FINANCIAL FEASIBILITY STUDY OF PANGKALAN BRANDAN – LANGSA TOLL ROAD PROJECT

FINAL PROJECT
In partial fulfilment of the requirements
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from Bandung Institute of Technology

By
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(Master of Business Administration)

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ABSTRACT

FINANCIAL FEASIBILITY STUDY OF PANGKALAN BRANDAN – LANGSA TOLL ROAD PROJECT

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To accelerate development on Sumatra Island and support national economic growth, the government issued Presidential Regulation No. 100 of 2014 regarding the construction of toll roads in Sumatra, assigning PT Hutama Karya (Persero) to undertake the development and management of the Trans Sumatra Toll Road. This regulation has undergone three amendments. The first amendment, Presidential Regulation No. 117 of 2015, added 20 toll road sections, including Binjai – Langsa. The second amendment, Presidential Regulation No. 131 of 2022, divided the Binjai – Langsa section into two phases. The third amendment, Presidential Regulation No. 42 of 2024, changed the construction phase of Binjai – Langsa from Phase III to Phase II, covering the Binjai – Pangkalan Brandan and Pangkalan Brandan – Langsa.

This study evaluates the financial feasibility of the Pangkalan Brandan – Langsa Toll Road project by calculating Net Present Value (NPV), Internal Rate of Return (IRR), Payback Period (PP), Discounted Payback Period, and Profitability Index (PI). The results show a positive Net Present Value (NPV) of IDR 12,773,885,792,000, an Internal Rate of Return (IRR) of 13.26% (above the discount rate of 9.22%), a Payback Period of 16.4 years, a Discounted Payback Period of 27.7 years, and a Profitability Index (PI) of 2.5190, indicating financial feasibility. Timely execution of the project is recommended to avoid cost overruns.

Keywords: Presidential Regulation, Financial Feasibility, Net Present Value (NPV), Internal Rate of Return (IRR), Payback Period (PP), Discounted Payback Period, Profitability Index (PI).

ABSTRAK

STUDI KELAYAKAN FINANSIAL PROYEK JALAN TOL PANGKALAN BRANDAN – LANGSA

Oleh
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Untuk mempercepat pengembangan di Pulau Sumatera dan mendukung pertumbuhan ekonomi nasional, Pemerintah mengeluarkan Peraturan Presiden No. 100 Tahun 2014 tentang pembangunan jalan tol di Sumatera, di mana PT Hutama Karya (Persero) ditugaskan untuk melaksanakan pembangunan dan pengelolaan Jalan Tol Trans Sumatera. Peraturan ini telah mengalami tiga perubahan. Perubahan pertama dalam Peraturan Presiden No. 117 Tahun 2015 menambah 20 ruas tol, termasuk Binjai – Langsa. Perubahan kedua dalam Peraturan Presiden No. 131 Tahun 2022 membagi ruas Binjai – Langsa menjadi dua tahap. Perubahan ketiga dalam Peraturan Presiden No. 42 Tahun 2024 mengubah tahap pembangunan Binjai – Langsa dari tahap III menjadi tahap II yaitu Binjai - Pangkalan Brandan dan Pangkalan Brandan - Langsa

Penelitian ini mengevaluasi kelayakan finansial Proyek Tol Pangkalan Brandan – Langsa dengan menghitung Net Present Value (NPV), Internal Rate of Return (IRR), Payback Period (PP), Discounted Payback Period, *dan* Profitability Index (PI). *Hasilnya menunjukkan* Net Present Value (NPV) *positif* Rp. 12.773.885.792.000, Internal Rate of Return (IRR) 13,26% *(lebih tinggi dari tingkat diskon 9,22%),* Payback Period (PP) *16,4 tahun,* Discounted Payback Period 27,7 *tahun, dan* Profitability Index (PI) 2,5190. *Semua indikator menunjukkan proyek ini layak secara finansial. Disarankan untuk melaksanakan proyek tepat waktu untuk menghindari pembengkakan biaya.*

Kata Kunci*: Peraturan Presiden, Kelayakan Finansial*, Net Present Value (NPV), Internal Rate of Return (IRR), Payback Period (PP), Discounted Payback Period, Profitability Index (PI).

VALIDATION

FINANCIAL FEASIBILITY STUDY OF PANGKALAN BRANDAN – LANGSA TOLL ROAD PROJECT

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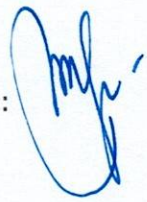
Signed : 

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TABLE OF CONTENTS

LIST OF APPENDICES

LIST OF FIGURES

LIST OF TABLES

LIST OF ABBREVIATIONS AND SYMBOLS

ABBREVIATIONS	Name	Page of initial usage
PSN	Nasional Strategic Project	
KPPIP	Committee for the Acceleration of Priority Infrastructure Delivery	
Restra	Strategic Plan	
Perpres	Presidential Regulation	
PUPR	Public Work and Public Housing	
APBN	State Budget	
BPJT	Toll Road Regulatory Agency	
KPBU	Government Cooperation with Business Entities	
PPJT	Toll Road Concession Agreements	
FIRR	Financial Internal Rate of Return	
WACC	Weighted Average Cost of Capital	
BUMN	State-Owned Enterprises	
ATP	Ability to Pay	
WTP	Willingness to Pay	
CAPEX	Capital Expenditure	
OPEX	Capital Expenditure	
VAT	Value Added Tax	
NPV	Net Present Value	
FCF	Free Cash Flow	
IRR	Internal Rate of Return	
PV	Present Value	
CF	Cash Flow	
PP	Payback Period	
PI	Profitability Index	
wd	Percentage of Weight of Debt Component	
rd	Cost of debt	
wp	Percentage of weight of preferred stock components	
rp	Preferred Stock Cost of Capital	
wc	Percentage of Weights of Common Equity Components	
rs	Cost of Common Equity Capital	
CAMP	Capital Asset Pricing Model	
re	Cost of Equity	
rf	Risk-free rate	
DER	Debt to Equity Ratio	

Km	Kilometer	
O&M	Operational & Maintenance	
BCR	Benefit Cost Ratio	
AADT	Annual Average Daily Traffic	
Rp.	Indonesian Rupiah	
Tc	Corporate Tax Rate	

SYMBOLS	Name	Page of initial usage
n	Remaining time of the concession period	
r	Discount rate	
N	Concession Period	
t	Period (Years)	
T	Tax	
β	Stock's beta coefficient	
V	Total Investment	
E	Equity Portion	
D	Debt Portion	

Chapter I Introduction

1.1 Background

1.1.1 National Strategic Project (PSN)

Indonesia's economic growth at 4.73 percent as of September 2015 is still far from expectations, especially because Indonesia needs growth of at least 7 percent to become a developed country by 2025. By embracing the spirit of acceleration, the Indonesian government has made several efforts to encourage investment in various infrastructure-related sectors. Regulatory, fiscal, and institutional improvements have been made to encourage the achievement of priority project milestones (KPPIP, 2023). Therefore, the Committee for the Acceleration of Priority Infrastructure Delivery (KPPIP) selects a list of projects that are considered strategic and has high urgency and provides facilities for facilitating project implementation. With the provision of these facilities, it is hoped that strategic projects can be realized faster.

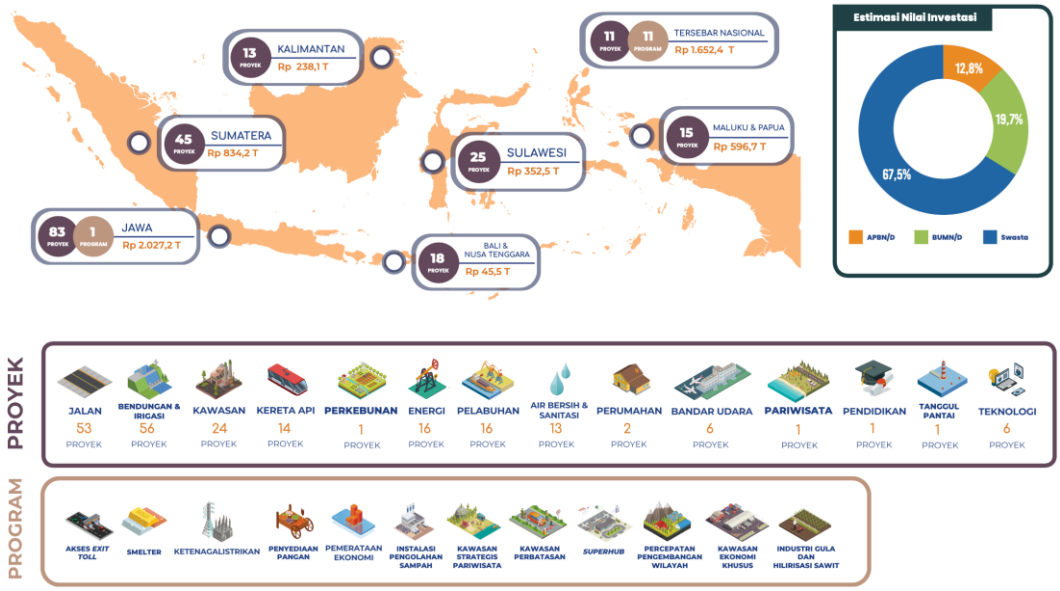

Figure 1 - 1 National Strategy Project in Indonesia

(Source: The 2nd Semester KPPIP Report, 2022)

KPPIP monitors the progress of the National Strategic Project (PSN) and evaluates project proposals and changes to the project list in the PSN program. The PSN list was first established through Presidential Regulation No. 3 of 2016 which later

underwent changes. In the fourth change to the PSN list, there are additional projects and changes in the scope of the PSN program without any projects being issued. The latest change in the PSN list is through the Regulation of the Coordinating Minister for Economic Affairs No. 9 of 2022 concerning Changes to the List of National Strategic Projects with the number of PSN projects to 200 projects and 12 PSN programs with details that can be seen from Figure 1 - 1. In the PSN, there are 53 Road & Bridge projects dominated by Toll Roads spread throughout Indonesia.

1.1.2 Presidential Regulation of Trans Sumatra Toll Road Assignment

To accelerate infrastructure development, the Government of Indonesia (GOI) issued a Presidential Regulation related to the assignment of Trans Sumatra Toll Road to PT. Hutama Karya (Persero). In Presidential Regulation No. 100 of 2014 there are 4 Trans Sumatra Toll Road Sections assigned to PT. Hutama Karya (Persero) to carry out its construction and operation.

To date, the Presidential Regulation related to the Trans Sumatra Toll Road has changed 3 times covering the scope of assignment, funding, and financing schemes. The changes to the Presidential Regulation are shown in Table 1 - 1 below:

Table 1 - 1 Presidential Regulations Relating to Trans Sumatra Toll Road

No.	Presidential Regulation (No.; Years)	Total Toll Road Section	Changes
1.	100; 2014	4 Toll Road Section	
2.	117; 2015	24 Toll Road Section	There are 20 additional Toll Road Sections that make a total of 24 Toll Road Section
3.	131; 2022	24 Toll Road Section	Phasing of construction implementation into 4 stages for 24 Toll Roads. In addition, adjustments were made to the 24 Toll Roads, but the number of Toll Roads remained the same. One of the changes in the Toll Road Section is Binjai - Langsa to Binjai - Pangkalan Brandan (part of Binjai - Langsa) which is included in Stage I and Pangkalan

			Brandan - Langsa (part of Binjai - Langsa) which is included in Stage III.
4.	42; 2024	24 Toll Road Section	Continue to use 4 stages of construction implementation and remain 24 Toll Roads. However, there is a change in the phasing order of the 24 planned Toll Roads, one of which is for Pangkalan Brandan - Langsa (part of Binjai - Langsa) which was previously Stage III turned into Stage II.

Source: (Presidential Regulation related to Trans Sumatra Toll Road, 2024)

Based on Table 1-1 above, the previous Binjai – Langsa Toll Road Section will be carried out construction in one stage of construction changed to two stages. The two stages become the Binjai - Pangkalan Brandan Toll Road Section and the Pangkalan Brandan - Langsa Toll Road Section. During the process, there was a change in stages due to constraints in the process of land acquisition and investment funding. In Figures 1 - 2 below, you can see the stages of construction of the Trans Sumatra Toll Road.

No.	Toll Road Section	Length (km)
Stage I	**I.A. Operation Toll Road Section**	
	1 Medan-Binjai	17
	2 Bakauheni - Terbanggi Besar	140
	3 Palembang - Simpang Indralaya	22
	4 Terbanggi Besar - Pematang Panggang - Kayu Agung	106
	5 Terbanggi Besar - Pematang Panggang - Kayu Agung *(Viability Gap Fund)*	83
	6 Pekanbaru - Dumai	132
	8a Kisaran - Indrapura (Lima Puluh - Indrapura Section)	16
	9a Kuala Tanjung - Tebing Tinggi - Parapat (Kuala Tanjung - Tebing Tinggi - Indrapura Section)	28
	13a Binjai - Langsa (Binjai - Stabat - Kuala Binjai - Tanjung Pura Section)	39
	7a Sigli - Banda Aceh (Seulimeum - Blang Bintang - Kutobaro Section)	50
	10a Simpang Indralaya - Muara Enim (Sp. Indralaya - Prabumulih Section)	65
	12a Lubuk Linggau Bengkulu (Taba Penanjung - Bengkulu Section)	17
	11a Pekanbaru - Padang (Pekanbaru-Bangkinang Section)	31
	Total I.A	**746**
	I.B. Toll Road Section under Construction	
	7b Sigli - Banda Aceh (Padang Tiji - Seulimeum Section)	25
	8b Kisaran - Indrapura (Kisaran - Lima Puluh Section)	32
	9b Kuala Tanjung - Tebing Tinggi - Parapat (Indrapura - Pematang Siantar Section)	65
	11b Pekanbaru - Padang (Bangkinang - Koto Kampar Section)	34
	11c Pekanbaru - Padang (Sicincin - Padang Section)	37
	13b Binjai - Langsa (Tanjung Pura - Pangkalan Brandan Section)	19
	Total I.B	**211**
	Total Stage I	**956**
Stage II	**II. Toll Road Concession Agreement Plan**	
	14a Betung - Tempino - Jambi (Betung - Bayung Lencir, Seksi Tempino - Ness Section)	137
	14b Betung - Tempino - Jambi (Bayung Lencir - Tempino Section) *(Viability Gap Fund)*	34
	15 Jambi - Rengat	198
	16a Rengat - Pekanbaru (Junction Pekanbaru - Bypass Pekanbaru Section)	31
	16b Rengat - Pekanbaru (Rengat - Junction Pekanbaru Section)	177
	17 Pelabuhan Panjang - Lematang	12
	13c Binjai - Langsa (Pangkalan Brandan - Langsa Section)	74
	11d Pekanbaru - Padang (Payakumbuh - Sicincin Section)	73
	11e Pekanbaru - Padang (Pangkalan - Payakumbuh Section)	45
	11f Pekanbaru - Padang (Koto Kampar - Pangkalan Section)	36
	25 Palembang - Betung (parts of Jalan Tol Kayu Agung - Palembang - Betung Section)	69
	Total Stage II	**884**
Stage III	**III. Advanced Backbone Section**	
	18 Dumai - Simpang Sigambal - Rantau Prapat	181
	19 Rantau Prapat - Kisaran	112
	20 Langsa - Lhokseumawe	134
	21 Lhokseumawe - Sigli	157
	Total III	**584**
Stage IV	**IV.A. Feeder Section with Toll Road Concession Agreement**	
	9c Kuala Tanjung - Tebing Tinggi - Parapat (Pematang Siantar - Parapat Section)	50
	10b Simpang Indralaya - Muara Enim (Prabumulih - Muara Enim Section)	56
	12b Lubuk Linggau - Bengkulu (Lubuk Linggau - Taba Penanjung Section)	80
	22 Muara Enim - Lahat - Lubuk Linggau	112
	Total IV.A	**298**
	IV.B Feeder Section not yet Toll Road Concession Agreement	
	23 Prapat - Tanjung - Sibolga	102
	24 Batu Ampar - Muka Kuning - Bandara Hang Nadim	20
	Total IV.B	**122**
	Total Stage IV	**420**
	Grand Total	**2,844**

Figure 1 - 2 Stages of Trans Sumatra Toll Road

(Source: PT. Hutama Karya (Persero), 2024)

1.1.3 Availability of Toll Road Funding

Based on Government Regulation No. 15 of 2005 concerning Toll Roads, toll roads are public roads that are part of the road network system and as national roads whose users are required to pay toll roads. Basically, the general requirement for

the construction of toll roads is as an alternative road to existing public roads, unless there are certain areas that need to be developed but do not have public roads.

In the 2020-2024 Strategic Plan (Renstra) document of the Ministry of Public Works and Public Housing (PUPR), the infrastructure development program is a priority where it is targeted to require funding of approximately IDR 2,058 trillion with road and bridge funding needs of IDR 573 trillion. In accordance with the trend of the availability of the State Budget (APBN), the funding needs are projected to be unable to be fully funded by the Government budget and are estimated to only be able to fund 30% of the total infrastructure budget needs of Public Works and Housing. With these conditions, there is a funding gap for infrastructure provision for the next five years. So to realize this, the Toll Road Regulatory Agency (BPJT) strives not to use government funds by conducting a Government Cooperation with Business Entities (KPBU) scheme where the Government through BPJT while the Business Entity is a Toll Road Business Entity that is an investor.

1.1.4 Toll Road Concession Cooperation

In general, Toll Road Business Entities (hereinafter abbreviated to "BUJT") obtain concession rights for toll road concessions through Toll Road Concession Agreements (hereinafter abbreviated to "PPJT) through a toll road concession investment tender process held by the Government which in this case is represented by the Toll Road Regulatory Agency (hereinafter referred to as "BPJT") of the Ministry of Public Works and Public Housing (PUPR). In addition to having economic feasibility in supporting the strategic plan for regional development and road networks set by the Government, toll road investment business has financial feasibility for investors.

Investors will calculate the business feasibility of investing in toll road operations based on the Financial Internal Rate of Return on Project or FIRR Project compared to the Weighted Average Cost of Capital (WACC) (Brigham &; Houston, 2009). In general, investors will make investment decisions if the amount of the FIRR Project is greater or at least the same as WACC and has a Payback Period of not more than 15 years.

1.2 Company Profile

1.2.1 Company History

PT Hutama Karya (Persero) hereinafter referred to as PT HK was originally a private Dutch East Indies company '*Hollandsche Beton Maatschapij*' which was nationalized in 1961 based on Government Regulation RI No. 61/1961 dated March 29, 1961, under the name PN Hutama Karya. The status of the Company changed to Limited Liability Company based on Government Regulation No. 14 of 1971 juncto Limited Company Deed No. 74 dated March 15, 1973, juncto Deed of Amendment No. 48 dated August 8, 1973 both of which were made before Notary Kartini Mulyadi, S.H., which was then based on the Joint Decree of the Board of Directors and Board of Commissioners, March 29 was designated as the Company's birthday.

