THE INDONESIA'S MINERAL ENERGY POTENTIALS AS THE BASE OF THE REGIONAL ENERGY RESILIENCE[1]

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Abstract

The energy minerals of Indonesia consist of oil, gas, coal and lignite. There are 60 potential hydrocarbon basins currently known. Because of its quality, most of Indonesian oil is exported. Indonesia presently produced 1.3 millions barrels of oil daily in line with the OPEC's quota granted to Indonesia. In addition Indonesia produces gas and condensate which are not regulated under the quota. Most of the product are shipped to Japan. Based on the present status of exploration, the oil reserve exceeds 10 billions barrels and might be sufficient for 15 years of production at the present level. However, depending upon the intensive exploration, the reserve might continuously increase. It is therefore, estimated that the Indonesian oil production might be well beyond 100 to 200 years to come, taking into account that only 10% of the known oil basins have presently been exploited. The gas reserve is estimated to be about 125 trillion cubic feet. The Indonesian coal deposit is estimated to be around 40 billions tons, which is sufficient for 400 years under the current annual production of 75 millions tons (Suyartono, 2001). A plan is drafted to construct a submarine cable connecting the Malaysian and Singapore's grid with the electricity generated by mine mouth in Sumatera. It maybe concluded that the mineral energy potential of Indonesia is sufficient to sustain the energy needs of Southeast Asian countries. The Indonesian mineral energy potentials can serve as regional energy resilience, should the commitment on regional energy policy can be drafted.

Keywords: mineral energy potentials, regional energy resilience, hydrocarbon reserve, coal, regional energy strategy

Introduction

The natural resource potentials of Indonesia and Malaysia, have been widely known in the world's market. In the past, following Malaysia as the world's largest tin producer, Indonesia produced around 50 thousands tons of tin. At present the position shifted to other natural resources, where Malaysia is the leading producer with about 18 thousands ton of CPO or about 53% of the world's total production, whilst Indonesia is at the second place with about 15 thousands tons of CPO production.

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This particular illustration demonstrates the natural resources potentials of both countries, in the world's market. It is however, interesting to evaluate its role in the regional market, particularly in relation with the self resilience of Indonesia and Malaysa in particular and the SE Asian region in general.

The energy is at present considered to be the most important element to support the life of human beings. It might be true, that the modern life nowadays is almost impossible without energy. The energy becomes the blood of the life. The cheap and clean generation of energy from water, however has already been at the sun set. The spatial problems was the prime reason to construct the water dam to generate the electricity, because of the densely populated area such as in Indonesia. The energy alternatives are considered to be economically unreliable.

The modern life therefore, relay the energy on the hydrocarbon, though environmentally, the production of such energy is less clean. Mineral energy thus, becomes the fundamental element of human life. It becomes apparent that the mineral energy is in the stake of the global politics, although the other reasons might be manipulated (Sudradjat, 1999).

This paper outlines the mineral energy potentials of Indonesia and how geographically it fits with the SEA Asian's market. A brief analisis is given on its role in the energy self resilience of this region.

Energy mineral resources of Indonesia

The geological condition of Indonesia is favorable for the formation of energy mineral resources. The hydrocarbon basins located at the back arcs are the most ideal geological environment for the accumulation of hydrocarbon. Oil, gas, coal and lignite are the main energy resources deposited in the back arc basins of Indonesia.

There are 60 hydrocarbon basins in Indonesia, most of them are located in the western part of Indonesia. Sumatera island contains about 65% of the total mineral energy reserve of this country consisting of oil, gas, coal and lignite. Likewise in Sumatera, those minerals were accumulated in Kalimantan, particularly in the eastern part of the island. The other potential areas are located in northern part of Java and the sea between Java and Kalimantan. The row of Indonesian hydrocarbon basin extends from the east northern tip of Sumatera to East Kalimantan along the eastern part of Sumatera, northern part of Java and the Java sea covering a distance of about more than 5,000 kilometers.

The other potential area is located in western portion of Irian island. However, the geological condition here is more complicated than that of western part of Indonesia. The potential reserve is also moderate. Much smaller basins are unevenly distributed in Sulawesi, Maluku and Nusa Tenggara. Being located at the highly compressed region due to the northward Australian plate movement, those basins are not promising, though small deposit might be found.

The significant hydrocarbon basins beyond the Indonesian arc system is the Natuna basin located in the northern border of Indonesian territory in the South China sea. The reserve was reported to be of the world class, containing billions of natural gas. Geologically the basin is belong to the South China Sea system, where the plate moved from the north resulting in the development of the back arc hydrocarbon basins in Northeastern part of Indonesia and Brunei Darussalam. Related to the geological process, the cratonic basins developed in South China Sea and the Gulf of Thailand which accumulated natural gas. These particular seas are the common boundary between many SE Asian countries.

