



INVESTMENT CATALOGUE



MINISTRY OF ENERGY AND MINERAL RESOURCES
REPUBLIC OF INDONESIA

2017



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POTENCY OF EMR INVESTMENT IN INDONESIA



Indonesia is located between three major tectonic plates: Eurasia tectonic plate; Hindia-Australia; and Pasific. As a result, Indonesia has a tremendous risk of geo-hazard as well as has various energy and mineral potential. Oil and gas is the main income for Indonesia economy for more than 100 years however its reserves have been depleted. Meanwhile, there is another potential energies that not optimally utilized such as coal, coal bed methane, shale gas, and new renewable energy.

Indonesia has potential of hydrocarbons in 60 sedimentary basins. In fact, Geological Agency identified 128 oil and gas basins. The proven





reserves of oil in 2014 are 3.6 billion barrels and only last for 13 years with current production level. While the proven reserves of gas in 2014 are 100.3 TCF and only last for 34 years. This assumption is based on the absence of new discoveries.

Despite the proven oil and gas reserves decline, the domestic oil production should be increased to meet the domestic demand. In order to increase oil production to 700,000 barrels per day in 2019, the Government is accelerating a refinery development through Refinery Development Master Plan (DRMP) program in 5 existing Pertamina refinery locations (RDMP RU Dumai, Plaju, Cilacap, Balikpapan, and Balongan) with total investment of US\$ 15-20 million.

In line with effort to increase oil and gas production, the Government is focusing on mineral value added as mandated by Law No. 4 of 2009 on Mineral and Coal Mining. In 2009, there are plan to complete 7 iron ore smelter with total investment of US\$ 99,817 million and 10 nickel ore smelter with total investment of US\$ 4,224 million. The Government of Indonesia committed to give support in smelter investments in Indonesia.

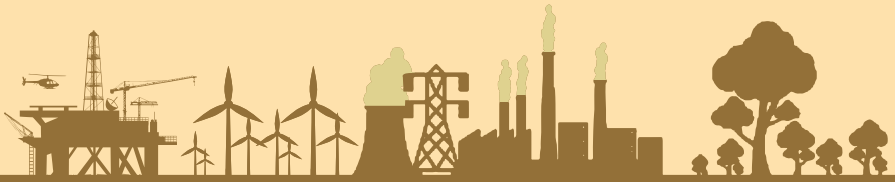
Mainstreaming of new renewable energy up to 23% in the national energy mix by 2025 as mandated by National Energy Plan. Geothermal became the main focus for development in addition to other energy. That is because Indonesia has abundant resources of geothermal and the biggest geothermal potential in the world, scattered along volcano belt from Sumatera, Java, Bali, Nusa Tenggara, North Sulawesi, and Maluku. Referring to research of Geological Agency, it identified 312 geothermal potential with total capacity 29,910 MW and total reserves are 16,524 MW. However, the installed capacity of geothermal power plants by 2014 reached 1403.5 MW or 4.9% of existing potential. Target installed capacity of geothermal power plants in 2019 are 3,195 MW.

In 2010, the installed capacity of geothermal power plants are 1,189 MW and increase in 2014 to 1,403.5 MW. Additional capacity of geothermal power plants during the period 2010-2014 are 214.5 MW. The geothermal power installed capacity is only 4% of Indonesia's geothermal potential around 28,000 MW. In order to increase the generating capacity in the future, it set 65 Geothermal Working Area (WKP), consisting of 19 existing WKP and 46 WKP which issued after Geothermal Law is enacted. In addition, in order to increase development of geothermal, it has made some breakthroughs, including harmonized and improvement of geothermal regulations.

In order to utilize all energy potential for the sake of Indonesian People, the Government of Indonesia facilitates investors through Investment Catalogue.

READY TO OFFER PROJECT

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- 1) Smelter Grade Alumina Refinery
Mempawah
- 2) Haltim Ferronickel Plant
Development Project Stage I
- 3) Gag Ferronickel Project