The year 1961 was a milestone in the transformation of the Company from a private company *'Hollandsche Beton Maatschapij'* to PN Hutama Karya. Since the transformation phase, PN Hutama Karya has produced construction works of historical and monumental value such as the DPR/MPR RI Building and the Pancoran Statue Monument. After 1 decade, PN Hutama Karya introduced the BBRV Prestressing system from Switzerland which became a milestone in the start of Prestressed Concrete technology in Indonesia. As a manifestation of the existence of this technology, PN. Hutama Karya formed a Special Pretension Division. In the year between 1970 – 1980 Hutama Karya changed its status to PT Hutama Karya (Persero). Then around the 1990s, the company made a breakthrough through business diversification by establishing a Hakapole Business Unit in the form of a Public Street Lighting Pole Factory of various types of octagonal steel, and expanding its business abroad. Furthermore, the Company has also initiated technological innovation with the design of LPBH-80 'SOSROBAHU' (Barrier-Free Rotary Platform) by Dr. Ir. Tjokorda Raka Sukawati.

In line with the continuous development of innovation and following the rapid advancement of construction technology, the Company has been able to produce products with high technology in the form of: Long Spans Bridge (Suspension

Cable Bridge, Balanced Cantilever Bridge, Arch Steel Bridge, Cable Stayed). From the experience of making these technology products, the Company has met international standards in terms of quality, work safety and environment marked by the issuance of ISO 9002: 1994, OHSAS 18001: 1999 certifications. Entering the millennial era marked by the rapid development of economic dynamics, the company has revitalized itself by developing markets in the private sector with the construction of: High Rise Building (Bakrie Tower, Apartments), Infrastructure (Toll Roads) and business diversification by forming Subsidiaries and Investments. Along with these developments, quality remains the Company's concern through the issuance of ISO 9001: 2008, ISO 14001: 2004 and OHSAS 18001: 2007.

Then in 2014, PT. Hutama Karya (Persero) began to penetrate the Toll Road business through Presidential Regulation No. 100 of 2014 as amended through Presidential Regulation No. 42 of 2024, the Company was assigned to carry out toll road operations in Sumatra or can be called the Trans Sumatra Toll Road with a total length of 2,844 km which was constructed in stages.

1.2.2 Vision, Mission, and Core Value

The Vision of PT. Hutama (Persero) is Indonesia's Most Valuable Infrastructure Developer (#IMVID). While the mission of PT. Hutama Karya (Persero) is:

- Succeeding the government’s mandate to build and operate the Trans-Sumatra Toll Road.
- Developing infrastructure-based multi-businesses through service investment, construction, and manufacturing businesses that can provide premium value-added to corporations and in the context of accelerating Indonesia’s economic growth.
- Building sustainable corporate capacity and capability through strengthening human capital and financial capital and creating a safety culture within the Company.

PT. Hutama Karya (Persero) is one of the State-Owned Enterprises that also has the same Core Value as other State-Owned Enterprises, namely: "AKHLAK" which

stands for *Amanah* (Mandate), *Kompeten* (Competent), *Harmonis* (Harmonious), *Loyal* (Loyal), *Adaptif* (Adaptive) and *Kolaboratif* (Collaborative).

In addition, the company also has a Motto: "INNOVATION THROUGH SOLUTION" which means that "Hutama People Always Look for New Alternative Ways in Managing Activities and Solving Problems".

1.2.3 Organizational Structure

To increase the company's competitiveness to face increasingly fierce competition and support the assignment of the Trans Sumatra Toll Road, an organizational structure that is in accordance with the company's strategy is needed and increased efficiency and effectiveness of business processes to maximize the output process. Currently, the applicable structure of PT Hutama Karya (Persero) refers to the Decree of the Board of Directors of PT Hutama Karya (Persero) No. 4555/KPTS/84/X/2023 dated October 19, 2023, concerning Changes in the Organizational Structure of PT Hutama Karya (Persero), as follows:

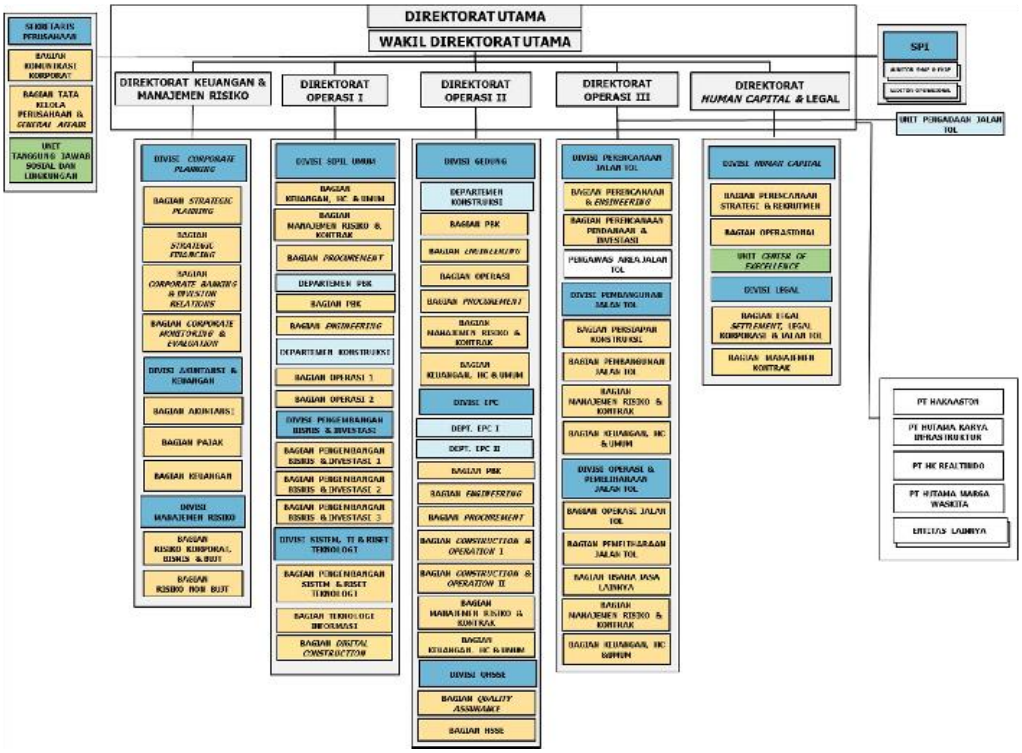

Figure 1 - 3 Organization Structure of PT. Hutama Karya (Persero)

(Source: PT. Hutama Karya (Persero), 2023)

1.3 Pangkalan Brandan - Langsa Toll Road

The Binjai - Langsa Toll Road, located in the provinces of North Sumatra and Aceh, is one of the toll roads included in the National Strategic Project based on the Coordinating Meter Regulation for Economic Affairs No. 9 of 2022. The current position, the Binjai - Langsa Toll Road with a total length of 129.9 km was operating at the end of December 2023 for the 12.3 km Binjai - Stabat and the 26.2 km Stabat - Tanjung Pura. As for the Tanjung Pura – Pangkalan Brandan along 19 km, it is planned to be operational in 2024.

When referring to Presidential Regulation No. 100 of 2014 j.o. Presidential Regulation No. 42 of 2024 article 2A paragraph 2, the Pangkalan Brandan - Langsa Toll Road is included in the Trans Sumatra Phase II Toll Road operation. This means that after the Phase I Toll Road has been fully operational by the end of 2024, the government will continue to focus on Phase II Toll Road, including the Pangkalan Brandan - Langsa Toll Road. The planned route of the Binjai - Langsa Toll Road can be seen in Figure 1 - 4 below.

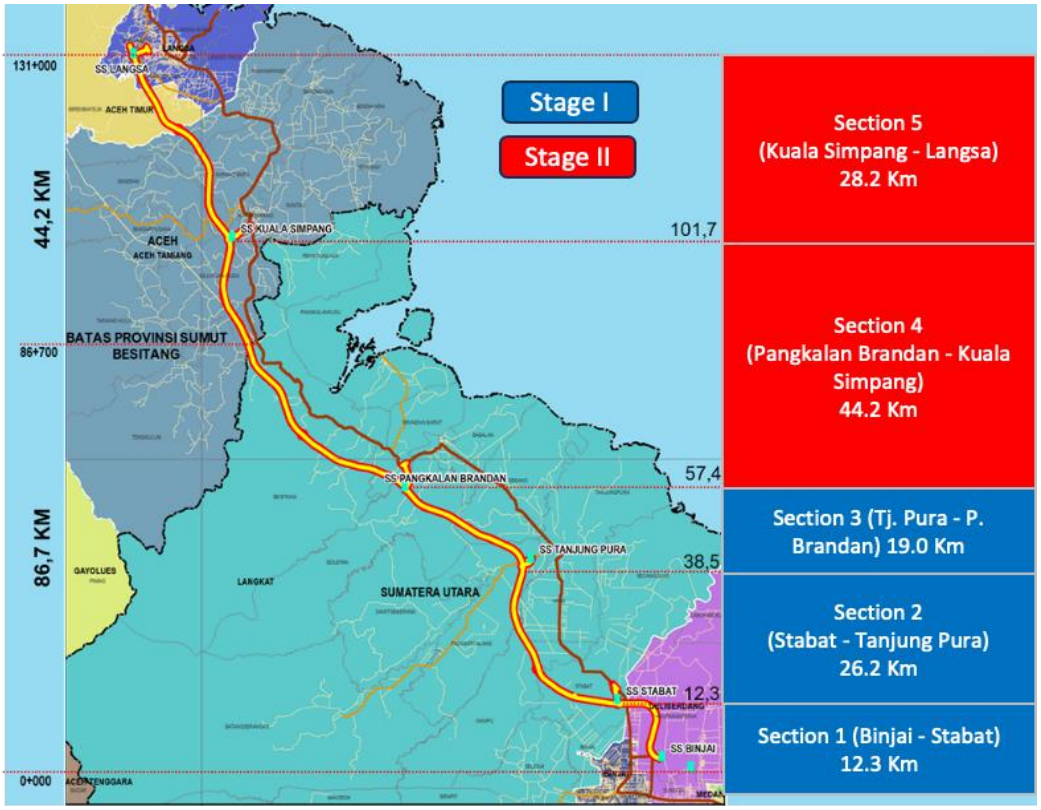

Figure 1 - 4 Binjai – Langsa Toll Road

(Source: PT. Hutama Karya (Persero), 2023)

1.4 Business Issues

Before carrying out the execution of the construction of the Pangkalan Brandan - Langsa Toll Road, it is necessary to carry out a feasibility study. Feasibility Study is an activity that studies in depth about an activity or business or business to be run, in order to determine whether or not the business is feasible to run (Kasmir &; Jakfar, 2016).

To find out whether the Pangkalan Brandan – Langsa Toll Road is a project worth constructing or not, the approach is through economic feasibility and financial feasibility. The need for economic feasibility is stated in Presidential Regulation No. 15 of 2005 Article 13, where it is explained that the feasibility study for toll road section plans includes socio-economic analysis, traffic projection analysis, toll road corridor selection, and construction cost estimation analysis and economic feasibility analysis.

Meanwhile, the need for financial feasibility is regulated in Presidential Regulation No. 15 of 2005 Article 24 which includes socio-economic analysis, traffic projection analysis, and construction cost forecast analysis as well as financial feasibility analysis including recommendations for business forms, funding schemes and efforts needed to make the project financially viable.

From the results of a feasibility study conducted by consultants that the Binjai - Langsa Toll Road is financially feasible for a 40-year concession period.. In addition to the financial feasibility study, the consultant also conducted an economic feasibility study whose results for the Binjai - Langsa Toll Road have economic feasibility as well. Feasibility studies conducted by consultants are carried out for the implementation of construction carried out in one stage. The Binjai – Langsa Toll Road will still have economic feasibility even though it will be carried out in stages.

However, for PT. Hutama Karya (Persero), which received the assignment of the Trans Sumatra Toll Road, needs to conduct a financial feasibility study again if it is carried out in two stages of development. If the results of the financial feasibility

study due to the construction phases have been carried out and produce results that are not financially feasible, PT. Hutama Karya (Persero) still has to carry out development because this is a mandate from the government. However, the results of the financial feasibility study can be the basis for PT. Hutama Karya (Persero) to develop the right strategy so that the approval of the Trans Sumatra Toll Road can still be carried out without burdening the Company.

The results of this feasibility analysis will also be used as evaluation material by the Minister of Public Works and Public Housing (PUPR) with consideration of the Minister of Finance and Minister of State-Owned Enterprises (BUMN) whether the Pangkalan Brandan - Langsa Toll Road Section will become the next Toll Road Development through a Decree issued by the Minister of PUPR.

1.5 Research Questions and Research Objectives

1.5.1 Research Questions

From the explanation above, it is known that the construction of the Binjai - Langsa Toll Road is carried out in two stages, where the first phase of the Binjai - Pangkalan Brandan Toll Road is scheduled to be completed in 2024. While the continuation of the toll road, namely the Pangkalan Brandan – Langsa Toll Road is Phase II of the Trans Sumatra Toll Road construction stages. Based on this description, the research questions are:

1. What is the Net Present Value, Internal Rate of Return, Payback Period, Discounted Payback and Profitability Index for the Pangkalan Brandan – Langsa Toll Road Project?
2. Is the development of the Pangkalan Brandan – Langsa Toll Road Project financially feasible?

1.5.2 Research Objectives

Based on the research questions above, the objectives of this study are as follows:

1. Calculate the Net Present Value, Internal Rate of Return, Payback Period, Discounted Payback Period and Profitability Index for the Pangkalan Brandan – Langsa Toll Road Project.

2. Determine whether the development of the Pangkalan Brandan – Langsa Toll Road Project is financially feasible.

1.6 Scope of Research and Writing Structure

The scope of research is as follow:

1. The analysis that of Pangkalan Brandan – Langsa Toll Road Project.
2. The analytical approach in this study considers internal factors that can be controlled to achieve research objectives, while external factors are not taken into account.

The writing structure is as follow:

Chapter I: Introduction

This chapter explains the background of the project, including the National Strategic Project (PSN) and regulations related to the assignment of the Trans Sumatra Toll Road. The company profile of PT Hutama Karya (Persero) is explained, as well as the Pangkalan Brandan - Langsa Toll Road Section Project and the business problems faced. Research questions and research objectives are identified, as well as the scope and limits of the study.

Chapter II: Literature Review

This chapter covers theoretical foundations on tariff determination, capital expenditure (CAPEX), operating expenditure (OPEX), and financial feasibility. Also discussed is the conceptual framework that guides this research.

Chapter III: Research Methodology

This chapter outlines the research design used, data collection methods, and data analysis methods. This research uses a case study design from the Pangkalan Brandan – Langsa Toll Road Project.

Chapter IV: Results and Discussion

This chapter explains the results of research and analysis based on the methodology used. Then the results of the research and analysis are described to answer research questions.

Chapter V: Conclusion and Recommendation

This chapter describes the conclusions, implications, suggestions related to the results of research and discussions that have been carried out.

Chapter II Literature Review

2.1 Theoretical Foundation

2.1.1 Tariff Determination

2.1.1.1 Ability to Pay (ATP) Survey

In general, toll tariff analysis is carried out by referring to the results of data processing of the willingness/ability to pay survey (WTP/ATP). In this analysis, road users are distinguished according to the type / class of vehicles.

Ability To Pay (ATP) is a person's ability to pay for the services he receives based on income that is considered ideal (Susanto et al., 2015). Factors that affect ATP among others are the amount of income, transportation needs, total transportation costs, travel intensity, total travel expenses, type of activity.

Willingness to Pay (WTP) is the maximum amount of money that will be spent by the buyer for an item (Mankiw, 2018). In general, the amount of money paid by consumers or individuals is an indicator of the utility obtained from a particular good or service (Barki & Rachmah, 2023).

2.1.1.2 Vehicle Classification

For vehicle classes, the Ministry of Public Works (PU) has regulated the division of groups through PU Minister Decree Number 370/KPTS/M/2007 with illustrations in Figures 2 - 1 below:

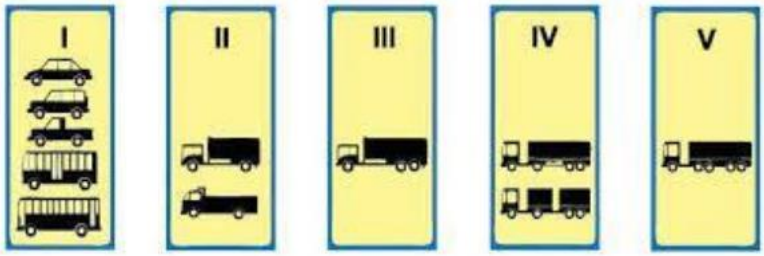

Figure 2 - 1 Vehicle Classification

(Source: Minister of Public Works and Public Housing, 2022)

Based on Public Works and Public Housing Decree No. 82/KPTS/M/2022 of 2022, toll tariff from the Binjai – Langsa Toll Road (Binjai – Stabat Section) in 2022 are as in Table 2 - 1 with an increase in toll rates by 12% every 2 years.

Table 2 - 1 Toll Rate by Vehicle Type

Class	Toll Tariff (Rp)	Vehicle Type
Gol I	15,000	Car, Jeep, Pick up, Small Truck, Buss
Gol II	22,500	Truck with 2 axles
Gol III	22,500	Truck with 3 axles
Gol IV	30,000	Truck with 4 axles
Gol V	30,000	Truck with 5 axles

(Source: Minister of Public Works and Public Housing, 2022)

2.1.2 Capital Expenditure (CAPEX)

Capital Expenditure refers to the costs incurred in order to acquire fixed assets, increase operational efficiency and productive capacity of fixed assets, and extend the useful life of fixed assets (Makatengkeng et al., 2014). In general, CAPEX from Toll Roads consists of Construction Costs, Design, Supervision, Toll Equipment, Escalation, Value Added Tax (VAT), Overhead, and Interest During Construction (IDC).

2.1.3 Operational Expenditure (OPEX)

Operational Expenditure refers to the allocation of budgeted costs for the process of operating the Company's assets so that they can run / function normally (Mulya, 2022). The function of toll roads itself must be in accordance with the Quality Service Standards regulated by the Ministry of Public Works (PU) through PU Regulation Number 16 / PRT / M / 2014 concerning Minimum Service Standards for Toll Roads.

2.1.4 Financial Feasibility

2.1.5.1 Internal Rate of Return (IRR)

According to Bringham (2015), Internal Rate of Return is the discount rate that forces Present Value (PV) inflows to be equal to the initial cost (or equal to Present Value (PV) of the entire cost if costs are incurred over several years), this is equivalent to forcing Net Present Value (NPV) to be equal to zero.

$$NPV = CF_0 + \frac{CF_1}{(1+IRR)^1} + \frac{CF_2}{(1+IRR)^2} + \cdots + \frac{CF_N}{(1+IRR)^N} = 0$$

$$= \sum_{t=1}^{N} \frac{CF_t}{(1+IRR)^t} = 0$$

where:

CF = Cash Flow in each period

N = Concession Period

t = Period (year)

The results of the IRR calculation will be a tool to decide whether the project is acceptable or not, the criteria for such a decision are as follows:

- If the IRR is greater than Discount Rate then the project is financially feasible. The Discounted Rate reflects the cost of acquiring capital used to fund the project (through equity, debt or equity and debt). If the IRR is greater than the Discount Rate, the project generates a greater return than would have to pay for that capital.
- If the IRR is smaller than Discount Rate then the project is not financially feasible. The Discounted Rate reflects the cost of acquiring capital used to fund the project (through equity, debt or equity and debt). If the IRR is smaller than the Discount Rate, the project generates a smaller return than it would have to pay for that capital.

