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# Financial Feasibility Analysis of an Autoclaved Aerated Concrete (AAC) Manufacturing Plant in East Kalimantan (Study Case of PT XYZ)

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**Abstract:** This study evaluates the financial feasibility of establishing an autoclaved aerated concrete (AAC) manufacturing plant in East Kalimantan, a region experiencing rapid construction growth driven by the development of Indonesia's new capital city. The analysis is conducted using a discounted cash flow approach within a capital budgeting framework. The financial model incorporates detailed assumptions on capital expenditure, revenue projections, cost structure, and financing structure within a ten-year projection horizon. Key feasibility indicators include Net Present Value (NPV), Internal Rate of Return (IRR), Payback Period (PP), and Profitability Index (PI), with the Weighted Average Cost of Capital (WACC) applied as the discount rate. The results indicate that the project is financially feasible, generating a positive NPV of IDR 104.738.902.831 and an IRR of 20.69%, exceeding the WACC of 10.07%, with a Payback Period of 5.3 years and a Profitability Index of 1,58. Overall, the findings suggest that the proposed AAC manufacturing plant is commercially viable, capable of supporting regional construction demand while significantly reducing cost dependency on inter-island AAC transportation from Java.

**Keywords:** Autoclaved Aerated Concrete, Financial Feasibility Analysis, Discounted Cash Flow, Manufacturing Investment, East Kalimantan.

## INTRODUCTION

The construction sector in East Kalimantan has experienced significant growth, driven largely by the development of Indonesia's new capital city, Ibu Kota Nusantara (IKN). According to the Central Statistics Agency (BPS), the construction sector contributed approximately 11.87% to East Kalimantan's economy in 2024, with an upward trend fuelled by major infrastructure projects and urbanization (Badan Pusat Statistik Kaltim, 2025). This growth is supported by the massive initial investment in IKN. A recent economic simulation study highlights that the relocation of the National Capital City triggers a multiplier effect on the regional economy. Specifically, the study identifies the processing industry as one of the key sectors benefiting the most (Agilita & Fevriera, 2024). This finding provides a strong

macroeconomic justification for establishing new manufacturing facilities in the region, as the demand for processed construction material like AAC is projected to rise in parallel with this economic expansion.

The transition from traditional masonry to AAC blocks in East Kalimantan reflects a strategic trade-off between higher upfront material cost and improved overall construction efficiency. Research shows that AAC blocks typically have a higher initial purchase price than red bricks or batako, which often creates a financial barrier to entry (Musyafa & Firdaus, 2023). A comparative study on building projects demonstrates that using AAC blocks can generate total cost savings of approximately 23.72% compared to red bricks, driven by reduced labor costs and minimal plastering requirements (Anam & Sugiyanto, 2022). This efficiency is achieved because the larger, precise dimensions of AAC blocks significantly reduce mortar usage and accelerate installation time (Walangitan & Inkiriwang, 2020). Furthermore, AAC blocks provide a high strength-to-weight ratio, which helps reduce structural dead loads and improves seismic performance relative to conventional materials (Paul et al., 2025) .

The local market faces a critical supply gap driven by a structural housing deficit. Recent data reveals a total housing backlog of 259,931 households in East Kalimantan, with 64.2% of this demand concentrated in the economic hubs of Samarinda, Kutai Kartanegara, and Balikpapan (Ministry of Housing and Residential Area, 2025). Meeting this concentrated demand via maritime logistics from Java is economically inefficient due to high freight cost and shipping constraints. Previous research indicates that logistics cost and distance between island significantly influence the volume of goods transported, suggesting that the geographical span between Jawa and East Kalimantan creates a barrier to material supply (Syahraul et al., 2024). Consequently, establishing a local manufacturing plant in East Kalimantan is proposed to capture this demand while eliminating cross-island logistics expenses.