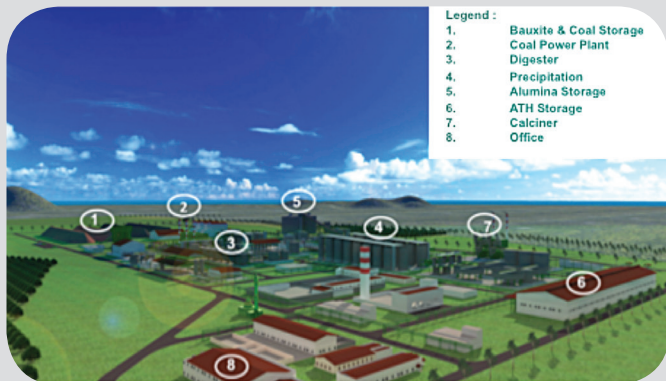
1) SMELTER GRADE ALUMINA REFINERY MEMPAWAH

PROJECT DESCRIPTION



Smelter Grade Alumina Refinery (SGAR) Mempawah Stage I Project & Mempawah Bauxite Mine Project

ANTAM has large reserves and resources of bauxite ore in Mempawah, West Kalimantan, where INALUM will be the off-taker. To support the bauxite processing and increase the value of bauxite reserves, ANTAM and INALUM will develop SGAR to connect the supply chain of bauxite-alumina-aluminium.



PROJECT BENEFIT



This Project is expected to increase value of bauxite reserves as well as utilize mineral and energy reserves

along with increasing quality of human resources in the transfer of technology, especially the processing and refining of mineral resources.

PROJECT STATUS



- Signing of JVA: 2Q16 (completed)
- Detail Engineering Drawing/ FS: 2Q16
- Construction Ground Breaking: 3Q16
- EPC Period: 1Q17 – 4Q19
- Commercial Operation Date: 4Q19

ESTIMATED VALUE



Investment needs:

- US\$ 750 million (Refinery & Power Plant); financed with 30% of equity and 70% of loan;
- Rp. 1,45 Trillion (Mining Development) financed with 100% of loan

TRANSACTION



- Shares of stock in SGAR Mempawah project
- Lending in SGAR Mempawah project
- Lending to ANTAM (8 years Bond Rp. 579 billion) for ANTAM equity portion in SGA
- Lending to ANTAM (8 years Bond Rp. 579 billion) for bauxite mining expansion

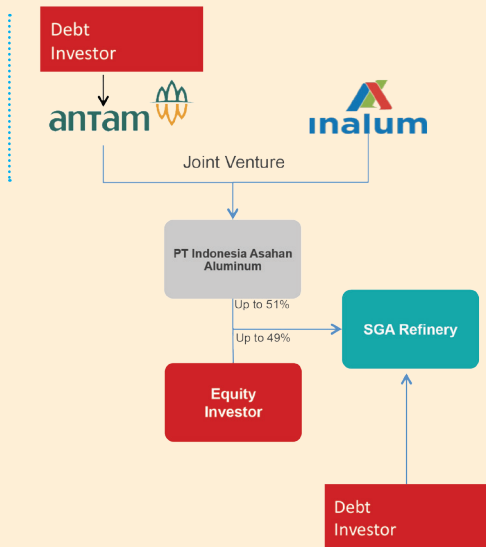
Mode of offer:

- Equity investment – join venture
- Limited Recourse Project Finance
- Corporate Finance to ANTAM

INVESTMENT OPPORTUNITY

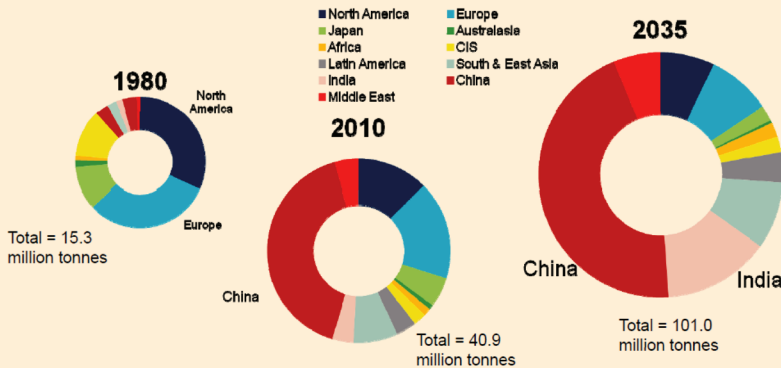


Investment structure:
maximum equity **49%**
of the SPV (refinery
expansion)
IRR: **10-12%**



Drivers of primary aluminium consumption switch from West to East:

Global consumption is forecast to grow steadily at a CAGR of 4.0% to 2016 with China, India and South East Asia driving consumption growth

Shares of primary aluminium consumption in:**CONTACTS****Business Development Division**

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2) HALTIM FERRONICKEL PLANT DEVELOPMENT PROJECT STAGE I

PROJECT DESCRIPTION



ANTAM has large reserves and resources of nickel ore in East Halmahera. To support the nickel processing and increase the value of nickel reserves, ANTAM develops Haltim Ferronickel Plant Stage II to increase expansion and develop stainless steel plant. Project development of Haltim Ferronickel Plant stage I Line 2 has capacity of 13,500 ton nickel in ferronickel per year.



