

FEASIBILITY STUDY OF DEVELOPMENT SMALL SCALE LIQUEFACTION NATURAL GAS IN EAST JAVA AS ALTERNATE FUEL FOR LIQUID FUEL OIL AND LIQUEFIED PETROLEUM GAS

Satrio Agus Marhendrawan¹

Universitas of Ciputra Surabaya
INDONESIA

E-mail : [satrioam@yahoo.com](mailto:¹satrioam@yahoo.com)

ABSTRACT

Lintas Nusantara Gas Ltd. has been running Liquefied Natural Gas (LNG) business in Wunut village, Porong district adjacent to two gas supply sources, East Java gas pipeline distribution PGN (Perusahaan Gas Negara) and EJGP (East Java Gas Pipeline) owned by Pertamina. The location was chosen because of its potential for commercial gain by building a natural gas liquefaction plant. The purpose of this study to determine the feasibility of following aspects such as market and marketing, production technics, management and organization, legality and legal, economic and financial aspects, as well as the EIA aspects.

The analytical method used is descriptive business feasibility analysis. The results showed that: a) the development of a natural gas liquefaction plant small scale in East Java by PT. Lintas Nusantara Gas when viewed in the views of market and marketing aspects is feasible to do; b) development of a natural gas liquefaction plant small scale in East Java by PT. Lintas Nusantara Gas from, viewed from the technical production aspects and the technology, is also feasible to do; c) the development of a natural gas liquefaction plant small scale in East Java by Lintas Nusantara Gas Ltd., viewed from management and organizational aspects, is feasible to carry out; d) development of a natural gas liquefaction plant small scale in East Java by Lintas Nusantara Gas Ltd., seen from legality and law aspects deserves to be done; e) the development of a natural gas liquefaction plant small scale in East Java by Lintas Nusantara Gas Ltd. in terms of economic and financial aspects is feasible to do; and f) the development of a natural gas liquefaction plant small scale in East Java by Lintas Nusantara Gas Ltd. viewed from the perspectives of Environmental aspects (EIA), is also feasible.

Keywords: *Market and Marketing Aspects, Production Technical and Technology Aspects, Management and Organizational Aspects, Legal and Legal Aspects, Economic and Financial Aspects, and Environmental Aspects (EIA).*

INTRODUCTION

Energy has become an integral part of human life. The issue of energy for human survival is a major problem faced by almost all countries in the world. Energy problems occurred because world energy demand continues to increase in line with population growth. However, such demands do not go hand in hand with energy reserves. The absence of energy reserves in large numbers becomes big problems in the world that need to be taken seriously.

Indonesia also experiences energy problems. Along with the increase of population in Indonesia, the demand for energy is increasing. The needs for energy which are not accompanied by an increase in energy production will make Indonesia's energy in crisis. As the countries of the world, Indonesia today uses fossil as primary energy sources (gasoline, kerosene, diesel, etc.).

The utilization of fossil fuel energy is expanding as an energy source in various fields of industry and households, resulted in the continuous and massive exploitation of crude oil from the sources. Crude, also called fossil fuels, is one of the natural resources that are not renewable since its formation took millions of years. Accordingly, when people keep exploiting them, they are likely to run out of these resources and experience energy crisis.

Indonesia needs alternative energy sources as a substitute for fossil fuel energy. Indonesia known as the country with abundant natural resources can take advantage of a variety of alternative energy sources other than fossil, one of which is natural gas. Natural gas can be an alternative energy source to meet the energy needs of the world community. This is because people may gain a lot of benefits from the use of natural gas in comparison with other energy sources. Unlike oil and coal, the use of liquefied natural gas is much cleaner and is environmentally friendly. In fact, it does not cause pollution to the environment. In addition, the liquefied natural gas also has some other advantages, such as colorless, odorless, non-corrosive and non-toxic.

