Final Report

APPENDIX 1

TERMS OF REFERENCE (TOR) OF THE STUDY

APPENDIX 1: TERMS OF REFERENCE (TOR)

Study in Japan

[J-1] Review of financial framework of MRT including PPP

- To review literature and cases on global experience in financial frameworks of urban railway system and summarize the following items:
 - (a) Type of financial frameworks
 - (b) Roles and responsibilities of stakeholders, i.e., operator and government
 - (c) Legal framework of PPP
 - (d) Risk allocation
 - (e) Service standard and revenue sharing
 - (f) Value for money (VfM) analysis
 - (g) Premise of financial analysis of project and content of financial analysis
- (2) To review literature and cases on operational efficiency and service level of urban railway system and summarize the following items:
 - (a) Customer satisfaction
 - (b) Operational efficiency (No. of service, peak-time operation, etc.)
 - (c) Financial efficiency
- (3) To formulate practical and recommendable project implementation schemes for MRT project by combining alternatives mentioned in (1) and (2) above. The number of schemes will be around 5.

To evaluate project efficiency of each scheme for such items as construction cost, operation cost, ridership, revenue, etc. based on literature.

[J-2] Analysis on the possible financial framework with Japanese ODA Loan

 To carry out financial analysis of the urban railway projects financed with Japanese ODA loan which are reviewed in [J-1] -(1).

To conduct short-tem & long-term financial analysis (financial statements, future cash flow, and FIRR) for each project implementation scheme formulated in [J-1] -(3). At the analysis, weighted average capital cost (WACC) of implementing organization is considered. For standard units of construction cost, operating cost, and ridership demand, the results of evaluation of project efficiency in [J-1] - (3) are reflected.

(2) To compare and evaluate project implementation schemes formulated in [J-1] - (3)

on the basis of the results of [J-1] - (2) and [J-2] - (1).

[J-3] Other issues on PPP in MRT project

(1) To conduct literature study and case studies of urban railway system in Japan and other countries on railway business strategy.

Case studies primarily cover the following items:

- (a) Linkage with urban planning and urban development
- (b) Establishment of transportation network
- (c) Approach to non-fare revenue increase
- (2) To analyze entry barriers and risks of private participants in railway network construction by more than one private operator by literature study and interview survey.

The analysis is primarily done from (a) the legal perspective (reciprocal extension contract, responsibility of development planning, etc.) and (b) the financial perspective (revenue sharing, development planning, etc.).

Field Study in Thailand

[T-1] Collection of data & information on the current MRT projects in Thailand through interview survey and collection of literature, and summary of results

- (1) To collect supplemental data & information on the financial schemes of the current two MRT projects in Thailand, e.g. SkyTrain Project and Blue Line and analyze the following items:
 - (a) Project profile
 - (b) Type of the financial framework (including detailed information of adopted PPP scheme)
 - (c) Roles and responsibilities of stakeholders
 - (d) Legal framework of PPP in the railway sector in Thailand
 - (e) Risk allocation (e.g. construction risk, operation risk, ridership risk, political risk, country risk, exchange risk etc. force majeure risk)
 - (f) Service standard (i.e. minimum standards of operation such as min. no of service, peak-time operation, etc.) and revenue allocation
 - (g) Application method, premise, and results of VfM analysis
- (2) To analyze current service performance in comparison with original plan and identify problems of service performance according to the results of [J-1] (2).

- (3) To analyze the financial efficiency of the current MRT projects in Thailand focusing on such items as WACC of fund raising, short-term & long-term financial analysis (financial statements & future cash flow analysis) and FIRR of operating company and to identify problems in comparison with the results of [J-2] - (1).
- (4) To identify the lessons to be learned from the projects from the results of the above
 (1) to (3) for the implementation of MRT projects in Thailand under both PPP scheme and operation-by-state scheme).

[T-2] Collection of data & information on MRT master plan in Thailand and analysis of issues of MRT master plan (added in October, 2009)

- (1) To review the current situation of city plan centering on MRT projects and identify the situation and issues of collaboration between city plan and transportation plan;
- (2) To review the plans of other modes of transportation such as BRT and feeder bus and analyze the situation and issues of collaboration between MRT plan and plans of other transportation modes;
- (3) To review the contents of URMAP3 (new MRT master plan) and to analyze issues, especially regarding a policy for network integration and a financial plan;
- (4) To review how URMAP3 positions other related plans including whether the cabinet meeting has approved or not and to analyze the situation and issues of implementation framework of URMAP3;
- (5) To analyze the situation and issues of organizational function which integrates related plans;
- (6) To design a framework of ideal integrated MRT master plan and identify a gap between the current situation and ideal framework; and
- (7) To formulate prospective assistance necessary for filling this gap.

[T-3] Case studies

 To carry out financial analysis of future MRT projects in Thailand assuming the use of Japanese ODA loan. The number of subject projects is around 3. Financial analysis is basically done for each project implementation scheme formulated in [J - 1] - (3). However, project implementation schemes may be modified according to a discussion between the Study Team and the Thai side.

[T-4] Finalization of report and holding of debriefing session

(1) To prepare a final report

A final report shall appropriately reflect the results of discussions between the Study Team and the Thai side.

(2) To hold a debriefing session in Thailand to report the results of the Study to stakeholders in Thailand and JICA.

[T-5] Review of tender documents for the Purple Line (added in January, 2010)

- (1) To review and analyze the contracts and tender documents for MRT system procurement including rolling stock and concession of operation including non-rail business, based on the results of [T-1], and make recommendations for the implementing agency; and
- (2) To draw up a report of review results and recommendations.

APPENDIX 2

MRT ASSESSMENT STANDARDIZATION

(reprinted from ADB document)

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APPENDIX 2 Draft Standardization Directive

1. Harmonisation of the 1992 PPSU Act studies

Studies of individual MRT projects within the Five Lines network needed under the 1992 PPSU Act are being separately procured by separate government agencies using different consulting contracts. At the same time, the Sub-Committee for MRT Finance and Operations (the meeting of January 18, 2007) has specified for study a network and concessioning variation which involves combining the Blue Line extension and the Purple Line, which are to be otherwise examined through separate studies. In addition, the Sub-Committee meeting has specified that different types of concessions be studied (Net Cost, Gross Cost and Modified Gross Cost).

To enable comparison of the findings of the separately procured and managed studies and integration into a coherent and meaningful network-level plan, the Ministry requires that the studies observe a standardisation of assumptions, concepts and presentation of findings as set out below. This work is to be undertaken for each Project Option, which will include:

- Individual lines (ie Blue Line, Purple Line or Green Line as defined by the agencies);
- Project Variation(s) as relevant (ie as identified by Sub-Committee for MRT Finance and Operations at the meeting of January 18, 2007); and
- Other combinations of lines as may be determined.

1.1 Ridership and revenue forecasts

Studies shall be based on common and consistent assumptions regarding demography, forecast years, MRT fares and transport networks as shown in Tables 1 and 4. With regard to MRT fares, consideration is to be given to:

- Non-integrated fares, with each MIRT boarding requiring payment of a fare that comprises a boarding charge plus a distance-related component; and
- Integrated fares, wherein passengers would not pay the boarding charge for second and subsequent boardings where they transfer directly between lines, eg a passenger transferring from the Purple to the Blue Line would pay a single boarding charge (for the first boarding) plus the distance-related component for their travel on each line.

1.2 Financial Modelling of PPP options

A key objective of the studies is to examine the potential options for private sector participation through investment in fixed Electrical and Mechanical (E&M) equipment and rollingstock for an MRT project, and operations and maintenance (O&M) of the constructed facility. Consideration is also to be given to alternative approaches to the financial structure of concession agreements.

Specifically, consideration is to be given for each Project Option to the following options with regard to private sector involvement:

- Investment and Operations:
 - A concessionaire undertakes only O&M, with the Government financing all infrastructure—this option will be the Public Sector Comparator PSC; and

- A Public Private Partnership (PPP) in which a private sector concessionaire finances all E&M and rollingstock investment and undertakes O&M, with the Government financing other infrastructure investment.
- For each Investment and Operations option, three concessionaire Payment Options¹:
 - Net Cost (current method)
 - Gross Cost
 - Modified Gross Cost (with partial demand risk transfer)

Assessments of the technical, economic and financial feasibility of the projects shall assume that in all cases MRT operations and maintenance meet performance-based specifications.

Accordingly, six combinations of Investment and Operations option and Concession Payment option are possible for each Project Option. The analysis shall be based on common approaches and standards, including:

- a common duration for concessions, with evaluations to be undertaken for 25, 30, 35 and 40 year periods
- common factors as described in Table 1
- · common factors with regard to depreciation and other accounting conventions
- a common risk analysis framework and basis for allocating and valuing risk in each option

The scope of the analysis for each combination of Project Option, Investment and Operations option, and Concession Payment option shall be in two parts:

Assessment of the financial performance of the Concessionaire

A financial feasibility analysis for each option that:

- Uses common factors as described in Table 1
- uses pro forma financial statements for the concessionaire (including income statement, cash flow and balance sheet for each year in the concession);

¹ The three concession options are:

[•] Net Cost concession: This is the form of agreement for the BTS and Blue Line subway. The concessionaire retains fare revenue and pays for O&M and pertinent asset costs. The government will need to make payments to the concessionaire if fare and other revenue is less than the costs incurred by the concessionaire, or the concessionaire will need to make payments to the government if the reverse should occur.

[•] Gross Cost concession: The government pays the concessionaire an amount equal to the costs the concessionaire incurs for the provision of agreed assets and services. Payments are subject to agreed standards being achieved. The government retains all fare revenue.

[•] Gross Cost concession (with partial demand risk transfer): A variant of the Gross Cost concession in which the concessionaire's remuneration incorporates a component that is related to patronage (ie the share of patronage over which the concessionaire has influence) or could be in the form of a bonus payment for achieving patronage targets.

- ensures that private sector concessionaires achieve an acceptable rate of return (either by making payments of excess revenue to the Government or receiving financial payments from the Government) with minimum cost to the Government;
- uses a funding plan based on limited recourse financing (ie the lenders cannot rely on any loan security beyond that provided in the project), indicating a Debt-to-Equity ratio, an interest rate and an internal rate of return on equity (ROE) which reflect the opportunity costs of the lenders and equity sponsors, taking into consideration the project risk of each option;
- presents the total cost of each option to the government; and
- presents summary indicators that show the performance of each option, including the financial internal rate of return (FIRR) on investment and the Enterprise Value (EV) of the project (defined as the Net Present Value of the cash flow available for debt service and other funds providers) and indicators of loan performance risk such as the Debt Service Coverage ratio series.

Value for Money (VfM) assessment

<u>Overview</u>

The objective of the Value-for-Money (VfM) analysis is to determine the procurement option that is likely, when account is taken of all risks and uncertainty, result in the lowest cost to the government over the life of the concession. As indicated elsewhere, six procurement options are to be considered covering investment and payment options. The VfM analysis should be prepared for the recommended concession period. The VfM analysis is also to be undertaken in a quantitative manner as far as possible. A qualitative assessment should be made where a quantitative analysis is not possible.

The VfM analysis will be based on forecast cash flows in nominal values. The results of the VfM analysis should be expressed as an expected present value of the cost to the government of ensuring the delivery of the MRT line over the duration of the concession, including the value of risk in each option that is retained by the government.

Costs to be taken into account will include:

- The best estimate of the cost of the project to the government and of forecast patronage demand, as estimated in the current studies.
- The potential for costs and revenue to differ from these best estimates, which will be largely related to optimism bias.

Best Estimate of Project Costs and Revenue:

The best estimate of the cost of the project and likely revenue will be prepared under other project activities. Issues to be considered are:

- In the case of a Net Cost concession there could be either a payment from the concessionaire to the government or the reverse depending on the financial viability of the project.
- In the case of a Gross Cost concession, separate account needs to be taken of payments to concessionaires and fare revenue that would be handled outside the concession.

- The cost of civil infrastructure need not be addressed because it is the same for each procurement options.
- Account should be taken of the effects of the three forms of concession on:
 - Funding costs incurred by concessionaires, including the effect on debt-equity ratio and the cost of equity and debt capital
 - The incentive for the concessionaire to maximise patronage on their system

Optimism Bias and Other Uncertainty:

International studies of project development in land transport have established sound statistical evidence for a phenomenon now known as 'optimism bias'. This is the tendency for actual costs to be higher and actual passenger demand to be lower than the best estimate at the time the decision is made to proceed with the project. Specific detailed data on the extent of optimism bias in Thailand is not available, though its presence is evident in cost escalation for past public sector projects and the lower than expected demand for the current MRT lines in Bangkok.

Costs and revenue may differ from the best estimate due to:

- Optimism bias. In the current analysis:
 - Parameters for the extent of optimism bias are reported in Table 2.
 - For construction cost, the statistical data for optimism bias is drawn largely from projects constructed by the public sector. Optimism bias in this case is consistent with the public sector approach to decision-making and project management incentives, which is not well suited to achieving project assets that satisfy well-considered use, quality and cost objectives. By contrast, common experience is that the private sector is able to better use skills, knowledge and inventiveness in various disciplines including risk analysis to achieve the ends. The lack of analysis of past expected and actual project costs in Thailand and non-disclosure of private sector costs necessitates some judgement of the appropriate extent of optimism bias to use in the current studies. Data reported in Table 2 are based on international experience (specifically capital costs and patronage) and understandings of general experience.
 - The potential for capital costs to be higher than expected will be less with concessionaire procurement because of better contract management
 - A concessionaire is likely to add a premium into a contract in a net cost concession to
 protect themselves against exposure to patronage risks that are beyond their control.
 This will not occur with a gross cost concession because the maximum patronage risk
 that a concessionaire bears is within their control.
- ~ In a gross cost concession where no patronage risk is transferred to the concessionaire, the concessionaire will not strive to maximise patronage. In the other concession options, the concessionaire has the incentive to maximise patronage to the extent that it is within their control.
- General uncertainty such as changes in law, taxes, force majeure and government policy. These should be addressed in a qualitative assessment that identifies any key differences between the six procurement options.

1.3 Submission of financial models with the study reports

Submission of the study reports should be accompanied by a fully-functioning, fully-auditable copy of the financial model or models used in the study, housed in an electronic file capable of being operated by a standard spreadsheet programme (such as Excel).

1.4 Economic Analysis

Key parameters for use in economic evaluations are shown in Table 3.

1.5 Studies inception conference

An inception conference for the studies will be organised, with attendees to include OTP, the MRT agencies (namely MRTA and BMA) and their study consultants, to discuss and ensure the required harmonisation as described above.

2. Open Technologies and Systems

The studies technical feasibility assessment and project cost estimation shall consider the efficiency and cost effectiveness of open technologies and systems for MRT. In particular the studies shall:

- identify all potential barriers to efficient and safe inter-operability of trains including signalling, rollingstock, ticketing, passenger information, communication and power, processes (managerial, legal and human) and proprietary technologies (in technology systems and sub-systems);
- identify the options to address these impediments, for existing (ie legacy) systems as well as future procurements; and
- for each option prepare an economic or cost-benefit analysis of removing these impediments and estimate an associated phasing schedule for implementation.

3. Passenger benefits: integrated MRT network

The traveling public benefits where the planning and management of an MRT network allow through-operation across any concession boundary, under an integrated fare tariff. Where through-operation is restricted due to poor planning or fragmented concessioning, passengers maybe be forced to transfer from one line to another and suffer an inconvenience which should be avoided or reduced if possible. Where fare is not integrated across concessions, passengers suffer a financial rather than a physical inconvenience under forced transfer.

The Net Cost, Gross Cost and Modified Gross Cost concessions being considered impose different demand risk burdens on revenue and, ultimately, the project cash flow available to service private sector debt and pay dividends. As is the case with the two existing Bangkok MRT concessions, where concessionaires bear significant demand risk they are likely to insist on exclusivity of line access to protect their fare revenue and cash flow.

Studies shall consider how these different demand risk burdens restrict or promote the potential passenger benefit of through-operation and fare integration, taking into account the phased development of the Bangkok MRT network.

Item	Quantity	Units	Notes
Price Units		-	
Base year prices	early 2007		
General rate of inflation		(% p.a.)	applied to all cost items—NESDB to provide
Duration of Analyses			
Concession duration	25, 30, 35, 40	years	(after construction period)
Evaluation period - financial analysis (FIRR)	25, 30, 35 & .40	years	(after construction period)
Discount Rates	5.0%	% р.а.	Approximates the risk-free rate. Used to find NPV of cash flows where risk is treated using explicit percentage overrun/underperformance factors (see Table 3).
Annualization factors			
Passenger demand	330	days/year	relative to average demand per working weekday
Supply of services	350	days/year	relative to average supply of services per working weekday
Revenue	,		
Fare structure			
Boarding charge	10	Baht	2001 prices
Distance charge	1.8	Baht/ km	2001 prices
Fare escalation (nominal)	3.0%	% р.а.	assuming fare increase every year at inflation rate
Non-fare revenue	7.0%	%	as % of fare revenue
Asset Life			
Civil Works			
Tunnels	100		
Structures, incl. stations & depots	50		
Buildings	30	years	

Table 1: Standard Assumptions for Financial Analyses

Item	Quantity	Units	Notes	
E&M equipment				
Power supply	30	years		
Mechanical, signalling, train control & ICT	15	years		
Rollingstock	30	(years)		
Land acquisition	nil			
Mid-life Refurbishment (in addition to O&M cost)	<u>.</u>			
Rollingstock				
Refurbishment of rollingstock occurs after	15	years of service		
Cost of refurbishment	33%	of initial price	cost of refurbishment, as a % of the initial cost of a railcar	
Exchange rate	35	(Baht/US\$)	·	
Private Sector Financing				
Debt-to-Equity ratio				
Net cost concession	2.0	times	1.5 for BMCL at present	
Gross cost concession	6.0	times	No demand risk. IPPs at 3-4 times.	
Modified gross cost concession	5.0	times	Benchmarked on UK LRT projects (some demand risk)	
Loans			Average for all loans	
Grace period	2	years of service	Principal repayment begins after this period	
Terms of loan (including grace period)	15	years		
Interest rate (%)			Average over the loan term	
Net cost concession	8.5%			
Gross cost concession	7.5%			
Modified gross cost concession	7.75%			
Return on Equity				

Item	Quantity	Units	Notes
Net cost concession	13.50%		Risk premium (on risk free rate) of 8.5% is similar to BMCL contract
Gross cost concession	12.50%	-	IPP equity returns are 12-13%
Modified gross cost concession	12.75%		
Financial Statements		<u> </u>	
Corporate tax	30%	of profit before tax	
Accounts receivable	16.67%	of non-fare revenue	Equal to 2 months waiting time for non-fare revenue collection
Inventory	0.25%	of gross fixed assets	
Accounts payable and current liabilities	8.33%	of O&M cost	Equal to 1 month of outstanding obligations

Table 2: Allowances for Optimism Bias (% difference from the Best Estimate)

	Gove	rnment procur	ement	Concession aire procurement					
	Net Cost concession	Gross Cost concession	Modified Gross Cost concession	Net Cost concession	Gross Cost concession	Modified Gross Cost concession			
Costs	<u> </u>	<u> </u>	<u></u>						
Capital Cost – E&M	+45%	+45%	+45%	+15%	+15%	+15%			
O&M Costs	+20%	+10%	+10%	+20%	+10%	+10%			
Patronage	l			, 		·			
Operating Year 1	-50%	-55%	-50%	-50%	-55%	-50%			
Operating Year 3 & after	-30%	-33%	-30%	-30%	-33%	-30%			

Source: Based on International studies for implementation of rail projects.