According to the standard manual for industrial feasibility studies, financial evaluation preferably should rely on discounting methods and incorporate sensitivity analysis to ensure rigorous investment assessment (United Nations Industrial Development Organization, 1978). Applying this framework, the establishment of an AAC plant in West Jawa has been proven financially viable with an IRR of 38.61%, effectively mitigating delivery delays caused by external supply dependency (Gandhi, 2018). Similarly, with the specific context of East Kalimantan, investment in a concrete batching plant in West Kutai demonstrated high profitability using similar NPV & IRR metrics, driven by surging regional construction demand (Kalter, 2020). However, empirical research remains limited regarding AAC manufacturing in East Kalimantan. Therefore, this study aims to evaluate the financial feasibility of establishing an autoclaved aerated concrete (AAC) manufacturing plant in East Kalimantan by applying a discounted cash flow (DCF) approach, followed by sensitivity analysis to assess the project's resilience to key financial risks.

## METHOD

This study adopts a quantitative approach to assess the investment feasibility of establishing an Autoclaved Aerated Concrete (AAC) manufacturing plant in East Kalimantan. The overall decision-making process is grounded in capital budgeting which is defined as the process through which managers plan and evaluate investments in fixed assets to align with the firm's long-term strategy (Zutter & Smart, 2022) . This frameworks essential for minimizing investment risk and ensuring that companies do not take the wrong steps in the future (Kameswara et al., 2025). To ensure a comprehensive assessment, this study employs a multi-metric approach. The Net Present Value (NPV) and Internal Rate of Return (IRR) are utilized as the primary profitability indicators, aligned with recent systematic reviews identifying them as the most robust standard for capital-intensive manufacturing projects (Pranoto et al., 2025). Complementing these, the Payback Period (PP) is calculated to assess liquidity risk by

determining the exact time required to recover invested funds (Brigham & Houston, 2019), while the Profitability Index (PI) is employed to measure capital efficiency or the value created per unit of investment (Ross et al., 2013).

The data collection involves a combination of primary sources which consist of internal corporate records and secondary sources which include industry technical documentations to build a comprehensive financial model. Key financial inputs such as capital expenditures, revenue assumptions, financing structures, interest rate, and a market absorption estimates were derived directly from the company's internal data to ensure market relevance. Complementing this, technical production parameters were obtained from publicly available industry specifications. All inputs were processed in Microsoft Excel to estimate feasibility indicators over a ten-year projection horizon, incorporating the Weighted Average Cost of Capital (WACC) as the discount rate. The company cost of capital serves as the appropriate discount rate for average-risk projects, representing the opportunity cost of investment in firm's assets (Brealey et al., 2023). Furthermore, the model specifically utilizes the after-tax WACC, which adjusts the cost of debt to reflect the tax deductibility. This specification is particularly relevant for asset-intensive manufacturing projects, where a high proportion of tangible assets increases debt capacity through collateral value, thereby influencing capital structure decisions and the resulting cost of capital, especially in the case of an AAC plant manufacturing project, which requires substantial investment in fixed assets. This aligns with the recent evidence from Indonesian manufacturing firms identifying asset structure as a key determinant of capital structure and financial sustainability (Malelak et al., 2025).

## RESULTS AND DISCUSSION

### Identifying Market Analysis

The proposed AAC manufacturing plant investment aims to serve the robust market in East Kalimantan. To validate the market accessibility, this study mapped the distribution network of building material stores across 9 key regencies. Based on internal company mapping, the target market comprises 1.148 active building material stores. The distribution of these outlets serves as a key proxy for market demand concentration. The Table 1 below presents the breakdown of the potential distribution network by regions.

**Table 1. Distribution of Building Material Stores**

| Rank | Region | Number of Stores | Distributions (%) |
|---|---|---|---|
| 1 | Balikpapan | 341 | 29.7% |
| 2 | Samarinda | 322 | 28.0% |
| 3 | Kutai Timur | 98 | 8.5% |
| 4 | Kutai Kartanegara | 81 | 7.1% |
| 5 | Penajaman Paser Utara | 77 | 6.7% |
| 6 | Others | 229 | 20.0% |
| | **Total** | **1.148** | **100%** |

Source: PT XYZ (Processed Data, 2025)