2.1.5.2 Net Present Value (NPV)

Net Present Value is a method of rating investment proposals, which is equal to the present value of future net cash flows, discounted at the cost of capital (Brigham &

Houston, 2009). The formula for determining the NPV of many future cash flows is shown below:

$$NPV = \sum_{t=1}^{n} \frac{Free\ Cash\ Flow_t}{(1+r)^t}$$

where:

n = Remaining time of the concession period

FCF_t = Free Cash Flow until the remaining time of the concession period

r = discount rate

The results of the NPV calculation will be a tool to decide whether the project is acceptable or not, the criteria for such a decision are as follows:

- If the NPV is greater than 0 (NPV>0) then the project is financially feasible.
- If the NPV is less than 0 (NPV<0) then the project is not financially feasible.

2.1.5.3 Payback Period (PP)

Payback Period is defined as the number of years it takes to recover funds invested in a project from its operating cash flow (Ehrhardt, Michael C.; Brigham, 2015).

$$Payback\ Period = Number\ of\ years\ prior\ to\ full\ recovery + \frac{Unrecovered\ cost\ at\ start\ of\ year}{Cash\ flow\ during\ full\ recovery\ year}$$

The results of the Payback Period calculation will be a tool to make a decision whether the project is acceptable or not, the criteria for the decision are as follows:

- If the Payback Period is less than the maximum payback period, the project is financially feasible.
- If the Payback Period is more than the maximum payback period, the project is not is financially feasible.

2.1.5.4 Discounted Payback Period

Discounted Payback Period is the period of time it takes for an investment's cash flows, discounted at the cost of investment capital, to cover its costs (Brigham & Houston, 2009). Each cash inflow is then discounted with WACC, then the present value is used in the payback period calculation.

2.1.5.5 Profitable Index (PI)

The use of Profitability Index (PI) in financial feasibility parameters is also commonly used. According to Osborn (2010), the use of IRR and PI methods is easier for investors in comparing financial indicators. While the Profitability Index (PI) refers to the ratio of discounted benefits to discounted costs (Gurau, 2012). Here is the formula of the Profitability Index (Jalunggono, et al):

$$PI = \frac{Cash\ Inflow}{Cash\ Outflow}$$

Where cash inflows and outflows have been discounted first, so PI has the following analysis standards:

- If the PI Value > 1, then the project is financially feasible.
- If the PI value is <1, then the is not is financially feasible.

2.1.5.6 Weighted Average Cost of Capital (WACC)

Weighted Average Cost of Capital is a weighted average consisting of the cost of debt, preferred stock, and common equity (Brigham & Houston, 2009). The calculation of WACC is as follows:

$$WACC = wd \times rd \times (1 - T) + wp \times rp + wc \times rs$$

where:

wd = Percentage of Weight of Debt Component

rd = Cost of debt

T = Tax

wp = Percentage of weight of preferred stock components

rp = Preferred Stock Cost of Capital

wc = Percentage of Weights of Common Equity Components

rs = Cost of Common Equity Capital

2.1.5.7 Cost of Debt

The interest rates a company must pay on its new debt is defined as the cost of debt before taxes. However, in the calculation of weighted average cost of capital, the cost of debt used is the cost of debt that has been reduced by tax or after-tax cost of

debt (Brigham & Houston, 2009). So, from the calculation of after-tax cost of debt is as follows:

$$after\ tax\ cost\ of\ debt = rd\ x\ (1 - T)$$

where:

rd = Cost of debt

T = Tax

2.1.5.8 Cost of Equity

Cost of Equity is the rate of return a company pays to equity investors. Companies use the cost of equity to assess the relative attractiveness of investments, including internal projects and external acquisition opportunities (Corporate finance Institute, 2024). The most widely used method for estimating the cost of ordinary equity is the Capital Asset Pricing Model (CAPM) (Brigham & Houston, 2009). The following is the calculation of the Capital Asset Pricing Model:

$$re\ = rf\ +\ \beta\times(rm - rf)$$

where:

re = Cost of Equity.

rf = Risk-free rate, in general, can use the rate of government securities with a certain period.

rm = Market Return, the difference between the return an investor requires over the average stock and the risk-free rate.

β = stock's beta coefficient.

2.1.5.9 Market Return (rm)

The Market Return (rm) can be calculated by calculating the profit level of the Indonesia Stock Exchange Composite (IDX Composite) can be seen as follows (Turlinda, Arly & Hasnawat, 2021).

$$rm = \frac{IDX\ Composite_t - IDX\ Composite_{t-1}}{IDX\ Composite_{t-1}}$$

where:

rm = Market Return

$IDX\ Composite_t$ = Indonesia Stock Exchange Composite at time t

$IDX\ Composite_{t-1}$ = Indonesia Stock Exchange Composite at time t-1

2.1.5.10 Stock's Beta Coefficient

According to Gitman & Zutter (2014), "The beta coefficient, β, is a relative measure of risk that cannot be verified. It is an index of the rate of movement of an asset's return in response to changes in market returns. The historical return of an asset is used in finding the beta coefficient of an asset. Market returns are the returns of a market portfolio of all traded securities. The Standard & Poor's 500 Composite Index or a similar stock index is usually used as a market return."

According to Rulinda, Arly, and Hasnawat (2021), "Beta (β) is described as a measure of a stock's risk to changes in stock prices in the market. In other words, beta is the standard deviation of stock returns associated with market returns. Beta (β) can be calculated by using dividing covariant and variants. However, Beta (β) can also be described as a slope between market returns and stock returns."

$$\beta = \text{slope}\ (Y, X)$$

where:

β = stock's beta coefficient.

Y = return of stock

X = return of Indonesia Stock Exchange (IDX) Composite

In addition to doing calculations, the value of β of shares can also be obtained from various websites, such as Yahoo Finance, Refinitiv Reuters, Pefindo Beta Stock, and others. The beta value used by market participants is usually an adjusted beta. In the Capital Asset Pricing Model (CAPM), the beta of a stock portfolio is the weighted average of the various betas of each other stock.

2.2 Conceptual Framework

A conceptual framework is needed to answer the research question. The conceptual framework for this study is as follows:

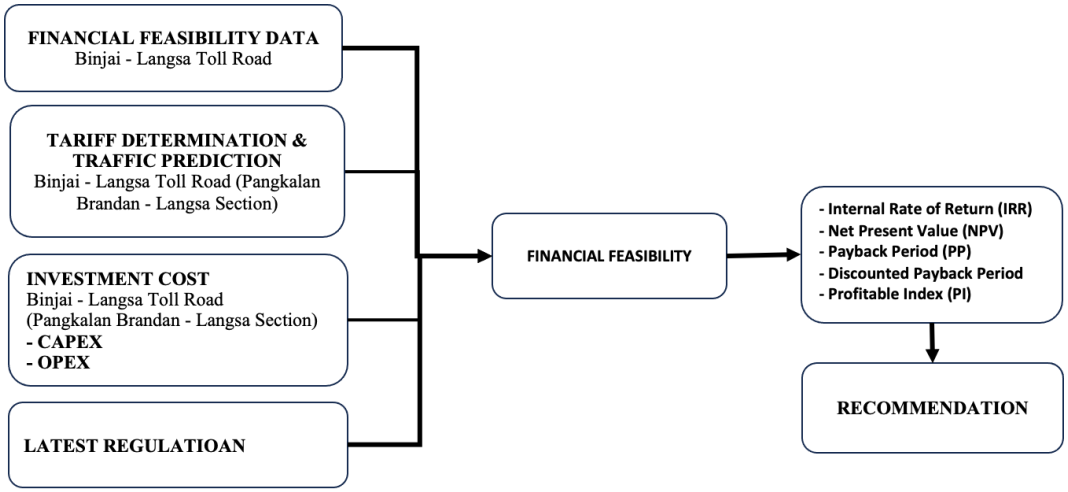

Figure 2 - 2 Conceptual Framework

(Source: Author)

This study uses data from the results of a financial feasibility consultant study for the Binjai – Langsa Toll Road. The data used are data on cost of debt assumptions, debt to equity ratio assumption, tariff increases assumption, toll road lengths, predictions volumes of traffic, construction costs, operating & maintenance costs and inflation assumptions.

Toll rates use existing toll rates and apply on the Binjai – Langsa Toll Road. For the prediction of traffic volume of the Pangkalan – Brandan Toll Road, prediction data is used from the results of the feasibility study of consultants adjusted to the the Pangkalan Brandan – Langsa Toll Road.

The investment cost is based on the investment cost of the Binjai – Langsa Toll Road which is adjusted to the length of the road for the Pangkalan Brandan – Langsa Toll Road. In addition to the data obtained from consultants, the latest regulations are also considered to be used.

After the data is obtained, the financial feasibility calculation is carried out by calculating the financial feasibility parameters, so that the results of the financial feasibility parameters such as Internal Rate of Return, Net Present Value, Payback Period, Discounted Payback Period and Profitable Index are obtained. From these financial feasibility parameters, conclusions can be drawn to be used as recommendations.

Chapter III Research Methodology

3.1 Research Design

According to Umar (2007), research design is a structured work plan that relates between variables comprehensively so that the results of the research answer the research questions. The plan in question is a series of activities for the implementation of research, starting from making hypotheses and their implications operationally to the final analysis. In this case, the study used a case study research design because it took a case study from the Pangkalan Brandan - Langsa Toll Road Section Project. According to Creswell (2010), a case study is a research strategy that researchers can use to closely investigate a program, event, activity, process, or group of individuals.

3.2 Data Collection Method

According to Cooper & Schindler (2014), data can be divided into 2 (two) classifications, namely primary data, and secondary data. Primary Data is data obtained and collected directly, the data obtained is still raw and has not been processed. Secondary data is data that has at least one level of interpretation of the data, usually secondary data obtained through journals, articles, or reports. In this study, only secondary data was collected through internal data owned by PT. Hutama Karya (Persero) and data belonging to consultants in collaboration with PT. Hutama Karya (Persero).

3.3 Data Analysis Method

The results of this study are presented with narratives and the results of financial assessment analysis as supporting quantitative data. To reinforce and clarify the results of data analysis, researchers use illustrations in the form of charts, tables, and figures.

Based on the explanation above, the research method can be described as Figure 3 - 1 below.

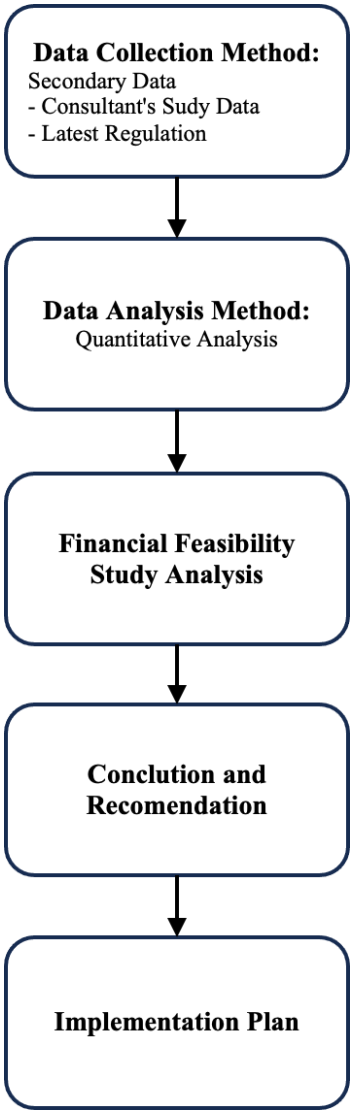

Figure 3 - 1 Research Methodology

(Source Author)

Chapter IV Results and Discussion

4.1 Data to calculate financial feasibility

4.1.1 Toll Rate Revenue Analysis

Based on the Decree of the Minister of Public Works and Public Housing No. 82/KPTS/M/2022 of 2022 regarding the determination of toll rates for the Binjai - Langsa Section 1 (Binjai - Stabat) Toll Road, the toll rate in 2022 for class I is Rp. 1,210 per km, with a road length of 12.3 km and an assumed tariff increase of 12% per 2 years as Table 4 - 1 below:

Table 4 - 1 Toll Tariff and Toll Rate by Vehicle Type

Class	Toll Tariff in 2022 (Binjai - Stabat) (Rp)	Toll Rate 2022 (Rp./km)	Increse in Rate	Vehicle Type
Class I	15,000	1,210	-	Class I (Car, Jeep, Pick up, Small Truck, Buss)
Class II	22,500	1,820	1.5x Class I	Class II (Truck with 2 axles)
Class III	22,500	1,820	1.5x Class I	Class III (Truck with 3 axles)
Class IV	30,000	2,430	2.0x Class I	Class IV (Truck with 4 axles)
Class V	30,000	2,430	2.0x Class I	Class V (Truck with 5 axles)

(Source: Minister of Public Works and Public Housing, 2022)

So, the assumption of the Toll Rate used for the Pangkalan Brandan - Langsa Toll Road is Rp. 1,210 per km for class I which will apply in 2027 (the beginning of operation) and the assumption of a tariff increase of 12% per 2 years can be calculated as in Table 4 - 2. From Table 4 - 2, it can be seen that for the first and second year of operational toll rates (2027 - 2028) using toll rates according to Table 4 - 1 and in the third and fourth years (2029 - 2030) there is an increase of 12% and subsequently toll rates can be calculated until the end of the concession (2027) according to the formula.

Based on the calculation of toll rates in Table 4 - 2, a growth graph of toll rates per year per vehicle can be made. Referring to an increase of 12% per 2 years, the growth rate per vehicle class can be illustrated in Figure 4 - 1 below. In Figure 4 - 1, the relationship between toll rates and the year of toll road operation for each type of vehicle can be seen, where there is an increase every year.

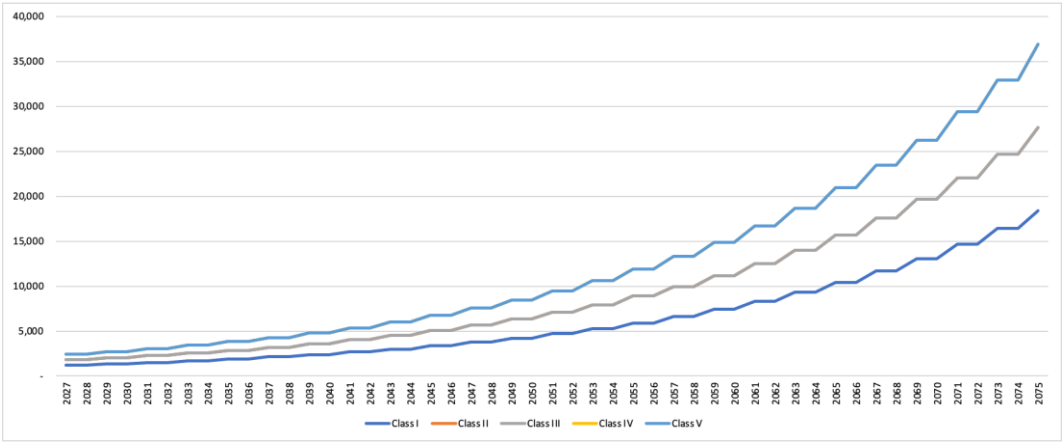

Figure 4 - 1 Pangkalan Brandan – Langsa Toll Road Rates Growth

(Source: Author)

Table 4 - 2 Toll Tariff and Toll Rate by Vehicle Type Years 2027 - 2075

Tariff Projection (Rp./KM)

No.	Class	Years																
		2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043
1	Class I	1,210	1,210	1,355	1,355	1,518	1,518	1,700	1,700	1,904	1,904	2,132	2,132	2,388	2,388	2,675	2,675	2,996
2	Class II	1,820	1,820	2,038	2,038	2,283	2,283	2,557	2,557	2,864	2,864	3,207	3,207	3,592	3,592	4,023	4,023	4,506
3	Class III	1,820	1,820	2,038	2,038	2,283	2,283	2,557	2,557	2,864	2,864	3,207	3,207	3,592	3,592	4,023	4,023	4,506
4	Class IV	2,430	2,430	2,722	2,722	3,048	3,048	3,414	3,414	3,824	3,824	4,282	4,282	4,796	4,796	5,372	5,372	6,017
5	Class V	2,430	2,430	2,722	2,722	3,048	3,048	3,414	3,414	3,824	3,824	4,282	4,282	4,796	4,796	5,372	5,372	6,017

No.	Class	Years															
		2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059
1	Class I	2,996	3,355	3,355	3,758	3,758	4,209	4,209	4,714	4,714	5,280	5,280	5,913	5,913	6,623	6,623	7,418
2	Class II	4,506	5,047	5,047	5,653	5,653	6,331	6,331	7,091	7,091	7,942	7,942	8,895	8,895	9,962	9,962	11,157
3	Class III	4,506	5,047	5,047	5,653	5,653	6,331	6,331	7,091	7,091	7,942	7,942	8,895	8,895	9,962	9,962	11,157
4	Class IV	6,017	6,739	6,739	7,547	7,547	8,453	8,453	9,467	9,467	10,603	10,603	11,876	11,876	13,301	13,301	14,897
5	Class V	6,017	6,739	6,739	7,547	7,547	8,453	8,453	9,467	9,467	10,603	10,603	11,876	11,876	13,301	13,301	14,897

No.	Class	Years															
		2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075
1	Class I	7,418	8,308	8,308	9,305	9,305	10,421	10,421	11,672	11,672	13,073	13,073	14,641	14,641	16,398	16,398	18,366
2	Class II	11,157	12,496	12,496	13,996	13,996	15,675	15,675	17,556	17,556	19,663	19,663	22,023	22,023	24,665	24,665	27,625
3	Class III	11,157	12,496	12,496	13,996	13,996	15,675	15,675	17,556	17,556	19,663	19,663	22,023	22,023	24,665	24,665	27,625
4	Class IV	14,897	16,684	16,684	18,687	18,687	20,929	20,929	23,440	23,440	26,253	26,253	29,404	29,404	32,932	32,932	36,884
5	Class V	14,897	16,684	16,684	18,687	18,687	20,929	20,929	23,440	23,440	26,253	26,253	29,404	29,404	32,932	32,932	36,884

(Source: Author)

To calculate the Annual Daily Average Traffic (AADT) per vehicle Class can be done based on the weighted traffic volume prediction data from the consultant's study as shown in Table 4 - 3. Based on this data, the Annual Average Daily Traffic can be calculated by year as shown in Table 4 - 4.

The data contained in Table 4 - 3 is the Average Daily Traffic data for an interval of 5 years so the data must be divided for each year by the increase every year as seen in Table 4 - 4.

Furthermore, it can also calculate the Annual Average Daily Traffic Growth (AADT) per vehicle class as shown in Figure 4 - 2 below.