Item	Quantity	Units	Notes
Price Units	early 2007		
Duration of Analyses	30	years	(after construction period)
Discount Rates	12.0%	% p.a.	Sensitivity test at 8%
Annualization factors			
Passenger demand	330	days/year	relative to average demand per working weekday
Supply of services	350	days/year	relative to average supply of services per working weekday
Revenue			
Fare structure			
Boarding charge	10	Baht	2001 prices
Distance charge	1.8	Baht/km	2001 prices
Real change in fare	0.0%	% p.a.	assuming fare increase every year - assumed equal to inflation
Non-fare revenue	7.0%	%	as % of fare revenue
Asset Life	<u></u>		
Civil Works			
Tunnels	100	1	
Structures, incl. stations & depots	50		
Buildings	30	years	
E&M equipment		1	
Power supply	30	years	
Mechanical, signalling, train control & ICT	15	years	
Rollingstock	30	(years)	
Land acquisition	nil		

Table 3: Standard Assumptions for Economic Analyses

Item	Quantity	. Units	Notes
Mid-life Refurbishment (in addition to O&M cost)		<u> </u>	
Rollingstock			
Refurbishment of rollingstock occurs after	15	years of service	
Cost of refurbishment	33%	of initial price	cost of refurbishment, as a % of the initial cost of a railcar
Exchange rate	35	(Baht/US\$)	
Economic values for estimating benefits			
Value of travel time			
Vehicle operating cost	-		Use parameters in Tables 4a-4d to calculate
Environmental cost			these economic values.

Table 4. Assumptions for passenger demand forecast

Item	Required standard	Notes				
Demography	Thailand Official Census 2000.	Source: National Statistical Office				
Forecast years	2006 (base), 2011, 2016					
Transport networks	As in OTP's Extended Bangkok Urban Model (eBUM)	Use of eBUM is mandatory				
Patronage growth from 2021	2% per annum	In line with population growth				

Table 4a. Vehicle kilometres and hours travelled, with the project implemented and without

	W	ithout the project	With the project					
	Vehicle km (million)	Vehicle hours (million)	Speed (kph)	Vehicle km (million)	Vchicle hours (million)	Speed (kph)		
Year 2006	194.94	7.94	24.55	194.94	7.94	24.55		
Year 2011	226.98	10.07	22.54	224.73	9.84	22,84		
Year 2016	268.45	12.47	21.53	263.02	11.80	22.29		

Source: OTP

Table 4b. Average vehicle operating cost of representative vehicle

Unit: Baht /vehicle km, 2003 constant prices

Speed(kph)	10	20	30	40	50	60	70	80	90	100
Baht/vehicle km	8.86	6.02	5.12	4.68	4.42	4.27	4.20	4.17	4.19	4.25

Source: OTP. Representative vehicle taken to be medium-sized passenger car.

Table 4c. Average value of time

			Unit: Baht /person-hour, 2000 constant prices
2006	2011	2021	Notes
71.4	88	126.2	Based on Urban Rail Transport Master Plan data for High Comfort Public Transport Category.

Source: OTP

Table 4d. Average environmental cost per representative vehicle km

	Unit: Baht /vehicle-km, 2003 constant prices
	Notes
5.0	Average of the costs for light-duty vehicles using gasoline and diesel in Mccubin & Delucchi, 1999.
Source: OTP	

APPENDIX 3

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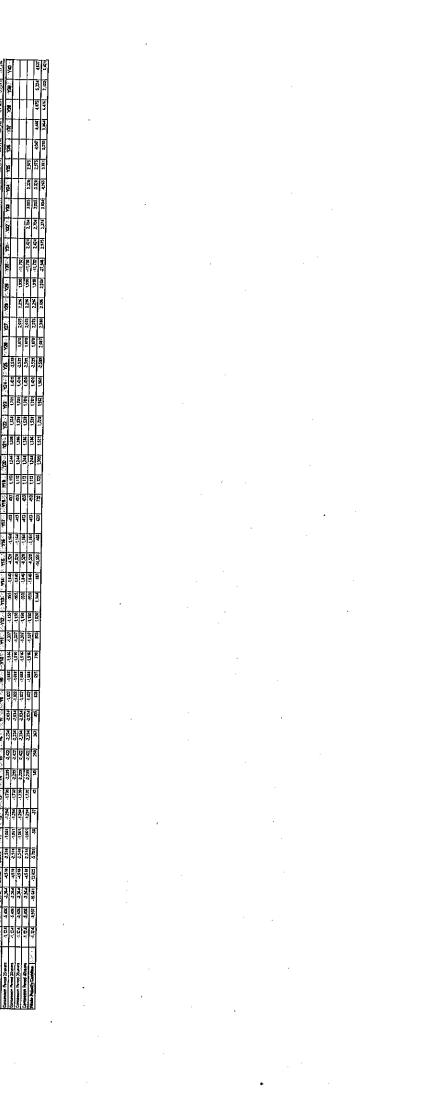
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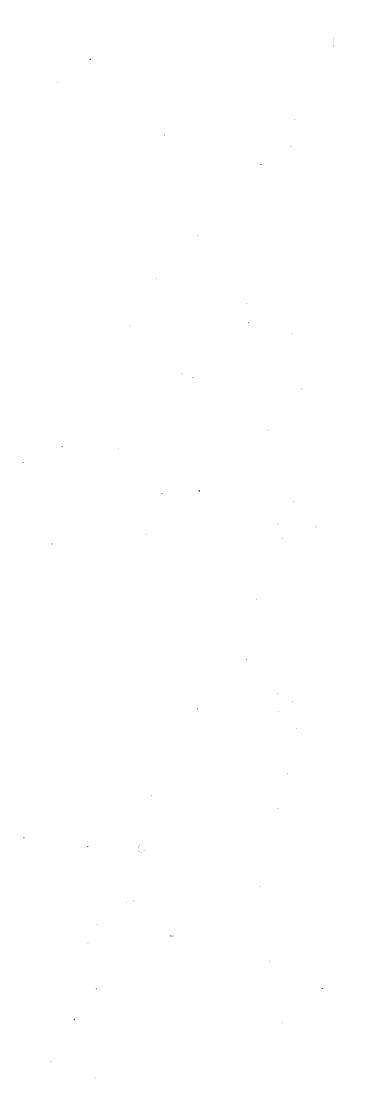
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Final Report

APPENDIX 4

CASE STUDIES OF URBAN RAILWAY SYSTEM IN OTHER

COUNTRIES

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APPENDIX 4 CASE STUDIES OF URBAN RAILWAY SYSTEM IN OTHER COUNTRIES

With the purpose of reviewing i) financial frameworks, and ii) operational efficiency and service level of urban railway systems in Japan and other foreign countries, the following six urban railway systems were studied and analyzed based on available data in Japan and on internet websites:

- a) Urban railway system in Manila, the Philippines;
- b) Urban Railway Systems in Singapore;
- c) Urban Railway Systems in Kula Lumpur, Malaysia;
- d) Delhi Metro in Delhi, India;
- e) Metropolitan Intercity Railway Company (Tsukuba Express) in Japan; and
- f) London Underground in London, the United Kingdom.

1. URBAN RAILWAY SYSTEM IN MANILA IN THE PHILIPPINES

1.1 Background

The Metro Manila (National Capital Region), holding 11.5 million people, is one of the most populated urban areas in the Southeast Asia. Manila's population has rapidly grown during the late 1970s and early 80s especially. In those days, "urban transportation" meant "*jeepney*" to common people in Manila. *Jeepney* was produced by converting surplus army tracks, public & private buses, and some private cars. As motorization grew in this period, the traffic jam in Manila became very serious. During the period from 1976 until 1977, a study on urban transportation in Manila was conducted with the assistance of the World Bank and this study recommended a light railway system. In 1980, the Light Rail Transit Authority (LRTA) was established as a government agency to promote an urban transportation system.

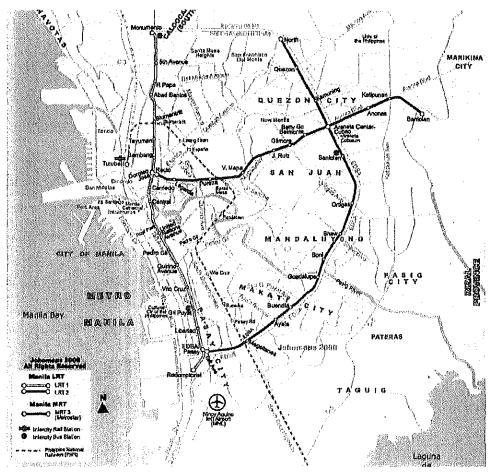
The initial assistance to a light rail transit (LRT) project came from the Belgium government, which granted a soft loan, and a consortium of Belgium companies provided a loan for the project. In 1985, the LRT first line (LRT1: Yellow Line) started full operation.

With the economic growth and continuous increase in the population in Metro Manila, the LRT1 faced with the problem of congestion in the 90s, and its transportation capacity needed to be strengthened. Two Japan's ODA loans supported the strengthening of LRT1's capacity in 1994 and 2000. Three other Japan's ODA loans were also provided for the construction of LRT2 (Purple Line).

In the 1990s, along with the trend of private sector participation in public infrastructure, the Philippine government decided to promote the development of Manila Metro Rail Transit System (MRT). The project of MRT, MRT3 (or Blue Line), was decided to be promoted under PPP scheme. Metro Rail Transit Corporation (MRTC) was awarded the MRT3 project under a Build-Lease-Transfer (BLT) scheme. MRTC started the construction of MRT3 in 1997, partial operation in December 1999 and full operation in July 2000.

1.2 Outline of Urban Rail System in Metro Manila

As Figure 1-1 shows, LRT1 goes through Metro Manila from North to South; LRT2 penetrates from East to West; and MRT3 draws semicircle to connect to LRT1 at South and LRT2 at East.



Source: LRTA



(1) LRT1 (Yellow Line) and LRT2 (Purple Line)

LRT1 (Yellow Line) is the first line of the Manila LRT system, which has a total length of 15 km from Baclaran Terminal in the south to Monumento Terminal in the north with 18 stations, and is fully elevated. The line runs in a north-south direction, linking cities of Quezon, Caloocan (both in the north area), Pasay and Paranaque City (both in the south). Passengers can transfer to LRT2 (Purple Line) at

Doroteo Jose station, while to MRT3 at EDSA station.

LRT2 (Purple Line) is the second line of the Manila LRT system. The line contains eleven stations and runs 13.8 km of mostly elevated track, with exception of Katipunan station which is underground. The line runs in an east-west direction, linking cities of Manila, San Juan, Quezon, Marikina, and Pasig. Passengers can transfer to the LRT1 Line at Recto station, while to MRT3 at Araneta Center-Cubao station.

and the second second second	Ballway Operation Data	Line 2		
Total Route Length	15 Kilometers	1 3.80 Kilometers		
Route	Baclaran Terminal to Monumento Terminal (Taft-Rizał Avenue Cor- ridor)	Santolan Terminal to Recto Ter- minal (Marcos Highway - Aurora Blvd Ramon Magsaysay - Le- garda - Recto)		
Number of Stations	18	11		
Number of Roll Cars	BN/ACEC (1 st Generation) - 64 (32 Trains @ 2 Cars)	72 - 18 Trainsets @ 4 Cars per Trainset		
an a	ADTRANZ (2nd Generation) - 28 (7 Trains @ 2 Cars)			
	KINKI SHARYO (3rd generation) - 48 (12 Trains @ 4 Cars)			
Daily Hour of Openration	17	17		
Minimum Train Headway	3 Minutes	5 Minutes		
Present Maximum Fare per Trip	Php 15.00	Php 15.00		

Table 1-1 Train	Operation Data of	LRT1 and LRT2
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Source: LRTA

LRT was initially operated by an operation company specially established for LRT operation, but later the operation was taken over by LRTA in the awake of the operation company's strike in 2000. Since then, LRTA is the operator of Manila LRT System.

(2) MRT3 (Blue Line)

The Metro Rail Transit Corporation (MRTC) operates the Manila Metro Rail Transit System, known as the MRT. MRTC is a private consortium established for development and operation of MRT3.

MRT3 serves 13 stations on 17 km of line. It is mostly elevated, with some sections at grade or underground. The line commences at the Taft Avenue and ends at the North Avenue, serving cities that the Epifanio de los Santos Avenue (EDSA) passes through: Makati, Mandaluyong, Pasay, Pasig, Quezon City, and San Juan. Taft Avenue station and Araneta Center-Cubao station interchange with the LRT network. Taft Avenue station connects to EDSA station of the LRT1 and Araneta Center-Cubao station connects to its Namesaka station of LRT2.

1.3 Financial Framework of Manila Urban Rail System

(1) LRT

The initial system of LRT was financed by a combination of the official and private funds from Belgium. The Belgium government provided an interest-free loan of 300 million pesos with a repayment period of 30 years. A Belgium consortium consisting of private companies of construction, rolling stock, signal/telecommunication, and engineering provided an additional loan of 700 million pesos¹.

To meet a growing number of passengers of LRT1 line, Japanese ODA loans were provided with the purpose of strengthening its transportation capacity. With Japanese ODA loans, additional rolling stock was procured and railway tracks were improves. A Japanese ODA loan of \$9.8 billion and that of \$22.3 billion were provided in 1994 and 2000 respectively.

(2) MRT3

Infrastructure of MRT3 was constructed with Build-Lease-Operation (BLO) scheme. A BLO agreement was signed by MRTC and the Department of Transport and Communications (DOTC). The agreement governs two project phases, i.e., construction phase and revenue service phase. In the agreement, MRT should construct the system by the specified date according to the specifications and drawings approved by DOTC. The completed system should satisfy the specified capacity requirements. MRTC was also obligated to provide all equipment be used in the system, including rail vehicles. At the completion of construction, MRTC was obligated to lease the system to DOTC and provide maintenance service. DOTC was required to make payments of rental fees to MRTC.

MRT3 project was financed by sponsors' equity investment (US\$190 million) and debt financing (US\$485.5 million). Lenders for debt financing consisted of JEXIM (US\$287.5 million with an interest rate of 2.8% per annum), Czech Bank (US\$88.4 million with 7.2% per annum), and a consortium of private banks, Foreign Currency Deposit Unit (FCDU) (US\$109.6 million with LIBOR+1.875%).

¹ No detail information on financing terms and conditions for Belgium loans is available.

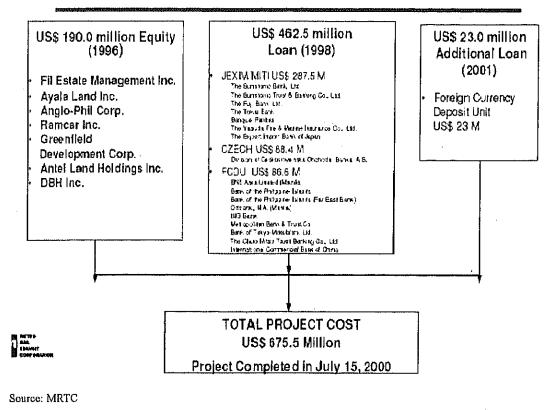


Figure 1-2 Financing of MRT3

1.4 Performance Summary of LRT and MRT

(1) Ridership

An average daily ridership of LRT1 is about 300 thousand trips, LRT2, 132 thousand trips, and MRT3, 400 thousand trips. The utilization level of LRT2 has been less than other two lines. A load factor (ridership/carrying capacity) of LRT1 is almost 80% against LRTA's target of 65%, which shows LRT1 is crowded most of the time.

(2) Efficiency of the Service

LRT1's daily operation hour is 5:00 am to 10:00 pm, i.e., total 17 hours daily, while MRT3 is 5:30 am to 10:30 pm.

Peak hour operation of LRT1 is 20 trains per hour (3 minutes. train headway), while LRT2 is 12 trains since LRT2 ridership is relatively less than LRT1. MRT3's peak hour operation is same as LRT1, 20 trains per hour.

(3) Financial Sustainability

For LRT, fare revenue exceeds its operating cost excluding financial cost, but is not sufficient to serve debt repayment. The ridership of LRT2 is relatively low and it is presumed that the operation of

LRT2 is not financially sustainable at this stage and it is difficult to sustain LRT' service without financial support form the Philippine government.

No detail information on expenditure is available for LRT and MRT3 as well.

	LRT Line 1	LRT Line 2	MRT3
Total route length (km)	15	13.8	16.95
Daily Ridership (no. of trips)	308,288	132,154	393,542
Annual Ridership (in million)	111.08	47.57	142.86
Fare revenue per passenger (peso)	14	.06	N.A.
Operating cost per passenger (excluding financial costs)	10).62	N.A.
Operating cost per passenger (including financial costs)	19	9.85	N.A.
Daily hours of operation	17	. 17	17
Minimum train headway (minute)	3	5	3
No. of trains operated at peak hour (no. of trains)	20	12	20
Maximum Fare per Trip (peso)	15.00	15,00	15.00

Source: LRT: Annual Report 2006, MRT: Metro Star website (2007)

(4) Customer Satisfaction

It was reported that passengers of LRT1 evaluate alleviated congestion after the capacity expansion. However, its load factor level is still high at approximately 80% and trains are densely packed at peak hours.

Accessibility (barrier-free access to stations, escalators), shops and services, safety and security are provided in LRT1, LRT2, and MRT3 as well. Customer satisfaction for these items still needs to be assessed.

2. URBAN RAILWAY SYSTEMS IN SINGAPORE

Urban Railway Systems in Singapore has not been developed with PPP but with a unique and efficient PSC, which could be a good reference to Bangkok MRT in making a plan of MRT development with consistency.

2.1 Outline of the System

(1) Background

a. City Planning

Before its independence in 1967, it is told that Singapore had started to make the first City Master Plan in 1958. The basic objective of the Master Plan was to establish strategic land effective use. The concept of the Master Plan was succeeded and materialized in the Concept Plan made in 1967 and its revisions made in 1971 and 1991.

The objectives of the Concept Plan were to solve population centralization, traffic jam and contamination. One of the important solutions recommended in the report was to introduce mass transit system.

b. Establishment of MRTC and Start of Construction

Establishment of MRTC

Upon the completion of Mass Transit Study which was undertaken based on the concept paper, the Mass Rapid Transit Corporation (MRTC) was established as a statutory body to undertake solely construction works. All of the necessary direct construction expenses and account expenses (mainly personal cost) were provided by the Government. And MRTC was required to be financially independent although its own revenue was quite limited to license fees and so on.

Start of MRT Construction

In May 1982, the construction started for the two lines East - West Line (7.0 km) and North -South Line (6.0 km) which would be expected to complete in 1990. The first scheduled construction portion consisted of 45 km of overhead railway, 28 km of subway and 3 km of surface railway. At the offset, the construction of 19.1% of the scheduled portion was started (present network in 2008 is 138 km).

Start of MRT Operation

On November 11, 1987, in about 5 years since construction commencement, trial operation of first completed portion was started and the other portions were subsequently followed.

c. Establishment of SMRT

In advance of operation, the SMRT Corporation (SMRT) was established in August 1987 as operating company with the license which was granted by the Land Transport Authority (LTA) for a period of 10 years and was later extended to 31 March 1998. The license fee payable is 1.0% of the gross annual fare revenue.

SMRT purchased the MRT System's operating assets from LTA on April 1998 for approximately \$1.2billion. The assets included trains, permanent way of vehicles, power system, control system and other related facilities etc. SMRT received also other two financial supports from LTA, loan of \$480million and a lease relating facilities. At the end of FY2008, the loan has been repaid fully.