PROJECT BENEFIT



This project is expected to increase value of nickel reserves as well as utilize mineral and energy reserves

along with increasing quality of human resources in the transfer of technology, especially the processing and refining of mineral resources.

PROJECT STATUS



- Assessment of Partner : 2017
- Funding & JVCO : 2018
- EPC Period : 2019 - 2021

ESTIMATED VALUE



- Line 1: Rp742 billion (infrastructure & auxiliary), not include Power Plant & Smelter.
- Line 2: Rp4 trillion (Smelter (Rp3,5 trillion) & infrastructure (Rp420 billion), not include Power Plant).

TRANSACTION



- Share stocks in Haltim Ferronickel Plant development project Stage I Line 2
- Lending in Haltim Ferronickel Plant development project stage I Line 2
- Lending to ANTAM (8 years bond Rp. 2 Trillion) for ANTAM equity portion in Haltim FeNi Plant Stage I Line 2
- Lending to ANTAM to develop infrastructure FeNi Plant Stage I Line I (MTN 5 years Rp 472 blion) and 2 (8 years Bond Rp 420 billion)

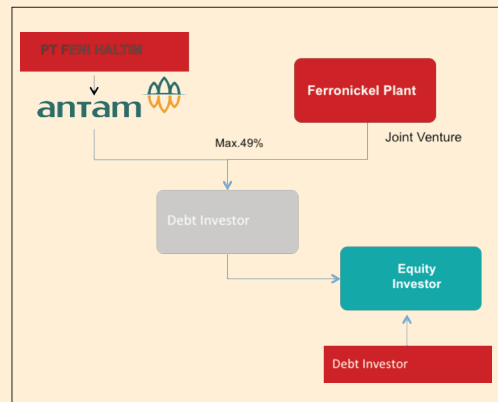
Mode of offer:

- Equity investment – join venture
- Limited Recourse Project Finance
- Corporate Finance to ANTAM



INVESTMENT OPPORTUNITY

Investment Structure
maximum equity **49%**
of PT FeNi Haltim
IRR: **15-18%**
Project Lifetime Min. **30**
Tahun





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3) GAG FERRONICKEL PROJECT

PROJECT DESCRIPTION



ANTAM has large reserves and resources of nickel ore in Papua (Gag Island). To support the nickel processing and increase the value of nickel reserves, ANTAM develops Ferronickel Plant to increase expansion. Gag Ferronickel Plant Project has capacity of 13,500 ton nickel in ferronickel per year.



PROJECT BENEFIT



This project is expected to increase value of nickel reserves as well as utilize mineral and energy reserves along with increasing quality of human resources in the transfer of technology, especially the processing and refining of mineral resources.

PROJECT STATUS



- Financing : 2017
- EPC Period: 2018 – 2021
- Commercial Operational Date : 4Q21



ESTIMATED VALUE

Rp6,6 trillion (Smelter, Power Plant , Infrastructure & Mine)



TRANSACTION

- Shares of stocks in Gag Ferronickel Project
 - Lending in Gag Ferronickel Project
- Mode of offer:
- Equity investment – join venture
 - Limited Recourse Project Finance



INVESTMENT OPPORTUNITY

Investment Structure:
maximum equity **75%**
of PT GAG Nikel
IRR: **15-18%**
Project Lifetime Min.
30 Tahun

antam 

Joint Venture

PT GAG Nikel

Max.75%

Debt
Investor

FeNi Gag Plant



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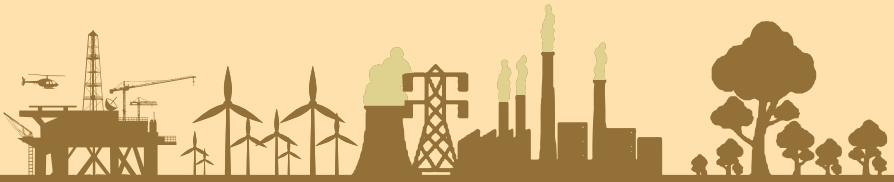
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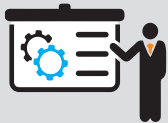
POTENTIAL PROJECT



