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Feasibility Analysis of Station Construction Project Public Refueling (Petrol Station)

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ABSTRACT
The development of fuel infrastructure in remote areas remains a critical challenge for Indonesia's energy access equity, particularly in regions with limited petrol station coverage relative to population density and vehicle growth. This study aims to analyze the financial feasibility of the construction of petrol stations in Terjun Jaya Village, Betara District, West Tanjung Jabung Regency. The method used is a project feasibility study with a quantitative descriptive approach. The analysis includes aspects of investment costs, revenue projections, and financial indicators such as Net Present Value (NPV), Internal Rate of Return (IRR), Payback Period (PP), Break Even Point (BEP), and Profitability Index (PI). The results of the study show that this petrol station project is financially feasible with a Net Present Value of IDR 7,155,058,232, an Internal Rate of Return of 11.24%, a Payback Period of 4 years and 1 month, and a Profitability Index of 1.62%. The project shows robust market potential supported by regional vehicle population data indicating 176,435 total vehicles in the area requiring regular fuel access. The implications suggest that strategic petrol station development in underserved rural areas can achieve both financial sustainability and significant social impact by improving energy access equity while generating attractive returns for investors.

Keywords: petrol stations, project feasibility, NPV, IRR, investment

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INTRODUCTION

The construction of a *Public Fuel Filling Station (SPBU)* in Terjun Jaya Village, Betara District, West Tanjung Jabung Regency, Jambi, is a strategic step in supporting increasing energy access in the area. This region, which has growing economic potential, needs adequate infrastructure to meet the fuel needs of both communities and local industry players. In recent years, the increase in transportation activities and economic growth in the region has created the need for gas station facilities that are closer and more accessible (Afriany & Ratna Sari Br Sinurat, Lidia Julianty, 2018; Ahmad et al., 2020; Baffour, 2016; Caryana, 2022; Cioara et al., 2023; Dauda et al., 2022).

Based on these conditions, fuel consumption of motor vehicles has also increased. Fuel appears to be a primary need equivalent to staple goods that are highly sought after by the community. However, this has not been supported by nearby facilities with sales outlets commonly called *Public Fuel Filling Units (SPBU)*.

Until February 2024 alone, in Tanjung Jabung Barat district, which covers an area of ±5,009.82 km² and has a population of around ±335.1 thousand people, there are only 8 petrol stations owned by PT Pertamina (Persero) (https://jambi.bps.go.id/). In addition, in the Betara District area, there is only 1 petrol station to support the needs of around ±30,663 people.

According to the Central Statistics Agency of Jambi Province in 2024, the number of motorcycles will be ±161,879 units, passenger cars ±4,869 units, buses ±2,520 units, trucks

±7,167 units, and the total transportation fleet is ±176,435 units. This indicates that the need for fuel is still very large for vehicle operations, thus opening the potential for fuel sales and vehicle spare parts.

In this context, the preparation of the *Cost Budget Plan (RAB)* is crucial as a guide for related parties in identifying the cost requirements to establish petrol stations in accordance with applicable operational standards (Anggraini & Ardan, 2024; Fachrurrazi et al., 2017; Husnita et al., 2023; Maskur, 2023; Tahan, 2021). This *RAB* covers all the costs of materials, labor, and other components needed to build optimally functioning petrol station infrastructure. With accurate cost estimates, project owners can perform better financial planning and execution strategies.

The research problem identified in this study centers on the critical infrastructure gap in fuel distribution services within West Tanjung Jabung Regency, where the current petrol station coverage ratio of 1:30,663 residents significantly exceeds the national recommended standard, creating both economic hardship for local communities and potential business opportunities for private investors. The urgency of this research is highlighted by the region's rapid economic development and increasing vehicle population growth (176,435 total vehicles), which has outpaced infrastructure development, forcing residents to travel 15-20 kilometers to access fuel or rely on expensive retail fuel sellers who lack quality assurance and stable supply chains.