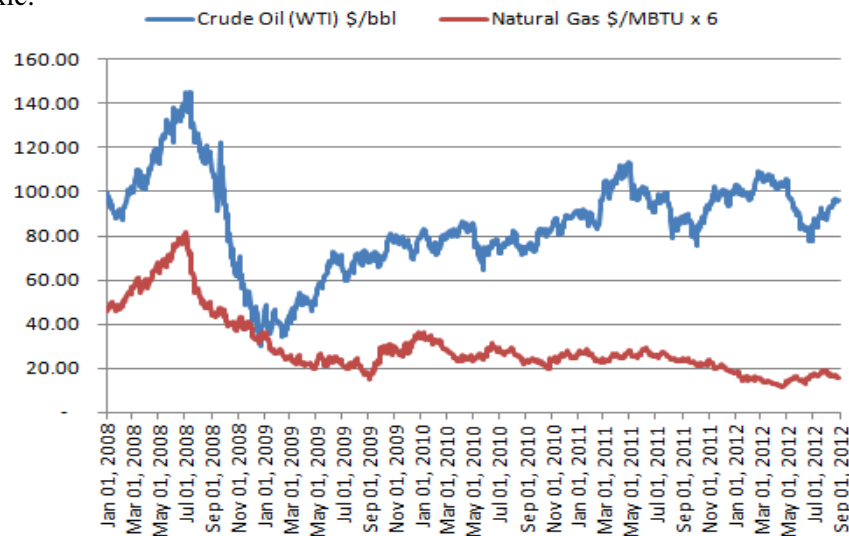


Figure 1. Comparison of Oil and Gas Prices

Source: The Rational Walk September 2, 2012

In terms of price, natural gas has a lower price compared to petroleum. Figure 1 shows natural gas prices tend to be more stable and always remain below the price of oil. Natural gas is one of the world's abundant energy resources, along with the development of world energy consumption. Natural gas is one source of energy alternatives that can be one of the main energy sources. In the distribution systems, natural gas can be distributed in two forms: liquid and gas. In the gas phase, the natural gas is distributed in the form of Compressed Natural Gas (CNG) and Gas Pipeline (PG). In the liquid phase, the natural gas is distributed in the form of Liquefied Natural Gas (LNG).

CONCEPTUAL FRAMEWORK

The conceptual framework of this study is described as follows.