- 1) Oil and Gas Project
 - a. Refinery Development Master Plan (RDMP)
 - b. Grass Root Refinery (GRR)
- 2) Mineral and Coal Project
 - a. Anode Slime & Precious Metal Refinery Project
 - b. Kaltara Stainless Steel Project Stage
- 3) Geothermal Project
 - a. WKP Gunung Galunggung
 - b. WKP Gunung Hamiding
 - c. WKP Gunung Wilis
 - d. WKP Simbolon Samosir
 - e. WKP Graho Nyabu
 - f. WKP Gunung Geureudong

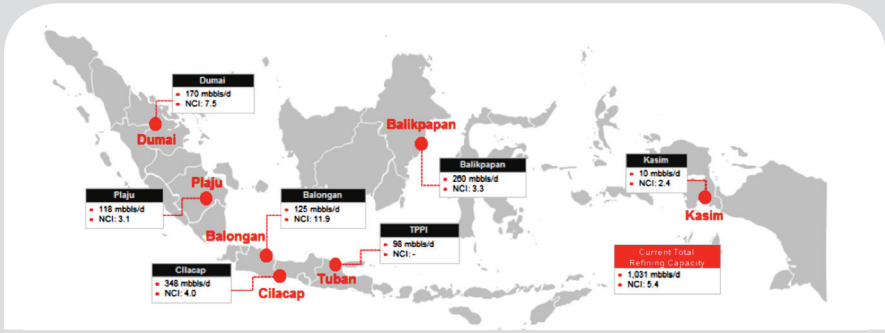
1) A. REFINERY DEVELOPMENT MASTER PLAN (RDMP)

PROJECT DESCRIPTION



RDMP

Pertamina's refinery has a total capacity of 1.031 mbsd, and will transform its refining business by upgrading 5 major existing refineries.....



Crude flexibility	Complexity	Product quality	Crude quantity
~2% S of crude flexibility	8-9 NCI	EURO IV up from EURO II	x2 increased capacity
Sulfur handling limit from 0.4% to ~2% S	Complexity improved from 5 to 8-9	Gasoline from 500 to <50 ppm S Diesel from 3,500 to <50 ppm S	From 820,000 BPD to 1,610,000 BPD

PROJECT BENEFIT



Upgrading existing Pertamina's refineries through 4 aspects:

- Increase crude oil refining flexibility
- Increase Nelson Complexity Index (NCI) of refinery.
- Increase Fuel quality
- Increase refinery capacity to ~1.7 times from current operational capacity in order to reduce dependency of import and increase national energy security

This project is expected to increase profitability and competitiveness existing refinery equal to refinery in Asia Pasific and Middle East.

PROJECT STATUS



- Refinery Development MasterPlan RU 2 Dumai : Feasibility studies
- Refinery Development MasterPlan RU 3 Plaju : Feasibility studies
- Refinery Development MasterPlan RU 4 Cilacap : Engineering
- Refinery Development MasterPlan RU 5 Balikpapan : Engineering & procurement
- Refinery Development MasterPlan RU 6 Balongan : Feasibility studies

RDMP Project stages:

- | | |
|---------------------------------|------------------------------------|
| a. Feasibility Study | d. EPC |
| b. Basic Engineering Design | e. Commissioning |
| c. Front End Engineering Design | f. Commercial Operation Date (COD) |

ESTIMATED VALUE



Estimated Total Value RDMP
Project : ±USD 15 – 20 bn

INVESTMENT OPPORTUNITY



- Financial Lender
- Strategic Partner
(Feedstock Supplier, EPC Contractor, Engineering Contractor, etc.)



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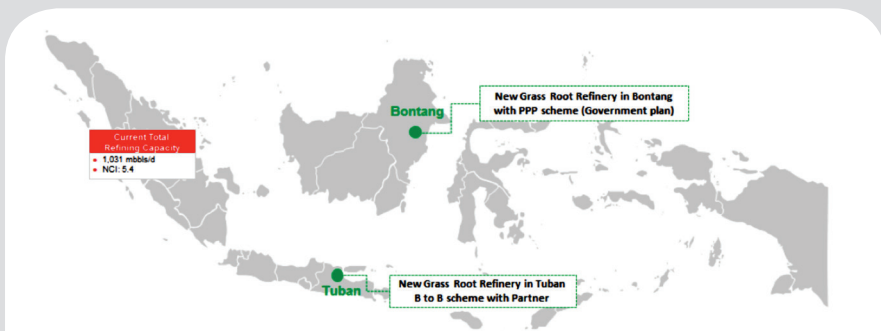
1) B. GRASS ROOT REFINERY (GRR)

PROJECT DESCRIPTION



GRR

Building World-Class Refining
Capacity for Indonesia's
Energy Needs....