Previous research by Amalia & Adi (2018) examined petrol station feasibility in urban Yogyakarta contexts, while Hidayat & Santosa (2021) focused on border area developments, and Kusnadi & Sumarno (2020) analyzed remote area feasibility using payback period models. However, research gaps exist in understanding the specific financial viability of petrol station development in rural Jambi contexts, where unique geographical, demographic, and economic factors create distinct challenges and opportunities not addressed in existing urban or border-focused studies.

The novelty of this research lies in its comprehensive financial feasibility analysis specifically tailored to the socio-economic context of rural Jambi, integrating multiple financial evaluation methods (NPV, IRR, PP, BEP, PI) with local market data to provide a holistic assessment framework that can be replicated for similar rural infrastructure development projects. The objective of this study is to conduct a thorough financial feasibility analysis of the proposed petrol station construction project in Terjun Jaya Village, evaluating investment requirements, revenue potential, and long-term profitability to inform investment decision-making. The benefits of this research include providing evidence-based investment guidance for private sector involvement in rural fuel infrastructure, contributing to Indonesia's energy access equity goals, supporting local economic development, and offering a methodological framework for evaluating similar infrastructure projects in comparable rural settings.

In addition, the importance of this project is also related to the government's efforts to ensure the availability of fuel in all corners of the country, including areas that still need

adequate energy infrastructure. This petrol station project is expected not only to support local needs but also to contribute to equitable access to energy throughout the Jambi region.

In the process, areas that are far from the reach of petrol stations have not been able to experience normal fuel supply because they are only served by retail fuel sellers. This situation is used by PT Wigati Karya Abadi to establish petrol stations in areas that have not yet been served by Pertamina. Following up on these conditions, PT Minyak Gaharu sees the potential of the petrol station as an investment prospect, so a business feasibility study is needed to support investment continuity.

METHOD

This study used a quantitative descriptive method to analyze the financial aspects of the Public Fuel Filling Station (SPBU) construction project in Terjun Jaya Village, Betara District, West Tanjung Jabung Regency. The focus of the research is on the calculation of the initial investment cost, revenue projections, profitability analysis, and project feasibility evaluation.

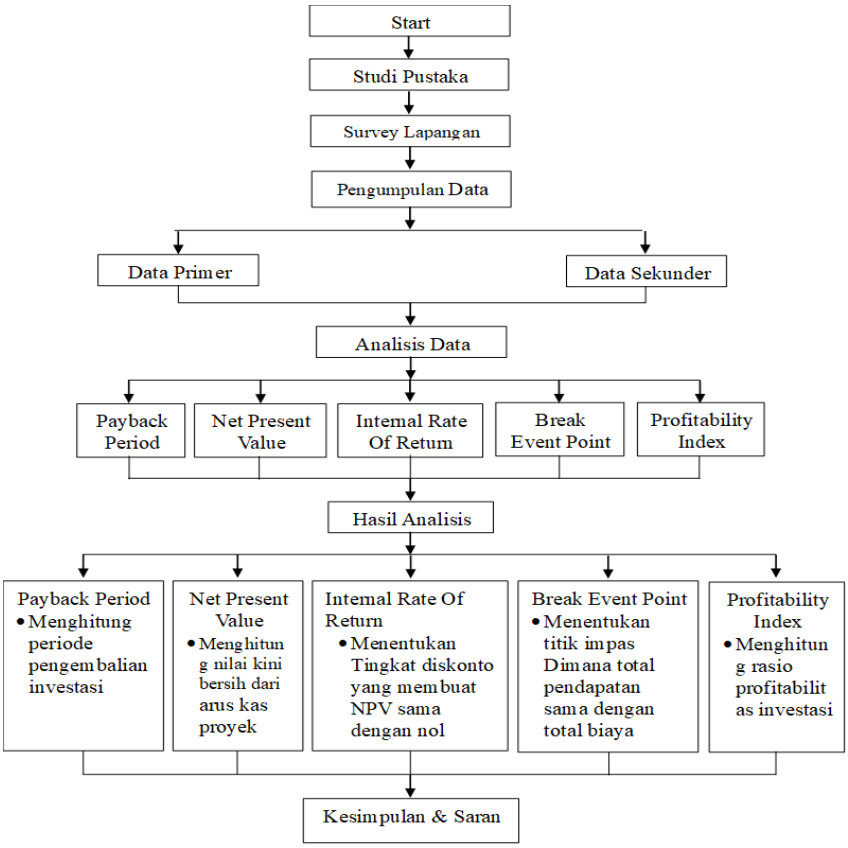


Figure I. Research Scheme

The data obtained is primary and secondary data, primary data is obtained through interviews and consultations with related parties, such as project contractors and petrol station owners, to understand the details of costs and operational processes. Secondary data was

taken from RAB documents, petrol station industry reports, and market data related to fuel prices and sales volume in the Jambi area. The following data was obtained in this study:

1. BPS Jambi 2024: Number of motorized vehicles
2. RAB Document : Cost plan for the construction of petrol stations and contractors
3. Pertamina Regulation: Operational and Technical Standards for Petrol Stations
4. Related literature : Journals, books and related literature on the feasibility analysis of petrol station projects

Data Analysis Techniques

Cost Analysis

Calculate the total initial investment cost of the petrol station project based on the RAB that has been prepared.

Revenue Projections

Estimate monthly revenue from fuel sales taking into account sales volume and profit margin per liter.

Profitability Analysis

Use the payback period method to calculate the return on capital period, as well as assess the project's profitability from projected revenue and operational costs.

Project Feasibility Evaluation

Based on the results of the analysis, an evaluation was carried out whether the project was financially feasible in the long term.

RESULTS AND DISCUSSION

This research was carried out on the construction project of a Public Fuel Filling Station (SPBU) located in Terjun Jaya Village, Betera District, Tajung Jabung Barat Regency, Jambi Province. This petrol station is designed to serve two-wheeled and four-wheeled vehicles with a fuel storage capacity of 80,000 liters. This project involves an initial investment of Rp 11,476,730,152, which includes infrastructure construction, and procurement of operational equipment.

The factors considered in this analysis include operating costs, fuel prices, daily sales volume, and government policies related to petrol station regulations. In addition, environmental aspects and marketing strategies are also part of the evaluation of this project:

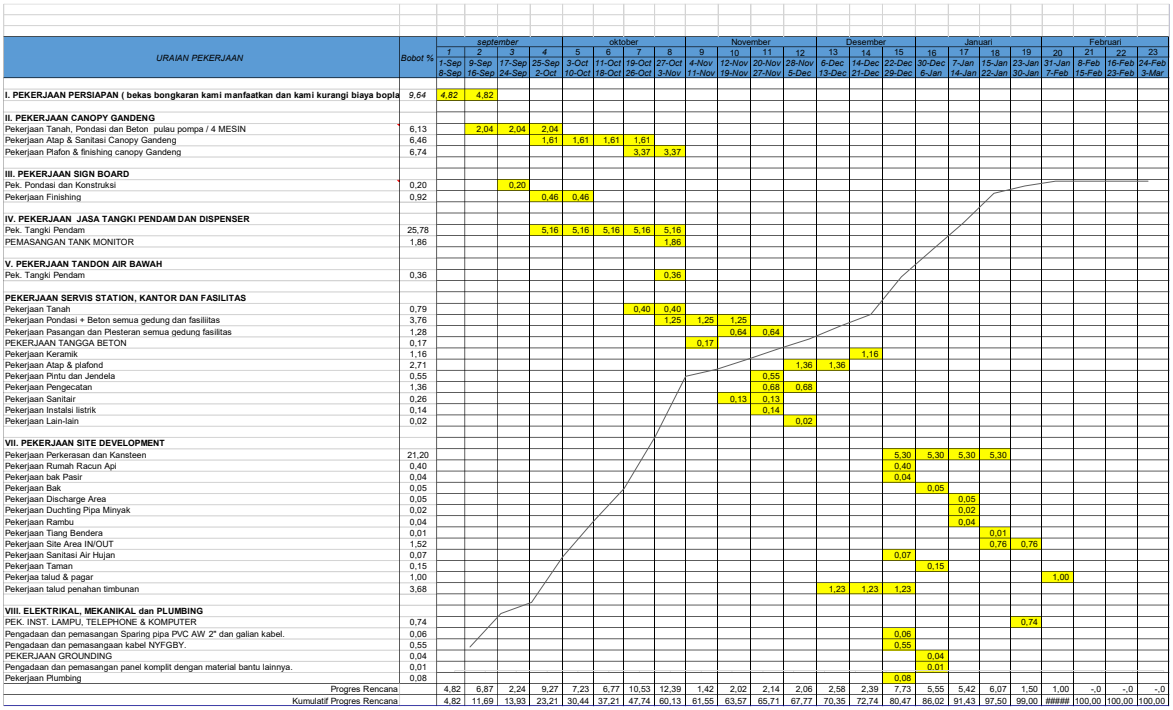
1. Fuel infrastructure condition: Betara District only has 1 petrol station serving ±30,663 residents and the distance to the nearest petrol station is ±15-20 km, causing dependence on retail fuel.
2. Market Potential: According to the Central Statistics Agency of Jambi Province in 2024, the number of motorcycles will be ±161,879 units, passenger cars ±4,869 units, buses ±2,520 units, trucks ±7,167 units, total transportation ±176,435. This shows that the need for fuel is still very large for vehicle operations, thus opening up the potential for fuel sales and also vehicle spare parts.

