unit (ESU) whose sole responsibility is to implement the EMP.

96. The IA/ESU is supported by the international Project Implementation Consultant[15] (PIC). The PIC assists with completion of the detailed subproject designs, works with the IA to ensure the EMP addresses the detailed subproject designs, and assists the IA with the implementation of the EMP. The PIC also delivers required capacity development and

[15] PIC to be defined

training to the IA/ESU. The ESU oversees and assists the work of the environmental officer (EO) of the construction contractor who implements the EMP with the CEMP[16].

97. External support of the ESU for the implementation of the EMP is provided by the international and national environment specialists (ES) of the PIC. The PIC will have budget for an external Environmental Monitoring Consultant (EMC) which will conduct the required field sampling and laboratory analyses of the environmental monitoring plan (e.g., water quality, air quality) of the EMP that cannot be performed by the contractor or IA/ESU.

98. The day-to-day operations including monitoring of waste management and worker and public safety at/near the new Binh Long - Tay Ninh TL will be the responsibility of the Power transmission company No.4 (PTC4). A summary of indicative responsibilities for implementation of the EMP is provided below.

99. The responsibilities of the EA with support from EVN include:

1. Overall responsibility for implementation of EMP;
2. Provide coordination and supervision for environmental and social safeguards and monitoring for IA/ESU;
3. Liaise with ADB on the implementation of the EMP; and
4. Coordinate resolution with IA/ESU with issues arising from the implementation of EMP.

100. The responsibilities of the ESU of IA include:

5. Assist PIC with the EMP to meet final detailed subproject design;
6. Notify DONRE to verify GoV approvals of subproject are met;
7. Assist PIC with articulation of CEMP requirements in contractor bid documents which included appended EMP;
8. Assist PIC with bid evaluations, specifically completeness of CEMP;
9. Undertake day to day management of EMP implementation activities;
10. Work with EMC on implementation of monitoring plan of EMP;
11. Ensure compliance with loan covenants and assurances in respect of entire subproject, including EMP (as well as relevant IPPs, GAPs, resettlement plans);
12. Lead follow-up meetings with all affected stakeholders in public consultations;
13. Prepare and submit quarterly reports on EMP implementation to IA/EA;
14. Oversee implementation of CEMP by contractor;
15. Coordinate with ES of PIC for EMP implementation;
16. Undertake regular construction site inspections to ensure contractor implements CEMP properly; and
17. Ensure EO of contractor submits monthly reports on construction mitigations and monitoring.

The responsibilities of the ES (International and National) of the PIC are:

18. Coordinate with ESU/IA for EMP to meet final detailed design of subproject;

[16] Contractor Environmental Management Plan prepared by contractor from EMP which is part of bid documents.

19. Provide technical direction and support to ESU/IA for implementation of EMP;

20. Oversee design and delivery of capacity development and training of ESU/IA and EO of contractor(s);

21. Provide advice and support to EMC with their monitoring activities;

22. Review all reports prepared ESU/IA and EMC for EA and ADB; and

23. Review location of any possible contaminated sites near subproject.

The responsibilities of Environmental Officer (EO) of Contractor include:

24. Implement CEMP for construction phase of subproject; and

25. Prepare and submit monthly reports on mitigation and monitoring activities of CEMP any environmental issues at construction sites.

The responsibilities of external Environmental Monitoring Consultant (EMC) include:

26. Implement the environmental sampling required for monitoring plan of EMP that cannot be conducted by the contractor and ESU/IA/EO.

27. Perform required laboratory analyses for monitoring program detailed in EMP; and;

28. Prepare and submit quarterly reports to IA/ESU on monitoring activities.

101. The Department of Natural Resources and Environment (DONRE) is the provincial agency which oversees environmental management of Binh Phuoc province. The DONRE with District staff provides direction and support for environmental protection-related matters including application of the Law on Environmental Protection (2014), EIA, and environmental standards.

102. The ADB provides guidance to EA/IA with any issues related to EMP, and reviews biannual reports on EMP activities compiled and submitted by EA. Table 20 summarizes major roles and responsibilities for the completion and implementation of the EMP.

Table 22. Primary responsibilities of EMP implementation

Responsible Group	Pre-construction					Construction	Operation
	Subproject Detailed Design	Supplement Baseline	Prepare Bid Documents	Stakeholder Consultation & GRM	Training of NPT-CPPMB	Monitoring & Reporting	Monitoring & Reporting
EA	oversee & assist IA/ PIC		oversee	initiate & oversee		reporting to ADB	
ESU/IA	with PIC	with PIC	with PIC	with EA	with PIC	monitoring & reporting to EA	
PIC	with IA	with ESU	with ESU	assist EA/IA	with ESU	monitoring & reporting to IA/EA & ADB	
EO/ contractor			prepare CEMP from EMP in bid documents			construction site observations & reporting to ESU	
EMC						field sampling with PIC/ESU & reporting to PIC	

Power Transmission Company No.4							PTC4
DONRE	approvals	provide information	approvals	technical expert		regulatory	regulatory

B. Summary of Potential Impacts of Subproject

The potential impacts of the subproject are summarized in Table 23.

Table 23. Summary of potential impacts of subproject

Pre-construction Phase
• Permanent acquisition of pepper, cashew, rice, and rubber and some acacia agriculture and plantation lands
Construction Phase
• Common construction-related civil works disturbances such as dust, noise, and reduced and/or blocked public access along roads caused by increased truck traffic and heavy equipment use, disruption of local traffic, increased risk of traffic accidents, damage to existing roads, soil pollution caused by equipment operation and maintenance, potential public and worker accidents, land erosion, drainage and flooding problems, solid and domestic waste from worker camps, social issues and community problems caused by migrant workers.
Operational Phase
• Risk of worker and public safety at or near new substation and transmission lines • Spills of hazardous materials such as transformer oil

C. Impact Mitigation Plan

103. The impact mitigation measures of the EMP are presented in a comprehensive mitigation plan for the three phases of subproject implementation (pre-construction, construction, operation) which is presented for each phase in Tables 24-26. The mitigation plan addresses the environmental issues and concerns identified at the stakeholder meetings. The mitigation plan identifies potential impacts, required mitigations, responsible parties, location, timing, and indicative costs.

104. The mitigation plan is organized into a series of mitigation sub-plans that address common potential impact types of power transmission lines. The modularized sub-plans are meant to be easily selected by contractors to formulate and budget their CEMPs as part of their bid documents. Example mitigation sub-plans are for a) Construction runoff and drainage; b) Erosion; c) Noise and dust control; d) Spoil disposal; e) Solid and liquid waste disposal; f) Construction traffic; g) Worker and public safety; h) Site restoration; i) Construction materials acquisition, transport, and storage, and j) Cultural chance finds. The mitigation sub-plans are detailed in the impact mitigations for the construction phase of the subproject (Table 25).

1. Pre-construction - finalization of EMP

105. The primary objective of the pre-construction phase of the subproject is to complete the engineering detailed designs, and prepare for the initiation of the construction phase. An important activity of the pre-construction phase is to ensure EMP meets the environmental management needs of the final detailed designs of subproject. Other important environmental safeguard activities of the pre-construction phase include initiation of land acquisition and compensation and required resettlement, continuation of public disclosure and initiation of grievance redress mechanism, clarify with the military whether UXO are possibly in subproject areas, and ensure EMP is appended to bid documents to enable contractors to prepare their CEMPs from the EMP. Table 24 lists the important activities of the pre-construction phase.

2. Construction Phase

106. The EMP prescribes impact mitigation measures for the construction phase of the subproject which were finalized during the pre-construction phase as summarized above. As indicated by the IEE the potential environmental impacts of the subproject primarily concern the short-term disturbances and impacts during construction of the Binh Long - Tay Ninh TL. Table 25 provides the mitigation measures for the construction phase.

3. Operation Phase

107. The brief list of impact mitigations for the operation of the completed Binh Long - Tay Ninh TL are summarized in Table 26. Potential environmental impacts of the operation of the completed TL concern worker and public safety. Increased risk of traffic accidents due to additional maintenance vehicles would be insignificant

Table 24. Finalization of impact mitigation plan during pre-construction phase

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[17] (USD)	Responsibility	
							Supervision	Implementation
Confirmation of land acquisition, and resettlement	No negative environmental impacts	1. Affected persons well informed well ahead of subproject implementation.	All affected persons in subproject area	Before subproject implemented	See resettlement plans	See resettlement plan	EA/IA/ESU	Resettlement committees
Disclosure, and engagement of community	No negative impacts	2. Continue information disclosure, and initiate Grievance Redress Mechanism	For all construction activities.	Beginning of subproject	Quarterly	No marginal cost[18]	IA/ESU	ESU
GoV approvals	No negative impact	3. Notify DONRE of subproject initiation to obtain required subproject permits and certificates.	Entire subproject	Before construction	As required	No marginal cost	EA/DONRE	DONRE
Detailed designs of subproject,	Minimize negative environmental impacts	4. Work with PIC[19] to complete detailed designs of the Binh Long - Tay Ninh TL 220 kV including avoiding Dau Tieng conservation forest. Ensure the following measures are included: a) identification of spill management prevention plans, and emergency response plans for all construction sites; b) no disturbance or damage to culture property; c) minimal acquisition of all agricultural land d) locate any required borrow pits away from public areas, and surround pits with fencing and access barriers; f) no or minimal disruption to local pedestrian and vehicle traffic along all road near subproject with contingency alternate routes; g) notify and provide local residents and merchants schedule of construction activities to minimize disruption to normal	Final siting	Before construction initiated	Once with detailed designs documents	No marginal cost	PIC	EA/IA

[17] Costs will need to be updated during detailed design phase.
[18] No marginal cost indicates that costs to implement mitigation are to be built into cost estimates of bids of contractors
[19] PIC is Project Implementation Consultant to be determined at during detailed design phase

		commercial and residential activities. h) suspension of TL across all surface waters with no tower foundations located in any surface waters						
Review EMP	Positive environmental impacts	5. Review finalized RoWs of TL to confirm minimal damage to agriculture areas, and avoidance of Dau Tieng conservation forest. 6. Identify any new potential impacts of subproject and include in EMP with special attention to residential areas. 7. Ensure mitigation measures and monitoring requirements of EMP meet detailed designs, and protect affected environments. 8. Submit EMP with any new potential impacts to ADB to review. 9. Complete mitigation sub-plans of EMP for: a) Construction drainage; b) Erosion; c) Noise and Dust; d) Contaminated spoil disposal; e) Solid and liquid waste disposal; f) Construction traffic; g) Worker and public safety; h) Site restoration; i) Construction materials acquisition, transport, and storage, and k) Cultural chance finds.	All sites	Before construction initiated	Once with detailed designs documents		PIC	IA/ESU
Confirm approved construction waste disposal sites	No negative impact	10. Notify DONRE to confirm locations of sites for borrow pits and disposal areas for construction waste for subproject, and obtain required permits. 11. Create registry for local and migrant workers.	Entire subproject	Before construction	As required	No marginal cost	IA/DONRE	ESU
UXO survey, and removal	Injured worker or public	12. Ensure GoV military is consulted and clears UXO areas where necessary along entire ROW of TL	All construction sites.	Beginning of Subproject	Once	See Monitoring Plan below	EA/IA	IA/GoV
Develop bid documents	No negative environmental impact	13. Ensure EMP is appended to contractor tender documents, and that tender documents instruct contractors to use EMP to construct their CEMPs, and that CEMPs must be budgeted. 14. Specify in bid documents that contractor must provide staff with training and experience with implementing CEMPs	All subproject areas	Before construction begins	Once for all tenders	No marginal cost	PIC	EA/IA
Awareness of	No negative	15. EA to review potential locations of physical resources, and	All subproject	Before	Once	No marginal cost	EA/IA	IA/ESU

physical cultural resources in area	environmental impact	explain possible PCR to contractors and PIC.	areas	construction begins				
Obtain and activate permits and licenses	Prevent or minimize impacts	16. Contractors to comply with all statutory requirements set out by GoV for use of construction equipment, and operation of construction plants such as concrete batching.	For all construction sites	Beginning of construction	Once	No marginal cost	EA/PIC	ESU and contractors
Capacity development	No negative environmental impact	17. Develop and schedule training plan for IA/ESU/EO to be able to fully implement CEMP, and to manage implementation of mitigation measures by contractors. 18. Create awareness and training plan for contractors whom will implement mitigation measures.	All subproject areas	Before construction begins	Initially, refresher later if needed	No marginal cost	PIC	PIC
Recruitment of workers	Spread of sexually transmitted disease	19. Use local workers as much as possible thereby reducing number of migrant worker	All work forces.	Throughout construction phase	Worker hiring stages	No marginal cost	EA/IA	Contractor's bid documents

Table 25. Impact mitigations for construction of 220 kV Binh Long - Tay Ninh TL

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[20] (USD)	Responsibility	
							Supervision	Implementation
Initiate EMP and sub-plans,	Prevent or minimize impacts	1. Initiate EMP and CEMP including individual management sub-plans for different potential impact areas that are completed in pre-construction phase (see sub-plan guidance below).	For all construction sites	Beginning of construction	Once	No marginal cost	IA/PIC	ESU and contractors
Worker camps	Pollution and social problems	2. Locate worker camps away from human settlements. 3. Ensure adequate housing and waste disposal facilities including pit latrines and garbage cans. 4. A solid waste collection program must be established and implemented that maintains a clean worker camps 5. Locate separate pit latrines for male and female workers away from worker living and eating areas. 6. A clean-out or infill schedule for pit latrines must be established and implemented to ensure working latrines are available at all times. 7. Worker camps must have adequate drainage. 8. Local food should be provided to worker camps. Guns and weapons not allowed in camps. 9. Transient workers should not be allowed to interact with the local community. HIV/AIDS education should be given to workers. 10. Camp areas must be restored to original condition after construction completed.	All worker camps	Throughout construction phase	Monthly	No marginal cost	PIC/IA/ESU	contractor
Training and capacity	Prevent of impacts through education	11. Implement training and awareness plan for IA/ESU//EO and contractors.	IA office, construction sites	Beginning of construction	After each event	No marginal cost	PIC	PIC/ESU
Implement Construction materials	Pollution, injury, increased traffic,	12. All required borrow pits should be approved by DONRE. 13. Select pits in areas with low gradient and as close as possible to	For all construction	Throughout construction	Monthly	No marginal cost	PIC/IA/ESU	contractor