The analysis reveals a pivotal market concentration in the dual economic hubs of Balikpapan and Samarinda, which command approximately 58% of the total distribution network. This dominance highlights that the primary demand for wall material sis heavily centralized in these 2 areas. Furthermore, while Penajam Paser Utara ranks fifth, its geographical proximity to Balikpapan suggests that a significant portion of the capital city's material demand is likely supported by the extensive logistics network in Balikpapan. This geographical concentration confirms the strategic viability for PT XYZ of establishing the production facility within East Kalimantan, allowing for efficient distribution to the region's

largest commercial hubs. For financial modeling purposes, drawing from the company's estimation, the aggregate absorption capacity from this network is projected to reach approximately 700.000 $m^3$ annually, serving as the baseline for revenue projections.

**Capital Expenditure and Investment Funding Analysis**

The investment in AAC manufacturing plant requires a significant capital investment. Based on the internal budget plan from PT XYZ, the total capital expenditure for the new AAC facility is estimated at IDR 199.884.268.631. This investment structure focuses heavily on physical infrastructure and machine production. Civil Works represent the largest cost component at IDR 85.620.141.431, followed by AAC Machineries at IDR 61.466.227.200 and Mechanical & Electrical Works at IDR 45.200.900.000. The remaining budget is allocated to Site Preparation at 5.323.000.000 and Support at IDR 2.274.000.000 to ensure full operational readiness.

Regarding the financing structure, PT XYZ implements a funding strategy comprising 80% bank loan (IDR 159.907.414.905) and 20% equity (IDR 39.976.853.723). The financial model assumes a fixed interest of 8% per annum based on the company's ongoing financing arrangement with a bank. The project timeline is scheduled to start construction in 2026, with commercial operations targeted to begin in second semester of 2027 (July 2027). Given the 18-month construction phase, the company utilizes a financing facility with a grace period and Interest During Construction (IDC) scheme. Consequently, interest expenses amounting to IDR 10.660.494.327 incurred during this phase are capitalized and added to the principal. This results in a total beginning debt balance of IDR 170.567.909.232 at the start of commercial operations.

The debt repayment schedule is structured over a total facility tenor of 10 years. Following the completion of the grace period, PT XYZ is schedule to begin amortization in July 2027. The repayment plan aims to settle all outstanding debts by 2035, resulting in an effective repayment period of 8.5 years. Based on the annuity method calculation, the interest burden will peak at IDR 12.770.190.754 in 2028 and gradually decline as the principal is amortized. Conversely, the principal repayment increases annually to reach its peak in 2035 at IDR 26.443.858.461. Consequently, the total loan amortization is at IDR 28.040.860.109 per annum from 2028 onwards, with the exception of the initial partial year in 2027.

**Weighted Average Cost of Capital (WACC)**

To determine the feasibility hurdle rate, the WACC is calculated based on the project's specific capital structure. Due to the capitalization of Interest During Construction (IDC), the debt portion increase, resulting a final composition of 81% debt and 19% equity.

Since PT XYZ is a private entity, the cost of equity is estimated using the capital asset pricing model with a bottom-up beta approach. By analyzing comparable public companies in the AAC sector with the selected unlevered beta of 0.74 and re-levering it against the high project's Debt-to-Equity ratio of 4,27x, the Project Beta is adjusted to 3,2. Using a risk free rate of 6,21% (adjusted for default spread) and an equity risk premium of 6,87% from Damodaran, , the calculated cost of equity is 26,39%. Meanwhile, the cost of debt is based on the interest rate of 8% per annum deducted with Indonesia corporate tax rate of 22%, the cost of debt equals to 6,24%.

Thus, the combination of cost of equity at 26,39% and after-tax cost of debt at 6,24% results in a final WACC of 10,07%. This rate will serve as the minimum acceptable rate of return (hurdle rate) and the discount rate applied to calculate the present value of the project's future cash flows. The detailed calculation is derived as follows:

$$WACC = (K_e \times W_e) + (K_d(1 - t) \times W_d)$$

$$WACC = (26{,}39\% \times 19\%) + (8\%(1 - 22\%) \times 81\%)$$

$$WACC = 10{,}07\%$$

Where:
Ke = Cost of Equity
We = Weight of Equity
Kd = Cost of Debt
Wd = Weight of Debt
t = Indonesian Corporate Tax Rate

**Production Capacity & Revenue Projection**

The production is design to align with the growing construction demand in East Kalimantan. Based on the company estimation, the total potential demand for AAC in East Kalimantan is estimated at 700.000 m³ per annum. Under normal operating conditions, PT XYZ targets to capture a significant market share by supplying approximately 304.500 m³ annually. This volume represents a market penetration of roughly 43%, positioning the company as a potential major supplier in the region.

