

FINANCING MASS TRANSIT SYSTEMS, THE JAKARTA'S CASE

Iskandar ABUBAKAR
 Director for Urban Traffic and Transport System Development
 Ministry of Communications,
 Jl Merdeka Barat No 8
 Jakarta, 10110
 Indonesia
 Fax +62-21-3506144
 Email: isk_abkr@indo.net.id

Abstract: The preparation of Jakarta's Mass Rapid Transit started in 1990 through a World Bank financed project called the Transport Network Planning and Regulations (TNPR). This study came up with a mass transit network proposal for Jakarta, which consist of new lines and improve the existing Jabotabek Railway network. Since then many followed studies has been prepared but there were no implementation of new lines yet. The main reason for this is financial problem.

Private sector participation is needed more in developing economies compare to advanced economies, which are relatively more affluent in public financing. However, financial feasibility is a very significant criterion for the success of private sector participation in the urban transportation infrastructure, especially since transportation projects are not always financially feasible. Whereas the public sector contribution in public private partnership would be in the form of incentives to complete projects for public benefit.

Keywords: mass transit, private sector participation, financing schemes

1. INTRODUCTION

High pressure of urban population and motorization growth over the last 30 years, not enough infrastructure to support the increasing demand for transport, and delayed in investment for public transport resulting a serious traffic congestion as well as huge air pollution problem on major roads in the city center.

Due to the fact that private vehicles are still more attractive, policy aimed at reducing people's desire and expectation to use private vehicles need to be put forward. Several proposed methods for restraining private vehicle usage will include the following:

- Progressive parking fees, particularly for long term parking, and parking in the inner city area;
- Limiting parking spaces;
- Charging additional rates on buildings having more than the allowed amount of parking spaces;
- Higher taxation (including permit fees) and computerised "road use payment" or area licensing systems;
- Traffic management (in conjunction with the definition of road hierarchy) to optimise the use of road space, prohibit on-street parking, improve pedestrian facilities, etc.;

- Additional toll roads, improved intercity ("primary") and urban ("secondary") road system, with flyovers at railway and major road intersections;
- Expansion and improvement of bus services through, amongst other bus priorities,
- Rationalisation of bus routes, matching of bus size to route type, transport interchanges at inter-city bus terminals with easy access to toll/arterial roads, and supporting facilities such as bus shelters.
- Increase use of railways by improvement of transport interchanges and commercial development at main stations, integration of city and inter-city railways and "adding new routes".
- Increase use of taxis (to restrain use of private cars) and of small bus transport on routes requiring small-capacity vehicles, and integration of such services with bus and train transport.
- Additional off-street parking facilities for trucks.

To solve the severe traffic problem, which is not an easy task, there is a need for a good public transport system, and among others is the development of mass transit lines. Huge investment is required for developing Mass Transits especially in developing countries. The fare-box revenue would not cover the total cost of the project; whereas public transport is not subsidized directly, political issue will be one of the major problems in implementing mass transit in Jakarta.

Since financing sources for the mass transit project from the government is very limited, there is a need for private sector participation as well as urban dwellers in the form of pricing, seeing that they would get the benefits from the MRT project. According to Europrice¹ technical report No. 2 that: Social Political Acceptance of road pricing is an issue, which plays a central role in the feasibility of implementing a road-pricing programme. Clearly, the viability of road pricing depends upon perceived benefits and the justification given for the development of such a program in the selected area. It is interesting to note that awareness rising is highly prioritized by all the EUROPrice cities, due to its importance in developing a successful program which is accepted by the citizens. The general emphasis of the cities was on the development of a public participation and education program which would "win the hearts and minds" of the citizens.

This paper will look at alternative ways for financing the mass transit project through public financing and private sector participation. Private sector participation could not cover the whole project cost so the involvement of the public will have an important role. The government role could reduce the risk of the private sector, which at the end will reduce the burden of the community. Public/Private partnerships can revitalize existing services or offer private financing and services that reduce capital costs and increase efficiency. Principally, government has the duty to provide transport infrastructure. However, private investors are invited to invest wherever is possible.

The proposed alternatives will start from no private sector participation at all to a full private project. The full private sector project seems not possible to be implemented in Jakarta or anywhere in the world. With public participation in the project, the costs would be borne by, both, the central and local government. Another key factor to be discussed in this paper is the preparation of institutional framework, which will maximize investment within limited resources.

