

STRATEGIES FOR DEVELOPING LAHENDONG GEOTHERMAL FIELD, INDONESIA

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ABSTRACT

Lahendong Geothermal Field is one of business units of Pertamina's Upstream Directorate, one of the present State Enterprise. The long lasting economic crisis, rapid globalization tendencies, regional economic demands as well as economic decentralization in general has set new colors and dynamics of Indonesia's business development.

Responding to the growing demand in electricity in the North Sulawesi province estimated at 16% per year through the year 2010 Pertamina intends to expand its geothermal power plant capacity in Lahendong geothermal field.

Since October 2001, the Lahendong geothermal field is producing steam to supply turbine with 20 MWe installed capacity. Pertamina is currently engaged in the operation of competitive geothermal facilities and in the expansion of the installed capacity in Lahendong Geothermal field as well as in other fields.

This paper presents a summary of the market demand in the region, preparation of contract and the strategy to develop Lahendong geothermal field

INTRODUCTION

Figure 1 shows the Lahendong geothermal field, which is located in the province of North Sulawesi, about 30 km South of Manado, capital city of the province.

The geothermal exploration activity in the area was started in 1976. During that period, a series of geology, geochemistry and geophysical surveys has been carried out by the Vulcanological Survey of Indonesia (VSI). Following this activities, two shallow wells have been drilled in the west side of Lake Linau as a test. Pertamina continued the exploration activities since 1982. As of 1994,

As of 1994, Pertamina has drilled 16 standard wells; six of them indicate good permeability and high temperature (i.e. LHD-8, LHD-10, LHD-11, LHD-12, LHD-14, and LHD-15), one well (LHD-7) is for injection, seven wells are used for monitoring, and two wells (LHD-3 and LHD-4) are abandoned.

Four of six wells have supplied steam to the existing 20MWe power generation, i.e. LHD-8, LHD-11, LHD-12, and LHD-15. The other wells were not being used; LHD-10 has not yet been tested and LHD-14 was considered less productive well.

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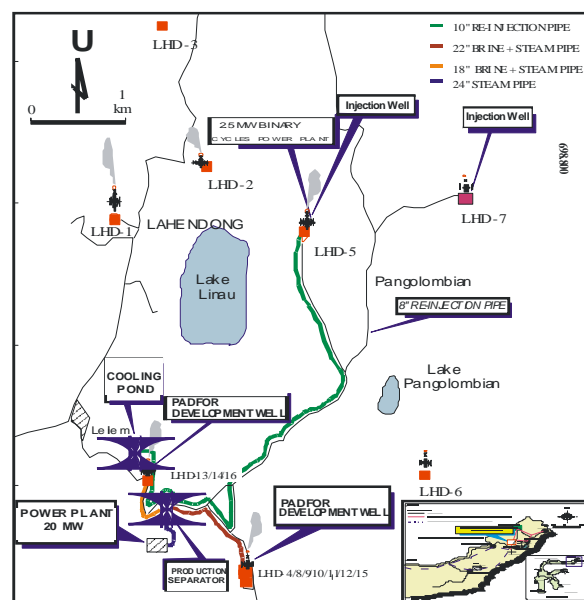


Figure 1. Lahendong Geothermal Field

Two units of 20 MWe power generations will be installed for next development. For that reason, Pertamina will drill three big-holes at pad LHD-5 and three standard wells at pad LHD-13.

FUTURE GEOTHERMAL DEVELOPMENT IN INDONESIA

The economic pressure in mid 1997 due drastic depreciation of the Rupiah to the US dollar, forced the Government to postpone several development projects in many sectors with Presidential Decree no. 39, 1997. At that time, geothermal energy seems to face an uncertain future. The cost of power, which is paid in US Dollar, became uncompetitive with power produced from other fuels.

In relation with the postponement of the above mention projects, the Government has lifted the Presidential Decree number 39, 1997 through another Presidential Decree number 15, 2002 and decided that several geothermal projects could be continued.

Geothermal energy resources main constraint is that it cannot be exported, stored or transported. Therefore geothermal energy should be kept in a strategic position as a preferred source of domestic energy.

The continuous growth on energy demand in Indonesia and the anticipated energy crisis in the coming years challenges the geothermal industry in Indonesia to speed up the development of electricity.