To achieve this target, the operational plan accounts for a ramp-up production. Commercial operations are scheduled to begin in 2nd semester of 2027. Consequently, 2027 treated as a partial year with a conservative utilization rate of 40%, resulting in a production volume of 144.661 m³. From 2028 to 2036, the plant is assumed to operate at a stable utilization rate of 80%. This level serves as the management's realistic baseline for maximum output, acknowledging that maintaining a theoretical 100% capacity is operationally unfeasible due to routine maintenance and downtime. Thus, the facility is projected to produce between 296.751 m³ to 304.500 m³ annually throughout the projection period

Regarding the pricing strategy, PT XYZ set a competitive entry price of IDR 700.000 per m³ for the first two years (2027-2028) to secure market acceptance. Starting from 2028, the selling price is adjusted with an annual increase of 2% to offset inflation in the construction sector of Indonesia.

**Table 2. Production & Sales Volume and Revenue Projection**

| Year | Utilization Rate (%) | Target Annual Production & Sales Volume (m³) | Selling Price (IDR/ m³) | Total Projected Revenue |
|---|---|---|---|---|
| 2027 | 40% | 144.661 | 700.000 | 101.262.525.000 |
| 2028 | 80% | 296.751 | 700.000 | 207.725.573.601 |
| 2029 | 80% | 304.566 | 714.000 | 217.459.822.734 |
| 2030 | 80% | 304.570 | 728.280 | 221.812.393.760 |
| 2031 | 80% | 304.567 | 742.846 | 226.246.340.881 |
| 2032 | 80% | 304.575 | 757.703 | 230.777.621.391 |
| 2034 | 80% | 304.570 | 772.857 | 235.388.750.062 |
| 2035 | 80% | 304.569 | 788.314 | 240.096.044.627 |
| 2036 | 80% | 304.572 | 804.080 | 244.900.431.185 |

Source: Author's Analysis

Based on the volume and price assumptions analysis, the project is projected to generate revenue of IDR 101.262.525.000 in the first year, growing significantly to IDR 207.725.573.601 in 2028 once the operations stabilize.

## Cost Structure Analysis

The project's cost structure is classified into direct manufacturing cost, operational expenditures, financial cost, and taxation. The cost of goods sold (COGS) comprises six primary components which are raw material cost, direct processing cost, machine maintenance cost, supporting material cost, direct labor cost and other production cost. Additionally, the financial model incorporates operational expenditure (OPEX), depreciation expense and interest expense to capture general administrative activities, asset allocation and financing costs. Then, a corporate tax rate of 22% is applied to taxable income.

**Table 2. Raw Material Cost**

| Year | Raw Material Cost (Rp/ $m^3$) | Total Raw Material Cost |
|---|---|---|
| 2027 | 352.951 | 70.356.513.324 |
| 2028 | 358.930 | 143.064.505.159 |
| 2029 | 365.014 | 147.788.421.522 |
| 2030 | 371.189 | 150.484.810.211 |
| 2031 | 377.615 | 153.354.044.053 |
| 2032 | 384.018 | 156.185.462.341 |
| 2034 | 390.801 | 159.303.678.413 |
| 2035 | 397.659 | 162.456.209.264 |
| 2036 | 404.454 | 165.531.000.628 |

Source: Author's Analysis

Raw material cost represents the most significant component of cost of goods sold, contributing approximately 73% to 75% of the total production cost. The production formulation is based on the technical specifications, utilizing a mix of silica sand, cement, lime, gypsum, aluminium paste, and waste slurry. Based on the projected material consumption and market price per material, the unit raw material cost is estimated at IDR 359.951 per $m^3$ in the initial year. It's important to note that while the production volume stabilizes in 2028, the unit material cost continues to rise annually. Driven by an annual growth of 1,7% to reflect inflationary adjustments, the cost increases to IDR 358.930 per $m^3$ in 2028 and steadily climbs to IDR 411.721 per $m^3$ by the end of the projection period. Consequently, the total raw material cost is IDR 70.356.513.324 at initial year, expanding to IDR 143.064.505.159 in 2028 as production stabilizes, and reaching IDR 165.531.000.628 by the end of the projection period.

