Alternative PPP Scheme for LRT Batam with Value Engineering Approach

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ABSTRACT

As one of the PPP projects offered in PPP Book 2017, Batam LRT project held the priority of railway network construction in Batam Island consists of 2 lanes. Line I namely Batam Center-Tanjung Uncang (1st Corridor) with length of ± 27.54 Km and line II is Batu Ampar-Hang Nadim Airport (2nd Corridor) with length of ± 27.93 Km. LRT Batam requires huge investment to build these two corridors. Therefore, an innovative and creative efforts shall create in the construction design to achieve an attractive investment for investors. One way to do this is by performing various financing simulations of the PPP scheme. This research aimed to identify varies range of PPP Scheme that will be selected in Batam LRT Project. This simulation shows optimum result using the PPP scheme offered with the partial support of construction financing by the Government.

Keywords

Batam, Infrastructure, LCC, PPP Scheme, Railway

1. INTRODUCTION

Batam is one Free Trade and Free Port Zone manage by Batam Enterprises Agency (BP Batam). Batam has an area of 41,500 Ha with an average population growth rate of 9% per year. As consequences of a free trade area and free port, the rate of population growth and economy in Batam continues to go up, resulting in increasing movement of goods and people. To accommodate these needs, it is necessary having an adequate, effective, and efficient transportation infrastructure, to be solution of traffic congestion problems that have occurred in Batam. Railway transportation based is the best mode choice that has the advantages of a large, comfortable, safe, energy efficient, environmentally friendly, and small land requirement. The Government, in this case the Directorate General of Railways-Ministry of Transportation, has undertaken the drafting of "Railway Masterplan on Batam Island" in fiscal year of 2009, then held preparation of "Feasibility Study of Railway Traffic Network Development of Batam Island" in fiscal year of 2010, and preparation of "Study Determination of Traffic Traffic Road Traffic Line Batam Island "in fiscal year of 2012.

2. LITERATURE REVIEW

2.1. PPP Principle

Public Private Partnership (PPP) or known as KPBU is a Cooperation between the Government and Business Entities in the Provision of Infrastructure for the public interest with reference to the pre-determined specification by the Minister/ Head of Institution/ Head of Region/ State Own Enterprise, partly or wholly using the resources of the Business Entity by paying attention to the risk sharing between Party (Presidential Regulation No. 38/2015).

PPP Schme is aiming to have sufficient funding requires for provision of infrastructure through business enterprise funds; Along with its quality, effective, efficient, right target and right time planning of infrastructure; Encourage an investment that shall be attractive for participation of business entities in the development; Encourage "user need to pay" or consid "the ability to pay"; Provide assurance of return on investment through periodic payment by government to business entity.

Figure 1. PPP Principle

In terms of financing, scheme of PPP has several levels as follows (Dikun, 2012):

a. If the project is economically and financially feasible, a full-financing scheme by a business entity or another Public Private Partnership (PPP) is available in terms of funding for the construction and operation and maintenance of the infrastructure.
b. If the project is economically feasible and financially marginal, then PPP schme shall follow with government support (VGF) or other Creative Financing such as PFI, PBAS, Infrastructure Bank, Land Bank and so on. Operational funding is undertaken by the Business Entity, while funding for construction implementation is performed jointly by the government and the business entity.
c. If the project is economically feasible but not financially feasible, then the suggested scheme is hybrid financing. Operational funding is undertaken by the Business Entity, while funding for the overall construction implementation comes from the government.