[20] Costs will need to be updated during detailed design phase.

acquisition, transport, and storage sub-plan	disrupted access	construction sites. 14. Required aggregate volumes must be carefully calculated prior to extraction to prevent wastage. 15. Pits should not be located near surface waters or cultural property or values. 16. All topsoil and overburden removed should be stockpiled for later restoration. 17. All borrow pits should have a fence perimeter with signage to keep public away. 18. After use pits should be dewatered and permanent fences installed with signage to keep public out, and restored as much as possible using original overburden and topsoil. 19. Unstable slope conditions in/adjacent to the pit caused by the extractions should be rectified with tree planting. 20. Define and schedule how materials are extracted from borrow pits, transported, and handled and stored at sites. 21. Define and schedule how fabricated materials such as steel, wood structures, and scaffolding will transported and handled. 22. All aggregate loads on trucks should be covered. .	areas.	phase				
DBST [low grade asphalt] production, and application to create / restore any road works	Air pollution, land and water contamination, and traffic and access problems,	23. Piles of aggregates at sites should be used/or removed promptly, or covered and placed in non- traffic areas 24. Stored paving materials e.g., DBST or asphalt, well away from all human activity and settlements, and cultural (e.g., schools, hospitals), and ecological receptors. Bitumen production and handling areas should be isolated. 25. Contractors must be well trained and experienced with the production, handling, and application of bitumen. 26. All spills should be cleaned immediately and handled as per hazardous waste management plan, and according to GoV regulations. 27. Bitumen should only be spread near any surface waters, or near any human activities. 28. Bitumen should not be used as a fuel.	For all construction areas.	Throughout construction phase	Monthly	No marginal cost	PIC/ESU	contractor

Implement Spoil management subplan	Contamination of land and surface waters from excavated spoil, and construction waste	29. Uncontaminated spoil to be disposed of in GoV-designated sites, which must never be in or adjacent surface waters. Designated sites must be clearly marked and identified. 30. Spoil must not be disposed of on sloped land, near cultural property or values, or on/near any other culturally or ecologically sensitive feature. 31. Where possible spoil should be used at other construction sites, or disposed in spent borrow pits. 32. A record of type, estimated volume, and source of disposed spoil must be recorded. 33. Contaminated spoil disposal must follow GoV regulations including handling, transport, treatment (if necessary), and disposal. 34. Suspected contaminated soil must be tested, and disposed of in designated sites identified as per GoV regulations. 35. Before treatment or disposal contaminated spoil must be covered with plastic and isolated from all human activity.	All excavation areas	Throughout construction phase	Monthly	See Monitoring Plan for contaminated soil analyses	PIC/ESU and DONRE	contractor
Implement Solid and liquid construction waste sub-plan	Contamination of land and surface waters from construction waste	36. Management of general solid and liquid waste of construction will follow GoV regulations, and will cover, collection, handling, transport, recycling, and disposal of waste created from construction activities and worker force. 37. Areas of disposal of solid and liquid waste to be determined by GoV. 38. Disposed of waste should be catalogued for type, estimated weigh, and source. 39. Construction sites should have large garbage bins. 40. A schedule of solid and liquid waste pickup and disposal must be established and followed that ensures construction sites are as clean as possible. 41. Solid waste should be separated and recyclables sold to buyers in community. <u>Hazardous Waste</u> 42. Collection, storage, transport, and disposal of hazardous waste such as used oils, gasoline, paint, and other toxics must follow GoV regulations. 43. Wastes should be separated (e.g., hydrocarbons, batteries, paints,	All construction sites and worker camps	Throughout construction phase	Monthly	No marginal cost	PIC/ESU and DONRE	contractor

		organic solvents) 44. Wastes must be stored above ground in closed, well labeled, ventilated plastic bins in good condition well away from construction activity areas, all surface water, water supplies, and cultural and ecological sensitive receptors. 45. All spills must be cleaned up completely with all contaminated soil removed and handled with by contaminated spoil sub-plan.						
Implement Noise and dust sub-plan	Dust Noise	46. Regularly apply wetting agents to exposed soil and construction roads. 47. Cover or keep moist all stockpiles of construction aggregates, and all truck loads of aggregates. 48. Minimize time that excavations and exposed soil are left open/exposed. Backfill immediately after work completed. 49. As much as possible, restrict working time at substation site between 07:00 and 17:00. 50. Maintain equipment in proper working order 51. Replace unnecessarily noisy vehicles and machinery. 52. Vehicles and machinery to be turned off when not in use. 53. Construct temporary noise barriers around excessively noisy activity areas where possible.	All construction sites.	Fulltime	Monthly	No marginal cost	PIC/ESU	contractor
Implement Utility and power disruption sub-plan	Loss or disruption of utilities and services such as water supply and electricity	54. Develop carefully a plan of days and locations where outages in utilities and services will occur, or are expected. 55. Contact local utilities and services with schedule, and identify possible contingency back-up plans for outages. 56. Contact affected community to inform them of planned outages. 57. Try to schedule all outages during low use time such between 24:00 and 06:00.	All construction sites.	Fulltime	Monthly	No marginal cost	PIC/ESU and Utility company	contractor
Implement Tree and vegetation removal, and site restoration	Damage or loss of trees, vegetation, and landscape	58. Contact DARD for advice on how to minimize damage to trees and vegetation along transmission line 59. Restrict tree and vegetation removal to within RoWs. 60. Within RoWs minimize removals of trees and install protective physical barriers around trees that do not need to be removed.	All construction sites.	Beginning and end of Subproject	Monthly	No marginal cost	PIC/ESU	contractor

sub-plan		61. Where possible all RoWs to be re-vegetated and landscaped after construction completed. Consult DARD to determine the most successful restoration strategy and techniques. Aim to replant three trees for each tree removed. 62. Restore sections of roads damaged by the construction of facilities.						
Implement Erosion control sub-plan	Land erosion	63. Berms, and plastic sheet fencing should be placed around all excavations and earthwork areas. 64. Earthworks should be conducted during dry periods. 65. Maintain a stockpile of topsoil for immediate site restoration following backfilling. 66. Protect exposed or cut slopes with planted vegetation, and have a slope stabilization protocol ready. 67. Re-vegetate all soil removal areas immediately after work completed.	All construction sites	Throughout construction phase	Monthly	No marginal cost	PIC/ESU	contractor
Implement worker and public safety sub-plan	Public and worker injury, and health	68. Proper fencing, protective barriers, and buffer zones should be provided around all construction sites. 69. Sufficient signage and information disclosure, and site supervisors and night guards should be placed at all sites. 70. Worker and public safety guidelines of MOLISA should be followed. 71. Population near possible blast areas should be notified 24 hrs ahead, and evacuated well before operation. Accepted GoV blast procedures and safety measures implemented. 72. Speed limits suitable for the size and type of construction vehicles, and current traffic patterns should be developed, posted, and enforced on all roads used by construction vehicles. 73. Standing water suitable for disease vector breeding should be filled in. 74. Worker education and awareness seminars for construction hazards should be given at beginning of construction phase, and at ideal frequency of monthly. A construction site safety program should be developed and distributed to workers. 75. Appropriate safety clothing and footwear should be mandatory for all construction workers. 76. Adequate medical services must be on site or nearby all construction	All construction sites.	Fulltime	Monthly	No marginal cost	PIC/ESU	contractor

		sites. 77. Drinking water must be provided at all construction sites. 78. Sufficient lighting to be used during necessary night work. 79. All construction sites should be examined daily to ensure unsafe conditions are removed.						
Civil works	Degradation of water quality and aquatic resources	80. Protective berms, or plastic sheet fencing should be placed between all earthworks and surface waters. 81. Erosion channels must be built around aggregate stockpile areas to contain rain-induced erosion. 82. Earthworks should be conducted during dry periods. 83. All construction fluids such as oils, and fuels should be stored and handled well away from surface waters. 84. No waste of any kind is to be thrown in surface waters. 85. No washing or repair of machinery near surface waters. 86. Pit latrines to be located well away from surface waters. 87. No unnecessary earthworks in or adjacent to water courses. 88. All irrigation canals and channels to be protected the same way as rivers, streams, and lakes	All construction sites	Throughout construction phase	Monthly	No marginal cost	PIC/ESU	contractor
Civil works	Degradation of terrestrial resources	89. No unnecessary cutting of trees along RoW. 90. All construction fluids such as oils, and fuels should be stored and handled well away from forested and plantation areas. 91. No waste of any kind is to be discarded on land or in forests/plantations.	All construction sites	Throughout construction phase	Monthly	No marginal cost	PIC/ESU	contractor
Implement Construction and urban traffic sub-plan	Traffic disruption, accidents, public injury	92. Schedule construction vehicle activity during light traffic periods. Create adequate traffic detours, and sufficient signage and warning lights. 93. Post speed limits, and create dedicated construction vehicle roads or lanes. 94. Inform community of location of construction traffic areas, and provide them with directions on how to best co-exist with construction vehicles on their roads. 95. Demarcate additional locations where pedestrians can develop road	All construction sites	Fulltime	Monthly	No marginal cost	PIC/ESU	contractor

		crossings away from construction areas. 96. Increase road and walkway lighting where necessary for safety.						
Implement Construction Drainage sub-plan	Loss of drainage and flood storage	97. Provide adequate short-term drainage away from construction sites to prevent ponding and flooding. 98. Manage to not allow borrow pits and quarries to fill with water. Pump periodically to land infiltration or nearby water courses. 99. Install temporary storm drains or ditches for construction sites 100. Ensure connections among surface waters (ponds) are maintained or enhanced to sustain existing stormwater storage capacity. 101. Protect surface waters from silt and eroded soil.	All areas with surface waters	Design and construction phases	Monthly	No marginal cost	PIC/ESU	contractor
Civil works and Chance finds sub-plan	Damage to cultural property or values, and chance finds	102. As per detailed designs all civil works should be located away from all physical cultural property and values. 103. Chance finds of valued relics and cultural values should be anticipated by contractors. Site supervisors should be on the watch for finds. 104. Upon a chance find all work stops immediately, find left untouched, and EA/IA notified to determine if find is valuable. The Culture Division of the DCST notified by telephone if valuable. 105. Work at find site will remain stopped until DCST allows work to continue.	All construction sites	At the start , and throughout construction phase	Monthly	No marginal cost	PIC/ESU	contractor

Table 26. Impact mitigations for operation of Binh Long - Tay Ninh TL

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[21] (USD)	Responsibility	
							Supervision	Implementation
Operation of new substation	Increased risk of worker or public injury	1. Occupational health and safety regulations and guidelines of MOLISA should be applied to operation and maintenance of transmission line	At all TL towers	Fulltime	Biannual	O and M	PTC4	
		2. Ensure TL towers are marked with clearly visable danger warning signs to keep public out.						
		3. Store and handle transformer fluids and other hazardous materials according to international procedures and standards						

[21] Costs will need to be updated during detailed design phase.

D. Monitoring Plan

108. The environmental monitoring plan for the three phases of subproject implementation is provided in Table 27 which consists of environmental indicators, the sampling locations and frequency, method of data collection, responsible parties, and estimated costs. The purpose of the monitoring plan is to determine the effectiveness of the impact mitigations, and to document unexpected positive or negative environmental impacts of the subproject.

109. The independent environmental monitoring consultant (EMC) as coordinated with the ESU/EO of the contractor will implement the environmental monitoring program with the EMC taking responsibility for all environmental sampling that must be analyzed in a laboratory. The PIC/IA will provide logistical support to the EMC and EO where necessary for the environmental monitoring plan.

110. The standards for ambient environmental quality (e.g., water and air quality) for Viet Nam listed in section II will guide the monitoring program. The environmental standards provided by the Environmental, Health and Safety Guidelines of the IFC/World Bank (2007) for Power Transmission and Distribution should be followed to supplement standards that are not provided by the GoV.

111. After construction is completed, the potential impacts of the operation of the new Binh Long - Tay Ninh transmission line will be monitored by the PTC4. Monitoring success of minor resettlement in the affected areas will be undertaken as part of the separate RP prepared for the subproject.

Performance Monitoring

112. Performance monitoring is required to assess the overall performance of the EMP. A performance monitoring system is normally developed by the EA for the entire subproject. Selected indicators of major components of the environment that will be affected primarily by the construction phase are drawn from the mitigation and monitoring plans and summarized in Table 28.

E. Reporting

113. Regular reporting on the implementation of mitigation measures, and on monitoring activities during construction phase of the subproject is required. Reporting is the responsibility of IA/ESU and should be conducted in conjunction with regular meetings with stakeholders as part of the continuation of stakeholder communications. The mitigation and monitoring plans (Tables 24-27) summarize proposed timing of reporting.

114. A report on environmental monitoring and implementation of EMP will be prepared quarterly for the EA by the IA/ESU. The IA report will compile monthly reports provided by the EO of contractor, the reports of the EMC on monitoring, and input from the ES of the PIC. The IA/ESU report will also be sent to the DONRE and ADB. The reports will table all indicators measured with the monitoring plan of EMP including performance monitoring indicators (Table 28), and will include relevant GoV environmental quality standards. A semi-annual report on the environment monitoring of the subproject must be prepared and submitted to the ADB by the EA for public disclosure on ADB website as required by ADB Public Communications Policy (2011).

