Feasibility Analysis of Availability Payment Scheme Implementation in Infrastructure Projects: Case Study of Trans Sumatera Toll Road Development Phase II

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ABSTRACT: Toll road infrastructure development is a key strategy in improving connectivity and economic growth in Indonesia. The Trans Sumatra Toll Road Phase II, including the Betung - Tempino - Jambi section, is a national strategic project that uses the Availability Payment (AP) scheme. This scheme guarantees the toll road operator's income based on predetermined service standards, regardless of traffic volume. This study aims to evaluate the financial feasibility of the Bayung Lencir - Tempino - Simpang Ness Toll Road project by comparing conventional and Availability Payment financing schemes. The analysis was conducted using financial indicators such as Net Present Value (NPV), Internal Rate of Return (IRR), Profitability Index (PI), Payback Period, and Discounted Payback Period. The results show that without the Availability Payment scheme, the project is not financially viable as it has a negative NPV and a lower IRR than the Weighted Average Cost of Capital (WACC). However, with the implementation of the Availability Payment scheme, the financial indicators show positive results, indicating that the project becomes feasible. These findings provide implications for the government in determining sustainable infrastructure project funding policies as well as for investors in assessing the feasibility of toll road project investments in Indonesia.

KEY WORDS: Availability Payment, Financial Feasibility Study , Trans Sumatera Toll Road.

1. INTRODUCTION

Toll road infrastructure development is a key strategy in improving connectivity and economic growth in Indonesia. One of the national strategic projects in this sector is the Trans Sumatra Toll Road (JTTS) Phase II, which includes the Betung - Tempino - Jambi section. The project is run by PT Hutama Karya (Persero) Tbk with the Availability Payment scheme, which is a payment model based on the availability of services provided by business entities to the government, in contrast to the traffic volume-based scheme (Putra, 2015).

As an integral part of JTTS Phase II, the Betung - Tempino - Jambi section has a strategic role in accelerating the mobility of goods and services in the Sumatra region. However, Jambi has the lowest Average Daily Traffic compared to other provinces along the main JTTS route.
This makes the project less attractive to private investors, so the government assigned PT Hutama Karya to build the toll road even though it is not financially viable.

The legal foundation for the construction of JTTS was first established through Presidential Regulation (Perpres) Number 100 of 2014, which assigned PT Hutama Karya to finance, plan, construct, and operate and maintain the toll road. This regulation was updated through Perpres Number 117 of 2015 which expanded the scope of the project by adding 24 new sections and emphasized the government's role in supporting project financing. Furthermore, Perpres No. 131 of 2022 introduced the concept of area development along the toll road corridor to improve the financial viability of the project.

A significant change occurred through Presidential Regulation No. 42 of 2024 which introduced the Availability Payment scheme as a new mechanism in project financing. Previously, investment returns depended on toll revenues from users, but under this rule, PT Hutama Karya will receive periodic payments from the government based on the availability of services that meet predetermined standards. Toll revenues are still deposited with the government as Non-Tax State Revenue (PNBP) for the development of the national toll road network.

The financial sustainability of this project is a crucial issue because the Availability Payment scheme requires the government to pay the operator periodically, which can burden the state budget in the long run. The project is divided into 3 sections namely, section 1 Betung - Tungkal Jaya, section 2 Tungkal Jaya - Bayung Lencir, and section 3 namely Bayung Lencir - Tempino (Construction Support portion) and Tempino Simpang Ness. This study will focus on section 3, namely the 52-kilometer Bayung Lencir - Simpang Ness section, which is a priority to be built and is planned to be operational in 2025.

In 2020, this project was declared financially unviable, but the Government is still trying to continue this project through funding from the state budget with the Availability Payment scheme. Therefore, the financial feasibility study of the Betung - Tempino - Jambi Toll Road section is an important aspect that can be analyzed through several key indicators, such as Weighted Average Cost of Capital (WACC), Net Present Value (NPV), and Internal Rate of Return (IRR). By analyzing the sensitivity to variable changes, this research is expected to provide academic and practical contributions in policy formulation and financial management of infrastructure projects based on the Availability Payment scheme in Indonesia.