Crude flexibility
~2% S
of crude flexibility
Sulfur handling limit
up to ~2% S

Complexity
10-12
NCI
World class
Complexity

Product quality
EURO IV - V
up from EURO II
Gasoline 10 - 50 ppm S
Diesel 10 - 50 ppm S

Crude quantity
300,000
BPD
Can be increased to
400,000 BPD

PROJECT BENEFIT



Developing Grass Root Refinery (GRR) is to supply domestic demand and reduce an import dependency. Project profile:

- Refinery capacity ~300 MBPD
- complexity NCI > 9
- integrated with petrochemical plant (TBD)

Bontang Refinery is expected to fulfill Fuel needs in East part of Indonesia (Kalimantan, Sulawesi, Bali, Nusa Tenggara, and Papua), while Tuban Refinery is expected to fulfill Fuel needs in Jawa, Bali and Sumatera.

PROJECT STATUS



- Grass Root Refinery (GRR) Bontang : Feasibility studies
- Grass Root Refinery (GRR) Tuban : Feasibility studies and negotiation with partners

RDMP project stages:

- a. Feasibility Study
- b. Basic Engineering Design
- c. Front End Engineering Design
- d. EPC
- e. Commissioning
- f. Commercial Operation Date (COD)

ESTIMATED VALUE



Total Estimated Value 1 GRR project: ±USD 13 bn (include Kilang Petrokimia)

INVESTMENT OPPORTUNITY



- Financial Lender
- Strategic Partner (Feedstock Supplier, EPC Contractor, Engineering Contractor, etc.)



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2) A. ANODE SLIME & PRECIOUS METAL REFINERY PROJECT

PROJECT DESCRIPTION



ANTAM has an ability to process and refine anode slime to extract gold and other precious metal from anode slime. Domestic anode slime processing and refining will increase commodities value including increase contribution to government and local people. Anode Slime and Precious Metal Refinery Project has capacity of 6,000 ton anode slime.

PROJECT BENEFIT



This project is expected to increase value of commodities through processing and refining and conservation mineral and energy reserves as well as increasing quality of human resources in the transfer of technology especially processing and refining technology of mineral resources.

PROJECT STATUS



- Signing of MoU ANTAM- PT Freeport Indonesia – PT Smelting : 1Q16 (Completed)
- Singing of JVCO : 4Q16
- EPC Period : 1Q17 – 4Q18
- Commercial Operational Date : 4Q18



ESTIMATED VALUE

US\$135 million (not include working capital US\$105 million)

TRANSACTION



- Shares stokcs in Anode Slime and Precious Metal Refinery Project Development
- Lending in Anode Slime and Precious Metal Refinery Project Development

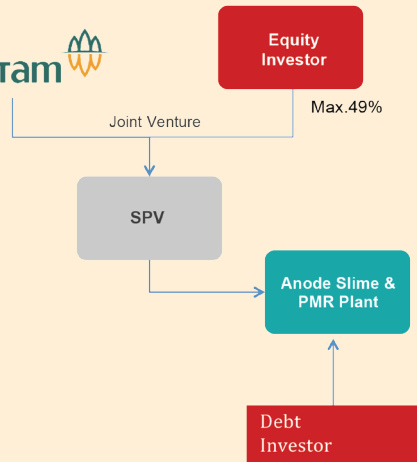
Mode of offer:

- Equity investment – join venture
- Limited Recourse Project Finance

INVESTMENT OPPORTUNITY



Equity **49%** of SPV
Project Lifetime Min.
20 Tahun



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2) B. KALTARA STAINLESS STEEL PROJECT STAGE I

PROJECT DESCRIPTION



Stainless Steel Project Stage I with capacity 500 thousands Ton with FeNi supply 40 Thousands Ton Ni, from:

1. FeNi Pomalaa with capacity of 27.000 Ni
 2. Feni P3FH stage I with capacity of 13.500 TNi
- Stainless Steel Project Stage I will be planned in Industrial Area North Kalimantan considered availability source of energy, infrastructure, and supporting facilities.

PROJECT BENEFIT



This Project is expected to increase a value added of Ferronickel and increasing quality of human resources in the transfer of technology, especially Nickel and Stainless Steel processing technology.