Table 27. Environmental monitoring plan for the 220 kV Binh Long - Tay Ninh TL

ENVIRONMENTAL EFFECTS MONITORING							
Environmental Indicators	**Location**	**Means of Monitoring**	**Frequency**	**Reporting**	**Responsibility**		**Estimated Cost (USD)**
					Supervision	**Implementation**	
Pre-construction Phase – Review Baseline Conditions							
Review baseline on sensitive receptors (e.g., cultural property and values, new schools or hospitals, rare/endangered species, critical habitat at all substation areas.	Entire ROW of 72.6 km TL	Original field work, community consultations	Once	Once	PIC/ESU	Environmental Monitoring Consultant	$1,000.
A) Qualitative air quality: dust, noise B) Visual qualitative affected surface water quality, i.e., TSS, oil and grease,	A) At tower foundations & access roads B) At all surface water crossings	Using field and analytical methods approved by DONRE.	A) One day and one night measurement b) One measurement	One baseline supplement report before construction phase starts	PIC/ESU	Environmental Monitoring Consultant	A) $1,000 B) $1,000.
Inventory of present and past land uses that could cause contaminated soil.	Possible contaminated lands at all excavation sites	Using field and analytical methods approved by DONRE.	Once	Once	PIC/ESU	Environmental Monitoring Consultant	$500.
Construction of 220 kV Binh Long - Tay Ninh TL							
Analysis of soil quality (heavy metals (As, Cd, Pb, oil and grease,	Possible contaminated lands at all excavation sites	Using field and analytical methods approved by DONRE.	**Once if**	Once	ESU	Environmental	$2,500.

hydrocarbons).			**needed**			Monitoring Consultant	
A) Qualitative air quality: dust, noise B)) Visual affected surface water quality TSS, oil and grease C) Analysis of contaminated soil quality (heavy metals (As, Cd, Pb, Hg, Mn), hydrocarbons. D) Domestic (worker) and construction solid waste inside and outside construction sites including worker camps. E) Public comments and complaints F) Incidence of worker or public accident or injury	A and B): Baseline sites of pre-construction phase. C) At sites where contaminated soil is suspected. D) All construction sites and worker camps E) Using hotline number placed at construction areas F) At all construction areas	A – C : Using field and analytical methods approved by DONRE. Include visual observations of dust and noise from contractor and public reports . D) Visual observation E) Information transferred by telephone hotline number posted at all construction sites. F) regular reporting by contractors/ESU	(A – B): Quarterly during construction periods Daily visual records C) Once at start of excavations D) Monthly E) Continuous public input F) Continuous	Monthly	(A - D):		A and B: $1,000./yr C: $1,000./yr D: no marginal cost
					ESU	Monitoring Consultant	
					(E and F) and daily observations:		E: $1,000./yr F: no marginal cost
					IA/ESU	contractor	
Operation of 220 kV Binh Long - Tay Ninh TL							
Incidence of worker accidents, or spills on hazardous materials	At substation and along connector lines	Regular documentation and reporting	Continuous	Quarterly	PTC4		O and M

Table 28. Performance monitoring indicators for Binh Long - Tay Ninh TL subproject

Environmental Component	Key Indicator	Performance Objective	Data Source
Pre-construction Phase			
Public Consultation and Disclosure	Affected public and stakeholders	Meetings with public stakeholders contacted during IEE and new stakeholders convened for follow-up consultation and to introduce grievance mechanism	Minutes of meeting, and participants list
EMP	Fina EMP	All stakeholders contacted during IEE re-contacted for follow-up consultation	EMP
Bid Documents	Requirements of EMP (CEMP[22])	EMP appended to bidding documents with clear instructions to bidders for CEMP	Bid documents
Training of IA/ESU	Training course(s) and schedule	By end of pre-construction phase, required course(s) that will be delivered are designed and scheduled	Course(s) outline, participants, and schedule
Construction Phase			
Affected water quality	Visual TSS, oil and grease,	GoV environmental standards and criteria met	Monitoring by EMC[23]
Air quality	Visual dust and noise	Levels never exceed pre-construction baseline levels	EMC and contractor monitoring reports,
Soil quality	Solid and liquid waste	Rigorous program of procedures and rules to collect and store all waste from construction camps and sites practiced.	Contractor and EMC monitoring reports
Hazardous materials and waste	Oil, gasoline, grease	Rigorous program of procedures to manage and store all waste from construction camps and sites practiced.	Contractor and EMC monitoring reports
Public and worker safety	Frequency of injuries	Adherence to GoV occupational health and Safety regulations[24]	Contractor reports
Cultural property	Incidence of damage, or complaints	No valued cultural property, or unearthed valuable relic is harmed in any way	Public input, contractor reports, public input, EMC reports
Traffic	Frequency of disruptions and	Disruptions, stoppages, or detours are managed to	Public input, contractor

[22] Contractor Environmental Management Plan developed from EMP in contractor bidding document
[23] Environmental Monitoring Consultant hired to assist implementation of Environmental Monitoring Plan
[24] OSH Guidelines provided by MOLISA, *or* IFC World Bank EHS (2007) *for* Electric Power Transmission & Distribution

Environmental Component	Key Indicator	Performance Objective	Data Source
	blocked roadways	absolute minimum.	reports, EMC reports
Operation of Binh Long - Tay Ninh TL			
Worker and Public Safety	Frequency of accidents and spills	No increase in pre-construction frequency	EA

F. Estimated Cost of EMP

115. The marginal costs for implementing the EMP are primarily for environmental monitoring because the costs for implementing impact mitigation measures are included with the construction costs in contractor bid documents. The preliminary cost for the implementation of the EMP for the subproject including an estimated environmental training budget for NPT / PPBM is approximately USD $17,000.00 which is summarized in Table 29. The environmental costs in Table 29 are primarily for field sampling which include professional per diems of technicians.

Table 29. Estimated costs for Environmental Monitoring Plan of EMP

Activity Type	Estimated Cost (USD)
Pre-construction Phase	
Updating Environmental Baseline	
cultural receptors	$1,000.00
environmental quality	$2,500.00
Construction Phase	
environmental quality	$6,500.00
public consultation	$2,000.00
Operation Phase	
environmental quality	no cost
public input	no cost
Training and capacity development of NPT / PPBM / ESU	$5,000.00
Total	**$17,000.00**

116. An estimated budget of USD $5,000.00 is required for training of the EA/IA/ESU on environmental assessment and management, and the implementation of the EMP. The estimated costs of the EMP and training will need to be updated by the PIC in conjunction with the IA/ESU during the pre-construction phase.

X. EMERGENCY RESPONSE PLAN

117. The Contractor must develop emergency or incident response procedures during construction and operation phases of the new Binh Long - Tay Ninh TL to protect workers and the public. The emergency response plan (ERP) outlines the roles and responsibilities of persons from first identification of an incident or emergency to the final steps of safe and complete closure of the situation. The detailed requirements for the ERP are described in Appendix D.

XI. INSTITUTIONAL CAPACITY REVIEW AND NEEDS

118. Currently there is insufficient experience and capacity for environmental assessment and management in CPPMB for the implementation of the EMP, and to develop future safeguards for the non-core subprojects. The PIC with assistance from the ESU/IA of the subproject will develop and deliver training courses to the IA staff including the EO of the contractor. The purpose of the course(s) is to strengthen the ability of the project owner including the ESU to oversee implementation of the EMP by construction contractors, and EMC. Costs for training should be included with costs for implementation of the EMP.

119. Training on the implementation of an EMP should address two thematic areas. The first area should be principles environmental assessment and management focused on the potential impacts of subproject activities on the natural and social environments. The second area should be environmental safeguard requirements of the ADB and GoV with specific reference to the EMP.

XII. CONCLUSIONS AND RECOMMENDATION

120. The initial examination of the 220 kV Binh Long - Tay Ninh transmission line indicates that potential environmental impacts are construction-related impacts and disturbances that can be mitigated and managed.

121. The public consultation meetings underscored the need for effective management of construction impacts such as noise, dust, traffic disruptions, and public safety. Follow-up meetings with the consulted stakeholders to address any construction-related issues are required. The civil construction impacts of elevated dust, noise, traffic disruptions, erosion and sedimentation, and public and worker safety can be managed effectively with standard construction practices (e.g., EHS Guidelines, IFC/World Bank Group, 2007, *for* Electric Power Transmission & Distribution.

122. The IEE concludes that the description of the feasibility design of the subproject combined with available information on the affected environment is sufficient to identify the scope of potential environmental impacts of the subproject. Providing that significant changes do not occur to the design of one or more of the subproject components, and that new sensitive environmental or PCR components are not identified in pre-construction phase, further detailed environmental impact assessment (EIA) of the subproject is not required.

APPENDIX A: RAPID ENVIRONMENTAL ASSESSMENT OF SUBPROJECT

Rapid Environmental Assessment Checklist Power Transmission

Country / Project Title: Preparation for Tranche 3 as part of the MFF Power Transmission Investment Program financed by ADB: Binh Long – Tay Ninh 220 kV transmission Line

Sector / Division: Energy / SEEN

Screening Questions	Yes	No	Remarks
A. PROJECT SITING IS THE PROJECT AREA ADJACENT TO OR WITHIN ANY OF THE FOLLOWING ENVIRONMENTALLY SENSITIVE AREAS?			
▪ CULTURAL HERITAGE SITE		X	
▪ PROTECTED AREA		X	The preliminary transmission line alignment is > 35 km from nearest National Protected Area, but does pass through southern margin of the Dau Tieng water conservation forest.
▪ WETLAND		X	
▪ MANGROVE		X	
▪ ESTUARINE		X	
▪ BUFFER ZONE OF PROTECTED AREA		X	
▪ SPECIAL AREA FOR PROTECTING BIODIVERSITY		X	
B. POTENTIAL ENVIRONMENTAL IMPACTS WILL THE PROJECT CAUSE…			
▪ encroachment on historical/cultural areas, disfiguration of landscape and increased waste generation?		X	
▪ encroachment on precious ecosystem (e.g. sensitive or protected areas)?		X	
▪ alteration of surface water hydrology of waterways crossed by roads and resulting in increased sediment in streams affected by increased soil erosion at the construction site?	X		By design the transmission tower foundations will not be placed in any surface water (river, stream, pond, reservoir). The EMP prescribes mitigation sub-plans for isolating surface waters from tower foundation construction
▪ damage to sensitive coastal/marine habitats by construction of submarine cables?		X	
▪ deterioration of surface water quality due to silt runoff, sanitary wastes from worker-based camps and chemicals used in construction?	X		The EMP prescribes measures for managing waste from temporary construction camps.

Screening Questions	Yes	No	Remarks
▪ increased local air pollution due to rock crushing, cutting and filling?		X	
▪ risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation?	X		The government and the EMP prescribe national and international regulations and guidelines for worker and public safety during power transmission line construction and operation.
▪ chemical pollution resulting from chemical clearing of vegetation for construction site?		X	
▪ noise and vibration due to blasting and other civil works?	X		Minimal noise is anticipated during construction and installation of towers. EMP prescribes noise and dust mitigation plans. There will be no blasting..
▪ dislocation or involuntary resettlement of people?		X	.
▪ disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?		X	
▪ social conflicts relating to inconveniences in living conditions where construction interferes with pre-existing roads?	X		Minor potential impact. The EMP includes mitigation measures for managing traffic caused by construction to prevent of minimize disturbance to regular traffic and local community
▪ hazardous driving conditions where construction interferes with pre-existing roads?	X		As above mitigation measures in EMP exists for managing construction truck traffic to prevent of minimize disturbance to regular traffic and local community
▪ creation of temporary breeding habitats for vectors of disease such as mosquitoes and rodents?		X	
▪ dislocation and compulsory resettlement of people living in right-of-way of the power transmission lines?		X	
▪ environmental disturbances associated with the maintenance of lines (e.g. routine control of vegetative height under the lines)?	X		New transmission line will require regular maintenance causing minor local disturbances
▪ facilitation of access to protected areas in case corridors traverse protected areas?		X	
▪ disturbances (e.g. noise and chemical pollutants) if herbicides are used to control vegetative height?		X	Herbicides will not be used during construction
▪ large population influx during project construction and operation that cause increased burden on social infrastructure and services (such as water supply and sanitation systems)?	X		Migrant worker population will be small, however, EMP prescribes mitigation measures managing influx and activities of workers and temporary camps. Use of local workers will be maximized.
▪ social conflicts if workers from other regions or countries are hired?	X		As above

Screening Questions	Yes	No	Remarks
▪ poor sanitation and solid waste disposal in construction camps and work sites, and possible transmission of communicable diseases from workers to local populations?	X		The EMP prescribes mitigation measures for solid and liquid waste management in temporary construction worker camps.
▪ risks to community safety associated with maintenance of lines and related facilities?		X	
▪ community health hazards due to electromagnetic fields, land subsidence, lowered groundwater table, and salinization?		X	Human health effects of EMF have not been established by international medical community (see Appendix of IEE). Land subsidence, lowering of groundwater table and salinization are not expected to occur.
▪ risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during construction and operation?	X		Minimal risks if any. Information campaign will be provided to community prior to and during construction. EMP will have provisions to reduce or mitigate these impacts.
▪ community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project (e.g., high voltage wires, and transmission towers and lines) are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?	X		Minimal risks if any. Information campaign will be provided to community prior to and during construction. EMP has provisions to reduce or mitigate these impacts.

