

INDONESIA'S REFINING DEVELOPMENTS: FUTURE PROSPECTS AND CHALLENGES

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First Registered on 26 June 2010; Received after Correction on 6 September 2010;

Publication Approval on : 30 September 2010

ABSTRACT

Since 1994 Indonesia has not built any new refineries due to the economic crisis in 1998, which was followed by political reform. Last year Indonesia had imported more than 400 thousand bpd (barrel per day) of petroleum products. On the supply side, Pertamina's refinery capacity of 1,050 thousand bpd produces only up to 750 thousand bpd of petroleum fuels or 68 % of domestic consumption.

A study has been conducted on the refining development in Indonesia up to year 2030. According to a projection based on reference scenario, in year 2030 Indonesia will consume 2.60 million bpd of petroleum fuels. If security of supply approach is taken into consideration, Indonesia will require 3 million bpd of total refinery capacity. New refineries producing additional 2 million bpd have to be constructed in order to fulfill domestic demand for petroleum fuels. The additional new refineries would then be on-stream one by one with 300 thousand bpd of capacity starting from year 2015, and would be built near consumers' area or close to the existing refineries.

As the margin of new refinery is not high enough, appropriate strategies such as optimum configuration, synergy to utilize possible supporting resources should be taken into consideration, while Indonesian government should also offers better incentives in order to make the project economically feasible.

Key words: *refining, petroleum fuels, new refineries development.*

I. INTRODUCTION

Indonesia has not built any new refineries since the year 1994 although fuel demand has continued to increase. The plan to develop new refineries had to be cancelled because of the Asian economic crisis in 1998, which was followed by a drastic political change as Indonesia moved into the democracy era.

In the years from 1995 to 2003, the world also went through a period of excess refining capacity. The refinery margin was very low, and sometimes even fell to a negative, making it economically unfeasible to build new refineries. Furthermore, capital scarcity in the market at that time made the investment decision more difficult.

As the fuel consumption continue to increase, existing refineries are no more capable to fulfill do-

mestic demand and the present fuel import has reached more than 400 thousand barrels/day.

A study has been conducted on the prospect of refining development in Indonesia up to year 2030. Factors at work in the study include security of supply, increased petroleum fuel demand, geographic situation, increased petroleum fuel import, national economic development, human resources and technology capability.

II. SUPPLY AND DEMAND OF PETROLEUM FUELS^{1,2,3}

Indonesia consumes at present more than 1,030 kb/d of petroleum fuels. Approximately 46 % of which was used for transportation. 40% of the transportation products were motor diesel, 30 % was gaso-

line, 15 % was kerosene and the rest were industrial diesel oil, fuel oil and avtur/avgas. Indonesia also produces and consumes about 0.22 million kiloliters of biofuels per year. The biofuels, which are ethanol and biodiesel, are mixed with gasoline and motor diesel respectively.

More than half of the petroleum fuels are consumed in Java and Bali islands. However, Indonesia is an archipelago consisting of more than 17,000 islands. The distribution of petroleum fuels in this country becomes therefore a complicated task which should be considered in selecting the location of new refineries (Figure 1).

Since late 2005 Indonesia has significantly reduced the subsidy for petroleum fuels. The fuels for industry are now sold at international market prices. Transportation fuels such as gasoline and motor diesel are still subsidized about 15-30 % of its economic prices depending on the relevant market prices. The government is now planning to restructure the sub-

sidy sistem in order to provide the subsidy only for the poor and for public transportation.

In order to reduce consumption of petroleum products, this country is diversifying its energy supply by producing biofuel, increasing the use of natural gas, developing geothermal energy and replacing the use of kerosene with LPG for households and micro businesses.

By the end of 2009, about 44 million free LPG stoves and cylinders had been distributed to the low-income people. LPG equivalent to 5.4 million kiloliters /year of kerosene replaced have been consumed. Because the use of LPG is more efficient than kerosene, this program has saved the country by US \$ 1.56 billion last year. Households in remote areas will continue to use the subsidized kerosene.