The second major component, direct processing cost, covers the energy and water inputs required for autoclaving and mixing operations. By integrating regional tariff rates with technical consumption data, the financial model derives unit costs of IDR 22.589 per $m^3$ for electricity, IDR 2.405 per $m^3$ for industrial water, and IDR 27.632 per $m^3$ for coal fuel at initial year and increasing every year to IDR 42.160 per $m^3$ at the end of the projection period. The coal is specifically modelled based on the usage of low-calorific coal (4.200 kCal/kg) sourced from local mines in East Kalimantan, indexed to the Indonesia Coal Index (ICI) 4. Collectively, these energy components contribute significantly to the unit economics. The total cost for direct processing cost at initial year (2027) is IDR 7.944.164.354. As production ramps up to operate normally for full year in 2028, the total direct processing cost is recorded at IDR 16.659.391.675, and is projected to scale to IDR 21.467.313.603 by 2036.

The machine maintenance cost is projected using the Replacement Aset Value (RAV) method based on the total machinery budget of IDR 61.466.227.200. To ensure the operational reliability, the model adopts a conservative budgeting strategy. In the initial year, the maintenance cost is set at a rate of 6,0% of RAV (IDR 3.687.973.632) to account for the "break-in period", where early-life technical adjustments and higher downtime risks are anticipated. As the plant achieves operational maturity, this rate is gradually reduced. By 2029 and going-

forward, the maintenance expenditure stabilizes at 2,0% of RAV (approximately IDR 1.23 billion annually). This steady-state assumptions is consistent with the industry benchmarks for well-managed facilities and is considered adequate to support routine preventive maintenance, thereby keeping unplanned equipment downtime at a low level of approximately 2,5% for the remainder of the projection period.

Meanwhile, the fourth component of COGS, supporting material cost, accounts for essential consumables required for the moulding, milling, and packaging processes. By factoring in technical consumption rates and benchmarked market prices, the model derives specific unit costs: IDR 9.200 per $m^3$ for mould release oil, IDR 4.950 per $m^3$ for grinding balls, and IDR 3.600 per $m^3$ for polyester strapping. Collectively, these supporting materials add approximately IDR 17.750 per $m^3$ to the production cost. As operations normally operates from 2029 going forward, these consumables form a significant recurring expenditure, with projected annual cost reaching approximately IDR 2.7 billion for mould oil, IDR 1.4 billion for grinding balls and IDR 1 billion for strapping.

The fifth component on the cost structure of this study is direct labor cost. The cost is projected based on the workforce plan provided by the PT XYZ. To manage the initial ramp-up phase in 2027, the plant will operate with 55 personnel running a 2-shift system. As operations expand to full capacity in 2028, the headcount increases to 83 employees to support a 3-shift production cycle. The financial model adopts the East Kalimantan Minimum Wage (UMP) as the baseline, and projected to IDR 4.500.000 in 2027, with an annual increase of 6,5% to adjust for inflation. Consequently, the total annual labor cost rises from IDR 1.494.000.000 in 2027 to IDR 5.171.107.500 in 2028.

