



Feasibility Analysis of Regular Gas Station Development Projects in Relation to the Economy

Trisna Ferdy Rediansyah¹, Agung Ari Andono^{2*}, Ohan Farhan³, Saihul Anwar⁴
Universitas Swadaya Gunung Jati Cirebon

Corresponding Author: Agung Ari Andono, agungriyan560@gmail.com

ARTICLE INFO

Keywords: Petrol Stations, Project Feasibility, NPV, Payback Period, BCR

Received : 6, October

Revised : 20, October

Accepted: 30, November

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ABSTRACT

This study analyzes the feasibility of the construction of regular petrol stations in Sepaku District, North Penajam Paser Regency, East Kalimantan. The need for development arises due to the increase in the number of vehicles that is not proportional to the availability of fuel infrastructure. A quantitative approach is used through fuel demand analysis, RAB preparation, and economic evaluation with NPV, BCR, and Payback Period. The results show that Semoi Dua Village is strategic because it is on the path to IKN with high population growth. Fuel needs are estimated at ±311,000 liters per week. The project is economically feasible with a positive NPV of IDR 15 billion, a BCR of 1.3, and a payback period of four years. Petrol stations are considered prospective operationally and economically.

INTRODUCTION

Indonesia's rapid economic growth has encouraged a significant increase in motor vehicle ownership, both motorcycles and cars. This increase in the number of vehicles has a direct impact on the high consumption of Fuel Oil (BBM), which is now considered the primary need of the community. However, this need has not been balanced with the availability of supporting infrastructure such as Public Fuel Filling Stations (SPBU), especially in areas that are not yet reached. One example is North Penajam Paser Regency which has an area of $\pm 3,333$ km² and a population of around ± 400 thousand people, but is only served by one Pertamina-owned petrol station until the end of 2024. In fact, in Sepaku District, which is inhabited by ± 42 thousand residents, there are no petrol stations at all. Based on data from the Central Statistics Agency of East Kalimantan in 2024, there are more than 155 thousand motorcycles and 32 thousand passenger cars in the district, which illustrates the large demand for fuel and supporting business opportunities such as vehicle parts. A business feasibility study is a systematic process that aims to assess whether a business opportunity is feasible to run, taking into account the positive and negative aspects of various alternatives. The study includes market analysis, goal formulation, cost and benefit calculation, and risk assessment.

The purpose of this study is to analyze the economic feasibility of petrol station projects so that they can be used as a reference for investing in petrol station projects. By evaluating the suitability of the location of the petrol station construction based on the prevailing strategic factors and regulations, planning the layout and facilities of the petrol station in accordance with safety and service standards, estimating fuel needs based on traffic data and projected vehicle growth in the area, conducting an economic feasibility analysis of petrol stations using the NPV (*Net Present Value*), PP (*Payback Period*), and BCR (*Benefit Cost Ratio*) methods Düssel

LITERATURE REVIEW

Location Selection Theory

The selection of petrol station locations combines mandatory criteria (space regulations, safety zones, rarely to the distribution network) and guiding criteria (traffic, accessibility, population density) that emphasize regulations and safety indicators

H1: The location of Semoi Dua Village meets the strategic criteria located on the access road to the IKN and has a safe distance from sensitive areas so that it is suitable for selection according to the multi-criteria method.

Operational, Safety, and Regulatory Compliance Theory

Operational feasibility includes the layout design of the supporting facilities, stock management, and compliance with environmental safety/fire management standards. Compliance with Pertamina's operator standards, and technical requirements affect permits, initial capital costs, and realization times.

H2: If the layout and facility design follows Pertamina's operator standards and regulations, then operational and licensing risks can be minimized, increasing the feasibility of the project.

Demand Estimation Theory

Fuel demand estimates for public fuel stations link vehicle growth, population, and income as well as district-level approaches to research sites.

H3: The demand for fuel at the site (Semoi Dua Village, Sepaku District) is sufficient to support the operating volume of the petrol station (e.g. $\pm 311,000$ L/week) during the projection, if the estimation model takes into account vehicle growth and traffic flow, this project is statistically valid.

Theory of Financial Analysis

The financial feasibility study assesses whether the project provides economic added value using *Net Present Value* (NPV), *Benefit Cost Ratio* (BCR), and *Payback Period* (PP). NPV Considers the time value of money to determine the net value of the project, BCR compares present benefits to present costs, PP assesses liquidity and short-term risk.