According to the study based on 6.5% per year of national economic growth, the annual growth of petroleum products would be 3.2 %. The petroleum demand would then increase more than two folds,

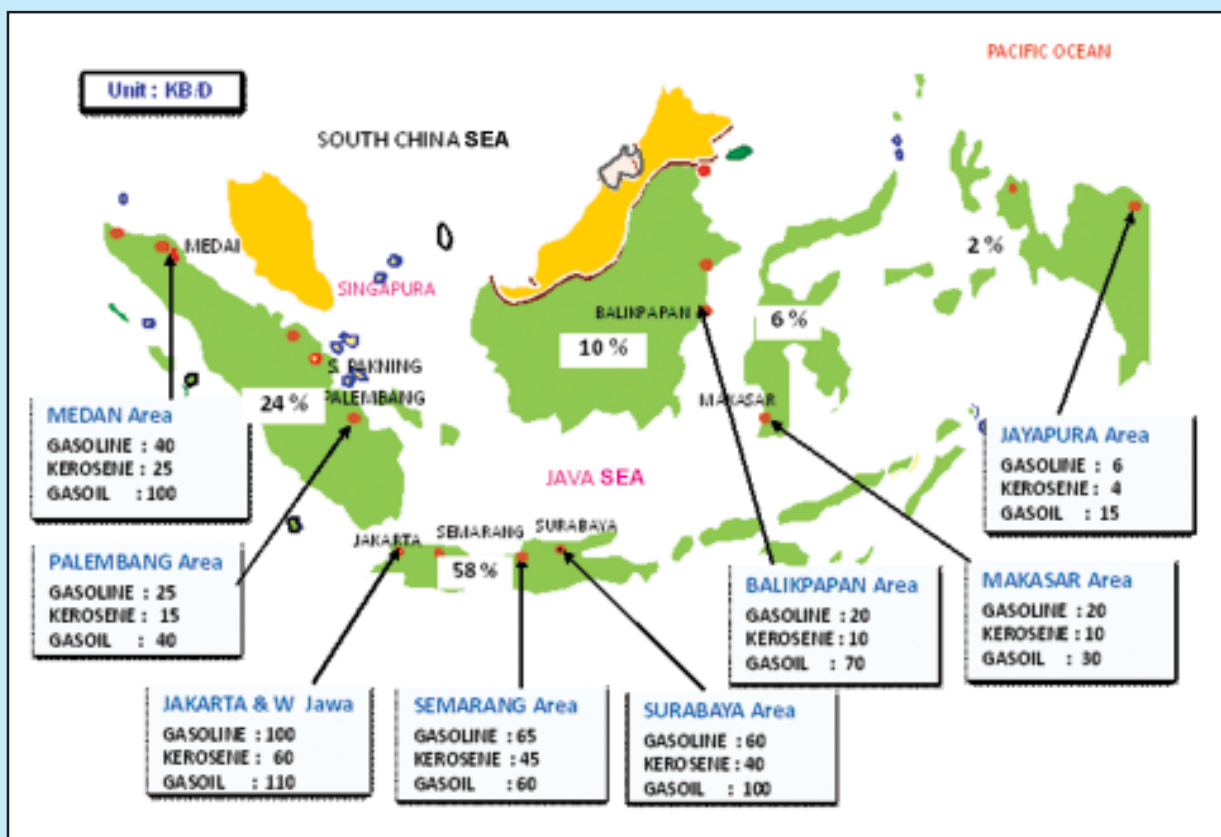


Figure 1
 Petroleum fuel consumption 2007

from 1200,000 bpd (barrels per day) in 2006 to 2.7 million bpd in 2030 excluding biofuels, whereas the supply from existing refineries is only 700-800 thousand bpd (Figure 2). The deficit of domestic supply is then growing from year to year.

The average complexity factor of those refineries is 5.0.

