FINANCIAL SIMULATION IN OPERATION AND MAINTENANCE OF RAILWAY TRANSPORTATION (CASE STUDY: GREATER JAKARTA LIGHT RAIL TRANSIT)

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FINANCIAL SIMULATION IN OPERATION AND MAINTENANCE OF RAILWAY TRANSPORTATION (CASE STUDY: GREATER JAKARTA LIGHT RAIL TRANSIT)

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Railway transportation is one of the promising infrastructure sectors that potentially become economic backbone of Indonesia in the future years. Greater Jakarta Light Rail Transit (LRT) is a railway project development that aims to provide alternative accessibility for commuters and in longer run expected to reduce vehicles population. Although other sectors are already familiar with contracting out operation and maintenance, the application for railway sector is relatively new either for regulator, operator and also supporting industries. This research aims to contribute financial simulation of operational and maintenance particularly in Greater Jakarta LRT project to help the regulator in gaining insight, producing better regulatory framework and propose the best contract for business entity. The result shows that procurement of rolling stock for about US$ 126 million shall supported by the government meanwhile depot construction that estimated around US$ 20.87 million belong to private responsibility. This overall concept produce significant rate of return for business, government has the opportunity to provide infrastructure and the people get reasonable tariff for their transportation cost.

Keywords: Financial, Indonesia, Light Rail, Maintenance, Operation, Transportation

1 INTRODUCTION

Compared to other developing countries in the region, Indonesia as a South – East Asian country is experiencing significant economic growth in recent years. Greater Jakarta consider as central economic activity in the country which greatly contributes to the increasing growth of national Gross Domestic Product (GDP). Despite its huge contribution, this capital city of Indonesia has many problems that concern various stakeholders from academics, practitioners, industries and government bodies particularly in mobility and connectivity sector for the people.

Greater Jakarta that consist of Jakarta Metropolitan, Bogor, Bekasi, Depok and Tangerang mainly relies the transportation on private vehicles either motorbikes or cars. In the records of Polda Metro Jaya (Jakarta Metropolitan Police) 2014, growth of private vehicles is around 12% which shown by daily purchase of motorbikes for about 4,000 to 4,500 in the meantime 1,600 new cars are registered every day. In 2014, total

ivate vehicles are about 17,523,967 units which dominated by motorbikes around 13,084,372 units. It then followed by private cars about 3,226,009 units, 673,661 of freight cars, 362,066 units of buses and special vehicles around 137,859 units. Compared from registered vehicles in 2006 where 7 million units are produced, there is significant growth of vehicles ownership during the 10 years period. Without proper planning and development from related parties, the traffic will get worst and decrease productivity in greater scale. Thus competing in global scale will require more efforts to be achieved (Quddus et al, 2009; Johansson and Mattsson, 2012).

One of the solutions to cope with the congestion problem can be done by introducing rail – based transportation. It is a mass transport that capable in moving people with great volume, higher speed and free from crossing line compared to buses (Chang, 2010; Berawi et al, 2014). Railway transportation is one of the promising infrastructure sectors that potentially become economic backbone of Indonesia in the future years (Zetha et al, 2012; Berawi et al, 2015). Currently, the government encouraging national railway system development with network connectivity expansion and transportation services improvement. The action is started by initiating Greater Jakarta Light Rail Transit (LRT) project development. It is an acceleration project from the government to provide alternative accessibility for commuters and in longer run expected to reduce vehicles population.

Greater Jakarta LRT project construction appoints PT Adhi Karya as the main contractor. It is supported by presidential law no 98/2015 and no 99/2015 as a means to accelerate urban transportation in the capital city of Indonesia. The company main task in to build elevated track, stations and operation facilities. The government through ministry of transportation will then take over the project for open tender on the LRT operation and maintenance. This action aims to regulate proper tariff from government for the people with rational price.

Although other sectors are already familiar with this type of tendering, the application for railway sector is relatively new either for regulator, operator and also supporting industries. It because current railway operation and maintenance is mainly conducted by single State Owned Enterprises through PT Kereta Api Indonesia (KAI) and it subsidiary through Jakarta Commuter Line (KCJ) which runs greater Jakarta line. Since most of stakeholders only had real experience in heavy rail project development, formulating proper policy will takes time and consume huge energy from related parties. Therefore, this research aims to contribute financial simulation of operational and maintenance particularly in Greater Jakarta LRT project to help the regulator in gaining insight, producing better regulatory framework and propose the best contract for business entity. It is expected can be used to attract private sector involvement and therefore accelerate infrastructure project development in Jakarta Metropolitan and its supporting areas.

