# Investment Estimation and Acceptance of State Tax Instead of Coal Mining Business License Clear and Clean in West Sumatera Province

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*Research Article*

# Investment Estimation and Acceptance of State Tax Instead of Coal Mining Business License Clear and Clean in West Sumatera Province

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**ABSTRACT**

This research conceptual measurement simulation for financial component which is needed for investment and benefit simulation held by stated that taken from company obligation categorized as non-tax for mining activities predicated with clear and clean at West Sumatera Province. This simulation connected with capital investment and operational activities that influenced by coal getting stripping ratio, coal hauling and other financial related. This simulation only values stated income non tax and royalty. Analysis methods using from several document feasibility study from Coal Company has already operated, and also estimation for all investment component and components of income stated non tax. Accuracy data accepted for this research at least 30% from all investment. Estimation starting from deciding production target, life mining period, investment needs financial operation and other financial activities, and comparison with theoretical measurement. The comparison result then used to make another financial model simulation. At the last, this research will present economy simulation model created from mining operational activities in west Sumatra province to estimate stated income non tax from mining production operational. Using sensitivity analysis, shows that the change of coal selling prices will gives significant influence to NPV project and stated income non tax.

*Keywords: estimation, investment, non tax, clear and clean, simulation,*

## 1. INTRODUCTION

This research do conceptually calculation the costs required for investment as well as the calculation of the profit obtained from the obligation of the State of the company in the form of the acceptance of the State is not against tax clear and clean coal mining in West Sumatera. The simulation is associated with the magnitude of the investment costs and operation of which depends on the selling price of coal, stripping ratio and transport distances, as well as other costs. Simulation of the acceptance of the country's only counting admissions state tax instead of a fixed royalty dues and dues. This research was limited against the special status of coal mining licences clear and clean in the Province of West Sumatera.

The purpose of this research is create a conceptual model of investment estimation and a conceptual model of the country instead of taxes from IUP clear and clean coal in West Sumatera.

## 2. EXPERIMENTAL SECTION

This research uses descriptive comparative method. Type of data used as analysis research is secondary data. The secondary data were used, among others:

### 2.1 The Investment

The estimated cost of the investment or capital cost is calculated by estimation the production capacity of coal per day or per year and life of mine. This estimation process according to Wijaya [1] based on a formula of Tylor [2] or known as Tylor's Rules that have been proven by Mc Spadden & Schaap [3] and Camm [4]. The formula is as follows:

$$\text{Production Capacity} = [\text{Coal Reserve}]^{0.75} \div 70 \qquad (1)$$

$$\text{Life of mine} = 0.2 \text{ x } \sqrt[4]{\text{Coal Reserve}} \qquad (2)$$

The investment costs can be calculated using the formula results O'Hara & Suboleski [5] which has been verified by Shafiee, Nehring and Topal [6] used are as follows:

$$\text{Cost of investment (US \$)} = \$400.000 \text{ x (coal of mine) } 0.6 \qquad (3)$$

Stebbins and Leinart [7] in Wijaya stating the above formula based on several components that stand out among other investments in exploration, production, job before working capital, purchase of mining equipment and processing, development costs, infrastructure costs, engineering and construction management, building and property purchases, and other costs (contingency).

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### 2.2 Costs Operation

Operating costs are the costs incurred to produce or digging coal, to connections to the port. This cost component reference using data from the Directorate General of Mineral and Coal Decision No.579.K/32/RTG/2015, about the cost of production for the determination of the price of coal to the year 2015. In the Appendix mentioned, that production costs are assigned based on the type of costs which consist of direct production costs, production costs, and indirect costs General and administrative.

Some of the costs incurred in the period before the operation of the production, especially in component costs, necessitating investment in map out to the present (2017). To do that, the projection used Marshall & Swift Mining and Milling Equipment Cost Index. The index used to compare between price/cost of a given year (past), with the price/cost of the current year or in the future, so as to provide an overview of the costs that will be incurred. The above charges will be multiplied by a factor of escalation Index Marshall & Swift until the age of the project, except for the cost of Amortization, Liberation/ replacement land and depreciation, Fixed Dues and Assuming the cost of production/Royalty. The equation used to calculate the cost at this time are as follows:

$$C_t = C_O \times \left(\frac{I_t}{I_O}\right) \quad (4)$$

Description;

CT = Cost Estimation when this year or will come
CO = cost in the previous year
It = Index Marshall & Swift this year or will come
IO = Index Marshall Swift & previous year