2. RESEARCH METHODS

This research uses quantitative methods as the main approach in data analysis, rather than qualitative methods. Secondary data will be analyzed to project operational cash flows, starting from the construction phase which lasts for two years until the end of the concession period, which is expected to be given to PT Hutama Karya (Persero) for 50 years.

This research consists of three main stages that are interrelated to ensure comprehensive results. The first stage is data collection, both through primary and secondary methods from various relevant sources. Next, a literature study was conducted to build a strong theoretical foundation. This study includes reviewing literature in the fields of corporate finance, investment, and real estate to understand the financial and investment aspects related to toll road projects.

Once the data has been collected, the next stage is data processing. The first step in this stage is to determine the basic assumptions for calculating the investment value and preparing financial statement projections, including estimates of income and costs. This calculation refers to the internal data of PT Hutama Karya (Persero). Next, the research will compile the company's cash flow projections by considering three main phases, namely the preparation, construction and operational periods. From here, financial indicators such as Net Present Value (NPV), Internal Rate of Return (IRR), and Payback Period will be calculated using the Availability Payment scheme as a project financing mechanism.

As a final stage, this research will conduct a sensitivity analysis to test the impact of changes in tenant prices on the feasibility of the project in the future. By recalculating the NPV, IRR, and Payback Period based on various rental price scenarios, this analysis is expected to provide a more accurate picture of the potential benefits and risks of the project. Thus, management can make more informed and strategic decisions in managing this infrastructure project.

3. RESULTS AND DISCUSSION
3.1 Toll Road Revenue Analysis

The main revenue from toll roads comes from tariffs charged to road users according to their vehicle category. Vehicles that can cross toll roads are classified into five groups based on the number of axes and types of vehicles, namely:
1. Class I: Passenger cars, pick-ups, small trucks, and buses.
2. Class II: Trucks with two axes.
3. Class III: Trucks with three axes.
4. Class IV: Trucks with four axles.
5. Class V: Trucks with five or more axes.

The determination of toll rates is based on Ability to Pay (ATP) and Willingness to Pay (WTP) analysis, which measures the ability and willingness of road users to pay toll rates. In addition, operational, maintenance, and investment costs of toll road construction are also taken into account to ensure project sustainability. In the planning, the toll tariff is estimated to increase by 12% every two years to adjust to inflation and increased operational costs.

Betung - Tempino - Jambi Section 3 is scheduled to be fully operational in 2025. Therefore, in accordance with the Decree of the Minister of Public Works No.

507/KPTS/M/2015 as well as the results of the consultant's study, the initial assumption of toll tariffs for 2025 is determined based on vehicle class. The basic tariff for Class I is set at Rp 1,700, while tariffs for other classes are calculated based on certain multipliers: Class II at Rp 2,805 (1.65 times the Class I tariff), Class III at Rp 3,400 (2.00 times), Class IV at Rp 4,250 (2.50 times), and Class V at Rp 5,100 (3.00 times).

Every year, the number of vehicles is projected to increase. In 2025, total traffic is estimated at 2,149 vehicles per day, with Group I vehicles dominating at 1,551 vehicles. Over time, this number increases to reach 26,045 vehicles per day in 2074, with Group I continuing to dominate (18,795 vehicles per day).

The vehicle growth of each group shows a steady increase, with significant growth in small vehicles (Group I) and large vehicles (Group III). Other vehicle groups also experienced increases, but in smaller amounts.

Once the toll tariff and AADT projection data are collected, revenue calculations for the Bayung Lencir - Tempino and Tempino - Simpang Ness Toll Roads will be performed. This revenue projection is very important in the Capital Budgeting analysis, which will determine whether the toll road development is financially feasible or not. Revenue calculation is done by calculating each vehicle classification using the following formula:

Revenue = Tariff × AADT × Number of Operating Days × Toll Road Length

3.2. Operation and Maintenance Costs

Although the traffic volume on the Trans Sumatra Toll Road is not as high as toll roads in Java, operational and maintenance costs remain of the same standard. This is due to the provisions of the Ministry of Public Works and Public Housing (PUPR) which set Minimum Service Standards (MSS) for all toll roads operating in Indonesia. Thus, operational and maintenance costs must be in accordance with the applicable standards, without taking into account differences in traffic density between regions.