¹ Europrice Technical Paper 2 S.T.A., City Of Rome's Mobility Agency

The public sector contribution in public private partnership would be in the form of incentives to complete projects for public benefit, realistic and objective application of regulations, Special funding mechanisms, Tax considerations, right-of-way and other site considerations, Competitive restrictions. While the private sector, on the other hand, is able to provide other vital elements: Initiative, imagination, and innovative ideas, Engineering and administrative skills and performance, Financial expertise and sources, Drive, competitive urge, and profit motive.

2. PRIORITY PROJECTS

The existing long term Master Plans, Jabotabek Railway Improvement Master Plan (JICA, 1981), Consolidated Network Plan (1993) and JABOTABEK Public Transport Review(1997), clearly points out the urgent need for an appropriate urban MRT system to cope with the main transport demand in the JABOTABEK area.

Top priority projects in all studies are North - South Line, from Blok M to Kota, for the first phase implementation, and East - West Line, from Tangerang to Bekasi, for the second phase implementation by year 2005. Both lines should be expanded for integration with other transport services such as the JABOTABEK Railway and the city bus network. Another priority should be the double-double track development for Bekasi line and the procurement of electric railway.

Following the above long-term Master Plan, Basic Design and Revised Basic Design Study were carried out to proceed to actual implementation

3. OPTIMIZATION OF THE PROJECT

Huge investment of 1.3 Billion US dollars is needed to complete the 14.5-km long MRT line. To reduce the project cost, several measures have been taken, such as: optimum fare setting, reduce the length of underground section, choices of construction methods etc.

3.1 Optimum Fare Setting

It is very important to set fare at the optimum level to minimize the level of subsidy, if there is any, which is represented by the ability to pay of the passenger and their willingness to pay the fare. In more developed countries the the percentage transport expences should not more than 10 to 14 percent of their dispoible income, but in the developing economies countris it could be reaching 30 persen. In the case of Jakarta the MRT is not the only chise so it will be used for lower middle income above.

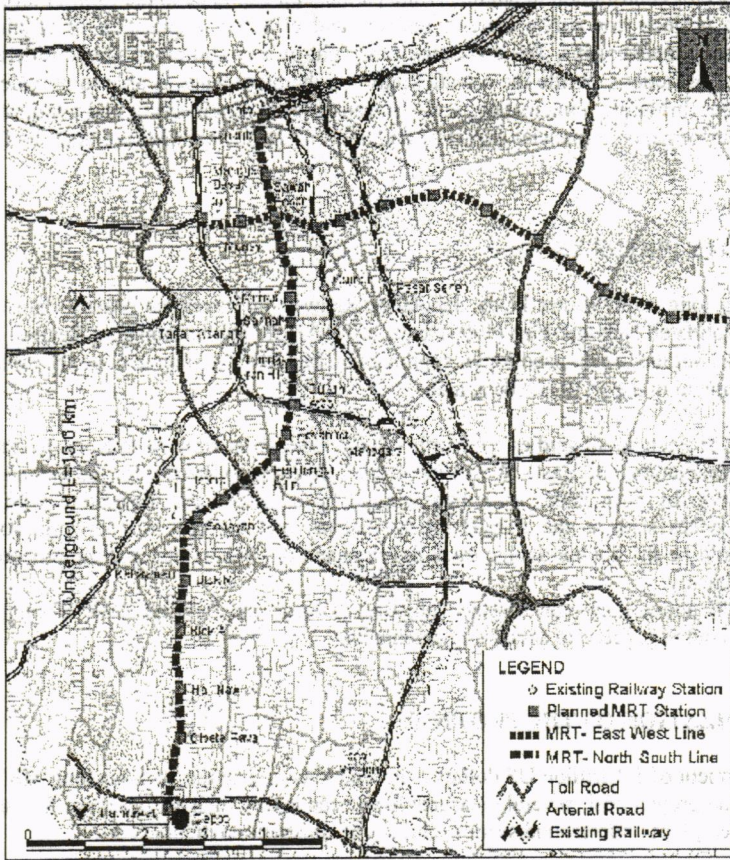


Figure 1.. The North-South planned MRT corridor

3.1.1 Demand Function

In the case of Jakarta’s MRT, the simplified demand model which is developed from the JICA study² made for the Jabotabek region base case³ are as follows.

$$\text{DEMAND} = 573.787 - .2280\text{fare} + 2.7\text{E-}05\text{fare}^2 \quad \dots \dots \dots (1)$$

Where fare is the fare in Rupiah per trip

² JICA, The Study on Integrated Master Plan for Jabotabek
³ There is no demand enhancement measures applied in this base case.

