

Financial Analysis and Fast Tracking of Sponge Ferro Alloy Smelter Construction Project at PT Sebuku Iron Lateritic Ores in Sebuku Island, South Kalimantan

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Abstract

PT SILO executed a smelter project on Sebuku Island, South Kalimantan, worth US\$ 51.5 million to process 4,725,000 WMT/year of iron laterite ore into 1,701,325 DMT/year of Sponge Ferro Alloy. The Smelter was built to increase the added value of minerals in accordance with UU No. 4/2009 on mineral and coal mining. Financial analysis is carried out to determine the feasibility of the project and its investment capability in providing benefits. Furthermore, fast tracking analysis is carried out to determine the opportunities for accelerating the project completion schedule and its effect on project feasibility. The results showed that the project was financially feasible with an NPV of US\$ 86,209,478; IRR of 16.18%; PBP for 12.76 Years; BCR of 1.0520; and BEP at US\$ 253.51/ton for the production of 1,617,000 DMT/year. Projects can be fast tracked to accelerate the duration of up to 4 months while maintaining financial feasibility.

Keywords: PT SILO executed, project feasibility, steel industry, production.

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INTRODUCTION

The steel industry in Indonesia has a very high growth potential, but currently the amount of domestic steel production is known to be only around 55% and the rest is fulfilled through imports [1]. To deal with this, the Government of Indonesia requires mining companies to increase the added value of mineral and/or coal in Law No. 4/2009. PT Sebuku Iron Lateritic Ores (SILO) has a mining permit (IUP) on Sebuku Island, South Kalimantan, which has abundant mineral resources in the form of laterite deposits (Fe, Ni, Co). The Smelter Project was executed to process 4,725,000 WMT/year of laterite iron ore into 1,701,325 DMT/year of Sponge Ferro Alloy with Fe content > 72%. The project requires a cost of US\$ 51,528,888 with a construction period from June 2018 to June 2023 in several stages. The integration between mining and iron processing in the country will ultimately increase the contribution of this sector to the national economy [2]. Financial analysis was conducted to determine the feasibility of the project and its investment capability in providing benefits to the amount of capital [3, 4]. Furthermore, fast tracking analysis is carried out to

determine the opportunity to accelerate the project completion schedule and its effect on project feasibility [5,6]. This study aims to determine the financial feasibility and how it will affect if the project can be completed more quickly. Novelty of this research is to combine the financial feasibility analysis of a project while considering the opportunity to accelerate its completion, especially in the smelter construction project.

LITERATURE REVIEW

Normal and Crash Project [Cost & Time]

The acceleration of the duration of the work is done using the crashing method, which reduces the duration of a job by increasing the number of work shifts, the number of working hours/overtime, the number of labor, the amount of material availability, or using more productive equipment and faster installation methods (Husen, 2013). Resources are generally allocated to direct costs, so the crashing method will add direct costs for a project. Crashing methods can only.

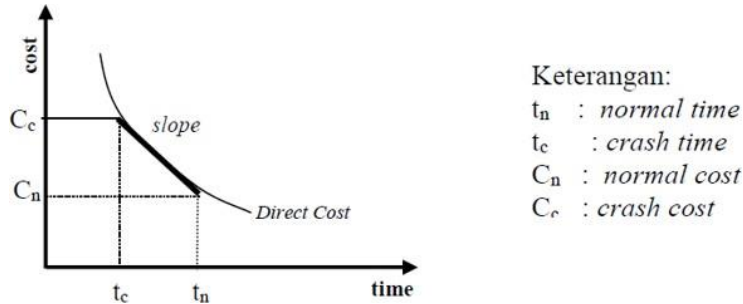


Figure 1: Relationship of Time and Costs in the Crashing Method
Source: Husen, 2013

Although in terms of cost fast tracking methods are cheaper, but the risk of applying the fast tracking method is that the contractor must provide sufficient resources for critical work that will be done by fast tracking. In addition, it is necessary to coordinate regularly so that there is no delay. The more critical paths done by fast tracking, the greater the risk.

If one of the critical paths late will affect Other critical paths (Stefanus *et al.*, 2017).

According to Stefanus *et al.*, (2017), in terms of cost, the fast tracking method will be cheaper than crashing. This is because the fast tracking method is not necessary to add labor or overtime hours, while the crashing method requires it so that there is an additional cost.

