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INVESTMENT ANALYSIS OF JETTY CONSTRUCTION OF EAST KALIMANTAN CHEMICAL INDUSTRIAL ESTATE

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Abstrak

Kawasan Industri Kimia Kalimantan Timur merupakan proyek industri kimia berbasiskan batubara pertama di Indonesia bahkan di Asia Tenggara. Industri ini juga mendukung program pemerintah yakni hilirisasi batubara yang menjadi arah kebijakan pemerintah untuk dapat meningkatkan nilai tambah dalam negeri. Nilai tambah ini selain bertujuan untuk mengubah Batubara mentah menjadi produk-produk jadi seperti amonia, metanol, DME dan turunan lainya juga membuka peluang pertumbuhan perekonomian di Indonesia. Tujuan utama dari penelitian ini adalah untuk menganalisis kelayakan investasi dalam pembangunan pelabuhan sebagai pendukung utama proyek pengembangan dan operasional kawasan industri kimia ini. Pembangunan pelabuhan ini diharapkan dapat memperlancar proses pembangunan, memfasilitasi distribusi material bahan bangunan dan logistik yang efisien serta menunjang operasional kawasn indutri kimia yang ada. Metode analisa yang digunakan dalam penelitian ini adalah analisa *Net Present Value (NPV), Internal Rate of Return (IRR), dan Payback Period (PBP)* yang dikembangkan oleh Damodaran. Hasil penelitian menunjukkan bahwa pembangunan Pelabuhan Konstruksi PT. BCDE memiliki prospek kelayakan finansial yang cukup baik, dengan NPV dan IRR yang positif, dan Payback Period dalam jangka waktu yang dapat diterima. Hasil Sekenario analisis dengan metoda EAA menunjukkan bahwa Skenario C merupakan sekenario yang layak dipilih untuk investasi jangka Panjang.

Kata Kunci: Pembangunan Dermaga Konstruksi, Analisa Investasi, Studi kelayakan

Abstract

The East Kalimantan Chemical Industrial Area is the first coal-based chemical industry project in Indonesia and even in Southeast Asia. This industry also supports the government's program, namely coal downstreaming, which is the direction of government policy to increase domestic added value. This added value, in addition to aiming to convert raw coal into finished products such as ammonia, methanol, DME and other derivatives, also opens up opportunities for economic growth in Indonesia. The objective of this research is to analyze the feasibility of investment in the construction of a port as the main supporter of the development and operational project of this chemical industrial estate. The construction of this port is expected to facilitate the construction process, facilitate the distribution of building materials and efficient logistics, and support the operation of the existing chemical industrial area. The analysis methods used in this study include the analysis of Net Present Value (NPV), Internal Rate of Return (IRR), and Payback Period developed by Damodaran. The results of the study indicate that the construction of the PT. BCDE Construction Port has a fairly good financial feasibility prospect, with positive NPV and IRR, and a Payback Period within an acceptable time frame. The results of the scenario analysis using the EAA method show that Scenario C is a scenario that is worthy of being chosen for long-term investment..

Keywords: Construction Jetty Development, Investment Analysis, Feasibility Study

INTRODUCTION

Indonesia is one of the largest coal producers in the world. If we look at historical production data, it turns out that Indonesia's coal production has reached a record high in recent years. Coal production in 2022 exceeds the record for highest coal production achieved in 2019. Where in 2019 national coal production was 616.2 million tons. In 2021, the country produced 614 million tons of coal, which is less than this amount. This country has abundant coal reserves and active coal mines, especially on the island of Kalimantan with reserves of more than 40%.

PT BCDE is a business that develops chemical industrial zones based on coal as well as a range of other chemical industries in East Kalimantan. PT BCDE covers

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approximately 1000 hectares and is strategically located in East Kalimantan, Indonesia. This company's main vision is to become a coal-based processing center that provides added value for Indonesia. To achieve its vision, this company has set its mission to create investment projects that are economically viable, environmentally viable and socially responsible.

PT BCDE's main operational focus centers on providing critical infrastructure and ancillary services to facilitate chemical production efforts. With a comprehensive offering that includes essential utilities, a strong transportation network, and strict compliance with regulatory standards, PT BCDE seeks to attract potential investors who wish to build chemical production facilities and develop the infrastructure necessary to sustain the growth of this industrial sector in the future.