PROJECT STATUS



Construction Period:

- Project preparation and another study (AMDAL, FS, etc): 2016 – 2021.
- Plant construction follow progress of PLTA construction.

ESTIMATED VALUE



Stage I US\$ 600 million (not include Power Plant), financed with 30% equity and 70% loan

TRANSACTION



- Shares of stocks in SS Project Kaltara
- Loan in SS Project Kaltara

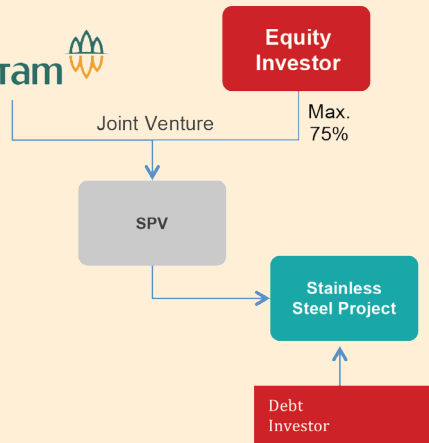
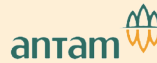
Mode of offer:

- Equity investment – join venture
- Limited Recourse Project Finance

INVESTMENT OPPORTUNITY



Investment Structure:
maximum equity **75%**
of SPV
Project Lifetime Min.
30 Tahun



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3) A. WKP GUNUNG GALUNGGUNG

PROJECT DESCRIPTION



Working Area is set by Ministry of EMR Decree No. 4286 K/30/MEM/2014, December 29th, 2014. The proposed total area of WKP Gunung Galunggung is 57,330 ha

Location

WKP Gunung Galunggung located in Tasikmalaya Regency, Garut Garut and Kota Tasimalaya, East Java Province.

Potentialand

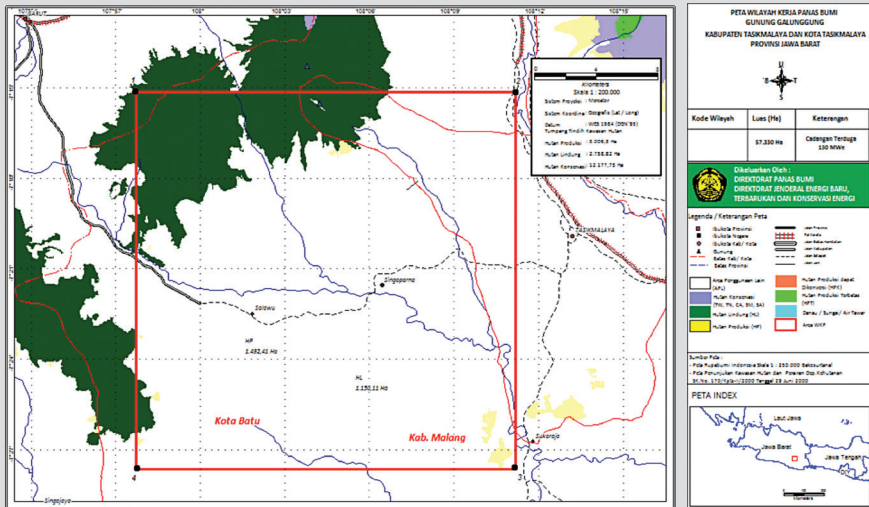
WKP Gunung Galunggung Potential is 130 MWe and development plan is 110 MW

Geoscience Summary

Low resistivity anomaly patterns in the south crater of Galunggung is the result if hydrothermal alteration of clay rocks. It can be the covering rock of geothermal system in Galunggung. Resistivity anomaly patterns shows the deployment of a truncated and not constantly led to speculation that the covering rock (low resistivity) and possible reservoir (medium resistivity) are not constantly be separate segments.

Galunggung prospect reservoir is estimated below and follow the pattern of the covering rocks. This reservoir cuts into 3 parts. The tops of reservoir located at an elevation between (-700) – (-1000) mbsl. Reservoir thickness ranging between 700 m to 1000 m.

Upflow is estimated to be around the peak of Gunung Galunggung to Gunung Kencana, while outflow headed south to manifestation of Cigunung. The existence of Cibalong manifestation likely as a part of Cigunung manifestation that controlled by geological structure through manifestations and as an outflow. It also has concealed outflow starts from Galunggung crater to southeast towards Cipanas rivers, Cikunir, and Cibanjaran.