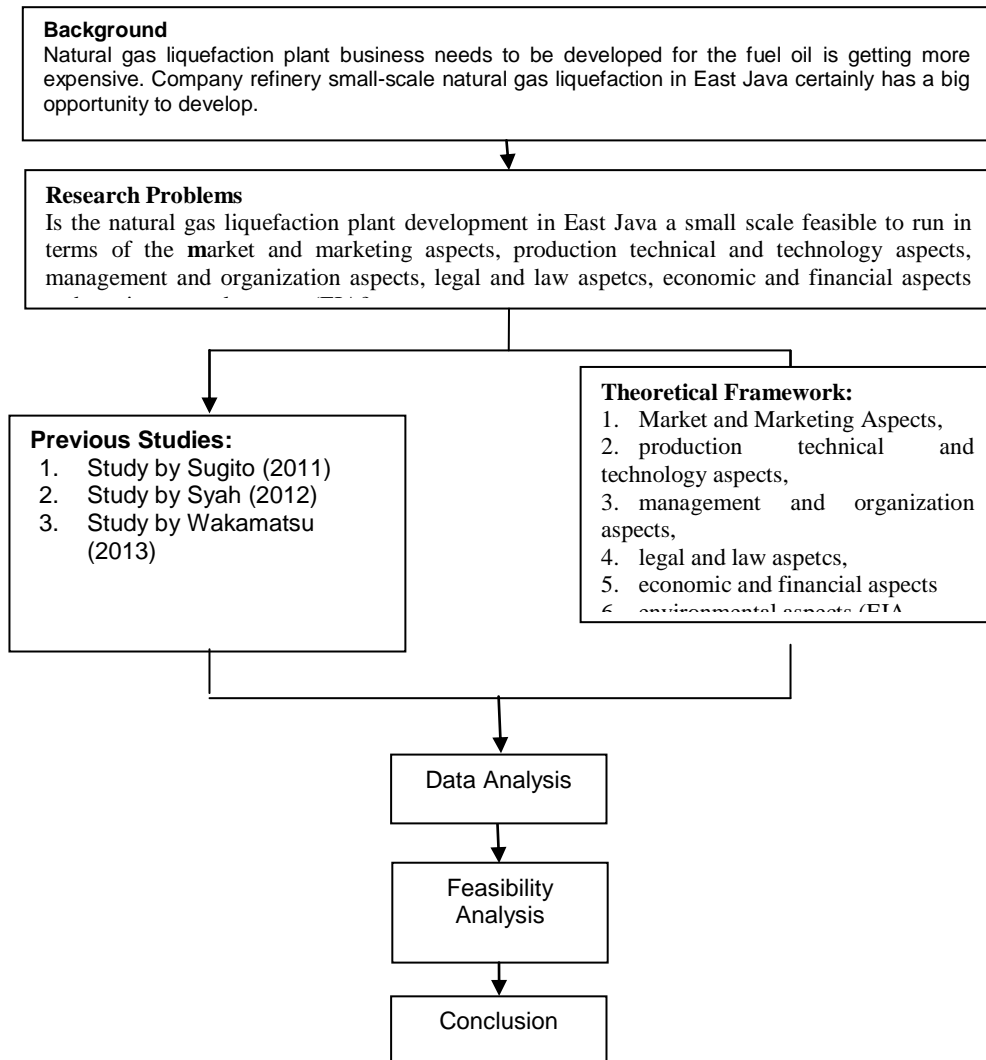


Figure 2. Conceptual Framework

Figure 2 visualizes that the natural gas liquefaction plant business should be developed for the more expensive fuel oil. The refinery small-scale natural gas liquefaction companies in East Java have a big opportunity to develop. This is because natural gas can be used as an alternative energy or fossil energy replacement. This study aims to determine the feasibility of developing refinery natural gas liquefaction small scale in East Java in terms of market and marketing aspects, technical aspects of production and technology, management and organization, legality and legal and economic aspects and finance as well as aspects of the EIA. The conclusion of this study is whether or not the development of a natural gas liquefaction plant in East Java a small scale is feasible to carry out.

FEASIBILITY STUDY FOR BUSINESS

Wijatno (2009) describes the feasibility study is the process that determines whether a business idea entrepreneur can be successful. The aim is to determine whether a business idea is feasible to implement. If a business idea is feasible, then the next step is to formulate a business plan. If not feasible, an entrepreneur should forget the idea of the business and are looking for another idea. By analyzing the feasibility of a business, the entrepreneur does not need to waste time, effort and cost for infeasible business idea. Another definition of the feasibility study proposed by Fitriani (2010) is a thorough study that aims to highlight all aspects of eligibility. In this case, the feasibility of a business is considered as part of the investment. The feasibility study has a comprehensive nature and must be able to present the results of a quantitative analysis of the benefits to obtain. According to Lazuardi et al., (2014), the feasibility study is in-depth research on a business idea pertaining to whether feasible or not particular ideas are to implement.

To obtain robust conclusions, it needs to conduct the feasibility of the business by considering some aspects such as market aspects, the legal aspects of human resource management aspects and financial aspects. Based on the aforementioned perspectives, the feasibility study concerns whether a business is feasible to run for a specific period of time based on several aspects, such as market aspects, the legal aspects of human resource management aspects and financial aspects. Wakamatsu et al. (2014) investigate the standard packaging design for the LNG plant with a mini, small and medium scales in Japan.

There are three conceptual frameworks of this present study, namely, gradual development, direct loading LNG carriers and LNG for transportation fuel. This study provides an optimal solution with a variety of ideas for the realization of the LNG value-added standards based packaging design of JGC.

RESEARCH METHODS

The data collection method of this present study is based on business feasibility aspects consisting of:

1. Market and Marketing Aspects

The data collection for market aspect includes:

a. Survey

This method focuses on the prospective target market community. Researchers conduct a survey by doing face to face interactions with the target market community.

b. Documentation Study

Documentation study is to obtain:

1) The literature materials from reference books journals and Internet websites about the oil market and alternative fuels.

2) The development of prices and sales of oil and alternative fuels within the last five years.

3) The development of public revenue during the last five to ten years.

4. Technical Production and Technology Aspects,

A survey is to obtain relevant data such as

a. The availability of raw materials

b. The layout of the targeted market

c. The availability of labor

d. The availability of technology

3. Management and Organizational Aspects

Data collection pertaining to management and organizational aspects include the interview.