3. Strategic Location: Terjun Jaya Village is located on the main Jambi – Kuala Tungkal route, which is often passed by private vehicles, buses and trucks across provinces.

INVESTMENT COST ANALYSIS

Initial Investment Costs

NO.	JOB DESCRIPTION	TOTAL PRICE (RP)
1	PREPARATORY WORK	870.000.000,00
2	CANOPY WORK COUPLED WITH 4 DISPENSERS	1.743.452.125,00
3	SIGN BOARD JOBS	101.007.685,00
4	WORK OF STORAGE TANKS AND DISPENSERS	2.493.111.500,00
5	UNDERGROUND WATER RESERVOIR WORK	32.333.468,50
6	STATION & OFFICE SERVICE WORK, AND FACILITIES	1.101.176.675,00
7	SITE DEVELOPMENT JOBS	2.546.609.455,00
8	ELECTRICAL, MECHANICAL AND PLUMBING JOBS	133.705.625,00
	TOTAL	9.021.396.533,50
	TOTAL PRICE	IDR 9,021,396,533,50
	INITIAL FUEL PURCHASE	IDR 818.000.000.00
	LICENSING AND ADMINISTRATION	IDR 500,000,000,00
	SUM	IDR 10,339,396,533,50
	VAT 11%	IDR 1,137,333,618,69
	TOTAL ROUNDING + 11% VAT	IDR 11,476,730,152,19
	COUNTED (nine billion nine hundred and ninety million)	



