

Environmental and Social Impact Assessment Report

Project Number: 50182-001
November 2018

INO: Riau Natural Gas Power Project Non-technical Summary

Prepared by ESC for the Asian Development Bank

The environmental and social impact assessment is a document of the project sponsor. The views expressed herein do not necessarily represent those of ADB's Board of Directors, Management, or staff, and may be preliminary in nature. Your attention is directed to the "Terms of Use" section of this website.

In preparing any country program or strategy, financing any project, or by making any designation of or reference to a particular territory or geographic area in this document, the Asian Development Bank does not intend to make any judgments as to the legal or other status of or any territory or area.



Riau 275 MW Combined Cycle Gas Power Plant IPP - ESIA

Medco Ratch Power Riau

Non-Technical Summary

AM039100-400-GN-RPT-1016 | V2

November 2018



Riau 275 MW Combined Cycle Gas Power Plant IPP - ESIA

Project No: AM039100
 Document Title: Non-Technical Summary
 Document No.: AM039100-400-GN-RPT-1016
 Revision: V2
 Date: November 2018
 Client Name: Medco Ratch Power Riau
 Project Manager: Eamonn Morrissey
 Author: Charlotte Moore
 File Name: \\jacobs.com\NZProjects\AENVW\Projects\AM039100
 Riau\Deliverables\ESIANTS\AM039100_Riau Non-Technical
 Summary_V1_Working.docx

Jacobs New Zealand Limited

Level 3, 86 Customhouse Quay,
 PO Box 10-283
 Wellington, New Zealand
 T +64 4 473 4265
 F +64 4 473 3369
 www.jacobs.com

© Copyright 2018 Jacobs New Zealand Limited. The concepts and information contained in this document are the property of Jacobs. Use or copying of this document in whole or in part without the written permission of Jacobs constitutes an infringement of copyright.

Limitation: This document has been prepared on behalf of, and for the exclusive use of Jacobs' client, and is subject to, and issued in accordance with, the provisions of the contract between Jacobs and the client. Jacobs accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this document by any third party.

Document history and status

Revision	Date	Description	By	Review	Approved
V0	08/08/2018	Draft for MRPR Review	C Moore	B Clarke	B Clarke
V1	09/11/2018	Final	C.Duncan	B Clarke	B Clarke
V2	28/11/2018	Final updated	C Duncan	B Clarke	B Clarke

Contents

1.	Introduction	4
1.1	Overview	4
1.2	What is the Project?	4
2.	The Project	6
2.1	Why is the Project Needed?	6
2.2	Where is the Project Located?	6
2.3	What Will the Project Look Like?	8
2.4	What land requirements will there be?	9
2.5	When Will Construction Start?	9
2.6	What Will Happen During the Construction Phase?	10
2.7	What Will Happen During the Operation Phase?	10
3.	Description of the Environment	13
3.1	What is the Condition of the Physical Environment at the Site?	13
3.2	What is the Condition of the Biological Environment at the Site?	14
3.3	What is the Condition of the Economy and Communities at the Site?	16
4.	Consultation	21
4.1	What Consultation Has Occurred?	21
4.2	What Has the Feedback of Consultation Been So Far?	21
4.3	What Commitments will MRPR Make to Address Concerns?	22
4.4	Is There an Opportunity to Comment on the Project?	23
5.	Managing Environmental and Social Impacts	24
5.1	How Will the Environment Be Affected During Construction?	24
5.2	How Will the Environment Be Affected During Operation?	25
5.3	How Will the People Be Affected?	26
6.	Mitigation and Monitoring	29
6.1	What Will Be Done to Reduce the Potential Impacts?	29
6.2	What Will Be Done to Monitor the Potential Impacts	29
7.	Conclusion	30

Important note about your report

The sole purpose of this report and the associated services performed by Jacobs New Zealand Limited (Jacobs) is to describe the Environmental and Social Impact Assessment (ESIA) for the Riau IPP Project, in accordance with the scope of services set out in the contract between Jacobs and the Client. That scope of services, as described in this report, was developed with the Client.

In preparing this report, Jacobs has relied upon, and presumed accurate, any information (or confirmation of the absence thereof) provided by the Client and/or from other sources. Except as otherwise stated in the report, Jacobs has not attempted to verify the accuracy or completeness of any such information. If the information is subsequently determined to be false, inaccurate or incomplete then it is possible that our observations and conclusions as expressed in this report may change.

Jacobs derived the data in this report from information sourced from the Client (if any) and/or available in the public domain at the time or times outlined in this report. The passage of time, manifestation of latent conditions or impacts of future events may require further examination of the project and subsequent data analysis, and re-evaluation of the data, findings, observations and conclusions expressed in this report. Jacobs has prepared this report in accordance with the usual care and thoroughness of the consulting profession, for the sole purpose described above and by reference to applicable standards, guidelines, procedures and practices at the date of issue of this report. For the reasons outlined above, however, no other warranty or guarantee, whether expressed or implied, is made as to the data, observations and findings expressed in this report, to the extent permitted by law.

This report should be read in full and no excerpts are to be taken as representative of the findings. No responsibility is accepted by Jacobs for use of any part of this report in any other context.

This report has been prepared on behalf of, and for the exclusive use of, Jacobs's Client, and is subject to, and issued in accordance with, the provisions of the contract between Jacobs and the Client. Jacobs accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this report by any third party.

1. Introduction

1.1 Overview

This Non-Technical Summary (NTS) provides an overview, in non-technical language, of the main findings of the Environmental and Social Impact Assessment (ESIA) prepared for the construction and operation of the Riau 275 MW Gas Fired Combined Cycle Power Plant (CCPP) Independent Power Producer (IPP) Project (referred to hereafter as the 'Project').

It is important to note that this NTS does not, and is not intended to, convey all of the information relating to the Project and its potential environmental and social impacts. By necessity, the text provided herein is a summary of the detailed assessments discussed in the ESIA. Therefore, for detailed information pertaining to any part of this NTS, please refer to the following ESIA Volumes which is available at the offices of Medco Ratch Power Riau (MRPR):

- Volume 1: Introduction;
- Volume 2: Environmental Impact Assessment (EIA);
- Volume 3: Social Impact Assessment (SIA);
- Volume 4: Environmental and Social Management Plan (ESMP) and Framework Environmental and Social Management System (ESMS); and
- Volume 5: Technical Appendices.

1.2 What is the Project?

The key components of the Project include:

- 275 MW gas turbine combined cycle power plant (CCPP) burning natural gas fuel only, referred to herein as the power plant;
- 40 km long underground gas pipeline which will bring fuel to the power plant;
- 150 kV (kilovolt) switchyard;
- 750 m long overhead 150 kV transmission line to connect the power plant to the electricity grid via interception with the existing Tenayan – Pasir Putih 150 kV transmission line;
- 500 m access road between the main road and the north of the power plant site;
- Temporary jetty for transportation of heavy equipment to site during construction; and
- 3 km water supply and discharge pipelines to and from the Siak River, to the power plant site.

Figure 1.1 shows the Project key components.