Interviews were conducted with natural gas liquefaction business operators who have experience in the field at least two years. It is to determine the requirements necessary for the jobs, the organizational structure and division of labor based on their position

4. Legality and Legal Aspects

The data collection for legal aspects of the feasibility is done through documentation study. This includes the terms of the licensing and permitting procedures that must be implemented in the workplace.

5. The Economic and Financial Aspects

The analytical method to collect data on the economic and financial aspects is to use the interview, documentation and observation. Documentation study is done by analyzing books or documents relating to the financial data such as the source of funds, investment costs, details of operational costs, inflation, the growth of people's income, deposit interest rate applicable in commercial banks and loan interest rate. Meanwhile, observational studies is conducted by observing the details of the fees that will be used. Eligibility for financial and economic aspects is based on the following:

a. If $NPV > 0$ then the project proposals is accepted.

b. If PP has a shorter time than that of the maximum PP, then the investment proposal will be accepted

c. $IRR >$ The required return rates

RESULT AND DISCUSSION

In this study, the analysis method for the feasibility is done descriptively focusing on an assessment of the financial aspects of the company, through a cash flow analysis, with measurement Payback Period, Net Present Value, Internal Rate of Return, and Break Event Point. In addition, it also describes the marketing aspects, technical aspects of production and technology, management and organization, and legality, as well as a SWOT analysis.

SWOT ANALYSIS

Based on the SWOT matrix calculation, the value is +2.92 and + 2.34. When plotted in Cartesian diagram, the results are as follows:

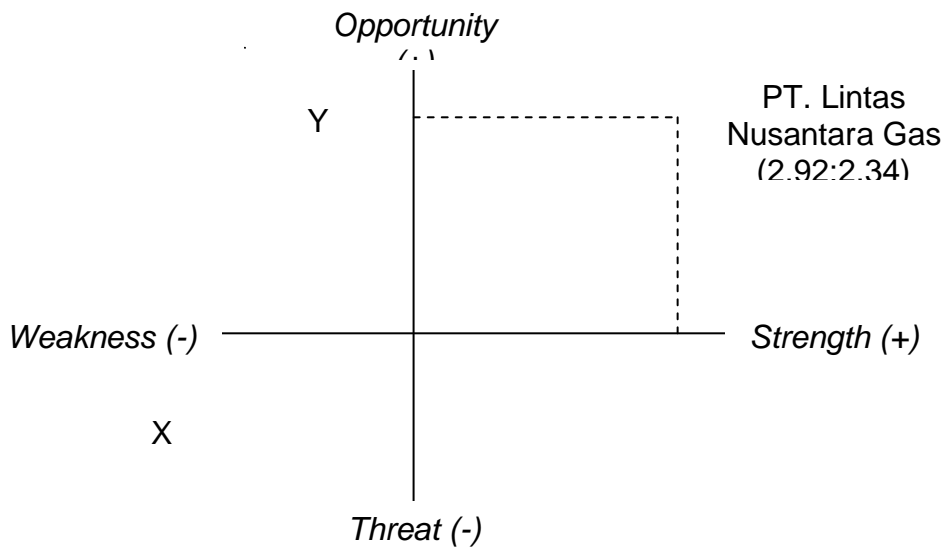


Figure 3. Plot the SWOT Analysis Diagram

Source: Data processed, 2015

Based on the picture 3, the right strategy to apply to the PT. Lintas Nusantara Gas is S-O strategy. It is a favorable position, that is, a position in which a company is able to use the skills to take advantage of opportunities.

The strategy to implement such a position is a growth-oriented strategy. It is a strategy that is oriented towards the development of the company. This strategy pursues opportunities in accordance with the strength of the company. The development of the Lintas Nusantara Gas Ltd. is implemented by increasing the production capacity of Liquefied Natural Gas (LNG) as an alternative to fuel oil (BBM) and Liquefied Petroleum Gas (LPG). Feasibility assessment based on economic and financial aspects can be seen from several methods: Net Present Value (NPV), Break Event Point (BEP), Internal Rate of Return (IRR), Payback Period and Profitability Index (PI). However, of the five methods, only three methods are used: Net Present Value (NPV), Internal Rate of Return (IRR) and Payback Period (PP). This is done because the bank wants to use three methods to determine the economic and financial aspects of the feasibility study.