2 OVERVIEW OF JAKARTA LIGHT RAIL TRANSIT

Jakarta Light Rail Transit (LRT) is a mass transit system that uses a smaller and slower of train compared to a MRT system. It is considerably cheaper and provides better flexibility in term of technical and technology wise. The system will connect Jakarta Metropolitan and other suburban areas such as Bekasi and Bogor. Visualization of LRT route can be seen in following figure.

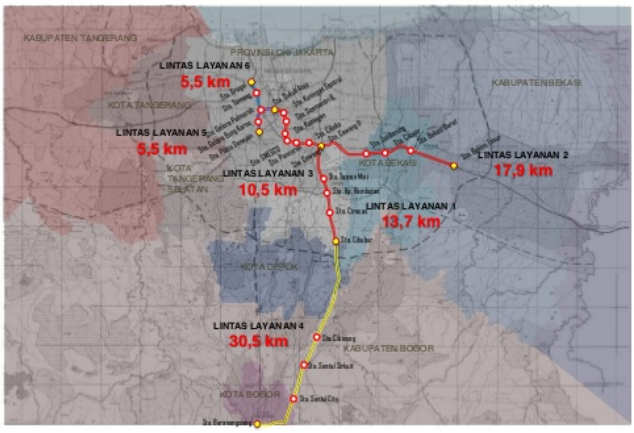

Figure 1. Greater Jakarta LRT Route Plan
Source: FGD between Ministry of Transportation and PT Adhi Karya, 2015

First phase of construction consist of three main line. Cibubur – Cawang Line will be construct with elevated line, has 5 stations and total length for about 13.2 km. While Cawang – Dukuh Atas Line also use elevated line with 8 stations and 10.2 km length in total. Last, Bekasi Timur – Cawang Line has 16.88 km elevated and 0.6 at grade line with 4 stations. The budget require to construct these infrastructure in phase one is about US$ 196 million which supported 51% from government capital and 49% of public funding through right issue. The construction of car depot remain undecided who will be take in charge whether PT Adhi Karya as the main contractor or the bidder for this development.

However, the initial stage shows two best alternative locations for car depot includes 8 hectare around Cibubur Station and 6 hectare on east side of Bekasi Timur Station. Furthermore, phase two of LRT construction includes Cibubur – Bogor route and Dukuh Atas – Palmerah – Senayan route. And, the last phase route is planned along Palmerah – Grogol (FS LRT, 2015).

3 RESEARCH METHODOLOGY

This research was conducted by using desk study from various reports that supported by directorate General of Railways, Ministry of Transportation, Republic Indonesia and qualitative analysis through in – depth interview. In – depth interview was conducted by using structured manner to gain input and also as a means to validate the research output. Respondents consist of 5 persons from academics, operator, government bodies and practitioners. They hold minimum master degree in transportation and related area; have experience more than 10 years in railway project and public private partnership in Indonesia.

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

1. The increase of annual operational and maintenance cost considers transportation sector inflation for about 5.46% (Statistics Indonesia, 2015).
2. Overhaul activity will be conducted every 10 years with estimated cost around US$ 0.044 million/car (FS LRT Manila, 2015). In 2027, the numbers of cars will about 37 units and increases to 56 units in 2042.
3. Existing plan from various reports shows that the Greater Jakarta LRT has passenger estimation for about 210,000 passengers. However, considering Manila LRT that only achieved 40% of their targeted revenue in the first operational phase, this analysis will use passengers demand with pessimist scenario with 35% of current demand or estimated for about 73,500 passengers per day.
4. Tariff in the first year of operation stage have to accommodate lower level income from greater Jakarta area, therefore it will limited to 15,000 rupiah or US$1.12 in the first five years and then increases according to 5 year inflation rate.
5. Other revenues assumed for about 1% from total fare box during the first ten years and expected to increase 0.5% every others 10 year.
6. General inflation will be around 5.95% and the life cycle cost for about 30 year.

4 RESULT AND DISCUSSION

In conducting the financial evaluation of Greater Jakarta LRT, the calculation involves only operations and maintenance activities. This is because the entire financing of investments have been assigned to PT Adhi Karya as the main contractor and government will reimburse construction cost of the project through the ministry of transportation. LRT facilities will be divided into the operating staff; maintenance staff and facilities maintenance items, while the LRT infrastructure consists of maintenance staff and infrastructure maintenance items (Lee and Toda, 2014). Facilities and infrastructure will produce base price which exclude overhead and contingency.