III. EXISTING REFINERIES^{3,4}

The existing refineries are located near the crude oil production areas or near the consumers' areas (Figure 3). The complexity of those refineries is generally low, except for the Balongan refinery in West Java and the one in Dumai which have a complexity factor of 10.9 and 7.4, respectively.

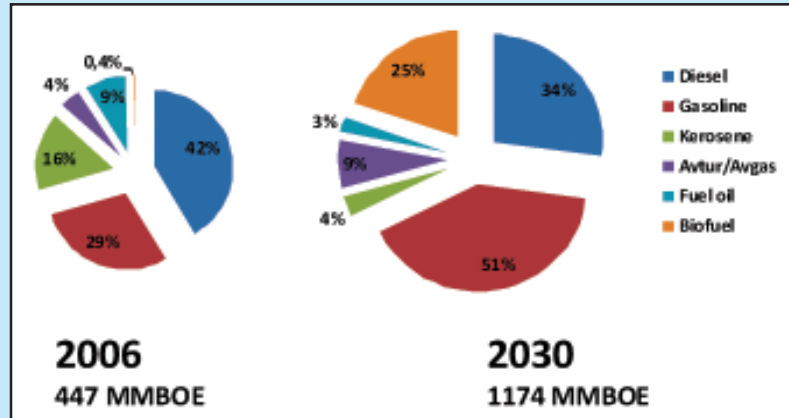


Figure 2
 Petroleum products consumption

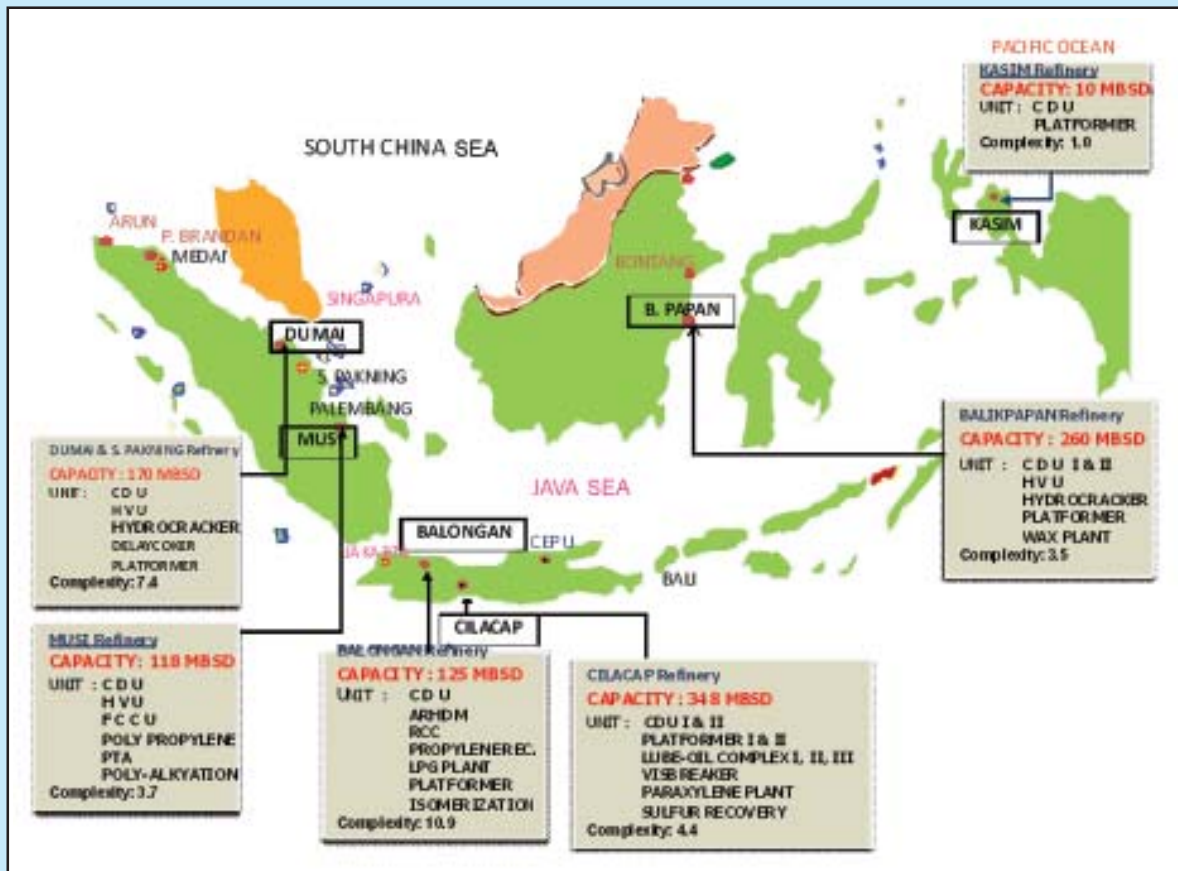


Figure 3