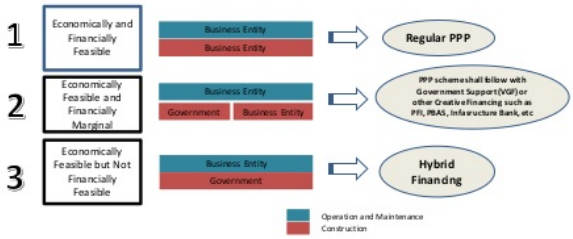

Figure 2. PPP Financing Scheme

2.2. Value Engineering

Value Engineering (VE) is a decision making process based on team which is systematic and structured. Value Engineering (VE) is a team approach that oriented in functions, organized and directed to analyze functions in products, system, or supply process, intended to increase value by identifying and removing unnecessary costs to achieve needed performance in lowest project's life cycle cost (Fong, 1998). VE method has been implemented in many infrastructure projects in developed countries, especially for projects with high costs and has been accepted as a best tool to manage project effectively (Berawi et al., 2008; Zetha, 2012). VE method has been tested systematically that able to analyze a system's functions to produce optimal output for a project, in quality, technology, efficiency, and innovation (Berawi et al., 2005). VE process (is also called VE study) is a sequence of activities in a value study for an object (project, process, product) that includes functions definitions, idea developments and evaluations that will result VE proposal and hold as a workshop (Isola, 1997). Generally, VE study consists of three steps, which are pre-workshop (preparation), workshop (six phases Job Plan execution), and post-workshop (documentation and execution).

3. OVERVIEW OF LRT BATAM

Location of study area is Batam City, located in Riau Islands Province on defined lane from Batam Center-Tanjung Uncang (1st Corridor) length ±27,54 Km and from Batu Ampar-Bandara Hang Nadim (2nd Corridor) length ±27,93 Km. Illustration given in the figure below.

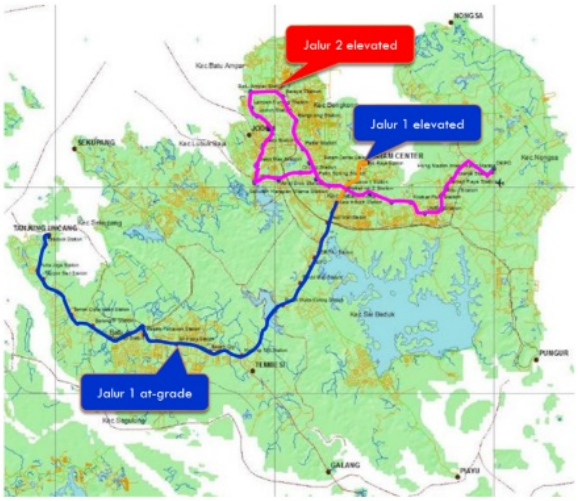

Figure 3. Location of Batam Light Rail Transit (LRT)

Component for Initial Cost and OM Cost Batam LRT for each Corridor can be seen on the table:

Table 1. Initial Cost and OM Cost

Cost of Batam LRT	1st Corridor (in Million Rp.)	2nd Corridor (in Million Rp.)
Initial Cost	3.435.160	9.450.179
OM Cost	52.505	99.767

Source: Technical Team, 2016

Rolling Stock that will be used has service age for 30 years. In the first 30 years of operational, LRT will used 2 car set of rolling stock. After that, these rolling stocks needs to get retrofit and the price shall not exceed half of the rolling stock prices. After operating for 50 years, rolling stock should be replaced with 3 car set to accomodate the increasing demand.

The results for Economic Feasibility with indicator of NPV and EIRR are shown below:

Table 2. Economic Feasibility Analysis Batam LRT

Corridor	NPV (in Million Rp.)	EIRR (Nominal)
1st	23.145.844,79	15,34%
2nd	35.295.323,19	16,57%

According to the tabel above, it can be concluded that LRT Batam Construction is Economically Feasible both for 1st Corridor and 2nd Corridor, this why the analysis can be advancing to Financial Feasibility Analysis and run the PPP Scheme Simulation. In Value Engineering approach, the revenue from operating dan maintenancing Batam LRT comes from (Zetha, 2012):

1. Ticketing Revenue, from number of demand annually multiplied by tariff
2. Property Development Revenue, such as Hotel and Condominium/ Apartment in each Corridors. Lancah Kuning Batu Ampar has available location for development 6 tower of Condominium/ Apartment, possibly can add to amount of revenue. Hang Nadim Airport has 16 ha available location recommended for developing integrated tourism area

(entertainment, hotel, restaurant) also acknowledge in adding revenue.