Moreover, these three methods are often used (Suliyanto, 2010). The following is the analysis of the economic and financial aspects of the Lintas Nusantara Gas Ltd.

CONCLUSION

Conclusion

Based on the aforementioned analysis some conclusions can be drawn:

1. The development of a natural gas liquefaction plant small scale in East Java by Lintas Nusantara Gas Ltd. in terms of the market and marketing aspects is feasible to do. This can be seen from the price of natural gas which is cheaper than the price of other energy sources. The marketing strategies of Lintas Nusantara Gas Ltd. is by increasing the production capacity of

Liquefied Natural Gas (LNG) as an alternative to fuel oil (BBM) and Liquefied Petroleum Gas (LPG).

2. Development of a natural gas liquefaction plant small scale in East Java by Lintas Nusantara Gas Ltd. viewed in the perspective of the technical aspects of production and the technology is also feasible to do. It can be seen from: a) designing products of Lintas Nusantara Gas Ltd. in the form of natural gas in the form of Liquefied Natural Gas (LNG) as a substitute for fuel oil (BBM) and Liquefied Petroleum Gas (LPG); b) the capacity of services amounted to 2.0 MMSCFD or two million standard cubic feet per day; c) planning facility which consists of site planning, planning the layout and planning of material handling; d) the location of businesses located in Wunut village that has natural gas in East Java; e) machinery and equipment used consist of a gas purification unit, gas dehydration units, cryogenic liquefaction, LNG storage and LNG cargo / truck.

3. The development of a natural gas liquefaction plant small scale in East Java by PT. Lintas Nusantara Gas seen from the management and organizational aspects is feasible. It can be seen from the organizational structure of PT. Lintas Nusantara Gas, labor at each position, their job specification and implement employee recruitment or labor.

4. The development of a natural gas liquefaction plant small scale in East Java by Lintas Nusantara Gas Ltd. in terms of legality and legal is feasible. It can be seen from: a) the type of companies such as PT or a Limited Liability Company; b) the identity of the implementation of the business that has been included in the Deed of Company; c) the business focuses on a natural gas liquefaction plant in East Java a small scale; and d) places that impact the applicable regulations has been licensed and owned by PT. Lintas Nusantara Gas.

5. The development of a natural gas liquefaction plant small scale in East Java by Lintas Nusantara Gas Ltd seen from the economic and financial feasible is feasible. It can be seen from the presence of: a) Net Present Value (NPV) PT. Lintas Nusantara Gas; b) Internal Rate of Return (IRR) PT. Lintas Nusantara Gas greater than the rate required; c) Pay Back Period PT. Lintas Nusantara Gas which is shorter than the economic future of the equipment used.

6. The development of a natural gas liquefaction plant small scale in East Java by Lintas Nusantara Gas Ltd. in the view of the EIA aspects is feasible. It can be seen from the presence of: a) the development of a natural gas liquefaction plant in East Java a small scale, in the village Wunut Porong; b) the technology used such as gas purification unit, gas dehydration units, cryogenic LNG liquefaction and storage; c) the use of natural resources optimally conducted with regard to the values of environmental sustainability and in keeping with the surrounding environment; d) the reports and documents made by the EIA consultants or specialized personnel who have been certified by the Ministry of Environment to examine matters related to EIA.

Suggsetion

Based on the description of the research, findings and conclusions above, the suggestions can be submitted are as follows:

1. Lintas Nusantara Gas Ltd. is feasible to continue its business development plan of natural gas liquefaction plant in East Java a small scale.
2. As a company that carries on business development of the natural gas liquefaction plant small scale in East Java, Lintas Nusantara Gas Ltd. has a big risk factor especially in terms of the safety of the existing workforce. Although the company has implemented procedures

Occupational Health and Safety (K3) and Safety Occupational health and Environment (K3L), it is also important to continue providing more services. This act serves as company's concern for the labor force, including by providing insurance as well as additional compensation for medical expenses and health control costs.

3. Next research must consider other aspects such as the environmental aspects of the industry by using of PEST method analysis (Politics, Economy, Social, and Technology).

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