### 2.3 Price Projections

Price predictions made in reference to Australia with the thermal coal market equality calorie coal (gross water received) 6.322 kcal/kg GAR or 6.800 kcal/kg of ADB (air dried base), moisture content (total moisture) 8%, 0.8% sulfur levels AR (as received), and ash content 15% of the reference AR, then in the calculation of the price of coal in West Sumatera is adapted to the coal quality. The formula used to calculate the price of coal from West Sumatera with coal quality thermal reference equality, is the formula benchmark price of coal and Mineral Resources by the Ministry, the Marker with the following formula:

The price of coal = (HBA*K(i)*A(i))-(B(i)-U(i))(5)

description;

HBA = Coal price reference-thermal coal marker (GAR)
K (i) = Heat value coal (i)/6322 kcal/kg
A (i) = (100 – Coal Water Content (i))/ (100 – 8/FKA (i)
FKA (i) = {[(100 – 8)/(100 – Coal Water Content (i))] * the moisture contentof coal (i)} + (100 – 8)/100
B (i) = (Sulfur content of Coal (i) – 0.8) * 3
U (i) = (Ash content of Coal (i) – 15) * 0.3
I = Price Marker

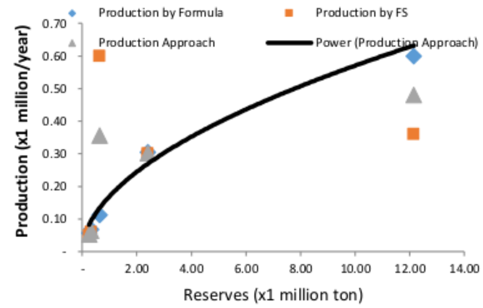


Figure 1 Formula of production Approach

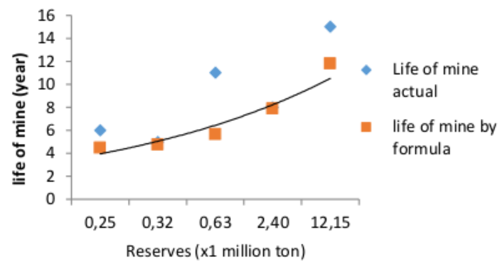


Figure 2 Formula approach to life of mine

## 3. RESULTS AND DISCUSSION

### 3.1 Results

The results of the processing of data regarding the cost of investment and the empirical formula yield data field as follows:

a. Production Target

Based on Figure 1 above can be shown that the bigger the reserves, then followed with an increase of annual production capacity.

mpirical formulas resulting from the approach to coal reserves with an annual production target, are as follows;

Y = 0,169x0,526 (6)

Y is the ideal production goals with in one year (million tons) and X is mining coal reserves in a region or a concession (million tons). To predict life of mine of the graph of Figure 2 obtained empirical formula as follows:

Y = 3,095e0,244x (7)

Y is the ideal life of mine in years, and X is a variable of the coal reserves of the mine in a million tons in a licenses.

b. Total cost of Investment

The total investment cost estimation calculations carried out using emperis equation is obtained from the processing of the data. Match with the magnitude of the total cost of the affected


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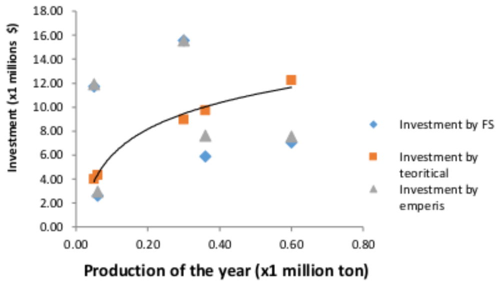


Figure 3 Results Total investment Approach

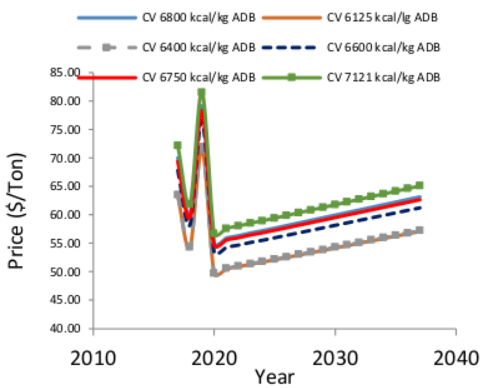


Figure 4 Projection Coal Price of WestSumatera

investment against inflation, then used Marshall & Swift Mine and Mill Equipment Cost Index.

Data documents the feasibility study regarding the magnitude of calculation of the cost of the investment at the time of the feasibility study carried out attempted on Table 2. The total cost of the investment is obtained is then projected by using equation (4). The results of these calculations are compared with calculations based on the magnitude of the investment needs of production using equation (3). Some of the data has a larger deviation than ± 30%, since the year is compared when making feasibility study to the needs of the investment of the year 2017.