 Indonesia's refineries configuration

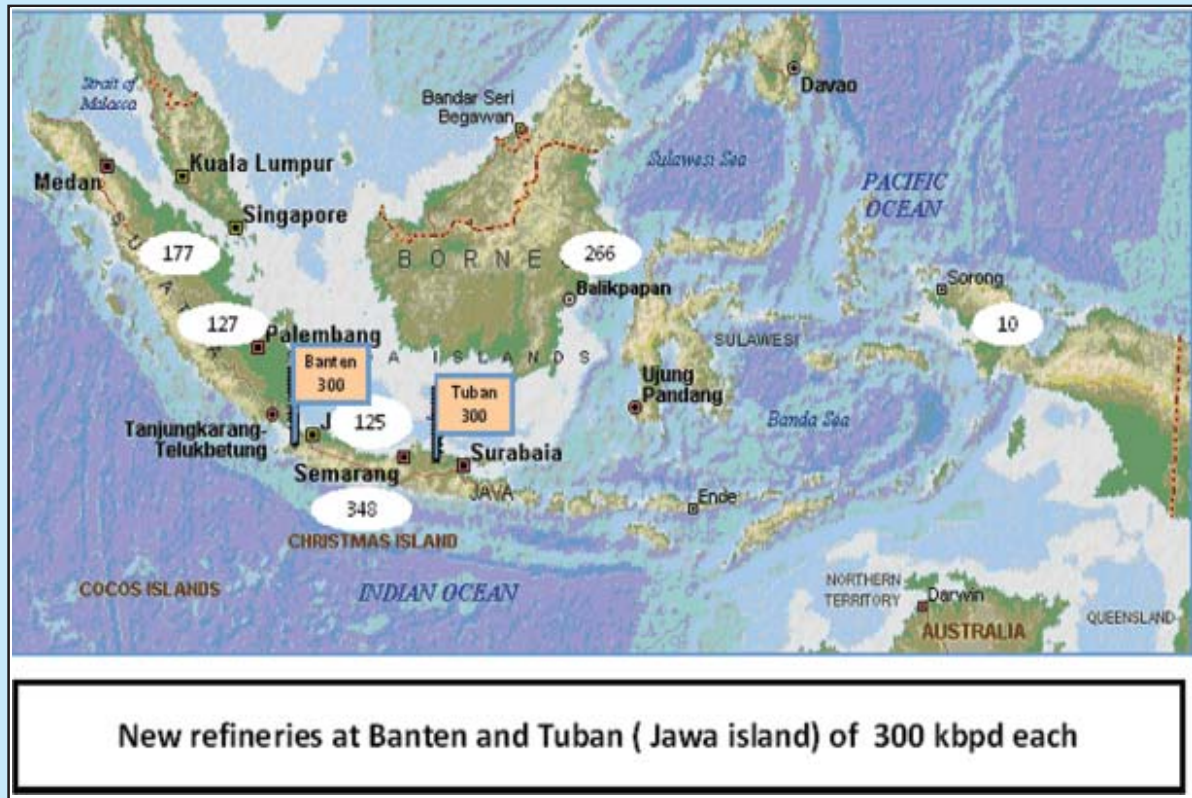


Figure 4
 Development projection: 2 New refineries By 2015

Except for the Balongan refinery, those refineries were built or revamped before the year 1990. They were designed to use local crude oils as feedstock, with the exception of a single unit I in the Cilacap refinery which uses Arabian Light Crude in order to produce lube base oils. The total capacity of the refineries is 1,050 thousand barrels per day.