3. Station Revenue, there are 3 types of station in Batam LRT, Type A, B, and C. Type A station does not has commercial area, Type B station has commercial area for rent, and Type C station besides has commercial area for rent, it also integrated with Mall/Airport, and significant in contributing to station revenue. Outdoor media such us billboard, will be placed in Type B and C station, strategic location, and inside or outside the car (train).

The purpose of Financial Feasibility Analysis Batam LRT is to calculate NPV value, IRR value, and Payback Period. Concession period starts with first operating year of Batam LRT. To calculate NPV and IRR value, it starts with analyzing:

1. Capital Expenditure
   Is the initial cost analysis with 7 scenario of construction, construction period estimated for 3 years (2018 – 2020), with asumption of construction progress are 25% for 1st year, 50% for 2nd year, and 25% for 3rd year.
2. Interest During Construction
   For construction period, based on capital ratio, where 70% of it comes from loan. Business Entity can get some loan with loan interest.
3. Depreciation and Infrastructure & Rolling Stock Replacement
4. Revenue
   Revenue comes from ticketing, property development, dan other revenue (station).
5. OM Infrastructure and OM Rolling Stock
6. Net Income

Taxable Income results from Total Income minus Cost of Depreciation, OM, Infrastructure & Rolling Stock Replacement. Based on analysis done previously, the NPV and IRR value, and Payback Period shown in the next table:

Table 3. Financial Feasibility Analysis Batam LRT

Private Modality	LCC	Ticket Price (Rp)	Property Occupancy (%)	Demand (%)	1st Corridor		2nd Corridor	
					NPV (In Million Rupiah)	IRR (Nominal)	NPV (In Million Rupiah)	IRR (Nominal)
Infrastructure (exclude land), EMU, and OM	50 yrs	10,000	65	61	-3,016,175	3.89%	-8,743,736	3.12%
		10,000	75	61	-2,982,723	3.95%	-8,684,906	3.16%
		12,500	65	61	-2,712,772	5.50%	-8,322,683	4.20%
		12,500	75	61	-2,679,577	5.56%	-8,263,783	4.25%
	75 yrs	10,000	65	61	-2,873,924	6.98%	-8,512,825	6.09%
		10,000	75	61	-2,840,471	7.01%	-8,453,995	6.11%
		12,500	65	61	-2,508,271	7.97%	-8,006,340	6.82%
		12,500	75	61	-2,475,075	8.01%	-7,947,440	6.84%

Source: Analysis, 2016

From that Financial Feasilibity Analysis above, it shows that NPV value for 1st and 2nd Corridor are negative. With IRR value below MARR, means that the plan for constructing Batam LRT is Financially unfeasible to be built for concession as far as 50 years or even 75 years.

Based on that analysis, it can be concluded that the IRR value is sensitive to changes of tariff, where in this analysis using tariff Rp. 10.000 and Rp. 12.500, but the IRR value does not sensitive to property occupancy ratio, and so it is need to do further study about PPP Scheme if the plan for constructing Batam LRT insist to be continued.

4. RESEARCH METHODOLOGY

This research use qualitative and quantitative efforts using interviews with the experts in railway. Technology selection analysis is done using Value Engineering method approach (Railway VfM Study, 2011). VE implementation result validation is performed using Life Cycle Costing (LCC) analysis to obtain IRR and NPV. In PPP scheme, LCC is a representation of Value for Money that has become a basic concept in a project that will be constructed using PPP financing (Berawi et al, 2014b; Grimsey & Lewis, 2005).