In the Bayung Lencir - Tempino - Simpang Ness Toll Road development project, the projected operational and maintenance costs are calculated based on data from the Toll Road Operations and Maintenance Division of PT Hutama Karya (Persero). This calculation refers to the average operational and maintenance costs of several previously operating Trans Sumatra toll roads, namely:

1. Pekanbaru - Dumai Toll Road
2. Pekanbaru - Bangkinang Toll Road
3. Palembang - Indralaya Toll Road
4. Pematang Panggang - Kayu Agung Toll Road

3.3. Operating & Maintenance Cost Growth Assumptions

Operation and maintenance costs in this project are projected to increase by 6% per year starting in 2025.

The data presented includes projected toll road operation and maintenance expenditures from Q4 2025 to Q1 - Q3 2040. These expenditures are divided into two main categories:

1. Operating & Service Expenses, consisting of:
   a. Toll Collection (costs related to toll payment system operations)
   b. Toll User Services (toll user service costs, including safety and supporting facilities)
   c. Rest Area Services (maintenance and operational costs of rest areas)
   d. Administration & General Costs (office operational costs, employee salaries, and other administrative costs)
2. Maintenance Costs, consisting of:
   a. Routine Maintenance (routine maintenance costs to ensure road conditions remain optimal)
   b. Periodic Maintenance (periodic maintenance carried out within a certain time interval)
   c. Upgrades (the cost of repairing and upgrading toll road facilities)
   d. Rest Area Maintenance (special maintenance for rest area)

3.3. Summary of Expenditure Projections

Initial Year (Q4 2025). Total expenditure: IDR 25.411 billion, with the main operating costs coming from toll collection, road user services, and administration.

Year 2026 – 2030. Costs gradually increase from IDR133.036 billion (2026) to IDR463.782 billion (2030). Periodic maintenance and road upgrades begin to appear in expenditures.

Year 2031 – 2035. Costs continue to increase, reaching IDR751.042 billion in 2035. Periodic maintenance and road upgrades contribute significantly to the total cost.

Year 2036 – 2040. Expenditure continues to increase, reaching more than IDR1.2 trillion in 2040. Periodic maintenance and road upgrades are increasingly dominant in expenditure.

3.4. Initial Investment Costs

The Bayung Lencir - Tempino - Simpang Ness Toll Road, which is part of the Betung - Tempino - Jambi Toll Road, connects South Sumatra Province with Jambi Province and is divided into two sections namely Bayung Lencir - Tempino: 33 km and Tempino - Simpang Ness: 19 km. The estimated investment cost for Bayung Lencir - Tempino Toll Road includes design cost, construction cost, supervision cost, toll road equipment cost, overhead cost, interest during construction (IDC). The total investment cost for the Bayung Lencir - Tempino section is Rp 7,037,948,687,496.15 while the Tempino - Simpang Ness section is Rp 4,039,633,482,656.64.

Figure 1 Section Betung - Tempino - Jambi

Details of investment costs to PT Hutama Karya (Persero) for the Bayung Lencir - Tempino - Simpang Ness Section are as follows:

Table 1 Investment Structure of Betung - Tempino - Jambi Section

No	Deskripsi	Bayung Lencir - Tempino Value (Rp)	Tempino - Simpang Ness Value (Rp)
1	Design	24,754,689,823.94	14,208,667,653.86
2	Konstruksi	5,568,330,410,345.75	3,196,103,718,131.89
3	Supervisi	64,875,054,365.18	37,236,907,150.00
4	Peralatan Jalan Tol	391,538,279,063.76	224,734,679,390.00
	Subtotal	**6,049,498,433,598.63**	**3,472,283,972,325.75**
	Subtotal + Tax	**6,714,943,261,294.48**	**3,854,235,209,281.58**
5	Overhead Cost	139,208,260,258.64	79,902,592,953.30
6	IDC Cost	183,797,165,943.02	105,495,680,421.76
	Subtotal	**323,005,426,201.67**	**185,398,273,375.06**
	Subtotal Investment	**7,037,948,687,496.15**	**4,039,633,482,656.64**
	Total Investment (Rp)		**11,077,582,170,152.80**

