

ABSTRACT

Diesel Fuel to Natural Gas Switching Program to Increase The Efficiency of Power Plant in Java Bali Power System: a Comparative Statistical Study

The huge amount of petroleum usage in providing electricity become one of the main problem currently experienced by PLN. The problem has deteriorated as the petroleum price continued to increase without being accompanied by the increase in the oil production of oil and the rise in electricity price that seriously hit PLN by the loss. To maintain PLN efforts to serve its public service obligation, Indonesia government allocate electricity subsidy to cover this loss. As stakeholders require PLN to escape from this subsidy, government carried out some measures to solve it and one of them that is important is fuel switching program from diesel fuel to natural gas.

It is then the aim of this study is to analyze quantitative and qualitative advantages of this fuel switching program if it is applied in one of the largest electricity systems in Indonesia that is Java-Bali system. The object of study was 32 generators that can utilize both diesel fuel and natural gas and then statistically analyze their number of fuel consumption (BTU), cost, and efficiency of both diesel fuel and natural gas as well as to analyze qualitatively the advantage profit of the fuel switching program. The descriptive analysis statistics use SPSS software version 15.

The result of analysis shows that the fuel switching program offers potential profit from the decline in the number of fuel consumption of total power plant about 5,407,233,721,629 BTU per month BTU (36.38%) and the decline in the fuel cost of total power plant and the electricity subsidy from government as big as Rp 1,227,284,231,069 per month (83.69 %) or Rp 14,727,410,772,828 (Rp 14.727 Billion) per year. It is also justified that in the Java-Bali system, the diesel fuel and natural gas has a substitution relationship and as diesel oil price fluctuating so is the diesel fuel and natural gas demand and prove the indifference theory.

Qualitative analysis result by SWOT analysis is also in line with the previous premises and supports the fuel switching program since natural gas more efficient, more practical and produce more environment friendly emission.

The ratio of fuel consumption and fuel cost of each power plant are unique and different each other due to different in design, operation parameter, performance, history of maintenance and operational pattern of power plant and also a variability of octane number of diesel fuel.

Keywords : fuel switching program, energy consumption, fuel cost, efficiency of power generation, Java Bali electricity system.