The final component in COGS, other production costs, encompasses essential factory overheads required to maintain operational readiness and on-site logistics. Based on the PT XYZ estimates, this category aggregates 3 fixed annual expenditures. First, the fixed electricity capacity charge (subscription) amounts to IDR 1.139.124.600 in 2027 and in 2028 to 2036 at fixed amount of IDR 2.278.249.200. Second, the plant budgets IDR 4.080.000.000 annually for Industrial Solar Fuel in 2028 to 2036 (while IDR 2.040.000.000 in 2027) to power support vehicles like forklifts, wheel loaders, backup generators and other operational vehicles. Third, heavy equipment rental is allocated at IDR 540.000.000 from 2028 to 2036 (IDR 270.000.000 in 2027) to support general site operations. As these are fixed obligations, they create a stable cost structure totaling IDR 6.898.249.200 annually from normal operations in 2028 to 2036, while the total of these costs in 2027 are IDR 3.449.124.600.

Operational expenditure (OPEX) includes 3 primary categories: personnel salaries, marketing initiatives, and general administrative overheads. The most significant component, personnel cost, is projected at IDR 1.188.000.000 during the 6-month operation in 2027. Reflecting a full year, this expenditure rises to IDR 2.530.440.000 in 2029, with an annual increase of 6,5% to accommodate regional wage adjustments. To support commercial activities, a fixed marketing budget of IDR 500.000.000 is allocated annually throughout the projection period. Additionally, other administrative costs are set at IDR 341.000.000 in 2027, projected to grow by 4% annually, ensuring a coverage for non-itemized office needs.

To reflect the consumption of economic benefits accurately, the model employs the straight-line depreciation over 10-year projection period. A key accounting assumption in this analysis is the capitalization of Interest During Construction (IDC), whereby these financing costs are allocated proportionally to the asset base. Consequently, the total depreciation expense is fixed at IDR 13.441.023.125 annually from 2027 to 2036. This figure is derived from the write-down of 3 major asset categories which are civil works, mechanical & electrical works, and AAC machineries.

To support capital requirements, the project utilizes debt financing repaid through an annuity method. The interest expense reaches its peak at IDR 12.770.190.754 in 2027,

coinciding with the first full year of steady-state operations. Subsequently, the annual interest expense decreases significantly to IDR 1.597.001.648 by 2035 and reaching zero in 2036 upon full repayment. Over the entire loan period, the total cumulative interest is IDR 67.779.401.698

To determine the corporate income tax expense, the financial model aggregates all revenue streams and subtracts total expenses, which have been described previously, to arrive at Earnings Before Tax (EBT). The analysis then applies the corporate income tax rate of 22% to taxable income, in accordance with the Harmonization of the Tax Regulations (Undang Undang Harminisasi Perpajakan). The projection of earnings before tax and the income tax expense is presented in the following table.

**Table 3. Projected EBT & Income Tax Expense**

| Year | Earnings Before Tax (EBT) | Income Tax Expense (@22%) |
|---|---|---|
| 2027 | 8.117.751.445 | 1.994.825.993 |
| 2028 | 34.319.499.388 | 7.744.284.814 |
| 2029 | 40.396.980.924 | 9.066.288.071 |
| 2030 | 43.210.992.921 | 9.685.407.446 |
| 2031 | 46.031.536.924 | 10.305.889.642 |
| 2032 | 49.093.441.401 | 10.979.538.615 |
| 2034 | 52.063.501.498 | 11.632.971.328 |
| 2035 | 55.220.151.497 | 12.327.399.092 |
| 2036 | 58.686.806.404 | 13.090.072.918 |

Source: Author's Analysis

As illustrated in the table, the project demonstrates commercial viability, achieving positive earnings before tax starting from the initial year of operation. In the first full year of production (2028), the project records an EBT of IDR 34.319.499.388, resulting in a income tax expense of IDR 7.744.284.814. As revenue scales and interest expenses decline, the taxable income grows consistently, leading to a projected income tax expense of IDR 13.090.072.918 by the end of the projection period.

**Financial Feasibility Analysis Using Discounted Cash Flow**

To determine the project's feasibility and its potential to yield a profitable return, this study employs the Discounted Cash Flow (DCF) method to analyze key investment criteria like Net Present Value (NPV), Internal Rate of Return (IRR), Payback Period (PP) and Profitability Index (PI). Furthermore, to test the project's resilience to market and operational volatility, a sensitivity analysis is conducted by adjusting the key variables (specifically revenue and cost of goods sold) within a range of ±5% to ±20% from the baseline projections.

