

FINANCIAL AND BUSINESS RISK: PRIVATE IPP, CASE ON BATURAKA COAL FIRED SPP 2X25MW

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Abstract—*In line with demand of social economic and industry growth in Indonesia, energy development such as electricity infrastructure is a key factor to support. In other hand, shortage of electricity supply in almost whole areas in Indonesia which is increasing 7% a year on the average. In response to this issue, Government instructed PLN under the coal based steam power plant accelerated development program with the total capacity 10.000 MW that consist of PLN's power plant development and also Independent Power Producer (IPP) developer. This program is actually purpose to decrease the cost of energy production (Fuel), primary energy diversification program, and to anticipate the delay of investment at private sector. It is necessary to balance the private sectors which build electric power plants and transmit its energy to PLN system through an electric sale agreement scheme called 'PPA' (power purchase agreement). By giving opportunity to private investor in charge, PLN is not only expected to provide electricity supply immediately to social and industry, but also getting help for project financing. IPP is developer that builds, operates and maintains the generating units, and sells its electricity to PLN under PPA (power purchase agreement). And one of IPPs in Indonesia is PT.Astratel Nusantara, that proposed development of Baturaja Coal Fired Steam Power Plant 2x25 MW (net) where the plant will be located in regency of Baturaja, South Sumatra. This area is very poor for quality of electricity services from PLN; this includes the service for PLN's big customer in industry like PT. Semen Baturaja, both for cement manufacturing process and for housing colony utilization. This final paper will try to evaluate the related aspects to find the answers whether IPP Baturaja 2x25 MW is executable or not by the firm's decision makers, by performing a project financial analysis as capital budgeting techniques to help determine the relevant cash flows associated with proposed capital expenditures. Besides that, it is how the project sponsor can mitigate the potential risks by performing project management methodology (PMBOK).*

Keywords: capital budgeting Techniques, project risk management, IPP (independent power producer)

1. Introduction

With the Indonesia's economy expanding 6%-7% annually in the past several years (source: www.ekon.go.id), as against power production growth of only 6.28% new power plants are needed to increase the capacity to prevent shortage in supply that will hamper the economic development. Demand for electricity is expected to grow faster with the economic growth especially industrial growth and growing population. The Indonesia's electricity sector has grown over the past years although not as fast as the leapfrogging increase in demand for power. In the past five years, power production of the state electricity company PT Perusahaan Listrik Negara (PLN) as the power procurement agency totaled 133,109 GWh in 2006, up to 160,786.21 GWh in 2010 (source: www.datacon.co.id).

Meanwhile, the country's power requirement has increased 7% a year on the average. Shortages in power supply both in Java and other islands have caused frequent blackouts especially outside Java (Sumatra, Kalimantan, etc.). The government through PLN has taken a big step to cope with the problem by launching crash program building power plants with a total capacity of 10,000 megawatts. In order to forestall electricity crisis, PLN has launched a program to boost investment in power generating plants using renewable fuel. Independent Power Producer (IPP) is also urged to speed up

implementation of their power projects. It is necessary to balance the private sectors which build electric power plants and transmit its energy to PLN system through an electric sale agreement scheme called 'PPA' (power purchase agreement). And one of IPPs in Indonesia is PT.Astratel Nusantara, that proposed development of Baturaja Coal Fired Steam Power Plant 2x25 MW (net) where the plant will be located in regency of Baturaja, South Sumatra. This area is very poor for quality of electricity services from PLN; this includes the service for PLN's big customer in industry like PT. Semen Baturaja, both for cement manufacturing process and for housing colony utilization. PT.Astratel Nusantara as private IPP (Project Sponsor) will offer a competitive and beneficial electricity tariff that is under PLN tariff, instead of using diesel engine power plant owned by PT.Semen Baturaja. There is also a side plan to reserving the excess power (if applicable) to be contributed to PLN.