The corporation wants to expand its industrial operation into 15 different sectors, each of which deals with a different kind of chemical product. These sectors consist of Coal to Ammonia (CTA), Coal to Methanol (CTM), Biodiesel, Oil Refining, Olefin, Urea, Purified Terephthalic Acid (PTA), Ammonium Nitrate, nonethylene Glycol, Polyethylene Terephthalate (PET), Dimethyl Ether (DME), Acetic Acid, Soda Ash, Polyvinyl Chloride (PVC), and Nylon.

Table 1 provides an overview of the production capacity of coal-based chemical industrial areas that have the potential to be developed.

Table 1. Production Capacity

No	Description	Production Capacity
1.	Industri Coal to Methanol	5.500 T/Day (MTPD) (Methanol), 0,82 Ton/Jam (Sulphur)
2.	Oil Mill Industry	2500 Ton/Day (Ammonia), 1000 MMSCFD (Hydrogen)
3.	Biodiesel Industries	1.100 Ton/Day
4.	Industri Coal To Ammonia	660,000 tons/year
5.	Industri Olefins	300,000 – 350,000 tons/year
6.	Urea and NPK Industry	1,000,000 tons/year
7.	Industri Purified Terepthalic Acid – PTA	600,000 tons/year
8.	Industrial Ammonium Nitrate	300,000 Tons/Year
9.	Monoethylene Glycol Industrial	330,000 tons/year
10.	Industri Polyethylene Terephthalate (PET)	1,000,000 tons/year
11.	Industri Dimethyl Ether (DME)	300,000 Tons/Year
12.	Industri Acetic Acid	100,000 Tons/Year
13.	Industrial Soda Ash	10,000 tons/year
14.	Polyvinyl Chloride Industrial (PVC)	10,000 tons/year
15.	Nylon Industry	10,000 tons/year

Source : PT.BCDE. 2020

In pursuing the full potential of the chemical industry, the company will integrate with investors and industrial partners. This initiative will encourage regional development, create jobs, and ultimately increase economic wealth in the area. These factors place PT BCDE in a strategic position—not only in Indonesia but also abroad. The location is ideal; This is complemented by a well-drafted business plan that considers all aspects of sustainability.

However, since the establishment of the PT BCDE Company was launched in 2009 and after the establishment of a coal gasification plant was launched in 2020, this project has not been able to be implemented properly because there is a shortage of regional development costs due to limited transportation access. Transportation or logistics costs for materials to arrive at the location are very expensive, because the nearest port cannot be used to unload all construction materials, apart from area limitations it is also related to port permits which will expire along with the expiration of PT ABC's coal mining permit in 2031. The company does not want to take risks if it has carried out port development with large investment costs by expanding the existing port but without certainty whether the port can be used in the long term to support the construction and operation of the existing chemical industrial estate until phase 2.

In addition to the planned jetty expansion at the PT ABC-owned port, there are a number of other project schemes that are anticipated to be the best means of addressing the issue of transporting building materials as a part of the development of an East Kalimantan chemical industrial area. The alternative scheme includes building a port within the Chemical Industrial Estate itself. To deepen the analysis, two project scenario schemes are presented, namely the first port scheme, namely building a port that is only

used for construction and operations in the first phase and the second alternative project scheme is building a port that can be used from construction and operation of phase 1 and phase 2 up to 2051 in accordance with the existing chemical industrial estate permit.

METHODOLOGY

The objectives of this research are as follows, in accordance with the research background in the previous chapter: (1) Find and analyze various alternative investment schemes available for the construction of a jetty in the industrial area; (2) Evaluate the feasibility of alternative investment schemes through technical, financial and risk analysis; and (3) Develop strategic recommendations for industrial area management based on the results of analysis and evaluation in points 1 and 2.