URAIAN PEKERJAAN	Bobot %	september				oktober				November				Desember				Januari				Februari			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
		1-Sep	9-Sep	17-Sep	25-Sep	3-Oct	11-Oct	19-Oct	27-Oct	4-Nov	12-Nov	20-Nov	28-Nov	6-Dec	14-Dec	22-Dec	30-Dec	7-Jan	15-Jan	23-Jan	31-Jan	8-Feb	16-Feb	24-Feb
		8-Sep	16-Sep	24-Sep	2-Oct	10-Oct	18-Oct	26-Oct	3-Nov	11-Nov	19-Nov	27-Nov	5-Dec	13-Dec	21-Dec	29-Dec	5-Jan	14-Jan	22-Jan	30-Jan	7-Feb	15-Feb	23-Feb	3-Mar
I. PEKERJAAN PERSIAPAN (bekas bongkaran kami manfaatkan dan kami kurangi biaya bopla	9,64	4,82	4,82																					
II. PEKERJAAN CANOPY GANDENG																								
Pekerjaan Tanah, Pondasi dan Beton pulau pompa / 4 MESIN	6,13		2,04	2,04	2,04																			
Pekerjaan Atap & Sanitasi Canopy Gandeng	6,46				1,61	1,61	1,61	1,61																
Pekerjaan Plafon & finishing canopy Gandeng	6,74							3,37	3,37															
III. PEKERJAAN SIGN BOARD																								
Pek. Pondasi dan Konstruksi	0,20			0,20																				
Pekerjaan Finishing	0,92				0,46	0,46																		
IV. PEKERJAAN JASA TANGKI PENDAM DAN DISPENSER																								
Pek. Tangki Pendam	25,78				5,16	5,16	5,16	5,16	5,16															
PEMASANGAN TANK MONITOR	1,86								1,86															
V. PEKERJAAN TANDON AIR BAWAH																								
Pek. Tangki Pendam	0,36								0,36															
PEKERJAAN SERVIS STATION, KANTOR DAN FASILITAS																								
Pekerjaan Tanah	0,79							0,40	0,40															
Pekerjaan Pondasi + Beton semua gedung dan fasiliitas	3,76								1,25	1,25	1,25													
Pekerjaan Pasangan dan Plesteran semua gedung fasilitas	1,28										0,64	0,64												
PEKERJAAN TANGGA BETON	0,17									0,17														
Pekerjaan Keramik	1,16														1,16									
Pekerjaan Atap & plafond	2,71												1,36	1,36										
Pekerjaan Pintu dan Jendela	0,55											0,55												
Pekerjaan Pengecatan	1,36											0,68	0,68											
Pekerjaan Sanitair	0,26										0,13	0,13												
Pekerjaan Instalsi listrik	0,14											0,14												
Pekerjaan Lain-lain	0,02												0,02											
VII. PEKERJAAN SITE DEVELOPMENT																								
Pekerjaan Perkerasan dan Kansteen	21,20															5,30	5,30	5,30	5,30					
Pekerjaan Rumah Racun Api	0,40															0,40								
Pekerjaan bak Pasir	0,04															0,04								
Pekerjaan Bak	0,05																0,05							
Pekerjaan Discharge Area	0,05																	0,05						
Pekerjaan Duchting Pipa Minyak	0,02																	0,02						
Pekerjaan Rambu	0,04																	0,04						
Pekerjaan Tiang Bendera	0,01																		0,01					
Pekerjaan Site Area IN/OUT	1,52																		0,76	0,76				
Pekerjaan Sanitasi Air Hujan	0,07															0,07								
Pekerjaan Taman	0,15																0,15							
Pekerjsa talud & pagar	1,00																				1,00			
Pekerjaan talud penahan timbunan	3,68													1,23	1,23	1,23								
VIII. ELEKTRIKAL, MEKANIKAL dan PLUMBING																								
PEK. INST. LAMPU, TELEPHONE & KOMPUTER	0,74																			0,74				
Pengadaan dan pemasangan Sparing pipa PVC AW 2" dan galian kabel.	0,06															0,06								
Pengadaan dan pemasangaan kabel NYFGBY.	0,55															0,55								
PEKERJAAN GROUNDING	0,04																0,04							
Pengadaan dan pemasangan panel komplit dengan material bantu lainnya.	0,01																0,01							
Pekerjaan Plumbing	0,08															0,08								
Progres Rencana		4,82	6,87	2,24	9,27	7,23	6,77	10,53	12,39	1,42	2,02	2,14	2,06	2,58	2,39	7,73	5,55	5,42	6,07	1,50	1,00	-,0	-,0	-,0
Kumulatif Progres Rencana		4,82	11,69	13,93	23,21	30,44	37,21	47,74	60,13	61,55	63,57	65,71	67,77	70,35	72,74	80,47	86,02	91,43	97,50	99,00	#####	100,00	100,00	100,00

Graph 1. S Curve

Monthly and Annual Operating Costs

Table 1. Cost of employee salary

No	Position	Sum	Salary Per Month	Total Per Month	Total Per Year
1	Petrol Station Supervisor	1	IDR 6,000,000	IDR 6,000,000	IDR 72,000,000
2	Operator Nozzle	8	IDR 3,000,000	IDR 24,000,000	IDR 288,000,000
3	Administration	2	IDR 3,500,000	IDR 7,000,000	IDR 84,000,000
4	Hygiene	2	IDR 2,000,000	IDR 4,000,000	IDR 48,000,000
Total				IDR 41,000,000	IDR 492,000,000