PROJECT BENEFIT



- Geothermal utilization will reduce CO₂ emissions that cause the greenhouse effect
- Project operational cost becomes low after gets geothermal steam (deployment phase)

PROJECT STATUS



Total Project

ESTIMATED VALUE



USD 80.000.000 (assumption: USD 4.000.000 for every 1 MW development).



TRANSACTION

Foreign Direct Investment is possible up to 100%



INVESTMENT OPPORTUNITY

- Investor as Geothermal Licences (IPB) holders obtained by auction mechanism
- Investor as Initial Survey Holder (PSP) holders or PSP and exploration
- Investor as lender/shareholder of IPB
- Investor as supplier of goods or services through geothermal supporting business industries



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3) B. WKP GUNUNG HAMIDING

PROJECT DESCRIPTION



Working Area is set by Ministry of EMR Decree No.2779K/30/MEM/2014 June 3rd, 2014. The Proposed total Area of WKP Gunung Hamiding is 42.100 ha.

Location

WKP Gunung Hamiding located in North Halmahera Regency, North Maluku Province.

Potential

WKP Gunung Hamiding Potential is 265 MWe and development plan is 20 MW.

Geoscience Summary

Three potential of Gunung Hamiding are 7 km² area reserves, 22.5 m² hypothesis resources and 95 km² hypothesis resources. Hamiding geothermal system controlled by volcanic structure “caldera collaps”. Hamiding geothermal system has upflow zone around Gunung Kao with outflow towards fumarole H-1 and H-2, northeast (H-4) and southwest towards Maluku warm springs.

WKP Gunung Hamiding geothermal systems are 2 phase systems that has a neutral pH and NCG less than 0.2

Geophysical survey of WKP Gunung Hamiding shows patterns of conductive layers that ranging from southwest to northeast of Gunung Kao.



TRANSACTION

Foreign Direct Investment is possible up to 100%



INVESTMENT OPPORTUNITY

- Investor as Geothermal Licences (IPB) holders obtained by auction mechanism
- Investor as Initial Survey Holder (PSP) holders or PSP and exploration
- Investor as lender/shareholder of IPB
- Investor as supplier of goods or services through geothermal supporting business industries



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PROJECT BENEFIT



- Geothermal utilization will reduce CO₂ emissions that cause the greenhouse effect
- Project operational cost becomes low after gets geothermal steam (deployment phase).

PROJECT STATUS



Total Project

ESTIMATED VALUE



USD 80.000.000 (assumption: USD 4.000.000 for every 1 MW development).development).

TRANSACTION



Foreign Direct Investment is possible up to 100%

INVESTMENT OPPORTUNITY



- Investor as Geothermal Licences (IPB) holders obtained by auction mechanism
- Investor as Initial Survey Holder (PSP) holders or PSP and exploration
- Investor as lender/shareholder of IPB
- Investor as supplier of goods or services through geothermal supporting business industries

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3) D. WKP SIMBOLON SAMOSIR

PROJECT DESCRIPTION



Working Area is set by Ministry of EMR Decree No.1827.K/30/MEM/2012, April 30th, 2012. WKP Simbolon Samosir total area is 168.800 ha

Location

WKP Simbolon Samosir located in Samosir Regency, Toba Samosir Regency, North Tapanuli Regency, Humbang Hasundutan Regency and Dairi Regency, North Sumatera Province.

Potential

WKP Simbolon Samosir reserves is 150 MWe and development plan is 110 MW.

Geoscience Summary

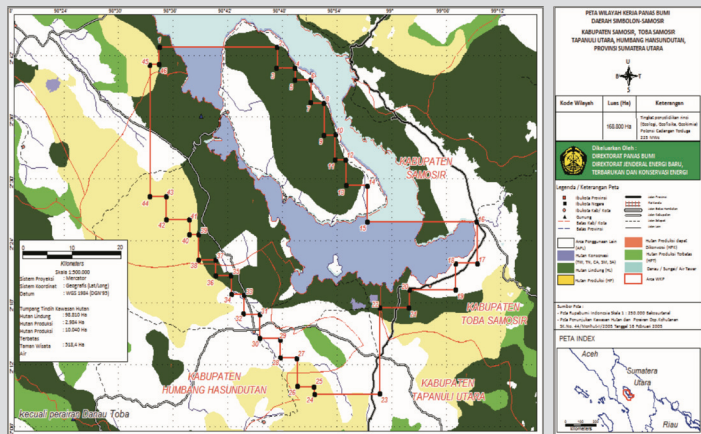
Integrated geoscience summary (aerial photography, landsat and geological imagery, geochemical and geophysical) shows that the lateral distribution of Simbolon-Samosir geothermal system controlled by Sibandung Kaldera structure (Kaldera Toba stage-3) with diameter of 57.7 km x 27.5 km. There are 2 groups headed to northeast-southwest and headed to northwest-south southeast south west which is medium transport of geothermal fluid from reservoir to the surface manifestation around Gunung Pusuk Bukit and Rianiate-Sigaol, including surface geothermal manifestation in Pagaran.