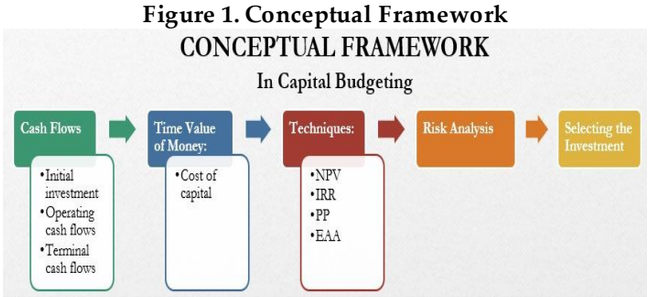
The research steps were carried out in stages including introduction, literature review, research and methodology, analysis, conclusions and recommendations. Collection of existing data, such as primary data obtained from Company management, namely financial data, budgeting and port operational targets. Secondary data regarding port service rates was obtained from literature, national media, observations and direct interviews with Port management PT. Pelindo in Samarinda.

Capital budgeting is the process of assessing and choosing long-term investments that align with the business's objectives to maximize owner value. (Gitman & Zutter, 2015). Companies can use capital budgeting analysis to determine whether an investment project is feasible from a financial standpoint. It is feasible to support management in achieving organizational objectives, such as boosting shareholder wealth.

To determine which investment projects have the greatest profit potential, the cash flows from each project must be calculated, then an assessment of the uncertainty associated with the overall cash flows is carried out. There are general approaches to evaluating long-term asset investments (Peterson & Fabozzi, 2002), including calculating the Payback Period (PBP), Net present value (NPV), Internal rate of return (IRR).

Operating costs are annual expenses that generate profits. Capital expenditure is monetary expenditure made by a company with the aim of generating profits for more than one year. Not all capital expenditures on fixed assets are fixed assets, but they are capital expenditures (Gitman & Zutter, 2015).

Figure 1. Conceptual Framework



Source: Author , 2024

Cash Flow, Time Value of Funds, Techniques, Risk Analysis, and Investment Selection are some of the concepts that form the conceptual framework for financial analysis, as shown in Figure 1.

This study will concentrate on capital budgeting, because there are three stages that must be passed to get the right analysis. The first stage is forecasting, which consists of two parts: port maintenance and port capacity. The second stage is projection. Forecasting service and throughput capacity for the future of the port is needed to carry out projections. The following step, which is the financial analysis itself and risk

analysis, is completed after being aware of the current predictions in order to make sure that investing in this port expansion project is both financially possible and has manageable risks.

As previously said, projects A, B, and C are the three project schemes for which a financial analysis of their company financial models will be performed in this research. The first alternative, called Project A, calls for enlarging an existing port. The second scheme, Project B, begins development exclusively for phase 1 operational capacity in the chemical industrial region, while the third scheme, Project C, begins construction for both phase 1 and phase 2 operational capacity in the industrial area.

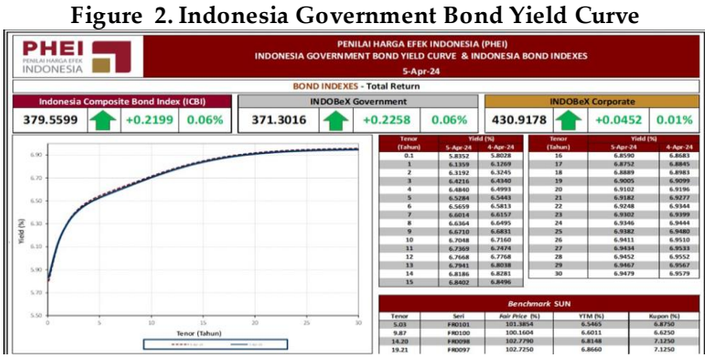
To determine project costs for various capital structures, convert the estimated price of port services into revenue and use the Weighted Average Cost of Capital (WACC). Next, do a feasibility study on all net present value (NPV) acceptance criteria. During the evaluation phase, the net present value (NPV) will be determined using the DCF approach, which considers the time value of money to determine the profitability of an investment. Following that, a risk analysis is conducted to assess the impact of changes in input parameters and identify risk variables. Because this project will incur significant capital expenses, careful assessment of the advantages of this improvement project is required to assist management in making decisions.