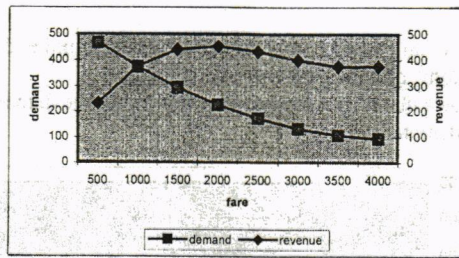


Figure 2. Relation between revenue, demand and the fare

3.1.2 Revenue

Using the demand formula, the revenue would follow the following formula:

$$\text{Revenue} = 573.787\text{fare} - .2280\text{fare}^2 + 2.7\text{E-}05\text{fare}^3 \quad (2)$$

Using the demand model, the optimum income lies around Rp. 2000 or about US \$ 0.22⁴, which is not enough to cover the total cost. Several measures have to be taken to make the project economically and financially feasible.

3.1.3 Measures to increase demand

Since revenue could not cover the total cost, several strategies has to be taken to increase the demand, among others are:

a. Capacity capping

Since an automobile-dependent transportation system contradicts many environmental and livability objectives it is very important to restrict the use of private transport. The main method for capping of the corridor is by enhancing the “3 in 1” scheme, that is the physical barrier to enter the Sudirman-Thamrin corridor for private car with less than 3 passenger (including the driver). This scheme could be enhanced by expanding the area and/or by introducing road pricing. Other traffic restraint measures that could be implemented include increase parking charges in the central area, limit parking space in central area etc.

b. Rerouting of parallel Bus services

It is a very important step to reduce the number of busses operating in paralel bus routes, and reroute the remaining buses as feeder service to the MRT line.

⁴ 1 US \$ is equivalent to Rp. 9.000.-

c. Other measures

There are other measures that could be done to increase ridership, i.e. developing commercial areas close or at the stations, provide park and ride facilities.

The following graph shows that different measures could shift the demand curve to the right, which is increasing the demand.

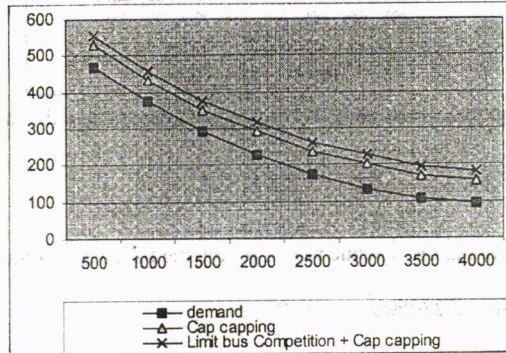


Figure 3. Effect of enhancement measures to the demand curve.

3.2 Reduce the Underground Section

Considering the construction cost, construction period, annex railway facilities, urban scenery, construction methods to be used, limiting the length of the underground section could certainly minimize the investment cost. The following figure shows several construction alternatives from totally underground to a minimize underground section.