Authorized capital and paid-in capital as of established date were 250,000,001 shares and 150,000,001 shares (value of a share is S dollar 1) respectively of which one share (deemed as special stock) was owned by LTA and the rest were held by Tamasek Holding Pte Ltd (100% National owned holding company).

d. Start of LRT Operation

In addition to MRT, two Light Rail Transit (LRT) systems were planned and constructed. One is Sengkang LRT having 11km and the other is Puggol having 19km at the beginning. Both are under operation of SMRT since 1997.

SMRT has been granted a similar License of Agreement by LTA to operate the LRT System commencing November 6, 1999 till March 2028. LTA currently owns all the operating assets and infrastructure required to operate the LRT System.

(2) Organizational Aspect of Urban Railway Systems

a. Organizational Framework to Supervise the System

Establishment of LTA

The transportation policy of Singapore, covering from construction of road and public transport facilities to traffic control of vehicles, has been implemented under the principles of solidity and well coordination. To implement the above, in September, 1995, the Land Transport Authority (LTA) was newly established as an independent statutory board under the Ministry of Communications by integrating four government entities, i.e., SMRT, Registry of Vehicles, Transport Division of Public works, Land Transport Division of the Ministry of Communication.

Role of LTA

LTA is expected to cover a variety of functions relating to the construction and operation of land transportation, namely from construction of MRT and roads to supervision of public transportation, traffic control, registration of vehicles and collection of toll fee.

b. Tariff Regulation by PTC

Fare of MRT and LRT is regulated by the Public Transport Council (PTC) and reviewed annually as shown in the table below (Table 2-1).

Table 2-1 Fare Adjustment

•	Fare are regulated by Public Transport Council (PTC) and reviewed annually based on max
	fare adjustment formula:
	0.5 ▲ CPI + 0.5 ▲ WI – 1.5%
	where 1.5% is the productivity index valid for 3 years
•	Fare adjustment made for Trains and Bus in 2008
	- Net10.6% fare adjustment after increase in fare rebate from 25 cents to 40 cents
	 Expect to yield additional \$3m in fare revenue for f

Fare was eventually lowered to increase ridership. The current ridership and revenues of public transportation services in Singapore are shown in Table2-2. The level of fare box is low in comparing with the neighboring Asian countries as indicated later.

		MRT	RT			1978 S.A. 18	BUS		
	1Q 09	1Q 08	% Change	1Q 09	1Q 08	% Change	1Q 09	1Q 08	% Change
Ridership ('000)	124,300	112,100	10.9	3.9	3.7	7.5	71.1	67.8	5.0
Avg. Daily Ridership ('000)	1,366	1,232	10.9	43.1	40.2	7,5	781.9	744.7	5,0
Average Fare (cents)	93.0	94.2	(1.2)	55.9	57,6	(2.9)	69.4	69.1	0.4
Revenue (S\$ million)	115.6	106.8	8.2	2.2	2.1	4.3	50.9	48.3	5,3
EBIT (S\$ million)	34.9	32.0	9.1	(0.1)	(0.1)	18,8	(3,3)	0.5	(737.1)
Notes 1. Hi	igher MRT op	erating profi	ts due to ridersl	hip growth	offset by	higher electric	ty costs.	·	

Table 2-2 Current Fare and Revenue of MRT, LRT and Bus Service in Singapore

1. Higher MRT operating profits due to ridership growth offset by higher electricity costs.

2. Lower LRT operating loss due to higher average daily ridership.

3. Lower Bus operating profits due to higher diesel costs.

4 As of first quarter of Fiscal Year 2009.

Source: SMRT

(3) SMRT Operation

SMRT started its operation of MRT in 1987 and then expanded its railway business to LRT in 1998 and now its railway operation accounts for 73% of its total operation. SMRT has also started other related business like bus, taxi, rental and consulting services. Brief description of SMRT business is shown in Table 2-3 and the share of each business in total sales is shown in Figure 2-1.

Type of Business	Content
MRT	 Dominant rail operator in Singapore with 21 years of O&M experience
	Operates the North South and East West MRT Lines and will operate
	Circle line from mid 2009
	 Average daily ridership of 1.4M (1Q of FY2009)
	About 80% market share based on daily ridership
LRT	Operates first LRI system at Bukit Panjang since 1989
	 Network comprises 7.8km linking 14 stations
-	 Average daily ridership of 43.1 thousand (1Q of FY2009)
Buses	· Owns about 860 buses running 80 basic bus services between Western
	and North-Western areas and the rest of Singapore
	 Average daily ridership of 781.9 thousand (1Q of FY2009)
	About 25% market share based on daily ridership
Rental	Rental of station spaces (about 27,000 squire meters)
	 Total of 27 stations refurbished to-date since FY2005
Advertising	Provides advertising spaces on trains, buses, taxis as well as in stations
	About 18% outdoor media market share
Taxis	Second largest taxi operator with 12% market share
	 Manages and leases about 3,000 taxis
Engineering and Other	Pursuing overseas land transport opportunities
Services	 First overseas project in Dubai
	Leases fiber-optic cables

Table 2-3 SMRT Operation

Source: SMRT

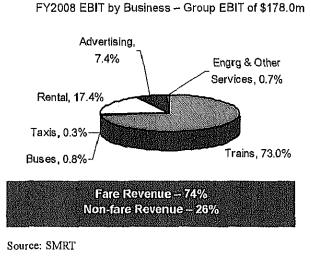
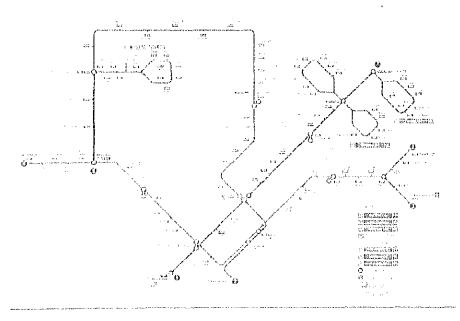


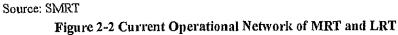
Figure 2-1 Core Businesses of SMRT

(4) Outline of Present Operational System

a. MRT and LRT Operation Map

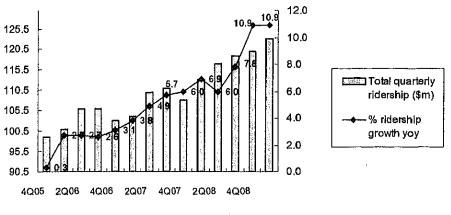
Since the first operation of MRT in 1987 and LRT in 1998, the network of the two transport systems has been rapidly expanded and its total length of lines as of the end of 2008 is 109.2km for MRT and 28.8km for LRT as in the following figures.





b. Ridership Development

In accompanying with the expansion of the operational network of MRT and LRT, the revenue from ridership of MRT and LRT has been successfully improved and reached to the highest level in 2008 (see Figure 2-2).



Source: SMRT

Figure 2-3 Trend of Revenue from Ridership of MRT and LRT

(5) Efficiency Level of Operations and Services

a. Customers satisfaction

It is understood that SMRT has gained enough customers' satisfaction from following.

i) Fare

Regarding published cash fare for a 10km journey, Singapore is S\$1.30 which is cheapest among the neighboring Asian countries including Bangkok of 1.81.

ii) Train Arrival (Punctuality)

In FY2008, SMRT realized a train arrival rate of 97% which is sufficiently higher than the target of 94% set by the government.

iii) Train Departure (Punctuality)

In FY2008, SMRT got a train departure rate of 98.5% which is sufficiently higher than the target of 96% set by the government.

iv) Train Service Availability

In FY2008, SMRT achieved a train service availability of 99.96% which is sufficiently higher than the target of 98.0% set by the government.

b. Efficiency of Operations and Services

It is understood the SMRT has gained good efficiency of operations and services from the following indicators.

i) Punctuality (Timelines of train arrivals)

In FY2008, SMRT got a punctuality score of 99.6 which is the lowest last 5 years.

ii) Manpower efficiency (passenger-km per staff & contractor hours)

In FY2008, SMRT got a manpower efficiency score of 100 which is the highest last 5 years

iii) Cost efficiency (Operating cost standardized place-km)

In FY2008, SMRT got a cost efficiency score of 100 which is the highest last 5 years.

iv) Safety (Fatalities due to accidents per billion passenger journeys (Cumulative)

In FY2008, SMRT got a safety score of 95.8 which is the average of last 5 years.

2.2 Financial Framework, Results and Its Efficiency

(1) Financial Framework

Construction is financed by the Singapore government utilizing MRTC as financial channel as well as technical supervisor. Operation is made by an independent government entity, SMRT, to which the operation license is granted by the government agency, LTA. Fare is regulated by an independent government regulatory body, PTC.

(2) Financial Performance of SMRT

SMRT is profitable mainly because of its fare revenue which accounts for 74% of total revenue. Non-railway business of MRT is also becoming profitable. SMRT was listed in 2000 and its stock price has been constantly going up.

	FY2004	FY2005	FY2006	Fy2007	FY2008
Revenue (\$ million)	667,3	673.5	711.7	743.1	802.1
EBITDA (\$ million)	225.5	230.0	247.2	255,0	284.1
Profit after tax (\$ million)	90.2	126.6	103,6	135,8	149.9
EPS (cent)	6.0	8.4	6.9	9.0	9,9
Net DPS (cent)	3.6	5.2	5,6	7.0	7.75
ROE (%)	19.7	24.5	18.2	22.1	22.8
ROTA (%)	5.6	8.6	7.5	9.8	10.6

Table 2-1 Financial Performance of SMRT

Note: The average growth rare of profit after tax is 13.5% during FY2004 until FY2008. Source: SMRT

(3) Financial Efficiency of SMRT

As a result of efficient operation as well as good financial operation, overall financial efficiency of SMRT is quite noteworthy as shown in the following table.

	F١	/2008	FY2007		
	Ratio	Growth (%)	Ratio	Growth (%)	
Total Ridership (Million trips)	469.3	7.9	434.9	5.1	
Car Kilometers operated(Million km)	78.0	1.2	77.1	2.0	
Passenger Trip distance (Million km)	5714.5	8,1	5288.3	4.6	
Average Operating Car Occupancy (persons)	73.3	6.8	68.6	2.4	
Source: SMRT				·	

 Table 2.2 Financial Efficiency Ratios of SMRT

2.3 Lessons learned from Singapore MRT/LRT

Singapore urban transport system has been constructed and managed by a group of the government and public entities which have been well coordinated. Singapore's system could have been done successfully under the following conditions.

- i) Singapore government is quite strong and stable, because its political system is quite developed and well functioning:
- ii) There are a number of public entities which have high professional capability in their own field in Singapore;
- iii) Land area of Singapore is adequate size so that central government can control all the area and all the process;
- iv) Financial situation of Singapore is quite sound and the government is able to make necessary public investments. Government is also highly rated by rating agencies so that its borrowing capacity is high;
- v) Singapore government is fully aware of benefits of PPP, particularly its financial aspects; and
- vi) PPP environment in Singapore is satisfactory, particularly in terms of legal framework and financial structure.

3. URBAN RAILWAY SYSTEMS IN KULA LUMPUR, MALAYSIA

3.1 Outline of the LRT Projects

(1) Background of the Project

Kuala Lumpur, the capital city of Malaysia, has an area of 243 km² with a population of 1.6 million in 2006. Along with the sharp economic development, vehicle ownership in the city had been

increasing rapidly. With such rapid vehicle increase, the city faced serious air pollution, traffic accident, and traffic congestion. To ease these problems, the Malaysia government decided to implement several urban railway projects.

At the planning stage of these urban railway projects, Malaysia followed a strategy of transforming the country in 30 years to a developed society (so-called "Vision 2020"). The strategy included active utilization of private finance for developing infrastructure in the country; one of the pillars of the strategy was "use the private sector and private finance as the engine of growth through the awarding of long-term concessions." This ambitious agenda was set under the sustained high growth of the Malaysian economy during the Mahathir years, and considerable success in developing expressway infrastructure.

In Malaysia, there were conglomerates with experience in infrastructure projects, a domestic capital market, and generally skilled technocrats. The success with large scale expressway projects contributed to a climate of confidence that LRT concession projects could also be implemented successfully². Given background, the government chose to privatize both the construction and operation of the LRT system.

(2) Outline of the Privatized Projects

Kuala Lumpur's urban railway system consists of 7 lines and was operated by 5 operators (currently 3 operators). Among the 5 operators, except for the Malaysian Railway (Keretapi Tanah Melayu: KTM), all other operators were private. Outline of these privatized projects are summarized as follows;

a. Two Light Rail Transit Systems

Two LRT systems, LRT System I and LRT System II were developed for shorter-distance movements within metropolitan Kuala Lumpur and its immediate suburbs. LRT System I - 27-km driver-operated rail system was constructed in two phases in the mid-1990s. The total investment in the development of LRT System I was RM 3,500 million. LRT System II - 29 km, was built at a total cost of RM 5,200 million.

b. Express Rail Link (ERL)

ERL is a 57 km electrified rail link between Kuala Lumpur and the Kuala Lumpur International Airport (KLIA) in Sepang. It has the longest route length track among the four privatized urban rail transit networks. Construction began in late 1998 and its services commenced in April 2002. Total investment in the project was RM 2,400 million.

c. KL Monorail

KL monorail is the most recent of Kuala Lumpur's urban rail transit systems which is a straddle beam elevated monorail system with 8.6 km dual guide way. KL Monorail service was

² George Abonyi, Luxmon Attapich, "Building an MRT Industry: Case of Malaysia", April 2007

12 x 2 trains

0600-2400



commenced on August 31, 2003. Although the KL Monorail is a small network relative to the others, because it is an elevated system, the total project cost was RM 1,180 million.

•	•	*

		LRT System Phase I	1. S. T. S.	LRT System II (PUTRA)	E Ekspress	RL Transit	KL MONORAIL
1) Route Network		27km		29km	57	7km	8.6 km
2) No. of Stations		25		24	2	5	11
3) Stations with Pa Facilities	rk and Ride	17		4	a bit an	4	1 - 44 - 1964 - 1944 - Andrews - 1993 - Haard Haldes and we
4) Stations with Fe	eder Bus Service	11		14	-	1	n an
5) Service	(a) Peak Hours	3 min per train		1.5 - 3 min per train	15 min per train	30 min	5 min per train
Frequency	(b) Off-Peak Hours	7-8 min per train	•	5 - 10 min per train	20 min per train	per train	8 min per train
6) Average Daily T	raffic Volume1	94,48)	150,494	6,	014	27,000
7) Commencement	t of Operations	Dec. 1996	Dec. 1998	Sep. 1998 & Jun. 1999	Apr.	2002	Aug. 2003

Table 3-1 Profile of 4 Privatized Projects

Source: Ministry of Transport, PPP Resource & Advisory Center, Malaysia, KL Rapid, and other various sources

17x3 car trains

0600-2350

8) Rolling Stock

9) Operating Hours

35x2 car trains

0600-2400

12 x 4 car trains

0533-0100

0500-2400

3.2 Financial Framework

(1) Financial Framework at Inception of the Operation

With the exception of KTM Komuter (Sentul Port Klang and Rawang Seremban) operated by KTM, the other urban railway systems were constructed under implemented under BOT (build - own - operate) scheme. Following table summarize the concession agreements of four privatized projects.

The government financed 10% of equity and 20% of concessional loan to the LRT System I project. On the other hand, in the case of LRT System II and KL Monorail, while about 25% of the project costs were covered by government's concessional loan (repayment obligations were on private concessionaires), there were no government equity injection for these projects.

As shown in the below table, out of 4 projects, concessionaires of two projects were not competitively awarded. According to the PPP Resources & Advisory Center of Malaysia, Malaysian government decided direct negotiation, because i) the transaction costs would be lower under negotiated contracting than if projects were privatized through competitive bidding, and ii) project implementation period can be much faster than under open tender bidding.

		LRT System I (STAR/ Ampang line)	LRT System II (PUTRA/ Ketana Jaya Line)	Express Rail Link (KLIA Express/ Transil)	KL MONORAIL
Priv	vatization Method	ВОТ	BOT	BOT	BOT
Сог	stracting Procedure	Direct Negotiation	Limited Tender	Limited Tender	Direct Negotiation
Со	ncessionaire	Sistem Transit Aliran Ringan Sdn Bhd (STAR) ¹	Projek Usahasama Transit Ringan Automatik (PUTRA) ²	Express Rail Link Sdn Bhd	KL Monorail Sdn Bhd
	nmencement of eration	Dec. 1996 & Dec. 1998	Sep. 1998 & Jun. 1999	Apr. 2002	Aug. 2003
Cor (yea	acession Period	30 + 30	30 + 30	30 + 30	40
50	Govt.	10%	0%	N.A.	0%
lcing	Govt. Loan	20%	25.6%	N.A.	25.4%
Financing	Private Equity	10%	20.4%	N.A.	22.0%
_	Commercial Loan	60%	54.0%	N.A.	52.6%
Tot	al Project Cost	RM 3,500 million	RM 5,200 million	RM 2,400 million	RM 1,180 million

Table 3-2 Concession Models of the Four Privatized Projects

Note 1: A Consortium, Kuala Lumpur Train Group, formed by Taylor Woodrow and Adtranz (Formed in 1990) developed LRT System I for STAR. Malaysian companies represented 55 per cent of the stake.

2: Wholly-owned subsidiary of Renong Berhad

Source: Ministry of Transport of Malaysia, PPP Resource & Advisory Center, Malaysia, and KL Rapid

(2) Bankrupt of Project Operating Entities and Subsequent Nationalization (Current Framework)

The privatization of the LRT system was based on the assumption that urban rail systems are

commercially viable whereas this has rarely been the case. In the case of Malaysia, at inception, the Sistem Transit Aliran Ringan Sdn Bhd (STAR), concessionaire of LRT System I, forecasted a positive net cash flow of RM 80.7 million in the first year of LRT System I operations, increasing to RM 1,793 million in the final year of its 30-year concession period³. The commercial outlook for the Projek Usahasama Transit Ringan Automatik (PUTRA) from its LRT System II operations was also assessed as one of high profitability.

Actual ridership volumes on both the LRT networks were much lower than forecasted by the concessionaires. Not only unrealistic ridership forecast made be concessionaires, low ridership was also due to the government's failure to implement policies to promote public transport. As a result, both STAR and PUTRA incurred huge annual deficits on their operations. The financial crisis of 1997/1998 aggravated the situation. The two companies owed a total of RM 5.7 billion of liabilities at November 2001 when the government's Corporate Debt Restructuring Committee (CDRC) restructured the debts of the two LRT companies through the issuance of government-guaranteed bonds by the Syarikat Prasarana Negara Berhad (SPNB: National Infrastructure Company Limited). On September 1, 2002, a government-owned operating company, RapidKL, officially took over LRT operations of Star-LRT and Putra-LRT. And, all the assets and liability were transferred to SPNB.

ERL and KL Monorail were also expected to be self-supporting. However, actually, fare revenues from riders were smaller than expected. Low ridership has weakened the financial viability of the railway operations. In order to salvage the networks, the Government has had to intervene and restructure the KL Monorail operations in May 2007. This has involved a Government takeover of the three LRT operations from the private sector concessionaires. Currently, Rapid KL pays an assets usage charge to SPNB, which is currently at 12 percent of the company's revenue. This charge is to increase in the future.

Not only operation of these three urban railway lines, but also that of bus service within Kuala Lumpur city were nationalized (October 2003), and are now being operated by RapidKL.

3.3 Efficiency Level of Operation and Service

(1) Operation and Service Performance during Inception Stage

As mentioned, ridership performance of the privatized LRT projects considerably lower than planned ridership envisaged at the time of feasibility study. The figure below compared the planned and actual ridership performance of privatized four projects.