So with the results of the projection needs investment and the formulation of theoretical approach, empirical formula obtained to predict total investment needs in West Sumatera. The formula is as follows;

$$Y = 3{,}163\ln(x)+13{,}26 \qquad (8)$$

Y is the total needs of the investment in units of million – dollar (million $) and X is a variable target annual production in million tons. The graph of the results of the calculation produces the equation 8 can be seen in Figure 3.

c. Price Projection

The projection of the price of coal was obtained from World Bank Australian Coal Price Forecast or the World Bank Institute (2017) for thermal coal prices Australia the period 2014 – 2030 published in March 2017. The following is the graph of the results of the regressions coal prices and coal in West Sumatera with a wide range of quality until the year 2037.

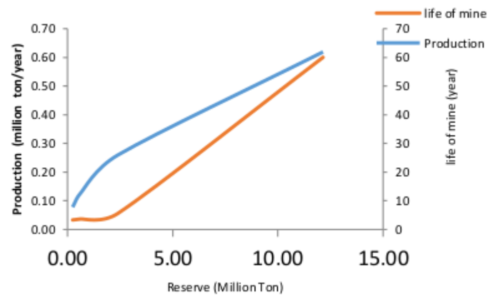


Figure 5 Simulation Production and Life of Mine

d. Production Scheduling

Estimated annual production target and life of mine is based on the assumption of reserve mining variations. The results generated from production scheduling. The simulation is made on an annual basis for each of the goals and appropriate life of mine. Following is Figure 5 Simulating production and life of mine.

e. Feasibility Assessment

Financial models company located on the cash flow simulation. Summary the analysis of feasibility of investment coal mining in West Sumatera that outlines the company's skill level in generating cash flow during the life of mine shown in Table 4 below. The eligibility calculation in the Table 4 below using a 10% of discount factors, these values using the method of approach to the weighted cost of capital or average weight average cost of capital (WACC). These methods are used because in the simulation calculation of cash flow, capital investment is part of the loan.

f. Estimation Tax Not Country Acceptance

Acceptance of State tax is not retrieved from the summation of results between fixed dues receipt estimation with estimated receipts royalty dues in one year. Acceptance of State instead of taxes that are derived from the coal mining business license clear and clean which was in West Sumatera Province, with of 158.43 million tons. The formula approach resulting from a fixed dues and royalty dues, are as follows:

$$Y = 4x \qquad (8)$$

$$Y = 17215x + 58259 \qquad (9)$$

Y is the total acceptance of the State tax is not in units of $/year, and X is the variable price of coal.

## Discussion

West Sumatera has the potential geology and the large coal reserves, as well as scattered in 5 (five) District/City, which can be developed by the prospective investors. The potential of the most high ranking coal quality (high calorie) with the range of 6300 – 7121 kcal/kg ADB (air dried base). With coal price projection of Sumbar Coal 1 (6125 kcal/kg) = 63.27 US $/Ton, Sumbar Coal 2 (6400 kcal/kg) = 64.87 US $/Ton, Sumbar Coal 3 (6600 kcal/kg) = 67.78 US$/Ton, Sumbar Coal 4 (6750 kcal/kg) = 69.36 US $/Ton, Sumbar Coal 5 (7121 kcal/kg) = 72.10 US US$/


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Table 4 Summary of the assessment of the feasibility of the various models of investment coal mining in West Sumatera