IV. FUTURE REFINERIES⁴

At present Indonesia imports some 400 thousand barrels a day of petroleum products. This country is now one of the largest petroleum fuels importers in Asia. Without new refineries, the import will continue to increase to 1850 thousand barrels by the year 2030, which means it will substantially weaken the security of supply of the country.

According to the study, by 2015 two refineries located in Banten province (in western part of Java) and Tuban in East Java respectively, should be constructed. Both are grass root refineries with 300 thousand bpd of capacity (Figure 4). These new refineries

could reduce fuels import to about 200 thousand bpd.

By 2020, two new refineries should also be constructed near the existing refineries, in Balongan in West Java and in Cilacap in Central Java. Both have 300 thousand bpd of capacity. These new refineries could reduce fuels import to about 70 thousand bpd (Figure 5).

After 2020, three new refineries should be constructed. Two refineries of which, located in Dumai in Central Sumatra and in Musi in South Sumatra, will produce 300 thousand bpd. Both are located near the existing refineries in the respected area. The third is a grass root refinery that would be located in South Sulawesi of about 125 thousand bpd of capacity, which is intended to supply the region of Eastern Indonesia (Figure 6).

In this scenario, Indonesian domestic crude oil production is considered to be the same as the current level at about 1 million bpd, the crude oil import

will therefore increase significantly to about 2 million bpd at 2030.

The crude oil sources in the future for the new refineries would come from Middle East and Africa. The crude oil quality would be medium to heavy and sour. As Indonesia would need more gasoline and motor diesel, the new refinery configuration would be bottom upgrading route, such as catalytic cracking or hydro cracking scheme. The investment required might be around US \$ 4-6 billion for a 250-300 thousand bpd of capacity.

IV. PERTAMINA PLANNING

Of those new refineries that are proposed to be built, Pertamina is planning to develop 3 refineries. The first two refineries which would be expected to come on stream by 2015/2016 will be constructed in Banten province and Tuban, East Java, respectively.

The Banten Bay refinery, located three-hour drive from Jakarta to the west, would be built in two stages with 150 thousand bpd each. The preliminary study

has been conducted.

The Tuban refinery is a green field refinery of 300 thousand bpd of capacity, which is expected to use Middle East and African crude oils as feedstock. Preliminary feasibility study is currently being prepared.

The third refinery would be the expansion of existing Balongan refinery with additional 300 thousand bpd of crude intake. Middle East and African crude oils are also expected as feedstock. Preliminary feasibility study is also being prepared.

V. THE FEASIBILITY OF NEW REFINERY AND THE NEED OF GOVERNMENT SUPPORT^{4,5,6,7}

The new refinery must be competitive at MOPS (Mid oil Platts Singapore) prices plus transport, whereas the margin of new refinery is generally not high enough and it is difficult to predict the long-term margins. High complexity, petrochemical integration, production of specialty products, high standard of

