

Environmental Safeguards Due Diligence Report

Due Diligence Report
April 2016

INO: Java-Bali 500-Kilovolt Power Transmission Crossing

Prepared by PT PLN Persero for the Government of Indonesia and the Asian Development Bank.

CURRENCY EQUIVALENTS

(as of 30 April 2016)

Currency unit	–	rupiah (Rp)
Rp1.00	=	\$0.0000757060
\$1.00	=	Rp13,209

ABBREVIATIONS

ADB	–	Asian Development Bank
COD	–	commercial operation date
Ext	–	extension (of substations)
EMF	–	electromagnetic field
GIS	–	gas insulated substations
GOI	–	Government of Indonesia
LARP	–	land acquisition and resettlement plan
O&M	–	operation and maintenance
PCB	–	polychlorinated biphenyl
PLN	–	Perusahaan Listrik Negara (Persero) (State Electricity Company)
SOP	–	standard operating procedure
TB	–	trafo bay
Trf	–	transformers
Upr	–	upgrading (of substations)

WEIGHTS AND MEASURES

kV (kilovolt)	–	unit of voltage, equal to 1,000 volts
MVA (megavolt-ampere)	–	unit of apparent power

NOTE

- (i) In this report, "\$" refers to US dollars.

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Updated Due Diligence Review of Component 7

Upgrading and Extension of 11 substations, Java Bali 500 kV Transmission Line Project

I. Introduction

On 2012, Due Diligence review of 26 Substations under component 7 has been prepared by PLN. On April 2013, PLN has proposed to revise scope of project under component 7 to 11 substation due to technical reason which are: some related 150 kV substation at that time have not been operated therefore the transformer extending cannot be done, limitation of the development of 70 kV in the Java Bali System therefore the transformer 70/20 kV will use existing transformer (use old transformer), and loading growth in existing transformer at Gilimanuk substation will not need as much 60 MVA. From 11 substations, 9 substations are come from original list and 2 substations are additional scope.

The new proposed component 7 will either extend or upgrade 11 existing 150 kV substations through the provision of new 150kV/20kV 60 MVA transformers (substation extension) or replacement of existing lower capacity transformers with new 150kV/20kV 60 MVA transformers (substation upgrading). The component will improve the reliability, quality and efficiency of power supply in the Java-Bali grid, and ensure substation capacity in Bali to distribute the power transmitted by the Project. The component will be co-financed by ADB. This project have very small footprints, all of component within the boundaries of existing substations and the severity and risk environmental and social impact are low.

This is an environmental review of Component 7, and is based on site visits to substations in Bali and Java undertaken in March 2015. The purpose of the review is to assess environmental impacts that may occur during Component 7 implementation, including land acquisition, PCB issues, health impacts from electromagnetic fields (EMFs), pollution from transformer oil, etc., and to develop appropriate mitigations.

PLN's decision to either extend or upgrade substations with new 150kV/20kV transformers for electricity distribution is based on existing and forecast electricity demand in the substation service area and the availability of extension land. As extension involves installation of new transformers, no used transformers requiring disposal will be generated with substation extensions.

When the extension of substations through new transformers is not appropriate due to the unavailability of land or lack of current or future demand, then existing transformers will be upgraded to 150 kV/ 20 kV. The existing transformers will be removed and transported to another location in Indonesia where the electricity consumption is still low and can be handled by the existing transformer. Thus, no used transformers requiring disposal will be generated by either substation extension or upgrading.

II. Component Description

Table 1 provides an overview of the Component 7 activities.

III. Site Survey

Site survey for Due Diligence of component 7 was conducted on March 2015 by PLN Environmental team.

Table 1: List of 11 substations to be extended/upgraded, Component 7

Substation	District/Region	Capacity original (Voltage)	Scope of Project	Capacity Trafo (MVA/LB)	Project cost (Million USD)	COD	Remarks
Lumajang	Lumajang, East Java	150/20 kV	Ext, 1 TB, 1 Trf	60	2.15	2017	Original scope
Alta prima	Surabaya, East Java	150/20 kV	Upr, 1 TB, 1 Trf	60	1.71	2017	Original scope
Babat/Baureno	Bojonegoro, East Java	150/20 kV	Upr, 1 TB, 1 Trf	60	1.71	2017	Additional Scope
Cerme	Gresik, East Java	150/20 kV	Ext, 1 TB, 1 Trf	60	2.15	2018	Original scope
Manyar	Gresik, East Java	150/20 kV	Ext, 1 TB, 1 Trf	60	2.15	2018	Original scope
Banaran	Kediri, East Java	150/20 kV	Ext, 1 TB, 1 Trf	60	2.15	2018	Original scope
Sampang	Sampang, East Java	150/20 kV	Upr, 1 TB, 1 Trf	60	1.71	2018	Original scope
Wonokromo	Surabaya, East Java	150/20 kV	Ext, 1 TB, 1 Trf	60	2.15	2019	Additional Scope
Sby. Selatan (Wonorejo)	Surabaya, East Java	150/20 kV	Ext, 1 TB, 1 Trf	60	2.15	2019	Original scope
Negara	Negara, Bali	150/20 kV	Ext, 1 TB, 1 Trf	60	2.15	2019	Original scope
Payangan	Glanyar, Bali	150/20 kV	Upr, 1 TB, 1 Trf	60	1.71	2019	Original scope