The challenges for private IPPs like PT.Astratel Nusantara in developing coal fired steam power plant (CFSP) is not easy. It should be realized by parties that with existence plan of IPP CFSP 2x25 MW Baturaja which developed PT.Astratel Nusantara will have added values and other mutual benefits, if and only if all related interests and concerns are fulfilled. The intended parties are:

- the Project Sponsor as the IPP Developer;
- PT. Semen Baturaja as the potential purchaser of the associated generated power;
- PT. PLN Rayon Baturaja as the other candidate which is expected to purchase excess power from the Plant;
- Social communities surrounding the nominated project location, which will receive both positive or negative impacts due to this project implementation;

Each of the mentioned parties has their respective interests and concerns in relation with the development of the Plant. The concerns related to policy, environmental and construction issue become a facing problem that related finally to project financial cost (EPC cost and Tariff) and project risks during its execution. Therefore, the knowledge to do business evaluation of such IPPs will be very important and critical for the IPP as well as the investors.

As IPP Developer, PT.Astratel Nusantara will build, operate and maintain the generating units CFSP 2x25 MW, and sells its electricity to PT.Semen Baturaja and PLN. This is because of the power capacity 2x25 MW will be excess if only for PT.Semen Baturaja, and this condition impact to regulation tariff and IPP business process that should be approved by PLN. PLN will review all the condition under PPA that will be conducted by IPP, such as land acquisition, Fuel Supplier, EPC, Operation and Maintenance, Permit and License respective. PT.Astratel Nusantara should consider the business scheme of IPP which is ruled by PLN's authority on behalf of GOI (Law no. 15/1985), they should play *the rule of game* well to face and resolve the potential issues during development CFSP Baturaja 2x25 MW. As Figure below illustrates the business scheme which should be performed by IPP PT.Astratel Nusantara in Baturaja.

However, this study is limited to scope as the followings:

- IPP Baturaja 2x25 MW cost estimate (*Direct cost* such EPC cost and *Indirect cost*)
- IPP Baturaja 2x25 MW financial analysis (NPV, IRR, Pay Out Time)
- Project Implementation Plan (Project *Duration*, *Milestone* & *project risks* management).

2. Business Issue Exploration

The writer recognizes the future potential IPP (PT.Astratel Nusantara) of electricity industry in Indonesia, as IPP developer is entitled to supply local industry such as PT. Semen Baturaja by developing CFSP 2x25 MW (net), moreover can be selling to PLN Baturaja. However, the development of Coal Fired Steam Power Plant (CFSP) also appears a possibility that any interests and/or concerns are not specifically owned by certain party. The problems identified such as:

- **Technical:** the problem contains site selection (acquisition), permit/legal, EPC (engineering, procurement and construction) and *project risk management*.

- **Financing Project:** this is about strong financial of PT.Astratel Nusantara and the support financing from Bank, since the nature is long-term investment.
- **Tariff concerns:** in this case, it is finally about the selling tariff from PLN whether feasible or not for PT.Astratel Nusantara.

As mentioned above the tariff of PLN versus IPP tariff calculated is main problem whether Go or Not Go this project. Besides that, as similar to the other industries, one of the key success factors of IPP Company is the financial. The stronger the financial source, the higher the chance to be successful. Therefore, to understand and assess the right investment value from investors is very important for the company to agree on the terms of equity financing, so they can grow the business faster. **EPC** cost, Fuel (Coal) cost and Operation Maintenance are key factors to determine *the tariff* that are going to be sold to PT. Semen Baturaja and PLN.

The writer helps PT.Astratel Nusantara in analysis their investment to make decision making on CFSPB Baturaja 2x25 MW (net) whether feasible or not, including to solutions of the potential problem/*risks* on IPP project.

Decision making is an activity that is often required to solve the problems faced. It is made easier with the existence of alternative solutions. Definition of the decision in general is a series of activities that are used in solving the problem in order to avoid or reduce negative impacts and take advantage of the opportunities that are owned. Decision making is the process of selecting alternatives series of activities to achieve desired goals. And in this case, the writer would like using project financial analysis (capital budgeting technique) and project risk analysis in order to illustrate project risk management plan.