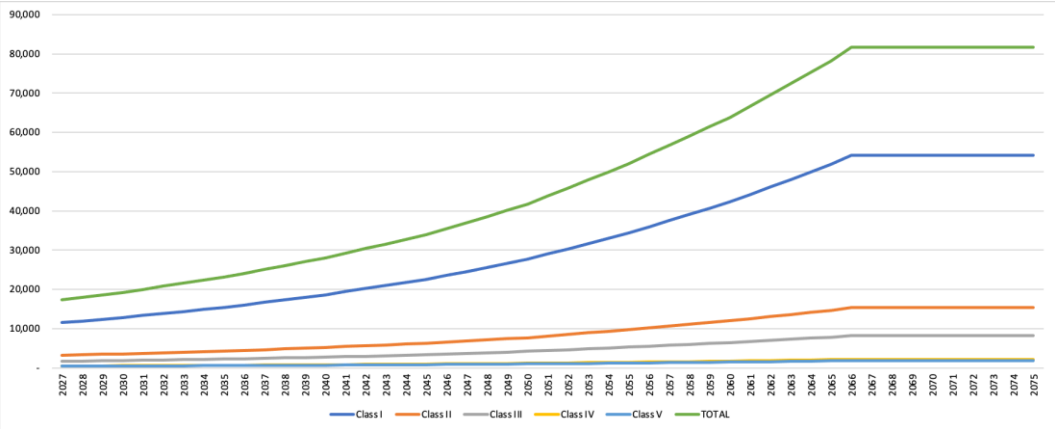

Figure 4 - 2 AADT Growth in the Pangkalan Brandan – Langsa Segment (Source: Author)

In Figure 4 - 2, it can be seen that the relationship between the Average Daily Traffic and the year of operation of toll roads for each type of vehicle, where there is an increase every year.

Based on Figures 4 - 2 above, it can be seen that the period 2067 - 2075 does not see AADT growth because it is best practice that if a toll road section has reached 80% of its capacity (80,000 vehicles/ day), traffic will reach a degree of saturation.

Table 4 - 3 Average Daily Traffic per Vehicle Class

Prediction of trafic volume based on consultant data

No.	Segment	Length (km)	Years 2025																			
			Traffic Volume in Veh/day (Medan - Aceh)					Traffic Volume in Veh/day (Aceh - Medan)					Average Traffic Volume in Veh/day					Weighted Traffic Volume in Veh/day				
			Class 1	Class II	Class III	Class IV	Class V	Class 1	Class II	Class III	Class IV	Class V	Class 1	Class II	Class III	Class IV	Class V	Class 1	Class II	Class III	Class IV	Class V
1	Langsa - Kuala Simpang	28.2	8,621	3,040	1,563	379	307	12,406	2,806	1,443	482	407	10,514	2,923	1,503	431	357	4,094	1,138	585	168	139
2	Kuala Simpang - Pangkalan Brandan	44.2	8,815	3,166	1,659	402	344	12,685	2,923	1,531	512	456	10,750	3,045	1,595	457	400	6,563	1,859	974	279	244
	Total	72.5	17,436	6,206	3,222	781	651	25,091	5,729	2,974	994	863	21,264	5,968	3,098	888	757	**10,657**	**2,997**	**1,559**	**447**	**383**
							28,296					**35,651**					**31,974**					**16,043**

No.	Segment	Length (km)	Years 2030																			
			Traffic Volume in Veh/day (Medan - Aceh)					Traffic Volume in Veh/day (Aceh - Medan)					Average Traffic Volume in Veh/day					Weighted Traffic Volume in Veh/day				
			Class 1	Class II	Class III	Class IV	Class V	Class 1	Class II	Class III	Class IV	Class V	Class 1	Class II	Class III	Class IV	Class V	Class 1	Class II	Class III	Class IV	Class V
1	Langsa - Kuala Simpang	28.2	10,350	3,594	1,883	456	370	14,895	3,318	1,738	581	490	12,623	3,456	1,811	519	430	4,916	1,346	705	202	167
2	Kuala Simpang - Pangkalan Brandan	44.2	10,589	3,748	1,997	486	416	15,238	3,460	1,843	618	551	12,914	3,604	1,920	552	484	7,884	2,200	1,172	337	295
	Total	72.5	20,939	7,342	3,880	942	786	30,133	6,778	3,581	1,199	1,041	25,536	7,060	3,731	1,071	914	**12,800**	**3,546**	**1,877**	**539**	**462**
							33,889					**42,732**					**38,311**					**19,224**

No.	Segment	Length (km)	Years 2035																			
			Traffic Volume in Veh/day (Medan - Aceh)					Traffic Volume in Veh/day (Aceh - Medan)					Average Traffic Volume in Veh/day					Weighted Traffic Volume in Veh/day				
			Class 1	Class II	Class III	Class IV	Class V	Class 1	Class II	Class III	Class IV	Class V	Class 1	Class II	Class III	Class IV	Class V	Class 1	Class II	Class III	Class IV	Class V
1	Langsa - Kuala Simpang	28.2	12,446	4,295	2,267	553	449	17,909	3,965	2,093	704	595	15,178	4,130	2,180	629	522	5,911	1,608	849	245	203
2	Kuala Simpang - Pangkalan Brandan	44.2	12,740	4,492	2,408	588	503	18,333	4,146	2,223	749	667	15,537	4,319	2,316	669	585	9,486	2,637	1,414	408	357
	Total	72.5	25,186	8,787	4,675	1,141	952	36,242	8,111	4,316	1,453	1,262	30,714	8,449	4,496	1,297	1,107	**15,397**	**4,245**	**2,263**	**653**	**560**
							40,741					**51,384**					**46,063**					**23,118**

No.	Segment	Length (km)	Years 2040																			
			Traffic Volume in Veh/day (Medan - Aceh)					Traffic Volume in Veh/day (Aceh - Medan)					Average Traffic Volume in Veh/day					Weighted Traffic Volume in Veh/day				
			Class 1	Class II	Class III	Class IV	Class V	Class 1	Class II	Class III	Class IV	Class V	Class 1	Class II	Class III	Class IV	Class V	Class 1	Class II	Class III	Class IV	Class V
1	Langsa - Kuala Simpang	28.2	15,051	5,274	2,738	669	542	21,658	4,868	2,527	852	718	18,355	5,071	2,633	761	630	7,148	1,975	1,025	296	245
2	Kuala Simpang - Pangkalan Brandan	44.2	15,409	5,508	2,910	712	609	22,173	5,085	2,686	906	807	18,791	5,297	2,798	809	708	11,473	3,234	1,708	494	432
	Total	72.5	30,460	10,782	5,648	1,381	1,151	43,831	9,953	5,213	1,758	1,525	37,146	10,368	5,431	1,570	1,338	**18,621**	**5,209**	**2,733**	**790**	**677**
							49,422					**62,280**					**55,851**					**28,030**

No.	Segment	Length (km)	Years 2045																			
			Traffic Volume in Veh/day (Medan - Aceh)					Traffic Volume in Veh/day (Aceh - Medan)					Average Traffic Volume in Veh/day					Weighted Traffic Volume in Veh/day				
			Class 1	Class II	Class III	Class IV	Class V	Class 1	Class II	Class III	Class IV	Class V	Class 1	Class II	Class III	Class IV	Class V	Class 1	Class II	Class III	Class IV	Class V
1	Langsa - Kuala Simpang	28.222	18,208	6,302	3,328	812	658	26,201	5,817	3,072	1,032	871	22,205	6,060	3,200	922	765	8,647	2,360	1,246	359	298
2	Kuala Simpang - Pangkalan Brandan	44.245	18,648	6,583	3,534	864	740	26,834	6,077	3,262	1,100	981	22,741	6,330	3,398	982	861	13,885	3,865	2,075	600	525
	Total	72.467	36,856	12,885	6,862	1,676	1,398	53,035	11,894	6,334	2,132	1,852	44,946	12,390	6,598	1,904	1,625	**22,532**	**6,225**	**3,321**	**959**	**823**
							59,677					**75,247**					**67,462**					**33,860**

No.	Segment	Length (km)	Years 2050																			
			Traffic Volume in Veh/day (Medan - Aceh)					Traffic Volume in Veh/day (Aceh - Medan)					Average Traffic Volume in Veh/day					Weighted Traffic Volume in Veh/day				
			Class 1	Class II	Class III	Class IV	Class V	Class 1	Class II	Class III	Class IV	Class V	Class 1	Class II	Class III	Class IV	Class V	Class 1	Class II	Class III	Class IV	Class V
1	Langsa - Kuala Simpang	28.2	22,315	7,770	4,220	982	795	32,112	7,172	3,895	1,249	1,054	27,214	7,471	4,058	1,116	925	10,598	2,910	1,580	434	360
2	Kuala Simpang - Pangkalan Brandan	44.2	22,878	8,124	4,475	1,050	897	32,922	7,499	4,131	1,337	1,189	27,900	7,812	4,303	1,194	1,043	17,034	4,769	2,627	729	637
	Total	72.5	45,193	15,894	8,695	2,032	1,692	65,034	14,671	8,026	2,586	2,243	55,114	15,283	8,361	2,309	1,968	**27,632**	**7,679**	**4,207**	**1,163**	**997**
							73,506					**92,560**					**83,033**					**41,678**

No.	Segment	Length (km)	Years 2055																			
			Traffic Volume in Veh/day (Medan - Aceh)					Traffic Volume in Veh/day (Aceh - Medan)					Average Traffic Volume in Veh/day					Weighted Traffic Volume in Veh/day				
			Class 1	Class II	Class III	Class IV	Class V	Class 1	Class II	Class III	Class IV	Class V	Class 1	Class II	Class III	Class IV	Class V	Class 1	Class II	Class III	Class IV	Class V
1	Langsa - Kuala Simpang	28.2	27,843	9,908	5,304	1,188	964	40,066	9,145	4,896	1,512	1,278	33,955	9,527	5,100	1,350	1,121	13,223	3,710	1,986	526	437
2	Kuala Simpang - Pangkalan Brandan	44.2	28,450	10,308	5,593	1,268	1,084	40,941	9,515	5,163	1,613	1,437	34,696	9,912	5,378	1,441	1,261	21,183	6,052	3,284	880	770
	Total	72.5	56,293	20,216	10,897	2,456	2,048	81,007	18,660	10,059	3,125	2,715	68,650	19,438	10,478	2,791	2,382	**34,406**	**9,762**	**5,270**	**1,406**	**1,207**
							91,910					**115,566**					**103,738**					**52,051**

No.	Segment	Length (km)	Years 2060																			
			Traffic Volume in Veh/day (Medan - Aceh)					Traffic Volume in Veh/day (Aceh - Medan)					Average Traffic Volume in Veh/day					Weighted Traffic Volume in Veh/day				
			Class 1	Class II	Class III	Class IV	Class V	Class 1	Class II	Class III	Class IV	Class V	Class 1	Class II	Class III	Class IV	Class V	Class 1	Class II	Class III	Class IV	Class V
1	Langsa - Kuala Simpang	28.2	34,168	12,141	6,464	1,438	1,167	49,168	11,208	5,967	1,830	1,547	41,668	11,675	6,216	1,634	1,357	16,227	4,547	2,421	636	528
2	Kuala Simpang - Pangkalan Brandan	44.2	34,917	12,619	6,823	1,536	1,315	50,247	11,648	6,298	1,955	1,742	42,582	12,134	6,561	1,746	1,529	25,999	7,408	4,006	1,066	933
	Total	72.5	69,085	24,760	13,287	2,974	2,482	99,415	22,856	12,265	3,785	3,289	84,250	23,808	12,776	3,380	2,886	**42,226**	**11,955**	**6,427**	**1,702**	**1,461**
							112,588					**141,610**					**127,099**					**63,771**

(Source: (Consultant, 2019)

Table 4 - 4 Average Daily Traffic per Vehicle Class Years 2027 - 2075

Traffic Projection for Section Pangkalan Brandan - Langsa (Section Length 72.5 km) (Vech/day)

No.	Class	Years																
		2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043
1	Class I	11,514	11,943	12,371	***12,800***	13,319	13,839	14,358	14,878	***15,397***	16,042	16,687	17,331	17,976	***18,621***	19,403	20,185	20,968
2	Class II	3,217	3,326	3,436	***3,546***	3,686	3,826	3,965	4,105	***4,245***	4,438	4,631	4,823	5,016	***5,209***	5,412	5,615	5,819
3	Class III	1,686	1,750	1,813	***1,877***	1,954	2,031	2,109	2,186	***2,263***	2,357	2,451	2,545	2,639	***2,733***	2,851	2,968	3,086
4	Class IV	484	502	521	***539***	562	585	607	630	***653***	680	708	735	763	***790***	824	858	891
5	Class V	415	430	446	***462***	482	501	521	540	***560***	583	607	630	654	***677***	706	735	765
Total		17,315	17,952	18,588	***19,224***	20,003	20,782	21,560	22,339	***23,118***	24,100	25,083	26,065	27,048	***28,030***	29,196	30,362	31,528

No.	Class	Years															
		2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059
1	Class I	21,750	***22,532***	23,552	24,572	25,592	26,612	***27,632***	28,987	30,342	31,696	33,051	34,406	35,970	37,534	39,098	40,662
2	Class II	6,022	***6,225***	6,516	6,807	7,097	7,388	***7,679***	8,096	8,512	8,929	9,345	9,762	10,201	10,639	11,078	11,516
3	Class III	3,203	***3,321***	3,498	3,675	3,853	4,030	***4,207***	4,420	4,632	4,845	5,057	5,270	5,501	5,733	5,964	6,196
4	Class IV	925	***959***	1,000	1,041	1,081	1,122	***1,163***	1,212	1,260	1,309	1,357	1,406	1,465	1,524	1,584	1,643
5	Class V	794	***823***	858	893	927	962	***997***	1,039	1,081	1,123	1,165	1,207	1,258	1,309	1,359	1,410
Total		32,694	***33,860***	35,424	36,987	38,551	40,114	***41,678***	43,753	45,827	47,902	49,976	52,051	54,395	56,739	59,083	61,427

No.	Class	Years															
		2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075
1	Class I	***42,226***	44,145	46,065	47,984	49,904	51,823	54,179	54,179	54,179	54,179	54,179	54,179	54,179	54,179	54,179	54,179
2	Class II	***11,955***	12,492	13,029	13,566	14,104	14,641	15,298	15,298	15,298	15,298	15,298	15,298	15,298	15,298	15,298	15,298
3	Class III	***6,427***	6,709	6,991	7,274	7,556	7,838	8,182	8,182	8,182	8,182	8,182	8,182	8,182	8,182	8,182	8,182
4	Class IV	***1,702***	1,774	1,845	1,917	1,989	2,060	2,147	2,147	2,147	2,147	2,147	2,147	2,147	2,147	2,147	2,147
5	Class V	***1,461***	1,522	1,584	1,645	1,707	1,768	1,843	1,843	1,843	1,843	1,843	1,843	1,843	1,843	1,843	1,843
Total		***63,771***	66,643	69,515	72,387	75,259	78,131	81,650	81,650	81,650	81,650	81,650	81,650	81,650	81,650	81,650	81,650

(Source: Author)

Therefore Toll Revenue is expected to be sourced from Toll Tariffs in 2027 (starting operations) according to Table 4 - 5 below:

Table 4 - 5 Toll Road Revenue in 2027 by Vehicle Class

Vehicle Class	Toll Rate 2027 (Rp./km) (See table 4-2)	Average Daily Traffic 2027 (Verhicle/day) (See table 4-4)	Toll Road Revenue in 2027 (Rp.)
(1)	(2)	(3)	(4)=(2)*(3)*365 days*72.5 km
Class I	1,210	11,514	368,512,553,043
Class II	1,820	3,217	154,846,571,066
Class III	1,820	1,686	81,173,378,142
Class IV	2,430	484	31,096,054,213
Class V	2,430	415	26,648,251,502
TOTAL		**17,315**	**662,276,807,967**

(Source: Author)

Based on the calculations in Table 4 - 5 above, the amount of toll road income per year for a 50-year concession period can be calculated, as shown in Table 4 - 6. The growth of toll road revenue until the 50th year can be shown in Figure 4 - 3 below:

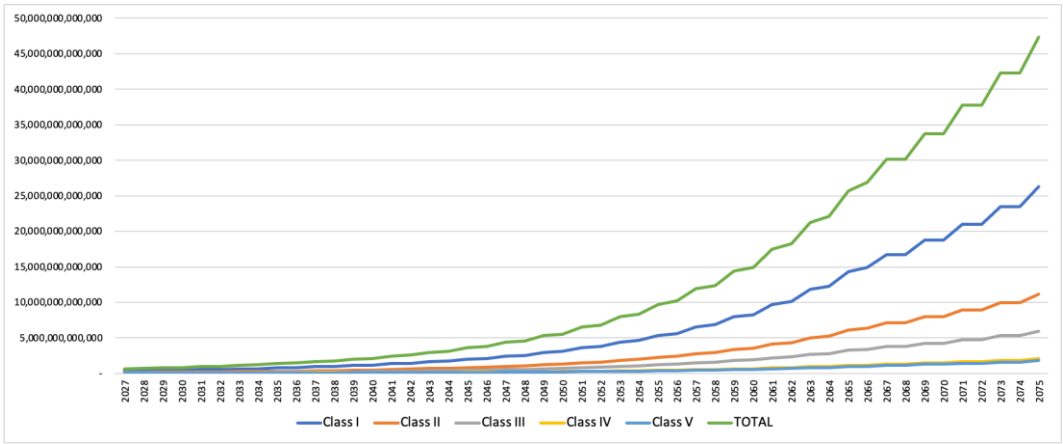

Figure 4 - 3 Pangkalan Brandan – Langsa Toll Road Revenue Growth
(Source: Author)

In Figure 4 - 3, it can be seen that the relationship between the Toll Road Revenue and the year of operation of toll roads for each type of vehicle, where there is an increase every year.

Table 4 - 6 Toll Road Revenue by Vehicle Class Years 2027 – 2075

Revenue (Rp.)

