Natural gas petroleum fuel substitution : analysis of supply-demand projections, infrastructures, investments and end-user prices

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Abstrak

The petroleum fuels (PF) subsidy has long burdens the government spending, and discourages less expensive energy usage such as natural gas (NG). Exporting NG and importing the more expensive PF products cause financial losses to Indonesia. The lack of NG infrastructure is the main hurdle in maximizing domestic NG usage and so does the perception of its high investment costs burdening government spending and pushing the NG transportation cost up. This study calculates the required NG infrastructure and its investments for several levels of PF substitutions up to 2030. To balance the NG demands, the supply from each field and its corresponding infrastructures needed was calculated and optimized using non-linear programming with generalized reduced gradient method to calculate the lowest transportation cost for the consumers. The study shows with a favorable return on investments attractive to private investors, the NG prices can still be put much lower than PF prices, allowing subsidy, import and production cost savings in many sectors. Furthermore, the highest level of substitution scenario needs only US$ 2.07 billion a year investment, very low compare to the current US$ 14.17 billion a year PF and electricity subsidy.