H4: Gas station projects will be economically feasible (NPV>0, BCR>1, PP $\leq$ economic lifespan) if projected fuel demand and conservative cost/revenue assumptions are used

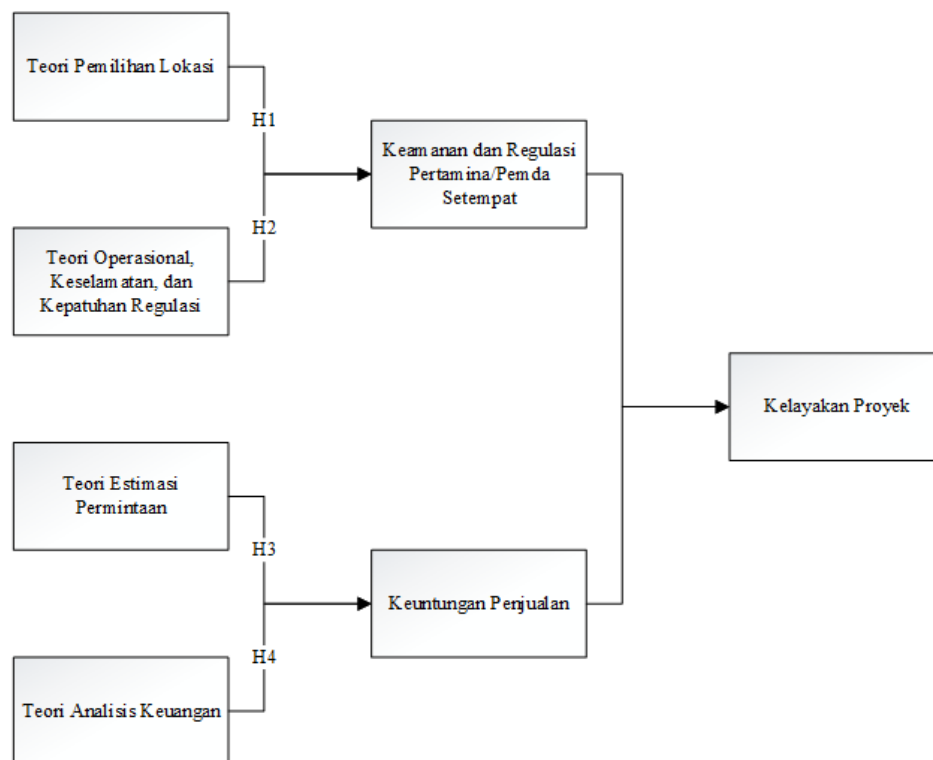


Figure 1. Conceptual Framework

METHODOLOGY

The research method used in making the journal research uses quantitative research to analyze the economic aspects of the construction of petrol stations in Sepaku District, North Penajam Paser Regency, East Kalimantan Province, Indonesia. The focus of this research is to determine the feasibility of the development site, the suitability of the layout of petrol station

facilities according to safety standards, and to analyze feasibility in economic aspects.



Figure 2. Research Work Flow Diagram

Data and Data Sources

The data sources used in this study were obtained from:

1. Data Primer

Primary data was obtained through interviews and consultations with related parties, such as project contractors, Pertamina retail MOR VI, and petrol station owners, to understand the details of costs and operational processes.

2. Data seconds

It is data obtained from various literature that supports the research, such as books, notes, journals, the internet, consultations with supervisors, discussions with fellow students and other data related to this research.

- Data on the Cost Budget Plan (RAB) of Semoi Dua Petrol Station
- Working Pictures of Semoi Dua Petrol Station
- Pertamina's standard oil selling price
- BPS 2024 population data in North Penajam Paser Regency
- East Kalimantan Police Motor Vehicle Data

3. Assumption data

These are the estimates that will be used in the research, such as:

- Economic life of petrol stations
- Operating costs
- Total oil sales in one week
- Total net profit and gross profit in one week

- e. The amount of profit is assumed to be 5%

Data Analysis Techniques

1. Location Analysis

Analyze the feasibility of the location based on the number of residents and the number of vehicles located at the project site according to BPS (Central Statistics Agency).

2. Building Layout Suitability Analysis

Analyze the layout in accordance with the applicable safety and security standards in government regulations and the surrounding community.

3. Estimated Revenue

Estimate the total income obtained from the fuel needs needed from vehicle data at the petrol station construction site.

4. Project Feasibility Evaluation

Based on the data obtained, an evaluation was carried out on whether the project was economically feasible in the long term.