Checklist for Preliminary Climate Risk Screening

Country/Project Title: Preparation of Tranche III of MFF for Power Distribution Development Project: Binh Long – Tay Ninh 220 kV transmission Line

Sector: Power Transmission

Subsector: Transmission

Division/Department: SEEN / SERD

Screening Questions		Score	Remarks
Location and Design of project	Is siting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather related events such as floods, droughts, storms, landslides?	0	No. The sensitivity of the few transmission line towers to the low lying areas that may experience increased flooding from climate change is offset by the elevated and substantiated foundations designs of the transmission towers.
	Would the project design (e.g. the clearance for bridges) need to consider any hydro-meteorological parameters (e.g., sea-level, peak river flow, reliable water level, peak wind speed etc)?	0	No. the transmission is inland and immune from sea level rise, or major river flow increases.
Materials and Maintenance	Would weather, current and likely future climate conditions (e.g. prevailing humidity level, temperature	0	

	contrast between hot summer days and cold winter days, exposure to wind and humidity hydro-meteorological parameters likely affect the selection of project inputs over the life of project outputs (e.g. construction material)?		
	Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s) ?	0	
Performance of project outputs	Would weather/climate conditions, and related extreme events likely affect the performance (e.g. annual power production) of project output(s) (e.g. hydro-power generation facilities) throughout their design life time?	0	

Result of Initial Screening (Low, Medium, High): Low

Other Comments: n/a

APPENDIX B: MINUTES AND PARTICIPANTS OF PUBLIC CONSULTATIONS

Located in separate large files

APPENDIX C: EIA APPROVAL LETTER FOR TRANSMISSION LINE

BỘ TÀI NGUYÊN VÀ MÔI TRƯỜNG

Số: 3041/QĐ-BTNMT

CỘNG HOÀ XÃ HỘI CHỦ NGHĨA VIỆT NAM
Độc lập - Tự do - Hạnh phúc

Hà Nội, ngày 25 tháng 12 năm 2014

QUYẾT ĐỊNH
Phê duyệt báo cáo đánh giá tác động môi trường của Dự án "Đường dây 220 kV Bình Long – Tây Ninh"

BỘ TRƯỞNG BỘ TÀI NGUYÊN VÀ MÔI TRƯỜNG

Căn cứ Luật Bảo vệ môi trường ngày 29 tháng 11 năm 2005;

Căn cứ Nghị định số 21/2013/NĐ-CP ngày 04 tháng 3 năm 2013 của Chính phủ quy định chức năng, nhiệm vụ, quyền hạn và cơ cấu tổ chức của Bộ Tài nguyên và Môi trường;

Căn cứ Nghị định số 29/2011/NĐ-CP ngày 18 tháng 4 năm 2011 của Chính phủ quy định về đánh giá môi trường chiến lược, đánh giá tác động môi trường và cam kết bảo vệ môi trường;

Căn cứ Thông tư số 26/2011/TT-BTNMT ngày 18 tháng 7 năm 2011 của Bộ trưởng Bộ Tài nguyên và Môi trường quy định chi tiết một số điều của Nghị định số 29/2011/NĐ-CP ngày 18 tháng 4 năm 2011 của Chính phủ quy định về đánh giá môi trường chiến lược, đánh giá tác động môi trường, cam kết bảo vệ môi trường;

Theo đề nghị của Hội đồng thẩm định báo cáo đánh giá tác động môi trường của Dự án "Đường dây 220 kV Bình Long – Tây Ninh" họp ngày 12 tháng 12 năm 2014 tại Thành phố Hồ Chí Minh;

Xét nội dung báo cáo đánh giá tác động môi trường của Dự án "Đường dây 220 kV Bình Long – Tây Ninh" đã được chỉnh sửa, bổ sung kèm theo Văn bản giải trình số 7558/AMT-TĐ ngày 19 tháng 12 năm 2014 của Ban Quản lý dự án các công trình điện miền Trung;

Xét đề nghị của Tổng Cục trưởng Tổng cục Môi trường,

QUYẾT ĐỊNH:

Điều 1. Phê duyệt nội dung báo cáo đánh giá tác động môi trường của Dự án "Đường dây 220 kV Bình Long – Tây Ninh" (sau đây gọi là Dự án) của Ban Quản lý dự án các công trình điện miền Trung (sau đây gọi là Chủ dự án) với các nội dung chủ yếu sau đây:

1. Phạm vi, quy mô, công suất của Dự án:

1.1. Xây dựng mới đường đường dây truyền tải điện trên không với những đặc điểm sau:

- Chiều dài tuyến: 72,6 km;

- Số mạch: 02;

- Cấp điện áp: 220 kV;

- Điểm đầu: Trạm biến áp 220 kV Bình Long;

- Điểm cuối: Trạm biến áp 220 kV Tây Ninh.

1.2. Xây dựng và lắp đặt thiết bị cho 02 ngăn đường dây 220 kV của Trạm biến áp 220 kV Bình Long và 02 ngăn đường dây 220 kV của Trạm biến áp 220 kV Tây Ninh.

2. Yêu cầu bảo vệ môi trường đối với Dự án:

2.1. Tổ chức thu gom, vận chuyển và xử lý toàn bộ các loại chất thải thông thường và chất thải nguy hại phát sinh trong quá trình thực hiện Dự án theo quy định tại Nghị định số 59/2007/NĐ-CP ngày 09 tháng 4 năm 2007 của Chính phủ về quản lý chất thải rắn, Thông tư số 12/2011/TT-BTNMT ngày 14 tháng 4 năm 2011 của Bộ Tài nguyên và Môi trường quy định về Quản lý chất thải nguy hại; tuân thủ nghiêm ngặt các quy định của pháp luật hiện hành về môi trường nước, trầm tích, không khí, tiếng ồn và độ rung trong quá trình thi công, vận hành Dự án.

2.2. Thực hiện các biện pháp phòng chống sạt lở, ngập úng, rửa trôi, xói mòn đất; các biện pháp giảm thiểu tác động tiêu cực đến đến hoạt động sản xuất nông nghiệp.

2.3. Thực hiện nghiêm túc các biện pháp cải tạo, tiếp địa công trình, nhà cửa; các quy định về an toàn điện của pháp luật hiện hành.

2.4. Thực hiện hoàn thổ và khôi phục cảnh quan các khu đất được giao làm mặt bằng phục vụ thi công.

2.5. Giáo dục, nâng cao nhận thức về bảo vệ môi trường cho cán bộ, công nhân viên làm việc cho Dự án.

2.6. Thực hiện chương trình giám sát môi trường và các công trình, biện pháp bảo vệ môi trường khác như đã đề xuất trong báo cáo đánh giá tác động môi trường; cập nhật, lưu giữ số liệu giám sát để cơ quan quản lý nhà nước về bảo vệ môi trường kiểm tra khi cần thiết.

3. Các điều kiện kèm theo:

3.1. Phối hợp với các cấp có thẩm quyền của địa phương thực hiện bồi thường, hỗ trợ, giải phóng mặt bằng, chuyển mục đích sử dụng đất theo các quy định hiện hành của pháp luật.

3.2. Phối hợp với các cơ quan chức năng quản lý giao thông và chính quyền địa phương để thống nhất kế hoạch thi công đường dây tại những điểm giao cắt với đường thủy, đường bộ; lắp đặt biển báo hoặc có hình thức thông báo kế hoạch phân luồng giao thông đến các chủ phương tiện giao thông trong thời gian kéo dây vượt đường thủy và đường bộ.

3.3. Thông tin rộng rãi cho chính quyền địa phương và cộng đồng dân cư nơi đường dây đi qua biết về các hoạt động thi công của Dự án.

3.4. Tuân thủ các quy định pháp luật về bảo tồn đa dạng sinh học, phòng chống cháy nổ và đảm bảo hành lang an toàn lưới điện trong quá trình thi công, vận hành Dự án.

Điều 2. Chủ dự án có trách nhiệm sau đây:

1. Lập, phê duyệt và niêm yết công khai kế hoạch quản lý môi trường của Dự án trước khi triển khai thực hiện dự án.

2. Thực hiện nghiêm túc các yêu cầu về bảo vệ môi trường quy định tại khoản 2 Điều 1 Quyết định này và các trách nhiệm khác theo quy định của pháp luật về bảo vệ môi trường.

Điều 3. Trong quá trình thực hiện, nếu Dự án có những thay đổi so với khoản 1 và khoản 2 Điều 1 của Quyết định này, Chủ dự án phải có văn bản báo cáo và chỉ được thực hiện những thay đổi sau khi có văn bản chấp thuận của Bộ Tài nguyên và Môi trường.

Điều 4. Quyết định phê duyệt báo cáo đánh giá tác động môi trường của Dự án là căn cứ để quyết định việc đầu tư Dự án; là cơ sở để các cơ quan quản lý nhà nước có thẩm quyền kiểm tra, thanh tra việc thực hiện công tác bảo vệ môi trường của Dự án.

Điều 5. Giao Tổng cục Môi trường chủ trì, phối hợp với Sở Tài nguyên và Môi trường tỉnh Tây Ninh, Bình Phước cùng các đơn vị có liên quan thuộc Bộ Tài nguyên và Môi trường kiểm tra, giám sát việc thực hiện các nội dung bảo vệ môi trường trong báo cáo đánh giá tác động môi trường đã được phê duyệt tại Quyết định nay.

Điều 6. Quyết định này có hiệu lực thi hành kể từ ngày ký./.

Nơi nhận:
- Ban Quản lý dự án các công trình điện miền Nam;
- Bộ trưởng Nguyễn Minh Quang (để báo cáo);
- Bộ Công Thương;
- Sở TN&MT các tỉnh Tây Ninh, Bình Phước;
- Thanh tra Bộ;
- Lưu: VT, TCMT, HS.MH (15).

KT. BỘ TRƯỞNG
THỨ TRƯỞNG

Bùi Cách Tuyến

APPENDIX D: EMERGENCY RESPONSE PLAN

123. The Contractor must develop emergency or incident response procedures (ERP) during construction. In the operational phase the operator/civil authorities will have responsibility for any emergencies or serious incidents. The construction phase should ensure:

i) Emergency Response Team (ERT) of the Contractor as initial responder;

ii) the District fire and police departments, emergency medical service, the Department of Public Health (DPH), collectively referred to as the External Emergency Response Team (EERT), as ultimate responders.

iii)

124. The Contractor will provide and sustain the required technical, human and financial resources for quick response during construction.

Table 30. Roles and Responsibilities in Emergency Incident Response

Entity	Responsibilities
Contractor Team (ERT)	- Communicates / alerts the EERT. - Prepares the emergency site to facilitate the response action of the EERT, e.g., vacating, clearing, restricting site. - When necessary and requested by the EERT, lends support / provides assistance during EERT's response operations.
External Emergency Response Team (EERT)	- Solves the emergency/incident
Contractor Resources	- Provide and sustain the people, equipment, tools and funds necessary to ensure Subproject's quick response to emergency situations. - Maintain good communication lines with the EERT to ensure prompt help response and adequate protection, by keeping them informed of Subproject progress.

125. The ERT will be led by the senior Contractor engineer (designated ERTL) on site with a suitably trained foreman or junior engineer as deputy. Trained first-aiders and security crew will be the core members of the ERT.

126. The Contractor will ensure that ERT members are physically, technically and psychologically fit for their emergency response roles and responsibilities.

127. Prior to the mobilization of civil works, the Contractor, through its Construction Manager, ERTL, in coordination with the EA/IA, will meet with the ultimate response institutions to discuss the overall construction process, including, but not limited to:

i) Subproject sites;
ii) construction time frame and phasing;
iii) any special construction techniques and equipment that will be used; i
iv) any hazardous materials that will be brought to and stored in the construction premise and details on their applications and handling/management system;
v) the Contractor's Emergency Management Plan
vi) names and contact details of the ERT members

128. The objective of this meeting is to provide the ultimate response institutions the context for:

i) their comments on the adequacy of the respective Emergency Management Plans
ii) their own assessment of what types, likely magnitude and likely incidence rate of potential hazards are anticipated
iii) the arrangements for coordination and collaboration.

129. To ensure effective emergency response, prior to mobilization of civil works, the Contractor will:

i) set up the ERT;
ii) set up all support equipment and facilities in working condition
iii) made arrangements with the EERT;
iv) conducted proper training of ERT members, and encouraged and trained volunteers from the work force; v) conducted orientation to all construction workers on the emergency response procedures and facilities, particularly evacuation procedures, evacuation routes, evacuation assembly points, and self-first response, among others; and vi) conducted drills for different possible situations.

130. To sustain effective emergency response throughout Subproject implementation an adequate budget shall be provided to sustain the capabilities and efficiency of the emergency response mechanism, the emergency response equipment, tools, facilities and supplies. Drills and reminders will take place regularly, the former at least every two months and the latter at least every month.

Alert Procedures

131. Means of communicating, reporting and alerting an emergency situation may be any combination of the following: i) audible alarm (siren, bell or gong); ii) visual alarm (blinking/rotating red light or orange safety flag); iii) telephone (landline); iv) mobile phone; v) two-way radio; and vi) public address system/loud speakers. Some rules relative to communicating/alerting will be:

(i) Whoever detects an emergency situation first shall immediately :
- call the attention of other people in the emergency site,
- sound the nearest alarm, and/or
- report/communicate the emergency situation to the ERT.

(ii) Only the ERTL and, if ERTL is not available, the Deputy ERTL are authorized to communicate with the EERT. Exceptional cases to this rule may be necessary and should be defined in the Emergency Management Plans.

(iii) When communicating/alerting an emergency to the EERT, it is important to provide them with at least: i) the type of emergency situation; ii) correct location of the emergency; ii) estimated magnitude of the situation; iii) estimated persons harmed; iv) time it happened; v) in case of a spill, which hazardous substance spilled; and vi) in case of fire and explosion, what caused it. Such details would allow the EERT to prepare for the appropriate response actions. For an effective reporting/alerting of an emergency situation:

(i) The names and contact details of the relevant persons and institutions should be readily available in, or near to, all forms of communication equipment, and strategically posted (at legible size) in all Subproject sites and vehicles:

- Most relevant construction/operations staffs namely, the ERTL, Deputy ERTL, first-aiders, supervising engineers, foremen
- EERT institutions/organizations
- Concerned village authority/ies
- IA Office, SS

(ii) All Subproject sites should have good access to any combination of audible and visual alarms, landline phones, mobile phones and two-way radio communication at all times.