1. Electricity and Water Costs
   a. Electricity Cost 20,000 KwH : Rp. 20,000,000
   b. Cost of Clean Water : Rp. 10,000,000
   c. Total : Rp. 30,000,000
2. Facility Maintenance Costs
   a. Maintenance 4 Dispenser/Pump : Rp. 6,000,000
   b. 4 Tank Maintenance : Rp. 8,000,000
   c. Electrical Maintenance : Rp. 1,000,000
   d. Total : Rp. 15,000,000
3. Administration and Tax Fees
   a. PPH (22%) : Rp. 1,370,000,000
   b. United Nations : IDR 4,000,000
   c. Billboard Tax : Rp. 1,000,000

d. Administration Fees : Rp. 100.000.000
e. Total : Rp. 1,475,000,000

Thus, the total monthly operational costs of Rp. 253,000,000 and annual Rp. 3,036,000,000

Revenue Projections

Revenue is obtained from the sale of fuel with an average daily volume of 35,700 liters with an average selling price of Rp. 10,700 per liter. Based on the data:

Table 2. Revenue projections

Yes	Revenue Gains	Amount (Rp)
1.	Daily Profit	IDR 17,292,857
2.	Weekly Profits	IDR 121,050,000
3.	Monthly Profit	IDR 484,200,000
4.	Annual Profit	IDR 5,810,400,000

Thus, the total annual revenue from fuel sales is significant enough to cover operational costs and provide profits for investors.

Profitability Ratio

1. Payback Period (PP)

   Initial investment = IDR 11,476,730,152
   Net profit per year = Rs. 2.774.400.000
   Payback Period = (INVESTASI AWAL)/(LABA BERSIH TAHUNAN)
   = 11.476.730.000/2.774.400.000
   = 4.1 Years

   Conclusion: The payback period of this project is 4.1 years, which means the initial investment will be returned in about 4 years and 1 month

2. Net Present Value (NPV)

   Calculation data
   Initial Investment : Rp. 11.476.730.152
   Annual Cash Flow :Rp. 2.774.400.000
   Investment Period : 5 Years
   Discount Rate : 10 %

Table 3. Net Present Value Table 10 % Discount Factor

YEAR	DISCOUNT FACTOR (10%)	CASH FLOW (Rp)	CURRENT VALUE (PV) (Rp)
1	1,1	IDR 2,774,400,000	IDR 3,051,840,000
2	1,21	IDR 2,774,400,000	IDR 3,357,024,000
3	1,331	IDR 2,774,400,000	IDR 3,692,726,400
4	1,4641	IDR 2,774,400,000	IDR 4,061,999,040
5	1,61051	IDR 2,774,400,000	IDR 4,468,198,944

Calculating NPV:

NVP = ∑ PV - 〖 C〗 _O

NVP = Rp. 18,631,788,384 - Rp. 11,476,730,152

= Rp. 7,155,058,232

Interpretation of Results :

Positive NPV (+Rp7,155,058,232), so this project is worth running, because the total current value of cash flow is greater than the initial investment.

Internal Rate Of Return (IRR)

Table 4. Table Internal Rate Of Return Discount 15%

			15%
Year	**Cash Flow (Rp)**	**Discount Factor 15 %**	**Discounted Cash Flow (Rp)**
0	-Rp11,476,730,152	1	-Rp11,476,730,152
1	IDR 2,774,400,000	1,15	IDR 3,190,560,000
2	IDR 2,774,400,000	1,3225	IDR 3,669,144,000
3	IDR 2,774,400,000	1,520875	IDR 4,219,515,600
4	IDR 2,774,400,000	1,74900625	IDR 4,852,442,940
5	IDR 2,774,400,000	2,011357188	IDR 5,580,309,381
	Total		IDR10,035,241,769

Table 5.Table Internal Rate Of Return 20% Discount

			20%
Year	**Cash Flow (Rp)**	**Discount Factor 20 %**	**Discounted Cash Flow (Rp)**
0	-Rp11,476,730,152	1	-Rp11,476,730,152
1	IDR 2,774,400,000	1,2	IDR 3,329,280,000
2	IDR 2,774,400,000	1,44	IDR 3,995,136,000
3	IDR 2,774,400,000	1,728	IDR 4,794,163,200
4	IDR 2,774,400,000	2,0736	IDR 5,752,995,840
5	IDR 2,774,400,000	2,48832	IDR 6,903,595,008
	Total		IDR 13,298,439,896