Other opportunities to develop geothermal energy with the assumption that economic recovery in Indonesia can be achieved in 2 or 3 years from now are among others :

- Energy Diversification Policy, majoring in sustainable energy (environmentally friendly) and possibilities of implementing "CDM" concept (Clean Development Mechanism) could strengthen the competitiveness of geothermal energy as an alternative source of energy.
- Free market implementation could help amend current steam or geothermal electricity price.
- Independent power rationalization with numerous compensation will give a business opportunity in the form of

Pertamina's share of Indonesian Partnership with a promising profit for the company.

LAHENDONG DEVELOPMENT PLAN

The total estimate geothermal resources in North Sulawesi are about 815 MWe, The proven reserve of Lahendong field is 78 MWe with a prospect area of approximately 12 km².

Looking at the need for electricity demand forecast in the region until year 2009 in figure-2, the electricity demand increased significantly. With the 8% increased demand, North Sulawesi will have a shortage in electricity by year 2005.

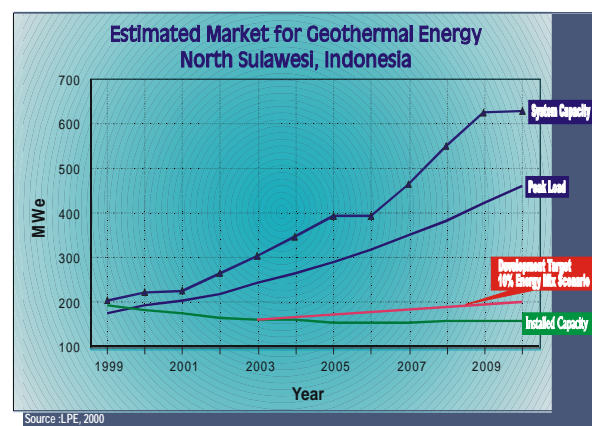


Figure. 2. Estimated Electricity Demand

Other opportunities for the market of electricity in North Sulawesi among others are :

- The highlighted development of an integrated economic region by the regional Government of Manado-Bitung city to accelerate industry in North Sulawesi
- The construction of cement factory near Amurang city, which need electricity for 20MW.
- The development of Likupang gold mining in Minahasa and Kotamobagu will require an estimate energy of 50MWe
- The drawdown of current Tanggori I and II Hydropower from Lake Tondano.

The Steam Sales Contract between Pertamina with PT PLN (Stated owned Electricity Company) is signed on May 12, 1999. The commissioning of power generation with capacity of 20 MWe was conducted in January 2000. The steam produced to generate the installed turbine is approximately 90,432 ton/month of steam generating electricity 11,520 MWh or equivalent to 746 BOEPD.

In November 10, 2000, an agreement was made between Pertamina and PLN to expand the capacity by adding another power plant in Lahendong.

The current plan is to develop the Lahendong field by adding 2 x 20 MWe of power plant with PT PLN with the commercial operation scheduled in 2006.

For development of 2 x 20 MWe power plant Pertamina will supply steam in the upstream or and generates electricity in the down-stream. However, the main target is to optimize the existing steam in the wellhead that needs additional six production wells and two injection wells as well. Currently, Pertamina and PT PLN is preparing a energy sales contract for the new power plant.

Figure 3 shows the tentative program for developing the Unit-2 (2X20) MWe power plant.

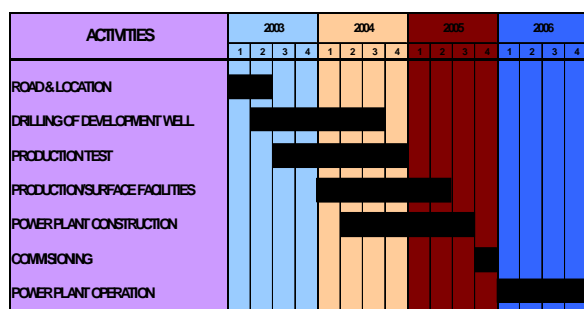


Figure 3 Time Schedule

CONCLUSION

The strong potential of geothermal resources and the growing industry in the North Sulawesi region gives an opportunity for geothermal energy to develop for anticipation of the growth of electricity demand.

Utilizing geothermal energy will have a multiplier effect in developing the local economy through the usage of domestic resources such as local products and services, labors, building infrastructure and opening opportunities for agro-business.

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