³ Source: PPP Resource and Advisory Center of Malaysia, Concession agreement of LRT system I and LRT system II

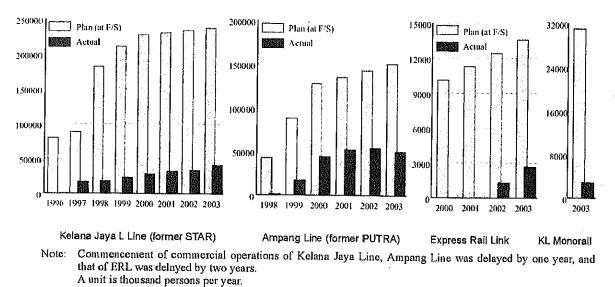


Figure 3-2 Ridership Performance of the Four Privatized Projects

According to the PPP Resources & Advisory Center of Malaysia, one fundamental reason for low ridership figures is i) the small size of the catchments areas of the LRT networks, and ii) population of Kuala Lumpur and its suburban area spreading over a large area, which is insufficient to sustain an urban rail transit system. Cheaper bus services, high motorcycle and car use intensify the competition in the limited transport market. The level of integration among transit operators, both in terms of physical integration and operational integration, such as a common ticketing system across the urban rail transit sector and bus services, was also not implemented. The limited and irregular bus services to the LRT stations, which are priced separately, and insufficient parking bays at the stations also limit the ridership of the LRT networks.

In the case of LRT systems, both STAR and PUTRA, the forecasted ridership, which was based on some aggressive assumptions of competing modes, has turned out to be unrealistic. One assumption was that bus fares in Kuala Lumpur would be raised upon the commencement of rail transit services. An upward revision of bus fares could have improved the competitive position of LRT operations vis-à-vis road-based public transport. However, such bus fare revision was not made at the time.

Also, poor integration between Ampang Line and Kelana Jaya Line, and even poor integration with other rail operators such as KL Monorail and KTM Komuter were considered to badly affect ridership performance.

(2) Current Operation and Service Performance/ Actions for the Future

After the nationalization, the performance of RapidKL is to be measured according to key performance indicators that are to be set by the Government. The Government penalizes RapidKL financially if the pre-defined targets are not met and rewards it if the targets are

exceeded. This scheme of incentives and penalties is meant to enhance efficiency and service quality of public transport in KL.

Since taking over the LRTs and bus network, RapidKL has taken steps to improve their service.

- i) LRT capacity has been increased. RapidKL and SPNB have issued tenders for the purchase of new LRT rolling stock to increase carrying capacity;
- ii) The common monthly pass for Ampang Line, Kelana Jaya Line, KL Monorail and buses operating within Kuala Lumpur has been introduced;
- iii) Former separate ticket systems by each line has been completely integrated into a common ticketing system magnetic Touch 'n Go card since March 2008, which can be used in all RapidKL buses and rail lines;
- iv) Masjid Jamek LRT station was upgraded to ensure seamless integration between Ampang Line and Kelana Jaya Line (construction was completed in November 2008); and
- v) The connectivity between LRT and bus has been improved. Trunk buses began to link hubs at the edge of the Kuala Lumpur's central business district with suburban transportation hubs. At these suburban hubs, local shuttles will radiate out from rail-based public transport stations and connect to residential areas (see Figure 3-1).

Ridership of Ampang line and Kelana Jaya line were increased up to about 43.8 billion trips per year (120 thousand trips per day) and 69.4 billion trips per year (190 thousand trips per day) respectively in 2006. However, RapidKL was still incurring an operating loss of RM 3 million (US\$0.8 million) per month on total revenue of RM 23 million (US\$6.13 million) and expenses of RM 26 million (US\$6.93 million) in 2006. The government of Malaysia currently provides no subsidy to RapidKL.

4. DELHI METRO IN INDIA

4.1 Outline of MRT Project

(1) Background of Project

India's population size is the second after China and is expected to exceed China in 2050. Traffic congestion has been a big headache for the government and Mass Transit System has long been awaited. Delhi is the Capital of India. Present population of Delhi is 14 million. City transportation was almost fully road-based until MRT was introduced, with about 38,500 buses (including medium & heavy), 75,000 auto-rickshaws, 16,000 taxis, 2.65 million two wheelers, 1.26 million cars and 135 thousand goods vehicles ply in the City. The existing railway line of 245 km carried only 2% of the

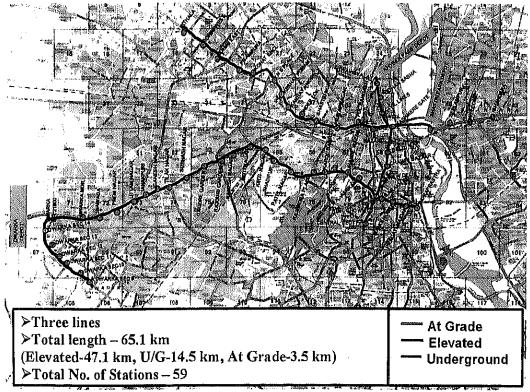
commuter traffic. Consequently, roads were constantly heavily congested, pollution levels were high and road accident rates were also very high. Under this situation, the original plan for mass transit was formed in the early 1990s and the government established a special purpose vehicle, the Delhi Metro Rail Corporation (DMRC), in 1995.

Today, DMRC is well regarded not just within India but also around the world as a highly successful case of mass transit system development in developing country. Much of the success reasons lie in how the project implementing scheme has been designed and prepared.

This case study traces back the history of DMRC and also reviews the recent performance. Notably, it is quite important to draw lessons from the soft elements of DMRC organization itself. This includes areas of governance, human resource management and other various management systems embedded within the organization.

(2) Outline of MRT Line

Phase I of Delhi Metro consists of three lines with a length of 65.1 km, of which 14.5 km is underground. Work of Phase I started on October 1, 1998 targeting completion in 10 years. The first phase of Delhi Metro was, however, completed by December 30, 2005 (exactly within 7 years and 3 months). During the construction, no major inconvenience or disruption in the city had been reported, which is quite unusual for a project of this size. Also, it is important to note that construction work was completed within the original estimated cost.



Source: Prepared by Study Team based on DMRC' data.

Figure 4-1 Map of Delhi Metro (Phase 1)

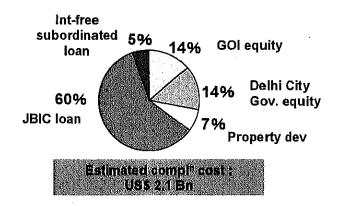
Appendix 4 - 20

4.2 Financial Framework

(1) Fund Raising Method

DMRC is a fully-owned government company - 50% shares held by the Federal Government (Government of India) and 50% shares by the Provincial Government (Government of Delhi). DMRC has full autonomy and there is no interference from the government or city agencies in the working of DMRC. There are 9 part-time and 5 full-time directors in the company.

The flow of funds from the two governments and from JBIC was smooth. Therefore, work never suffered for want of funds. DMRC is now funding 10% of Phase–II from its own resources.



Source: DMRC seminar, DMRC annual report2007 Figure 4-2 Phase1 –Project Cost & Funding Source

(2) Role Sharing

The support of the two Governments to the project was very visible, which sent the right message to all related stakeholders. In the project, both central and city government plays a critical role in ensuring a sustainable financial structure. For example, one of the key decisions was the Government's decision to exempt DMRC from payment of taxes & duties. This reduced the cost of the project by 18%.

Also, to assist smooth implementation, the Government of India set up two committees; one under the Cabinet Secretary and another under the Group of Ministers. These committees assisted to speed up decision making and coordination required across multiple ministries.

Lands required for the project were acquired by the City Government under the Land Acquisition Act. For this, periodical meetings were held at the level of Chief Secretary (bureaucratic head of Provincial Government) to review the progress of the land acquisition. At no time, work was held up for want of land. DMRC had a well laid policy for rehabilitation and resettlement of affected persons.

Since DMRC did not have expertise for the planning and building of a metro system, it engaged a

consortium of 5 international consultants to assist as general consultants. By this, DMRC could bring in international standards of specification, quality of work and safety standards. It is important to note that capability building was one of the most important missions of the consultants. This initial investment in capability building has resulted in not only a world class metro system but also in a world class institution. As a professional organization, DMRC is now also assisting other Metros in the country and abroad.

(3) Legal Framework of PPP Model

DMRC got two enabling legislations enacted by the Parliament, i.e., legislation for the construction activities of MRT and legislation for the operation & maintenance of MRT.

Under this legal cover, DMRC was able to: i) acquire any premises; ii) create tunnel under any building or structure; and iii) be exempted from payment of property tax and other taxes.

These legislations were different from the Railway Act prevalent in the country and developed specifically for MRT, since the characteristics of urban mass transit is quite different from inter-city railway.

(4) Risk Sharing

DMRC took all revenue risk from the beginning. This contributed to the autonomy and independence that DMRC enjoys today. However, DMRC management knew that taking such risk was not an easy task. The management made sure that DMRC had a sustainable (defensible) financial structure from the early planning stage. This led to ensuring tax exemptions, stable cost of energy, government indirect support for ridership enhancement and other competitive commercial structures.

Another notable aspect of risk sharing is the way they managed vendors. The procurement package was sub-divided into many packages (probably more than 10 packages). This allowed DMRC to avoid over-dependence on selected vendors. However, this required DMRC to build in-house capabilities for "system integration," which is quite a task with risks. The human resource pool from the Indian Railway may have contributed to such a bold strategy.

(5) Setting of Key Performance Indicators and Revenue Sharing

The specifics of key performance indicator (KPI) are not clear from publicly available information. However, several points regarding performance should be emphasized as follow:

- Commercial profitability from railway: Sustainable financial operation from core business was thought to be a high priority from beginning;
- Passenger satisfaction: There are clearly planned efforts to make passenger satisfaction a priority. They have made a plan for passenger convenience and safety facilities. This also includes the recent roll-out of Metro feeder bus service; and
- Increase in non-rail revenue ratio: DMRC has taken initiatives to diversify sources of revenue,

including consulting services and real estate business.

(6) VfM Analysis

Since DMRC is a fully government owned entity, it is assumed that there was no value for money (VfM) analysis for this project. The Study Team could not find any trace that the Government of India considered PPP concession model as an alternative. This is understandable as India had plenty of railway expertise pool from the long history of Indian Railway.

(7) Financial Analysis

Original financial analysis prior to the commencement of Phasel is not clear. However, based on indirect evidence, it is fair to state that DMRC took a conservative view on tariff and ridership forecast. One of the keys to their success is the defensible financial structure, building on a conservative ridership scenario.

2.4.3 Current Efficiency Level of Operation and Service

(1) Customer Satisfaction

DMRC has put significant efforts to maintain a high level of customer satisfaction. Reports mention a low level of customer complaints with a high level of corporate image. This is owing to their strict standards to maintain punctuality and safety. Although no publicly available customer satisfaction survey has been available, it is fair to say that DMRC has earned the trust of mass public given their generally positive public reputation.

(2) Efficiency of Operation and Service

Some notable characteristics of operation and services are:

- About 1,200 train trips a day with 64 train sets (256 Coaches). Each train consists of 4 coaches. When traffic increases trains can be lengthened to 6 coaches and finally to 8 coaches.
- Average ridership is 550,000 trips a day. Frequency during peak hours is 4 minutes.
- Trains operate from 6 AM to 11 PM. Punctuality measured with a least count of 60 Seconds.
- Fare ranges from Rs. 6.00 (15 cents in the U.S. currency) to Rs. 22.00 (50 cents in the U.S. currency), lowest in the world.
- More than 30% of DMRC's revenue is from non-rail business sources, mainly real estate development, consulting service and advertisements.
- DMRC has introduced bus feeder services to improve the ridership.

Based on such operation and service efficiency, the system has been making operating profit from the first year. Despite heavy investment burden, DMRC has been able to service and pay back the loans without delay.

(3) Financial Efficiency

Financial performance of DMRC is impressive. Overall, their profitability is 4%, which is relatively high for mass transit. This is because they have a very high non-rail revenue ratio of 44%. It is believed that non-rail revenue will be an inevitable part of urban railway system success, especially from a financial sustainability point of view.

Gross profitability of non-rail business such as consulting service and real estate is extremely high and contribute to the overall profitability of DMRC.

It is worth noting that non-rail business ratio of other financially successful case, such as Hong Kong MTR and Tokyo Metro, is also relatively high compared to poorly performing cases.

, INCOME	
 Traffic Operations 	2,833,832,364
 Consultancy 	134,478,705
 Real Estate 	1,534,585,697
Others	540,620,275
TOTAL (a)	5,043,517,041
EXPENDITURE	
Traffic Operations	2,003,544,264
Consultancy	36,807,579
Real Estate	65,064,880
Others	2,791,386
TOTAL (b)	2,108,208,109
EBITDA (c= a-b)	2,935,308,932
DEPRECIATION AND INTEREST	
Depreciation	1,836,449,700
 Less:- transferred to CWIP 	66,200,013
TOTAL(d)	1,770,249,687
Interest & Finance Charges	1,051,076,509
 Less:- transferred to CWIP 	85,843,779
TOTAL (e)	965,232,730
PROFIT BEFORE TAX (f=c-d-e)	199,826,515

Profit/Revenue=4%
Non-rail revenue/Revenue=44%
Gross Profit/Revenue(train)=29%
Gross Profit/Revenue(non-

rail)=95%

Source: DMRC seminar, DMRC annual report2007

Figure 4-3 Financial Highlights of Phase-I (2007) - Profit and Loss Statement

(4) Key Lessons from Delhi Case

DMRC has shown that a government agency can handle a mammoth project in a crowded city efficiently (causing no inconvenience to the public) and in time, and within budget. Delhi Metro does not receive any government subsidy for operation.

DMRC's success has encouraged metro projects to come up in cities like Bangalore, Hyderabad, Mumbai, Chennai and Kochi. DMRC is the prime consultant to all the cities.

The innovative structure of DMRC, which is 50% owned by the Federal Government and 50% by the City Government, has contributed to the success. No one government has the majority to control the company. DMRC has full freedom and flexibility to decide on technical and financial matters.

The Board of Directors has delegated full powers to the Managing Director. Therefore, decision making process is fast.

The case of DMRC provides quite a counter-intuitive result. In conventional theory, 100% government-owned companies had been believed to be inefficient compared to private. DMRC provides a solid counter argument and proves that government entities can perform well under good governance and management system.

5. METROPOLITAN INTERCITY RAILWAY COMPANY (TSUKUBA EXPRESS) IN JAPAN

5.1 Outline of Metropolitan Intercity Railway Company (MIR)

(1) Background of MIR

In the northern part of Tokyo metropolitan area, the development of commuter lines has been left behind. The area was deemed to be one of the most undeveloped areas. Therefore, local governments along the line eagerly promoted a new commuter line to this area.

The purpose of the line is as follows;

- To implement a commuter rail network in the northern part of Tokyo metropolitan area;
- To mitigate congestion of the existing commuter railway line;
- To provide good residential area in the northern part of Tokyo metropolitan area; and
- To provide infrastructure for industries along the line and establish business core cities in the area.

In 1985 the construction of the line was proposed to the Ministry of Transport as one of the commuter lines in Tokyo metropolitan area by 2000. The construction of the line was started in 1994 and Metropolitan Intercity Railway Company (MIR) started its service in 2005.

(2) Outline of MIR

The project has been promoted by MIR who is the newest commuter rail company in Japan. This line connects Akihabara, a center of Tokyo, with Tsukuba city, research and academic city northern part of Tokyo metropolitan area. The route length is 58.3km and most of the line is elevated section except the underground section around the terminals. The number of rolling stock is 180.

5.2 Financial Framework

(1) Funding Raising Method

In Japan, it was obvious that the newly established urban railway company would generate a big debt if the existing financial scheme would be adopted. And the government does not financially support the commuter companies on the operation stage. These have brought about big deficit to them.

To support the expansion of urban transportation, therefore, the Ministry of Transport constituted the law for development of residential area and implementation of commuting railways in the metropolitan area to suppress the land acquisition cost. The Ministry also provided the large amount of capital and the funds with no interest in order to reduce total amount of debt and to suppress total construction cost.

The funds for the line were gathered from the following sources:

i) interest-free loans from the central and local governments;	
ii) fiscal investment and loan fund from the central government; and	
iii) equity participation by local governments and private companies.	
Concrete figures of funds are as follows:	
Loans from the central government without interest	411.3 billion yen
Fiscal investment and loan fund from the central government	61.7 billion yen
Loans from the local governments without interest	411.3 billion yen
Equity participation by local governments	144.0 billion yen
Equity participation by private companies	19.0 billion yen

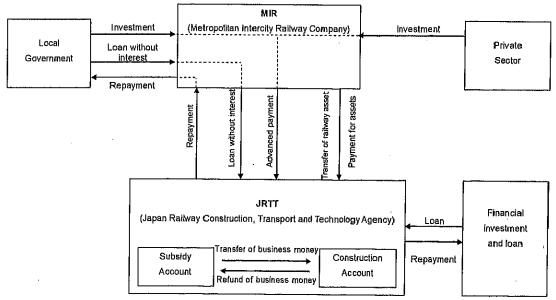
1,047.3 billion yen

(2) Role Sharing between the Public and Private Sectors

Total

Financial scheme of the project is not PPP in a strict sense but the joint stock company to implement the project was established jointly by the public and public sectors. It has been eagerly pushed ahead by the local governments along the line and the Ministry of Transport. The private sector invested only 10% of the capital of the company and it did not provided a loan.

As an implementation body, MIR was newly established and as a construction body, the Japan Railway Construction, Transport and Technology Agency (JRTT) was involved. The relationship of the implementation body and construction body is described in the following figure.



Source: Study Team

Figure 5-1 Institutional Setting of MIR

a. Implementation body

The core staff of MIR was gathered together from the Ministry of Land, Infrastructure, Transport and Tourism (MLIT), JRTT and several private railways in Tokyo.

The capital of MIR is about 185 billion yen, which is the second biggest one as a railway company. This capital is contributed by local governments along the line and related private companies.

b. Construction body

The main construction body is JRTT which is a kind of government agency and has a lot of experience on construction works of urban railways and *Shinkansen*. It has carried out all the construction works of the project except procurement of rolling stock for railways.

(3) Legal Framework of PPP model

As mentioned above, this project is not implemented with PPP scheme and furthermore there is no legal framework of PPP model for railways in Japan.

(4) Risk Sharing

Basically MIR takes all the risks concerning construction and operation.

(5) Setting of Key Performance Indicators and Revenue Sharing

In Japan, each railway company is obliged to submit its train time table to MOT. And each railway company is required to get approval on its fare level from MOT. MOT also requires each railway company to make its effort to reduce the congestion ratio at peak time to 150%.

Key performance indicators of the line and figures are expressed in the following table.

KPI Train km per day	Figures 16,569km/day
Number of trains at peak time	19 trains per hour on working day
Average traffic volume for all days	193,000 passengers/day
Number of passengers at peak time	Not available.
Average travel distance	22.2km

Table 5-1 Key performance indicators of MIR

Source, Railway statistical annual report 2007, Homepage of MIR (www.mir.co.jp)

All the revenue from the line goes to MIR. There is no concession agreement with others.

(6) Value for Money Analysis

It is considered that there was no consideration of value for money in this project. In order to lessen land acquisition costs, the government introduced a special arrangement by issuing a law. This is not attained by participation of private sectors.

(7) Financial Analysis

In Japan, every year each railway company is obliged to report its detailed financial results to MOT to evaluate the proposed new fare level when needed. These figures are publicly opened. Based on these figures of MIR, financial analysis was carried out.