There are several assumptions that being made in calculating financial analysis of Batam LRT. It describes as follows:

1. Assuming the increase of annual operational and maintenance cost considers transportation sector inflation for about 6,50%.
2. Using expert judgement, overhaul activity will be conducted in 30th years with estimated cost around half of the Rolling Stock price. In 50th years the spesification will changes in number car per set from 2 cars to 3 cars. While the Total Operation and Maintenance (OM) Cost will be OM Cost Annually multiplied by number of Rolling Stock operation.
3. Existing plan from reports shows that Batam LRT has passenger estimation for about 17.000 passengers/ day for 1st Corridor and 23.539 passengers/ day for 2nd Corridor in the first operational year (2022). However, Batam LRT will only achieved 61% of their targeted passenger in the first operational year (moderate demand scenario).
4. Tariff for Batam LRT will be simulated between Rp. 10.000, and Rp. 12.500 (OBC Batam LRT, 2015).

5. RESULT AND DISCUSSION

According to result from Batam LRT Construction Financial Analysis, the optimum choice for PPP Scheme simulation for constructing Batam LRT is by using BOT Scheme with staged tendering process. The BOT Scheme will be bundling for 1st Corridor and 2nd Corridor, and the other BOT Scheme is with financial support for some part of construction or by using Viability Gap Funding (VGF). All of three PPP Scheme are described with 7 scenario as follows:

Table 4. 7-Scenario for PPP Scheme

Scenario		Describe
Staging Tender	1st Scenario	1st Corridor + Depo and Rolling Stock built first, then 2nd Corridor after that
	2nd Scenario	2nd Corrior + shortcut and Rolling Stock built first, then 1st Corridor after that
Staging Tender	3rd Scenario	2nd Corridor + Depo and Rolling Stock built first, then 1st Corridor after that
	4th Scenario	1st Corridor + Shortcut and Rolling Stock built first, then 2nd Corridor after that
Bundling 1st and 2nd Corridor	5th Scenario	1st and 2nd Corridor + Depo + Shortcut and Rolling Stock build together
PPP Scheme with financial supporting for some construction	6th Scenario	1st Corridor built by Business Entity (private or state owned), 2nd Corridor + Shortcut and Depo built by government, and all of the Rolling Stock for 1st and 2nd Corridor will be provided and operated by Business Entity
	7th Scenario	2nd Corridor built by Business Entity (private or state owned), 1st Corridor + Shortcut and Depo built by government, and all of the Rolling Stock for 1st and 2nd Corridor will be provided and operated by Business Entity

Below are the simulation for PPP Scheme according to 7 Scenario with additional 3 varians of revenue. All of the 7 Scenario will be simulated with moderate demand scenario (61% passenger).

1. PPP Scheme Simulation with Tariff Rp. 10.000 and Hotel Occupancy ratio 65%

The simulation result shows that NPV value is negative, although the LCC is perfom further until 100th years. Similar result happend, if the 49% of Construction Cost (VGF) burdened on government, the NPV value still negative. This simulation shows that, if the tariff Rp. 10.000 and hotel occupancy ratio 65%, project can not be applied to any PPP Scheme.

2. PPP Scheme Simulation with Tariff Rp. 10.000 and Hotel Occupancy ratio 65%
   The simulation result shows that NPV value only positive for 6th Scenario with investment return period or Pay Back Period in 66th years and the simulation done with 75 years LCC. Meanwhile, from 1st to 5th Scenario, the NPV value still negative although with additional 49% VGF from government. From this simulation, sensitivity result for tariff changes is significant.
3. PPP Scheme Simulation with Tariff Rp. 12.500 and Hotel Occupancy Ratio 75%
   This simulation will show sensitivity for Hotel Occupancy Ratio. The simulation result shows that NPV value only positive for 6th Scenario with shorter investment return period (63th years) with LCC for 75 years. For 1st to 5th Scenario, the NPV value still negative although with additional 49% VGF from government.

Based on 3 PPP Scheme Simulation above, it can be conclude that the 6th Scenario is the only scenario that possible to be further acknowledged. 6th Scenario: PPP Scheme with financial supporting for some construction, where 1st Corridor built by Business Entity (private or state owned), 2nd Corridor with Depo and Shortcut built by government, while all of the Rolling Stock for 1st and 2nd Corridor will be provided and operated by Business Entity.
The next Simulation below only focusing to advancing 6th Scenario.