A. *Conceptual Framework*

As mentioned earlier in Chapter I how PT.Astratel Nusantara will face some potential issues on development of CFSPB Baturaja 2x25 MW (net) like technical, financial, project implementation and legal/regulatory concerns. This potential business should be supported not only by internal condition (financial and capability), but also by several factors in macro level such as infrastructure, economic condition, regulation and politic. The writer aims to set out the main categories of problems that have arisen with IPP PT.Astratel Nusantara, based on experience in a range of IPPs. In order to value an IPP start-up company likes PT.Astratel Nusantara, it is needed to examine several factors:

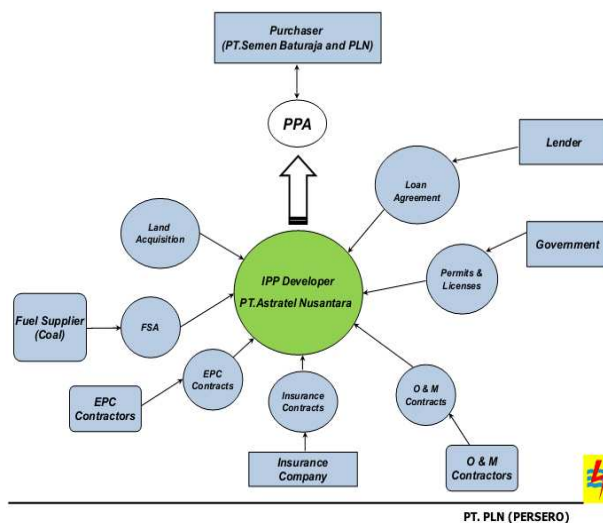


Figure I: Business Schemes of IPP PT.Astratel Nusantara

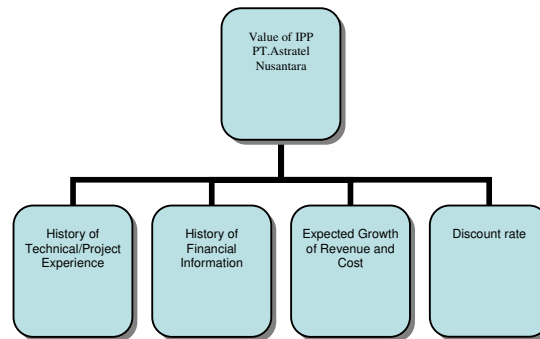


Figure 2. Conceptual Framework

Conceptual focus on Capability Analysis of IPP PT.Astratel Nusantara is conducted to determine the carrying capacity of project execution of CFSPB Baturaja 2x25WM and to analyze the problems faced by the company. These activities include (a) evaluation of history of technical' s capacity or project experience; (b) identification of financial capability relating to this project; (c) expected growth of revenue and cost by project financial analysis; and (d) using discount rate to determine the present value of future amount.

B. Method of Data Collection and Analysis

Two main questions that need to be addressed in this study, which make an analysis of IPP CFSPB Baturaja 2x25MW to be developed, that is decision making on investment that can be analyzed with project financial analysis (capital budgeting technique) and project risk analysis to achieve the expected target of shareholder. To get data collection, field surveys and interview with the stakeholders (PT.Astratel Nusantara and PLN) are conducted in order to determine the project assumption in calculation. The second method is addressed using the analytical and simulation methods. By doing this method, it will be known whether the solutions produced with analytical method are technically and operationally capable to achieve the target of shareholder.

C. Analysis of Business Situation

To know whether this project IPP Baturaja 2x25MW can be executed or not, calculation assumptions based on the condition of PT.Astratel Nusantara's capability and experience, PLN's data library, financial and operation capability obtained in the analytical study are conducted. PT.Astratel Nusantara are financially supported by Astra International and their project experience since 1992 in project infrastructure, are key perspectives to ensure this project can be executed properly. Alternative solutions are developed based on the gap between the existing capability of PT.Astratel Nusantara both technical and commercial, and the proposed capacity obtained in the project financial calculation. The activities include the process of identifying the gap, searching for solutions of problems and prevention of potential risk/obstacles that may occur during the implementation of project, preparing alternatives of development program through project master schedule, and financial analysis of alternatives.