- MIR recorded a deficit after depreciation and tax in 2007. The size of deficit is 9.4% of total revenue. MIR records a deficit even it enjoys favorable treatments such as interest-free loans and lower land acquisition costs. This deficit is considered to be due to the fact that MIR is still at the early stage of operation.
- The ratio of depreciation expense to total expenditure is around 62%. This fact shows that the construction cost of modern a commuter line is huge. The most important factor for the sustainable and sound operation of commuter line is how to share the burden of construction cost and/or how to restrain the construction cost.

ltems		Amount (¥ Thousand)
Fare box revenue	A	25,727,316
Non fare box revenue	В	1,046,719
Total revenue	C=A+B	26,774,035
Total operation cost without taxes	D	9,063,957
Taxes	E	2,080,770
Depreciation cost	F	18,156,311
Total expenditure	G	29,301,038
Profit or loss for railway business	H=C-G	-2,527,003

 Table 5-2 Profit and Loss of MIR

Source: Railway statistical annual report 2007

5.3 Current Efficiency Level of Operation and Service

(1) Customer satisfaction

MIR has not reported the result of customer satisfaction survey to the public. From the following aspects, the customer satisfaction of the line seems to reach a high level.

a. availability

MIR does not provide any statistics of train delay. However, no train delay of the line has been reported in newspaper since it opened. Therefore, its availability is deemed to be ensured.

b. safety

MIR is equipped with the automatic train protection (ATP). Therefore, any incident due to a signal passing accident danger (SPAD) would hardly happen. As platform doors are installed on the platform, falling-down of passengers from the platform is protected. As just described, the MIR line is highly equipped with safety measures and no serious incident was reported in the

railway statistical annual report 2007. The safety level of this line can be considered sufficiently high.

c. fare level

In Japan, the fare level of a newly opened line tends to be high for the recovery of the huge construction cost. However, the minimum fare of this line is 160 yen. This is the same as Tokyo Metro which is the largest metro in Japan. From Table 5-3, it can be seen that the average fare of MIR is smaller than that of lines operated with public & private joint scheme or that of lines operated by the public sector. It seems that the fare level of MIR is acceptable as a commuter line.

d. amenity

As MIR is a newly constructed line, a sufficient number of escalators and elevators are installed from the opening. At ticketing gates, the automatic fare collection (AFC) for smart card is installed. Universal signage is introduced for passengers to find station facilities easily. A lot of amenities are available at stations on this line. Thus, passengers may feel comfortableness on the line.

(2) Efficiency of Operation and Service

Table 5-3 shows efficiencies of operation and services by type of operator of commuter railway in Japan. Commuter railways operated by the public sector include the Tokyo Metropolitan Government Bureau of Transportation, Tokyo Metro, Transportation Bureau of City of Yokohama, Transportation Bureau of City of Nagoya and Osaka Municipal Transport Bureau. Those operated jointly by the public and private sectors are MIR, Chiba Urban Monorail, Saitama Railways, Tama Urban Monorail, Tokyo Waterfront Area Rapid Transit and Toyo Rapid Railway. Private operating companies of urban railway are Tokyu, Seibu Railway, TOBU Railway, Keio, Odakyu Electric Railway and Keihin Electric Express Railway.

The comparison with other urban railways shows:

- a) Fare per passenger km of MIR is cheaper than the average of public & private joint operators and also that of public operators. This lower fare level may be owing to suppressed construction cost. MIR's moderate fare has contributed to an increase in passengers, which is higher than estimated.
- b) The number of staff per route km of MIR is smaller than that of all types⁴. This may be brought about through the introduction of various facilities to operate with smaller number of staff. Operation with less staff leads to financial efficiency.

⁴ It should be noted that all lines operated by the public sector are underground railways that need more staff than railways on the ground or elevated.

Type of Operating Company	Fare per passenger km (Yen)	Number of staff per route km		
MIR	16.36	9.7		
Public	22.6	35.9		
Public + Private (Joint)	33.0	13.0		
Private	11.3	19.9		

Table 5-3 Comparison of Operation and Service Level of Commuter Lines in Japan

Source: Railway statistical annual report 2007

(3) Financial Efficiency

Table 5-4 shows the financial efficiency and ratio of profit to railway assets by type of operator of commuter railways in Japan. From this table, the following can be pointed out.

- a) Financial efficiency and profit ratio of railways operated jointly by the public and private sectors are the worst among three types. It seems that an unprofitable railway project tend to be undertaken by an operating company jointly established by the public and private sectors.
- b) Financial efficiency and profit ratio of MIR is lower than the average of each type. This is due to a deficit.

Four years has passed since the start of MIR operation in 2005. The number of passengers is still low. However, ridership is expected to increase in the coming years. As most of operating expenses are fixed cost, it is expected that financial performance of MIR will be improved in future.

It should be also noted that the demand forecast of MIR line was carefully carried out to avoid tragedy of over-estimation because many people considered MIR would be a money-losing line at the planning stage. The current number of ridership is bigger than estimated. Thus, the ridership is still at only 234 thousand passengers per working day.

Type of Operating Company	Financial Efficiency (%)	Ration of Profit to Railway Assets (%)
MIR	109.4	-0.3
Public	81.3	2.9
Public + Private (Joint)	97.5	0.8
Private	80.4	5.8

Table 5-4 Comparison of Financial Efficiency of Commuter Lines in Japan

Source: Railway statistical annual report 2007

6. LONDON UNDERGROUND IN THE UNITED KINGDOM

6.1 Outline of MRT Project

In the first half of the 2000's, a PPP scheme was introduce to infrastructure maintenance work of the London Underground. In this section, the PPP scheme which the London Underground has introduced is studied and evaluated as a case study in this section.

(1) Background of Project

The history of London's underground railway dates back to 1986 when the world's first underground railway opened⁵. The London Underground Limited (LUL) has played an important role of urban transportation in London for the long time. London Underground currently serves a large part of Greater London and neighboring areas of Essex, Hertfordshire and Buckinghamshire. London Underground covers 402 km of rout with 11 lines and 270 stations.

In the 1990s, the aging of infrastructure and inflexible response to rapidly expanding demand were recognized as keen issues of LUL. LUL could not make a persistent budget because the size of government subsidies which LUL received varied from year to year. It was considered that the private sector would be able to raise long-term funds easier than the public sector such as LUL. LUL's weak capacity of investment planning and, as a result, frequent cost overrun and delay also invited enthusiastic discussions on PPP for the underground railway in London. In February 2002 it was announced that the maintenance and renewal of LUL's infrastructure would be undertaken through three private organizations under the public private partnership (PPP)⁶.

LUL is under the Transport for London (TfL). TfL is a functional body which is responsible for transport under the Greater London Authority.

(2) Outline of PPP

In 1998, LUL was split into four organizations, i.e., an operating company for running trains and stations and three infrastructure companies (Infracos) responsible for renewing and maintaining assets. Four organizations were operated as public organizations to test a new underground railway operation system with PPP. During this shadow operation, the bidding process of PPP was preceded. In the result, three Infracos were transferred to the private sector. Private consortiums became shareholders of the Infracos. LUL signed three 30 year PPP contracts with Tube Lines for Infraco JNP in December 2002, and with Metronet for Infraco SSL and Infraco VCB in April 2003. LUL retained the ultimate ownership and responsibility for the daily operation of trains and stations, and for safety, while the private Infracos were expected to maintain and renew infrastructure including the trains, stations, track and signaling, in a whole life manner.

⁵ Transport of London, "London Underground Factsheet," February 2009.

⁶ Martin Kellaway & Helen Shanks, "Metronet, Tube Lines and the London Underground PPP," National Accounts Classification Committee, 24 September 2007

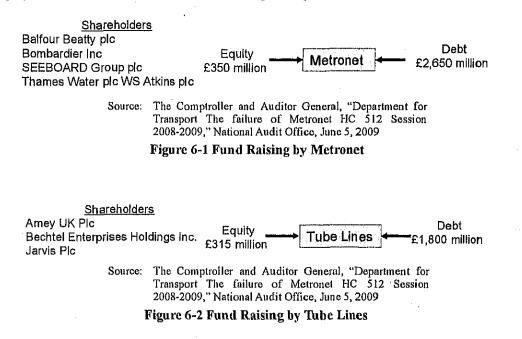
6.2 Financial Framework

(1) Fund Raising Method

a. Fund Raising by Private Sector

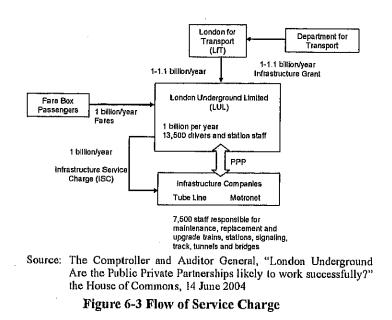
The participants in the Metronet Consortium are affiliates of Balfour Beatty plc, Bombardier Inc, SEEBOARD Group plc (part of the American Electric Power Company Inc. group), Thames Water plc (part of the RWE group) and WS Atkins plc. Metronet arranged a borrowing of £2.65 billion for the first 7-and-half-year period of the 30-year PPP contracts. In addition, Metronet's five shareholders supposed to provide £350 million in equity. Metronet planned to invest nearly £8.7 billion in its two PPP contracts during the first 7-and-half-year period split almost equally between maintenance and renewal.

The shareholders of Tube Lines Limited are affiliates of Amey UK Plc, Bechtel Enterprises Holdings Inc., and Jarvis Plc. The share capital was divided equally among shareholders. Tube Lines Limited raised £315 million in equity and arranged £1.8 billion in borrowing to help fund its planned investment of £4.8 billion during the first 7 and half years. In 2003 Grupo Ferrovial SA of Spain acquired Amey. In 2004 Jarvis sold its shares to Amey. Thus, Grupo Ferrovial SA holds two thirds of the share capital. Tube Lines increased its debt to £2.0 billion and reduced its equity to £180 million at the time of refinancing in May 2004.



b. Payment of Infrastructure Service Charge to Infracos

Regular payments of an Infrastructure Service Charge (ISC) are made by four-weekly to Infracos by LUL according to a fee structure that is fixed for the first 7 and half years. The amount of payments is adjusted according to defined performance bonuses and abatements. The adopted performance indicators are the maximum capacity of the system, the day-to-day ability of LUL to make use of this capacity, and the quality and comfort of the system as experienced by passengers.



(2) Role Sharing of the Public and the Private Sector

The role sharing was arranged as follows:

Public sector	LUL	
Tublic accion		 retain responsibility for passenger service provision on the Underground, includin operation of trains and stations;
		-
		 be responsible for collecting and retaining all fares and other revenues (includin from advertising, car parks etc.);
		- continue to manage the existing network-wide PFI contracts, and any other PI
		contracts let before or after completion of the PPP (other than the NLTS Contract
		which will transfer to Infraco JNP);
		- manage its relationship with the Infracos through the Service Contracts;
		 continue with marketing and planning of the whole network;
		- take a leading role in ensuring that the PPP arrangements maintain and improv
		safety in accordance with its statutory responsibilities; and
		- participate in changes to Underground standards and operational practices
		accordance with a contractual standard setting and change process.
Private sector	Infracos	- maintain and upgrade the track, tunnels, signals, stations, lifts, escalators and train
	(JNP, SSL,	under 30 year contracts to LUL. After the contract period the upgraded assets with
	VCB)	return to the public sector.

Table 6-1	Role Sharing of Public and Privat	e Sectors
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Source: European Commission, "State aid No N 264/2002 - United Kingdom London Underground Public Private Partnership," 02.10.2002

The underground lines and assets managed by three Infracos are as follows:

Name of Infraco/ Consortium	Participants in Consortium	Responsible Line	Assets under Management		
Infraco JNP/ Tube Lines	- Jarvis plc - Amey plc - Bechtel	- Jubilee Line - Northern Line - Piccadilly Line	 Over 370km of track 100 stations 250 trains Associated infrastructure 		
Infraco SSL/ Metronet	 Bombardier Transportation SEEBOARD Group plc 	 Metropolitan Line District Line Circle Line Hammersmith & City Line East London Line 	- Over 690km of track - 150 stations		
Infraco BCV/ Metronet	- Balfour Beatty plc - Thames Water plc - WS Atkins plc	- Bakerloo Line - Central Line - Victoria Line - Waterloo & City Line	- 350 trains - associated infrastructure		

Table 6-2 Lines and Assets of Infracos

Source: European Commission, "State aid No N 264/2002 – United Kingdom London Underground Public Private Partnership," 02.10.2002

(3) Legal Framework of PPP Model

London Underground's rights of direction and control under the Service Contract arise in two main circumstances, safety and inadequate performance⁷.

(4) Risk Sharing

The risk sharing between LUL and Infracos is as shown in the following table.

	LUL	Infracos
Revenue Risk	A risk of LUL's revenue is under LUL.	Infracos' revenue risk depends on the level of Inforacos' performance as measured under the performance regime
Cost Risk	LUL is to cover additional costs to meet its performance requirements	Infracos take risks of changes in the projected costs
Event Risk		Infracos take no risk on unforeseeable events with major potential cost consequences.

Table 6-3 Risk Sharing between LUL and Infracos

Source: European Commission, "State aid No N 264/2002 – United Kingdom London Underground Public Private Partnership," 02.10.2002

(5) VfM Analysis & Financial Analysis

The government considered four business structures: a public sector unified business; a private sector unified business; separate private sector businesses split vertically by group of lines; and horizontally split businesses (with operations and infrastructure maintenance, renewal and upgrading

⁷ European Commission, "State aid No N 264/2002 – United KingdomLondon Underground Public Private Partnership," 02.10.2002

carried out by separate businesses). The government chose the third option⁸.

LUL evaluated the net present value of three PPPs with a 6 per cent discount rate. The net present value of all three PPPs over 30 years was evaluated at £15.7 billion (with a value of £9.7 billion at 2002-03 prices over the first 7 and half years)⁹.

Ernest & Young LLP prepared a report which reviewed the value for money of LUL's PPP, "London Underground PPPs: Value for Money Review," dated February 5, 2002. In this report, Ernest & Young LLP reviewed LUL's assessments of the value for money of the PPP and concluded that overall the methodology adopted for assessing the value for money by LUL were robust and appropriate and LUL's recommendation that the PPP proposals delivered value for money was subjective. Ernest & Young LLP adopted five cases for the comparison of PSC and VfM. For each case, the comparison was made on both a cash (NPC) and value (NPV) base. The adopted cases were as shown in the following table.

Ref	Evaluation Period	PSC Funding Assumptions	Discount Rate	Comments			
A	30 years	Traditional	6%	This scenario represents the base case PSC. It assumes that funding will be on an annual basis.			
В	30 years	Traditional	3.5% with 30% upliftThis is the main sensitivity for discount rate assumptions. It is a variant that captures the lo of public sector capital. To reflect the opportun of Government expenditure there is 30% uplift				
с	30 years	Stable Funding	6% In order to assess the impact of a stable funding environment, additional cost savings were project the PSC. These were reflected in savings on investment and maintenance costs.				
D	7 and half years	Underlying costs only	6%	In order to assess the underlying cost of the PPP with the PSC over the first 7 and half years. PPP funding costs are excluded.			
E	7 and half years	Traditional	Costs are excluded.In order to make a like-for-like comparison captulethe impact of funding that will be raised as part of6%year bid. This 7 and half year analysis comparesPSC with the PPP for 7 and half years plus theoutstanding debt and equity amounts as of year				

Table 6-4 Prime Financial Analysis Comparisons

Source: Ernst & Young LLP, ""London Underground PPPs: Value for Money Review," February 5, 2002"

The results of comparison were as shown in the following table. The report concluded that "overall it is not possible to produce a single comparison that is able to provide indisputable evidence of value for money in either direction and the range of outcomes should be assessed. The results of the financial analysis need to be considered with the wider qualitative factors."

⁸ The Committee of Public Accounts, "London Underground Public Private Partnerships - Seventeenth Report of Session 2004–05," The House of Commons, 31 March 2005

⁹ The Comptroller and Auditor General, "London Underground Are the Public Private Partnerships likely to work successfully?" the House of Commons, 14 June 2004

SSL		JNP		В	BCV		Total	
Comparison	NPC	NPV	NPC	NPV	NPC	NPV	NPC	NPV
А	below	below	within	below	within	below	below	below
В	below	below	above	below	within	below	within	below
С	below	below	above	below	above	below	above	below
D	below	below	within	below	above	above	below	below
E,	below	below	above	within	above	above	within	below

Table 6-5 Summary of Comparisons

Note: 'below' - PPP price below 2nd quartile of PSC range 'within' - PPP price within 2nd quartile of PSC range

'above' - PPP price above 2nd quartile of PSC range

Source: Ernst & Young LLP, "London Underground PPPs: Value for Money Review," February 5, 2002.

(6) Evaluation of LUL's PPP Projects by the Government

The report of Committee of Public Accounts under the House of Commons examined the rationale of LUL's PPP projects in 2005 and made the following conclusions and remarks¹⁰:

- The PPP approach might have been restricted solely to major upgrade work which LUL was unable to implement effectively. However, the actual PPP covered ongoing maintenance and renewal work;
- The Department for Transport and LUL should have considered wider, non-quantitative factors alongside the PSC, as recent Treasury guidance downplays the role of the PSC. They should not use the PSC as conclusive evidence of the value for money of the PPPs;
- Issuance of a public sector bond should be considered for financing infrastructure projects in which significant risk transfer to the private sector may not be achievable. Bond financing would have been cheaper than the PPP financing costs;
- Disagreement between the main parties responsible for procuring and managing a PPP ideally should be resolved certainly before the terms of a PPP agreed;
- The accuracy of PSC, and value for money, is very sensitive to the costing of risk; and so forth.

6.3 Current Efficiency Level of Operation and Service

(1) Customer Satisfaction

The level of customer satisfaction for the operation of LUL has remained unchanged since the start of PPP. This means that the introduction of PPP for infrastructure renewal and maintenance has not

¹⁰ The Committee of Public Accounts, "London Underground Public Private Partnerships - Seventeenth Report of Session 2004 - 05," the House of Commons, March 2005.

give a significant impact to customer satisfaction of passengers.

	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08
London Underground	75	76	78	78	76	77
Busses	.76	77	78	78	78	79
Docklands Light Railway	92.5	94	94.9	95.4	96.8	97.3

Source: Transport for London, "Annual Reports and Statement of Accounts"

(2) Efficiency of Operation and Service

The trend of operational performance of London Underground is as shown in the following table. Such indicators as passenger journeys and kilometers operated have shown improvement. It is considered that the operation of LUL has been adequately supported by services of Infracos.

	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08
Passenger journeys (millions)	942	948	976	971	1,014	1,073
Kilometers operated (millions)	66.0	67.7	69.4	68.8	69,8	70.5
Percentage of schedule operated (per cent)	92.2	93.1	95.3	93.6	94.5	94.8
Excess journey time (weighted) (minutes)	9.7	7.4	7.2	7.5	8.1	7.8

Table 6-'	Peri	formance	Indicators	of	London	Underground
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Source: Transport for London, "Annual Reports and Statement of Accounts"

At the introduction of PPP, it was estimated that that the PPP would realize an investment in underground railway infrastructure of over £16 billion over the first 15 years. Sustained investment has been made along with the PPP arrangements. Line upgrades are due to realize a 25% increase in transportation capacity by 2018 and most of the significant capacity increases are due between 2010 and 2017. Therefore, investments to increase the capacity of LUL must be continued to accommodate the increasing passengers. The progress of line upgrading program is as shown in the following table.