Table 6. Table Internal Rate Of Return Discount 22%

			22%
Year	**Cash Flow (Rp)**	**Discount Factor 22 %**	**Discounted Cash Flow (Rp)**
0	-Rp11,476,730,152	1	-Rp11,476,730,152
1	IDR 2,774,400,000	1,22	IDR 3,384,768,000
2	IDR 2,774,400,000	1,4884	IDR 4,129,416,960
3	IDR 2,774,400,000	1,815848	IDR 5,037,888,691
4	IDR 2,774,400,000	2,21533456	IDR 6,146,224,203
5	IDR 2,774,400,000	2,702708163	IDR 7,498,393,528
	Total		IDR 14,719,961,230

IRR =CF/〖(1+r)〗^n

Using the 10% discount rate:

$$10\ \% = \frac{2.774.400.000}{(1+0,1)^1} + \ + \ + + \frac{5.548.800.000}{(1+0,1)^2} \frac{8.323.200.000}{(1+0,1)^3} \frac{11.097.600.000}{(1+0,1)^4} \frac{13.872.000.000}{(1+0,1)^5}$$

$$= \frac{20.322.210.227}{18.081.057.078} \text{ x } 10\%$$

= 11.24%

IRR can be found through experiments using the trial and error method, which usually gives a result of about 11.24%

Interpretation: if the IRR is greater than the discount rate used (10%), then the project is profitable

Break Even Point (BEP)

BEP Per Year

BEP = (TOTAL INVESTASI)/(Pendapatan Per Tahun-Biaya Operasional Per Tahun)

= 11.476.730.152/(5.810.400.000-3.036.000.000)

= 11.476.730.152/2.474.400.000

= 4.1

Profitability Index

$$PI = 1 + \frac{NPV}{INVESTASI\ AWAL}$$

$$= 1 + \frac{Rp.\ 7.155.058.232}{\text{Rp.11.476.730.152}}$$

= 1.6

Interpretation: if PI > 1, then the project is feasible because it generates greater value than the investment cost.

Analysis Results

From the results of the calculated analysis, the following values were obtained:

1. Payback period

The payback period shows the time needed to return the initial investment, in the Tanjung Jabung Barat DODO Petrol Station Construction project whose initial investment was IDR 11,476,730,152 and obtained 4 years, 1 month to return the initial capital in this project.

2. Net Present Hairs (NPV)

Net present value is a method to determine constant cash flow, in this project an NPV of IDR 7,155,058,232

3. Internal Rate of Return (IRR)

The Internal Rate of Return is the discount rate that makes the NPV equal to zero. From calculations through interpolation or using financial software, 11.24% was obtained

4. Break Event Point (BEP)

Break Even Point is a break-even point or point When there are no profits or losses, in this DODO Petrol Station Construction project, the break event point is able to be carried out because the sales target exceeds the BEP value.

5. Profitability Index (PI)

The Profitability Index is a method for determining the value of an investment, resulting in a present value of 1.6

CONCLUSION

The financial feasibility analysis of the petrol station construction project in Terjun Jaya Village, Betara District, West Tanjung Jabung Regency, indicates strong viability, highlighted by a capital recovery period of 4 years and 1 month, a positive Net Present Value of IDR 7,155,058,232, an Internal Rate of Return of 11.24% exceeding the 10% discount rate, and a Profitability Index of 1.62, demonstrating valuable returns above the initial investment. To ensure success, the study recommends securing sufficient working capital for initial operations, forming partnerships with local transportation stakeholders, implementing risk management for fuel price and supply fluctuations, establishing financial monitoring systems, exploring revenue diversification through automotive and convenience services, and maintaining regulatory compliance. Future research should focus on the long-term impacts of market competition, regulatory changes, and environmental considerations on the operational sustainability and profitability of rural petrol stations in evolving economic contexts.

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