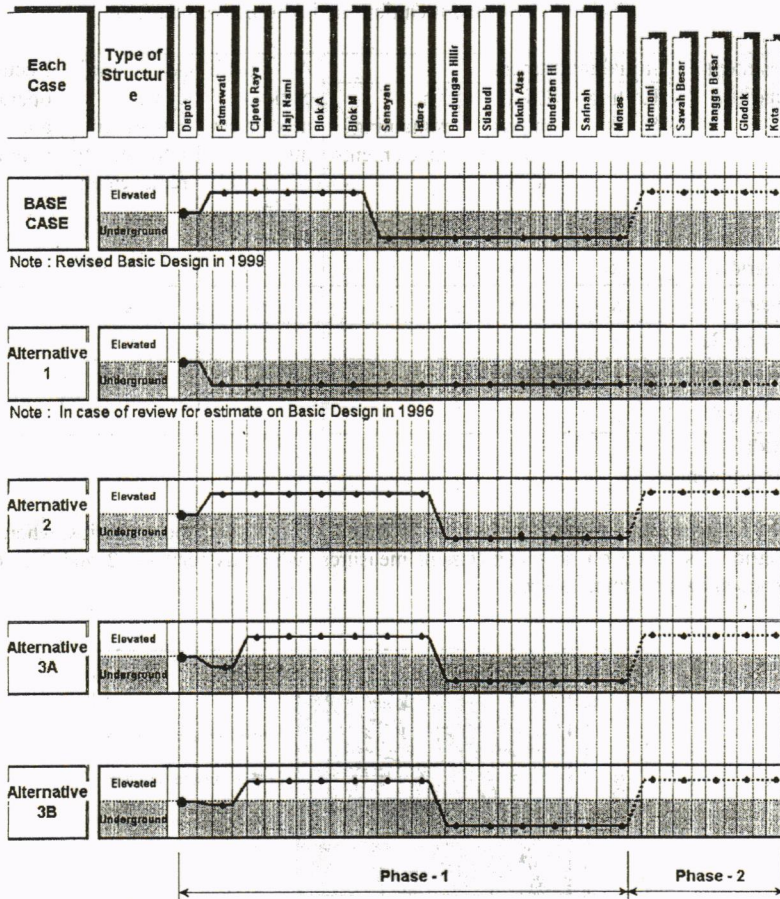


Figure4.. Alternatives developed to optimize the total project cost

3.3 Private Sector Participation

The key issue in mass transit operation is to involve private sector as much as possible to reduce government investment. The basic approach for this should be that the public sector should only undertake what cannot be done by the private sector.

The strategies that has been evaluated from total private to total government project are as follows:

Table 1. Investment Options and Alternative scenarios

Investment scenarios	Initial investment			All life cycle investment into additional rolling stock	All life cycle investment into facility replacement	Recurring operation and maintenance
	Rolling Stock	E&M minus Rolling stock	The remaining Investments			
Scenario 1	x	x	x	x	x	x
Scenario 2	x	x	-	x	x	x
Scenario 2a	x	-	-	x	x	x
Scenario 3	x	x	-	-	x	x
Scenario 4	x	x	-	-	-	x

x MRTC

- Government

In the following figure could be seen the IRR under several demand scenarios, where demand scenario 1 is based on no enhancement measures, where as scenario 2 and 3 is based on demand enhancement measures.

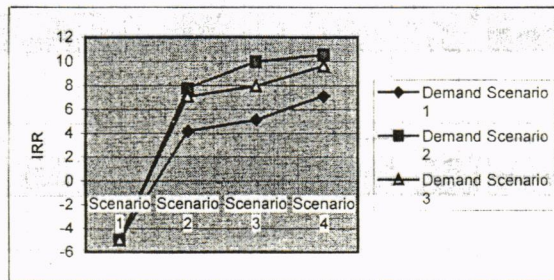


Figure 5. Return on Investment of MRT Project under different demand scenarios.

4. FINANCIAL SOURCES FOR THE JAKARTA'S MRT

Total cost of this project will be borne by, both, central and local government. To finance this project, the GOI is expecting to get a soft loan such as the Special Yen Loan from the Government of Japan. Private sector involvement will be as the operator of the MRT, or we could say as Mass Rapid Transit Corporation (MRTC)



Figure 6. Financial sources.

4.1 Relationship Between Government and MRTC

Since the government is doing the investment for the infrastructure, the operator in return has to pay the government a “Track Access Charge” (TAC) for using the track. On the other hand it is the government responsibility to maintain the track, which will be contracted out by the government. The contractor could be the railway company. To do that the government has to pay the operator/contractor Infrastructure Maintenance and Operation (IMO). Since the low-income passenger who uses mass transit/railways could not pay the total cost of transport the government has to pay the difference in the form of Public Service Obligation (PSO).

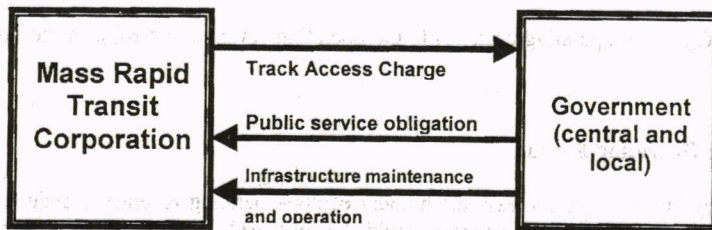


Figure 7. Financial arrangement between MRTC and Government.