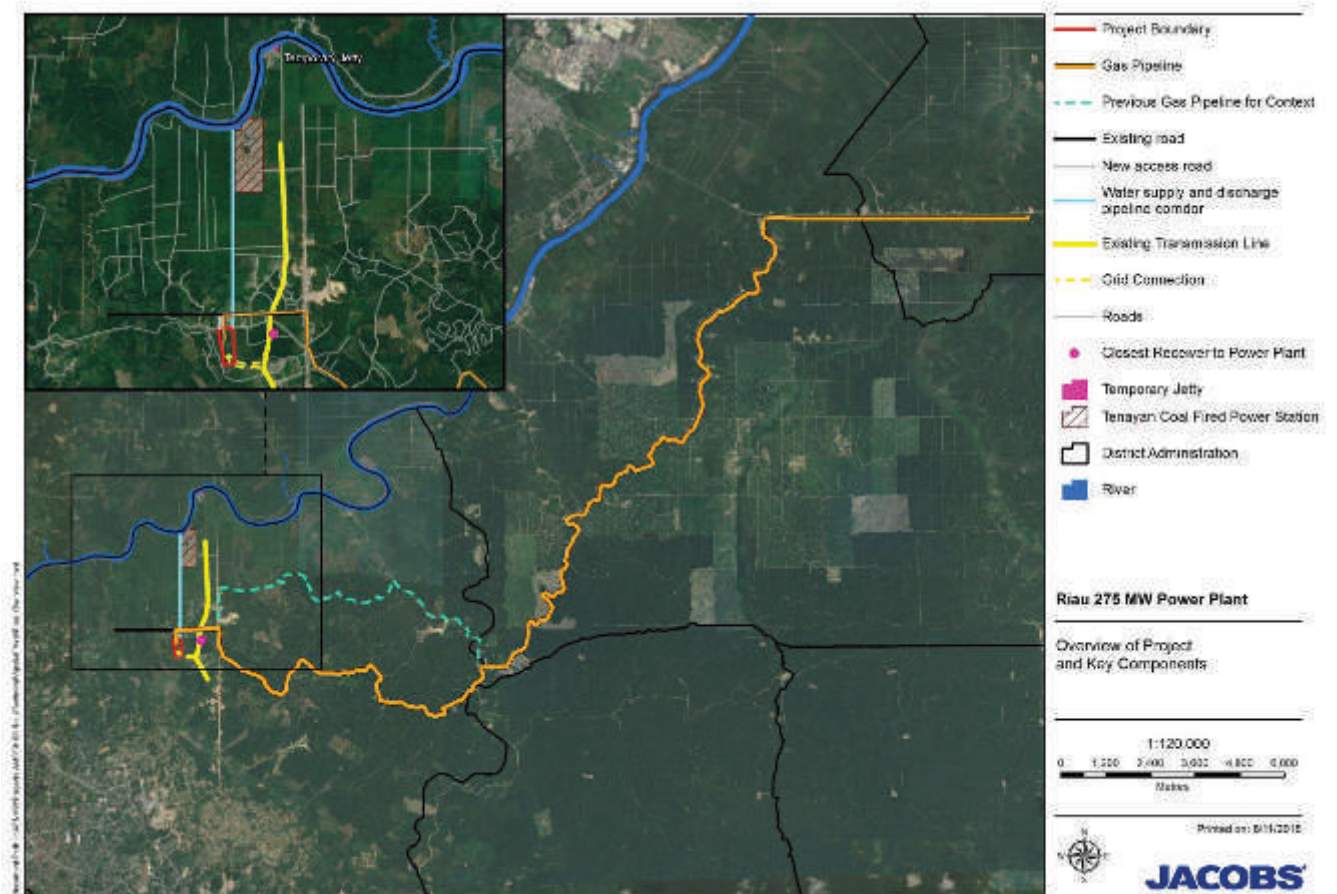


Figure 1.1 : Overview of Project and Key Components

2. The Project

2.1 Why is the Project Needed?

The Electricity Supply Business Plan (RUPTL) for 2017 – 2026 is based on the National Electricity Plan (RUKN) and provides a ten-year development plan for electricity in Indonesia. RUPTL serves as a guidance document to streamline the development of power infrastructure to meet electricity demand within the state-owned electricity corporation PT Perusahaan Listrik Negara (Persero) (PLN) business areas. PLN is actively encouraging the private sector to develop generation capability to meet current and expected electricity demand.

Under the 2017 – 2026 RUPTL, it aims to achieve 100% electrification across Indonesia with population growth expected to increase at 1% per year and PLN customers currently increasing at a rate of 8% per annum. In order to meet this objective, RUPTL indicates at least 77.8 GW (gigawatt) of power plants will need to be constructed. Natural gas is planned to contribute approximately 30% of energy generation sources in order to achieve the electricity generation target. The Project is therefore in line with the direction provided by Indonesia's long-term electricity plan and consistent with PLN's broader initiative of encouraging private sector Build-Own-Operate-Transfer projects.

2.2 Where is the Project Located?

The Project is located in the Tenayan Industrial Village (previously known as Sail Village) in the Tenayan Sub District of Pekanbaru City, in the Province of Riau (Figure 2.1 and Figure 2.2). The power plant site is located approximately;

- 10 km due east of the city centre of Pekanbaru in central Sumatra, Indonesia;
- 3 km south of the Siak River; and
- 2 km south of PLN's existing 2 x 110 MW Tenayan Coal Fired Power Plant (CFPP).

The power plant and switchyard will be located within the 9.1 hectares of privately owned land currently being used as a palm oil plantation. The site is bounded by palm oil plantations to the west, south and east and Road 45 on the North. All other components of the Project will require approximately 17.26 hectares of land.

MRPR will construct a gas supply pipeline from a connection point at an offtake location known as SV1401 on the main Grissik to Duri gas pipeline which is located north-east of the power plant site in the Siak Regency. The gas will be delivered to the power plant by approximately 40 km of pipeline, approximately 30 km of which will be located within the existing road reserve and 10 km within palm oil plantation.

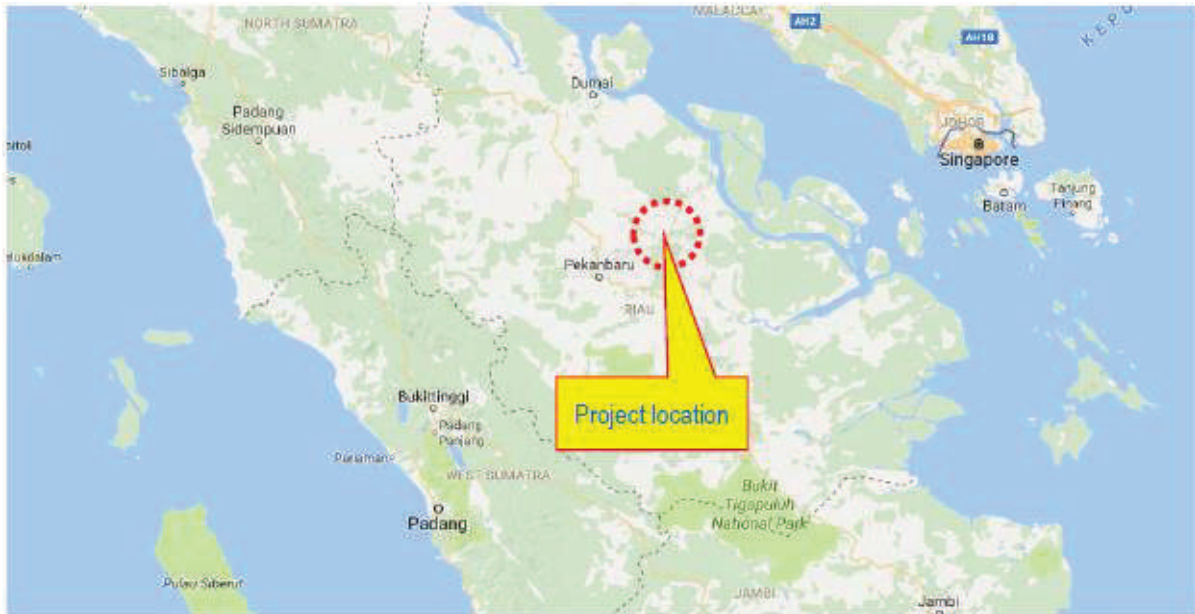


Figure 2.1 : Project Location

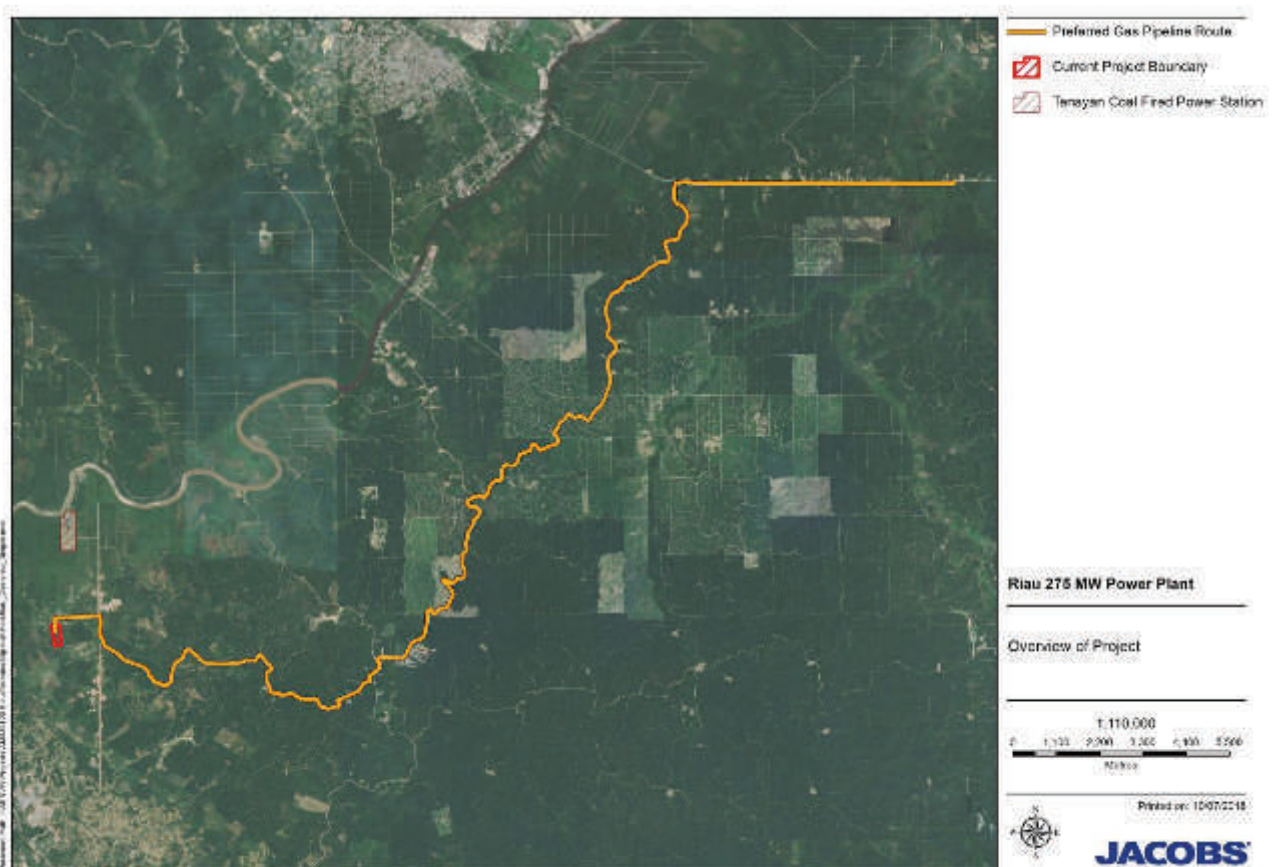


Figure 2.2 : Location Overview

2.3 What Will the Project Look Like?

Natural gas power plants typically connect to a gas pipeline which provides the natural gas fuel for the plant.