RESULT AND DISCUSSION

A. Weighted Average Cost of Capital (WACC)

To determine the capital cost of a project, the cost of equity must be computed. The Capital Wealth Forecasting Method (CAPM) will be used in this study to estimate the cost of equity. This technique of calculating the cost of equity requires the risk-free rate, beta, and risk premium. The free risk level is estimated using yield data for ten-year Indonesian government bonds beginning in April 2024. The project is partially funded by corporate equity and the remainder through debt. The WACC for scenario A is 8.36%, whereas those for scenarios B and C are 9.45%.

Figure 2. Indonesia Government Bond Yield Curve



Source: PHEI, 2024

B. Port Service Rates

A port will generate more profits than losses if it operates economically. The relationship between these two flows, as well as the assessment of how economically effective a port is, is not influenced by the actual revenue flow to the port. According to UNCTAD (1997), the pricing system used and the resulting cost differences lead to an increase in the income of port entities.

Based on benchmarks that have been carried out at several ports in Indonesia, prices for port services can be seen in the table below:

Table 2. Other Port Service Charge

Charge Estimation (Benchmarking)		
Liquid per ton	Rp 27.000,00	Priok
General Cargo per ton	Rp 180.000,00	Priok
General Cargo per ton	Rp 197.400,00	Karingangau
General Cargo per ton	Rp 215.400,00	Samarinda

Source: Resut of Author's interview and literature, 2024

Table 3 below shows the prices of port services, which are set by companies based on factors such as port location, accessibility, and type of material, as shown in Table 2.

Table 3. Port Service Rate Plan

Material	Price per Ton/M3
Bulk Cargo	Rp 160.000,00
Goods Cargo	Rp 320.000,00
Liquid Cargo	Rp 83.600,00

Source: PT.BCDE, 2024

C. Rate Escalation

The magnitude of change in port service pricing is still taken into account when predicting prices. This is derived using historical data on loading and unloading rates for 20' FCL port containers, which began at Rp. 650,000 in 2016 and grew to Rp. 750,000 in 2022. Thus, prices have increased by IDR 100,000 over the previous six years, or 2% every year. Based on this information, the price increase for port services is expected to be 2%.

D. Financial Analysis

In financial analysis, the Discounted Cash Flow DCF technique is used to calculate the economic evaluation after acquiring all aspects of the assessment mode.

1. Revenue Projections: The port makes a lot of money from loading and unloading services for all the materials there. Table 4 below shows the revenue projection results from the three scenarios.

Table 4. Revenue All Scheme

Year	Skenario A	Skenario B	Skenario C
2025	Rp108,160,000,000	Rp108,160,000,000	Rp108,160,000,000
2026	Rp189,120,000,000	Rp189,120,000,000	Rp189,120,000,000
2027	Rp234,880,000,000	Rp234,880,000,000	Rp234,880,000,000
2028	Rp235,200,000,000	Rp235,200,000,000	Rp235,200,000,000
2029	Rp170,720,000,000	Rp235,928,000,000	Rp235,928,000,000
2030	Rp132,976,000,000	Rp236,264,000,000	Rp236,264,000,000
2031	Rp320,000,000	Rp236,568,000,000	Rp236,568,000,000
2032	Rp0	Rp227,672,160,000	Rp328,040,160,000
2033	Rp0	Rp219,407,875,200	Rp334,600,963,200
2034	Rp0	Rp211,146,433,344	Rp394,523,175,744
2035	Rp0	Rp215,369,362,011	Rp456,708,436,404
2036	Rp0	Rp219,676,749,251	Rp521,223,298,221
2037	Rp0	Rp224,070,284,236	Rp588,136,071,136
2038	Rp0	Rp228,551,689,921	Rp657,516,865,648
2039	Rp0	Rp233,122,723,719	Rp729,437,637,512
2040	Rp0	Rp237,785,178,194	Rp803,972,233,504
2041	Rp0	Rp242,540,881,758	Rp670,554,202,506
2042	Rp0	Rp247,391,699,393	Rp683,965,286,556
2043	Rp0	Rp252,339,533,381	Rp697,644,592,287
2044	Rp0	Rp257,386,324,048	Rp711,597,484,133
2045	Rp0	Rp262,534,050,529	Rp725,829,433,816
2046	Rp0	Rp267,784,731,540	Rp740,346,022,492
2047	Rp0	Rp273,140,426,170	Rp755,152,942,942
2048	Rp0	Rp278,603,234,694	Rp770,256,001,801
2049	Rp0	Rp284,175,299,388	Rp785,661,121,837
2050	Rp0	Rp289,858,805,376	Rp801,374,344,273
2051	Rp0	Rp295,655,981,483	Rp817,401,831,159
Total	Rp1,071,376,000,000	Rp6,444,333,423,634	Rp14,450,062,105,171