Line		Contractual Completion		
and the second	Capacity Increase	Date	of End of 2007/08)	
Sub-surface lines	48%	2012-18	13%	
Victoria	19%	2013	39%	
Bakerloo	38%	2020	0%	
Waterloo & City	25%	2007	100%	
Jubilee	33%	2009	61%	
Northern	20%	2012	34%	
Piccadilly	25%	2014	19%	

Table 6-8 PPP Line Upgrading Program and Progress

Source: Transport Committee, "Delays possible Maintaining and upgrading the London Underground," March, 2009.

(3) Financial Efficiency & Financial Sustainability

The income statement of Tube Lines (Infracos JNP) is as shown in the following table. Tube Line has maintained an operating profit, and profit on ordinary activities after interest payment.

	2003/04	2004/05	2005/06
Turnover	597	864	875
Operating costs	-522	-736	-800
Operating profit	75	128	75
Interest receivable and similar income	35	63	87
Interest payable and similar charges	-69	-137	-99
Profit on ordinary activities before taxation	42	54	63
Tax on profit on ordinary activities	-16	-11	-20
Profit on ordinary activities after taxation	26	43	44

Source: Tube Line, "Tube Lines Directors' Report & Accounts."

In July 2007, Metronet BCV and Metronet SSL became unable to meet their spending obligations and were placed under the administration of government. TfL purchased 95% of Metronet's debts from the private sector lenders in February 2008¹¹. The Department for Transport (DfT) provides a grant of £1.7 billion of grant available to TfL for this deal. Two Infracos of Metronet were transferred to TfL on May 27, 2008. LUL takes the responsibility of delivering Metronets's work program.

The National Audit Office pointed out in its report¹² that the main cause of Metronet's failure was its poor corporate governance and leadership. According to the report, the five shareholders were Metronet's suppliers and had different interests. At Metronet, many decisions had to be agreed unanimously by five shareholders. The management of Metronet had poor access to cost information of the suppliers and could not monitor costs of works. The executive management of Metronet changed frequently.

The summary of the project implementation schemes of urban railway systems adopted as case studies is shown in Table 7-1.

¹¹ The Comptroller and Auditor General, "Department for Transport The failure of Metronet HC 512 Session 2008-2009," National Audit Office, June 5, 2009.

¹² The Comptroller and Auditor General, "Department for Transport The failure of Metronet," National Audit Office, June 2009.

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	private entity	Bath LRT and MRT are Public, not PPP. Government made overall plan. Government entity MRTIC is in charge of construction and attointer government conportation SMRT (100% of share is owned by government entities) in "	Kuala Lumpur's urban raiway system consists of 7 lines. While 3 lines are operated by Malaysian Raiway (KTM), remaining 4 lines were developed and operated by 4 different companies under printet patricipation scheme (BOT), However, after facing
operation of PPP		charge operation.	the financial difficulty, newly established gowrment-oweed operating company (Rapid KL) took over 3 piloak. LFT operations of Star-LFT and Putne-LFT, and KL Montrail
1 Fund Raising Method	MFT construction was faameed by the private sectod.	Construction cost is paid by government budget	Four privedized LFT projects were implemented under BOT scheme. Gowennent provided corressional kenn for LFT System (, 1 and KL, Morronal projects, Mass government provided 10% of graft based oquity injection for LFT system () LFT System (). Gowt equity: 10% Gowt's barr. 20% commercial barr. 60% and privale scalor schuty: 17% LFT System (). Gowt's heart 25.6% Commercial Loart: 24.0% and privale scalor's chuty: 17% LFT System (). Gowt's heart 25.6% Commercial Loart: 24.0% and privale scalor's chuty: 17% KL Moronal: Dowt's heart 25.6% Commercial Loart: 22.6% and privale scalor's equity: 20.6% Express Rail Link: University
 Roles and Responsibilities of slotechoders, i.e., the public sector and private sector 	The phate sector firanced and constructed MRT. The tailway asset has been leased to the Government and MRT receives the fee. Operation is samied out by the private sector according to the synement with the Government. Details turknown.	 Construction is made by MRTC and its cast is fully covered by the government. MRTC staff salary is also supplied by the government. Revenue sources of MRTC are timized to only licenses the and consulting fees Operations is made by SMRT on the basis of teense given by the government (filterines fae is 1% of tare revenue (75%). SMRT also these to moving the revenue. Carst in accordance with the actuation method agree dwith the government. First ride tare is US\$0.33 Fare is set in accordance with the calculation method agreed with the government. First ride tare is US\$0.33 	Before restoratization: Financing, construction, operation and maintanance were done by phoate concessionate. After restandarization: At assets were tennsterred to SPNB (Autorea infrastructure Company Limited). Newly established government-sommed operating company (Rapid KL) is responsible for operation and minitanance af the nativesy systems and pays on osset usage charge to SPNB.
3 Legal Framework of PPP	BOT Law. oficially "An act authorizing the financing, combuction, operation and maintenoise of infrastructure projects by the private sector and fit other purpose" exists. The terms and conditions that an act applies and proceedures are lagatived in EOT-Law.	NJ PPP intrastructure projects and there is no PPP law (to be confirmed).	The Railways Act 1981 (Act No. 462) provides a legal framework for the privalization of railway operations in the country
4. Risk Albcation	It depends on the type of contract. In case of MRT, construction, finance, and operation risk are born by the private sector while the government takes riskenship risk. Since 8.11 contract is not available, risk ellocation of MRT is unknown.	Construction risk, demand risk (market risk), revenue risk and other risks are taken by government and public entities. Cost of taking risk is absorbed by government.	Mejor rists during construction phase and operation phase are deemed to be shouldered by private corcessionine. Land acquisition risk, political risk and were considered to be taken by public sector.
5 Service Startdard and Reverse Sharring	Service standards for LRT and MeTT are unknown. Revenue of MRT may be determined in BLT contract, which is not arealishe.	 Covernment emphasizes to pranete transport system development. SMRT promotes land transports (rain, bus, taxies els) The service levels made by SMRT are enough injoher than the Bench Marks of the services set by the overment. Government will get only License Fee from SMRT which will try maximize its revenue by diversifying its prevenue sources. 	After the nationalization, the performance of RapidAL is to be measured accepting to key performance indicating Is be set by the Gargets are constant. The Covernment pendicies RapidAL financially 7 the pre-defined largets are not met and rewards if the Bargets are exceeded.
6 Method of VIM Analysis	It may be discussed in the Gavenment but not known.	VFM bigether with similar concepts would be reviewed by the government. No detail information is available.	No triomation available
7 Premise of Financia! Analysis of Project and Content of Financial Analysis	Revenue of indeship of Liff covers its operation and meinthoacce cost but interest poyment and depreciation carroot be covered. No detail of expenditure available. No financial date of MRT.	SMATT is listed and now understood as a profitable company. its rados of profitability (after tax) /reverue and profitability(ditta)/assets are 19.7%%. 22.8% respectively.	No data available
8 Customer Satisfaction	LPT passengers are not condurbable by congestion. No debail information about customer satisfication for both LPT and MPT.	Accuracy of departum and antwal 98.5% (36%). 37.0% (34%). Availability99.9% (38.0%) Note: () Covernment larget	No data avaitable
9 Operational Efficiency 10 Francial Efficiency	No datafriformation scalable. No datafriformation scalable.	Accumary gets 99.6 points, efficiency of roan power gets 100 points respectively scored by the government Profitability (after tax) /revenue: 18.7% Profitability (after)/assets: 10.6%	No data available Privats operators for LGT System I, II and KL Monorad have been suffering from serious financial defait after commenzament of their operatoria. Aust before the national and RL Monorad have been suffering from serious frances for LRT System I and II were RML System Required the 1.5 billion US Dalany. Currently, statis-wored operator, Ruppid(L, does not receive a suitsidy and is currently incurring an operatorig base of RM 3 million, (USSB). Andion) per month on bale revenue of RM23 million (USSB.13 million) and expenses of RM26 million (USSB.53 million).
Overal Exabution	 Besh Lift and MRT have been recognized as convenient means of transport in Mena. Analysis and evaluation are untable, since debal information on operation, finance, and other related matters are not exaliable. 	 Shigapore LMT and MRT are planned, constructed and operated by goveriment with its public entities. This urban transport system itself is highly environeed for its operational and financial efficiencies. It is observed the success is entitiumed to the government intention and Mini francial support. Arother selient facture is the implantation system consisted of government to make policy and planning. MRTC to make efficient construction and SMRT to make profit at maximum level as a fisted profitable company, which is regarded as the most efficient and well arganized. 	 Actual releasing weatmes on polarized LKT systems were much lower than forecarbed by the concessionalies. Not only unrealistic riden/up timesast made be concessionalies, we idensity was also due to the government's failure to implement policies to premote public transport as well as poor integration between uchan rahwy systems, and even poor integration with other mode of transport (such as bus). As a result, STAR, PUTRA, and NL Monrall incurred huge sensul deficits on their poleration. These three LKT systems with other mode of transport (such as bus). As a result, STAR, PUTRA, and NL Monrall incurred huge sensul deficits on their poleration. These three LKT systems were the madoregred. Webschen directed in they burden to salvage the network. LRT systems is Kuala Lumpur were considered to be one of the failure complex of urban madery polecid through phones participation schemes and state potention rahway systems in Kuala Lumpur were developed both under private sector participation schemes and state pertation rahway systems. However, out of 4 privationed the solver of 3 fares were barkrupted on there are share pertation reference. Urban maleway systems. Any event of a privation scheme as and state pertation rahway systems. The constitueed to be very informable guide to stady about Financeward of three remarkity metality metalenear. Mereaction the solver of the barrel to be very informable guide to stady about Financeward of urban remarkit.

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Table 7-2 Comparison of Urban Railway Systems in Japan and Other Foreign Countries (Continued)

operation or PPP 1 Fund Raising Method 2 Roles and	Construction cost was 10% kinded by Jupanese ODA kan. Remainder was funded by equity from certral and local government, han fron francial statistical, etc.	centrals. And this project should be recognized as poverment direct control in realty. Regarding construction budget, private sectors only invested 10% of the capibili of this company and caritral gowmment and	infasturcture due b UULS kow czepability of investment planning and easier fund raising by the private sector. One private concortium (Tube Lives) extehlished an infrasturture company (infrace) and another private consontum
		the focal governments suversited and borrowed the minimum product requires tot one project.	(werzowej estowistica dwo arrázos izr rememing and martiatining assets. Two contaritums procured necessary Por bank tears and bond issuarce in addition to equip participation. Roytami provinstric dan infrastriculte Senica Change (ISC) are made by four-weekby to fethaces by LUL.
responsionance or stakeholders, i.e., the public sector and private sector	Corporate governance of globs islandard was applied to DMRC. This allowed rechnomous management and eliminated policie intervention. Governments one was provide support in herms of tax exemption, stable procurement of energy, accelerated land acquisition and coordination with ofter transport modes.	Ministry of fransport established the law for development of residencial area and for implementation for commuting railways in the metropolican area. The Ministry established MR as an implementing body and provided the large armount of capital and the for metropolican provided the large armount of capital and the for the formation of the railways are the owners and operating the formation of the railways are the owners and operating the formation of the formation of the formation of the formation of the railways are the owners and operates this railways after the operating and will repay the doct. MRN implemented the construction of the railways are the owners and operates this railways after the operating and will repay the doct. MRN implemented the construction of the railways are the owners and operates this railway after the operating and will repay the doct. MRN implemented the construction of the railways are the owners and operates this railway after the operating and will repay the doct. Man construction area and operates the railways area to a supervise the report of the railways area to a supervise the range of the railways area to a supervise the range of the railways area to a supervise the range of the railways area to a supervise the range of the railways area to a supervise the range of the railways area to a supervise the range of the railways area to a supervise the range of the railways area to a supervise the railways area to a supervise the range of the railways area to a supervise the range of the railways area to a supervise the range of the railways area to a supervise to a supervise to a supervise the range of the railways area to a supervise to a s	Public setchr (JUL), Rebairs responsability for passenger service provision including operation of hmire and stabions far collecting and annian gui alternates. An anniantures. An annianta per and participanting at the whole reasonic te asserved metamony anniantars and upgraded the back, turnels, signals, stabions, after, escatakons and hains under Brytem contracto to LUL, After the contract period the upgraded assets will relation to the public sector.
Legal Framtwork of Per		General PPT law & exhibithed in Japan but there is no baid framework of PPP model for railways in Japan.	According to the Cliberts Chanter in 1991, the Ministry of Finance published "Appaised and Evaluation in Central Government (Green Book)" as guideline of public projects apparisel, Since 1992, PFI was promoted for public projects which were not subted for privatizations are outsouncing. U.X. did net introduce any comprehensive and regarding PFI linetaed, acto of individual public businesses are modified in and the business areas. As for Mittacha, use in Donou, the Andoon Transport Market and the Andoon Transported business areas. As for Mittacha, action for the Antoine 1994, to order to make PFI.
4 fürk Allocation		Breitaily Mit wil lake all the risks for construction and operation.	A risk of LUEs revenue is under LUE infrance' revenue risk depends on the level of infrances' performance as measured under the performance regime. Infrances take risks of changes in the projected costs. LUL is to cover additional costs to meet its performance requirements. Infrances take no unforces additional costs to meet to performance requirements.
5 Service Standard and Revenue Sharing	Specific service level standards call or the fourtion may backly vanishe information framework for an event of the fourtier to both local and central government eccording to sharehelding ratio. For the standard provide the standard structure to both local and central government eccording to sharehelding ratio. However, for the first several years of operation if sevens the shareholders had sgneet to ratio panif, earnings to prepare for their areastness. As we must retrain structure structure structure to central data to be the government in principle of the several studies corporate for.	Each mismay company is obleged to submit their table fab. Hot. And sach mismay company is required to get approval their the fab. How from MOT MOT also requires each mismay company to make its effort to reduce the congestion main at peak time to 150%. All There is no concession fee at all.	The arrow of ISC payments from ULL is adjusted according to table of performance boukses and abustments. The adopted performances indicatos are the muzimum capacity of the system, the dopto-day ability of ULL to make use of this capacity and the quality and confinit of the system as experienced by presengers.
6 Method of VIIN Analysis		 Most of the project budget of this line is financed by the central and local governments through a part of the capital is financial by the primate sectors. The construction cest of this line is suppressed by the new lineacial scheme minducced by the new lineacial sectors and MRIs in that allocated by participation of private sectors. In this project there is no Value for Money is found. 	Lordon Underground set out to analysis of the PPP proposals in its Final Assessment Report Wirch covered a wice range of issues including value for morey. In underbixing an assessment of the value for movey london Underground considered both Imaacia and wider factors. This was considered with the approach set out by the National Audi Office in considered both Imaacia.
Premise of Financial Analyzis of Project and Context of Financial Analysis		In Japan, every year each callway company is obliged to report to dealed financial results to MOT to evaluate the proposed remviae even when revoted. These organs are properly operated to accord on these figures, manufal analysis was carried out. The poor result for the early stage of operations not tax. The annuaries about 9.4% of tabil revenue. The poor result for the early stage of operations is brought about them provision of the final without interest and suppression of clackal investment. B) The read of operations bits obtoo (2004) then provision of the final without interest and suppression of clackal investment. B) The read of operations but of stages the outs of the fact with our dealer of the read of the and suppression of clackal investment. B) The read of operation is bout CFANO file the speculation. The fact show followed interest land suppression condent reading the read is the parel bits outs bit about the mest important further source observations for the fact show for the readom of the company and the parel and the stope and the lines.	In the fitancial analysis, the expected cost of the private sector (PPP) and public sector option (PSC) was compared. The poyment streams were secreted as no treater values the pruvel sector values. The for costs and monectach monectack, Anolysis that fittine was 20 year and 7.5 years. These optionses set aut a discramt rate of 6% real per annum. A discount rate of 3.5% was also used to assess servisivities.
8 Customer Satisfaction		Econocementers a builof emerities are available at stations on this line. And feev may feel carritrabiliteness on this line, <u>a searchistic Mint</u> door not provide any statistic and early. But no this disky that the line was reproded in the meapper scirce a doorest. Therease its searchistic is carried any that the space of the line, the state of at TUT and about high to like the search relation is searchistic in makery statistical around in point 2007. The safety keet of this free seems high to like their is acceptable for the commutant of builds of Photas scheme or that of builds scheme. It search that the fare keet is acceptable for the commutant, durant of builds of Photas scheme or that of builds scheme. It search built for any scheme scheme is the commutant, durantly, a this for is in they constructed, the escability, elevations and AFC for standard scheme are acceded ut horers of statistical is instructed.	The level of customer subtlaction for the operation of LUL has remained uncleared and on PPP. This means that the immodulum of PPP for infrastructure remained and maintenance has not give a significant impact to customer satisfaction of passengens.
9 Operational Efficiency		a Fare per passenger tran d Mit & cheeper han the eventge of build. S Phalls operations and also that of Public operators in Laans. This could be achieved by expression to incontrudors rost. This modened fare level for removed the number of passenger more throws and the number of a staff part include the number of the number of staff part includes the fare number of the number of staff part includes the number of the number of staff part includes the number of the number of staff part includes the number of the number of staff part includes the number of the number of staff part includes the number of the number of staff part includes the number of staff part includes the number of the number of staff.	In the first year of PPP (April 2003 - March 2004), availability performance measured by fast customer hours was better than the bald contractual benchmark. Faut nectibolion performance in the first year was better than threshold on the Mode and the performance of LUL such indicators as parsenger journeys and Mometurs operated have stoom improvement during benchmance and LUL such indicators as parsenger journeys and Mometurs operated have stoom mynowement during action when innovement.
10 Financial Efficiency	Net positioner inblaster 4%, Noronali revenue mino 44% (Gross minery business profibility 25%, Gross non-zahway business profibibility 55%, Net profit over bala asset 0.13%, Net profit over bala requipt 0.41%.	Profit and Loss of MR has defind but its volume is small. With started its service recently and the runnber of persengers is still have but the releasing will accrease to meet dutine hold) the operation read is backady as same as that at the infimute stage. Therefore, the PLP of MR will be converted in backets one infuture.	UUL date: net open fit: financial information on the web. Therefore, information on changes in financial conditions of UU, after PPP is not available. There house a point before the net year. Nave, openating profit ration has knoted after PPP is not available. There house a point before the network and weak, openating profit ration has knoted
Civeral Featurdion We excess 1. Fearraria turburkor Consulta 2. Stapfice 2. Stapfice 2. Stapfice 1. Fearraria 1. Consulta 2. Stapfice 1. Consulta 2. Stapfice 1. Consulta 2. Stapfice 2. Stapfice 2. Stapfice 2. Stapfice 2. Stapfice 2. Stapfice 2. Stapfice 2. Stapfice 2. Stapfice 2. Stapfice 3. Stablice 2. Stapfice 3. Stablice 3. S	DuRIC case to be a model success case of government serve of them. Table: we provided all if haraneout: Role a deficition however, DNRC ond some server and claim. UNRC was been defined design, construction, operation and maintenance. At the same line, DNRC was beed the first of project performance and risk, On the other inhead, government file for all (by project performance and risk, On the other inhead, government file for all they project performance and risk. On the other inhead, government file for all they project performance and risk. On the other inhead, government file for all they project performance and risk. On the other inhead, government file for all they project performance and risk. On the other inhead, government file for all they project performance and risk. On the other inhead and the project performance and risk. At a reask, management DNRC did not coververy on selected suppliers. It is tampting to notcource to a supplier with filegratic function. DNRC did not coververy on selected suppliers. It is tampting and not will be allocated all dragginger function. The analysis of the theory of the anne, it is imported all dragginger the state. They also the project on the terthistion file file anne, it is imported to find distruction. The state for the state for the advectorent All for anne, it is imported to find dynared beind file from a state for the statement is for the anne, it is introduct to the antider and another pPP for infrastructure deviction tert. All the mans, it is imported to find dynared beind beind beinder noted for the antimication tert and the reasons. Therefore, we induction regarding management policy formation systems. Therefore, we then and another pDBN.	The project was planned in considering the fact that a newly constituted commater fine wal trut to have a difficulty in the operation management in recent years. Regarding the table evaluation, the following viewpoint should be taken into considering the second seco	The case can be a reference when Thellond considers a participation of private sector in upgrading and maintenance of infrastructure in the nuture. The interpret of the sector of private sector in upgrading and maintenance of infrastructure in the nuture. The sector is not observed as the result of PDP in upgrading and maintenance of fingebine imposed on operation of trains and statisfies is not observed as the result of PDP in upgrading and maintenance of infrastructure. The nuture is not observed as the result of PDP in upgrading and maintenance of findebuck that the nuture information in the nuture of the sector of the intervention of the sector and prove the result of PDP in upgrading and maintenance of findebuck the intervention frame as many uncertain factors to be assessed. The observed that the main reson for the Mchanel's falsure is also port corporate presentates and sectors. The nuture is the intervention factors to be assessed. The National Austi Office concluded that the main reason for the Mchanel's falsure is to port corporate progreted. The National Austi Office concluded that the main reason for the Mchanel's falsure is the prove corporate progreted. The National Austi Office concludes that the main reason for the Mchanel's falsure is the provement and port ender the reason for the state of th