Notes: Ext = Extension of substation; Upr = Upgrade of substation; TB=Installation of Trafo Bay; Trf = Installation of Transformer, COD=Commercial Operating Date

The survey took into account the following issues:

1. Existing conditions: a) land acquisition issues, involuntary resettlement and compensation for lost assets (i.e. trees or crops); b) PCB risks; solid waste disposal; handling of transformer oils, etc.
2. During constructions stage: storage, handling, use and disposal of hazardous materials such as transformer oils; soil and water contamination; PCB risks; health and safety risks; removal of vegetation and earthworks and construction activities including access ways and construction platforms; and solid waste.
3. Operational Stage: Operating and Maintenance (O & M); storage, handling, use and disposal of hazardous materials such as transformer oils; EMF exposure to workers and community; and solid wastes.
4. GoI Regulation and PLN Standard Operating Procedures (SOPs) to undertake environmental health and safety control and monitoring during construction and operation.

IV. Site Visit Findings

Site visit findings are summarized in Table 2. Annex A presents existing transformers equipment and environmental conditions at each substation.

V. Impacts and Mitigations

1. Existing conditions:

- a. There are no resettlements issues in the substations to be extended. Land area is available for transformer extension in all of substation, and is also available for a control room if required.
- b. All substations located at modified environment and there are no environmentally sensitive areas that will be affected by the substation upgrading or extension.

- c. There are no risks associated with PCB handling or disposal. PCBs have been banned since 1970, and the substations assessed were constructed after that year. Handling of transformer oil is adequate through periodic testing and monitoring from the control room.
- d. all substation transformers have adequate spill containment berms.

2. During construction:

- a. Storage, handling and disposal of hazardous materials:
 - i. For new installations restrictions on the use of PCBs will be included as a requirement in the design and bidding contract documents.
 - ii. For replacement (upgrading) of existing transformers, transformers oils will be removed prior to transportation and either reused or taken for recycling at registered recycling facilities, , or for disposal at registered hazardous waste disposal facilities if recycling is not available .
- b. All new transformers, either for substation extension or upgrading, will be equipped with suitably sized impervious spill containment berms made of precast and reinforced concrete in accordance with relevant national standards.
- c. For replacement (upgrading) of existing transformers, transformers oils will be removed prior to transportation, tested, and either reused or taken for recycling at registered recycling facilities,, or for disposal at registered hazardous waste disposal facilities.
- d. Spoil from excavation for the transformer bases will be only a minor impact since the all sub station located at flat areas and volume of soil excavated will be very small. Other construction wastes will also be minimal. Spoil will be reused to the extent possible and appropriate spoil and waste disposal will be a requirement in the design and bidding contract documents.




3. During Operation:

- a. Transformers will be operated according to Government of Indonesia and PLN Standard Operating Procedures (SOPs), thereby mitigating risks associated with storage, handling, use and disposal of hazardous materials such as transformer oils; and health and safety issues including EMF exposure to workers and the local community. Regulations and SOPs related to emergency response and readiness and occupational health and safety are presented in Annex C.
- b. Transformer oil performance and quality will be monitored and managed by control room operators and through routine testing and analysis.