The CCPP will have two gas turbines and two heat recovery steam generators (HRSG) stored outdoors, one steam turbine generator set within a building, two power plant stacks estimated to be 45 m in height, and a cooling tower anticipated to be approximately 10 m in height. There will be a control room and office space for the operation and maintenance staff, black start diesel generators and a high voltage switchyard.

Electricity is generated by the power plant and delivered to transmission lines, sometimes referred to as 'the grid', to connect with consumers. See Figure 2.3 for a typical transmission tower, Figure 2.4 for the existing view from the approximate location of Jl Bukit Sentosa road facing north-east and Figure 2.5 for an impression of what the power plant may look like from the same location.



Figure 2.3 : Typical Transmission Tower



Figure 2.4 : Existing View of the Proposed Power Plant Site from Jl Bukit Sentosa (Approximate), Looking North-East



Figure 2.5 : Impression of the Proposed Power Plant from Jl Bukit Sentosa (Approximate), Looking North-East

2.4 What land requirements will there be?

MRPR plans to construct the power plant and switchyard on a 9.1 ha plot of privately owned land. The total land requirements for the power plant and switchyard (excluding temporary laydown areas and offices for the construction workforce) are estimated at approximately 5.4 ha. In addition, the Project will have land requirements for the water abstraction point at the Siak River, water supply pipelines to and from the power plant site, the gas supply pipeline, and the 150 kV transmission line.

During construction, there will be further land requirements for the construction workforce including temporary laydown areas and offices. The additional area is estimated at a further 3.7 ha. There will also likely be a need for a temporary jetty to be built on the banks of the Siak River and is expected to be located nearby to PT Perusahaan Listrik Negara (Persero) (PLN)'s existing Tenayan CFPP. This will be used for transportation of materials and equipment during the construction phase of the power plant.

2.5 Duration of Construction

The construction of the project is anticipated to take 24 months with six months for commissioning, as outlined in the indicative schedule in Table 2.1 below. It should be noted that the timings are on the basis of all construction activities occurring in parallel i.e. at the same time. MRPR will build, own and operate the plant for a 20-year term, after which the ownership of the development will be passed to PLN.

Table 2.1 : Construction and Commissioning Schedule

Activity	Estimated Duration (months)
Site clearance and levelling (may commence before financial close)	6
Gas pipeline construction	12
Power plant and switchyard engineering, procurement and construction	24

Construction of water intake and discharge pipelines	8
Transmission line construction	8
Commissioning	6

2.6 What Will Happen During the Construction Phase?

The majority of the construction activities will be concentrated on the power plant and switchyard sites; the main activities at the power plant will include:

- Site clearance and levelling;
- Excavations for major structures i.e. foundations, drainage structures, trenches, and ditches, gutters and channels;
- Piling and construction of foundations;
- Installation of power plant building and transport infrastructure; and
- Landscaping.

Construction of other aspects of the Project will also be required including:

- Construction of the 40 km long gas pipeline including preparation of the pipeline route involving vegetation clearance, transportation of pipe sections, welding of the sections, digging and preparing the trench of the pipeline, lowering the pipe into the trench, backfilling the trench and general area reinstatement.
- A temporary jetty serving as a berth for ships or barges delivering plant items and construction materials and equipment.
- A transmission line including eight transmission towers between the Tenayan CFPP switchyard and the existing transmission line (Pasir Putih's) switchyard. This involves surveying, foundation construction, erection of towers, and testing and commissioning of the transmission line.
- Construction of an approximately 3 km in length water intake and water discharge pipeline between the power plant site and the Siak River. This includes a trench of 2 m width, a working corridor of 4 m along the pipeline route, and construction of a water intake structure on the bank of the Siak River.
- Construction of a 500 m length access road, between the north of the power plant site and the main road.

According to labour estimates, construction workforces will peak at approximately 956 workers for the power plant and 299 workers for the gas pipeline. Jacobs understands that the EPC Contractor has no plans for a Workers Camp and that workers will be sourced and housed in the surrounding Pekanbaru and Siak Regency area.

2.7 What Will Happen During the Operation Phase?

Prior to the power plant being brought into operation, a range of performance and reliability tests are undertaken. This stage is known as 'commissioning' and for the Project, this involves pre-operational testing of the power plant, transmission line and gas pipeline. Once the plant has completed and passed the performance and reliability tests, it is handed over for commercial operation.

2.7.1 Power plant

A CCPP uses both a gas and a steam turbine to produce more electricity from the same amount of fuel than a traditional simple-cycle power plant. Ambient air is firstly filtered and compressed in a gas turbine, where fuel is added and the mixture is heated to a high temperature. This mixture causes the gas turbine blades to spin,

which in turn drives a generator and converts some of this energy into electricity. A HRSG captures the exhaust heat which would otherwise escape from the stack and creates steam. This is delivered to a steam turbine and is converted into additional electricity. All steam exhausts to the condenser where it is condensed to water in cooling towers before returning to the Heat Recovery Steam Generator to be converted to steam once again.

A diagram of the process is provided in Figure 2.6.

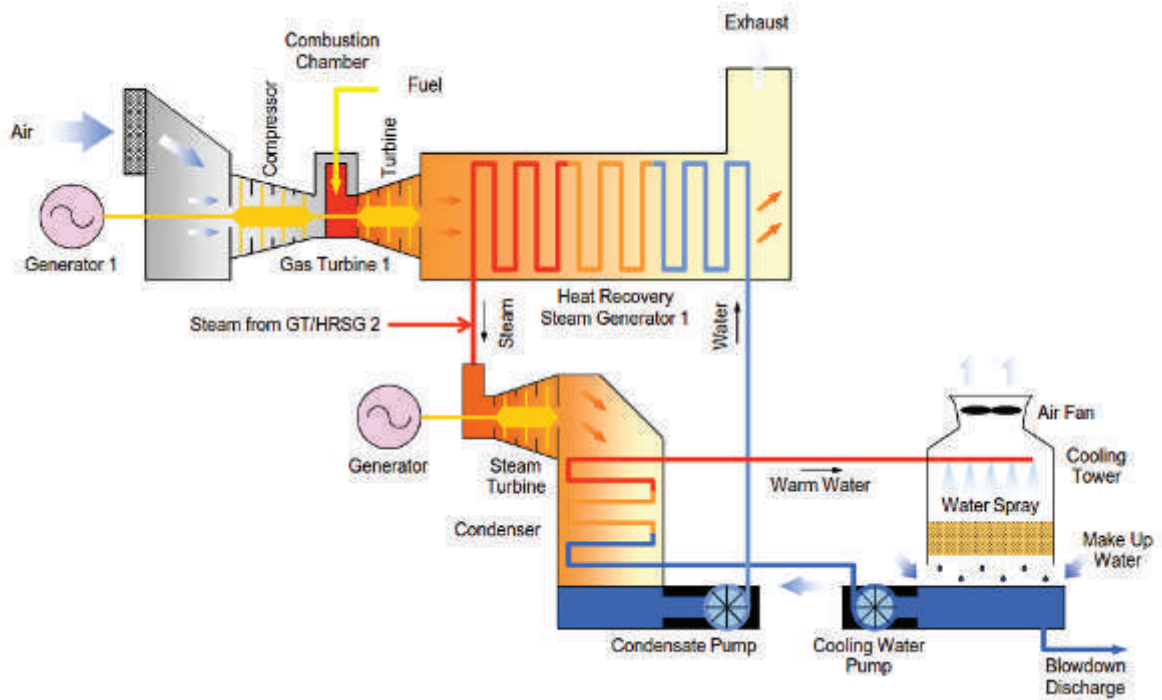


Figure 2.6 : General Process of a Combined Cycle Power Plant

Water will be abstracted from the Siak River via the water intake pipeline for use at the power plant site. Water abstracted from the Siak River, on arrival at site, will enter a raw water reservoir / settling pond to be clarified and filtered, and then stored in a filtered water tank. The power plant will not produce any hazardous liquid wastes however certain streams of liquid waste will require treatment prior to being discharged into the Siak River via the discharge pipeline. All liquid waste streams discharging to the Siak River via the water discharge pipeline will pass through the final disposal pond first. The power plant's onsite wastewater treatment systems will include systems for contaminated stormwater, normal wastewater, abnormal wastewater, oily wastewater and sanitary water. The power plant will not produce any bulk solid wastes such as ash or sludge which are generated in a coal fired power station or some industrial processing facilities. The use of hazardous substances at the power plant is limited to chemicals used in general maintenance. There will be a fire detection and protection system.

There will be site security and employment of approximately 60 full time staff. During scheduled maintenance there will be additional temporary workers on site which can increase the total staff on site to approximately 200.