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APPENDIX 5

COMPARISON OF FINANCIAL AND OPERATIONAL INDICATORS OF URBAN RAILWAY IN OTHER COUNTRIES

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APPENDIX 5: Comparison of Financial and Operational Indicators of Urban Railway in Other Countries

Image:				Manila Line1&2	Manila Line3	Singapore	Japan	Malaysia	Delhi	London
Consideration function Consideration function Constant constant Constant constant<		Railway operator		Light Rail Transit Authority		Singapore Mass Rapid Transit Ltd	Metropolitan Intercity Railway Company	PURTA(Currently Rapid KL)	Deihi Metro Raiway Corporation	London Underground Limited
Induction of the part of the pa			Concession Period	•	25 years	-	•	30years +30 years	-	30 years
		Investors and concession period	Rolling stock Equipments Infrastructures	Light Rail Transit Authority			MIRC (Local gov.90%, private 10%)	PURTA (PPP, Build- Operate-Transfer) Source of funds: Gov.loan 25.6%, Private equity 20.4%, Other reht5.4%	DMRC (the central gov. and Delhi city)	London Undergrounc Limited PPP for infrastructure maintenance and asset improvement
QMI A Image: constraint of the constraint of		Currency		000000000Yen	Million USD	SS 000	00Million Yen	DODOORS	0000000Rupees	00000GBP
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Opening cost E	iolic	Others	D				649			
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Freed/wat 2004 2006		Grand total	G=SUM(A:F)	1,340			8,081	5,200	10,571	1,566
Currencia Londonesis controlesis controlesis <thcontrole< th=""> <thcontrolesis< th=""> <thco< th=""><th></th><td>Fiscal year</td><td></td><td>2004</td><td>2003</td><td>2008</td><td>2006</td><td></td><td>2008</td><td>2007</td></thco<></thcontrolesis<></thcontrole<>		Fiscal year		2004	2003	2008	2006		2008	2007
A 1,59,102 450.9 1,39,102 450.9 1,367,73 5,377,73 5,377,73 5,377,33 5,377,33 5,373 5,313		Currency		000Pesos	000Pesos		7000		0000Rupees	
Proment benefact B 36.57 1.046.179 36.67 1.046.179 2.1303 Proment benefaction E 0 34.600 34.600 34.600 34.600 Deterion cast Example of the revenue 55.774(155 1.7374 1.3736 31.660 36.774(155 31.660 36.774(155 31.660 36.774(155 31.660 36.774(155 31.7378 31.7328 31.7328 31.7328 31.7328 31.7328 31.7328 31.7328 31.7328 31.7328 31.7328 31.7328 31.7328 31.7328 31.7328 31.7328 31.7328 31.7328		Fare revenue	A	1.659,788		436.9			39.287	
France France C 0 2,400 2,400 2,400 Extension C 9(68) 1/31/41 1/31/36 802.1 25/740 2.5/76 Extension F 1/31/34 1/31/34 1/31/34 1/31/34 1/31/34 1/31/34 Determente 1 0 1/35/34 1/31/34 1/31/34 1/31/34 1/31/34 Determente 1 0 1/31/34 1/31/34 1/31/34 1/31/34 Determente 1 0 1/31/34 1/31/34 1/31/34 1/31/34 Determente 1 0 1/31/34 1/31/34 1/31/34 1/31/34 Determente </th <th>1.</th> <td>Non rail business</td> <td>В</td> <td>36,957</td> <td></td> <td></td> <td></td> <td></td> <td>2,813</td> <td></td>	1.	Non rail business	В	36,957					2,813	
Sustancy Sustancy (mathematication) C 9 9 9 0 0 Sustancy (mathematication) C Sustancy (mathematication) C Sustancy (mathematication) C Sustancy (mathematication) C		Property development	0		2,460				24,500	
Cherreneue C 4364 602.1 26774(35) 5776 5776 Cherreneue F 1/31/14 1,387,44 1,387,44 1,387,44 5.774(35) 7.703 7.733 Cherreneue F F 1/10,155 1/10,155 1/10,155 1/10,155 7.703 7.7		Subsidy		34,669					0	
	3)1	Other revenue	<u>u</u>		4.394				5.778	
	199	Total revenue	G=SUM(A:F)	1.731.414			26.774.035		72.378	
Priver cost Breakdown of H 237 500 1155,167 7.7 1017.337 1017.337 1017.337 Track access of atrape I 0 1,055,000 1 0 1,055,000 0 1,055,000 0 1,055,000 0 1,055,000 0 1,055,000 0 0 0 0 1,055,000 0	n le	Oneration cost	H - H	1 280 697					70 RUT	
	sloni	•	Breakdown of H	237,900						2
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		Property development cost							1,859	
Other costs N 82,652 186,507 409,6 16,15 18,156,311 27,905 429 Depreciationmentation 0 -0 106,1 18,156,311 27,905 -1,329 Depreciationmentation 0 -1,453,695 -1,453,695 -2,597,667 -1,463,695 -2,597,603 -2,597,603 -1,333,695 -1,333,695 -1,453,695 -1,453,695 -2,597,603 -2,59 65,1 -1,333,695 -1,453,695 -1,453,695 -2,597,003 -2,59 65,1 -1,30		Management/administration	L M	AEE 107	27.000					
		Other mst	× N	R2 657					OCN.	
		Depreciation/amortization	0	352,880			18.156.31		27.905	
Balance R-G-Q -1,463.005 -2.587.667 149.9 -2.577.003 4132 Route kn km -1,463.805 -1,463.805 -1,463.805 -2.587.603 -4,132 -4,132 Route kn km -1,463.805 -1,463.83 -2.577.003 -2,43 -65.1 -65.1 Nominum are bminum are bminum are -0.53 -0.53 -0.53 -0.74 -0.53 -0.74 -0.53 No. of fashes bminum are -0.51 -0.56 -0.		Interest	4	1,013,598					10,324	
Number of stations Im 16 16.9 16.9 85.4 55.3 29 65.1 Number of stations Local currency 1		Balance	R=G-Q	-1,463,605	-2,587					
Number of stations Local currency 15 15.0 15.0 10.0 10.0 724 00 Mnimum fare PPP rate(USD) USS0.69 USS1.21 USS0.69 US		Route km	kan kan kan kan kan kan kan kan kan kan	15					Ű	
Mnimum tate PPP rate(USD) USS0.69 USS0.33 USS1.21 USS0.41 USS0.43 USS0.41 USS0.41 USS0.41 USS0.41 USS0.41 USS0.41 USS0.43 USS0.41			Local currency				160			
No. of passengers per day image reding distance		Minimum tare	PPP rate(USD)	USSD.69		\$SN		Sn	US\$0.4	nss [
Average rding distance 15.6 14.5 22.2 6.3 1 1 0 Average rding distance 63 797 797 704 6.3 1 200 Average rding distance 65.04 39.4 30.4 6.0 3.00 4.40-1.30 4.40-1.30 Average load factor 5.00-23:00 5.00-33:00 5.00-1.300(Next Moming) 6.00-23:30 6.00-23:00 4.40-1.30 Average load factor 5.00 20 in average 500-1.300(Next Moming) 6.00-23:30 6.00-23:30 6.00-23:30 6.00-23:30 6.00-23:30 6.00-23:30 6.00-23:30 6.00-23:30 6.00-23:30 6.00-23:30 6.00-23:30 6.00-23:30 6.00-23:30 6.00-130 4.40-1:30 7.50		No. of passengers per day		308,288		1,080	193,687	154.8		2
Average lead perturb E2 04 3.40 4.04 1.400 1.400 Average lead perturb 610-23:00 5:00-23:00 5:00-23:00 6:00-23:00 4:40-130 No of trains per hour during peak 5:00-23:00 5:00-23:00 20 in average 6:00-23:30 6:00-23:30 6:00-23:30 4:40-130 No of trains per hour during peak % 5:00-23:00 20 in average 19 6:00-23:30<	əou	Average riding distance			15.6	•-				
Operation hours 5:00-23:00 5:00-33:00 5:00-33:00 6:00-30:00 6:	ew.	Average load factor		800	,				007'I	
No of trains per hour during peak 24 20 20 in average 19 15 Availability/Punctuality % 59.4 94.5 99.56 99.5 100 No of rolling stock C=A*B 76 72 536 20.4 70 280 No of rolling stock C=A*B 560 570 2,830 576 2,930 2,79 No of staff momber per station 31.1 51.5 55.5 28.3 27.3 48.8 48.8 Staff number per station 37.3 39.6 31.7 9.7 20.7 45.0	loti	Operation hours		5:00-23:00			5:00-1:00(Next Morning)			4-40-1-30
abilityPunctuality % 59.4 94.5 99.56 99.5 100 nulting stock C=A*B 76 72 636 204 70 280 2,79 nulting stock C=A*B 560 570 2,830 566 600 2,830 70 staff 31.1 51.5 55.5 28.3 28.3 26 48.8 number per station 37.3 39.6 31.7 9.7 20.7 45.0	94	No of trains per hour during peak		24						
Folling stock C=A*B 76 72 636 204 70 280 2,79 f staff 560 570 2,830 566 600 2,930 10 number per station 31.1 51.5 55.5 28.3 28.3 26.5 48.8 number per station 37.3 39.6 31.7 57.5 28.3 26.7 48.8		Avaitability/Punctuality	%	59.4					100	
tstart 560 570 2,830 566 600 2,930 number per station 31.1 51.5 55.5 28.3 25.5 48.8 number per station 37.3 39.6 31.7 9.7 20.7 45.0		No of rolling stock	C=A'B	76						2,79
numer per station 31.1 31.5 35.5 28.3 25 48.8 Aumber per route km 37.3 39.6 31.7 9.7 9.7 20.7 45.0		No of staff		280						
number per route xm []] 34.5 34.5 35.7 45.0 45.0		Staff number per station								
		Statt number per toute km		31.3			9.7		45.0	

Performance data of LRTA Manila is based on that of the Line 1 only. Regarding MiR, procurement cost of routing stock is not discossed and in contruction cost, the procurement cost of rolling stoc Homepage of each railways, Annual report of each railways and Interlim report 1 of this study Construction cost of LU is the capital expenditure in 2007 Source:

APPENDIX 6

PURPLE LINE M&E TENDER PREPARATION ADVISORY:

ACTIVITY REPORT

Purple Line M&E Tender Preparation Advisory: Activity Report

Background

"The Study on Financial Frameworks in Mass Transit System Project in Thailand" has reviewed the merits and demerits of various financial models and identified the key success factors for project implementation. Since application of study results are quite important, the study team has been tasked to provide additional support to the Purple Line M&E tender preparation. The scope of tender includes M&E procurement/installment, operation and maintenance. With the Thai government's recent decision for 'Gross Cost' scheme, bidders will basically be evaluated on quality of service and amount of service fee (cost plus margin) for M&E procurement/installment, operation and maintenance. This tender structure will be quite different from the past and requires careful upfront documentation of tender documents.

Objective

The objective of this advisory is to assist MRTA in their tender document preparation, with focus on clarifying the key characteristics of Gross Cost scheme. This includes providing investor's view via market sounding, providing check list on tender documentation and recommending perspectives on bidder's requirements, fee payment scheme, risk allocation and evaluation method.

<u>Activity</u>

The study activities were held between February to July 2010. There were four visits to Bangkok, each with a specific agenda.

1. February Visit:

In this visit, we met MRTA to discuss overall objectives and activity plan. Thereafter, we met KPMG team, hired by ERIA, who was tasked to provide high level tender document as a reference to MRTA. We discussed commercial principles with KPMG. Please see attached document titled "*Commercial principles*"

In February we also conducted market sounding with BTS, Sumitomo and Mitsubishi. We were able to obtain useful inputs on investor's concerns such as FX risk, future CAPEX responsibilities, proposal development lead time, fee payment schemes, non-rail business interests and network integration. Please see attached documents titled "Market Sounding Interview Guide", "Minutes of Meeting with BTSC", "Minutes of Meeting with Sumitomo", "Minutes of Meeting with Mitsubishi"

2. March Visit:

In this visit, we met MRTA to discuss the checklist for tender document. This checklist includes bidder's requirements (skill/experience, ownership, minimum performance commitments, etc.), bid mechanism (service fee, non-rail business rights, etc.), supplier contract guidelines (line extension, technical transfer, etc.), concession agreement (conditions precedent, risk allocation, performance monitoring, network integration, etc.). Please see attached document titled "*Tender document checklist*".

With MRTA, we also discussed the procurement structure. This was important because there was no shared image on how the Gross Cost scheme structure will be different compared to that of the previous Net Cost scheme. Please see attached document titled "*Procurement structure*"

With KPMG, we provided inputs on component 3 of their scope of work, which includes TOD cases of policy, organization and financing examples. Please see attached document titled *"Component 3"*.

3. April Visit:

In this visit, we met MRTA and their advisor responsible to develop the actual draft of tender document. Our activities have increasingly focused on providing timely inputs to their document preparation. In our discussions, there were many questions around bidder requirements. Key questions included;

1) What should be the bidder qualification profile?

2) What skill hurdle should be provided in the tender document?

3) Where should the skill be located (at prime level or SPC level or sub-con level)?

4) What should be the rules on exclusivity for bidders?

5) What type of ownership requirements should we ask bidders?

The discussion material on how to design above variables are included in attached document titled "Bidder Requirements"

4. July Visit:

In our last visit, we met key members of the tender committee including Dr. Yemchai of MRTA, Mr. Kulis of SEPO (MOF) and Dr. Ahcom of NESDB. At this timing, draft tender documents were already reviewed by tender committee. Remaining tasks were to refine several important topics, including the following.

 Evaluation Method: Under the gross cost scheme, evaluation should focus on quality of service and competitiveness of fee. Therefore, evaluation of the investor alone will not be sufficient. M&E system integrator, supplier and O&M service provider will also need to be

Appendix 6 - 2

evaluated in terms of experience and track record. This implies that the proposal development lead time for bidders must be sufficient for them to pre-negotiate and fix suppliers and O&M service providers. Based on market sounding, it would require minimum 4months lead time.

2) Risk Allocation and Payment Scheme: There are several philosophies on handling of uncontrollable risks such as technology innovations and FX fluctuations. Government can decide to 1) retain and attract investors, 2) share in the spirit of partnership or 3) transfer most to investors. We communicated that the last option would not only limit the number of bidders but also incur large risk premium on the fee. Therefore, the middle option was balanced and recommended.

In relation to this, FX risk and payment schemes were discussed. We recommended to share FX risk and avoid flat payment scheme, which will be a huge risk factor for capex investment. Rather, a gradual upfront payment portion for capex (e.g. pay back for all capex portion by year15) could be perceived as balanced. An acute upfront payment (e.g. pay back for all capex portion year5) was not recommended because it does not provide enough additional financing for Thai gov't. In other words, this will be very close to PSC and defeats the purpose of implementing under PPP scheme.

For details of July visit, please see attached document titled "Follow-up of MRT implementation scheme; discussion with NESDB".

<u>Tender document checklist</u> (as an additional scope to the study on financial framework in mass transit systems in Thailand)	 Supplier Contract Guidelines: Under the 'gross cost contact secure supplier commitment prior to bidding Therefore. (b)
Bidder Requirements: Are the following bidder requirements specified in the tender document?	pplier contract guidelines. Are the tollowing guidelines as
	stension considerations
1 Skiir Experience requirements 1 Indemendent M&F system integration exherience	L Information discretized of system specification take
1 I.than mass ranid transit obcrator experience	* Desiration accomment in the same of fire extension (in
	r au pute agreement in me case of mic extension ()) ical transfer
Downership requirements:	
	within a timeframe)
	Commitments for other capability building
D Restrictions on ownership changes during concession	D Performance commitment
Minimum performance commitment:	D Bidder to secure supplier's performance in order to fulfill:
System reliability, availability	commitment
Customer service (e.g. load factor, survey satisfaction)	\square MRTA's nght to directly access information upon termination of concession agreement
D Security	
□ Compliance with supplier contract guideline:	
U M&E system plan	utaliagement of concessionare. Last store, alle teluct documents should specify
D Evidence of supplier commitment according to guideline	to be appendent in the convession agreement. The rate routowing conductors spec document?
Rights to review part of supplier contract during tender	
X. Funding commitments:	□ Conditions precedent (mutual action commitments before legal binding effect)
C D Funding plan	
C)	[] Performance monitoring system
D Commitment to general conditions described in attached concession agreement draft	C KPI
E Rid Mechanism . Are the following hid criteria described clearly in the tender dominent?	[] Measurement method
	I Incentives (include bonuses for ridership enhancements and customer satisfaction)
G Service fee.	Penalties (include strict penalties for performance below minimum commitment)
Calculation method (e.g. formula, currency, payment schedule)	D Network integration
	[] Compliance with AFC system standards (technical specification could be included in
	tender document or to be excluded from tender and describe conditions for lease from
Adjustments from non-rail business rights:	
Description of rights for all non-rail business types (include revenue sharing, if any)	Line extension considerations
D Description of how non-rail should be adjusted from service fee if rights are given to	D MRTA's rights to access supplier's system specification information according to
concessionaire(hump-sum, or show breakdown)	
D Performance:	
Commitments beyond minimum requirements (may decide to take this out to simplify	
evaluation)	Describe MRTA's rights to receive technical transfer either directly from suppliers or
Other evaluation criteria (e.g. ideas and suggestions on design improvements to enhance	
	L Capacity adjustments
Evaluation weight across multiple criteria	 Responsibilities for additional rolling stock investment Conditions for astreement revision

- Independent M&E syst

 Urban mass rapid transi

 Urban mass rapid transi

 Independent M&E main
- Ownership requirements:
 Local player equity
- Local player equity (as
 Restrictions on conflict
 Restrictions on owners!