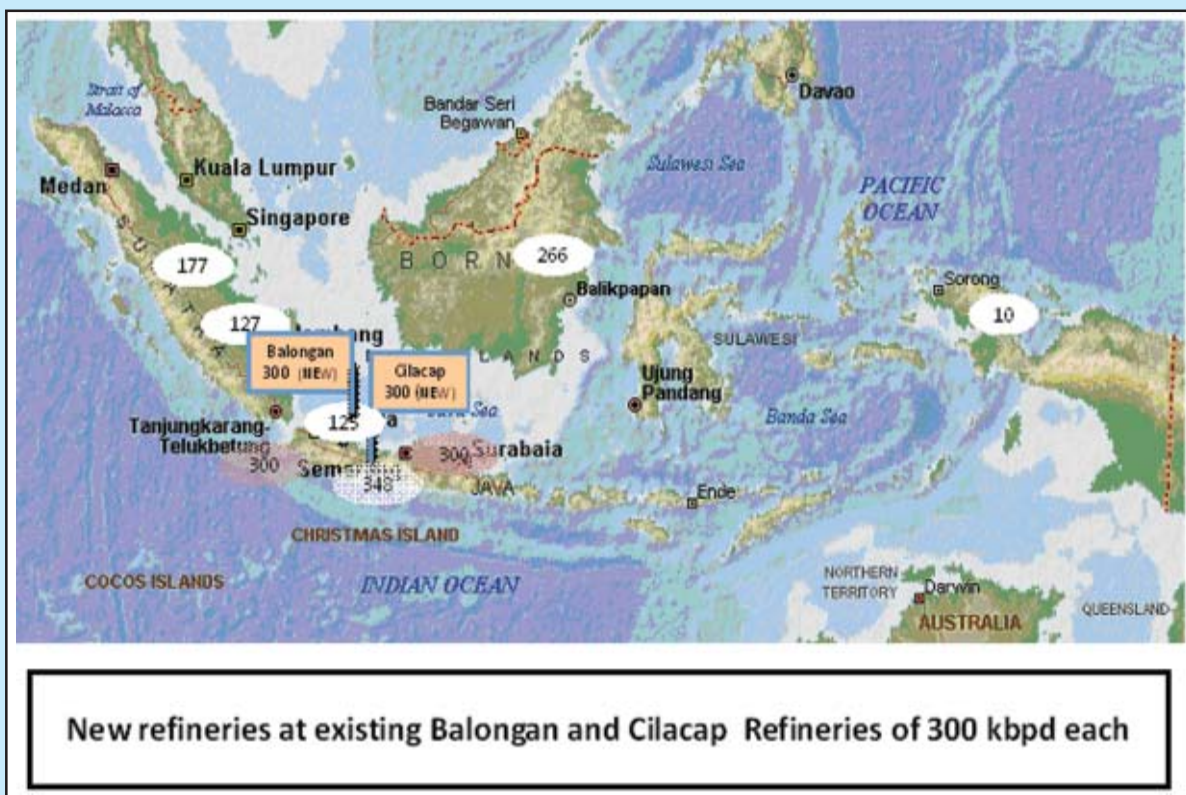


Figure 5
Development projection: 2 New refineries By 2020

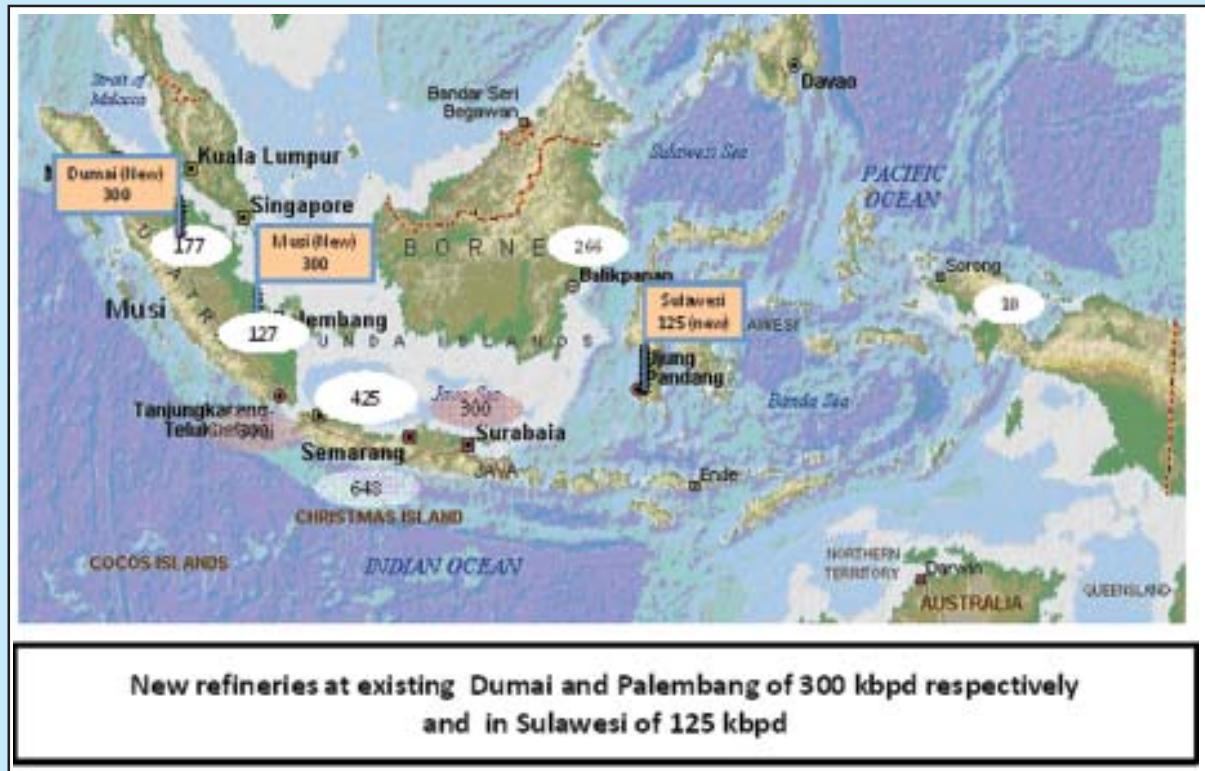


Figure 6
 Development projection: 3 New refineries after 2020

operating efficiency and synergies with existing refineries (which are also of low margins) are therefore among the strategies that should be taken into consideration when developing new refineries. The participation of the crude oils provider in the investment would also improve the feasibility of the project as well as secure long-term supply of the feedstock.

For that reason, the Indonesian government policy encourages the investors to take part in the investment by providing necessary assistance, which includes, among others, G to G negotiation in crude oil supply (with petroleum exporting countries), some incentive offers in order to make the project economically feasible such as lower taxes, accelerated amortization and full company equity ownership.

According to the current regulation, the tax waive on revenue will be applied to the revenue equal to 30% of capital invested during 6 years period. Higher tax waive is currently being discussed with the government. Besides the reduction of tax on revenue, amortization can be accelerated two times than the

normal one, and the cumulative compensation on the loss can be executed in 10 years. All of these can also reduce the tax on revenue.

The value added tax can be waived for capital goods such as machines and plants equipments, as well as for feedstock. The sales tax will be reduced from 30% to 23%-28%. 100% foreign ownership of refinery investment can also be applied.

However, those incentives are still less competitive compared to those offered in other countries. The government of Indonesia is therefore reviewing the necessary improvement to the present incentives in order to create more attractive and competitive investment climate.

VI. CONCLUSION

By the year 2030, based on the reference scenario of this study, the final energy consumption in Indonesia will increase to almost four fold while the petroleum products will be about three fold or to 2.6 million barrel per day.

Being an archipelago and very dense population in certain region, the security of supply of petroleum products in this country is utmost critical. This will therefore require the development of new refineries of about 2 million barrels per day capacity. The additional new refineries would be on-stream one by one with 300 thousand barrel per day of capacity starting from year 2015, and would be built near consumers' area or close to the existing refineries.

Industrial optimization strategies should be explored for enhancing the margin of the new refineries. However, better government incentives to make the project economically feasible and more competitive is also a must in order to attract potential investors.

VII. ACKNOWLEDGEMENT

The author would like to thanks colleges in Center of Data and Information, especially Ms Farida Zed and Mr Saleh Abdurrahman, and those in R and D Center for Oil and Gas Technology 'LEMIGAS', for their precious contribution, and to Mr. Trias Noverdi, for his valuable help in reviewing the English of this paper.

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