3. Business Solution

A project decision through reasonable analysis is clearly needed prior project execution, besides to ensure lender (bank) in project financing. From analysis above, the root problem of IPP CFSPB 2x25 MW which developed by PT.Astratel Nusantara is,

- How to get optimum tariff from PLN and how to calculate its component / variable such as EPC cost, O&M and its fuel (coal) price.
- Potential risks during project implementation because of external (PEST analysis)
- New comer on IPP Industry

The next chapter will discuss the business solution to solve this root problem through project financial analysis and project risk analysis (PMBOK) on best practice and reasonable assumptions.

And before that, the steps on analysis are the followings:

Project Risk Analysis, refer to PMBOK:

- Define the risk inputs (risk management plan and risk register)
- Conduct risk probability and impact assessment (mitigation) based on the inputs
- Recommend the output of project risk register (updates).

Project Financial Analysis:

1. Define and Calculate Project Cost (Direct Cost and Indirect Cost)
 2. Define Financial Parameters (technical and/or economic assumptions)
- Calculate and Evaluate Project Financial refers to Project Economic Indicators (by capital budgeting technique) whereas:
 - Net Present Value (NPV), accept if > \$0.
 - Internal rate of return (IRR), accept if > the cost of capital
 - Payback Period, accept if < maximum acceptable payback period

Using the project financial analysis and project risk analysis, it will expect to get a view for project decision making. Firstly we do is define and calculate project cost that refer to direct and indirect cost. And before doing that, some related engineering data (equipment and coal specification) as basic variable in calculation will be assumed based on common practice in IPP PLN. Moreover, parameters are assumed and/or pre-determined as below :

- o Net Plant Heat Rate : 3,152 kcal/kWh
- o Coal price ([ICI www.argusmedia.com](http://www.argusmedia.com)) : US 55.03/ton at site
- o Project Life/Operating time : 20 years
- o Debt to Equity ratio : 60 : 40
- o Loan Interest : 9%
- o Installed capacity (Gross Capacity) : 54 MW
- o Net capacity : 50 MW
- o Potential Availability Factor (PAF) : 90 %
- o Capacity Factor (CF) : 80 %
- o Coal caloric value : 4500 kcal/kg
- o Inflation rate (BI rate year 2012) : 2.5% (US)
5.19% (INA)

Besides that, evaluation is conducted also require project cost information. And in this case, it has been calculated as the followings:

Summary of Project Cost:

- EPC CostUS\$ 45,900,000.00
- VAT + other taxes 20%.....US\$ 9,180,000.00
- 5% Const. Management...US\$ 2,295,000.00
- **Project Direct Cost** US\$ 57,375,000.00

- Development Cost ... US\$ 2,006,500.00
- Initial O&M mob cost.....US\$ 550,000.00
- Working Capital US\$ 2,887,454.00
- Financial Cost (IDC)..... US\$ 5,389,225.00
- **Project Indirect Cost**US\$ 10,833,179.00

- **Total Project Cost****US\$ 68,208,179.00**

The 3 scenarios either on cost or tariff is calculated in this project, where the assumptions / engineer estimate of each component will be detail as the following:

1. Three scenarios on Cost

- Component A; EPC cost is various increasing, Acquisition cost is fixed. EPC cost is calculated with potential risk consideration (detail on attachment C), where based on engineering estimate assumption for most likely is 2%, pessimistic is 3% and for optimistic is 1%. And the sensitivity analysis will be calculated based on EPC cost estimate as \$US 45,900,000. So that, the EPC cost with 3 scenarios as the following:
 1. For the most likely is \$US 48,586,400 or equal $48,586,400 / (2 \times 27 \times 1000) / \text{kW} = \$\text{US } 900 / \text{kW}$ on some risks such as Turbine, Boiler, Ash Handling and Coal Handling;
 2. For **pessimistic** is \$US 48,782,100 or equal $48,782,100 / (2 \times 27 \times 1000) / \text{kW} = \$\text{US } 903 / \text{kW}$;
 3. And for **optimistic** is \$US 48,390,700 or equal $48,390,700 / (2 \times 27 \times 1000) / \text{kW} = \$\text{US } 896 / \text{kW}$.