4.1.1 Infrastructure Maintenance and Operation

Infrastructure maintenance and operation is the payment from the government to the railway operator covering all the costs associated maintenance of infrastructure, including personnel cost required for train operation.

$$IMO = \sum C_{mi} + \sum C_{oi} \tag{3}$$

Where C_{mi} is maintenance cost of infrastructure and C_{oi} is operating cost of infrastructure

4.1.2. Track Access Charge

Track access Charge is a payment from Railway Company to the government as charge for utilizing the infrastructure, recurrent maintenance and operation cost (same as the amount of IMO), and asset renewal cost based on annualized calculation (depreciation).

$$\text{TAC} = \text{IMO} + \text{Depreciation} \quad \dots \dots \dots (4)$$

For the Jakarta's MRT case depreciation could not be borne totally by MRTC especially at the beginning of the operation where the number of passengers are still low. It will be applied if the financial cash flow is already on the positive side,

4.1.3. Public Service Obligation

Public service obligation is the compensation from the government to the railway operator for any losses incurred for services or fares specified by the government rather than being based on the commercial oriented. It is calculated as the differences between revenue and cost.

$$\text{PSO} = \Sigma C_O - \Sigma R_O - \Sigma R_{\text{NOP}} \quad \dots \dots \dots (5)$$

Where C_O is the operating cost, R_O is the operating revenue and R_{NOP} is the non-operating revenue.

4.2 Non Operating Revenue

It is very important to increase the amount of non-operating revenue to reduce the amount PSO. This non-operating revenue could be obtained, among others, from peripheral businesses developed around the stations. The right to develop peripheral businesses around the station is given to MRTC to improve their financial balance. These peripheral businesses could be shopping centers, office spaces, high-rise flats etc.

5. CONCLUSIONS

High pressure of urban population and motorization growth over the last 30 years and not enough infrastructures to support the increasing demand for transport and delayed in investment for public transport resulting a serious traffic congestion as well as huge air pollution problem on major roads in the city center. To catch up with the problem there is a need in heavy investment for MRT infrastructure. The first popular corridor will be the line from Fatmawati in Southern part of Jakarta to Kota in the Northern part of Jakarta, where it will be constructed in two phases, the first phase will be from Fatmawati to Monas.

This project would be joint project between the central government and the local government, and to operate the mass rapid transit a MRTC will develop. Since fare box revenue is not enough to cover the cost, it is very important for the government to enhance the demand. Implement road pricing including increase parking charges in the central area, limit parking space in central area etc

To reduce the burden to the government budget there is a need to minimize the investment and maximize all possible revenues. And it is also very important to involve private sector where it is possible for example in operating company, peripheral business development along the corridor.

REFERENCES

a) Books and Books Chapters

The World Bank, (1997) **Is The World Bank Anti-Metro**, The public Transport Report 1997/98, Campden Publishing Limited, Hongkong,.

Williams, K.M and Margaret A. Marshall, (1996) **Managing Corridor development A Municipal Handbook** Center for Urban Transportation Research, Florida.

JICA (2000), **The Study on Integrated Master Plan for Jabotabek**, Final Report, Jakarta,

b) Journal Papers

Snitbhan N., Koomsup P., Thongpakde N.,(1997) **Urban Rail Mass Transit Financing Options**, TDRI Quarterly Review, Vol. 12 No. 4 December 1997, pp. 11-19

c) Paper presented to conferences

Abubakar I., (2000) **Alternatif-Alternatif Instrumen Ekonomi Dan Manajemen Permintaan Angkutan**, Instrumen Ekonomi dan Manajemen Permintaan Angkutan di Surabaya, Surabaya

Directorate General of Land Communications, (2001), **The development of The Railway System in Indonesia**, Seminar on Development of the Railway System in Indonesia, Jakarta

Litman, T., (1998) **Optimizing Public Transit Benefits** Victoria Transport Policy Institute, Presented at Texas Transportation Planning Conference San Antonio,

Naelaningtyas, M., dan Olly Norojono, (2000) **Alternatif Pembiayaan Angkutan Umum Perkotaan Di Yogyakarta**, , Simposium III, Forum Study Transportasi Antar Perguruan Tinggi, Universitas Gajah Mada, Yogyakarta,.

Marks S.D., **Implementing an Urban Mass Transit System 2000** Apa National Planning Conference, <http://www.asu.edu/caed/proceedings00/MARKS/marks.htm>

Ridwan A.S., and Sri Hartini, (2001) **Synchronizing Corporate and Government Budgeting Problem in Railway Infrastructure Management**, Seminar on Development of the Railway System in Indonesia, Jakarta

d) Other documents

Cob M.J., **Financing Bangkok's Mass Transit: The "Mega Projects" Update 2000**,
<http://www.idcworld.com/bangkok.htm>

National Mass Transit Authority and The Karachi Mass Transit Program
<http://www.geocities.com/WallStreet/Exchange/6033/KMTP.html>

Europrice, Technical Paper 2 S.T.A., City Of Rome's Mobility Agency