The potentials of hydrocarbon mineral of Indonesia is outlined below (Table 1):

Table 1. The hydrocarbon potentials, reserve and annual production of Indonesia)*

No	Energy minerals	Potetials	Reserve	Annual production
1	Oil	70-72 billion bbl	9-10 billions bbl	0,4-0,5 billions bbl
2	Gas	300 tcf	123-135 tcf	3 tcf
3	Coal	38,9 billions tons	9-10 billions tons	73-75 millions tons
4	Lignite**)	> 40 billions tons	> 20 billions tons	not yet exploited

*) Figures were quoted from Sudradjat 2003, position might have increased

**) Lignite deposits in many cases are estimated to be part of coal. Many purely lignite deposits were ignored. The figure mentioned in this table is based on a rough estimation.

(tcf = trillion cubic feet, bbl = barrel)

Out of 60 hydrocarbon basins, there are only 10% intensively explored and exploited. The reserves might well increase in the course of the new exploration in the future. The present hydrocarbon reserve was found in the Tertiary basin. The Pre-Tertiary basins remain to be explored, though it would be technically challenging. The preliminary investigation shows that the Pre-Tertiary basins might as well potentials as the Tertiary basins.

The reserve might also increase by way of the additional technology in the exploitation. The Enhanced Oil Recovery (EOR) in the mature oil fields has prolonged the production life of the oil fields. The intensive exploration with the new technology has discovered the new oil reserve in the old oil field already abandoned, such as that of Cepu Block in East Java. The oil reserve thus, is expectedly increased in line with the addition of technology in

exploitation as well as exploration. The frontier area remains 70% of the total Indonesian basins.

The regional policy energy and the self resilience

Because of its good quality, most of the Indonesian oil is exported. Indonesia presently produced 1.3 millions barrels of oil daily in line with the OPEC's quota granted to Indonesia. In addition Indonesia produces gas and condensate which are not regulated under the quota. Most of the products are shipped to Japan. Based on the present status of exploration, the oil reserve exceeds 10 billions barrels and might be sufficient for 15 years of production at the present level. However, depending upon the intensive exploration, the reserve might continuously increase. It is therefore, estimated that the Indonesian oil reserve might be well beyond 100 to 200 years, taking into account that only 10% of the known oil basins have been exploited. The gas reserve is estimated to be about 125 trillions cubic feet.

Under the long term contract the traditional gas export are shipped to Japan. However an integrated gas pipeline both undersea and on land have been built to collect the gases from Natuna to Singapore and Malaysia, together with gas supply collected from Gulf of Thailand, Duri and Grissik in Sumatera. The pipeline extends as far as Kuala Lumpur. The blueprint has been drafted to connect the pipeline with Aceh and Kangean gas fields respectively in Aceh and East Java. The submarine pipeline will also be built to connect the network already established in East Kalimantan. The natural gas pipeline network therefore, would be integrated the western part of Indonesia with Singapore and Malaysia.

The Indonesian coal deposit is estimated to be around 40 billions tons, which is sufficient for 400 years production under the current annual production of 75 millions tons (Suyartono, 2001). Indonesian coal are exported overseas including Malaysia and the Philippines. The main utilization of coal is for electric generation and cement production. The Indonesian coal is competitive due to its low sulfur content. A plan is drafted to construct a submarine cable connecting the Malaysian and Singapore's grid with the electricity generated by mine mouth in Sumatera.

Based on the geographic accumulation of the energy minerals, which concentrates in western part of Indonesia, it would be worth to take into consideration that the energy potential is located in the backyard of Malaysia. The wide distribution and easy access of the deposits enables the efficient transportation to the market in Southeast Asia region. In addition, the gas pipeline in the North, run almost at the heart of the region.

By connecting the natural gases from East Java and East Kalimantan, the whole natural gas system will be more than sufficient to sustain the development of Southeast Asia region. Coal with the reserve of more than 400 years, undoubtedly becomes a strong element in energy self resilience in SE Asian region. Together with the natural gas pipelines, the submarine cable transmitting the electricity from the mine mouth coal generator will be the strong fundament for the resilience.

Conclusions

It maybe concluded that the mineral energy potential of Indonesia is sufficient to support the energy needs of Southeast Asian countries. It is therefore the Indonesian mineral energy potentials can serve as regional energy resilience, should the commitment on regional energy strategy can be drafted. It is highly recommended to open the intensive dialogue on this particular sector.

The integration of the system and the intensification of the exploration would be the most important steps to sustain the regional energy self resilience. The energy exported to other part of the world might be planned under the regional energy policy. The integration of energy distribution through pipeline and cables is very important in the Southeast Asian energy self resilience. It is expected therefore, that the SE Asia's energy policy could be drafted.

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