| Description | Variable Distance | Unit | Stripping Ratio Sumbar Coal 1 | Sumbar Coal 2 | Sumbar Coal 3 | Sumbar Coal 4 | Sumbar Coal 5 |
|---|---|---|---|---|---|---|---|
| Quality of Coal | | kcal/kg | 6125 | 6400 | 6600 | 6750 | 7121 |
| Price Projection | | US$/ton | 63,27 | 64,87 | 67,78 | 69,36 | 72,10 |
| Sawahlunto | | | | | | | |
| FOB Barge | 4,5 | Km | 11 | 11 | 11 | 12 | 13 |
| | 125 | Km | 7 | 7 | 7 | 9 | 9 |
| DCF-(NPV i = 10%) | 4,5 | Km | $27.52 | $27.37 | $27.37 | $22.03 | $19.77 |
| IRR | | | 12% | 12% | 12% | 11% | 11% |
| PP | | | 9,53 | 9,54 | 9,54 | 8,49 | 10,42 |
| ARR | | | 21,41% | 21,38% | 21,38% | 20,19% | 19,69% |
| BC Ratio | | | 1,22 | 1,22 | 1,22 | 1,21 | 1,21 |
| DCF-(NPV i = 10%) | 125 | Km | $44.33 | $44.18 | $44.18 | $38.83 | $36.58 |
| IRR | | | 15% | 15% | 15% | 14% | 13% |
| PP | | | 8,03 | 8,04 | 8,04 | 8,49 | 8,70 |
| ARR | | | 25,33% | 25,30% | 25,30% | 24,10% | 23,60% |
| BC Ratio | | | 1,25 | 1,25 | 1,25 | 1,24 | 1,24 |
| South Pesisir | | | | | | | |
| FOB Barge | 25 | Km | 10 | 10 | 10 | 11 | 12 |
| | 125 | Km | 7 | 7 | 7 | 9 | 9 |
| DCF-(NPV i = 10%) | 25 | Km | $44.88 | $44.73 | $44.73 | $39.39 | $37.13 |
| IRR | | | 15% | 15% | 15% | 14% | 14% |
| PP | | | 7,98 | 7,99 | 7,99 | 8,45 | 8,65 |
| ARR | | | 25,46% | 25,43% | 25,43% | 24,23% | 23,73% |
| BC Ratio | | | 1,25 | 1,25 | 1,25 | 1,24 | 1,24 |
| DCF-(NPV i = 10%) | 125 | Km | $44.33 | $44.18 | $44.18 | $38.83 | $36.58 |
| IRR | | | 15% | 15% | 15% | 14% | 13% |
| PP | | | 8,03 | 8,04 | 8,04 | 8,49 | 8,70 |
| ARR | | | 25,33% | 25,30% | 25,30% | 24,10% | 23,60% |
| BC Ratio | | | 1,25 | 1,25 | 1,25 | 1,24 | 1,24 |
| Sijunjung, Dharmasraya, 50 Kota | | | | | | | |
| FOB Barge | 135 | Km | 7 | 7 | 7 | 9 | 9 |
| | 150 | Km | 7 | 7 | 7 | 8 | 9 |
| | 165 | Km | 6 | 6 | 6 | 8 | 8 |
| DCF-(NPV i = 10%) | 135 | Km | $46.43 | $46.33 | $46.33 | $42.51 | $40.78 |
| IRR | | | 15% | 15% | 15% | 14% | 14% |
| PP | | | 7,80 | 7,80 | 7,80 | 8,12 | 8,26 |
| ARR | | | 25,66% | 25,64% | 25,64% | 24,79% | 24,40% |
| BC Ratio | | | 1,25 | 1,25 | 1,25 | 1,25 | 1,24 |
| DCF-(NPV i = 10%) | 150 | Km | $25.93 | $25.83 | $25.83 | $22.01 | $20.28 |
| IRR | | | 12% | 12% | 12% | 11% | 11% |
| PP | | | 9,62 | 9,63 | 9,63 | 10,07 | 10,28 |
| ARR | | | 20,89% | 20,86% | 20,86% | 20,01% | 19,63% |
| BC Ratio | | | 1,22 | 1,22 | 1,22 | 1,21 | 1,21 |
| DCF-(NPV i = 10%) | 165 | Km | $50.81 | $50.70 | $50.70 | $46.88 | $45.16 |
| IRR | | | 16% | 16% | 16% | 15% | 15% |
| PP | | | 7,48 | 7,49 | 7,49 | 7,78 | 7,92 |
| ARR | | | 26,68% | 26,66% | 26,66% | 25,81% | 25,42% |
| BC Ratio | | | 1,26 | 1,26 | 1,26 | 1,25 | 1,25 |

Ton.

With the FOB barge or FOT barge varies. Sawahlunto to alternate FOT-Barge to PLTU Sijantang 4.5 km distance, when alternative FOB-barge to port of Teluk Bayur with distance of 125 km. South Pesisir Regency when FOT-Barge to port Patapahan Painan with distance 25 km counts when FOT-Barge to the port of Teluk Bayur then distance of 125 km. Where as for Sijunjung, Dharmasraya Regency and City 50 FOT-Barge to the port of Teluk Bayur with a distance of 135 km, 150 km and 165 km away.

Estimation of the acceptance of the country instead of taxes is the result of addition of predictions dues remain with the predictions of the royalty dues. Prediction model of estimation of dues still use formula formula to calculate and 8 prediction formula using royalty dues 9.


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## CONCLUSION

Results from simulation conceptually retrieved early picture, that business investment mining in West Sumatera deserves to be developed on the condition and specific scenarios. Factors affecting the investment estimation and acceptance of State tax is not the ups and downs of the price of coal, the initial investment cost of the her little big, and operational costs. Changes to the components of the selling price of coal has significant effects against the rate of return or Net Present Value (NPV) of the project.

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