No.	Class	Years									
		2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
1	Class I	368,512,553,043	382,229,917,709	443,460,956,259	458,824,404,685	534,735,755,379	555,588,177,511	645,613,471,600	668,968,184,388	775,401,644,836	807,874,138,218
2	Class II	154,846,571,066	160,132,324,192	185,268,246,595	191,188,290,096	222,572,931,639	231,014,978,370	268,191,868,114	277,646,960,453	321,554,299,128	336,158,696,977
3	Class III	81,173,378,142	84,235,071,209	97,772,375,990	101,201,472,225	118,007,494,440	122,669,339,989	142,610,927,802	147,832,194,816	171,419,877,250	178,540,278,691
4	Class IV	31,096,054,213	32,278,706,957	37,476,722,866	38,801,293,939	45,295,723,501	47,133,997,790	54,848,944,729	56,907,811,934	66,042,680,634	68,813,843,650
5	Class V	26,648,251,502	27,663,790,272	32,120,848,526	33,258,251,948	38,829,513,062	40,409,783,942	47,028,861,401	48,798,764,787	56,636,908,354	59,003,522,025
Total		**662,276,807,967**	**686,539,810,339**	**796,099,150,236**	**823,273,712,892**	**959,441,418,021**	**996,816,277,602**	**1,158,294,073,646**	**1,200,153,916,378**	**1,391,055,410,203**	**1,450,390,479,561**

No.	Class	Years									
		2037	2038	2039	2040	2041	2042	2043	2044	2045	2046
1	Class I	941,188,227,391	977,557,419,978	1,135,597,806,072	1,176,331,301,770	1,372,834,031,268	1,428,177,004,554	1,661,542,375,180	1,723,526,505,260	1,999,771,911,581	2,090,299,487,908
2	Class II	392,854,666,206	409,211,591,798	476,636,739,476	494,956,496,139	575,976,190,096	597,601,104,517	693,533,141,210	717,753,045,361	831,009,703,454	869,830,204,942
3	Class III	207,939,961,748	215,914,811,363	250,756,420,294	259,688,251,862	303,366,048,462	315,881,254,840	367,804,036,563	381,821,067,706	443,338,670,710	466,994,079,458
4	Class IV	80,175,207,466	83,278,910,044	96,748,526,136	100,224,673,023	117,054,298,624	121,856,963,462	141,858,783,696	147,237,768,315	170,930,763,285	178,202,895,863
5	Class V	68,734,551,979	71,385,159,290	82,920,058,593	85,888,738,781	100,344,435,164	104,493,482,894	121,679,634,299	126,326,567,756	146,690,321,359	152,893,022,676
Total		**1,690,892,614,790**	**1,757,347,892,472**	**2,042,659,550,571**	**2,117,089,461,575**	**2,469,575,003,615**	**2,568,009,810,267**	**2,986,417,970,948**	**3,096,664,954,398**	**3,591,741,370,389**	**3,758,219,690,847**

No.	Class	Years									
		2047	2048	2049	2050	2051	2052	2053	2054	2055	2056
1	Class I	2,442,526,311,944	2,543,917,197,431	2,962,745,052,868	3,076,302,844,613	3,614,390,428,915	3,783,321,671,864	4,426,523,264,589	4,615,726,256,691	5,381,520,758,649	5,626,149,557,885
2	Class II	1,017,688,791,202	1,061,167,752,869	1,237,204,320,280	1,285,900,757,347	1,518,342,850,856	1,596,476,853,483	1,875,564,158,843	1,963,074,241,785	2,296,654,443,694	2,399,841,560,986
3	Class III	549,527,426,789	576,021,484,586	674,817,407,469	704,490,752,202	828,903,115,722	868,776,588,978	1,017,688,069,703	1,062,346,359,749	1,239,845,207,772	1,294,285,469,836
4	Class IV	207,732,031,853	215,876,820,340	250,904,201,887	260,026,364,992	303,399,567,570	315,569,606,348	367,068,402,542	380,698,845,973	441,648,804,134	460,244,543,255
5	Class V	178,187,210,871	185,134,236,345	215,131,013,238	222,911,681,769	260,178,401,044	270,695,718,507	314,958,600,286	326,737,995,844	379,139,478,371	395,096,632,887
Total		**4,395,661,772,660**	**4,582,117,491,572**	**5,340,801,995,742**	**5,549,632,400,924**	**6,525,214,364,107**	**6,834,840,439,180**	**8,001,802,495,962**	**8,348,583,700,043**	**9,738,808,692,620**	**10,175,617,764,850**

No.	Class	Years									
		2057	2058	2059	2060	2061	2062	2063	2064	2065	2066
1	Class I	6,575,271,759,976	6,849,256,015,121	7,978,029,102,697	8,284,891,468,460	9,700,879,255,216	10,122,680,065,757	11,809,818,581,453	12,282,235,489,259	14,285,210,684,713	14,934,576,188,139
2	Class II	2,803,392,119,672	2,918,961,691,039	3,398,675,013,894	3,528,112,933,825	4,129,024,077,844	4,306,561,669,803	5,022,191,173,175	5,221,033,276,169	6,070,260,424,664	6,342,993,084,186
3	Class III	1,510,572,819,728	1,571,545,913,240	1,828,421,287,562	1,896,711,152,296	2,217,592,930,024	2,310,869,369,478	2,692,643,306,002	2,797,112,918,190	3,249,772,434,023	3,392,466,426,667
4	Class IV	536,301,116,262	557,128,344,078	647,310,240,521	670,636,735,675	782,738,960,544	814,364,777,131	947,509,464,965	982,930,379,543	1,140,553,449,416	1,188,576,752,549
5	Class V	460,380,241,892	478,252,254,950	555,659,180,170	575,675,834,795	671,893,349,466	699,029,763,962	813,306,119,873	843,698,904,108	978,982,690,945	1,020,185,939,247
Total		**11,885,918,057,530**	**12,375,144,218,428**	**14,408,094,824,845**	**14,956,028,125,051**	**17,502,128,573,094**	**18,253,505,646,131**	**21,285,468,645,468**	**22,127,010,967,270**	**25,724,779,683,760**	**26,878,798,390,788**

No.	Class	Years								
		2067	2068	2069	2070	2071	2072	2073	2074	2075
1	Class I	16,726,725,330,716	16,726,725,330,716	18,733,932,370,402	18,733,932,370,402	20,982,004,254,850	20,982,004,254,850	23,499,844,765,432	23,499,844,765,432	26,319,826,137,284
2	Class II	7,104,152,254,288	7,104,152,254,288	7,956,650,524,803	7,956,650,524,803	8,911,448,587,779	8,911,448,587,779	9,980,822,418,313	9,980,822,418,313	11,178,521,108,510
3	Class III	3,799,562,397,867	3,799,562,397,867	4,255,509,885,611	4,255,509,885,611	4,766,171,071,884	4,766,171,071,884	5,338,111,600,510	5,338,111,600,510	5,978,684,992,571
4	Class IV	1,331,205,962,855	1,331,205,962,855	1,490,950,678,398	1,490,950,678,398	1,669,864,759,806	1,669,864,759,806	1,870,248,530,982	1,870,248,530,982	2,094,678,354,700
5	Class V	1,142,608,251,956	1,142,608,251,956	1,279,721,242,191	1,279,721,242,191	1,433,287,791,254	1,433,287,791,254	1,605,282,326,204	1,605,282,326,204	1,797,916,205,349
Total		**30,104,254,197,682**	**30,104,254,197,682**	**33,716,764,701,404**	**33,716,764,701,404**	**37,762,776,465,572**	**37,762,776,465,572**	**42,294,309,641,441**	**42,294,309,641,441**	**47,369,626,798,414**

(Source: Author)

4.1.2 Data

In calculating the financial feasibility of Pangkalan Brandan - Langsa Toll Road, there are several data to be taken from the consultant study for Binjai - Langsa Toll Road, as follows:

- Cost of Debt before Tax : 11%
- Debt to Equity Ratio (DER) : 70% : 30%
- Tol Increased Rate : 12% for every 2 years
- Toll Length Pangkalan Brandan – Langsa : 72.5 Km
- Prediction of traffic volume for segment:
  - Langsa - Kuala Simpang : Year 2025 – 2060
  - Kuala Simpang - Pangkalan Brandan : Year 2025 – 2060
- Construction Cost : Rp. 12,624,712,993,143
- Operational & Maintenance Cost (in 2027) : Rp. 623,205,988,331.71
  - Inflation rate : 6% per year
- Land Acquisition Expense by Government

Meanwhile, other assumptions are adjusted to the latest applicable regulations as follows:

- Construction Period : 2 years (2025 – 2026)
- Starting Operation : 2027
- Concession Period : 50 years
- Toll Tariff : Toll Tariff Segment Binjai – Stabat in 2022

4.1.3 Investment Cost

In determining the investment value, the estimated value of toll road construction costs for the Pangkalan Brandan - Langsa Toll Road uses the value of toll road construction costs on the Binjai - Langsa Toll Road as a result of the consultant's study. While the length of each section for the Binjai - Langsa Toll Road is as shown in Table 4 - 7 below:

Table 4 - 7 Length of the Binjai - Langsa Toll Road Section based on stages

Segment	Length (km)	Length Sub. Section. (km)	Remarks
Binjai - Stabat	12.3	57.5	Stage 1
Stabat - Tanjung Pura	26.2		
Tanjung Pura - Pangkalan Brandan	19.0		
Pangkalan Brandan - Kuala Simpang	44.2	72.5	Stage 2
Kuala Simpang - Langsa	28.2		
Total Length (km)	**129.9**	**129.9**	

(Source: Author)

Based on the comparison of road length in accordance with Table 4 - 7 above and construction cost data for the Binjai – Langsa Toll Road above and new tax regulations, the Investment Cost Component for the Pangkalan Brandan – Langsa Toll Road can be calculated as shown in Table 4 - 8 below:

Table 4 - 8 Investment Cost Component

	Section	Binjai - Langsa		Pangkalan Brandan - Langsa	
1	Construction Cost	Length: 129.9 Km	**12,624,712,993,148**	Length:72.5 Km	**7,040,316,714,951**
2	Design Cost	1% of construction cost	126,247,129,931	1% of construction cost	70,403,167,150
3	Supervision Cost	3% of construction cost	378,741,389,794	3% of construction cost	211,209,501,449
4	Toll Equipment Cost	2% of construction cost	252,494,259,863	2% of construction cost	140,806,334,299
5	Escalation Cost	7% of construction cost	883,729,909,520	7% of construction cost	492,822,170,047
	Sub total		**14,265,925,682,258**		**7,955,557,887,895**
6	VAT	10% of sub total	1,426,592,568,226	11% of sub total	875,111,367,668
	Sub total		**15,692,518,250,483**		**8,830,669,255,563**
7	Overhead Cost	2,5% of contruction cost	315,617,824,829	2,5% of contruction cost	176,007,917,874
	Sub total		**16,008,136,075,312**		**9,006,677,173,437**
8	IDC	9% of loan portion	1,008,512,572,745	9% of loan portion	567,420,661,927
9	Financial cost	0,25% of loan portion	28,014,238,132	0,25% of loan portion	15,761,685,054
	TOTAL		**17,044,662,886,189**		**9,589,859,520,417**

(Source: Author)

In Table 4 - 8, it can be seen that for the calculation of the investment cost component for the Pangkalan Brandan – Langsa Toll Road, the latest tax regulations have been calculated.

The construction of the Pangkalan Brandan - Langsa Toll Road will be carried out for 2 (two) years starting from 2025 to 2026, so that the capital expenditure value is assumed to be spent for 2 years so that each year is 50% of the total, namely:

- Year 2025 = Rp. 4,794,929,760,209
- Year 2026 = Rp. 4,794,929,760,209

4.1.4 Operational and Maintenance Cost

In determining the cost of operation and maintenance using his study, the consultant for the Binjai – Langsa Toll Road for the cost of 2027 - 2060 converted the length of the road handling the Pangkalan Brandan - Langsa Toll Road. For the years 2061 – 2075, it is calculated by the growth rate based on consultant data for the inflation rate every year. The following is a projection of the amount of operational and maintenance costs after being converted into proportional to the length of the toll road shown in Table 4 - 9.

If depicted in graphic form, assuming a growth rate of 6% per year starting in 2027. Growth in Operation and Maintenance Costs of Pangkalan Brandan – Langsa Toll Road as Figure 4 - 4 below:

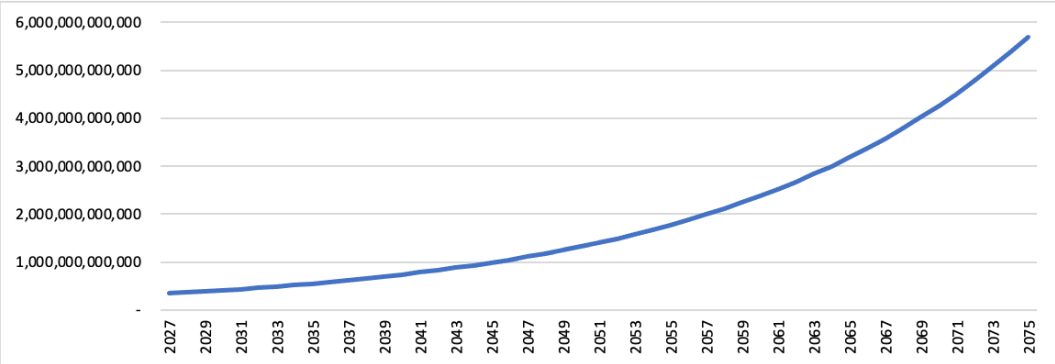

Figure 4 - 4 Operational and Maintenance Expense Growth
(Source: Author)

In Figure 4 - 4, it can be seen that the relationship between Operational and Maintenance Expense and the year of operation of toll roads, where there is an increase every year.

Table 4 - 9 Operation and Maintenance Cost Project

Pangkalan Brandan - Langsa (Length: 72.5 km)

Years	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
Operational & Maintenance Cost	347,538,002,558	368,390,282,712	390,493,699,674	413,923,321,655	438,758,720,955	465,084,244,212	492,989,298,864	522,568,656,796	553,922,776,205	587,158,142,776
O & M Cost Growth	0	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%

Pangkalan Brandan - Langsa (Length: 72.5 km)

Years	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046
Operational & Maintenance Cost	622,387,631,343	659,730,889,224	699,314,742,577	741,273,627,131	785,750,044,760	832,895,047,445	882,868,750,292	935,840,875,309	991,991,327,828	1,051,510,807,498
O & M Cost Growth	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%

Pangkalan Brandan - Langsa (Length: 72.5 km)

Years	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056
Operational & Maintenance Cost	1,114,601,455,948	1,181,477,543,305	1,252,366,195,902	1,327,508,167,656	1,407,158,657,716	1,491,588,177,179	1,581,083,467,809	1,675,948,475,878	1,776,505,384,431	1,883,095,707,497
O & M Cost Growth	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%

Pangkalan Brandan - Langsa (Length: 72.5 km)

Years	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066
Operational & Maintenance Cost	1,996,081,449,947	2,115,846,336,944	2,242,797,117,161	2,377,364,944,191	2,520,006,840,843	2,671,207,251,294	2,831,479,686,373	3,001,368,467,555	3,181,450,575,609	3,372,337,610,147
O & M Cost Growth	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%

Pangkalan Brandan - Langsa (Length: 72.5 km)

Years	2067	2068	2069	2070	2071	2072	2073	2074	2075
Operational & Maintenance Cost	3,574,677,866,756	3,789,158,538,762	4,016,508,051,088	4,257,498,534,155	4,512,948,446,205	4,783,725,352,978	5,070,748,874,157	5,374,993,806,608	5,697,493,435,005
O & M Cost Growth	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%

(Source: Author)

4.1.5 Discount Rate using WACC

Before calculating the Weighted Average Cost of Capital (WACC), it is necessary to calculate the after tax cost of debt where the amount of the Cost of Debt before Tax is obtained from the data of the consultant study as shown in Table 4 - 10 below:

Table 4 - 10 After Tax Cost of Debt

No	Description	Symbol	Formula / Remark	Value/Result
1	Cost of Debt before tax	rd	Company Policy (Consultant)	11.00%
2	Corporate Tax Rate	T	Source : https://www.online-pajak.com/tentang-efiling/tarif-pph-badan	22.00%
3	after tax cost of debt		$after\ tax\ cost\ of\ debt = rd\ x\ (1-T)$	8.58%

(Source: Author)

In addition to the after tax cost of debt, to calculate WACC, the amount of Cost of Equity (re) must also be calculated by previously calculating the Stock's Beta Coefficient (β), Market return (rm) and Risk-free Rate (rf). The calculation of Beta Value (β) uses the same business approach as Levered Beta data obtained from Perfindo Beta Stock data November 30, 2023 edition (Source: https://www.pefindo.com/beta-stock/?filter=2023-11-30) and Third Quarter 2023 data from the company's Financial Statement obtained from the Indonesia Stock Exchange (Source: https://www.idx.co.id/id/perusahaan-tercatat/laporan-keuangan-dan-tahunan/), then we get the calculation as shown in Table 4 - 11 below:

Table 4 - 11 Adjustment Beta (β) Calculation

Institution	Ticker Symbol	Levered Beta	Debt (mil)	Equity (mil)	D/E Ratio	Tax Rate
Jasa Marga	JSMR	0.876	86,871	38,029	2.3	22%
Citra Marga Nusaphala Persada	CMNP	0.552	9,011	12,925	0.7	
Waskita Karya	WSKT	2.002	84,108	12,431	6.8	
Wijaya Karya	WIKA	1.782	55,679	10,972	5.1	
Nusantara Infrastructure	META	1.129	7,802	3,302	2.4	
Adhi Karya	ADHI	2.327	30,436	8,983	3.4	
Pembangunan Perumahan	PTPP	2.151	44,220	15,098	2.9	
Average		**1.546**			**3.4**	

Beta Unleveraged (Arithmatic)	0.427	$\frac{Leverage\ Beta}{(1+(1-Tax)\times Laverage)}$
Beta Re-Leveraged		
Levegare (D/E) Project	2.333	
Beta Leverage (Arithmatic)	**1.204**	$Unleverage\ Beta\times(1+(1-Tax)\times Laverage)$

(Source: Author)

Meanwhile, to calculate the Market Return (rm) and Risk-free Rate (rf), a graph from the Implied Market-risk-premium (IMRP) for Indonesia (Source: http://www.market-risk-premia.com/id.html) is used as seen in Figure 4 - 5 below. From Figure 4 - 5 below, it can be seen that the Market Return (rm) for December 31, 2023 is 10.00% and the Risk-free Rate (rf) for December 31, 2023 is 6.49%.