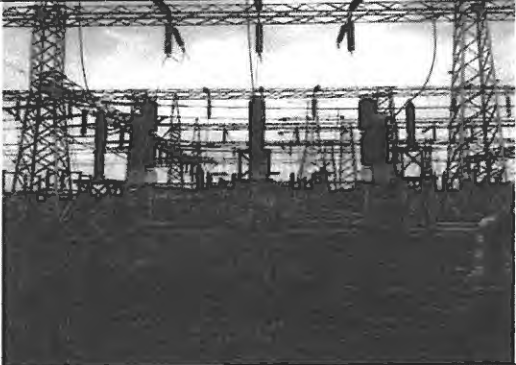
VI. Conclusion

Based on the survey results there are no resettlement issues expected with Component 7. There is no risk associated with PCB handling or disposal as PCBs have been banned since 1970, the substations assessed were constructed after that year, and restrictions on the use of PCBs in new transformers will be included as a requirement in the design and bidding contract documents. All transformers, either for substation extension or upgrading, will be equipped with water tight spill containment berms made of precast and reinforced concrete in accordance with relevant national standards. Minor impact from construction spoil and wastes are localized and short-term and can be mitigated through appropriate disposal. Operational risks associated with emergencies, hazardous materials and health and safety will be addressed through the application of GoI regulations and PLN SOPs, and transformer oil performance and quality will monitored and managed by control room operators and through routine testing and analysis. Overall it is concluded that Component 7 will have minimal negative environmental impacts, and it is recommended that the component proceed with the application of the mitigation measures and PLN SOP and GoI regulations referenced in this report.




Annex A: Survey Results of Existing Substation Transformers and Environmental Conditions and Issues

NO.	SUBSTATION	PICTURE OF LAND REQUIRED AND LAND AVAILABLE
1	<p>LUMAJANG SUBSTATION Project Scope : Ektension Trafo #3 Proposed capacity: 1 x 60 MVA Land Location : In the substation. The substation is surrounded by residential and paddy field. Land Status : PLN's Land Land Use : Existing transformer Conclusion : no adverse environmental impacts Environmental , category C</p>	
2	<p>GIS WONOKROMO Project Scope : Ektension Trafo #3 Proposed capacity: 1 x 60 MVA Land Location : In the substation. The substation is located in urban residential Land Status : PLN's Land Land Use : Existing transformer placement, empty land Conclusion : no adverse environmental impacts Environment, category C</p>	
3	<p>BANARAN SUBSTATION Project Scope : Ektension Trafo #3 Proposed capacity: 1 x 60 MVA Land Location : In the substation. The substation is surrounded by paddy field Land Status : PLN's Land Land Use : Existing transformer Conclusion : no adverse environmental impacts Resettlement, category C</p>	
4	<p>MANYAR SUBSTATION Project Scope : Ektension Trafo #3 Proposed capacity: 1 x 60 MVA Land Location : In the substation. The substation is located in industrial area Land Status : PLN's Land Land Use : Existing transformer Conclusion : no adverse environmental impacts Environment, category C</p>	

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NO.	SUBSTATION	PICTURE OF LAND REQUIRED AND LAND AVAILABLE
5	<p>CERME SUBSTATION Project Scope : Ektension Trafo #3 Proposed capacity: 1 x 60 MVA Land Location : In the substation. The substation is surrounded by residential and paddy field. Land Status : PLN's Land Land Use : Existing transformer Conclusion : no adverse environmental impacts Environment, category C</p>	
6	<p>SAMPANG SUBSTATION Project Scope : Uprating Trafo #1 Proposed capacity: 1 x 60 MVA Land Location : In the substation. The substation is located in residential area. Land Status : PLN's Land Land Use : Existing transformer Conclusion : no adverse environmental impacts Environment, category C</p>	
7	<p>SURABAYA SELATAN SUBSTATION Project Scope : Uprating Trafo #3 Proposed capacity: 1 x 60 MVA Land Location : In the substation. The substation is surrounded by residential and paddy field. Land Status : PLN's Land Land Use : Existing transformer placement, empty land Conclusion : no adverse environmental impacts Environment, category C</p>	
8	<p>ALTAPRIMA SUBSTATION Project Scope : Uprating Trafo #1 Proposed capacity: 1 x 60 MVA Land Location : In the substation. The substation is located in industrial area. Land Status : PLN's Land Land Use : Existing transformer placement, empty land Conclusion : no adverse environmental impacts Environment, category C</p>	

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NO.	SUBSTATION	PICTURE OF LAND REQUIRED AND LAND AVAILABLE
9	<p>BABATSUBSTATION Project Scope : Uprating Trafo #1 Proposed capacity: 1 x 60 MVA Land Location : In the substation. The substation is surrounded by residential area and paddy field. Land Status : PLN's Land Land Use : Existing transformer Conclusion : no adverse environmental impacts Environment, category C</p>	
10	<p>NEGARA SUBSTATION Project Scope : Uprating Trafo #3 Proposed Capacity : 1 x 60 MVA Land Location : In the substation. The substation is surrounded by paddy field area. Land Use : Existing transformer Conclusion : no adverse environmental impacts Environment, category C</p>	
11	<p>PAYANGAN SUBSTATION Project Scope : Uprating Trafo #2 Proposed Capacity : 1 x 60 MVA Land Location : In the substation. The substation is surrounded by residential. Land Use : Existing transformer Conclusion : Minimum environmental impact Environment, category C</p>	

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