(iii) Contractor's construction vehicles should also be equipped with the appropriate communication facilities.

Emergency Response Situations

132. The following tables suggest general procedures that will be refined in the final EMP during detailed design, and described in more detail in the Emergency Management Plans of the Contractor.

Table 31. Evacuation Procedure

Procedure	Remarks
▪ Move out as quickly as possible as a group, but avoid panic.	▪ All workers/staff, sub-contractors, site visitors to move out, guided by the ERT.
▪ Evacuate through the directed evacuation route.	▪ The safe evacuation shall have been determined fast by the ERTL/Deputy ERTL and immediately communicated to ERT members.
▪ Keep moving until everyone is safely away from the emergency site and its influence area.	▪ A restricted area must be established outside the emergency site, all to stay beyond the restricted area.
▪ Once outside, conduct head counts.	▪ Foremen to do head counts of their sub-groups; ERTL/Deputy ERTL of the ERT.
▪ Once outside, conduct head counts.	▪ Foremen to do head counts of their sub-groups; ERTL/Deputy ERTL of the ERT.
▪ Report missing persons to EERT immediately.	▪ ERTL/Deputy ERTL to communicate with the EERT.
▪ Assist the injured in evacuation and hand them over to the ERT first-aiders or EERT medical group	▪ ERT to manage injured persons to ensure proper handling.

Procedure	Remarks
▪ If injury warrants special care, DO NOT MOVE them, unless necessary and instructed/directed by the EERT.	▪ ERTL/Deputy ERTL communicates with EERT to get instructions/directions in handling the injured.

Table 32. Response Procedure During Medical Emergency

Procedure	Remarks
▪ Administer First Aid regardless of severity immediately.	▪ Fundamentals when giving First Aid: - Safety first of both the rescuer and the victim. - Do not move an injured person unless: - victim is exposed to more danger when left where they are, e.g., during fire, chemical spill - it would be impossible for EERT to aid victims in their locations, e.g., under a collapsed structure - instructed or directed by the EERT. ▪ First AID to be conducted only by a person who has been properly trained in giving First Aid.
▪ Call the EERT emergency medical services and/or nearest hospital.	▪ ERTL/Deputy ERTL or authorized on-site emergency communicator
▪ Facilitate leading the EERT to the emergency site.	▪ ERTL/Deputy ERTL to instruct: - an ERT member on- site to meet EERT in access road/strategic location. He/she shall hold orange safety flag to get their attention and lead them to site. - Other ERT members to clear access road for smooth passage of the EERT.
▪ If applicable, vacate site and influence area at once, restrict site, suspend work until further notice.	▪ Follow evacuation procedure.

Table 33. Response Procedure in Case of Fire

Procedure	Remarks
▪ Alert a fire situation.	▪ Whoever detects the fire shall immediately: - call the attention of other people in the site, - sound the nearest alarm, and/or - Foreman or any ERT member among

Procedure	Remarks
	the construction sub-group contacts the fire department (in this case it should be agreed on that it is alright for any ERT member in the sub-group to alert the fire department) - report/communicate the emergency situation to the ERTL/Deputy ERTL.
▪ Stop all activities/operations and evacuate.	▪ All (non-ERT) workers/staff sub-contractors, site visitors and concerned public to move out to safe grounds following the evacuation procedure.
▪ Activate ERT to contain fire/control fire from spreading.	▪ Guided by the training they undertook, ERT members assigned to mitigate the fire shall assess their own safety situation first before attempting to control fire spread.
▪ Call the nearest fire and police stations and, if applicable, emergency medical services.	▪ When alerting the EERT, ERTL will give the location, cause of fire, estimated fire alarm rating, any injuries.
▪ Facilitate leading the EERT to the emergency site.	▪ ERTL/Deputy ERTL to instruct: - an ERT member to meet the EERT in the access road or strategic location and lead them to the site. He/she shall hold the orange safety flag to get their attention and lead them to the site. - some ERT members to stop traffic in, and clear, the access road to facilitate passage of the EERT.
▪ ERT to vacate the site as soon as their safety is assessed as in danger.	▪ Follow appropriate evacuation procedure.

APPENDIX E: ENVIRONMENTAL COMPLIANCE AUDIT OF BINH LONG AND TAY NINH SUBSTATIONS

Binh Long 220 kV Substation

ENVIRONMENTAL COMPLIANCE AUDIT

Introduction

133. National Power Transmission Corporation (NPT) identified the 220 kV Binh Long - Tay Ninh transmission line sub-project be included on the list of loan proposals from Asian Development Bank (ADB) to improve the quality and reliability of electric power supply in Vietnam. The transmission lines will be constructed with starting point: the existing substation 220kV Binh Long. In order to accommodate the new 220 kV transmission line, the 220 kV Binh Long substation has to be extended by two bays for the line to Tay Ninh substation.

134. Pursuant to the ADB SPS (2009), an environmental compliance audit (ECA) for 220 kV Binh Long and 220 kV Tay Ninh substations is required because the substations form the end points of the new transmission line and therefore are associated facilities external to the ADB-financed transmission line. The ECAs are required to determine whether the two substations pose any environmental risk or impact on the transmission line.

1. OBJECTIVE

135. The main objective of the ECAs of the two substations are as follows:

- To determine whether the operations of the substation comply with regulations and guidelines for Viet Nam for electric power substation operation, and if there are any areas of substation operations that may may cause or is causing environmental impacts or risks.

Audit and Site Investigation Procedure

136. The environmental compliance audit is focused on the existing substations located at Thanh Tuan village, Thanh Luong commune, Binh Long district, Binh Phuoc province. The audit was conducted through site visit and inspection of the substation facilities and premises, interview with substation staff and validation of substation records and reports related to environmental management. The site visits were conducted during May, 2015.

INFORMATION NEEDED AND DESCRIPTION OF EXISTING SUBSTATIONS

Land occupied by existing substation and substation operation

137. he Binh Long 220 kV substation (formerly Phuoc Long 220 kV substation) operates within a property covering an area about 3ha. The substation is operated by Eastern Power Transmission within Power Transmission Company No.4. It started operating in 2011. Capacity of the substation is 110/220kV – 2 x 125MVA.

138. The substation is operated to improve the stability of power grid 110kV of Binh Phuoc – Tay Ninh areas and increasing power transmission capacity from hydropower plants of Thac Mo,extended Thac Mo, Can Don and Srokphunmieng to National grid.

Facilities and Equipment at Binh Long substation

139. Facilities in Binh Long substation include the following:

- Transformer 110/220kV – 2 x 125MVA.
- Side 220kV: 4 transmission bays of 220kV, 2 general bays of transformer 220kV, 1 communication bay.
- Side 110kV: 8 transmission bays, 02 general bays of transformer, 1 communication bay.
- Circuit breaker 220kV, 110kV, 22kV.
- Battery room.
- Substation building with office and control room.

140. There are 18 staff assigned to operate and conduct minor maintenance works on the substation. The staff work 24 hour shifts on alternative days with 2 shifts for 5 groups. All the major maintenance and inspections are done by the maintenance department. Once the substation staff notices any problem, they immediately inform the Eastern Power Transmission within Power transmission company No.4 to determine if major maintenance works is necessary.

141. Transformer maintenance and regular checking of transformers and equipment is done by the maintenance team of the substation. However, if a transformer or large equipment needs to be changed due to damage a contracting company is invited to tender services such as changing the transformer oil or changing to a new transformer.

Environmental Management at Substation:

Management of transformer oil.

142. There is no oil containment around transformer areas. Minor maintenance such as transformer oil refilling is done at the compound but major maintenance works are done outside through service contractors. Based on the inspection of the transformers the cooling oil used does not include PCBs.

143. The maintenance team of the substation performs regular inspection on the equipment and noise detection. If there is any abnormal condition that was detected during the daily inspection, check on the insulation oil is administered. Oil sample is collected and then sent to the laboratory oil analysis is done once every three months. There was no evidence of oil spillage during the site visit at Binh Long substation. New oil barrels were found and kept at the concrete warehouse building. Similarly, there was no oil spillage observed at the warehouse building.

Management of solid waste

144. Recyclable solid waste is sold to recyclers. Office waste such as paper and debris are dumped through the local waste collection system. Hazardous waste is stored in closed containers with warning labels on the cover. The substation has conducted the contract with functional units to transfer and handle waste as prescribed by Law.

Management of old batteries

145. There were no old batteries in battery room because unused batteries were not onsite. Old batteries are handled the same way as hazardous waste according to regulations when they need to be replaced.

Implementation of safety policies and procedures

146. Safety signage is found throughout the transformer and switchyard areas. The substation area and property is protected by a continuous fence to prevent unauthorized entry by the public. In terms of safety training and orientation, Power Transmission Company No.4 conducts safety training to all staff every year at power transmission unit. This includes safety orientation and training of all staff.

147. During the site visits workers were asked about their awareness of the safety policies. All workers indicated that they were fully aware of the safety policies, and that they are required to strictly observe the safety procedures. Informal safety orientation is conducted to make sure that all workers are wearing PPEs and safety shoes when working at the switchyard. Hard hats were being worn and also found at the control room. Safety monitoring is conducted according to Registration of Environmental Standard Reaching for 220kV Phuoc Long substation (now is 220kV Binh Long substation) according to No. 137/TNMT-MT dated 11/12/2004.

148. Environmental monitoring at the substation includes:

- Monitoring air environment
- Monitoring quality of wastewater
- Monitoring the electromagnetic field annually

Fire prevention

149. There are fire extinguishers kept at the office building, and outside in substation yard. There have been no accidents at the substation.

Permits

150. The substation has been in compliance with environmental law of Vietnam, including Certificates of Registration of Environmental Standard Reaching of Department of Natural Resource and Environment Of Binh Phuoc Province (see below). Another certification for safety is as follows:

- Certificate of eligibility for fire prevention and fighting of Binh Phuoc Province Public Security Department No. 57/DK-PCCC.

List person interviewed

151. The following substation staff were interviewed during the environmental audit:

1. Do Van Kham – engineer – head of substation.
2. Nguyen Tri Thanh – engineer – substation operation staff.
3. Ngo Van My – enginer – substation operation staff.
4. Nguyen Thanh Tan – engineer – substation operation staff.
5. Do Van Giap – watchman.

Department of Natural Resource and Environment
Binh Phuoc province

Socialist Republic of Vietnam
Independence – Freedom - Happiness

Binh phuoc, 11/12/2004

CERTIFICATE
Of Registration of Environmental Protection Reaching for 220kV Phuoc Long substation – South Vietnam Power Project Management Board

Director of Department of Natural Resource and Environment of Binh Phuoc province

CERTIFIES

Article 1: South Vietnam Power Project Management Board submitted Registration of Environmental Protection Reaching for 220kV Phuoc Long substation at Thanh Luong commune, Binh Long district, Binh Phuoc province dated 30/9/2004.

Article 2: the Project Owner has responsibilities to fully implement mitigation measures as showed in environmental protection reaching contents.

Article 3: The Environmental Protection Reaching of the Project constitutes the basis for environmental state management agencies to supervise, control and inspect implementation of environmental protection content of the Project.

Article 4: During operation, the Project Owner must fully implement environmental protection and mitigation measures and ensure waste handing to meet Vietnam environmental Standard.

Recipients:

Project owner;
Division of Natural resources and Environment;
Archival: VT;

On behalf of department of Natural Resource and Environment
Vice director

(signature and stamp)

Nguyen Chung Thom

SỞ TÀI NGUYÊN&MÔI TRƯỜNG
TỈNH BÌNH PHƯỚC
*****
Số: 1437 /TNMT-MT

CỘNG HOÀ XÃ HỘI CHỦ NGHĨA VIỆT NAM
Độc lập - Tự do - Hạnh phúc
----------*****----------

BẢN SAO

Bình Phước, ngày 10 tháng 10 năm 2004

PHIẾU XÁC NHẬN

BẢN ĐĂNG KÝ ĐẠT TIÊU CHUẨN MÔI TRƯỜNG

Trạm biến áp 220kV Phước Long – Ban quản lý
Dự án các công trình điện miền Nam

GIÁM ĐỐC SỞ TÀI NGUYÊN VÀ MÔI TRƯỜNG
TỈNH BÌNH PHƯỚC

XÁC NHẬN

Điều 1. *Ban quản lý Dự án các công trình điện miền Nam đã trình Bản đăng ký đạt tiêu chuẩn môi trường cho Trạm biến áp 220kV Phước Long tại xã Thanh Lương, huyện Bình Long, tỉnh Bình Phước ngày 30/9/2004.*

Điều 2. *Chủ đầu tư có trách nhiệm thực hiện đúng như những biện pháp khống chế ô nhiễm theo Bản đăng ký đạt tiêu chuẩn môi trường.*

Điều 3. *Bản đăng ký đạt tiêu chuẩn môi trường của Ban quản lý Dự án là căn cứ để Sở TN&MT kiểm tra việc thực hiện bảo vệ môi trường của Dự án.*

Điều 4. *Trong quá trình hoạt động, Ban quản lý Dự án phải thực hiện đầy đủ các biện pháp khống chế ô nhiễm, bảo vệ môi trường và đảm bảo xử lý các chất thải đạt tiêu chuẩn môi trường Việt Nam.*