**Working Capital Analysis**

Before assessing the investment feasibility, a working capital analysis is conducted to estimate the project's operational cash requirements. The financial model incorporates a working capital schedule based on specific turnover assumptions. The projection sets the collection period at 30 days and establishes an inventory holding period of 15 days to maintain sufficient safety stock. Conversely, the credit terms with suppliers allow for payment period of 45 days. This structure basically results in a Cash Conversion Cycle (CCC) of 0 days.

**Financial Feasibility Results**

**Table 4. Projected FCFF & Present Value of Cash Flow (2026 – 2031)**

| Description (in IDR Million) | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 |
|---|---|---|---|---|---|---|
| EBIT | - | 14.898 | 47.487 | 52.345 | 53.838 | 55.231 |
| (-) Income Tax | - | 3.278 | 10.447 | 11.516 | 11.844 | 12.151 |
| **NOPAT** | - | **11.620** | **37.040** | **40.829** | **41.994** | **43.080** |
| | | | | | | |
| (+) Depreciation Expense | - | 14.186 | 14.186 | 14.186 | 14.186 | 14.186 |
| (+/-) Net Changes in WC | - | (5.635) | (1.147) | (338) | (182) | (158) |
| (-) Capex | (199.884) | - | - | - | - | - |
| **FCFF** | **(199.884)** | **20.172** | **50.079** | **54.677** | **55.998** | **57.107** |
| Cumulative Cash Flow | (199.884) | (179.712) | (129.633) | (74.956) | (18.958) | 38.149 |
| | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 |
| WACC | 10,07% | 10,07% | 10,07% | 10,07% | 10,07% | 10,07% |
| Discount Factor | 0,91 | 0,83 | 0,75 | 0,68 | 0,62 | 0,56 |
| **PV of Cash Flow** | **(181.604)** | **16.651** | **37.557** | **37.256** | **34.667** | **32.120** |
| Cumulative PV of Cash Flow | (181.604) | (164.953) | (127.396) | (90.140) | (55.473) | (23.353) |

Source: Author's Analysis

**Table 5. Projected FCFF & Present Value of Cash Flow (2032 – 2036)**

| Description (in IDR Million) | 2032 | 2033 | 2034 | 2035 | 2036 |
|---|---|---|---|---|---|
| EBIT | 56.747 | 58.045 | 59.393 | 60.902 | 62.113 |
| (-) Income Tax | 12.484 | 12.770 | 13.066 | 13.398 | 13.665 |
| **NOPAT** | **44.263** | **45.275** | **46.326** | **47.504** | **48.448** |
| | | | | | |
| (+) Depreciation Expense | 14.186 | 14.186 | 14.186 | 14.186 | 14.186 |
| (+/-) Net Changes in WC | (174) | (157) | (165) | (183) | (160) |
| (-) Capex | - | - | - | - | - |
| **FCFF** | **58.275** | **59.304** | **60.347** | **61.507** | **62.474** |
| Cumulative Cash Flow | 96.424 | 155.728 | 216.075 | 277.582 | 340.056 |
| | | | | | |
| | 7 | 8 | 9 | 10 | 11 |
| WACC | 10,07% | 10,07% | 10,07% | 10,07% | 10,07% |
| Discount Factor | 0,51 | 0,46 | 0,42 | 0,38 | 0,35 |
| **PV of Cash Flow** | **29.779** | **27.533** | **25.455** | **23.572** | **21.753** |
| Cumulative PV of Cash Flow | 6.426 | 33.959 | 59.414 | 82.986 | 104.739 |

Source: Author's Analysis

**Table 6. Investment Feasibility Indicators**

| Investment Criteria | Results |
|---|---|
| Net Present Value (NPV) | IDR 104.738.902.831 |
| Weighted Average Cost of Capital (WACC) | 10,07% |
| Internal Rate of Return (IRR) | 20,69% |
| Payback Period (PP) | 5,3 Years |
| Profitability Index (PI) | 1,58 |

Source: Author's Analysis

Based on the investment results shown in the Table 6, the project generates a Net Present Value (NPV) of IDR 104.738.902.831, an Internal Rate of Return (IRR) of 20,69%, a Payback

Period (PP) of 5,4 years, and a Profitability Index (PI) of 1,58. These figures indicate that the AAC plant project is financially feasible because the NPV > 0, the IRR exceeds the WACC, the payback period is shorter than the project's economic life, and the PI > 1.