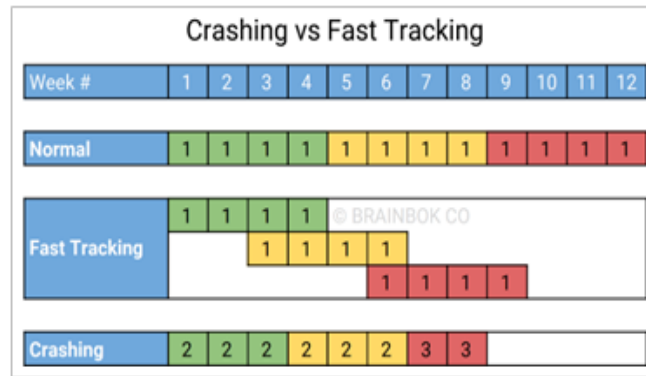


Figure 2: Comparison of Fast Tracking Crashing
Source: Brainbok, 2022

Project Management

In the Triple Constraint theory, we can see costs, quality and time (schedule) are interrelated as part of the triangle side. If one side changes, it will have an impact on the other side. That is why it takes a management of these three things. In addition to cost management, quality and time, management is also

needed in the form of resource management, environment, risk and information systems. The management activities are realized through planning activities (planning), organizing (organizing), implementation (actuating), and controlling. This can be seen in Figure 3 below:



Investment

According to Bambang Mulyana and Eddy Nugroho [1] there is an investment which means the time dimensioning which is to hold assets today to get

results in the future. Investment can also be interpreted as an activity of procurement of assets to build or increase the company's operating capacity.

Capital bugeting

According to chad J. zutter and Scott b smart [5] Capital budgeting is the process of evaluating and choosing long-term investments that contribute to the company's goal of maximizing owner's wealth.

According to Eugene f. brigham and Michael C. Ehrhardt [6]. Capital budgeting is a planned summary of the entire project analysis process and decides which will be accepted and thus included in the capital budget.

There are 5 commonly used methods for investment, that is

1. Payback Peeriod (PP)

According to Lawrence J. Gitman and Chad J Zutter [4] is the time it takes for a company to cover the initial investment in a project, calculated from the Cash Inflow used formula:

$$PP = \frac{\text{Investment Value}}{\text{Net Cash Flow}} \times 1 \text{ year} \dots\dots\dots (1)$$

According to Lawrence J. gitman and chad J zutter [5] Decision criteria in the PP Method are when the return period is used to make a accept-reject decision, the following decision criteria apply:

- a. If the return period is less than the maximum acceptable return period. Accept the project.
- b. If the return period is greater than the maximum acceptable return period, reject the project.

Discounted payback period (DPP)

According to Bambang Mulyana and Eddy Nugroho [1] this method is a modification of the repayment method so that it is slightly different from the payback period method, namely by including the time value of money method.

The completion steps are

- a. Calculate the length of discounted cash flow for return on investment.
- b. Set the investment payback period.
- c. if item (a) is smaller than item (b), it means that the investment plan is feasible, but if on the contrary, the investment plan is rejected

As a guide in making decisions on the proposal of an investment, the information that must be considered is:

- a. Initial investment notated with C₀
- b. Year cash flow to – i which is notated with C_i where i can 1,2,3,...n
- c. Period of return of investment notated with t.
- d. The age of the project is n, can be greater than t or can be also smaller than t,
- e. PV total cash flow during the n investment period

$$PV = \frac{C_1}{(1+R)^1} + \frac{C_2}{(1+R)^2} + \dots + \frac{C_n}{(1+R)^n} = \sum_{i=1}^n \frac{C_i}{(1+R)^i} \dots\dots\dots (2)$$

Discounted payback period calculated based on how long the value of item (e) exceeds the value of

item (a) if the value of item (e) is smaller than item (a), and then the investment proposal is rejected.

Net Present Value (NPV)

According suad husna and suwarsono Muhammad [3]. This method calculates the difference between the present value of investment and the present value of net cash receipts (operational or terminal cash flow) in the future.