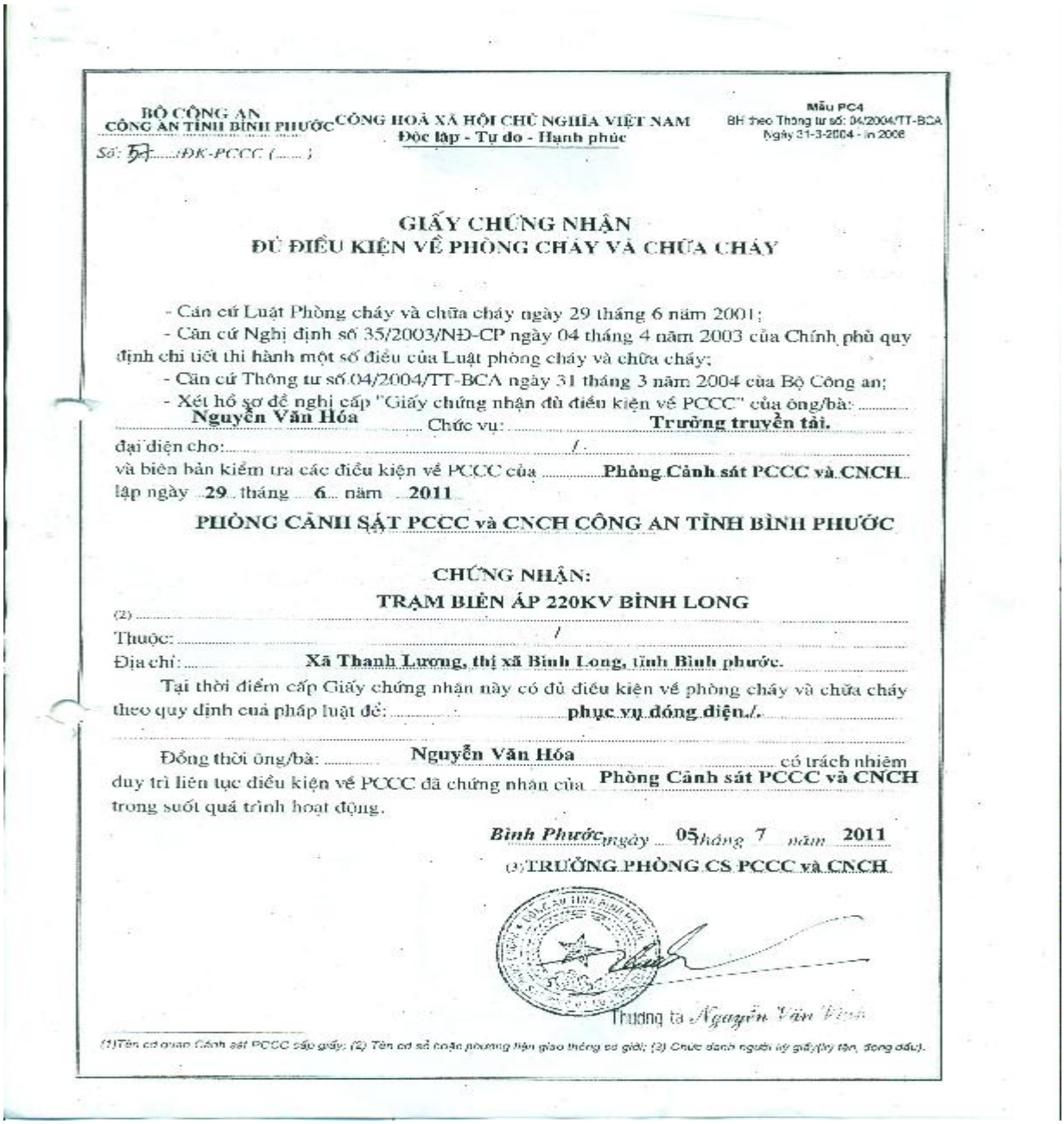
Chứng thực bản sao
đúng với bản chính.
Số chứng thực 7222 Quyển số 01-SCT/BS
ngày 25 tháng 12 năm 2011
CHỦ TỊCH UBND PHƯỜNG TÂN BÌNH
Bùi Anh Khoa

KT. GIÁM ĐỐC SỞ TÀI NGUYÊN VÀ MÔI TRƯỜNG
PHÓ GIÁM ĐỐC

Nguyễn Công Thiện

Nơi nhận:
- BQLDACCT điện miền Nam (để thực hiện);
- Lưu VT, P.MT.

Certificate of eligibility for fire prevention and fighting



BỘ CÔNG AN
CÔNG AN TỈNH BÌNH PHƯỚC

CỘNG HOÀ XÃ HỘI CHỦ NGHĨA VIỆT NAM
Độc lập - Tự do - Hạnh phúc

Mẫu PC4
BH theo Thông tư số: 04/2004/TT-BCA
Ngày 31-3-2004 - In 2008

Số: 57 /ĐK-PCCC (.....)

GIẤY CHỨNG NHẬN
ĐỦ ĐIỀU KIỆN VỀ PHÒNG CHÁY VÀ CHỮA CHÁY

- Căn cứ Luật Phòng cháy và chữa cháy ngày 29 tháng 6 năm 2001;
- Căn cứ Nghị định số 35/2003/NĐ-CP ngày 04 tháng 4 năm 2003 của Chính phủ quy định chi tiết thi hành một số điều của Luật phòng cháy và chữa cháy;
- Căn cứ Thông tư số 04/2004/TT-BCA ngày 31 tháng 3 năm 2004 của Bộ Công an;
- Xét hồ sơ đề nghị cấp "Giấy chứng nhận đủ điều kiện về PCCC" của ông/bà: **Nguyễn Văn Hóa** Chức vụ: **Trưởng truyền tải.**

đại diện cho: /.

và biên bản kiểm tra các điều kiện về PCCC của **Phòng Cảnh sát PCCC và CNCH** lập ngày **29** tháng **6** năm **2011**

PHÒNG CẢNH SÁT PCCC và CNCH CÔNG AN TỈNH BÌNH PHƯỚC

CHỨNG NHẬN:

TRẠM BIẾN ÁP 220KV BÌNH LONG

(2) /

Thuộc:

Địa chỉ: **Xã Thanh Lương, thị xã Bình Long, tỉnh Bình phước.**

Tại thời điểm cấp Giấy chứng nhận này có đủ điều kiện về phòng cháy và chữa cháy theo quy định của pháp luật để: **phục vụ đóng điện./.**

Đồng thời ông/bà: **Nguyễn Văn Hóa** có trách nhiệm duy trì liên tục điều kiện về PCCC đã chứng nhận của **Phòng Cảnh sát PCCC và CNCH** trong suốt quá trình hoạt động.

Bình Phước ngày 05 tháng 7 năm **2011**

(3) TRƯỞNG PHÒNG CS PCCC và CNCH

Trương tá *Nguyễn Văn Hóa*

(1)Tên cơ quan Cảnh sát PCCC cấp giấy; (2) Tên cơ sở hoặc phương tiện giao thông cơ giới; (3) Chức danh người ký giấy(ký tên, đóng dấu).

Tay Ninh 220 kV Substation

(Currently under construction)

Environmental Compliance

The 220 kV Tay Ninh substation is currently under construction thus the operation of the substation cannot be assessed for operational compliance. However, the substation was required to obtain an Environmental Compliance Certificate (ECC) before construction began as part of the environmental due diligence for the substation as part of the required environment impact assessment of the substation. The ECC issued by the Provincial Peoples Committee pursuant to the requirements of the Law on Environmental Protection (2014) as administered by the Department of Natural Resources and Environment is found below.

Relevant Information for 220 kV Tay Ninh substation

- Located in Ninh Thanh Ward, outside Tay Ninh City, Tay Ninh province.

- Location was approved by Tay Ninh province People's Committee via Document No. 2641/UBND-KTN dated 22/07/2008.

- Environmental Impact Assessment report of the 220 kV substation project was approved by Tay Ninh province people's committee No. 544/QD-UBND dated 18/3/2015.

- Substation is adjacent to provincial highway No. 784 which connects Ho Chi Minh City to Tay Ninh city (Figure 1) and is:
    - Bordered on northeast by provincial No. 784;
    - Bordered on southwest and southeast by upland area of cassava, rubber, custard apple plantations
    - Bordered on northwest by existing 110 kV Tay Ninh – Thac Mo transmission line.

- Total area of the substation: 37.1 ha.
- Features:
    - new 220/110/22kV substation is constructed and scheduled to be developed to 500 kV substation;
    - Voltage: 220/110/22kV;
    - substation has two transformers 220/110/22kV-250MVA. Current stage will install 1 transformer 250 MVA and associated equipment. Next stage (expected in 2020) will install second transformer
    - The substation will connect to new 220 kV Tay Ninh - Binh Long transmission line.

Before construction began land clearance and required compensation was completed. The have been no complaints from affected or local households during construction.

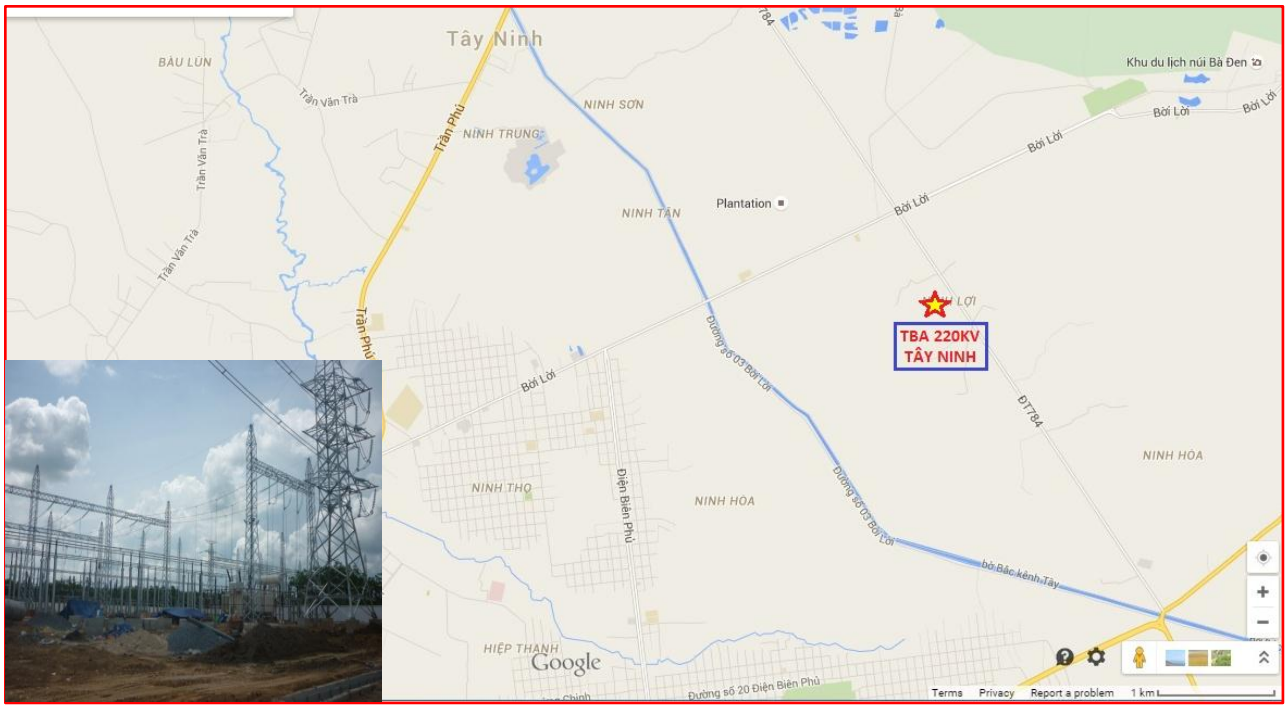


Figure 1. The Tay Ninh 220 kV substation location

-

During construction the contractors have undertaken mitigation measures to minimize the impact on environment as in Table 1. This will be required as part of the ECC.

Table 1 Mitigation measures to minimize the impact on environment

Project Activities	Location/responsibiity	Mitigation Measures
PRE-CONSTRUCTION ACTIVITIES		
Acquisition of land and payment of compensation	Construction areas	○ compensation and support and site clearance has completed and no any complaints of local people.
CONSTRUCTION ACTIVITIES		
Contractor prepares CEMP	Contractor	○ Contractor's Environmental Management Plan (CEMP) was prepared by the Contractor. There is an SE and EO
Establishment of contractor's facilities (camps, offices, quarries, etc).	Construction site	○ The contractors have constructed worker camp, and offices: Office located on site Some workers rented local house 100m from subproject site ○ reduce unnecessary clearing of vegetation. ○ no discharge of grey water or sewage allowed to surface water systems.