- Minimum performance commi
- System reliability, availal
 Customer service (e.g. lo
 Security

- Compliance with supplier contract

 Compliance with supplier contract

 M&E system plan

 Evidence of supplier comt

 Rights to review part of su

 Punding commitments:

 P

 Funding plan

 Evidence of funding commitment

 Commitment to general condition
- Bid Mechanism: Are the followir
- C Service fee:
- Calculation method (e.
- Breakdown information
 Conditions for service:
- Adjustments from non-rail busi
- Description of rights fo
 Description of how nor concessionaire(lump-si
- Deformance:
- Commitments beyond evaluation)
 - Other evaluation criteria (e.g. ridership, non-rail revenue)
 - Evaluation weight across multi

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- Safety Ē
- Countermeasures against heavy accidents such as a collision accident in 2005 m
 - Evidence of equipment supplier's safety performance from past
- Punctual operation C
- ① Evidence of equipment supplier's operational performance from past
- Technical knowledge transfer
- Localization ratio of parts maintenance at target year
- Local staff ratio in the operation and maintenance at target year
- MM commitment of operation/ maintenance specialists who meets experience requirements D
- Rolling stock 0
- Encourage equipment selection with excellence in total life cycie cost
- Technical degrees of freedom (Staff number for train operation is a typical example for clarification. For narrow option, limited to the driverless operations. For broad option, train operation with a staff on board can be selected with a good reason.)
- standards such as IEC, EN, IEEE and ISO. For broad option, more standards with Range of technical standards (For narrow option, limited to international major reliable track record can be adopted)

Appendix 6-5

- Supplier experience requirements in urban railway rolling stock manufacturing
- Cost breakdown requirements for the total price of the rolling stock (for example, a car with cab, a car with propulsion and a trailer car)
- Clarification of detailed technical documents for approval of the Project owner prior to its manufacturing
- Requirement for the proposal on the technical plan for increase of cars in a train-set Ð
- Requirement for the cost calculation method for procurement of additional train-sets due to the increase of passengers þ
- Requirement for the cost calculation for the refurbishment of rolling stock after 10-15 years from the commencement П
- Requirement for the proposal of staff allocation for periodical maintenance and emergency trouble shooting
- Requirement for proposal of spare parts cost during the outsourcing years
- Description of a work place for recovery when the car body is damaged at an accident 00

Signaling/OCC

- Encourage equipment selection with excellence in total life cycle cost
- Technical degrees of freedom (CBTC for the signal system is a typical example for clarification. For narrow option, limited to CBTC systems. For broad option, ATP system with track circuit can be selected after discussion with the Project owner)
 - standards such as IEC, EN, IEEE and ISO. For broad option, more standards with Range of technical standards (For narrow option, limited to international major reliable track record can be adopted) D
- Supplier experience requirements in urban railway signal system/OCC manufacturing
 - Cost breakdown requirements for the total signaling cost (for example, cost for each equipment, cost for installation)
- Clarification of detailed technical documents for approval of the Project owner prior to its manufacturing
- Requirement for the proposal on the technical plan for signal replacement after 10-15 years from the commencement
- Proposal on the signal connection plan of the existing one with the new one for the new section when the line will be extended (in case that a different supplier will install a new one)
- Request of the cost calculation method for the signaling system when a station will be added at a later stage
- Requirement for the proposal of staff allocation for periodical maintenance and emergency trouble shooting
- Requirement for proposal of spare parts cost during the outsourcing years

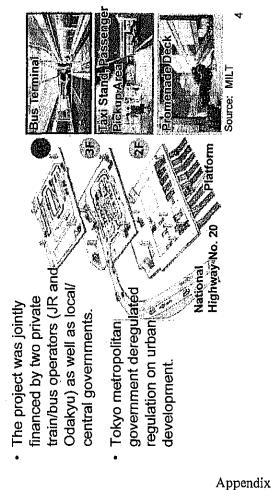
Training

- D Proposal of minimum training period before commencement after completion of construction works when the construction works is delayed
- Allowance period for the initial troubles after opening when KPI is not counted

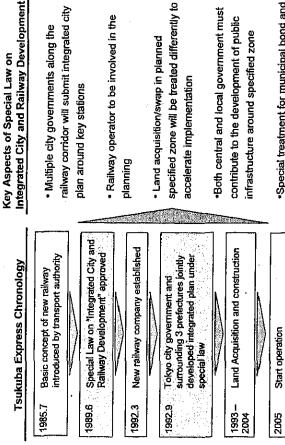
THREE TIERED FRAMEWORK FOR SUCCESSFUL MASS TRANSIT DEVELOPMENT IN BANGKOK Category	Sector vision Sector vision Sovernance Law and regulation	Tier2: Integrated Bangkok city TOD plan Integrated multi-modal plan MRT Masterplan	Tier3: • Financial framework Each MRT • Concession agreement Line • Supplier management Implemen • Non-rail business management Scheme • Scheme	CASE STUDY FOR INTEGRATED TOD PLANNING: CURITIBA BRAZIL	 Transit-oriented development (TOD) aims to encourage the use of public transit and to reduce automobile dependency. Integrated its zoning and transportation to place high density development next to public transportation system. Development density is progressively lower with increasing distance from public transport system.
	PURPLE LINE M&E TENDER PREPARATION ADVISORY ON "COMPONENT 3"		Discussion with KPMG March, 2010	TIER2: OVERVIEW OF INTEGRATED MASTER PLAN AND CURRENT	And London And London

Appendix 6-6

CASE STUDY OF INTEGRATED MULTI-MODAL PLAN: SHINJUKU *IERMINAL STATION* Multi-modal transport hub includes promenade deck, taxi stand, bus terminal, commercial complex, and hotel.



ENABLING POLICY EXAMPLE : DEVELOPMENT OF TSUKUBA **EXPRESS RAILWAYS AND STATION SURROUNDINGS** 6-7



railway corridor will submit integrated city Multiple city governments along the

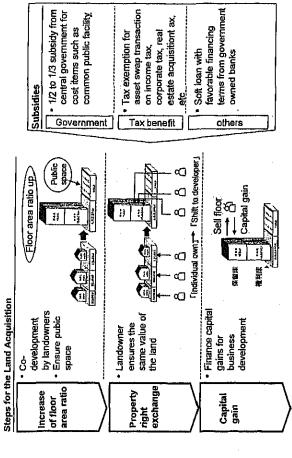
Railway operator to be involved in the

specified zone will be treated differently to Land acquisition/swap in planned accelerate implementation Both central and local government must contribute to the development of public infrastructure around specified zone Special treatment for municipal bond and ശ equity participation of local government

SOLUTIONS REQUIRE ORGANIZATION, FINANCING AND POLICY ACTIONS

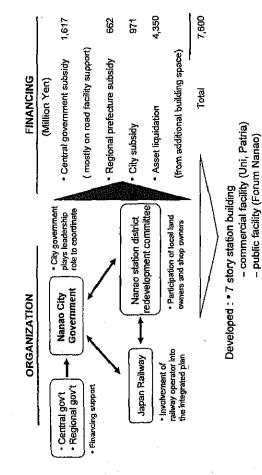
ACTIONS			
	INCOMPANIES IN THE OPENIES	Sector Change Sector	a set to be a set of the set of t
Integrated Bangkok City TOD Plan	Joint city and transport planming organization (e.g. urban development committee)	PPP: Scheme for station and surrounding real estate development	Law to promote TOD development (e.g. joint station and surrounding development (aw)
Integrated Multi-modal Plan	Joint station development organization	Government cost for public facility portion and private fund for commercial	Guideline for public fransport access and subsidies/fax exemption for dev.
Network Integration	Joint equity holding company for common ticketing and other common assets	Equity funding according to pre- defined sharing rule between lines	MRT policy on common asset management across multiple lines
			2

LAW OF URBAN DEVELOPMENT SUPPORTS SWAP INCENTIVE SYSTEM *W*ITH THE GOVERNMENT SUBSIDIES (JAPAN EXAMPLE)



Source: lit search, Web search

ORGANIZATION AND FINANCING EXAMPLE : NANAO STATION AND SURROUNDING REDEVELOPMENT



60

Road expansion
 Park and green area development

Parking facility (530 capacity)

PROCUREMENT STRUCTURE AND PROCESS

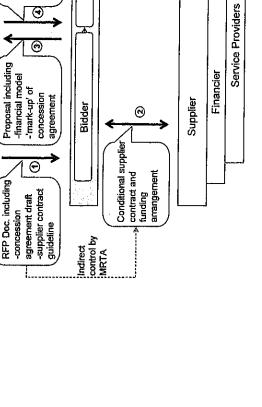
MRTA

RFP Doc. including





March, 2010



Supplier contract finalization and financial closure

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agreement finalization and financial closure

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Evaluate and determine preferred bidder

Preferred Bidder

Concession

BIDDER QUALIFICATION DETERMINES THE DEGREE OF COMPETITION AND QUALITY/COMMITMENT





April, 2010



Key Skill	Low Hurdle	$\widehat{1}$
Financial	 Has lead investor experience for 	
Organizer	large intrastructure project	infrastru
Railway M&E	-Has successfully completed	•Has suc
design-build	railway M&E design-build project	than thre
PM	as prime contractor	project a
		the last 1
Svstem	 Has at least one project role 	-Has at h
internation	technical experience to	technical
ional South	successfully integrate systems	independ
		to succe
Each system	+Has at least 10 years of vendor	Has at le
•		

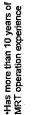
Ivestor experience for	 Has more than 5 cases of lead
ructure project	investor experience for large railway
ssfully completed	 Has successfully completed more
E design-build project	than three railway M&E design-build
ntractor	project as prime contractor within
	the last 10years
st one project role	-Has at least five project role
perience to	technical experience as
/ integrate systems	independent integrator (non-vendor)

σ

High Hurdle

	to successfully integrate systems
+Has at least 10 years of vendor	-Has at least 20 years of vendor
experience with three projects	experience with more than ten
installing the system for railway	projects installing the system for MET
بوهدا ووروفي المعفي ومحمد فقاليهم وليما وفيدالي وموفونا	
 Has more than 10 years of 	 Has more than 25 years of
experience providing	experience providing
maintenance services for M&E	maintenance services for M&E

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subsystems

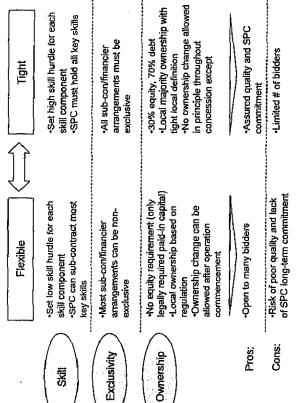
+Has more than 3 years of MRT operation experience

Operation

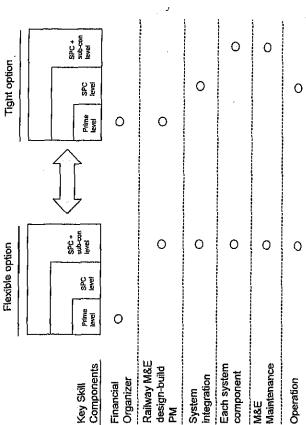
subsystems

Maintenance

M&E



SKILL LOCATION



Appendix

6-10

component

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EXCLUSIVITY FOR SUB-CONTRACTOR/FINANCIER

OWNERSHIP

exclusive

Exclusive

Nonexclusive

Exclusive

Flexible option

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0

Financier

0

0

integrator

System

0

0

Supplier

0

0

Maintenance service provider

Operation

service provider

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Tight option

Tight option	 •30% of total system installation cost should be funded by SPC equity 	 Majority of equity from local legal entity with more than 20years of local existence 	 Minimum2% equity each from key system suppliers to ensure long-term commitment 	-Minimum2% equity from operators to ensure long- term commitment	-Ownership cannot be changed throughout concession period, except for ownership default
Flexible option	 Minimum paid-in-capital based on regulations to set up SPC 	 Local equity to be provided based on regulatory requirement only 	 No equity requirement from suppliers 	 No equity requirement from operators 	 Ownership can be changed after operation commencement
	Equity ratio	Local ownership	Supplier ownership	Operator ownership	Ownership change

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TOPICS REQUIRING SIMILAR OPTION DISCUSSION

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 Government service payment calculation method for 'apple-to-apple' bid evaluation

4

 Key concession agreement clause on service payment adjustments, penalties and incentives Supplier contract guidelines including details of technical transfer, source code disclosure, extension fair price agreements ŝ

 Follow-up of overall study recommendations Suggestions on Purple Line Tender Preparation (Gross Cost Scheme) 	 Evaluation Method Risk allocation and fee payment scheme Bidder requirements 	·		1. Follow-up of overall study recommendations	 Suggestions on Purple Line Tender Preparation (Gross Cost Scheme) 	 Evaluation Memon Risk allocation and fee payment scheme Bidder requirements
۵ ۲	· ····································		Mass Transit		-Has there been further discussions? -Any new	bottlenecks?
Follow-up on MRT mplementation scheme	Discussion with NESDB	July 2010	The study suggested actions along three-tiered structure of Mass Transit Category	 Sector vision Governance Law and regulation 	 Integrated Bangkok city TOD plan Integrated multi-modal plan MRT network integration 	 Financial framework Concession agreement Supplier management Non-rail business management
		Appendix	9 The study suggested a		Tiet2: Integrated MRT Masterpian	Tier3: Each MRT Line Implementa tion Scheme

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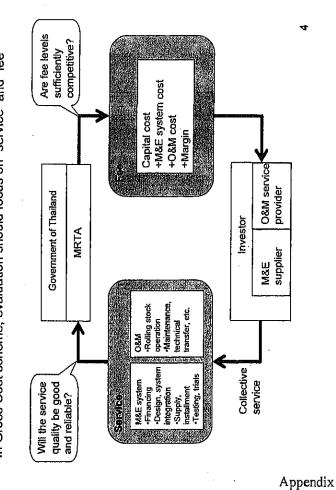
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Study on Financial Frameworks in Mass Transit System Project in Thailand

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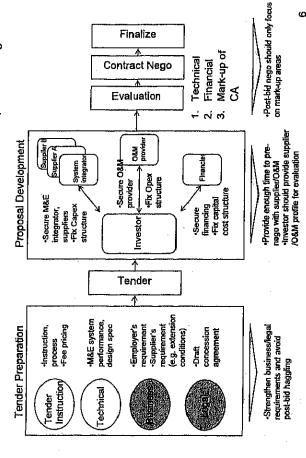
In Gross Cost scheme, evaluation should focus on "service" and "fee" "WHAT" TO EVALUATE



TENDER PROCESS IMPLICATIONS

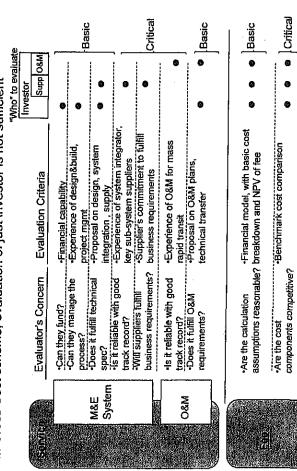
6-13

Front load bid requirements, provide time and minimize post-bid nego



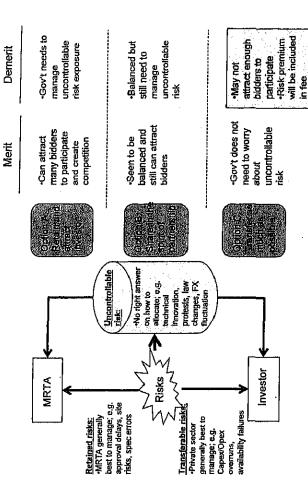
"HOW" TO EVALUATE

In Gross Cost scheme, evaluation of just investor is not sufficient



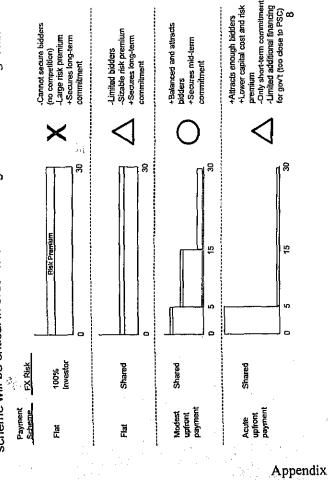
RISK ALLOCATION

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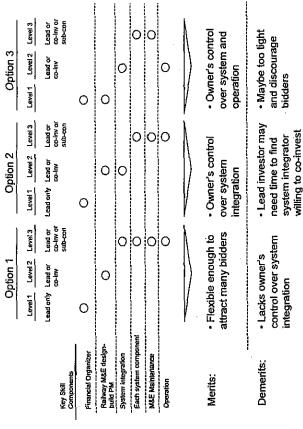


PAYMENT SCHEME

Since most M&E system will be imported, handling of FX risk and payment scheme will be critical in order to secure enough bidders of the right kind



Skill requirement options should be assessed before tender 6-14



BIDDER REQUIREMENT

Bidder's skill requirements can be made "tight" or "mild", depending on sector characteristics

Level 3	Lead investor or co-investor or sub-con must have the	skul	
Level 2	Lead investor or co-investor must have the skill	balanceso	
Level 1	Lead investor must have the skill		
		Lead investor (majority owner) Co-investor (minority owner) Sub-contractor	

 Which type of skill should be level 1 or level2? Key considerations:

 Can we get the right type of owners if we make it too mild? Can we attract enough bidders if we make it too tight?

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•M&E system installation:	
>Has independent system integration capability (not over-reliant on supplier)	
POptimizes lifecycle cost	
Manages tight negotiation with suppliers on procurement conditions (i.e. price, performance,	erformance,
technical transfer, other after services)	
> Influences civil designs to optimize cost and maximize user revenue	
•Operation:	
>Committed to long-term operational excellence (e.g. owner should not seek short-term exit)	rt-term exit)
PMaintains high level of system availability/reliability	
Strives to improve operational cost efficiency	
•Maintenance:	
Committed to localization of maintenance capability (e.g. swift technical transfer from supplier	from supplie
expats)	-
Plritends to develop own maintenance equipment strategy (e.g. by keeping detail data records)	data records
 Strives to improve maintenance cost efficiency 	

ADVISORY ON "COMMERCIAL PRINCIPLES"

Discussion with KPMG

February, 2010

PURPLE LINE M&E TENDER PREPARATION

Implication:

 Ownership: independent from supplier influence (only minority equity), no conflict of interest with SPC

 Incentives: for lifecycle cost optimization(e.g. don't just evaluate equipment cost), for longterm commitment(e.g. sufficient equity portion with restrictive changes in ownership)
 Penalities: for not achieving KPI targets (e.g. frequent breakdowns, poor customer survey)

-Bidding criteria:

Two primary criteria: annuity cost, system performance >Annuity cost should have breakdowns by system installation, operation, maintenance

PArhuny cost should have preakdowns by system installation, operation, maintenance SSystem performance minimum requirement to be clarified in tender document. Bidder can commit to higher performance levels for additional points

Extra borus for ideas and suggestions to improve design for cost optimization and revenue enhancement (e.g. securing retail space)

>Bidder to indicate own experience plus supplier names and experience as qualification

Line extension:

If allowed by policy, the same concessionaire should manage the extension portion in the future

≻However, this is provided that. 1) performance of the concessionaire has been satisfactory, 2) there is a pre-determined fair price agreement

-Supplier management:

> Supplier management guidelines should be mentioned in the tender document as well as concession agreement

> Solidelines should include topics such as technical transfer, information disclosure, fair price autoention for extension performance commitments etc.

agreement for extension, performance commitments, etc >Concessionaire should bid based on contractual commitment from suppliers

MRTA should be able to review the detail supplier contract during bidder evaluation

Network integration:

>Top-down or bottom-up standardization of AFC system specification should be included in the tender document to achieve common ticketing

Non-rail business:

>Business rights by business type to be decided and included in tender document