RESEARCH RESULTS

Analysis of the Location of the Construction of the Petrol Station

This research was carried out on a regular type Public Fuel Filling Station (SPBU) project in the area of Semoi Dua Village, Sepaku District, North Penajam Paser Regency, East Kalimantan Province which was designed on an area of about 4,500 square meters. Some of the conditions evaluated to support the feasibility of the development site are as follows:

1. The area of Sepaku sub-district is $\pm 1,172$ square kilometers with a population of ± 40 thousand people and there is only 1 petrol station serving, causing dependence on fuel sold per liter at nearby stalls.
2. According to the Central Statistics Agency of East Kalimantan Province in 2024, the number of motorcycles is $\pm 155,690$ units, passenger cars $\pm 32,161$ units, buses ± 998 units, trucks $\pm 7,167$ units, and total transportation $\pm 214,025$ units. This shows that the need for fuel is still very large for vehicle operations.

Analysis of Petrol Station Layout and Facilities

1. This project is designed with a land area of about 4,500 square meters which includes main facilities such as refueling canopies, office buildings, toilets, prayer rooms, minimarkets, ATM centers, visitor rest areas, and parking areas.
2. The access in and out of the vehicle has a width of more than 14 meters which makes it easier for large vehicles to maneuver.
3. The fuel dispenser is located in the middle of the operational area, with 4 units (Tatsuno) each consisting of 8 nozzles, serving up to 3 types of products (Dexlite, Peralite, Pertamina, and Pertamina Dex).
4. The latent tank is placed on the outside of the operation (the left side of the site), close to the discharge point, meeting the safety and ease of fuel dismantling aspects.

5. There are several important safety and environmental elements that have been provided such as grills, oil catchers, monitoring wells, water storage ponds, fire poison houses at three points, 9 kg apart in each dispenser and in the generator room, internal and external grounding, safety signs, and TPS LB3 which are very important for the safety and operation of petrol stations.

Fuel Demand Analysis Based on Traffic Data

From traffic data as the basis for analysis, motor vehicle data was obtained from BPS East Kalimantan

Table 1. Estimated Average Fuel Consumption Per Day

Vehicle Type	Quantity (units/ day)	Average Fuel Consumption (liters/ day/ unit)
Motorbike	155.690	4
Passenger Cars	32.161	20
Bus	998	50
Truck	25.147	50

Table 2. Estimated fuel needs per vehicle type for one week

IN 1 WEEK						
FUEL TYPE	PERCENTAGE	SALES VOLUME (LITERS)	SP	MP	BUS	TRUCK
Perthalite	40%	124.400,00	24880	1244		
Pertamax 92	20%	62.200,00	6220	1866		
Pertamina Dex	7%	21.770,00		1089		
Dexlite	33%	102.630,00			677	1376
	100%	311.000,00				

Economic Feasibility Analysis

With a construction cost of Rp. 14,674,006,000, an estimated operational cost of Rp. 3,675,400,000 per year, and a projected revenue with an estimated fuel sales volume of 44,400 liters, an annual revenue of Rp. 9,062,042,000 is obtained.

In accordance with the 2023 BI Rate obtained from the Central Statistics Agency website, the MARR (Minimum Acceptable Rate Return) is 5.75%. So:

$$\sum PV \text{ Benefit} = \frac{Income_1}{(1+5,75\%)^1} + \dots + \frac{Income_5}{(1+5,75\%)^5} \quad (1)$$

From the formula above, it is obtained:

Table 3. Calculation Table

No.	Year	Inclusion	Production	PV Benefit
0			14.674.006.000	
1	1st year	9.062.042.400	3.675.400.000	8.549.096.604
2	Year 2	9.062.042.400	3.675.400.000	8.065.185.475
3	3rd year	9.062.042.400	3.675.400.000	7.608.665.543
4	4th year	9.062.042.400	3.675.400.000	7.177.986.361
5	5th year	9.062.042.400	3.675.400.000	6.771.685.246
6	6th year	9.062.042.400	3.675.400.000	6.388.382.308
7	Year 7	9.062.042.400	3.675.400.000	6.026.775.762
8	8th year	9.062.042.400	3.675.400.000	5.685.637.511
9	9th year	9.062.042.400	3.675.400.000	5.363.808.973
10	10th Year	9.062.042.400	3.675.400.000	5.060.197.144
Total		90.620.424.000	51.428.006.000	66.697.420.928

According to the table, the methods used to calculate *Net Present Value* are as follows:

$$\text{Net Present Value} = \Sigma \text{PV Benefit} - \Sigma \text{Pengeluaran} \quad (2)$$

From the calculation above, it was found that the net *present value* of Rp. 15,269,414,310 > 0, which means that the investment in this project is worth doing.