		○ fuel storage areas was located far from watercourse. ○ contractor's storage facilities surrounded by a security fence.
Noise and vibration	Construction site including road approaches	○ machines do not work simultaneously on the construction site. ○ construction vehicles must drive slowly in area
Dust management	Construction site	○ equipment/construction road selected to reduce emission and dust. ○ watering on hot days and shielding at construction area,
Prevention of soil erosion on construction site.	Construction site	○ contractors have complied with regulations during the construction, having safeguards to protect foundation, and pumping water out of foundation fit when raining or groundwater.
Storage and handling of: fuel and lubricants	Construction site	○ fuel stored in container with a lid, in a dry place, far from water source.
Public access to site	Construction site	○ erect warning signs and barriers around work areas. ○ site can only be accessed with permission of contractor
Community Safety from increased vehicle movements		○ all vehicles provided by the Contractor was properly maintained and operated in accordance with road laws
Workplace health and safety	Worker in construction site	○ erect warning signs and barriers around work areas ○ no drugs or alcohol allowed on-site ○ noise and dust to be controlled. ○ potable water, and washing and showering facilities.
Disposal of site waste	Construction site	○ all waste materials to be collected and sorted; (i). those that can be recycled and (ii) those that need to go to an approved landfill site for disposal.
Worker issues (i): Hiring of workers and HIV/AIDS issues	Worker in construction site	○ construction workers are mostly residents. ○ contractors also implement advocacy activities in HIV/AIDS awareness program

Corrective Action: All mitigation measures are being implemented

Environmental Certificate

TAY NINH PROVINCE PEOPLE'S COMMITTEE

SOCIALIST REPUBLIC OF VIETNAM
Independence – Freedom – Happiness

No: 544/QĐ-UBND

Tay Ninh, March 18th 2015

DECISION

Approval of Environmental impact assessment report of Project "220 kV Tay Ninh substation" Investor: National Power Transmission Corporation

CHẢIRMAN OF TAY NINH PROVINCE PEOPLE'S COMMITTEE

Pursuant to Law on Organization of People's Council and People's Committee dated November 26th, 2005;

Pursuant to Law on Environmental Protection dated June 23rd, 2014;

Pursuant to Decree no.29/2011/ND-CP dated April 18th, 2001 of the Government regarding Regulation on strategic environment assessment, environmental impact assessment, and environmental protection commitment;

Pursuant to Circular no. 26/2011/TT-BTNMT dated July 18th, 2011 of Ministry of Natural Resources and Environment clarifying some articles of Decree no.29/2011/ND-CP dated April 18th 2001 of the Government.

With reference to the request of the Appraisal Board EIA report of the Project "220kV Tay Ninh substation" by NPT on 20 November 2014 at DONRE.

Considering the content of EIA report of the project "220 kV Tay Ninh" has been edited, supplemented with written explanation of the 0672 / AMN-ĐB on 27 January 2015 of NPT

With reference to the request of the Director of Binh Phuoc DONRE in the Official Document no. 694/TTr-STNMT dated 12th February 2015.

DECISION

Article 1. Approving the Environmental impact assessment report of Project "220KV Tay Ninh substation" prepared by the National Power Transmission Corporation (hereinafter referred to as the project owner) with the following main contents:

1. The location, scale and capacity of the Project:220kV Tay Ninh substation including 02 transformers, capacity of each transformer is 220/110/22kV-250MVA.
2. The environmental protection requirement for the project:

2.1 Implementation of environmental protection measures during construction and operation the project must ensure that resources generated waste is treated thoroughly and meet the requirements specified in the Standards Vietnam (QCVN):

- Collecting and processing all waste generated during construction in accordance with regulations.
- Design, build rainwater collection systems with separate collection systems waste water; Project owners must collect and process the entire waste water arising from the activities of

the project ensures QCVN 14: 2008 / BTNMT column A, K = 1.2 before being discharged into the environment.

- Implement strictly measures to reduce the sources of dust emissions from construction activities of construction of the Project to environmental ambient air reaches QCVN 05: 2013 / BTNMT, QCVN 06: 2009 / BTNMT.
- During the construction and commissioning of this project activity must ensure it meets the requirements for noise and vibration are defined in QCVN 26: 2010 / BTNMT, QCVN 27: 2010 / BTNMT.

2.2. Collect, transport and treat all domestic solid wastes, regular solid wastes and hazardous solid wastes generated during project implementation as stipulated in Decree No. 59 / 2007/ND-CP dated April 9, 2007 by the Government on management of solid waste.

2.3. Collect, transport, stored and handled as prescribed in Decree No. 59 / 2007/ND-CP dated April 9, 2007 by the Government on management of solid waste and Circular No. 12/2011 / TT-BTNMT dated 14th April 2011 of the Ministry of Natural Resources and Environment regulations on hazardous waste management.

2.4. Implement management measures and technical prevention and fight and overcoming the incidents by fire or explosion in operation, repair and maintenance building, the risks and other environmental problem.

2.5. Ensure funding for the implementation of environmental protection activities. Fully implement the program management and environmental monitoring as described in the report of environmental impact assessment approved.

Article 2. The project owner shall be responsible the following

1. Project owner have to establish, approve and publicly list the environmental management plan of the project before the project implement;
2. Implement strict requirements on environmental protection provisions of Clause 2, Article 1 of this Decision and responsibilities as prescribed by law for the protection of the environment.

Article 3. During the implementation process, changes on the content of paragraphs 1 and 2 of Article 1 of this Decision, if any, shall be submitted in a written report by the project owner and shall only be made upon written approval of Tay Ninh Province People's Committee.

Article 4. The Decision approving the report on the assessment of environmental impact shall act as the foundation for project investment decision; as a basis for the State's competent management agencies to supervise and inspect the implementation of environmental protection of the project.

Article 5. Authorizing the Director of the Department of Natural Resources and Environment to authenticate the supplemental cover page of the approved report on the assessment of environmental impact and execute the examination and monitoring on the implementation of environmental protection in the approved report on the assessment of environmental impact of this Decision.

Article 6. This decision takes effect from the date of signing./../.

Destination:
– Chairman, Vice Chairman Huynh Quang;
- Owner Project
- DONRE

On behalf of Tay Ninh Province People Committee
VICE CHAIRMAN
(Signature and stamp)

Huynh Van Quang

ỦY BAN NHÂN DÂN TỈNH TÂY NINH	CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM Độc Lập – Tự Do – Hạnh Phúc
Số: 544 /QĐ-UBND	*Tây Ninh, ngày 18 tháng 3 năm 2015*

QUYẾT ĐỊNH

Phê duyệt báo cáo đánh giá tác động môi trường của Dự án Trạm biến áp 220kV Tây Ninh do Tổng Công ty Truyền tải điện Quốc gia làm Chủ dự án

CHỦ TỊCH ỦY BAN NHÂN DÂN TỈNH

Căn cứ Luật Tổ chức Hội đồng Nhân dân và Ủy ban Nhân dân ngày 26 tháng 11 năm 2003;

Căn cứ Luật Bảo vệ môi trường ngày 23 tháng 6 năm 2014;

Căn cứ Nghị định số 29/2011/NĐ-CP ngày 18 tháng 4 năm 2011 của Chính phủ Quy định về đánh giá môi trường chiến lược, đánh giá tác động môi trường, cam kết bảo vệ môi trường;

Căn cứ Thông tư số 26/2011/TT-BTNMT ngày 18 tháng 7 năm 2011 của Bộ Tài nguyên và Môi trường Quy định chi tiết một số điều của Nghị định số 29/2011/NĐ-CP ngày 18 tháng 4 năm 2011 của Chính phủ Quy định về đánh giá môi trường chiến lược, đánh giá tác động môi trường, cam kết bảo vệ môi trường;

Theo đề nghị của Hội đồng thẩm định báo cáo đánh giá tác động môi trường của Dự án Trạm biến áp 220 kV Tây Ninh do Tổng Công ty Truyền tải điện Quốc gia làm Chủ dự án họp vào ngày 20/11/2014 tại Sở Tài nguyên và Môi trường;

Xét nội dung báo cáo đánh giá tác động môi trường của Dự án Trạm biến áp 220kV Tây Ninh đã được chỉnh sửa, bổ sung gửi kèm Văn bản số 0672/AMN-ĐB ngày 27/01/2015 của Tổng Công ty Truyền tải điện Quốc gia;

Xét đề nghị của Giám đốc Sở Tài nguyên và Môi trường tại Tờ trình số: 694/TTr-STNMT ngày 12 tháng 02 năm 2015,

QUYẾT ĐỊNH:

Điều 1. Phê duyệt báo cáo đánh giá tác động môi trường của Dự án Trạm biến áp 220kV Tây Ninh được lập bởi Tổng Công ty Truyền tải điện Quốc gia (sau đây gọi tắt là Chủ dự án) với các nội dung chủ yếu sau đây:

1. Phạm vi, quy mô, công suất của Dự án: Trạm biến áp 220kV Tây Ninh gồm hai (02) máy biến áp, công suất mỗi máy biến áp là 220/110/22kV-250MVA.

2. Yêu cầu bảo vệ môi trường đối với Dự án:

2.1. Thực hiện các giải pháp bảo vệ môi trường trong suốt quá trình thi công xây dựng và đưa Dự án vào hoạt động phải đảm bảo các nguồn thải phát sinh được xử lý triệt để, đáp ứng các yêu cầu được quy định tại các Quy chuẩn Việt Nam (QCVN):

- Thực hiện đầy đủ các biện pháp đảm bảo an toàn trong quá trình thi công.

- Thu gom, xử lý các chất thải phát sinh trong quá trình thi công theo đúng quy định.

- Thiết kế, xây dựng hệ thống thu gom nước mưa riêng biệt với hệ thống thu gom nước thải sinh hoạt; Chủ dự án phải thu gom và xử lý toàn bộ nước thải sinh hoạt phát sinh từ hoạt động của Dự án đảm bảo đạt QCVN 14:2008/BTNMT, cột A, hệ số K = 1,2 trước khi thải ra môi trường.

- Thực hiện đầy đủ các biện pháp giảm thiểu các nguồn phát sinh bụi, khí thải từ hoạt động thi công xây dựng công trình của Dự án đảm bảo môi trường không khí xung quanh đạt QCVN 05:2013/BTNMT, QCVN 06:2009/BTNMT.

- Trong quá trình thi công xây dựng và đưa dự án vào hoạt động phải bảo đảm đáp ứng các yêu cầu về tiếng ồn và độ rung được quy định tại QCVN 26:2010/BTNMT, QCVN 27:2010/BTNMT.

2.2. Thu gom, vận chuyển và xử lý toàn bộ các loại chất thải rắn công nghiệp, bùn, đất và rác thải sinh hoạt trong quá trình thi công xây dựng và đưa Dự án vào hoạt động đảm bảo các yêu cầu về vệ sinh môi trường và tuân thủ các quy định của Nghị định số 59/2007/NĐ-CP ngày 09/4/2007 của Chính phủ về quản lý chất thải rắn.

2.3. Thu gom, vận chuyển, lưu giữ và xử lý toàn bộ các loại chất thải nguy hại của Dự án bảo đảm tuân thủ các quy định của Nghị định số 59/2007/NĐ-CP ngày 09/4/2007 của Chính phủ về quản lý chất thải rắn và Thông tư số 12/2011/TT-BTNMT ngày 14/4/2011 của Bộ Tài nguyên và Môi trường Quy định về quản lý chất thải nguy hại.

2.4. Thực hiện các biện pháp quản lý và kỹ thuật để phòng chống và khắc phục các sự cố do cháy, nổ và các rủi ro, sự cố môi trường khác trong giai đoạn thi công xây dựng và giai đoạn hoạt động của Dự án.

2.5. Đảm bảo kinh phí để thực hiện các hoạt động bảo vệ môi trường. Thực hiện đầy đủ chương trình quản lý và giám sát môi trường như đã trình bày trong báo cáo đánh giá tác động môi trường được phê duyệt.

Điều 2. Chủ dự án có các trách nhiệm sau đây:

1. Lập, phê duyệt và niêm yết công khai kế hoạch quản lý môi trường của Dự án trước khi triển khai thực hiện dự án.

2. Thực hiện nghiêm túc các yêu cầu về bảo vệ môi trường quy định tại Khoản 2 Điều 1 Quyết định này và các trách nhiệm khác theo quy định của pháp luật về bảo vệ môi trường.

Điều 3. Trong quá trình thực hiện nếu Dự án có những thay đổi so với các khoản 1 và 2 Điều 1 của Quyết định này, Chủ dự án phải có văn bản báo cáo và chỉ được thực hiện những thay đổi sau khi có văn bản chấp thuận của UBND tỉnh Tây Ninh.

Điều 4. Quyết định phê duyệt báo cáo đánh giá tác động môi trường của Dự án là căn cứ để quyết định việc đầu tư Dự án; là cơ sở để các cơ quan quản lý nhà

nước có thẩm quyền kiểm tra, thanh tra việc thực hiện công tác bảo vệ môi trường của Dự án.

Điều 5. Ủy nhiệm Sở Tài nguyên và Môi trường thực hiện việc kiểm tra, giám sát việc thực hiện các nội dung bảo vệ môi trường trong báo cáo đánh giá tác động môi trường đã được phê duyệt tại Quyết định này.

Điều 6. Quyết định này có hiệu lực thi hành kể từ ngày ký./.

Nơi nhận:
- CT, PCT Huỳnh Quang;
- Chủ dự án;
- Sở TNMT;
- UBND thành phố Tây Ninh;
- UBND phường Ninh Thạnh;
- LĐVP-CVK;
- Lưu: VP.UBND Tỉnh.

KT. CHỦ TỊCH
PHÓ CHỦ TỊCH

Huỳnh Văn Quang

Certificate of Registration of Environmental Protection Commitment for 220kV Tay Ninh substation

Tay Ninh town People Committee
Ref No. 55/GXN – UBND

Socialist Republic of Vietnam
Independence – Freedom - Happiness
Tay Ninh town, 12/12/2007

CERTIFICATE
Of Registration of Environmental Protection Commitment for 220kV Tay Ninh substation
The town People Committee
CERTIFIES

Article 1: On 26 November 2007, the Project Owner, Nguyen Cong Toan submitted Official Letter 5729 dated 26/11/2007 to register environmental protection commitment for the 220kV Tay Ninh substation.

Article 2: the Project Owner has responsibilities to fully implement the content of the stated environmental protection commitments.

Article 3: The environmental protection commitment of the Project constitutes the basis for environmental state management agencies to supervise, control and inspect implementation of environmental protection content of the Project.

Article 4: This Certificate is effective from the date of issuance.