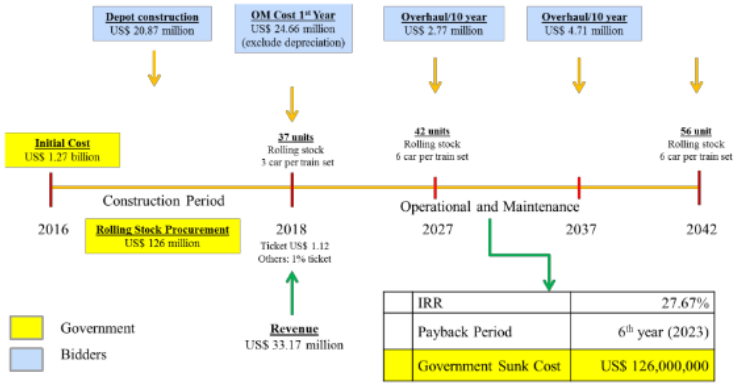

Figure 2. Diagram Simulation Where Bidders Responsible for Depot Construction

The first simulation assumed that initial cost for about US$ 1.27 billion firstly supported by the government. Government will be also procuring the rolling stock (RS)

from respective LRT contractor during the construction period and all of the 37 units of LRT car are ready upon operational phase. The construction period estimated require three years from ground breaking which started in 2016.

On the other hand, while construction of LRT infrastructure is being conducted by the appointed contractor from the government, the bidder is responsible to construct depot which estimated require US$ 20.87 million. When the operational phase is launched, the bidder will also be responsible to maintain depot and infrastructure; also operate and maintain rolling stock. As the demand for about 35% from current estimation, annual passengers demand estimated around 30,660,000. With the ticket price is set around US$1.12, operational and maintenance cost in the first year of operation is about US$ 24.66 million, the result shows an internal rate of return for about 27.67% with payback period six year.

The second simulation also assumed that initial cost supported by the government. Government no longer responsible in procuring US$ 126 million of rolling stock (RS) yet obliged to construct the depot stations for about US$ 20.87 million. On the other hand, the bidder is responsible to invest for rolling stock procurement and also its maintenance. They also are responsible to maintain infrastructure that constructed by using public funds. Following figure will be shown the distribution of responsibility for the two parties.

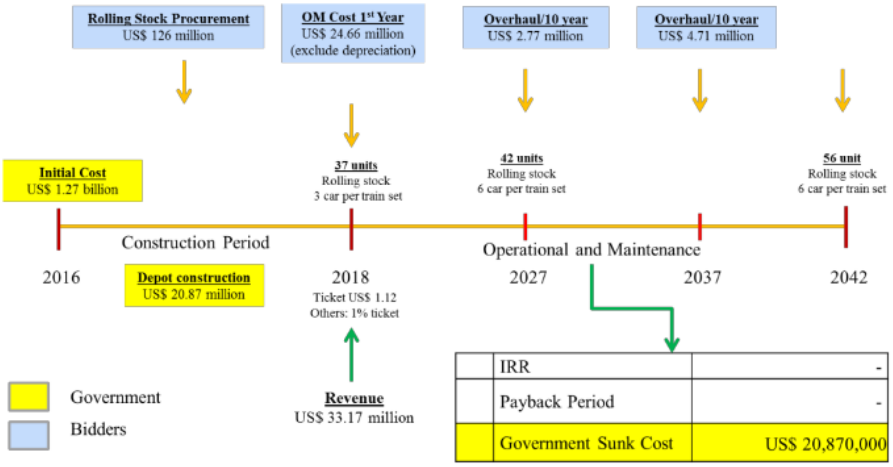

Figure 3. Diagram Simulation Where Bidders Responsible for RS Procurement

As the demand for about 35% from current estimation, annual passengers demand estimated around 30,660,000. With the ticket price is set around US$1.12, operational and maintenance cost in the first year of operation is about US$ 24.66 million, the result shows insignificant internal rate of return for the project. It means with US$ 126 million of rolling stock borne by the private, this scenario for the project is considered unfeasible.

5 CONCLUSION

Greater Jakarta LRT project expected accelerate a better transportation system in capital city of Indonesia. The result of this research contributes for knowledge dissemination in international debate about Light Rail Transit development particularly in developing countries. There are assumptions that being set, firstly ticket price limit to US$1.12, and then operational and maintenance cost in the first year of operation calculated for about US$ 24.66 million. The output produces two simulations that showed government involvement for the project through sunk cost and the feasibility.

Operation and Maintenance with private investment in depot construction is proposed as the best scenario compared to Operation and Maintenance with private investment in rolling stock. OM with government support in rolling stock produces internal rate of return for about 27.67%. In contrary, OM with government support only for LRT depot made the project unfeasible in business perspective.

Acknowledgement

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