1. Benefit Cost Ratio Analysis

Benefit Cost Ratio (BCR) is a financial analysis tool used to evaluate the feasibility of a project or investment by comparing the total expected benefits to the total costs incurred.

$$\text{Benefit Cost Ratio} = \frac{\Sigma \text{PV Benefit}}{\Sigma \text{Pengeluaran}} \quad (3)$$

From the calculation above, a *benefit cost ratio* of 1.3 is obtained, which means that the project is considered profitable because the benefits exceed the cost.

2. Payback Period

The Payback Period is the period of time it takes for an investment or project to generate enough revenue to cover the initial cost of the investment. From table 4.17 the time period required to cover the initial investment costs for 4 years.

DISCUSSION

The project location was chosen based on strategic considerations, namely on the main road connecting Balikpapan Province with the National Capital City (IKN) of the archipelago, which is expected to increase transportation and logistics activities in the area. The planned petrol station layout and facilities show that the project design has followed the technical, operational, and safety standards generally set by Pertamina as well as government regulations related to the construction of petrol stations. With a land area of about 4,500 m², this area is sufficient to accommodate all main facilities, including a filling canopy, operational building, toilets, prayer rooms, rest areas, and minimarkets. The placement of these supporting facilities provides added value for the convenience

of visitors while increasing the potential for non-fuel income such as from minimarkets and ATM centers. Based on the estimated fuel needs, a conclusion was obtained that showed that the demand for fuel in Sepaku District was very large, especially with the increase in community mobility and the development of the IKN area, this data can be the basis for efficient and profitable petrol station investment planning in the Sepaku area. The results of the economic analysis show that the results of the NPV are positive, the BCR value is more than 1, and the initial return on capital period of 4 years is feasible for the project.

CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the research on **the Feasibility Analysis of the Construction of the Petrol Station Project in Semoi Dua Village, Sepaku District, North Penajam Paser Regency, East Kalimantan**, it can be concluded that several important things related to the financial, operational, and business prospects of this project can be concluded:

1. Analysis of the Construction Site

The construction of a petrol station in Semoi Dua Village, Sepaku District, North Penajam Paser Regency is considered very strategic because this area has a large enough population and a high level of motor vehicle ownership, but does not have adequate petrol stations. The location is on the main route to the Capital City of the Archipelago (IKN), so it has the potential to increase fuel demand.

2. Analysis of Petrol Station Layout and Facilities

The planning of the petrol station layout is in accordance with Pertamina's standards and safety regulations. The land area of 4,500 m² is equipped with main facilities (filling canopy, fuel dispenser, hidden tank, office building, prayer room, toilets, minimarket, ATM center, and parking area). The layout also pays attention to access in and out of large vehicles, security systems, and environmental facilities such as LB3 TPS, oil catchers, and monitoring wells. This shows the readiness of facilities that support safe and efficient operations.

3. Fuel Demand Analysis Based on Traffic Data

Based on data from BPS and the East Kalimantan Police, the number of vehicles reached more than 214 thousand units. The estimated weekly fuel demand reaches ±311,000 liters with the following compositions: Peralite (40%), Pertamax (20%), Pertamina Dex (7%), and Dexlite (33%). This shows the high sales potential and that the construction of new petrol stations can meet the needs of the community and support mobility around the IKN area.

4. Economic Feasibility Analysis

- Construction cost : Rp. 14.674.006.000,-
- Annual operating cost : Rp. 3,675,400,000,-
- Annual Income : Rp. 9,062,042,400,-
- Benefit Cost Ratio (BCR): 1.3 (>1, meaning profitable).
- Payback Period (PP): 4 years (faster than the life of the project).

From the calculation results, this project is financially feasible because it shows long-term profits, low risk, and has growth prospects as economic activity in the IKN area increases.

ADVANCED RESEARCH

Every research has limitations; Thus, recommendations to implement future research by collecting sales realization data for at least 1 year, taking data on the effectiveness of petrol station services, conducting a local economic survey within a radius of 2-5 km from petrol stations, simulating the addition of battery charging facilities for EVs in the petrol station environment, and analyzing from various other aspects.

ACKNOWLEDGMENT

The author expresses his deepest gratitude to the supervisors in completing this research, especially to the Gunung Jati Independent University Cirebon, academic supervisors, and related agencies who have provided the necessary data and information. The author also thanked his family and colleagues who have helped by providing moral support in the preparation of this journal.

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