2.7.2 Transmission Line

Once constructed and operational, the 150 kV transmission line will be transferred as an asset for PLN to own and operate. Maintenance activities will be carried out to ensure the line and equipment are functioning properly, this includes maintaining the space under the transmission line by trimming any vegetation growth.

2.7.3 Gas pipeline

MRPR will operate the underground gas pipeline over the 20-year term. The pipeline is anticipated to be in service at all times. The timing of any shutdowns will be co-ordinated carefully with the gas supplier and PLN as any shutdown will result in the cessation of power plant operations. Routine maintenance will involve cleaning the gas pipeline.

3. Description of the Environment

3.1 What is the Condition of the Physical Environment at the Site?

3.1.1 Air Quality

Generally, the air quality in the project area is good, with air quality being consistently within the national and international guidelines. Sources of air pollution are primarily influenced by human activity and from energy production, industry, household cooking and heating, and vehicle traffic. The main local source of air pollution is the Tenayan CFPP located 2 km to the north of the proposed power plant.

3.1.2 Water

Site investigations and observations of the stream channels indicate that the power plant and gas pipeline route is located in land that is prone to landslides and general surface erosion. The erosion is primarily due to heavy rainfall events and poorly consolidated soils. The shallow groundwater table is also likely to be variable with the shallowest levels encountered in lower lying areas. There are a number of shallow wells nearby to the power plant site and the gas pipeline route which are likely to be used for domestic purposes and/or irrigation of palm oil plantations. Groundwater is generally of good quality however, activities in the area that may impact groundwater quality should be carefully managed.

3.1.3 Geology and Soils

Regional scale geological maps indicate that the geology of the power plant and gas pipeline comprises very fine sandy siltstone that is well sorted, brittle, and poorly cemented. Site investigations from the general vicinity of the power plant are generally consistent with the above description near the ground surface.

The soils in the vicinity of the power plant are not contaminated. The soils along the gas pipeline were noted to contain contaminants however they were generally at low levels and there were no exceedances in relation to the protection of human health. This indicates that no measures are required to protect human health during construction works along the pipeline.

3.1.4 Natural Hazards

Natural hazards may include the following: forest fires, earthquakes, volcanic activity, tsunamis, landslides and flooding and tropical cyclones however, these are not considered to be a risk within the Project area.

3.1.5 Noise

Existing noise sources in the residential areas near the project area include noise from traffic, general residential noise, birds and dogs in the day time and noise from traffic, noise from nocturnal insects, generators, and birds at night time.

3.1.6 Landscape and Visual

Riau is bordered by two main features, the Bukit Barisan Mountains and the Malacca Strait, with mountain ranges, lowlands and islands forming the main geological features. Pekanbaru is the capital and largest city of the Riau Province, which is an oil and gas resource-rich region of Sumatra, home to rivers, forest and palm oil plantations. In the past, Riau also had many forest resources however extensive logging, plantation development and fires have led to a decline in this land use.

The Project area is located in area of predominantly palm oil plantation, see Figure 3.1 below.



Figure 3.1 : Palm Oil Plantation Within Project Site (Source: Tenayan Environmental and Social Baseline Study Report)

3.2 What is the Condition of the Biological Environment at the Site?

3.2.1 Freshwater Environment

The project area contains the Siak River as the main watercourse and is frequently used for transportation by commercial boats and tankers. The Tenayan River is smaller than the Siak River and to the west of the power plant site. The main watercourse that will be crossed by the pipeline route is the Gasib River.

Water quality is average from an ecological perspective with concentrations of many chemical parameters being within environmental guidelines. The rivers appear to have a recent decline in water quality associated with domestic and industrial waste however, most parameters were found to be within guidelines where they existed. The ecology of the rivers is relatively poor with low diversity, as observed during the wet season. A range of fish species were present, especially in the Siak River which are broadly in line with the expected numbers of species for the region. The Siak River is the primary watercourse that would be potentially impacted by project activities.

3.2.2 Land Animals, Birds and Rats

There are no legally protected areas of conservation concern or areas of conservation interest within a 5 km radius of the Project area. The diversity of bird species was greatest along the transects covering the gas pipeline and water pipeline routes and this coincides with the areas of habitat that are not dominated by oil palm plantation. The mammal species most abundant through the study area were two macaque species and the silvery lutung (*Trachypithecus cristatus*). The nearest Important Bird Areas (Birdlife International, 2018) are between 50 and 100 km north, south and east of the project area. The Tesso Nilo National Park is approximately 75 km south of the project area. There are no UNESCO heritage sites within 100 km of the Project area. The nearest is over 300 km to the south of the Project area. The nearest Key Biodiversity Area (KBA) is approximately 50 km from the nearest Project feature (the start of the gas pipeline).

The majority of species recorded at the power plant had an International Union of Conservation of Nature (IUCN) conservation status of 'Least Concern'. Two species of 'Near Threatened' conservation status were recorded, a long tailed parakeet (*Psittacula longicauda*) and a silvery lutung (*Trachypithecus cristatus*). Both of

these species are considered by IUCN as 'Near Threatened' because of the extensive habitat loss (deforestation) that has occurred within their range. The data collected therefore did not include any IUCN Red Listed Threatened species (Vulnerable, Threatened, Endangered or Critically Endangered) at the power plant.

There was direct evidence of a number of IUCN Red Listed Threatened species recorded along the water pipeline route including Black partridge (*Melanoperdix niger*), Sunda-blue flycatcher (*Cyornis caeruleus*) and Southern pig-tailed macaque (*Macaca nemestrina*).

The gas pipeline route along the paved roads had a varied species recorded including Black partridge (*Melanoperdix niger*), Sunda blue flycatcher, sambar deer, sun bear and southern pig-tailed macaque, all of which are IUCN Vulnerable species. At the same locations, *Anisoptera marginata* and agile gibbon (IUCN Endangered) and sunda pangolin (Critically Endangered) were recorded.

3.2.3 Plants and Habitat

The habitat covering the power plant site is primarily palm oil plantation.

The transmission line was dominated by bush and scrub and included the IUCN Red Listed Threatened species of legume/trees (*Azadirachta indica*).

The water pipeline route passes through plantation forest (*Acacia mangium*) stands and rubber plantation with scrub. Direct evidence of IUCN Red Listed Threatened species legume/trees (*Azadirachta indica*) was also recorded along the route.

The Project area is generally characterised by oil, rubber and lumber plantations which are considered to be modified habitat. There are discrete areas along the gas pipeline route where plantation wood has been unmanaged for a number of years (potentially decades) and natural growth of native vegetation has occurred.

One IUCN Endangered (agile gibbon) and one IUCN Critically Endangered (sunda pangolin) species were recorded at three discrete areas along the gas pipeline route. The sunda pangolin is considered Critically Endangered by the IUCN due to high levels of hunting and poaching for its meat and scales. The key threats to the agile gibbon are habitat loss, primarily as a result of deforestation. A Discrete Management Unit (DMU) has been defined based on the sunda pangolin (which has been noted in the Project area. Sunda pangolins are understood to be wide ranging species that are found across all of Sumatra. The DMU is provided in Figure 3.2.