Source: Author Analysis, 2024

2. Operating Cash Flow: Cash flow forecasts show how much money a firm will receive over a given period of time, as well as the advantages of its activities. A company's free cash flow is the amount of money available for distribution after deducting taxes, working capital, and investments from its operational cash flow. After subtracting all expenditures and investments, FCFF is used to calculate corporate profitability. One of the benchmarks used to examine and analyse an organization's financial well-being. Port development is financed using 60% loans

or debt. A positive anticipated cash flow value means that the project is profitable. It also demonstrates that the company has earned sufficient money to meet its operational expenses and investment operations. When picking investment projects based on the total present value (NPV) produced by economic research, such as utilizing a discounted cash flow model.

E. Capital Budgeting Analysis

1. Net Present Value (NPV): To evaluate if an investment is viable, future cash flows must be discounted to present value. The Weighted Average Cost of Capital (WACC) is used as the discount rate in this discounting technique. Scenario A will be discounted at an 8.36% WACC. Scenarios B and C will likewise be discounted, with a WACC of 9.45%.
2. Internal Rate of Return (IRR): In addition, the IRR in scenario A is around 24.36%, the IRR in scenario B is 10.98%, and the IRR in scenario C is 11.40%, each of which has an IRR that is greater than the cost of capital.
3. Payback Period (PBP): Table 5 column 9 shows the investment payback period (PBP) based on the calculations found in the table.

Table 5. Summary Capital Budgeting Analysis of All Project Scheme

Project	Variable	Escalation	Tax	Debt Ratio	WACC	NPV	IRR	PBP	Project Life
A	*Price / Revenue*	*2%*	*30%*	*60%*	*8.36%*	Rp133,898,220,716	24.36%	3 Years 6 Months	7 years
	Direct Cost	*2%*							
	Indirect Cost	*10%*							
B	*Price / Revenue*	*2%*	*10%*	*60%*	*9.45%*	Rp197,995,750,601	10.98%	19 Years 1 Months	27 years
	Direct Cost	*2%*							
	Indirect Cost	*10%*							
C	*Price / Revenue*	*2%*	*10%*	*60%*	*9.45%*	Rp463,271,448,824	11.40%	20 Years 6 Month	27 years
	Direct Cost	*2%*							
	Indirect Cost	*10%*							

Source: Author Analysis, 2024

4. Equivalent Annual Annuity (EAA): Table 5 demonstrates that project A has a 7-year project time, but projects B and C both have 27-year project periods. To directly compare projects of different durations, utilize the equivalent annual annuity (EAA) computation approach. The EAA approach calculation study reveals that scheme project A has an annual annuity value of 26,878,073,639, while Project B scheme is worth IDR 21,385,368,986, and Project scheme C is worth IDR 50,037,593,451 each year. The calculation results above show that the Scheme C project has the highest annual annuity value. Therefore, project scheme C can be applied to this project to obtain maximum benefits.

F. Risk Analysis

Risk analysis is used to determine how the values of several independent variables impact one dependent variable. Capital budgeting involves combining an overall appraisal of present value with pessimistic (worst case), most probable (base case), and optimistic (best case) cash inflow estimates. This broad scenario technique is utilized for capital budgeting. Three major criteria determine the viability of the BCIP port development project: (1) Direct Cost Escalation; (2) Tax rates; and (3) Debt ratio. The minimum and maximum values of each parameter are calculated using tax regulations and assumptions relevant to the port project. These numbers are then applied to the worst and best project situations. Table 6 presents the risk analysis.