Advance simulation for 6th Scenario will be divided to 4 alternative, where each of them Business Entity gets the right to operating Rolling Stock for 1st and 2nd Corridor. Below are the advance simulation for 6th Scenario:

- 6A: 1st Corridor with whole infrastructure without Depo and Shortcut
- 6B: 1st Corridor with whole infrastructure and Depo without Shortcut
- 6C: 1st Corridor, with some infrastructure (upper structure only) and Depo but without Shortcut
- 6D: 1st Corridor, with some infrastructure (upper structure only) but without Depo and Shortcut

The simulation result for PPP Scheme - 6th Scenario shows that, the best choice for PPP Scheme with financial supporting for some construction are:

- 6C (1st Corridor-Upper Structure with Depo)
- 6D (1st Corridor-Upper Structure without Depo)

Concession recommended is 75 years with Tariff Rp. 12.500 and Property expectation level 65%.

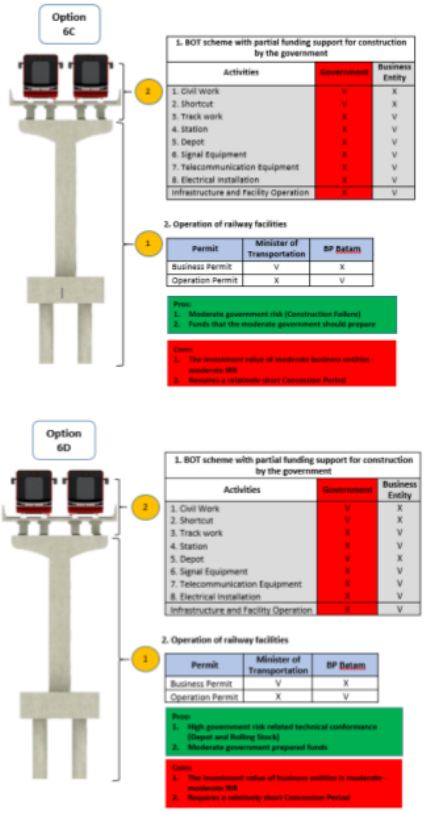

Figure 4. PPP Scheme for 6C and 6D

6. CONCLUSION

The results showed that scenario 6C and 6D give positive NPV result for 75 years concession period. IRR for scenario 6C is slightly smaller than 6D scenario since its indicate depo development is not charged to the Enterprise. However, the different is not significant, therefore the recommendation of PPP scheme for LRT Batam is BOT scheme with the support of some construction financing by Government, where 1st Corridor is constructed by Business Entity without civil work and shortcut, while the 2nd track is built by the government (scenario 6C).

Table 5. Simulation Result for PPP Scheme 6C Code and 6D Code

Scenario	CAPEX (In Million Rupiah)			NPV	IRR	PBP (yrs)
	Business Entity	Government	Total			
6c	3,025,219	9,860,520	12,885,739	754,748.73	12.83%	47
6d	2,618,920	10,266,819	12,885,739	1,101,376.49	13.46%	40

Table 6. PPP Scheme Recommendation for Batam LRT

Government Contracting Agency	BP Batam
Private Role	BOT Scheme with Government Support
Government Support	• Partial financing of construction • Gives TOD development and management rights
Investment return scheme	Tariff with the support of land availability and TOD development

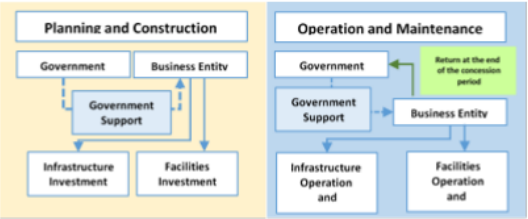

Figure 5. PPP Scheme Recommendation for Batam LRT

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