3.5. Weighted Average Cost of Capital (WACC) Analysis

The Bayung Lencir - Tempino - Simpang Ness Toll Road construction project has a funding structure consisting of 30% equity and 70% debt. This means that most of the financing of this project depends on loan funds. PT Hutama Karya (Persero) as the project developer has set the cost of debt at 11%.

In investment risk analysis, the market risk premium is calculated as the difference between the market return and the risk-free rate. Based on data from Indonesia's Implied Market Risk Premium (IMRP) chart, in March 2024, it was recorded:

- Implied Market Return (QCOC): 10,46%

- Risk-Free Rate (Rf): 6,69%
- Implied Market Risk Premium (IMRP): 3.77% (difference between QCOC and Rf)

The chart shows that from 2003 to 2024, the market rate of return has fluctuated, with a downward trend since its peak in 2008-2009, then stabilized at around 10% in recent years. Meanwhile, the risk-free rate (Rf) has also experienced a gradual decline since the beginning of the period, but has remained above 5% in recent years.

(Figure 2 Implied-Risk-Premia: Indonesia)
(source: http://www.market-risk-premia.com/id.html**)**

As shown in the graph of the Implied Market-Risk Premium in March 2024, the Market Return value stands at 10.46%, while the Risk-Free Rate stands at 6.69%.

Table 2. WACC analysis

No	Deskripsi	Simbol	Formula	Value
1	Investment Cost	V		11,077,582,170,152.80
2	Equity	E	$E = 30\% \times V$	3,323,274,651,045.84
3	Debt	D	$D = 70\% \times V$	7,754,307,519,106.95
4	Weight of Debt	WoD		0.70
5	Weight of Equity	WoE		0.30
6	Risk Free Rate	Rf		6.69%
7	Beta	β	β = Unlaverage Beta x (1+ (1 - Tax) x Laverage	0.825
8	Market Return	RM		10.46%
9	Cost of Equity (CAPM)	RE	$RE = Rf + \beta (RM - Rf)$	9.80%
10	Cost of Debt Before Tax	RD		11%
11	Corporate Tax Rate	T		22%
12	Cost of Debt After Tax			8.58%
13	Weighted Cost of	WACC	WACC = RE x WoE + RD x (1-T_x WoD	8.95%

Berdasarkan tabel di atas, nilai Discount Rate yang dihitung menggunakan analisis Weighted Average Cost of Capital (WACC) adalah 8,95%

1.1. Kelayakan Finansial

Pembangunan Jalan Tol Betung – Tempino – Jambi dapat dianggap layak secara finansial apabila perhitungan memenuhi kriteria berikut:

1. Internal Rate of Return (IRR) lebih besar dari Weighted Average Cost of Capital (WACC).
2. Net Present Value (NPV) lebih besar dari Rp 0.
3. Profitability Index (PI) lebih besar dari 1,0.

Setelah memperoleh nilai investasi awal, pendapatan tol, serta biaya operasi & pemeliharaan, Operating Cash Flow (OCF) proyek ini selama periode konstruksi dan konsesi dapat ditentukan. OCF ini akan membantu dalam perhitungan IRR, NPV, dan PI proyek.