The presence of heat source below the surface of Kaldera Sibandung supported by high temperature hot springs (< 92-96oC) and solfatara (85.6-94.3oC) in Gunung Pusuk Bukit and Simbolon – Rianiate – Sigaol.

Referring to studies of 95 survey points MT-TDEM in Simbolon – Samosir, conductive layers (< 10 ohm-m) as claycap only appears in Gunung Pusuk Bukit,. Resistivity layer (>10-60 ohm-m) which represents the reservoir layer located in the shallow zone (thickness

of about 750m). Conductive layer that has resistivity < 10 ohm-m is not found on the surface of Rianiate-Sigaol.

Instead, a high resistivity zone that around 100 ohm-m to hundreds ohm-m presents on 1,500 m (above sea level) up to 250 m (below sea level) indicating cap rock like lava rocks and fresh welded ignimbrite. Therefore, resistivity layers of 10-100 ohm-m indicates reservoir rocks that can be found in 250 to 1,750 below sea level.



PROJECT BENEFIT



- Geothermal utilization will reduce CO₂ emissions that cause the greenhouse effect
- Project operational cost becomes low after gets geothermal steam (deployment phase)

PROJECT STATUS



Total Project

ESTIMATED VALUE



USD 440.000.000 (assumption: USD 4.000.000 for every 1 MW development).development).



TRANSACTION

Foreign Direct Investment is possible up to 100%



INVESTMENT OPPORTUNITY

- Investor as Geothermal Licences (IPB) holders obtained by auction mechanism
- Investor as Initial Survey Holder (PSP) holders or PSP and exploration
- Investor as lender/shareholder of IPB
- Investor as supplier of goods or services through geothermal supporting business industries



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PROJECT BENEFIT

- Geothermal utilization will reduce CO₂ emissions that cause the greenhouse effect
- Project operational cost becomes low after gets geothermal steam (deployment phase)

PROJECT STATUS

Total Project

ESTIMATED VALUE

USD 440.000.000 (assumption: USD 4.000.000 for every 1 MW development).

TRANSACTION

Foreign Direct Investment is possible up to 100%

INVESTMENT OPPORTUNITY

- Investor as Geothermal Licences (IPB) holders obtained by auction mechanism
- Investor as Initial Survey Holder (PSP) holders or PSP and exploration
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- Investor as supplier of goods or services through geothermal supporting business industries

CONTACTS**Direktorat Panas Bumi**

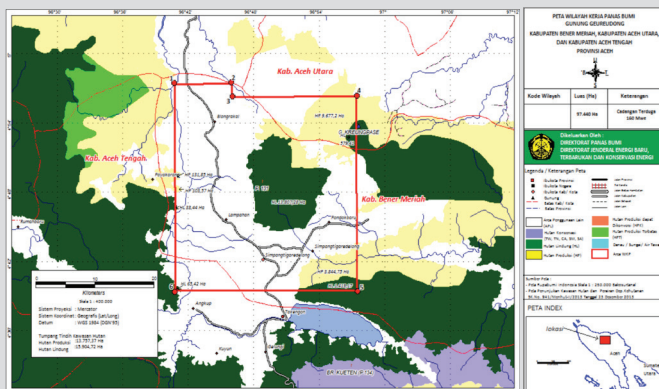
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PROJECT DESCRIPTION



PROJECT BENEFIT

- Geothermal utilization will reduce CO₂ emissions that cause the greenhouse effect
- Project operational cost becomes low after gets geothermal steam (deployment phase)

PROJECT STATUS

Total Project

ESTIMATED VALUE

USD 220.000.000 (assumption: USD 4.000.000 for every 1 MW development).

TRANSACTION

Foreign Direct Investment is possible up to 100%

INVESTMENT OPPORTUNITY

- Investor as Geothermal Licences (IPB) holders obtained by auction mechanism
- Investor as Initial Survey Holder (PSP) holders or PSP and exploration
- Investor as lender/shareholder of IPB
- Investor as supplier of goods or services through geothermal supporting business industries

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