Formula

NPV = Present value of cash inflows – initial investment (3)

$$NPV = -C_0 + \frac{C_1}{(1+R)^1} + \frac{C_2}{(1+R)^2} + \dots + \frac{C_n}{(1+R)^n} \dots\dots\dots (4)$$

Or summarized into

$$NPV = -C_0 + \sum_{i=1}^n \frac{C_i}{(1+R)^i} \dots\dots\dots (5)$$

Where is

C₀ = Initial Investment C_i = year cash flow to i i = project age, from year i to n
R = discount rate

However, the most commonly used formulas are

$$NPV = \sum_{i=0}^n \frac{C_i}{(1+R)^i} \dots\dots\dots (6)$$

Where is

C₀ = Initial Investment
C_i get ≥ 0 or ≤ 0, if
C_i ≥ 0 or positive, means the cash inflow is greater than the investment
C_i ≤ 0 atau negative, means the cash inflow is smaller than the initial investment i = project age, from year i to n
R = discount rate

The criteria contained in the NPV method are

- a. If the NPV > 0, the investment proposal is accepted.
- b. If the NPV < 0, the investment proposal is rejected.
- c. If NPV = 0, the value of the company is fixed even if the investment proposal is accepted or rejected.

Internal rate of return (IRR)

According to Bambang Mulyana and Eddy Nugroho [1]. This method is an approach to calculate the interest rate that can equalize the present value of all cash inflows with the cash flow of an investment. The principle of this method is used to calculate the real rate of return and look for it using trial and error because the yield is obtained from investment cash flow, not from external factors, then this yield is called IRR

Formula

$$IRR = \sum_{t=0}^n \frac{A_t}{(1+r)^t} \dots\dots\dots (7)$$

Information

A_t = cash flow for the period t.

r = the interest rate that will make the present value of the proceeds equal to the investment value (capital outlays)
 n = the last period of expected cash flow

The criteria contained in the IRR method are

- a. If $IRR >$ discount rate, then the investment proposal is accepted
- b. If $IRR <$ discount rate, then the investment proposal is rejected

Profitability Indeks (PI)

According to Bambang Mulyana and Eddy Nugroho [1] The PI method, also called desirability index, is a method that calculates the ratio of PV cash flow after initial investment (Proceeds) divided by the amount of initial investment (outlays). The formula used for the PI method.

$$PI = \frac{PV \text{ cash flow after initial investment}}{\text{Initial Investment}} \dots\dots\dots (8)$$

Kriteria yang terdapat pada metode PI adalah

- a. If $PI > 1$, then the investment proposal is accepted
- b. If $PI < 1$, then the investment proposal is rejected
- c. If $PI = 1$, No problem projects are accepted / rejected

RESEARCH METHODOLOGY

PT SILO provided the secondary data to be analysed using several financial parameters. The data obtained include project planning documents (scope, schedule, cost), as well as estimates of operational costs

& revenues from the Smelter. Several financial analysis that being used are Net Present Value (NPV), Internal Rate Return (IRR), Payback Period (PBP), Benefit Cost Ratio (BCR), and Break Event Point (BEP). NPV is calculated as difference between discounted cash flows from a project's expenses and revenues, and the project is determined as feasible if it has a positive NPV value [3, 12, 13]. IRR shows how much cash flow is capable of returning its capital, where the project is determined as feasible if $IRR >$ discount rate [3, 7]. PBP shows how long does it take to achieve the net benefit from the cost of capital that has been spent [3, 8]. BCR is comparison between the present value of future inflows of funds with the investment value, and the project is determined as feasible if it has a value of $BCR > 1$ [3, 9]. BEP is used to find out the price or production volume where the company does not make a profit or suffer a loss [3, 10].

Schedule acceleration can be done using the Crashing and/or Fast Tracking method [11]. The fast tracking method has the advantage that it usually does not require additional costs, because it only shifts the start time of a job without requiring additional resources [6]. Therefore, the fast track method was applied in this study. The project schedule modelling is carried out with the Microsoft Project program to determine the total project duration & critical path, so that fast tracking analysis can be carried out to accelerate project completion. The research flow is shown in Figure 4 as follows:

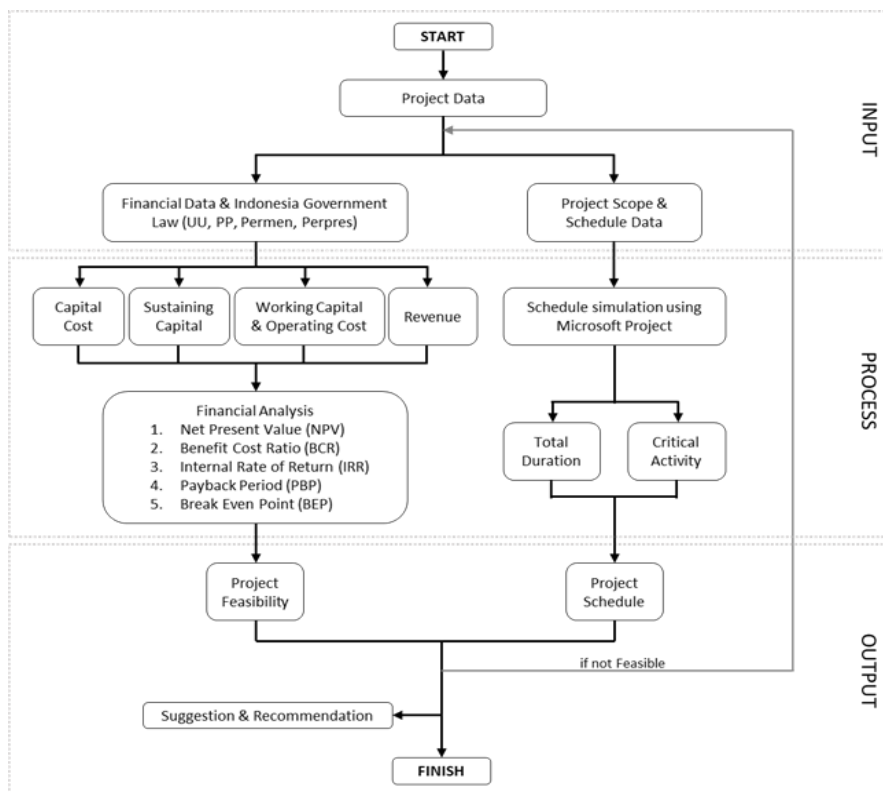


Figure 1: Research flow consisting of input - process – output

RESULTS AND DISCUSSION

Financial Analysis

The cost required for the Sponge Ferro Alloy Smelter Construction Project at PT. Sebuk Iron Lateritic Ores includes: (1) Capital Cost, (2) Sustaining Capital, and (3) Working Capital & Operating Cost. The capital cost is used for the construction costs of the smelter project, which is US\$ 51,528,888. The sustaining capital is used for maintenance of equipment needed to maintain continuity of operations and production targets. The working capital & operating cost consists of electricity cost, coal purchasing, iron ore mining cost, maintenance cost, daily consumables cost, and labour cost. Straight line depreciation & amortization is calculated for 10 years from the end of the project and the salvage value of equipment and buildings is considered zero.

The source of funding used by PT SILO is an equity of 30% and a loan of 70%. The smelter has a production capacity of 1,701,325 DMT/year which will be achieved gradually as the project is completed. Based on the price trend of sponge ferro alloy, PT SILO determines the price of its product at US\$ 266.7/ton in 2019, US\$ 272.8/ton in 2020, and it is assumed that the price will continue to increase by 1% per year.

For the financial analysis, the Discounted Cash Flow (DCF) timeframe is set for 20 years (2018-2038) and Indonesian Rupiah - US Dollar exchange rate is assumed at Rp. 14,500. Also, 25% tax is applied to the company profits. The process of financial analysis is shown in Table 1 as follows:

Table 1: Financial analysis of Sponge Ferro Alloy Smelter Projec

| Proyek Pembangunan Smelter Sponge Ferro Alloy di PT SILO | | Tahun | | | | | | | | | | | | |
|---|-----------|-----------|------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|------------|-------|
| | | 0 2018 | 1 2019 | 2 2020 | 3 2021 | 4 2022 | 5 2023 | 6 2024 | 7 2025 | 8 2026 | 9 2027 | 10 2028 | 11 2029 | |
| Revenue | | | | | | | | | | | | | | |
| + Produksi | Juta Ton | | 0.284 | 0.425 | 0.567 | 0.567 | 0.851 | 1.276 | 1.560 | 1.701 | 1.701 | 1.560 | 1.701 | |
| + Harga Produk | US\$/Ton | | 266.7 | 272.8 | 275.5 | 278.3 | 281.1 | 283.9 | 286.7 | 289.6 | 292.5 | 295.4 | 298.4 | |
| + Total Penjualan | Juta US\$ | | 75.62 | 116.03 | 156.25 | 157.82 | 239.09 | 362.22 | 447.15 | 492.67 | 497.60 | 460.70 | 507.60 | |
| Cost | | | | | | | | | | | | | | |
| - Initial Capital | Juta US\$ | (29.61) | (1.02) | (6.08) | (8.03) | (5.99) | (0.81) | | | | | | | |
| - Working Capital | Juta US\$ | | (21.43) | | | | | | | | | | | |
| - Sustaining Capital | Juta US\$ | | | | | | | | | | | (4.27) | | |
| - Operating Cost | Juta US\$ | | (129.86) | (131.16) | (132.47) | (133.80) | (270.27) | (409.46) | (413.56) | (417.69) | (421.87) | (390.58) | (430.35) | |
| - Depreciation & Amortization | Juta US\$ | | (1.04) | (1.04) | (1.04) | (2.09) | (3.13) | (3.13) | (3.13) | (3.13) | (3.13) | (3.13) | (2.09) | |
| Earning (before Interest & Tax) | | Juta US\$ | (29.61) | (77.73) | (22.25) | 14.71 | 15.94 | (35.12) | (50.37) | 30.46 | 71.85 | 72.60 | 62.72 | 75.16 |
| + Debt | Juta US\$ | 20.73 | 15.71 | 4.26 | 5.62 | 4.19 | 0.57 | | | | | | | |
| - Primary Debt Payment | Juta US\$ | | (2.07) | (3.64) | (4.07) | (4.63) | (5.05) | (5.11) | (5.11) | (5.11) | (5.11) | (5.11) | (3.03) | |
| - Interest Payment | Juta US\$ | | (1.04) | (1.82) | (2.03) | (2.32) | (2.53) | (2.55) | (2.55) | (2.55) | (2.55) | (2.55) | (1.52) | |
| Earning (before Tax) | | Juta US\$ | (8.88) | (65.13) | (23.45) | 14.23 | 13.18 | (42.13) | (58.03) | 22.80 | 64.19 | 64.94 | 55.06 | 70.61 |
| - Tax (25%) | Juta US\$ | | | | (3.56) | (3.29) | | | (5.70) | (16.05) | (16.24) | (13.76) | (17.65) | |
| Cashflow | | Juta US\$ | (8.88) | (65.13) | (23.45) | 10.68 | 9.88 | (42.13) | (58.03) | 17.10 | 48.15 | 48.71 | 41.29 | 52.96 |
| Net Profit + Depreciation | Juta US\$ | (8.88) | (64.09) | (22.41) | 11.72 | 11.97 | (39.00) | (54.90) | 20.23 | 51.28 | 51.84 | 44.42 | 55.05 | |
| Present Value (Discount Rate 10%) | | Juta US\$ | (8.88) | (58.26) | (18.52) | 8.80 | 8.18 | (24.21) | (30.99) | 10.38 | 23.92 | 21.98 | 17.13 | 19.29 |
| Net Present Value | | US\$ | 86,209,478 | | | | | | | | | | | |

First, revenue is calculated based on the estimated total production per year multiplied by the product price. Earnings are obtained from total revenue subtracted by total cost, and then also subtracted from debt & interest payment. 25% tax is applied when the company makes profit. Present value is calculated with a 10% discount rate. Based on the table 1, the NPV value of the project is US\$ 86,209,478. Another financial parameter is calculated with the result of IRR 16.18%; BPB for 12.76 Years; BCR of 1.0520; and BEP

at US\$ 253.51/ton for the production of 1,617,000 DMT/year. The result of financial analysis is summarized in the Table 4 below.

Schedule Fast Tracking

The Smelter Construction Project runs from June 2018 to June 2023. The data is obtained when the project progress has reached 71.23% with some preliminary work and supporting infrastructure completed. The smelter consists of 3 Lines. Line #1 is

already finished, Line #2 targeted in February 2023, and Line #3 targeted in May 2023. Lastly, Completion of Coal Mill Backup targeted in June 2023. Based on the initial plan and the progress of the project, there is an opportunity to accelerate the completion of Line #3 and

Coal Mill Backup. Schedule acceleration is carried out using the Fast Tracking method so that the duration & resource needed for each task does not change. The Microsoft Project program is used to perform schedule fast tracking, as shown in Figure 2 as follows:

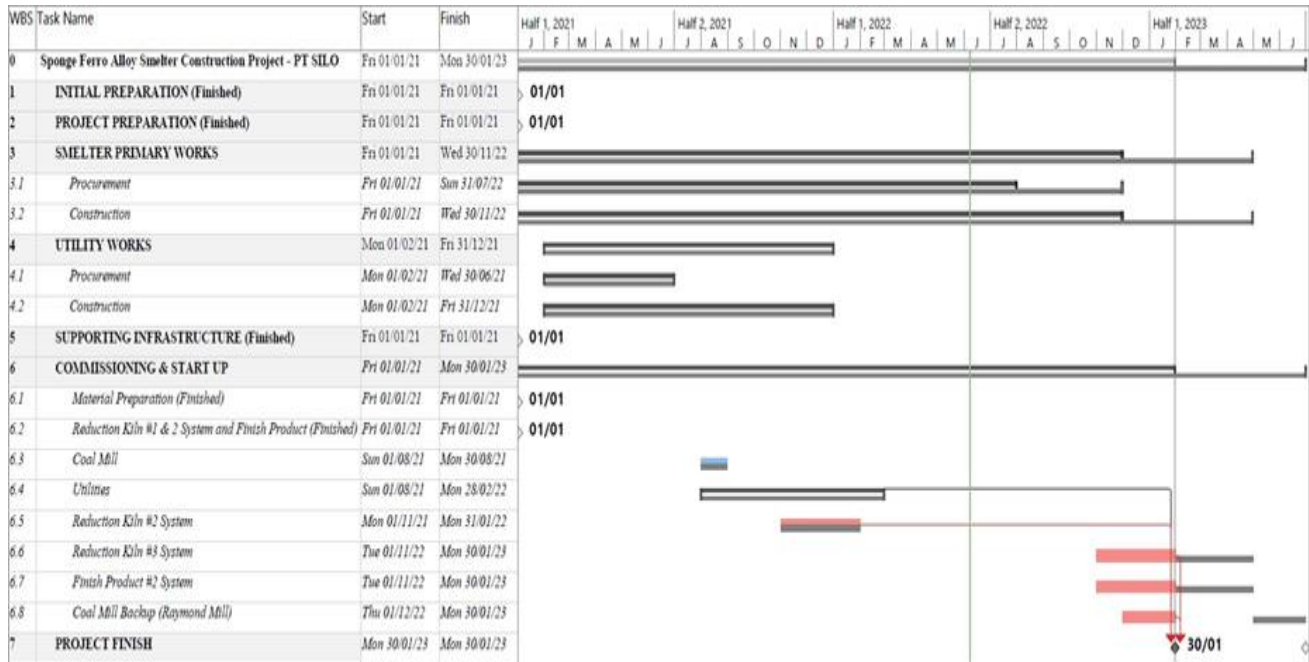


Figure 4: Gantt Chart from Ms Project to simulate schedule acceleration using fast tracking method

The project can be accelerated for 4 months using the fast tracking method, with the completion target shifting from June 2023 to January 2023. Total capital cost and production capacity have not changed.

Operating cost & revenue in 2023 will increase, because the operational phase in that year can be started more earlier. Comparison of project parameters is shown in table 2 as follows:

Table 2: Comparison between initial plan and accelerated plan with fast tracking

| No. | Parameter | Initial Plan | Accelerated Plan with Fast Tracking | Deviation | Note |
|-----|----------------------------|---------------------|-------------------------------------|-----------------------|--|
| 1 | Project Duration | 60 months | 56 months | - 4 months | Fast Tracking implemented for Line #3 and Coal Mill Backup works |
| 2 | Target Finish | June 2023 | January 2023 | - 4 months | |
| 4 | Capital Cost | US\$ 51,528,888 | Not changed | - | Capital cost is not affected because there is no additional resource needed |
| 5 | Operating Cost (year 2023) | US\$ 270.27 million | US\$ 389.30 million | + US\$ 119.03 million | Cost & revenue increased because the operational phase in 2023 can be started more earlier |
| 6 | Revenue (year 2023) | US\$ 239.09 million | US\$ 358.64 million | + US\$ 119.55 million | |

The increase of operating cost & revenue in 2023 will affect the project financial analysis. The NPV value of accelerated plan is increased to US\$ 86,532,879. Another financial parameter is calculated

with the result of IRR 16.20%; PBP for 12.74 Years; BCR of 1.0584; and BEP at US\$ 258.61/ton for the production of 1,650,000 DMT/year. The process of financial analysis is shown in table 3 as follows.