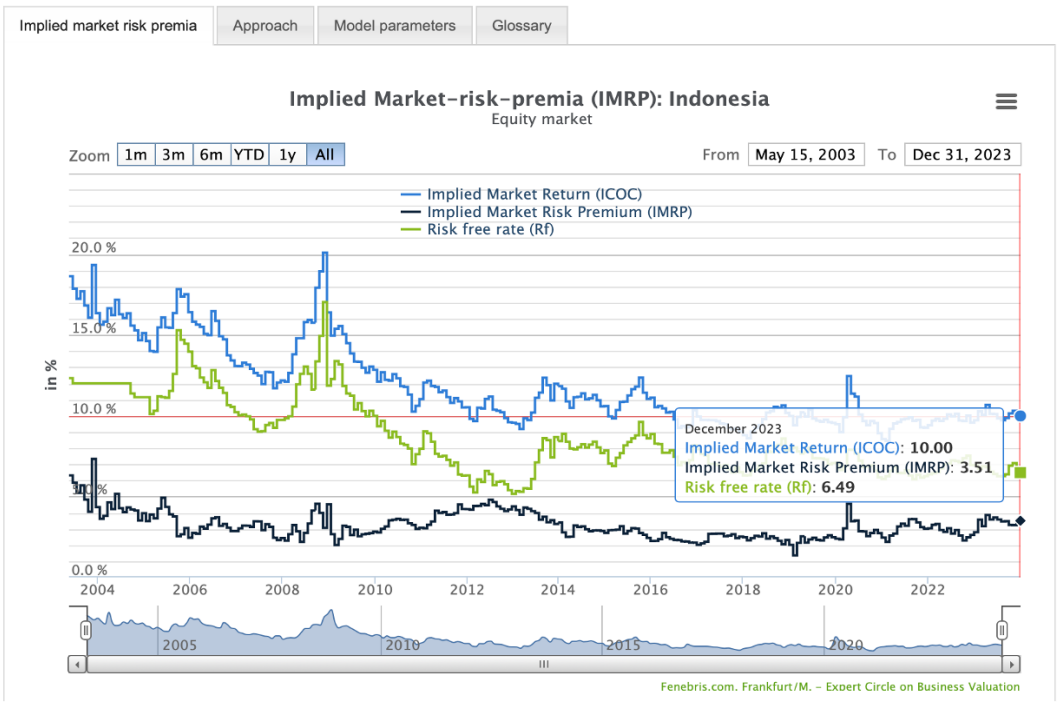

Figure 4 - 5 Implied Market-risk-premia (IMRP): Indonesia
(Source: http://www.market-risk-premia.com/id.html)

After obtaining the amount of the Stock's Beta Coefficient (β), Market Return (rm) and Risk-free Rate (rf), then the amount of the Cost of Equity (re) can be calculated as shown in Table 4 - 12 below:

Table 4 - 12 Cost of Equity

No	Description	Symbol	Formula / Remark	Value/Result
1	Risk free rate	rf	Soruce : http://www.market-risk-premia.com/id.html	6.49%
2	Beta	β	See Table Beta (Table 4 - 11)	1.204
3	Market Return	rm	Soruce : http://www.market-risk-premia.com/id.html	10.00%
4	Cost of Equity	re = rs	$re = rf + \beta \times (rm - rf)$	10.72%

(Source: Author)

Because PT. Hutma Karya (Persero) is not a public company, so Beta (β) is a private company, where Beta is a re-leveraged Beta (β) as shown in Table 4 – 11 above. The calculation of Weighted Average Cost of Capital (WACC) for Pangkalan Brandan – Langsa Toll Road can be seen in Table 4 - 13 below:

Table 4 - 13 Weighted Average Cost of Capital (WACC)

No	Description	Symbol	Formula / Remark	Value/Result
1	Total Investment (in Billion Rupiah)	V		9,590
2	Equity Portion (in Billion Rupiah)	E	30% * V	2,877
3	Debt Portion (in Billion Rupiah)	D	70% * V	6,713
4	Percentage of Weight of Debt Component	wd	$wd = \frac{D}{V}$	0.70
5	Percentage of Weight of Common Equity Components	wc	$wc = \frac{E}{V}$	0.30
6	Weighted Cost of Capital	WACC	$WACC = wd\ x\ rd\ x\ (1-T) + wp\ x\ rp + wc\ x\ rs$	9.22%

(Source: Author)

Based on the calculation of WACC above, a value of 9.22% was obtained so that the amount of the Discount Rate used was 9.22% or equal to the WACC.

4.2 Financial Feasibility Calculation

4.2.1 Internal Rate of Return (IRR)

Based on the results of the calculation of Revenue, Capital Expenditure and Operations & Maintenance above, the amount of the Internal Rate of Return (IRR) can be calculated as shown in Table 4 - 14 below. From the calculations shown in the table, the Internal Rate of Return (IRR) was obtained at 13.26%.

4.2.2 Net Present Value (NPV)

Based on the results of the calculation of Revenue, Capital Expenditure, Operational & Maintenance and Discount Rate using WACC above, the amount of Net Present Value (NPV) can be calculated as shown in Table 4 - 15 below. From the calculations shown in the table, the NPV value is Rp. 12,773,885,792,000.

Table 4 - 14 Internal Rate of Return (IRR) Calculation

(in thousands of rupiah)

Years	1 2025	2 2026	3 2027	4 2028	5 2029	6 2030	7 2031	8 2032	9 2033	10 2034	11 2035	12 2036
Total Revenue	**-**	**-**	**662,276,808**	**686,539,810**	**796,099,150**	**823,273,713**	**959,441,418**	**996,816,278**	**1,158,294,074**	**1,200,153,916**	**1,391,055,410**	**1,450,390,480**
Total Cost	**(4,794,929,760)**	**(4,794,929,760)**	**(347,538,003)**	**(368,390,283)**	**(390,493,700)**	**(413,923,322)**	**(438,758,721)**	**(465,084,244)**	**(492,989,299)**	**(522,568,657)**	**(553,922,776)**	**(587,158,143)**
Capital Expenditure	(4,794,929,760)	(4,794,929,760)										
Operational & Maintenance	-	-	(347,538,003)	(368,390,283)	(390,493,700)	(413,923,322)	(438,758,721)	(465,084,244)	(492,989,299)	(522,568,657)	(553,922,776)	(587,158,143)
Cash Flow	**(4,794,929,760)**	**(4,794,929,760)**	**314,738,805**	**318,149,528**	**405,605,451**	**409,350,391**	**520,682,697**	**531,732,033**	**665,304,775**	**677,585,260**	**837,132,634**	**863,232,337**

Years	13 2037	14 2038	15 2039	16 2040	17 2041	18 2042	19 2043	20 2044	21 2045	22 2046	23 2047	24 2048
Total Revenue	**1,690,892,615**	**1,757,347,892**	**2,042,659,551**	**2,117,089,462**	**2,469,575,004**	**2,568,009,810**	**2,986,417,971**	**3,096,664,954**	**3,591,741,370**	**3,758,219,691**	**4,395,661,773**	**4,582,117,492**
Total Cost	**(622,387,631)**	**(659,730,889)**	**(699,314,743)**	**(741,273,627)**	**(785,750,045)**	**(832,895,047)**	**(882,868,750)**	**(935,840,875)**	**(991,991,328)**	**(1,051,510,807)**	**(1,114,601,456)**	**(1,181,477,543)**
Capital Expenditure												
Operational & Maintenance	(622,387,631)	(659,730,889)	(699,314,743)	(741,273,627)	(785,750,045)	(832,895,047)	(882,868,750)	(935,840,875)	(991,991,328)	(1,051,510,807)	(1,114,601,456)	(1,181,477,543)
Cash Flow	**1,068,504,983**	**1,097,617,003**	**1,343,344,808**	**1,375,815,834**	**1,683,824,959**	**1,735,114,763**	**2,103,549,221**	**2,160,824,079**	**2,599,750,043**	**2,706,708,883**	**3,281,060,317**	**3,400,639,948**

Years	25 2049	26 2050	27 2051	28 2052	29 2053	30 2054	31 2055	32 2056	33 2057	34 2058	35 2059	36 2060
Total Revenue	**5,340,801,996**	**5,549,632,401**	**6,525,214,364**	**6,834,840,439**	**8,001,802,496**	**8,348,583,700**	**9,738,808,693**	**10,175,617,765**	**11,885,918,058**	**12,375,144,218**	**14,408,094,825**	**14,956,028,125**
Total Cost	**(1,252,366,196)**	**(1,327,508,168)**	**(1,407,158,658)**	**(1,491,588,177)**	**(1,581,083,468)**	**(1,675,948,476)**	**(1,776,505,384)**	**(1,883,095,707)**	**(1,996,081,450)**	**(2,115,846,337)**	**(2,242,797,117)**	**(2,377,364,944)**
Capital Expenditure												
Operational & Maintenance	(1,252,366,196)	(1,327,508,168)	(1,407,158,658)	(1,491,588,177)	(1,581,083,468)	(1,675,948,476)	(1,776,505,384)	(1,883,095,707)	(1,996,081,450)	(2,115,846,337)	(2,242,797,117)	(2,377,364,944)
Cash Flow	**4,088,435,800**	**4,222,124,233**	**5,118,055,706**	**5,343,252,262**	**6,420,719,028**	**6,672,635,224**	**7,962,303,308**	**8,292,522,057**	**9,889,836,608**	**10,259,297,881**	**12,165,297,708**	**12,578,663,181**

Years	37 2061	38 2062	39 2063	40 2064	41 2065	42 2066	43 2067	44 2068	45 2069	46 2070	47 2071	48 2072
Total Revenue	**17,502,128,573**	**18,253,505,646**	**21,285,468,645**	**22,127,010,967**	**25,724,779,684**	**26,878,798,391**	**30,104,254,198**	**30,104,254,198**	**33,716,764,701**	**33,716,764,701**	**37,762,776,466**	**37,762,776,466**
Total Cost	**(2,520,006,841)**	**(2,671,207,251)**	**(2,831,479,686)**	**(3,001,368,468)**	**(3,181,450,576)**	**(3,372,337,610)**	**(3,574,677,867)**	**(3,789,158,539)**	**(4,016,508,051)**	**(4,257,498,534)**	**(4,512,948,446)**	**(4,783,725,353)**
Capital Expenditure												
Operational & Maintenance	(2,520,006,841)	(2,671,207,251)	(2,831,479,686)	(3,001,368,468)	(3,181,450,576)	(3,372,337,610)	(3,574,677,867)	(3,789,158,539)	(4,016,508,051)	(4,257,498,534)	(4,512,948,446)	(4,783,725,353)
Cash Flow	**14,982,121,732**	**15,582,298,395**	**18,453,988,959**	**19,125,642,500**	**22,543,329,108**	**23,506,460,781**	**26,529,576,331**	**26,315,095,659**	**29,700,256,650**	**29,459,266,167**	**33,249,828,019**	**32,979,051,113**

Years	49 2073	50 2074	51 2075
Total Revenue	**42,294,309,641**	**42,294,309,641**	**47,369,626,798**
Total Cost	**(5,070,748,874)**	**(5,374,993,807)**	**(5,697,493,435)**
Capital Expenditure			
Operational & Maintenance	(5,070,748,874)	(5,374,993,807)	(5,697,493,435)
Cash Flow	**37,223,560,767**	**36,919,315,835**	**41,672,133,363**

Internal Rate of Return (IRR) =	**13.26%**

(Source: Author)

Table 4 - 15 Net Present Value (NPV) Calculation

(in thousands of rupiah)

Years	1 2025	2 2026	3 2027	4 2028	5 2029	6 2030	7 2031	8 2032	9 2033	10 2034	11 2035	12 2036	13 2037
Total Revenue			**662,276,808**	**686,539,810**	**796,099,150**	**823,273,713**	**959,441,418**	**996,816,278**	**1,158,294,074**	**1,200,153,916**	**1,391,055,410**	**1,450,390,480**	**1,690,892,615**
Total Cost	**(4,794,929,760)**	**(4,794,929,760)**	**(347,538,003)**	**(368,390,283)**	**(390,493,700)**	**(413,923,322)**	**(438,758,721)**	**(465,084,244)**	**(492,989,299)**	**(522,568,657)**	**(553,922,776)**	**(587,158,143)**	**(622,387,631)**
Capital Expenditure	(4,794,929,760)	(4,794,929,760)											
Operational & Maintenance			(347,538,003)	(368,390,283)	(390,493,700)	(413,923,322)	(438,758,721)	(465,084,244)	(492,989,299)	(522,568,657)	(553,922,776)	(587,158,143)	(622,387,631)
Cash Flow	**(4,794,929,760)**	**(4,794,929,760)**	**314,738,805**	**318,149,528**	**405,605,451**	**409,350,391**	**520,682,697**	**531,732,033**	**665,304,775**	**677,585,260**	**837,132,634**	**863,232,337**	**1,068,504,983**
Discount Factor	0.91557	0.83827	0.76750	0.70270	0.64337	0.58906	0.53932	0.49379	0.45210	0.41393	0.37898	0.34699	0.31769
Present Value (PV)	**(4,390,106,587)**	**(4,019,461,558)**	**241,562,067**	**223,564,345**	**260,956,343**	**241,130,474**	**280,816,647**	**262,564,099**	**300,784,861**	**280,473,671**	**317,259,939**	**299,530,795**	**339,455,731**
Cummulative PV	(4,390,106,587)	(8,409,568,145)	(8,168,006,079)	(7,944,441,733)	(7,683,485,391)	(7,442,354,917)	(7,161,538,270)	(6,898,974,171)	(6,598,189,309)	(6,317,715,638)	(6,000,455,699)	(5,700,924,904)	(5,361,469,173)

Years	14 2038	15 2039	16 2040	17 2041	18 2042	19 2043	20 2044	21 2045	22 2046	23 2047	24 2048	25 2049	26 2050
Total Revenue	**1,757,347,892**	**2,042,659,551**	**2,117,089,462**	**2,469,575,004**	**2,568,009,810**	**2,986,417,971**	**3,096,664,954**	**3,591,741,370**	**3,758,219,691**	**4,395,661,773**	**4,582,117,492**	**5,340,801,996**	**5,549,632,401**
Total Cost	**(659,730,889)**	**(699,314,743)**	**(741,273,627)**	**(785,750,045)**	**(832,895,047)**	**(882,868,750)**	**(935,840,875)**	**(991,991,328)**	**(1,051,510,807)**	**(1,114,601,456)**	**(1,181,477,543)**	**(1,252,366,196)**	**(1,327,508,168)**
Capital Expenditure													
Operational & Maintenance	(659,730,889)	(699,314,743)	(741,273,627)	(785,750,045)	(832,895,047)	(882,868,750)	(935,840,875)	(991,991,328)	(1,051,510,807)	(1,114,601,456)	(1,181,477,543)	(1,252,366,196)	(1,327,508,168)
Cash Flow	**1,343,344,808**	**1,375,815,834**	**1,683,824,959**	**1,735,114,763**	**2,103,549,221**	**2,160,824,079**	**2,599,750,043**	**2,706,708,883**	**3,281,060,317**	**3,400,639,948**	**4,088,435,800**	**4,222,124,233**	**5,118,055,706**
Discount Factor	0.29087	0.26631	0.24383	0.22324	0.20440	0.18714	0.17134	0.15687	0.14363	0.13150	0.12040	0.11024	0.10093
Present Value (PV)	**319,264,209**	**357,750,068**	**335,463,553**	**375,902,138**	**354,649,109**	**393,655,353**	**370,233,497**	**407,831,444**	**388,761,703**	**431,468,363**	**409,438,059**	**450,689,619**	**426,132,046**
Cummulative PV	(5,042,204,964)	(4,684,454,896)	(4,348,991,344)	(3,973,089,206)	(3,618,440,097)	(3,224,784,744)	(2,854,551,247)	(2,446,719,803)	(2,057,958,100)	(1,626,489,737)	(1,217,051,678)	(766,362,059)	(340,230,013)

Years	27 2051	28 2052	29 2053	30 2054	31 2055	32 2056	33 2057	34 2058	35 2059	36 2060	37 2061	38 2062	39 2063
Total Revenue	**6,525,214,364**	**6,834,840,439**	**8,001,802,496**	**8,348,583,700**	**9,738,808,693**	**10,175,617,765**	**11,885,918,058**	**12,375,144,218**	**14,408,094,825**	**14,956,028,125**	**17,502,128,573**	**18,253,505,646**	**21,285,468,645**
Total Cost	**(1,407,158,658)**	**(1,491,588,177)**	**(1,581,083,468)**	**(1,675,948,476)**	**(1,776,505,384)**	**(1,883,095,707)**	**(1,996,081,450)**	**(2,115,846,337)**	**(2,242,797,117)**	**(2,377,364,944)**	**(2,520,006,841)**	**(2,671,207,251)**	**(2,831,479,686)**
Capital Expenditure													
Operational & Maintenance	(1,407,158,658)	(1,491,588,177)	(1,581,083,468)	(1,675,948,476)	(1,776,505,384)	(1,883,095,707)	(1,996,081,450)	(2,115,846,337)	(2,242,797,117)	(2,377,364,944)	(2,520,006,841)	(2,671,207,251)	(2,831,479,686)
Cash Flow	**5,118,055,706**	**5,343,252,262**	**6,420,719,028**	**6,672,635,224**	**7,962,303,308**	**8,292,522,057**	**9,889,836,608**	**10,259,297,881**	**12,165,297,708**	**12,578,663,181**	**14,982,121,732**	**15,582,298,395**	**18,453,988,959**
Discount Factor	0.09241	0.08461	0.07746	0.07092	0.06493	0.05945	0.05443	0.04984	0.04563	0.04178	0.03825	0.03502	0.03206
Present Value (PV)	**472,945,405**	**452,068,759**	**497,365,088**	**473,240,419**	**517,030,281**	**493,011,117**	**538,334,246**	**511,297,120**	**555,100,045**	**525,503,756**	**573,069,734**	**545,705,691**	**591,711,537**
Cummulative PV	132,715,393	584,784,152	1,082,149,240	1,555,389,660	2,072,419,940	2,565,431,057	3,103,765,303	3,615,062,423	4,170,162,468	4,695,666,224	5,268,735,959	5,814,441,649	6,406,153,187

Years	40 2064	41 2065	42 2066	43 2067	44 2068	45 2069	46 2070	47 2071	48 2072	49 2073	50 2074	51 2075
Total Revenue	**22,127,010,967**	**25,724,779,684**	**26,878,798,391**	**30,104,254,198**	**30,104,254,198**	**33,716,764,701**	**33,716,764,701**	**37,762,776,466**	**37,762,776,466**	**42,294,309,641**	**42,294,309,641**	**47,369,626,798**
Total Cost	**(3,001,368,468)**	**(3,181,450,576)**	**(3,372,337,610)**	**(3,574,677,867)**	**(3,789,158,539)**	**(4,016,508,051)**	**(4,257,498,534)**	**(4,512,948,446)**	**(4,783,725,353)**	**(5,070,748,874)**	**(5,374,993,807)**	**(5,697,493,435)**
Capital Expenditure												
Operational & Maintenance	(3,001,368,468)	(3,181,450,576)	(3,372,337,610)	(3,574,677,867)	(3,789,158,539)	(4,016,508,051)	(4,257,498,534)	(4,512,948,446)	(4,783,725,353)	(5,070,748,874)	(5,374,993,807)	(5,697,493,435)
Cash Flow	**19,125,642,500**	**22,543,329,108**	**23,506,460,781**	**26,529,576,331**	**26,315,095,659**	**29,700,256,650**	**29,459,266,167**	**33,249,828,019**	**32,979,051,113**	**37,223,560,767**	**36,919,315,835**	**41,672,133,363**
Discount Factor	0.02936	0.02688	0.02461	0.02253	0.02063	0.01889	0.01729	0.01583	0.01450	0.01327	0.01215	0.01113
Present Value (PV)	**561,472,680**	**605,931,405**	**578,476,167**	**597,752,437**	**542,861,208**	**560,966,430**	**509,438,085**	**526,443,422**	**478,071,959**	**494,044,245**	**448,636,278**	**463,638,289**
Cummulative PV	6,967,625,867	7,573,557,272	8,152,033,439	8,749,785,875	9,292,647,083	9,853,613,513	10,363,051,599	10,889,495,021	11,367,566,979	11,861,611,225	12,310,247,503	12,773,885,792

Discount Rate using WACC =	**9.22%**
Net Present Value (NPV) =	**12,773,885,792**

(Source: Author)

4.2.3 Payback Period (PP)

From the calculation of Cash Flow, the time required for a return on investment can be calculated as shown in Table 4 - 16 below. From the calculation table, it was obtained that the Payback Period (PP) was 16.4 years.