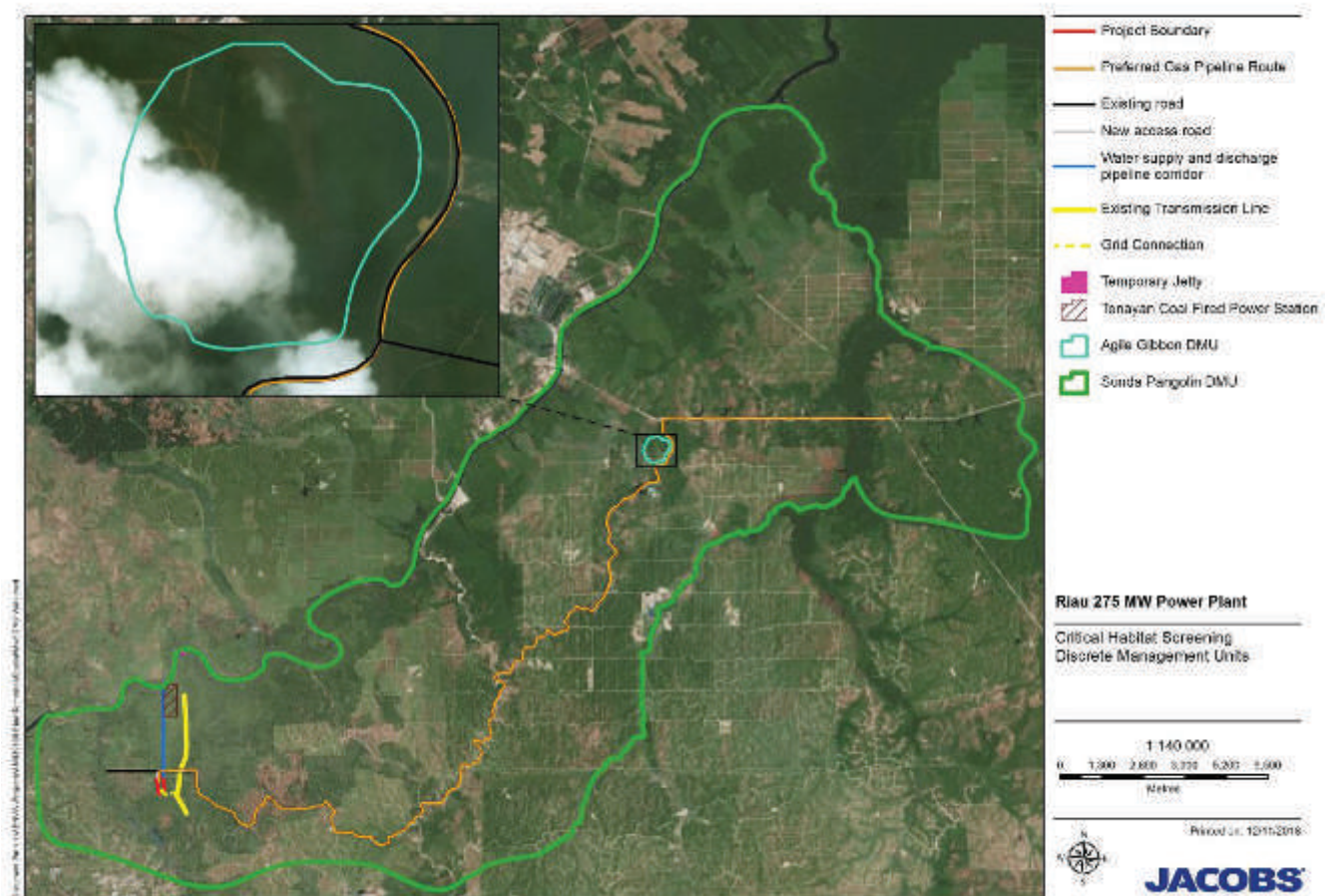


Figure 3.2 : Discrete Management Unit for Sunda Pangolin

A Critical Habitat Assessment was conducted in accordance with the requirements and criteria set out in PS 6. The conclusion from this assessment was that the Sunda Pangolin triggers Critical Habitat under Criterion 1 Tier 2 for the DMU in relation to the regular occurrence of a Critically Endangered species. The Agile Gibbon is determined to not trigger Critical Habitat under Criterion 1 – 3. As a result of this a Biodiversity Action Plan has been prepared and will be implemented during construction to management and mitigate the impacts on the Critical Habitat.

3.3 What is the Condition of the Economy and Communities at the Site?

3.3.1 Cultural Heritage

Cultural heritage including archaeological sites, old mosques, burial sites, sacred grounds, temples, and other historical objects should be protected and maintained since they are national and international assets. The power plant site does not contain any historical or cultural heritage sites. The nearest site identified was Okura Village which was noted to contain a sacred cemetery of village elders located close to the village settlement in a place called Tebing Tinggi, located on the opposite side of the Siak River to the Project site.

The gas pipeline route has two heritage sites nearby. The first is Koto Gasib Village, is located approximately 3 km from the gas pipeline, containing a burial site of Princess Kacamayang, the daughter of a king during the

Gasib kingdom. The second is Putri Puan Elok's tomb, one of the daughters of a noblemen during Gasib Kingdom era, located approximately 2 km from the gas pipeline.

3.3.2 Community Facilities and Utilities

3.3.2.1 Clean Water Facilities

50% of Siak Regency' communities have to buy drinking water and they use the Siak River for bathing (BPS Siak District, 2016). However, the river is polluted from various sources including palm oil waste and as a result the water quality of Siak River is very poor (refer to ESIA Volume 2: EIA for water quality results at points adjacent to the Project area). The water intake and discharge pipelines are located in the Melebung and part of Maredan PDAM. Other areas still use well water and most villagers of Kuala Gasib, Pinang Sebatang, Maredan, Tualang Timur Villages buy gallon water for drinking purposes.

3.3.2.2 Sanitation Facilities

Siak Regency sanitation facility services cover 95.7% of the area, which at a national level is very high. Many villagers in the three villages/kelurahans near the power plant site have sanitation facilities within their properties while others use communal toilets in the villages. The social survey identified that 88% of the respondents have sanitation facilities at home, 7% of them use the Siak River for sanitation means, 3% use public toilets and the remainder use the gutter or any available places including Siak River (2%).

3.3.2.3 Waste

Domestic liquid waste such as water from the bathroom or dish water is disposed to the backyard. The waste is left to be absorbed by the land. The social survey identified that, 48% respondents dispose liquid waste to the gutter, 36% dispose it to the septic tank, 11% to any available places and 5% dispose it to the Siak River.

The social survey also identified that 96% of respondents dispose of solid waste through incineration, 3% dispose it to any available places, 1% take it to a waste disposal facility and 1% dispose to the Siak River.

3.3.2.4 Telecommunication

Many villagers within the Project Aol have cellular phones with Telkomsel being the service provider; however, not all locations have good signals.

3.3.2.5 Electricity

Based on Pekanbaru City Mayor's Performance Achievement Report (2016), 263,192 households had electricity or almost all of Pekanbaru households. In comparison in Siak Regency in 2015, 68.3% of households had access to electricity, about 20% use non-state electricity facilities and around 10% do not have electricity. Based on the social survey, the three administrative areas of Bencah Lesung, Industri Tenayan and Tuah Negeri have access to electricity supplied by PLN while some of villagers have to use diesel power generators, pay to use their neighbours power or the head of the kelurahans.

The villages along the gas pipeline route do not have access to electricity, with the exception of Kuala Gasib Village where approximately 50% of households have had electricity since January 2018. As of January 2018 electrification hasn't reached Meredan Village, Pinang Sebatang Village and Tualang Timur Village. Most of the villagers are still using diesel power generators and some of them still use oil lamps.

3.3.3 Population

The project location for the power plant, transmission lines, temporary jetty site, water pipeline and gas pipeline is spread across two administrative areas of Pekanbaru City and Siak Regency. The villagers and people affected by the Project live predominantly in these two administrative areas; Figure 3.33 shows the villages within the Project AoI.

According to BPS Statistics Indonesia's 2017 survey, Pekanbaru had a total population of 1,064,556 and the Siak Regency has a total population of 453,052. The Siak Regency is about 13 times larger than Pekanbaru City however, the population in Pekanbaru City is much higher than Siak Regency (more than 100% of the total population of Siak Regency).

There are nine villages within the Project's Area of Influence (AoI). The Tuah Negeri administrative area has the highest population with 10,377 inhabitants. Melebung Village, located in the middle of the palm oil plantation, has the smallest population with 834 inhabitants. Marelan Village has the largest area size (145.2 km²), followed by the old village of Okura located across the Siak River from the Tenayan CFPP.