Table 3: Financial analysis of Sponge Ferro Alloy Smelter Project with schedule fast tracking applied

| Sponge Ferro Alloy Smelter Construction Project at PT SULO | | Year | | | | | | | | | | | | | | | | | | | | | |
|---|------------|------------|----------|------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|---------|-------|
| | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | |
| | | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | |
| Revenue | | | | | | | | | | | | | | | | | | | | | | | |
| + Smelter Production | mill. Ton | | 0.284 | 0.425 | 0.567 | 0.567 | 1.276 | 1.276 | 1.560 | 1.701 | 1.701 | 1.560 | 1.701 | 1.701 | 1.701 | 1.560 | 1.560 | 1.701 | 1.701 | 1.701 | 1.701 | 1.701 | |
| + Product Price | US\$/Ton | | 266.7 | 272.8 | 275.5 | 278.3 | 281.1 | 283.9 | 286.7 | 289.6 | 292.5 | 295.4 | 298.4 | 301.3 | 304.4 | 307.4 | 310.5 | 313.6 | 316.7 | 319.9 | 323.1 | 326.3 | |
| + Total Revenue | mill. US\$ | | 75.62 | 116.03 | 156.25 | 157.82 | 358.64 | 362.22 | 447.15 | 492.67 | 497.60 | 460.70 | 507.60 | 512.68 | 517.81 | 479.40 | 484.20 | 533.50 | 538.83 | 544.22 | 549.66 | 555.16 | |
| Cost | | | | | | | | | | | | | | | | | | | | | | | |
| - Initial Capital | mill. US\$ | (29.61) | (1.02) | (6.08) | (8.03) | (5.99) | (0.81) | | | | | | | | | | | | | | | | |
| - Working Capital | mill. US\$ | | (21.43) | | | | | | | | | | | | | | | | | | | | |
| - Sustaining Capital | mill. US\$ | | | | | | | | | | (4.27) | | | | (4.40) | (4.40) | | | | | | | |
| - Operating Cost | mill. US\$ | (129.86) | (131.16) | (132.47) | (133.80) | (389.30) | (409.46) | (413.56) | (417.69) | (421.87) | (390.58) | (430.35) | (434.65) | (439.00) | (406.44) | (410.50) | (452.30) | (456.82) | (461.39) | (466.01) | (470.67) | | |
| - Depreciation & Amortization | mill. US\$ | | (1.04) | (1.04) | (1.04) | (2.09) | (3.13) | (3.13) | (3.13) | (3.13) | (3.13) | (2.09) | (2.09) | (2.09) | (1.04) | | | | | | | | |
| Earning (before Interest & Tax) | | mill. US\$ | (29.61) | (77.73) | (22.25) | 14.71 | 15.94 | (34.60) | (50.37) | 30.46 | 71.85 | 72.60 | 62.72 | 75.16 | 75.94 | 76.72 | 67.52 | 69.30 | 81.20 | 82.01 | 82.83 | 83.65 | 84.49 |
| + Debt | | mill. US\$ | 20.73 | 15.71 | 4.26 | 5.62 | 4.19 | 0.57 | | | | | | | | | | | | | | | |
| - Primary Debt Payment | mill. US\$ | | (2.07) | (3.64) | (4.07) | (4.63) | (5.05) | (5.11) | (5.11) | (5.11) | (5.11) | (5.11) | (3.03) | (1.46) | (1.04) | (0.48) | (0.06) | | | | | | |
| - Interest Payment | mill. US\$ | | (1.04) | (1.82) | (2.03) | (2.32) | (2.53) | (2.55) | (2.55) | (2.55) | (2.55) | (2.55) | (1.52) | (0.73) | (0.52) | (0.24) | (0.03) | | | | | | |
| Earning (before Tax) | | mill. US\$ | (8.88) | (65.13) | (23.45) | 14.23 | 13.18 | (41.61) | (58.03) | 22.80 | 64.19 | 64.94 | 55.06 | 70.61 | 73.75 | 75.16 | 66.80 | 69.21 | 81.20 | 82.01 | 82.83 | 83.65 | 84.49 |
| - Tax (25%) | mill. US\$ | | | | (3.56) | (3.29) | | | (5.70) | (16.05) | (16.24) | (13.76) | (17.65) | (18.44) | (18.79) | (16.70) | (17.30) | (20.30) | (20.50) | (20.71) | (20.91) | (21.12) | |
| Cashflow | | mill. US\$ | (8.88) | (65.13) | (23.45) | 10.68 | 9.88 | (41.61) | (58.03) | 17.10 | 48.15 | 48.71 | 41.29 | 52.96 | 55.31 | 56.37 | 50.10 | 51.90 | 60.90 | 61.51 | 62.12 | 62.74 | 63.37 |
| Net Profit + Depreciation | | mill. US\$ | (8.88) | (64.09) | (22.41) | 11.72 | 11.97 | (38.48) | (54.90) | 20.23 | 51.28 | 51.84 | 44.42 | 55.05 | 57.40 | 58.46 | 51.14 | 51.90 | 60.90 | 61.51 | 62.12 | 62.74 | 63.37 |
| Present Value (Discount Rate 10%) | | mill. US\$ | (8.88) | (58.26) | (18.52) | 8.80 | 8.18 | (23.89) | (30.99) | 10.38 | 23.92 | 21.98 | 17.13 | 19.29 | 18.29 | 16.93 | 13.47 | 12.43 | 13.25 | 12.17 | 11.17 | 10.26 | 9.42 |
| Net Present Value | | US\$ | | 86,532,879 | | | | | | | | | | | | | | | | | | | |