Recipients:	**On behalf of Tay Ninh Town People Committee** **Vice Chairman** **(signature and stamp)**
Project owner; Division of Natural resources and Environment; Archival: VT;	**Nguyen Hong Quang**

ỦY BAN NHÂN DÂN THỊ XÃ TÂY NINH	CỘNG HOÀ XÃ HỘI CHỦ NGHĨA VIỆT NAM Độc lập - Tự do - Hạnh phúc
Số: 55 /GXN-UBND	*Thị xã Tây Ninh, ngày 12 tháng 12 năm 2007.*

GIẤY XÁC NHẬN ĐĂNG KÝ BẢN CAM KẾT BẢO VỆ MÔI TRƯỜNG của Dự án Trạm biến áp 220KV Tây Ninh

ỦY BAN NHÂN DÂN THỊ XÃ XÁC NHẬN

Điều 1. Ngày 26 tháng 11 năm 2007, Chủ dự án là ông Nguyễn Công Toàn, đã có Văn bản số 5729 ngày 26 tháng 11 năm 2007 đăng ký Bản cam kết bảo vệ môi trường của Dự án Trạm biến áp 220KV Tây Ninh.

Điều 2. Chủ dự án có trách nhiệm thực hiện đúng và đầy đủ những nội dung về bảo vệ môi trường nêu trong Bản cam kết bảo vệ môi trường.

Điều 3. Bản cam kết bảo vệ môi trường của dự án là cơ sở để các cơ quan quản lý Nhà nước về bảo vệ môi trường giám sát, kiểm tra, thanh tra việc thực hiện bảo vệ môi trường của Dự án.

Điều 4. Giấy xác nhận này có giá trị kể từ ngày ký.

Nơi nhận:
-Chủ Dự án;
-Phòng TN-MT/TX;
-Lưu: VT.
(03)

TM. ỦY BAN NHÂN DÂN THỊ XÃ
KT. CHỦ TỊCH
PHÓ CHỦ TỊCH

Nguyễn Hồng Quang

PHOTOS SURVEY AND INTERVIEW






APPENDIX F: HEALTH EFFECTS OF ELECTROMAGNETIC RADIATION EMF

152. The popular concern of negative health effects of exposure to electromagnetic fields (EMF) originally arose from exposure to high voltage transmission lines. Today the concern of EMF has spread to exposure to personal electronic sources of EMF such as microwave ovens and cellular phones. The World Health organization (WHO) as part of their mandate for monitoring global human health with specific focus on developing countries recently conducted an extensive review and assessment http://www.who.int/peh-emf/en/ of the validity of the concerns of EMF.

153. Provided below is the recent review and critical summary conducted by WHO of the extensive research on human health and EMF which is reprinted verbatim below. The portion of the research database published in primary is referenced follows the summary.

154. In the area of biological effects and medical applications of non-ionizing radiation approximately 25,000 articles have been published over the past 30 years. Despite the feeling of some people that more research needs to be done, scientific knowledge in this area is now more extensive than for most chemicals. Based on a recent in-depth review of the scientific literature, the WHO concluded that current evidence does not confirm the existence of any health consequences from exposure to low level electromagnetic fields. However, it is believed that some gaps in knowledge about biological effects exist and need further research.

Effects on general health:

155. Some members of the public have attributed a diffuse collection of symptoms to low levels of exposure to electromagnetic fields at home. Reported symptoms include headaches, anxiety, suicide and depression, nausea, fatigue and loss of libido. To date, scientific evidence does not support a link between these symptoms and exposure to electromagnetic fields. At least some of these health problems may be caused by noise or other factors in the environment, or by anxiety related to the presence of new technologies.

Effects on pregnancy outcome

156. Many different sources and exposures to electromagnetic fields in the living and working environment, including computer screens, water beds and electric blankets, radiofrequency welding machines, diathermy equipment and radar, have been evaluated by the WHO and other organizations. The overall weight of evidence shows that exposure to fields at typical environmental levels does not increase the risk of any adverse outcome such as spontaneous abortions, malformations, low birth weight, and congenital diseases. There have been occasional reports of associations between health problems and presumed exposure to electromagnetic fields, such as reports of prematurity and low birth weight in children of workers in the electronics industry, but these have not been regarded by the scientific community as being necessarily caused by the field exposures (as opposed to factors such as exposure to solvents).

Cataracts

157. General eye irritation and cataracts have sometimes been reported in workers exposed to high levels of radiofrequency and microwave radiation, but animal studies do not support the idea that such forms of eye damage can be produced at levels that are not thermally hazardous. There is no evidence that these effects occur at levels experienced by the general public.

Electromagnetic fields and cancer

158. Despite many studies, the evidence for any effect remains highly controversial. However, it is clear that if electromagnetic fields do have an effect on cancer, then any increase in risk will be extremely small. The results to date contain many inconsistencies, but no large increases in risk have been found for any cancer in children or adults.

159. A number of epidemiological studies suggest small increases in risk of childhood leukemia with exposure to low frequency magnetic fields in the home. However, scientists have not generally concluded that these results indicate a cause-effect relation between exposure to the fields and disease (as opposed to artifacts in the study or effects unrelated to field exposure). In part, this conclusion has been reached because animal and laboratory studies fail to demonstrate any reproducible effects that are consistent with the hypothesis that fields cause or promote cancer. Large-scale studies are currently underway in several countries and may help resolve these issues.

Electromagnetic hypersensitivity and depression

160. Some individuals report "hypersensitivity" to electric or magnetic fields. They ask whether aches and pains, headaches, depression, lethargy, sleeping disorders, and even convulsions and epileptic seizures could be associated with electromagnetic field exposure.

161. There is little scientific evidence to support the idea of electromagnetic hypersensitivity. Recent Scandinavian studies found that individuals do not show consistent reactions under properly controlled conditions of electromagnetic field exposure. Nor is there any accepted biological mechanism to explain hypersensitivity. Research on this subject is difficult because many other subjective responses may be involved, apart from direct effects of fields themselves. More studies are continuing on the subject.

The focus of current and future research

162. Much effort is currently being directed towards the study of electromagnetic fields in relation to cancer. Studies in search for possible carcinogenic (cancer-producing) effects of power frequency fields is continuing, although at a reduced level compared to that of the late 1990's.

163. The long-term health effects of mobile telephone usage is another topic of much recent research. No obvious adverse effect of exposure to low level radiofrequency fields has been discovered. However, given public concerns regarding the safety of cellular telephones, further research aims to determine whether any less obvious effects might occur at very low exposure levels.

a. Key emergent points

- A wide range of environmental influences causes biological effects. 'Biological effect' does not equal 'health hazard'. Special research is needed to identify and measure health hazards.
- At low frequencies, external electric and magnetic fields induce small circulating currents within the body. In virtually all ordinary environments, the levels of induced currents inside the body are too small to produce obvious effects.
- The main effect of radiofrequency electromagnetic fields is heating of body tissues.
- There is no doubt that short-term exposure to very high levels of electromagnetic fields can be harmful to health. Current public concern focuses on possible long-term health effects caused by exposure to electromagnetic fields at levels below those required to trigger acute biological responses.
- WHO's International EMF Project was launched to provide scientifically sound and objective answers to public concerns about possible hazards of low level electromagnetic fields.
- Despite extensive research, to date there is no evidence to conclude that exposure to low level electromagnetic fields is harmful to human health.
- The focus of international research is the investigation of possible links between cancer and electromagnetic fields, at power line and radio frequencies.

Independent Published Research on Health Effects of EMF

Repacholi MH, Cardis E (1997) Criteria for EMF health risk assessment. *Radiation Protection Dosimetry,* 72:305-312.

Repacholi MH (ed) (1998) Low-level exposure to radiofrequency electromagnetic fields: health effects and research needs. *Bioelectromagnetics,* 19:1-19.

McKinlay AF and Repacholi MH (eds) (1999) Exposure metrics and dosimetry for EMF epidemiology. *Radiation Protection Dosimetry,* 83(1-2):194.

Repacholi MH and Greenebaum B (eds) (1999) Interaction of static and extremely low frequency electric and magnetic fields with living systems: Health effects and research needs. *Bioelectromagnetics,* 20:133-160.

Foster KH, Vecchia P, Repacholi MH (2000) Science and the precautionary policy. *Science,* 288:979-981.

Kheifets L (2001) Electric and magnetic field exposure and brain cancer. *Bioelectromagnetics* 5: S120-S131.

Kheifets L (2001) Electric and Magnetic Fields and Occupational Health. *Patty's Industrial Hygiene and Toxicology*, Fifth Edition 100: 141-198.

Kheifets L, Greenberg R, Neutra R, Hester G, Poole C, Rall D, Banerjee G (2001) From epidemiology to policy: An EMF case study. *American Journal of Epidemiology* 154(12): S50-59.

Kheifets L, Hester G, Banerjee G (2001) The Precautionary Principle and EMF: Implementation and Evaluation. *Journal of Risk Research* 4(2): 113-125.

Mezei G, Kheifets L (2001) "Is There any Evidence for Differential Misclassification or Bias Away from the Null in the Swedish Childhood Cancer Study?" Letter to the Editor, *Epidemiology* 12(6):750.

Repacholi MH (2001) Health risks from the use of mobile phones. *Toxicology Letters* 120: 323-331.

Foster KR, Osepchuk JM, and Repacholi MH (2002) Environmental impacts of electromagnetic fields from major electrical technologies. *Environmental Health Perspectives*

Goldstein LS, Kheifets L, van Deventer TE, Repacholi MH (2002) Comments on the paper "Long-term exposure of Em -Pim1 transgenic mice to 898.4 MHz microwaves does not increase lymphoma incidence" Radiation Research. *Radiation Research* 158: 357-364.

Goldstein LS, Kheifets L, van Deventer TE, Repacholi MH (2002) Further comments on "Long-term Exposure of E&mgr;-Pim1 Transgenic Mice to 898.4 MHz Microwaves Does Not Increase Lymphoma Incidence" by Utteridge et al., *Radiation Research* 158, 357-364 (2002)

Kheifets L, Thrall N (2002) Electromagnetic Fields and Health. *Macmillians Guide to Pollution*

Litvak E, Foster KR, and Repacholi MH (2002) Health and safety implications of exposure to electromagnetic fields in the frequency range 300 Hz to 10 MHz., *Bioelectromagnetics,* 23(1):68-82.

Mezei G, Kheifets L (2002) Clues to the possible viral etiology of childhood leukemia. *Technology* 9: 3-14.

Repacholi MH (2002) Assessment of the Health Effects of EMF Exposure. *The Radio Science Bulletin* 301: 14-24.

Sahl J, Mezei G, Kavet R, McMillan A, Silvers A, Sastre A, Kheifets L (2002) Occupational magnetic field exposures and cardiovascular mortality in a cohort of electric utility workers. *American Journal of Epidemiology* 156:913-918.

Dewhirst MW, Lora-Michiels M, Viglianti BL, Dewey WC, and Repacholi MH (2003) Carcinogenic effects of hyperthermia. *International Journal of Hyperthermia,* 19(3):236-251

Goldstein LS, Dewhirst MW, Repacholi MH, and Kheifets L (2003) Summary, conclusions and recommendations: adverse temperature levels in the human body, *International Journal of Hyperthermia,* 19(3):373-384

Kheifets L, Repacholi MH, and Saunders R (2003) Thermal stress and radiation protection principles. *International Journal of Hyperthermia,* 19(3):215-224

McKinlay A, Repacholi MH (2003) (eds) Weak electric fields effects in the body. *Radiation Protection Dosimetry* 106 (4) 2003

Repacholi MH (2003) WHO's health risk assessment of ELF fields. *Radiation Protection Dosimetry,* 106(4):297-299

Riadh W. Habash Y, Brodsky LM, Leiss W, Krewski D, Repacholi MH (2003) Health Risks of Electromagnetic Fields. Part I: Evaluation and Assessment of Electric and Magnetic Fields. *Critical Review in Biomedical Engineering*, 31(3&4):219–273

van Deventer TE, Repacholi MH (2004) Effet de la Téléphonie mobile su la santé humaine: état des connaissances scientifiques, *Droit de l'environnement dans la pratique*, 8, 708-724

Kheifets L, Repacholi M, Saunders R, van Deventer TE (2005) Sensitivity of Children to Electromagnetic Fields, *Pediatrics*, August 2005, 303-313

Kheifets L, Sahl J, Shimkhada R, Repacholi MH (2005) Developing policy in the face of scientific uncertainty: interpreting 0.3 µT or 0.4 µT cut points from EMF epidemiologic studies, *Risk Analysis*, 25 (4), vol. 5, no.1, 927-935

van Deventer TE, Saunders R, Repacholi MH (2005) WHO health risk assessment process for static fields, *Progress in Biophysics and Molecular Biology*, 87, 355-363

Kheifets L, van Deventer TE, Lundel G, Swanson J (2006) Le principe de précaution et les champs électriques et magnétiques : mise en œuvre et évaluation, *Environnement, risques et santé*, Jan-Feb 2006, 43-53

van Rongen E, Saunders R, van Deventer TE, Repacholi MH (2006) Static fields: Biological effects and mechanisms relevant to exposure limits. *Health Physics*, June 2007, vol. 92, no. 6, 584-590

Valberg P, van Deventer TE, Repacholi MH (2007) Workgroup Report: Base Stations and Wireless Networks: Radiofrequency (RF) Exposures and Health Consequences. *Environmental Health Perspectives*, March 2007, vol. 115, no. 3, 416-424

van Deventer TE, Simunic D, Repacholi MH (2007) EMF standards for human health, chapter in *Handbook of Biological Effects of Electromagnetic Fields*, 3rd ed., Biological and Medical Aspects of Electromagnetic Fields, F. Barnes and B Greenebaum, eds., 277-292

van Deventer E, Foster K (2008) Risk Assessment and Risk Communication for Electromagnetic Fields: A World Health Organization Perspective, chapter in book *The Role of Evidence in Risk Characterization: Making Sense of Conflicting Data*, P. Wiedemann and H. Schütz, eds., WILEY-VCH, 13-24