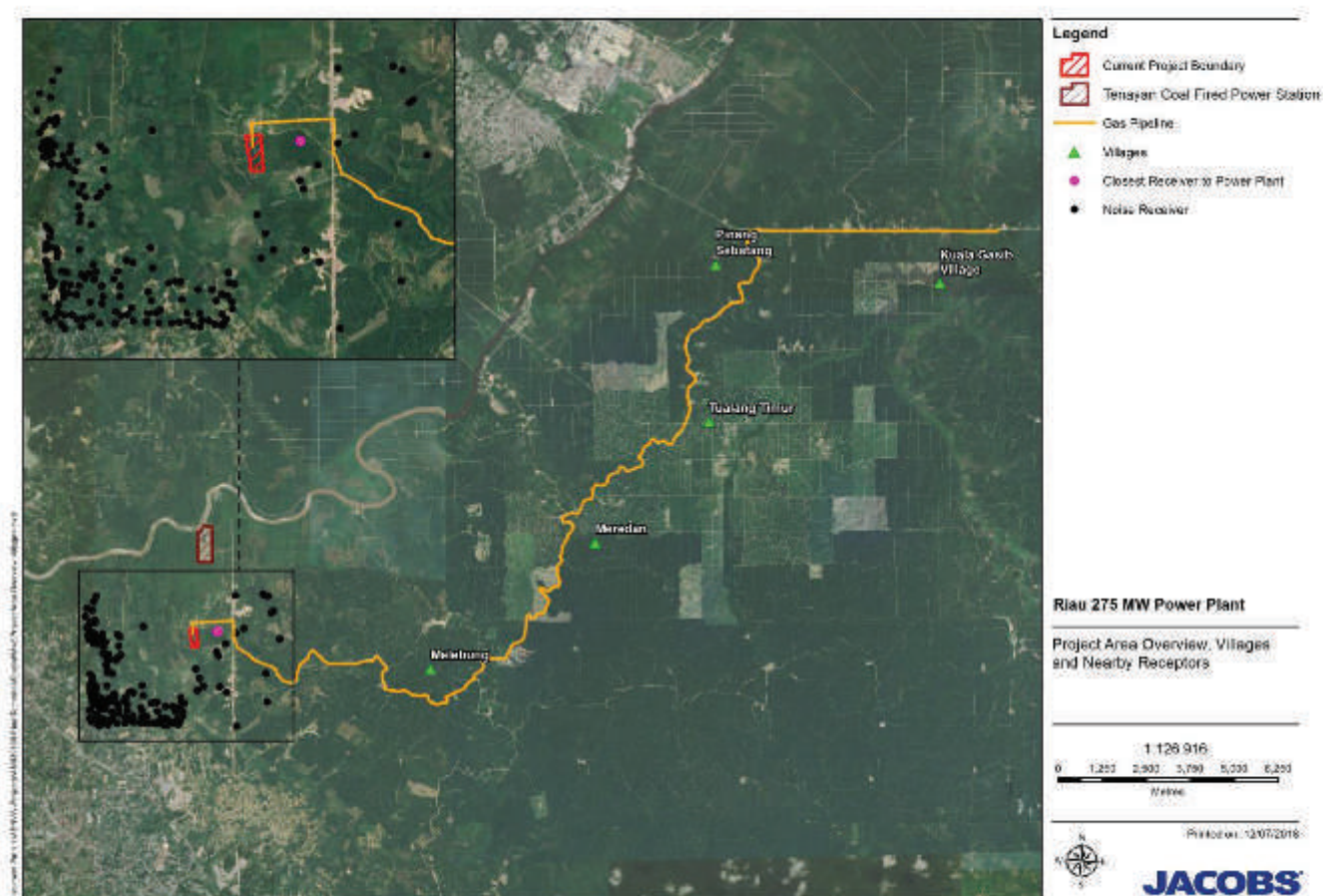


Figure 3.3 : Project Area Villages

3.3.3.1 Ethnicity and Language

'*Masyarakat adat*' (customary communities) or simply 'adat', in Indonesia, is a term used to identify groups of people who have customary norms and rules. Based on socioeconomic surveys, interviews with community

leaders and desk based studies that have included maps marking customary claims for land in the project area, there are no *masyarakat adat* residing in the Project Aol.

Ethnic diversity exists in each project affected village however, these populations do not satisfy criterion to be classified as “Indigenous people” under the definition used by the International Finance Corporation or the Asian Development Bank.

The predominant ethnic groups in Industri Tenayan and Pinang Sebatang are: Malay, Javanese, Batak, Minang, Nias and Ambonese. Households who belong to either Batin, Javanese, Batak, Nias, Minang and Ambonese groups do exist within the Project area but all are have migrated to the Project area.

Bahasa Indonesia language is the unifying language across the country and is commonly spoken in Riau, along with Riau Malay, including Pekanbaru. Each ethnic group speaks a dialect of Bahasa or some ethnic groups partially speak their own language from their original islands.

3.3.3.2 Religion

Islam is the most widely practiced religion in all villages, followed by Catholic, Protestant, Hindu, Buddhist and Taoism/Confucism. In some areas of Siak Regency, Bahai is also practiced.

3.3.3.3 Gender

In general, the female population is lower when compared to the male population. However, the difference is not significant at the Regency and Sub-District level. The number of the households in Pekanbaru City are about 253,533 households with an average of four members in every household. Data is not available regarding the number of households in Siak Regency.

There are approximately 10% more males than females in Pekanbaru City, but there are four Sub-Districts that have more females compared to males: Sail, Lima Puluh, and Payung Sekaki and Senapelan.

3.3.3.4 Education

In general, Siak Regency has a higher net enrolment ratio for elementary school, secondary school and high school compared to Pekanbaru City. The schools in Siak Regency consist of public schools and private schools with some schools under the Ministry of Religion. Almost all school children are enrolled in elementary school. In contrast, around 20% of middle school students in Siak Regency and 30% in Pekanbaru City did not continue to high school.

3.3.3.5 Health

In terms of facilities and health personnel, Pekanbaru City has significantly greater numbers and resources than Siak Regency.

Using Tenayan Raya Sub-District health centre data, there are five major reported illnesses in the community including: infection of the upper respiratory system, skin diseases, diarrhoea, hypertension and diabetes. Infection of the upper respiratory system is the most common illness. Skin diseases are most likely related to access and availability of clean water facilities and hypertension and diabetes are likely related to life style choices. The other major health issue in the area is HIV/AIDS incidents and in Pekanbaru City, HIV/AIDS patients are increasing in number. There are 62 cases of neonatal mortality in the Pekanbaru City area.

3.3.4 Economy

Construction, wholesale and retail, and processing industries are the third largest sectors contributing to Gross Regional Domestic Product (GRDP) in Pekanbaru City. Between 2010-2016, growth in the following sectors was in decline: agriculture –forestry and fisheries, processing industry, real estate, information and communication, administration-defence and compulsory social security, and education services. In contrast, construction, transportation and warehousing, health services and other services are slowly increasing in GRDP. Company services, mining and quarrying are stable whilst electricity and gas fluctuates.

The livelihood of the villagers varies from one village to another. Each family tends to have a primary and secondary job. The villages near to the power plant are located close to Pekanbaru City; therefore, most of these villagers work as either public servants, private company employees and traders. Due to the proximity of some villages to Pekanbaru, Minang and Chinese ethnicities have tended to operate shops, and restaurants. Most of the villages along the gas pipeline are employed as palm oil plantation workers, farmers or have opened restaurants, beside the road.

More than 50% of respondents' income in the five villages is between 1,000,000 (USD 72.63) to 5,000,000 (USD 363.17). In relation to the land acquisition process, the villagers with low incomes are most likely those who cannot afford to obtain legal certificate for their properties. In line with the income level, more than 50% of the respondents have a monthly expenditure between 1,100,000 (USD 79.89) to 3,000,000 (USD 217.9); the majority of their income is at poverty level.

3.3.5 Transportation

3.3.5.1 Local Road Network

The main north-south highway extending along the spine of Sumatra (named Jl. Lintas Timur Sumatra) runs approximately 5 km south-west of the site and through the city of Pekanbaru. Immediately surrounding the site there is a network of dirt roads accessing palm oil plantations. A wide and straight dirt road runs from the settlement in the south to the existing CFPP on the Siak River to the north; this road provides access for land transport to the Main Road (Jl. Lintas Timur Sumatra). To the north, it extends to the site of the proposed jetty.

3.3.5.2 Public Transport Network

There is little information available on public transport services in the settlement to the south of the power plant due to the informal nature of the public transport sector in Indonesia. However, it is likely that privately owned minibuses (Angkot) and motor cycle taxi's (Ojek) serve the settlement.

3.3.5.3 River Network

The project area contains the Siak River as the main watercourse which is commonly used for navigation, transportation, fishing and a source of raw water for industries and frequently used for transportation by commercial boats and tankers. Small boats (pompon, sampan and speed boats) were the most common type of boats on the Siak River when surveyed.

4. Consultation

4.1 What Consultation Has Occurred?

The first public consultation for the Project was conducted on 11th October 2016 and was attended by 78 participants including 11 women, 2 non-governmental organisations (NGO) and a University of Riau lecturer in Kelurahan Bencah Lesung Office.

MRPRs Community Liaison Officer has visited most of the villages around the power plant and along the gas pipeline in order to maintain communications and provide ongoing information related to the Project.

On the 11th – 15th of December 2017, two community member meetings at two locations along the gas pipeline and one meeting in the office of Kelurahan Tenayan Raya were conducted.

A social survey of Tuah Negeri, Bencah Lesung and Industri Tenayan Villages adjacent to the power plant and the five villages along the gas pipeline route Kuala Gasib, Pinang Sebatang, Meredan, Tualang Timur and Melebung was conducted in June to September 2017 and January to February 2018. During the social surveys, any community concerns in relation to the Project were recorded.

Various Indigenous People Interviews have been undertaken from 2017-2018. It has included Village leaders, general village interviews, Aliansi Masyarakat Adat Nusantara (AMAN), Lembaga Adat Melayu (LAM), meeting with local and regional councils and Sakai and Limo Batin ethic groups.

Livelihood Restoration Census Survey was conducted for those that were potentially affected persons along the gas pipeline. The survey was done in August 2018 and gathered data including source of income, income and how respondents would be affected.

Okura Village Fisher Folk Focus Group Discussion was undertaken in September 2018, information around how the residents use the Siak River, and their dependence on the river for their livelihood.

ESIA Disclosure was held in September 2018 in Industri Tenayan and Tualang Timur Villages. Communities concerns in relation to the project were recorded. The reoccurring theme was around job opportunities for both male and female participants.

Livelihood Restoration Disclosure was held in November 2018 in Melebung, Pibang Sebatang, Tualang Timur, Kuala Gasib and Meredan. The construction of the gas pipeline was explained and how it would impact those residing or had businesses close to the construction corridor.

4.2 What Has the Feedback of Consultation Been o Far?

From the social survey conducted at the power plant, approximately 60% of respondents in Tuah Negeri, 70% of respondents in Bencah Lesung and 40% of respondents in the Industri Tenayan administrative areas did not know about the power plant development. However, when the goals of the project were explained, the majority of respondents seemed in favour of the Project as it would provide benefit to local communities. The respondents who were not in favour noted a lack of clarity concerning benefits and fear of environmental impacts.

Based on the social survey along the gas pipeline route, approximately 45% of the respondents were aware of the Project. Approximately 96% respondents along the gas pipeline route approved of the project.