In general, the results of the financial analysis between the initial plan and the accelerated plan both show that the project is economically feasible. Both of the Net Present Value have positive value, and the percentage of Internal Rate of Return exceeds the Cost of Capital. Pay Back Period is shorter than the project

lifecycle, and Benefit Cost Ratio reaches more than 1. Break Even Point can be used as reference for the minimum selling price & total production target. The result of financial analysis (initial plan & accelerated plan) is shown in Table 4 as follows:

Table 4: Result of financial analysis (initial plan & accelerated plan)

| No. | Parameter | Initial Plan | Accelerated Plan with Fast Trading | Deviation | Note |
|-----|-------------------------|--|--|---------------------------------|--|
| 1 | Net Present Value | US\$ 86,209,478 | US\$ 86,532,879 | +US\$ 323,401 | Feasible; NPV > 0 |
| 2 | Internal Rate of Return | 16.18 % | 16.20% | +0.02% | Feasible; IRR > Cost of Capital |
| 3 | Pay Back Period | 12.76 years | 12.74 years | -0.02 years | Feasible; PBP is shorter than the economic life of the project |
| 4 | Benefit Cost Ratio | 1.0520 | 1.0584 | +0.0064 | Feasible; BCR > 1 |
| 5 | Break Even Point | US\$ 253.51/ton at production rate of 1.617.000 DMT/year | US\$ 258.61/ton at production rate of 1.650.000 DMT/year | +US\$ 5.10 and +33.000 DMT/year | Minimum selling price & total production target |

The project is economically feasible based on the parameter of NPV, IRR, PBP, and BCR [3, 4, 12].

Schedule acceleration can be done by pushing forward the start date of several tasks with the same productivity

so that it does not require additional resources or costs [11]. Thus, the operational phase of the smelter can be started earlier. Further studies can be conducted to analyze the risks that arise as a result of schedule changes, for example related to the availability of work space on the site and the availability of electricity and heavy equipment [5, 6].

CONCLUSIONS

The Sponge Ferro Alloy Smelter Construction Project at PT Sebuku Iron Lateritic Ores is feasible from a financial perspective with a Net Present Value (NPV) of US\$ 86,209,478; Internal Rate Return (IRR) of 16.18%; Payback Period (PBP) for 12.76 Years; Benefit Cost Ratio (BCR) of 1.0520; and Break Event Point (BEP) at US\$ 253.51/ton for the production of 1,617,000 DMT/year.

The acceleration scenario using the fast tracking method has the opportunity to cut the project duration for 4 months, from the target finish at the end of June 2023 to the end of January 2023. The project with the acceleration scenario is feasible from the financial aspect with a Net Present Value (NPV) amounting to US\$ 86,532,879; Internal Rate Return (IRR) of 16.20%; Payback Period (PBP) for 12.74 Years; Benefit Cost Ratio (BCR) of 1.0584; and Break Event Point (BEP) at US\$ 258.61/ton for the production of 1,650,000 DMT/year.

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