Table 6. Risk Analysis of Project Schame C

Scenario Selector	Worst Case	Base case	Best Case
Direct Cost Escalation	3%	2%	1%
TAX	30%	10%	0%
Debt Ratio	50%	60%	70%
NPV	**Rp55,688,311,630**	**Rp463,271,448,824**	**Rp761,502,696,030**

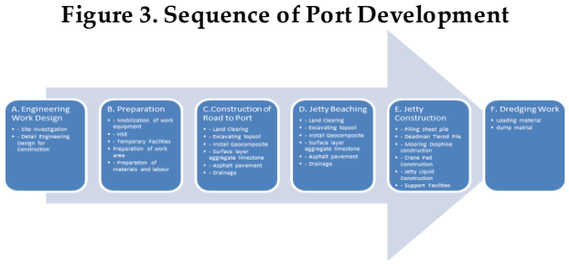
Source: Author Analysis, 2024

Risk analysis reveals that the worst-case scenario for all factors at the same time is that the NPV reduces to IDR 55,688,311,630, while the best-case scenario is that the NPV increases to IDR 761,502,696,030, with a best-to-worst case range of IDR 705,814,384,400.

G. Implementation Plan

Several works are involved in the process of completing the port building project, as indicated in the list and sequence of works in the accompanying network diagram (Figure 3):

Figure 3. Sequence of Port Development



Source: Author, 2024

With the development of a port in the industrial area, the logistics process becomes more efficient, namely allowing the planned delivery of production materials and the arrival of construction materials to be cheaper and on time according to plan so that it can increase profits for the company. Supervision and control of the project plan must be carried out to ensure that the project can run well. Supervision and control from various parties involved in the project is needed to reduce deviations between planning and implementation. The implementation plan is created based on the recommendations of the project technical analysis. Engineering work design, preparation, implementation and monitoring of the project begins in 2024. Table 7 shows the detailed implementation plan.

Table 7. Implementation Plan

No	Description	PIC	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051
A	Engineering Work Design	Engineering Dept																												
B	Preparation	Infrastructure Dept.																												
C	Construction of Road to Port	Project Dept.																												
D	Jetty Beaching	Project Dept.																												
E	Jetty Construction	Project Dept.																												
F	Dredging Work	Operation Dept																												
G	Port Operation Phase 1	Operation Dept																												
H	Port Operation Phase 2	Operation Dept																												
I	Monitoring & Controling	Engineering Dept																												

Source: Author, 2024

CONCLUSION

In accordance with the research goals, this study conducted several analyses, including a preliminary examination of internal and external elements that might impact the success of the existing coal-based chemical sector. Government assistance to downstream coal projects provides special benefits. However, the location of this industrial sector, remote from public ports, is a hindrance to its growth.

To overcome this logistics transportation problem, we have carried out several schemes, including borrowing a jetty belonging to a nearby coal company to expand or modify an existing pier or to build a new pier at the port. However, we hope that the port can be built at the BCIP location itself so that it can speed up the process of developing the chemical industry area as a whole even though it requires investment in development costs at this time.

However, in order to assess whether or not this project is possible for PT. BCDE, as the owner and manager of the port area to be created, a financial feasibility analysis is

required in addition to the goal of providing technological advantages. To establish an investment's viability, future cash flows must be discounted to their present value. The discount rate employed in the discount procedure is WACC 9.45%, with a 2% annual increase.

Using capital budgeting approaches, project schemes A, B, and C are demonstrated to be financially viable, with positive NPV values and IRRs larger than WACC. Due to the varying project ages, a financial feasibility study is necessary utilizing the Equivalent Annual Annuity (EAA), and when compared to current project schemes, project scheme C gives a larger EAA value for the Company than other project schemes. Aside from that, the Port Development project scheme in Industrial Areas, or project scheme C, has a larger NPV value than the other project schemes. During this resesearch, we encouraged management to invest in the Port Development project in the Industrial Estate to build with the development of all Phases both of phases 1 and 2 of the Chemical Industrial Estate in East Kalimantan with an NPV of IDR 463,271,448,828, IRR 11.4%, and a PBP of 20.5 years.

After this project is done, more research will be necessary to support port operations. The author will continue to do operational research, including continuous improvement, so that he may not only monitor port operations but also analyze, control, and enhance systems or develop new ways if abnormalities arise. In terms of past financial expectations. To preserve the sustainability of effective and efficient port operations by growing earnings and adding value for all stakeholders, boosting market share and minimizing operational costs remains a major objective.

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