Concerns raised by the public included:

- Concerns about the amount of danger that nearby residents will be put in;
- Concerns of vegetation and privately owned trees removal and the level of respect to the villagers;
- Concerns about proper compensation for land to be acquired;
- Confidentiality concerns of any information disclosed by local communities;
- Concerns about the intrusion of the Project beyond its proposed boundaries and assisting public facilities rather than disrupting them;
- Concerns about MRPR's honesty and openness on the likely impacts to local communities;
- Concerns of black outs and electricity availability to villages;
- Concerns about impacts on the economy from the Project and beneficially impacting rather than negative;
- Ongoing consultation i.e. being made aware of the beneficial and negative impacts following the ESIA and including early warnings; and
- Monitoring of Project facilities on a regular basis.

4.3 What Commitments will MRPR Make to Address Concerns?

A process of identifying relevant stakeholders that may be directly or indirectly affected by the project has been completed. A Stakeholder Engagement Plan (SEP) has been prepared for the Project to guide engagement activities for the Project. The objectives of this SEP are to:

- Identify the local legal framework of consultation activities and disclosure requirements, particularly in respect of those public consultation activities that are directly required under the local permitting process;
- Identify potential stakeholders in the area of influence, as well as relevant interested parties such as government agencies and other key stakeholders;
- Record all consultation activities, including those prior to the commencement of the ESIA process;
- Describe how concerns or grievances will be handled via a Grievance Mechanism;
- Provide an action plan for further consultation including at least two meetings bi-annually in each affected community during preparation, construction and operational phases of the Project, including details on appropriate formats for effective and culturally meaningful interaction with the community and relevant stakeholders; and
- Provide a disclosure plan, including the identification of any locations where relevant project documentation will be available locally and elsewhere as well as languages to be used.

The SEP will be revised and updated periodically including upon completion of the ESIA to assist with ongoing engagement throughout the Project.

4.4 Is There an Opportunity to Comment on the Project?

Yes, the following member of MRPR can be contacted below.

Name	Erdiharto Sucahyadi
Address	Surya Dumai Building, 3A Floor. Jl. Jenderal Sudirman No 395, Pekanbaru 28116, Riau, Indonesia
Email	Erdiharto.sucahyadi@medcoenergi.com
Telephone Number	+62-812 6848 9387

5. Managing Environmental and Social Impacts

5.1 How Will the Environment Be Affected During Construction?

5.1.1 Power Plant

The following impacts have been identified during the construction of the power plant:

- Groundwater beneath the power plant is likely to be shallow, so the levelling of the site and excavation for power plant foundations may intercept the water table. Monitoring-based mitigation will be implemented during the short-term construction timescales and therefore the impact is anticipated to reduce to acceptable levels.
- Compaction of the site and exposed topsoil due to vegetation clearance (palm oil plantations) and pad levelling would be the most direct impact during construction, and would increase runoff and sediment load, thus requiring some form of temporary treatment or retention prior to discharge.
- The construction of the power plant (particularly the chimney structure) will be moderately visible to neighbouring villages and residents and outdoor workers. Visual impacts associated with the construction of the power plant will range from those of a temporary nature, such as the creation of construction laydown areas and temporary site facilities; to those that are permanent (i.e. the completed construction and operation of the new power plant. Due to the already modified environment from the existing CFPP and the palm oil plantations, there is a lower overall level of adverse visual impacts likely as a result of the power plant and is anticipated to be within acceptable limits with regards to both permanent occupiers and outdoor workers.
- The road network surrounding the power plant during construction is predicted to experience increased traffic levels, and pedestrians and cyclists may be disadvantaged by this. Following the implementation of mitigation such as the development of a Traffic Management Plan and the use of the Siak River barges to avoid the need to truck the cargo through local roads, the impact will reduce to acceptable levels.

5.1.2 Transmission Line

The impacts during the construction of the transmission line are anticipated to be at acceptable levels, or lesser in significance than for example, the impacts during power plant construction as identified above.

5.1.3 Gas Pipeline

The following impacts have been identified during the construction of the gas pipeline:

- There will be temporary impacts for local residents and fauna in relation to noise and dust during construction of the gas pipeline, however, it is anticipated that with appropriate mitigation and monitoring by the Construction Contractor, this will be reduced to acceptable levels.
- The gas pipeline route runs next to paved roads, and through two discrete areas deemed to be Natural Habitat which may support greater diversity of flora and fauna species including IUCN Critically Endangered and Endangered species. The construction activities in these areas will be managed to minimize loss of habitat and disturbance to flora and fauna. The noise, vibration and presence of work force within the working area has the potential to result in these species avoiding the area and for animals to become trapped within the excavations, giving a potential for mortality or injury. The work on the pipelines will be carried out in 500 m sections lasting up to a week so only relatively small areas will be indirectly affected as the construction works progress. Following implementation of measures to reduce disturbance and mortality/injury to species, the impacts will reduce to acceptable levels.

- Construction of the pipeline near watercourses could cause localised sediment inputs to streams due to soil disturbance. With appropriate sediment controls in place, the impact will reduce to acceptable levels.
- As scattered residential properties are located along the proposed pipeline route, due to limited existing rural road width, the construction of the gas pipeline will result in traffic disruptions and possible temporary lane or road closures. Following implementation of adequate traffic management and staged pipeline digging works, the impact will reduce to acceptable levels.

5.1.4 Temporary Jetty and Water Supply/Discharge intake and Discharge Structures

There is minimal risk of impacts on water quality and permanent loss of habitat during jetty use due to the low value of the existing ecology. Sediment control will reduce the risk and size of potential impacts and preparation for potential spills and provision of kits to deal with spills should reduce potential effects from the use of the jetty however while the mitigation may reduce impacts there is still potential for a detectable change to water quality.

Uncontrolled eroded soil material from the works area of the water supply and discharge structures will cause direct and indirect sediment impacts. With a well-developed Erosion and Sediment Control Plan in place (incorporating elements such as staging, clean water diversions, sediment retention etc.) as well as other proposed mitigation measures, it is considered that the impacts resulting from erosion of soils would be reduced to acceptable levels.

5.2 How Will the Environment Be Affected During Operation?

5.2.1 Power Plant

The following impacts have been identified during the operation of the power plant:

- The air quality impact of the operation of the power plant is expected to result in a permanent change to the contaminant concentrations (principally nitrogen dioxide) in the surrounding environment. 1 shows the highest predicted maximum ground level concentrations of nitrogen dioxide (1-hour average, 99.9th percentile) from the power plant. However, when taking the existing (background) levels of nitrogen dioxide into account, the maximum contaminant levels are predicted to be well within acceptable levels and therefore nearby residents are not expected to be significantly impacted by the operation.
- During operation there may be a number of residents surrounding the power plant that experience adverse views of the power plant from their properties within nearby villages and outdoor workers in palm oil plantations. There are moderate adverse impacts expected as a result of this. Due to the already modified environment including the existing CFPP and the palm oil plantations, there are lower overall level of adverse visual impacts likely as a result of the power plant and is anticipated to be within acceptable limits with regards to both permanent occupiers and outdoor workers. Plumes from the cooling towers anticipated to be at acceptable levels.
- The operation of the power plant could result in an increase in traffic during morning peak times from employees travelling to work each day, likely from Pekanbaru City. The local road impact is anticipated to be within acceptable levels.