4.2.4 Discounted Payback Period

In addition to the Payback Period, the Discounted Payback Period can be calculated from the Cash Flow that has been discounted using WACC (9.22%) as shown in Table 4 - 17 below. Based on the calculation table, it was obtained that the Discounted Payback Period was 27.7 years.

4.2.5 Profitability Index (PI)

From the calculation of the Cash Flow that has been discounted with WACC, the size of the Profitability Index (PI) can be calculated as presented in Table 4 - 18 below. From the table, the Profitability Index (PI) value is 2.5190.

Table 4 - 16 Payback Period (PP) Calculation

(in thousands of rupiah)

Years	1 2025	2 2026	3 2027	4 2028	5 2029	6 2030	7 2031	8 2032	9 2033	10 2034	11 2035	12 2036	13 2037
Total Revenue			**662,276,808**	**686,539,810**	**796,099,150**	**823,273,713**	**959,441,418**	**996,816,278**	**1,158,294,074**	**1,200,153,916**	**1,391,055,410**	**1,450,390,480**	**1,690,892,615**
Total Cost	**(4,794,929,760)**	**(4,794,929,760)**	**(347,538,003)**	**(368,390,283)**	**(390,493,700)**	**(413,923,322)**	**(438,758,721)**	**(465,084,244)**	**(492,989,299)**	**(522,568,657)**	**(553,922,776)**	**(587,158,143)**	**(622,387,631)**
Cash Flow (CF)	**(4,794,929,760)**	**(4,794,929,760)**	**314,738,805**	**318,149,528**	**405,605,451**	**409,350,391**	**520,682,697**	**531,732,033**	**665,304,775**	**677,585,260**	**837,132,634**	**863,232,337**	**1,068,504,983**
Cummulative CF	(4,794,929,760)	(9,589,859,520)	(9,275,120,715)	(8,956,971,187)	(8,551,365,737)	(8,142,015,346)	(7,621,332,649)	(7,089,600,615)	(6,424,295,840)	(5,746,710,581)	(4,909,577,947)	(4,046,345,610)	(2,977,840,627)
Payback Period													
Years	1	2	3	4	5	6	7	8	9	10	11	12	13
Month	-	-	-	-	-	-	-	-	-	-	-	-	-

Years	14 2038	15 2039	16 2040	17 2041	18 2042	19 2043	20 2044	21 2045	22 2046	23 2047	24 2048	25 2049	26 2050
Total Revenue	**1,757,347,892**	**2,042,659,551**	**2,117,089,462**	**2,469,575,004**	**2,568,009,810**	**2,986,417,971**	**3,096,664,954**	**3,591,741,370**	**3,758,219,691**	**4,395,661,773**	**4,582,117,492**	**5,340,801,996**	**5,549,632,401**
Total Cost	**(659,730,889)**	**(699,314,743)**	**(741,273,627)**	**(785,750,045)**	**(832,895,047)**	**(882,868,750)**	**(935,840,875)**	**(991,991,328)**	**(1,051,510,807)**	**(1,114,601,456)**	**(1,181,477,543)**	**(1,252,366,196)**	**(1,327,508,168)**
Cash Flow	**1,097,617,003**	**1,343,344,808**	**1,375,815,834**	**1,683,824,959**	**1,735,114,763**	**2,103,549,221**	**2,160,824,079**	**2,599,750,043**	**2,706,708,883**	**3,281,060,317**	**3,400,639,948**	**4,088,435,800**	**4,222,124,233**
Cummulative CF	(1,880,223,623)	(536,878,815)	838,937,019	2,522,761,978	4,257,876,741	6,361,425,961	8,522,250,041	11,122,000,083	13,828,708,966	17,109,769,283	20,510,409,231	24,598,845,031	28,820,969,265
Payback Period													
Years	14	**15**	-	-	-	-	-	-	-	-	-	-	-
Month	-	**5**	-6	-17	-24	-35	-39	-49	-51	-60	-60	-70	-68

Years	27 2051	28 2052	29 2053	30 2054	31 2055	32 2056	33 2057	34 2058	35 2059	36 2060	37 2061	38 2062	39 2063
Total Revenue	**6,525,214,364**	**6,834,840,439**	**8,001,802,496**	**8,348,583,700**	**9,738,808,693**	**10,175,617,765**	**11,885,918,058**	**12,375,144,218**	**14,408,094,825**	**14,956,028,125**	**17,502,128,573**	**18,253,505,646**	**21,285,468,645**
Total Cost	**(1,407,158,658)**	**(1,491,588,177)**	**(1,581,083,468)**	**(1,675,948,476)**	**(1,776,505,384)**	**(1,883,095,707)**	**(1,996,081,450)**	**(2,115,846,337)**	**(2,242,797,117)**	**(2,377,364,944)**	**(2,520,006,841)**	**(2,671,207,251)**	**(2,831,479,686)**
Cash Flow	**5,118,055,706**	**5,343,252,262**	**6,420,719,028**	**6,672,635,224**	**7,962,303,308**	**8,292,522,057**	**9,889,836,608**	**10,259,297,881**	**12,165,297,708**	**12,578,663,181**	**14,982,121,732**	**15,582,298,395**	**18,453,988,959**
Cummulative CF	33,939,024,971	39,282,277,233	45,702,996,261	52,375,631,485	60,337,934,793	68,630,456,851	78,520,293,458	88,779,591,340	100,944,889,048	113,523,552,228	128,505,673,961	144,087,972,356	162,541,961,315
Payback Period													
Years	-	-	-	-	-	-	-	-	-	-	-	-	-
Month	-76	-73	-82	-79	-87	-83	-92	-88	-96	-91	-99	-94	-102

Years	40 2064	41 2065	42 2066	43 2067	44 2068	45 2069	46 2070	47 2071	48 2072	49 2073	50 2074	51 2075
Total Revenue	**22,127,010,967**	**25,724,779,684**	**26,878,798,391**	**30,104,254,198**	**30,104,254,198**	**33,716,764,701**	**33,716,764,701**	**37,762,776,466**	**37,762,776,466**	**42,294,309,641**	**42,294,309,641**	**47,369,626,798**
Total Cost	**(3,001,368,468)**	**(3,181,450,576)**	**(3,372,337,610)**	**(3,574,677,867)**	**(3,789,158,539)**	**(4,016,508,051)**	**(4,257,498,534)**	**(4,512,948,446)**	**(4,783,725,353)**	**(5,070,748,874)**	**(5,374,993,807)**	**(5,697,493,435)**
Cash Flow	**19,125,642,500**	**22,543,329,108**	**23,506,460,781**	**26,529,576,331**	**26,315,095,659**	**29,700,256,650**	**29,459,266,167**	**33,249,828,019**	**32,979,051,113**	**37,223,560,767**	**36,919,315,835**	**41,672,133,363**
Cummulative CF	**181,667,603,814**	**204,210,932,922**	**227,717,393,703**	**254,246,970,034**	**280,562,065,693**	**310,262,322,343**	**339,721,588,511**	**372,971,416,530**	**405,950,467,642**	**443,174,028,410**	**480,093,344,245**	**521,765,477,608**
Payback Period												
Years	-	-	-	-	-	-	-	-	-	-	-	-
Month	-97	-104	-103	-116	-113	-126	-123	-136	-131	-144	-138	0

Payback Period (PP):	**16 Years**
	5 Month

Payback Period = 16.4 Years

(Source: Author)

Table 4 - 17 Discounted Payback Period Calculation

(in thousands of rupiah)

Years	1 2025	2 2026	3 2027	4 2028	5 2029	6 2030	7 2031	8 2032	9 2033	10 2034	11 2035	12 2036	13 2037
Total Revenue			**662,276,808**	**686,539,810**	**796,099,150**	**823,273,713**	**959,441,418**	**996,816,278**	**1,158,294,074**	**1,200,153,916**	**1,391,055,410**	**1,450,390,480**	**1,690,892,615**
Total Cost	**(4,794,929,760)**	**(4,794,929,760)**	**(347,538,003)**	**(368,390,283)**	**(390,493,700)**	**(413,923,322)**	**(438,758,721)**	**(465,084,244)**	**(492,989,299)**	**(522,568,657)**	**(553,922,776)**	**(587,158,143)**	**(622,387,631)**
Cash Flow (CF)	**(4,794,929,760)**	**(4,794,929,760)**	**314,738,805**	**318,149,528**	**405,605,451**	**409,350,391**	**520,682,697**	**531,732,033**	**665,304,775**	**677,585,260**	**837,132,634**	**863,232,337**	**1,068,504,983**
Present Value (PV)	**(4,390,106,587)**	**(4,019,461,558)**	**241,562,067**	**223,564,345**	**260,956,343**	**241,130,474**	**280,816,647**	**262,564,099**	**300,784,861**	**280,473,671**	**317,259,939**	**299,530,795**	**339,455,731**
Cummulative PV	(4,390,106,587)	(8,409,568,145)	(8,168,006,079)	(7,944,441,733)	(7,683,485,391)	(7,442,354,917)	(7,161,538,270)	(6,898,974,171)	(6,598,189,309)	(6,317,715,638)	(6,000,455,699)	(5,700,924,904)	(5,361,469,173)
Discounted Payback Period													
Years	1	2	3	4	5	6	7	8	9	10	11	12	13
Month	-	-	-	-	-	-	-	-	-	-	-	-	-

Years	14 2038	15 2039	16 2040	17 2041	18 2042	19 2043	20 2044	21 2045	22 2046	23 2047	24 2048	25 2049	26 2050
Total Revenue	**1,757,347,892**	**2,042,659,551**	**2,117,089,462**	**2,469,575,004**	**2,568,009,810**	**2,986,417,971**	**3,096,664,954**	**3,591,741,370**	**3,758,219,691**	**4,395,661,773**	**4,582,117,492**	**5,340,801,996**	**5,549,632,401**
Total Cost	**(659,730,889)**	**(699,314,743)**	**(741,273,627)**	**(785,750,045)**	**(832,895,047)**	**(882,868,750)**	**(935,840,875)**	**(991,991,328)**	**(1,051,510,807)**	**(1,114,601,456)**	**(1,181,477,543)**	**(1,252,366,196)**	**(1,327,508,168)**
Cash Flow	**1,097,617,003**	**1,343,344,808**	**1,375,815,834**	**1,683,824,959**	**1,735,114,763**	**2,103,549,221**	**2,160,824,079**	**2,599,750,043**	**2,706,708,883**	**3,281,060,317**	**3,400,639,948**	**4,088,435,800**	**4,222,124,233**
Present Value (PV)	**319,264,209**	**357,750,068**	**335,463,553**	**375,902,138**	**354,649,109**	**393,655,353**	**370,233,497**	**407,831,444**	**388,761,703**	**431,468,363**	**409,438,059**	**450,689,619**	**426,132,046**
Cummulative PV	(5,042,204,964)	(4,684,454,896)	(4,348,991,344)	(3,973,089,206)	(3,618,440,097)	(3,224,784,744)	(2,854,551,247)	(2,446,719,803)	(2,057,958,100)	(1,626,489,737)	(1,217,051,678)	(766,362,059)	(340,230,013)
Discounted Payback Period													
Years	14	15	16	17	18	19	20	21	22	23	24	25	**26**
Month	-	-	-	-	-	-	-	-	-	-	-	-	**9**

Years	27 2051	28 2052	29 2053	30 2054	31 2055	32 2056	33 2057	34 2058	35 2059	36 2060	37 2061	38 2062	39 2063
Total Revenue	**6,525,214,364**	**6,834,840,439**	**8,001,802,496**	**8,348,583,700**	**9,738,808,693**	**10,175,617,765**	**11,885,918,058**	**12,375,144,218**	**14,408,094,825**	**14,956,028,125**	**17,502,128,573**	**18,253,505,646**	**21,285,468,645**
Total Cost	**(1,407,158,658)**	**(1,491,588,177)**	**(1,581,083,468)**	**(1,675,948,476)**	**(1,776,505,384)**	**(1,883,095,707)**	**(1,996,081,450)**	**(2,115,846,337)**	**(2,242,797,117)**	**(2,377,364,944)**	**(2,520,006,841)**	**(2,671,207,251)**	**(2,831,479,686)**
Cash Flow	**5,118,055,706**	**5,343,252,262**	**6,420,719,028**	**6,672,635,224**	**7,962,303,308**	**8,292,522,057**	**9,889,836,608**	**10,259,297,881**	**12,165,297,708**	**12,578,663,181**	**14,982,121,732**	**15,582,298,395**	**18,453,988,959**
Present Value (PV)	**472,945,405**	**452,068,759**	**497,365,088**	**473,240,419**	**517,030,281**	**493,011,117**	**538,334,246**	**511,297,120**	**555,100,045**	**525,503,756**	**573,069,734**	**545,705,691**	**591,711,537**
Cummulative PV	132,715,393	584,784,152	1,082,149,240	1,555,389,660	2,072,419,940	2,565,431,057	3,103,765,303	3,615,062,423	4,170,162,468	4,695,666,224	5,268,735,959	5,814,441,649	6,406,153,187
Discounted Payback Period													
Years	-	-	-	-	-	-	-	-	-	-	-	-	-
Month	-4	-14	-27	-36	-50	-57	-73	-78	-95	-98	-116	-118	-137

Years	40 2064	41 2065	42 2066	43 2067	44 2068	45 2069	46 2070	47 2071	48 2072	49 2073	50 2074	51 2075
Total Revenue	**22,127,010,967**	**25,724,779,684**	**26,878,798,391**	**30,104,254,198**	**30,104,254,198**	**33,716,764,701**	**33,716,764,701**	**37,762,776,466**	**37,762,776,466**	**42,294,309,641**	**42,294,309,641**	**47,369,626,798**
Total Cost	**(3,001,368,468)**	**(3,181,450,576)**	**(3,372,337,610)**	**(3,574,677,867)**	**(3,789,158,539)**	**(4,016,508,051)**	**(4,257,498,534)**	**(4,512,948,446)**	**(4,783,725,353)**	**(5,070,748,874)**	**(5,374,993,807)**	**(5,697,493,435)**
Cash Flow	**19,125,642,500**	**22,543,329,108**	**23,506,460,781**	**26,529,576,331**	**26,315,095,659**	**29,700,256,650**	**29,459,266,167**	**33,249,828,019**	**32,979,051,113**	**37,223,560,767**	**36,919,315,835**	**41,672,133,363**
Present Value (PV)	**561,472,680**	**605,931,405**	**578,476,167**	**597,752,437**	**542,861,208**	**560,966,430**	**509,438,085**	**526,443,422**	**478,071,959**	**494,044,245**	**448,636,278**	**463,638,289**
Cummulative PV	6,967,625,867	7,573,557,272	8,152,033,439	8,749,785,875	9,292,647,083	9,853,613,513	10,363,051,599	10,889,495,021	11,367,566,979	11,861,611,225	12,310,247,503	12,773,885,792
Discounted Payback Period												
Years	-	-	-	-	-	-	-	-	-	-	-	-
Month	-138	-104	-103	-116	-113	-126	-123	-136	-131	-144	-138	0

Discounted Payback Period:	**27**	**Years**
	9	**Month**

Discount Rate using WACC =	9.22%
Discounted Payback Period =	**27.7 Years**

(Source: Author)

Table 4 - 18 Profitability Index (PI)

(in thousands of rupiah)

Years	1 2025	2 2026	3 2027	4 2028	5 2029	6 2030	7 2031	8 2032	9 2033	10 2034	11 2035	12 2036	13 2037
Total Revenue			**662,276,808**	**686,539,810**	**796,099,150**	**823,273,713**	**959,441,418**	**996,816,278**	**1,158,294,074**	**1,200,153,916**	**1,391,055,410**	**1,450,390,480**	**1,690,892,615**
Total Cost	**(4,794,929,760)**	**(4,794,929,760)**	**(347,538,003)**	**(368,390,283)**	**(390,493,700)**	**(413,923,322)**	**(438,758,721)**	**(465,084,244)**	**(492,989,299)**	**(522,568,657)**	**(553,922,776)**	**(587,158,143)**	**(622,387,631)**
Capital Expenditure	(4,794,929,760)	(4,794,929,760)											
Operational & Maintenance			(347,538,003)	(368,390,283)	(390,493,700)	(413,923,322)	(438,758,721)	(465,084,244)	(492,989,299)	(522,568,657)	(553,922,776)	(587,158,143)	(622,387,631)
Cash Flow (CF)	**(4,794,929,760)**	**(4,794,929,760)**	**314,738,805**	**318,149,528**	**405,605,451**	**409,350,391**	**520,682,697**	**531,732,033**	**665,304,775**	**677,585,260**	**837,132,634**	**863,232,337**	**1,068,504,983**
Present Value (PV)	**(4,390,106,587)**	**(4,019,461,558)**	**241,562,067**	**223,564,345**	**260,956,343**	**241,130,474**	**280,816,647**	**262,564,099**	**300,784,861**	**280,473,671**	**317,259,939**	**299,530,795**	**339,455,731**

Years	14 2038	15 2039	16 2040	17 2041	18 2042	19 2043	20 2044	21 2045	22 2046	23 2047	24 2048	25 2049	26 2050
Total Revenue	**1,757,347,892**	**2,042,659,551**	**2,117,089,462**	**2,469,575,004**	**2,568,009,810**	**2,986,417,971**	**3,096,664,954**	**3,591,741,370**	**3,758,219,691**	**4,395,661,773**	**4,582,117,492**	**5,340,801,996**	**5,549,632,401**
Total Cost	**(659,730,889)**	**(699,314,743)**	**(741,273,627)**	**(785,750,045)**	**(832,895,047)**	**(882,868,750)**	**(935,840,875)**	**(991,991,328)**	**(1,051,510,807)**	**(1,114,601,456)**	**(1,181,477,543)**	**(1,252,366,196)**	**(1,327,508,168)**
Capital Expenditure													
Operational & Maintenance	(659,730,889)	(699,314,743)	(741,273,627)	(785,750,045)	(832,895,047)	(882,868,750)	(935,840,875)	(991,991,328)	(1,051,510,807)	(1,114,601,456)	(1,181,477,543)	(1,252,366,196)	(1,327,508,168)
Cash Flow	**1,097,617,003**	**1,343,344,808**	**1,375,815,834**	**1,683,824,959**	**1,735,114,763**	**2,103,549,221**	**2,160,824,079**	**2,599,750,043**	**2,706,708,883**	**3,281,060,317**	**3,400,639,948**	**4,088,435,800**	**4,222,124,233**
Present Value (PV)	**319,264,209**	**357,750,068**	**335,463,553**	**375,902,138**	**354,649,109**	**393,655,353**	**370,233,497**	**407,831,444**	**388,761,703**	**431,468,363**	**409,438,059**	**450,689,619**	**426,132,046**