### Financial Feasibility Results – Sensitivity Analysis of Revenue

**Table 7. Investment Feasibility Indicators**

| Deviation | NPV | IRR | Conclusion |
|---|---|---|---|
| Revenue -20% | (73.271.164.632) | 0,40% | Not Feasible |
| Revenue -15% | (28.768.647.766) | 6,60% | Not Feasible |
| Revenue -10% | 15.733.869.100 | 11,83% | Feasible |
| Revenue -5% | 60.236.385.965 | 16,47% | Feasible |
| Base Case 0% | 104.738.902.831 | 20,69% | Feasible |
| Revenue +5% | 149.241.419.697 | 24,62% | Feasible |
| Revenue +10% | 193.743.936.563 | 28,32% | Feasible |
| Revenue +15% | 238.246.453.428 | 31,83% | Feasible |
| Revenue +20% | 282.748.970.294 | 35,20% | Feasible |

Source: Author's Analysis

The sensitivity analysis in the Table 7 indicates that the project's financial viability is sensitive to fluctuations in revenue. While the project remains feasible with a 10% decline in revenue (positive NPV of IDR 15.733.869.100), a further decrease to -15% triggers a financial loss, resulting a negative NPV of -28.768.647.766. This suggests that the project has a safety margin around 10% to 14% regarding sales targets. The decline beyond this threshold will render the investment unfeasible.

### Financial Feasibility Results – Sensitivity Analysis of COGS

**Table 8. Investment Feasibility Indicators**

| Deviation | NPV | IRR | Conclusion |
|---|---|---|---|
| COGS -20% | 225.711.037.789 | 30,90% | Feasible |
| COGS -15% | 195.468.004.049 | 28,49% | Feasible |
| COGS -10% | 165.224.970.310 | 25,99% | Feasible |
| COGS -5% | 134.981.936.571 | 23,40% | Feasible |
| Base Case 0% | 104.738.902.831 | 20,69% | Feasible |
| COGS +5% | 74.495.869.092 | 17,85% | Feasible |
| COGS +10% | 44.252.835.353 | 14,85% | Feasible |
| COGS +15% | 14.009.801.613 | 11,64% | Feasible |
| COGS +20% | (16.233.232.126) | 8,16% | Not Feasible |

Source: Author's Analysis

The sensitivity analysis in the Table 8 demonstrates that the project exhibits stronger resilience to production cost fluctuations compared to revenue changes. The analysis shows that the AAC plant remains financially viable even if the COGS increases by 15%, maintaining a positive NPV of IDR 14.009.801.613. However, the project reaches its breaking point at a 20% surge in COGS, where the NPV becomes negative to IDR -16.233.232.126.

## CONCLUSION

The results of this study indicate that the investment in the Autoclaved Aerated Concrete (AAC) manufacturing plant in East Kalimantan is financially feasible. With a Net Present Value (NPV) of IDR 104.738.902.831 and Internal Rate of Return (IRR) of 20,69%, above the WACC, the project delivers a strong return while achieving capital recovery within 5,3 years.

This viability is fundamentally strengthened by a strong market accessibility, where the distribution network is concentrated in the dual economic hubs of Balikpapan and Samarinda, allowing PT XYZ to directly capture the acute housing backlog intensified by the Ibu Kota Nusantara (IKN) migration while eliminating cross-island logistics inefficiencies. However, the project resilience depends on revenue stability. While the investment can absorb increase in production costs, the sensitivity shows that a 15% drop in sales would make the project unviable. Accordingly, PT XYZ should prioritize focused on marketing initiatives directed at a high-demand population clusters to ensure sales remain within sustainable range. Thus, this study is expected to serve as a practical reference for investors and industry stakeholders in making decisions regarding infrastructure-related investments in Indonesia.

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