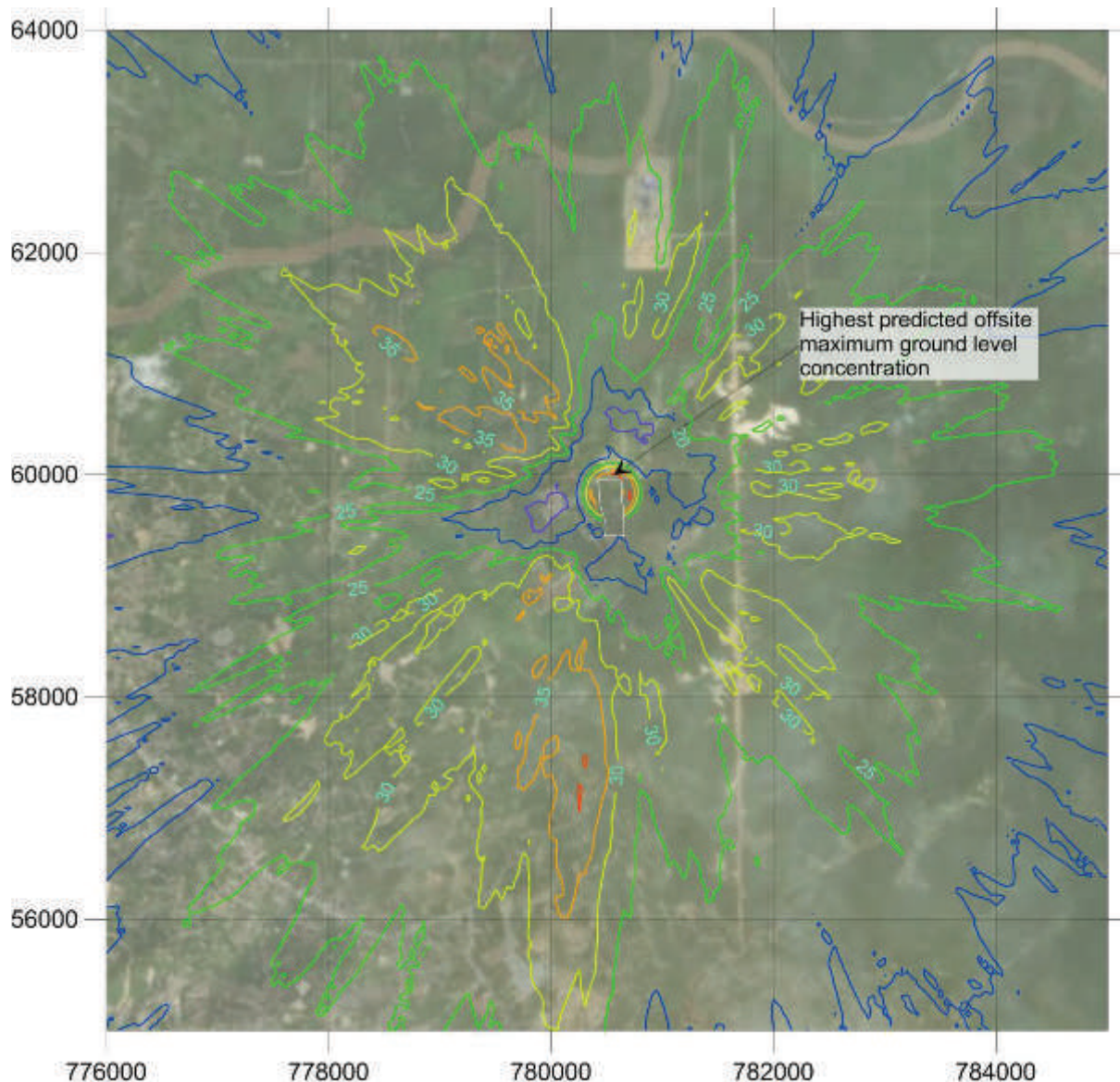


Figure 5.1 : Highest Predicted Maximum Ground Level Concentrations (1-Hour Average, 99.9th Percentile) of Nitrogen Dioxide ($\mu\text{g}/\text{m}^3$) from Discharges from the Proposed Power Plant (Excluding Background)

5.2.2 Transmission Line

The impacts during the operation of the transmission line are anticipated to be at acceptable levels, or lesser in significance than for example, the visual impacts during power plant construction as identified above.

5.3 How Will the People Be Affected?

The social impacts associated with the Project during construction and operation are summarised in the below sections.

5.3.1 Employment

There will be an increased opportunity for employment of local labour during the construction and operation of the Project. According to construction labour estimates, construction workforces will peak at approximately 956 workers for the power plant and 299 workers for the gas pipeline. During operation, a total of 62 individuals will be employed, with only one of these anticipated to be sourced from overseas direct employment is anticipated to generate a number of jobs for the local community that will continue over a number of years both during construction and operation, which will be beneficial to the local communities.

It is likely that many villagers may not qualify for some of the operational jobs as the criteria for these positions can include advanced education and specialist skills. However, there will be many positions where technical expertise is not required. This could bring social conflict, discussed below in Section 5.3.5. There is the potential for women to be disproportionately affected as many of the construction skilled jobs may be biased towards men. The impacts to gender bias are anticipated to be minor however following implementation of employment related mitigation, as noted above, there is no impact from the Project anticipated.

There will also be indirect employment opportunities for local businesses through the Project requiring the provision of goods and services. A benefit to local companies could therefore be expected, which in turn has the potential to provide a foundation for developing sustainable local businesses. Similarly, benefits are anticipated as a result of the education opportunities (i.e. training for the Project work required) which may be transferred to the local communities.

5.3.2 Temporary Physical Displacement

There are no residents located on land proposed to be occupied by the power plant, transmission line or temporary jetty and therefore not result in the physical displacement of any residences.

Similarly, the preferred water intake and discharge pipeline route is within government owned land therefore no physical displacement of residence impacts will occur.

Temporary displacement of up to approximately 46 warungs which are adjacent to the construction works of the gas pipeline may occur, however current understanding is that this is not likely. As the pipeline will be constructed 500 m at a time, any physical displacement will be for short durations of approximately one week and impact to these residences is considered to be minor. It is possible that some of those affected during construction of the gas pipeline may be vulnerable groups, including Nias or Okura people, Melebung villagers, or those who are poor, elderly, widowed or disabled. Many members of the community are also poor therefore the impacts on these people would be more significant. A Livelihood Restoration Plan (LRP) will outline those people that will be affected by the land acquisition and construction process and how compensating those livelihoods will be maintained or enhanced. Following implementation of a LRP, the Project is anticipated to have no significant impact on residents however it is still noted that any vulnerable people may still be slighted impacted.

5.3.3 Economic Displacement

The power plant and transmission line land currently comprises palm oil plantation which is a source of income for local communities that work on the land and therefore the removal of palm oil plantation land associated with the Project will impact on their livelihood. The livelihood of only one individual will be impacted from the power plant and none from the transmission line, therefore the impact of the power plant and transmission line on economic displacement is not considered significant.

Although no permanent physical displacement is anticipated, businesses such as warungs and kiosks may require temporary re-location due to construction of the gas pipeline. As the construction of the gas pipeline will be carried out in 500 m sections that are anticipated to take no more than a week to complete, therefore impacts

to livelihood of any affected communities will be small in number (less than 200) and temporary. It has been identified that of those affected during construction of the gas pipeline 33 persons are vulnerable and many members of the community are generally poor. Following implementation of a LRP, the construction of the gas pipeline is anticipated to have a minor impact on economic displacement.

5.3.4 Cultural Heritage

The construction of the gas pipeline route could potentially cause damage to sacred sites. Workers who are not aware of the importance of culture heritage sites may damage them unknowingly and excavation of the gas pipeline trench might encourage looters to find and sell artefacts and in the process, damage the sacred sites.

To mitigate any possible impacts, there will be a Chance Find Procedure for all Project components and the Worker's Code of Conduct will include a Cultural Heritage section. The gas pipeline will be designed to avoid disturbance to any sacred sites identified and therefore no impacts are anticipated and the temporary jetty will be sited away from the sacred cemetery in Okura Village. With these measures in place, there will be no impacts to cultural heritage sites.

5.3.5 Community Health, Safety and Security Impacts

Dust and noise related nuisance impacts from construction are anticipated to be short-term. Contaminant concentrations resulting from the operation of the power plant are predicted to be well below recommended levels. The workforce to be introduced will be relatively small against the existing population and therefore opportunity for outside diseases is small. There are a number of existing healthcare facilities adjacent to the Project area and Pekanbaru City is only 10 km to the west, therefore, there is good capacity to absorb any increased healthcare demands as a result of the Project. Consequently, the health impacts are not considered to change as a result of the Project.

In relation to the potential social conflict between the workforce and local population where members of the workforce are not from local villages, consideration in the form of mitigation will be in place for this including MRPR developing a Worker's Code of Conduct. Social conflict levels within the area are not therefore anticipated to change as a result of the Project.

6. Mitigation and Monitoring

6.1 What Will Be Done to Reduce the Potential Impacts?

MRPR will implement measures to prevent and mitigate the potential negative impacts and to effectively manage the Project for environmental protection, for the construction and operation stages of the Project. Mitigation measures are identified in the Technical Reports that are the basis of the Project ESIA and are summarised in the ESIA and Environmental and Social Management Plan (ESMP). The mitigation measures proposed also reflect the outcomes from consultation.

Where necessary, mitigation measures have been proposed to meet the requirements of Indonesian laws and regulations and international guidance. International guidance requires that a sequencing strategy is applied that gives priority to avoiding impacts, then a focus on the reduction or minimisation of impacts that cannot be avoided, and finally where impacts are unavoidable people affected by the Project must receive compensation.

In general, the types of mitigation measures identified are implemented by one or more of the following means:

- incorporated into the plant design;
- specifying construction methods;
- developing and implementing management plans;
- undertaking monitoring; and
- following consultation and grievance procedures.

MRPR in collaboration with the EPC Contractors (and any Subcontractors) will establish, maintain, and strengthen as necessary an organisational structure that defines roles, responsibilities and authority to implement an ESMP during construction and operation of the Project.

6.2 What Will Be Done to Monitor the Potential Impacts

A recommended environmental monitoring program as set out in the ESMP will be designed to conduct sufficient monitoring to demonstrate compliance with the applicable international guidelines and Indonesian standards specified for the receiving environments (air, water, soil, etc.). The monitoring programmes will also assess the performance of containment and treatment systems at the power plant during construction and operation and for the construction of the pipeline.

The Monitoring Procedures will set out the location of the sampling points, sampling methodology to be used (grab samples, automated etc.), number of samples to be collected each round, frequency of sampling, sample handling and preservation, parameters to be analysed for and analytical methods, and reporting requirements. This monitoring will include, but will not be limited to:

- Regular monitoring of in stream water quality and of stormwater discharged into the environment from the stormwater sumps, during all seasons;
- Groundwater levels and quality;
- Traffic management measures;
- Occupational Health and Safety performance;
- Waste generation;
- Noise and ambient air quality; and
- Social surveys and changes monitoring.

7. Conclusion

This ESIA summarises a large amount of technical work undertaken to assess the impacts of the proposed Project. The ESMP sets out mitigation and monitoring actions that address the key environmental and social impacts identified in the analysis. Control measures will be implemented through a Project Environmental and Social Management System to ensure that the environmental and social impacts of the Project are acceptable and in compliance with the Indonesian legislation and international guidelines