- Component B; Fixed Operation and Maintenance cost is various increasing, For this cost component, since CFSPP Baturaja is low up to middle capacity, assumed based on engineer estimate that the cost of operator (service) and maintenance (comp. D: spare part) is not much different, thus increasing component B&D is same (% taken from inflation US rate for plant insurance and from inflation Indonesia for property tax; since spare part is from principle in China). So that, the fix cost is calculated with potential risk consideration (detail on attachment F), where based on US inflation rate as pessimistic is escalated on 2.5% / year and optimistic is escalated on 1% / year and most likely is escalated on 2% / year. For Indonesia Inflation rate (BI rate 2012) as pessimistic is escalated on 6.5% / year and optimistic is escalated on 5.0% / year and most likely is escalated on 5.19% / year.

- Component C; Fuel (coal) cost is various increasing, as mentioned previously where based on “eia” above, for pessimistic is taken 15% increasing as pessimistic scenario, most likely is taken average 7%; and optimistic is taken as 2% increasing.

- Component D; Variable Fixed Operation and Maintenance cost is various increasing, as previous mentioned for this cost component, since CFSPP Baturaja is low up to middle capacity, assumed based on engineer estimate that the cost of operator (service) and maintenance (comp. D: spare part) is not much different, thus increasing component B&D is same (% taken from inflation US rate for plant insurance and from inflation Indonesia for property tax; since spare part is from principle in China). So that, the fix cost is calculated with potential risk consideration (detail on attachment F), where based on US inflation rate as pessimistic is escalated on 2.5% / year and optimistic is escalated on 1% / year and most likely is escalated on 2% / year. For Indonesia Inflation rate (BI rate 2012) as pessimistic is escalated on 6.5% / year and optimistic is escalated on 5.0% / year and most likely is escalated on 5.19% / year.

Result of analysis will indicate both lender’s concern (project performance) and Plant owner’s concern (electricity tariff). To compromise with electricity purchaser’s, computer can assist to “back solve” the problem. This back solver will make computer’s iteration process until the optimized values are obtained. The followings are summary of the result (*most likely* scenario):

Electricity Tariff

| | | |
|--------------------------|---|---------------|
| Component A | : | US\$ 0.043133 |
| Component B | : | US\$ 0.003996 |
| Component C | : | US\$ 0.038546 |
| Component D | : | US\$ 0.001836 |
| Total electricity tariff | : | US\$ 0.087510 |

Result Project Financial Analysis/Project Performance:

| | | |
|-----------------------|---|----------------|
| IRR Project | : | 13.29% |
| IRR Equity | : | 14.97% |
| WACC | : | 11.41% |
| NPV Project at 11.41% | : | US\$ 7,362,327 |

| | |
|---------------------------|------------------|
| NPV Equity at 11.41% | : US\$ 8,579,889 |
| POT (Project) (after COD) | : 6.06 years |
| POT (Equity) (after COD) | : 7.16 years |
| PI | : 1.01 |

Seen that refer to project economic indicator, project is feasible ($IRR > WACC$) to executed with the tariff is still in PLN's range for industry, (600 – 900 rupiah/kwh). However, the tariff still open to be more negotiated with PLN. Finally based on the both analysis above, CFSPB Baturaja 2x25 MW is potential/feasible project to be done. So that, programs and implementation plan can be produced.

4. Conclusion and Implementation Plan

Based on the evaluation, the CFSPB Baturaja 2x25 MW is concluded as technically and financially ok and prospect, a project implementation plan needs to be taken into account by PT.Astratel Nusantara, where this project is also proposed to use project financing where Equity is 40% and Loan (lender/Bank) is 60%. The purpose is to ensure that PT.Astratel Nusantara can meet their target goal for profit and growth estimation in IPP line business. Therefore, the milestone set must be achieved within the schedule. The delay of the project would cause miscalculation of the expectation of return on investment (ROI) and risk variable.

To see implementation program and project schedule of CFSPB Baturaja 2x25 MW, see the project master schedule below:

| Project Milestone | Schedule |
|----------------------------------|----------------------------------|
| Preparation Activities/Tender | 0 - 11 Months (since 1 Jan 2013) |
| EPC Activities/Power Plant Built | 11- 35 Months (since 1 Jan 2015) |
| Operation Maintenance | 30 Years since COD 1&2 |

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