Years	27 2051	28 2052	29 2053	30 2054	31 2055	32 2056	33 2057	34 2058	35 2059	36 2060	37 2061	38 2062	39 2063
Total Revenue	**6,525,214,364**	**6,834,840,439**	**8,001,802,496**	**8,348,583,700**	**9,738,808,693**	**10,175,617,765**	**11,885,918,058**	**12,375,144,218**	**14,408,094,825**	**14,956,028,125**	**17,502,128,573**	**18,253,505,646**	**21,285,468,645**
Total Cost	**(1,407,158,658)**	**(1,491,588,177)**	**(1,581,083,468)**	**(1,675,948,476)**	**(1,776,505,384)**	**(1,883,095,707)**	**(1,996,081,450)**	**(2,115,846,337)**	**(2,242,797,117)**	**(2,377,364,944)**	**(2,520,006,841)**	**(2,671,207,251)**	**(2,831,479,686)**
Capital Expenditure													
Operational & Maintenance	(1,407,158,658)	(1,491,588,177)	(1,581,083,468)	(1,675,948,476)	(1,776,505,384)	(1,883,095,707)	(1,996,081,450)	(2,115,846,337)	(2,242,797,117)	(2,377,364,944)	(2,520,006,841)	(2,671,207,251)	(2,831,479,686)
Cash Flow	**5,118,055,706**	**5,343,252,262**	**6,420,719,028**	**6,672,635,224**	**7,962,303,308**	**8,292,522,057**	**9,889,836,608**	**10,259,297,881**	**12,165,297,708**	**12,578,663,181**	**14,982,121,732**	**15,582,298,395**	**18,453,988,959**
Present Value (PV)	**472,945,405**	**452,068,759**	**497,365,088**	**473,240,419**	**517,030,281**	**493,011,117**	**538,334,246**	**511,297,120**	**555,100,045**	**525,503,756**	**573,069,734**	**545,705,691**	**591,711,537**

Years	40 2064	41 2065	42 2066	43 2067	44 2068	45 2069	46 2070	47 2071	48 2072	49 2073	50 2074	51 2075
Total Revenue	**22,127,010,967**	**25,724,779,684**	**26,878,798,391**	**30,104,254,198**	**30,104,254,198**	**33,716,764,701**	**33,716,764,701**	**37,762,776,466**	**37,762,776,466**	**42,294,309,641**	**42,294,309,641**	**47,369,626,798**
Total Cost	**(3,001,368,468)**	**(3,181,450,576)**	**(3,372,337,610)**	**(3,574,677,867)**	**(3,789,158,539)**	**(4,016,508,051)**	**(4,257,498,534)**	**(4,512,948,446)**	**(4,783,725,353)**	**(5,070,748,874)**	**(5,374,993,807)**	**(5,697,493,435)**
Capital Expenditure												
Operational & Maintenance	(3,001,368,468)	(3,181,450,576)	(3,372,337,610)	(3,574,677,867)	(3,789,158,539)	(4,016,508,051)	(4,257,498,534)	(4,512,948,446)	(4,783,725,353)	(5,070,748,874)	(5,374,993,807)	(5,697,493,435)
Cash Flow	**19,125,642,500**	**22,543,329,108**	**23,506,460,781**	**26,529,576,331**	**26,315,095,659**	**29,700,256,650**	**29,459,266,167**	**33,249,828,019**	**32,979,051,113**	**37,223,560,767**	**36,919,315,835**	**41,672,133,363**
Present Value (PV)	**561,472,680**	**605,931,405**	**578,476,167**	**597,752,437**	**542,861,208**	**560,966,430**	**509,438,085**	**526,443,422**	**478,071,959**	**494,044,245**	**448,636,278**	**463,638,289**

Discount Rate using WACC =	9.22%
Profitability Index (PI):	**2.5190**

(Source: Author)

Chapter V Conclusion and Recommendation

5.1 Conclusion

From the results of the calculation of financial feasibility above, it can be concluded as follows:

- The Internal Rate of Return (IRR) value of 13.26% is greater than the WACC value of 9.22% which means the project is financially feasible to implement.
- The Net Present Value (NPV) value of Rp. 12,773,885,792,000 or in other words positive value which means the project is financially feasible to be carried out.
- The value of the Payback Period (PP) is 16.4 years and the value of the Discounted Payback Period is 27.7 years, which are both less than the 50 years concession period. This means that the project is financially feasible to be implemented.
- The Profitability Index (PI) value of 2.5190 greater than 1, indicating that the project is financially feasible to be implemented.

From the parameters mentioned above, it can be concluded that the construction of the Pangkalan Brandan – Langsa Toll Road, which is part of the Binjai - Langsa Toll Road, is financially feasible to be carried out even though the implementation process is carried is staged.

5.2 Recommendation

Based on investment criteria in terms of financial aspects, several things can be recommended as follows:

- Learning from the Binjai – Langsa Toll Road where the construction process is carried out in stages due to government policy, it is better for the calculation of financial feasibility studies to make alternatives if there is a phasing in its implementation.
- Timely project execution to avoid cost overruns.
- To reduce the financial burden of the company, the source of investment funds should not use loans but fully use equity derived from State Capital Participation funds because the project is an assignment from the Government.

From the results of the financial feasibility study for the Pangkalan Brandan - Langsa Toll Road, an implementation plan can be prepared to be used by the company as shown in Figure 5 - 1 below.

Description	Years					
	2024	2025	2026	2027	-	2075
Data Collection for Thesis						
Financial Feasibility Study Ananlyisis (Thesis)						
Recommendations to the Company						
Adendum of Toll Road Concession Agreement						
Procurement of Construction Services for Pangkalan Brandan - Langsa Toll Road						
Construction Period						
Operation Period						

Figure 5 - 1 Time Line to Implementation

(Source: Author)

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APPENDICES

Appendix - A Financial Analysis

(in thousands of rupiah)

Years	1 2025	2 2026	3 2027	4 2028	5 2029	6 2030	7 2031	8 2032	9 2033	10 2034	11 2035
Total Revenue	**-**	**-**	**662,276,808**	**686,539,810**	**796,099,150**	**823,273,713**	**959,441,418**	**996,816,278**	**1,158,294,074**	**1,200,153,916**	**1,391,055,410**
Total Cost	**(4,794,929,760)**	**(4,794,929,760)**	**(347,538,003)**	**(368,390,283)**	**(390,493,700)**	**(413,923,322)**	**(438,758,721)**	**(465,084,244)**	**(492,989,299)**	**(522,568,657)**	**(553,922,776)**
Capital Expenditure	(4,794,929,760)	(4,794,929,760)	-	-	-	-	-	-	-	-	-
Operational & Maintenance	-	-	(347,538,003)	(368,390,283)	(390,493,700)	(413,923,322)	(438,758,721)	(465,084,244)	(492,989,299)	(522,568,657)	(553,922,776)
Cash Flow (CF)	**(4,794,929,760)**	**(4,794,929,760)**	**314,738,805**	**318,149,528**	**405,605,451**	**409,350,391**	**520,682,697**	**531,732,033**	**665,304,775**	**677,585,260**	**837,132,634**
Cummulative CF	**(4,794,929,760)**	**(9,589,859,520)**	**(9,275,120,715)**	**(8,956,971,187)**	**(8,551,365,737)**	**(8,142,015,346)**	**(7,621,332,649)**	**(7,089,600,615)**	**(6,424,295,840)**	**(5,746,710,581)**	**(4,909,577,947)**
Discount Factor	0.91557	0.83827	0.76750	0.70270	0.64337	0.58906	0.53932	0.49379	0.45210	0.41393	0.37898
Present Value (PV)	**(4,390,106,587)**	**(4,019,461,558)**	**241,562,067**	**223,564,345**	**260,956,343**	**241,130,474**	**280,816,647**	**262,564,099**	**300,784,861**	**280,473,671**	**317,259,939**
Cummulative PV	**(4,390,106,587)**	**(8,409,568,145)**	**(8,168,006,079)**	**(7,944,441,733)**	**(7,683,485,391)**	**(7,442,354,917)**	**(7,161,538,270)**	**(6,898,974,171)**	**(6,598,189,309)**	**(6,317,715,638)**	**(6,000,455,699)**
Payback Period											
Years	1	2	3	4	5	6	7	8	9	10	11
Month	-	-	-	-	-	-	-	-	-	-	-
Discounted Payback Period											
Years	1	2	3	4	5	6	7	8	9	10	11
Month	-	-	-	-	-	-	-	-	-	-	-

(in thousands of rupiah)

Years	12 2036	13 2037	14 2038	15 2039	16 2040	17 2041	18 2042	19 2043	20 2044	21 2045	22 2046
Total Revenue	**1,450,390,480**	**1,690,892,615**	**1,757,347,892**	**2,042,659,551**	**2,117,089,462**	**2,469,575,004**	**2,568,009,810**	**2,986,417,971**	**3,096,664,954**	**3,591,741,370**	**3,758,219,691**
Total Cost	**(587,158,143)**	**(622,387,631)**	**(659,730,889)**	**(699,314,743)**	**(741,273,627)**	**(785,750,045)**	**(832,895,047)**	**(882,868,750)**	**(935,840,875)**	**(991,991,328)**	**(1,051,510,807)**
Capital Expenditure	-	-	-	-	-	-	-	-	-	-	-
Operational & Maintenance	(587,158,143)	(622,387,631)	(659,730,889)	(699,314,743)	(741,273,627)	(785,750,045)	(832,895,047)	(882,868,750)	(935,840,875)	(991,991,328)	(1,051,510,807)
Cash Flow (CF)	**863,232,337**	**1,068,504,983**	**1,097,617,003**	**1,343,344,808**	**1,375,815,834**	**1,683,824,959**	**1,735,114,763**	**2,103,549,221**	**2,160,824,079**	**2,599,750,043**	**2,706,708,883**
Cummulative CF	**(4,046,345,610)**	**(2,977,840,627)**	**(1,880,223,623)**	**(536,878,815)**	**838,937,019**	**2,522,761,978**	**4,257,876,741**	**6,361,425,961**	**8,522,250,041**	**11,122,000,083**	**13,828,708,966**
Discount Factor	0.34699	0.31769	0.29087	0.26631	0.24383	0.22324	0.20440	0.18714	0.17134	0.15687	0.14363
Present Value (PV)	**299,530,795**	**339,455,731**	**319,264,209**	**357,750,068**	**335,463,553**	**375,902,138**	**354,649,109**	**393,655,353**	**370,233,497**	**407,831,444**	**388,761,703**
Cummulative PV	**(5,700,924,904)**	**(5,361,469,173)**	**(5,042,204,964)**	**(4,684,454,896)**	**(4,348,991,344)**	**(3,973,089,206)**	**(3,618,440,097)**	**(3,224,784,744)**	**(2,854,551,247)**	**(2,446,719,803)**	**(2,057,958,100)**
Payback Period											
Years	12	13	14	15	-	-	-	-	-	-	-
Month	-	-	-	5	- 6	- 17	- 24	- 35	- 39	- 49	- 51
Discounted Payback Period											
Years	12	13	14	15	16	17	18	19	20	21	22
Month	-	-	-	-	-	-	-	-	-	-	-

Source: Author

Appendix - B Financial Analysis (Continue)

(in thousands of rupiah)

Years	23 2047	24 2048	25 2049	26 2050	27 2051	28 2052	29 2053	30 2054	31 2055	32 2056	33 2057
Total Revenue	**4,395,661,773**	**4,582,117,492**	**5,340,801,996**	**5,549,632,401**	**6,525,214,364**	**6,834,840,439**	**8,001,802,496**	**8,348,583,700**	**9,738,808,693**	**10,175,617,765**	**11,885,918,058**
Total Cost	**(1,114,601,456)**	**(1,181,477,543)**	**(1,252,366,196)**	**(1,327,508,168)**	**(1,407,158,658)**	**(1,491,588,177)**	**(1,581,083,468)**	**(1,675,948,476)**	**(1,776,505,384)**	**(1,883,095,707)**	**(1,996,081,450)**
Capital Expenditure	-	-	-	-	-	-	-	-	-	-	-
Operational & Maintenance	(1,114,601,456)	(1,181,477,543)	(1,252,366,196)	(1,327,508,168)	(1,407,158,658)	(1,491,588,177)	(1,581,083,468)	(1,675,948,476)	(1,776,505,384)	(1,883,095,707)	(1,996,081,450)
Cash Flow (CF)	**3,281,060,317**	**3,400,639,948**	**4,088,435,800**	**4,222,124,233**	**5,118,055,706**	**5,343,252,262**	**6,420,719,028**	**6,672,635,224**	**7,962,303,308**	**8,292,522,057**	**9,889,836,608**
Cummulative CF	**17,109,769,283**	**20,510,409,231**	**24,598,845,031**	**28,820,969,265**	**33,939,024,971**	**39,282,277,233**	**45,702,996,261**	**52,375,631,485**	**60,337,934,793**	**68,630,456,851**	**78,520,293,458**
Discount Factor	0.13150	0.12040	0.11024	0.10093	0.09241	0.08461	0.07746	0.07092	0.06493	0.05945	0.05443
Present Value (PV)	**431,468,363**	**409,438,059**	**450,689,619**	**426,132,046**	**472,945,405**	**452,068,759**	**497,365,088**	**473,240,419**	**517,030,281**	**493,011,117**	**538,334,246**
Cummulative PV	**(1,626,489,737)**	**(1,217,051,678)**	**(766,362,059)**	**(340,230,013)**	**132,715,393**	**584,784,152**	**1,082,149,240**	**1,555,389,660**	**2,072,419,940**	**2,565,431,057**	**3,103,765,303**
Payback Period											
Years	-	-	-	-	-	-	-	-	-	-	-
Month	- 60	- 60	- 70	- 68	- 76	- 73	- 82	- 79	- 87	- 83	- 92
Discounted Payback Period											
Years	23	24	25	26	-	-	-	-	-	-	-
Month	-	-	-	9	- 4	- 14	- 27	- 36	- 50	- 57	- 73

(in thousands of rupiah)

Years	34 2058	35 2059	36 2060	37 2061	38 2062	39 2063	40 2064	41 2065	42 2066	43 2067	44 2068
Total Revenue	**12,375,144,218**	**14,408,094,825**	**14,956,028,125**	**17,502,128,573**	**18,253,505,646**	**21,285,468,645**	**22,127,010,967**	**25,724,779,684**	**26,878,798,391**	**30,104,254,198**	**30,104,254,198**
Total Cost	**(2,115,846,337)**	**(2,242,797,117)**	**(2,377,364,944)**	**(2,520,006,841)**	**(2,671,207,251)**	**(2,831,479,686)**	**(3,001,368,468)**	**(3,181,450,576)**	**(3,372,337,610)**	**(3,574,677,867)**	**(3,789,158,539)**
Capital Expenditure	-	-	-	-	-	-	-	-	-	-	-
Operational & Maintenance	(2,115,846,337)	(2,242,797,117)	(2,377,364,944)	(2,520,006,841)	(2,671,207,251)	(2,831,479,686)	(3,001,368,468)	(3,181,450,576)	(3,372,337,610)	(3,574,677,867)	(3,789,158,539)
Cash Flow (CF)	**10,259,297,881**	**12,165,297,708**	**12,578,663,181**	**14,982,121,732**	**15,582,298,395**	**18,453,988,959**	**19,125,642,500**	**22,543,329,108**	**23,506,460,781**	**26,529,576,331**	**26,315,095,659**
Cummulative CF	**88,779,591,340**	**100,944,889,048**	**113,523,552,228**	**128,505,673,961**	**144,087,972,356**	**162,541,961,315**	**181,667,603,814**	**204,210,932,922**	**227,717,393,703**	**254,246,970,034**	**280,562,065,693**
Discount Factor	0.04984	0.04563	0.04178	0.03825	0.03502	0.03206	0.02936	0.02688	0.02461	0.02253	0.02063
Present Value (PV)	**511,297,120**	**555,100,045**	**525,503,756**	**573,069,734**	**545,705,691**	**591,711,537**	**561,472,680**	**605,931,405**	**578,476,167**	**597,752,437**	**542,861,208**
Cummulative PV	**3,615,062,423**	**4,170,162,468**	**4,695,666,224**	**5,268,735,959**	**5,814,441,649**	**6,406,153,187**	**6,967,625,867**	**7,573,557,272**	**8,152,033,439**	**8,749,785,875**	**9,292,647,083**
Payback Period											
Years	-	-	-	-	-	-	-	-	-	-	-
Month	- 88	- 96	- 91	- 99	- 94	- 102	- 97	- 104	- 103	- 116	- 113
Discounted Payback Period											
Years	-	-	-	-	-	-	-	-	-	-	-
Month	- 78	- 95	- 98	- 116	- 118	- 137	- 138	- 157	- 164	- 193	- 199

Source: Author

Appendix - C Financial Analysis (Continue)

(in thousands of rupiah)

Years	44 2068	45 2069	46 2070	47 2071	48 2072	49 2073	50 2074	51 2075
Total Revenue	**30,104,254,198**	**33,716,764,701**	**33,716,764,701**	**37,762,776,466**	**37,762,776,466**	**42,294,309,641**	**42,294,309,641**	**47,369,626,798**
Total Cost	**(3,789,158,539)**	**(4,016,508,051)**	**(4,257,498,534)**	**(4,512,948,446)**	**(4,783,725,353)**	**(5,070,748,874)**	**(5,374,993,807)**	**(5,697,493,435)**
Capital Expenditure	-	-	-	-	-	-	-	-
Operational & Maintenance	(3,789,158,539)	(4,016,508,051)	(4,257,498,534)	(4,512,948,446)	(4,783,725,353)	(5,070,748,874)	(5,374,993,807)	(5,697,493,435)
Cash Flow (CF)	**26,315,095,659**	**29,700,256,650**	**29,459,266,167**	**33,249,828,019**	**32,979,051,113**	**37,223,560,767**	**36,919,315,835**	**41,672,133,363**
Cummulative CF	**280,562,065,693**	**310,262,322,343**	**339,721,588,511**	**372,971,416,530**	**405,950,467,642**	**443,174,028,410**	**480,093,344,245**	**521,765,477,608**
Discount Factor	0.02063	0.01889	0.01729	0.01583	0.01450	0.01327	0.01215	0.01113
Present Value (PV)	**542,861,208**	**560,966,430**	**509,438,085**	**526,443,422**	**478,071,959**	**494,044,245**	**448,636,278**	**463,638,289**
Cummulative PV	**9,292,647,083**	**9,853,613,513**	**10,363,051,599**	**10,889,495,021**	**11,367,566,979**	**11,861,611,225**	**12,310,247,503**	**12,773,885,792**
Payback Period								
Years	-	-	-	-	-	-	-	-
Month	- 113	- 126	- 123	- 136	- 131	- 144	- 138	-
Discounted Payback Period								
Years	-	-	-	-	-	-	-	-
Month	- 199	- 232	- 236	- 273	- 276	- 317	- 319	-

FINANCIAL ANALYSIS OUTPUT

Discount Rate using WACC	**9.22%**	
Internal Rate of Return (IRR):	**13.26%**	
Net Present Value (NPV):	**12,773,885,792**	**> 0**
Payback Period (PP):	**16.4**	**Years**
Discounted Payback Period:	**27.7**	**Years**
Profitability Index (PI):	**2.5190**	**> 1**

Source: Author