1) Internal Rate of Return (IRR)

Menurut Ross, et.al, (2008), konsep dasar yang mendasari metode IRR adalah untuk memberikan suatu angka yang menyimpulkan keuntungan dari suatu proyek. Angka yang dihasilkan tidak bergantung pada suku bunga yang berlaku di pasar modal. IRR dianggap baik jika nilainya lebih tinggi daripada tingkat pengembalian minimal (tingkat diskonto) yang diterima. Jika IRR lebih besar daripada tingkat diskonto, hal ini menunjukkan bahwa proyek tersebut akan menghasilkan NPV yang positif. Berikut adalah rumus IRR:

$$0 = P_0 + P_1/(1+IRR) + P_2/(1+IRR)_2 + P_3/(1+IRR)_3 + \ldots + P_n/(1+IRR)_n$$

Dimana P_0 = *Initial Investment*

P_1, P_2 = *Cash Flow*

2) Net Present Value (NPV)

According to Ross, et.al, (2008), the method used to calculate NPV (Net Present Value) is by discounting project cash flows. The basic principle of investment generally states that the project is accepted if the NPV is greater than zero, and rejected if the NPV is less than zero. This NPV provides guidance in making good decisions, as a higher NPV will increase the overall value of the company. To calculate NPV, the project cash flows are discounted. The same applies in capital budgeting calculations, where it is the project cash flows that are discounted, not earnings or profits. Here is the NPV formula:

$$NPV = -C_0 + \frac{C_1}{1+r} + \frac{C_2}{(1+r)^2} + \ldots + \frac{C_T}{(1+r)^T}$$

3) Profitability Index (PI)

According to Ross, et.al, (2008), the Profitability Index is the ratio between the present value of expected future cash flows after the initial investment divided by the amount of the initial investment. It is used to show how much value will be obtained from each unit of currency invested. If the value of PI > 1, then the project is considered to generate a profit of at least one unit of currency for each unit of currency invested.

Based on the Operating Cash Flow mentioned above, the calculation of Internal Rate of Return (IRR), Net Present Value (NPV), Payback Period, Discounted Payback Period, and Profitability Index for this project without Availability Payment scheme are as follows:

1. Net Present Value (NPV): IDR -4,123,196,493
2. Internal Rate of Return (IRR): 7,20%
3. Payback Period: 28 Years
4. Discounted Payback Period: 51 Years
5. Profitability Index (PI): 0,5787

Based on the results of the calculation of financial feasibility without using Availability Payment, investment decisions can be concluded as follows:

1. NPV is negative.
2. IRR is smaller than WACC.
3. Discounted Payback Period is longer than the concession period.
4. Profitability Index is less than 1.

The calculations of Internal Rate of Return (IRR), Net Present Value (NPV), Payback Period, Discounted Payback Period, and Profitability Index for this project with the Availability Payment scheme are as follows:

1. Net Present Value (NPV): Rp 609,688,031,798
2. Internal Rate of Return (IRR): 9,28%
3. Payback Period: 19.92 Years
4. Discounted Payback Period: 48 Years
5. Profitability Index (PI): 1,0668

With the Availability Payment, this project becomes more financially feasible, because the NPV is positive and the PI is greater than 1, although the Discounted Payback Period is still quite long.

4. CONCLUSIONS

Based on the results of the research that has been carried out, several main conclusions can be drawn regarding the financial feasibility of the construction of the Bayung Lencir - Tempino - Simpang Ness Toll Road:

1. Without Availability Payment Scheme
   a. The project is not financially feasible based on the negative Net Present Value (NPV) indicator and the Internal Rate of Return (IRR) which is lower than the Weighted Average Cost of Capital (WACC).
   b. Payback period is longer than the specified concession period, thus increasing investment risk.
2. With Availability Payment Scheme
   a. The Availability Payment Scheme improves the financial viability of the project by generating a positive NPV and IRR higher than the WACC.
   b. The Profitability Index (PI) is more than 1, indicating that the project is profitable for investors and can be run sustainably.
   c. Periodic payments by the government provide revenue certainty for toll road operators and reduce investment risks associated with fluctuations in traffic volume.
3. Implications for Infrastructure Financing
   a. Availability payment can be an alternative solution for infrastructure projects that are not financially viable but have significant economic impact.
   b. The government needs to ensure fiscal sustainability to support this scheme so that it continues to provide long-term benefits for the development of toll road networks in Indonesia.

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