# Chapter 11

# Financial Analysis of Public Transport

# Chapter 11 Financial Analysis of Public Transport

## 11.1 Financial Analysis of Rail-Based Transport

### 11.1.1 Rail-Based Transport System

(1) Lines for Financial Analysis

Out of the total 10 lines of 254 km, 5 lines of over 194 km are completed and in operation. Section 2 of PUTRA 15 km is expected to operate as scheduled in 1999. The South section of PRT is not included in the present financial analysis, since progress of this section is delayed.

**Table 11.1.1 Operation Outline of Rail - Based Transportation in KL**

| Company | | | Operation Section | | | | | Station/Distance | |
|---|---|---|---|---|---|---|---|---|---|
| Name | No. | Line | Origin | | - | Destination | | Number | Length |
| KTMB | 1 | N.S.Line | 1 | Seremban | - | 3 | Rawang | 20 | 105 |
| | 2 | W.Line | 2 | KL.Central | - | 4 | Pel.Klang | 19 | 48 |
| STAR | 3 | Ampang Line | 5 | Ampang | - | 6 | Sentul Timur | 18 | 15.2 |
| | 4 | S.Petaling Line | 20 | Chan Show Line | - | 7 | Sri Petaling | 8 | 11.8 |
| PUTRA | 5 | Section 1 | 8 | Lenbah Subang | - | 9 | Pasar Seni | 11 | 14.1 |
| | 6 | Section 2 | 9 | Pasar Seni | - | 10 | Gombak | 13 | 14.9 |
| PRT | 7 | N.Section | 11 | Tun Razak | - | 2 | KL.Sentral | 13 | 8 |
| KTM | 8 | Batu Caves Line | 13 | Junction | - | 14 | Batu Cave | | 7.6 |
| LRT-1 | 9 | Cheras Line | 18 | Junction | - | 17 | Cheras | | 17.3 |
| LRT-2 | 10 | Damansara Line | 18 | Junction | - | 19 | Damansara | | 11.9 |
| Total | | Length Approved: 217 km, Planned Length: 36.8 km | | | | | | 111 | 253.8 km |

Source: KTMB, STAR, PUTRA and PRT

Note 1:

KTMB: Keretapi Tanah Melayu Berhad (KTMB)
STAR: Sistem Transit Aliran Ringan (STAR)
PUTRA: Projek Usahasama Transit Automatic Sdn Bhd (PUTRA)
PRT: People Mover Rapid Transit (PRT)

Note 2: Figures for PRT are based on in - house estimation.

(2) New Lines

Batu Caves Line, the extension of KTMB from Sentul station with 8 km length, is expected to start construction in 1999 and is to be completed in 2001. Two other lines, a Cheras line with a length of 17 km and a Damansara line with 12 km length are recommended by the SMURT-KL Master Plan, and are assumed to be completed by 2020 after a 4 year construction period.

### 11.1.2 Costs for Rail-based Transport Systems

(1) Capital Investment Cost

The total investment cost amounts to RM 15.6 billion in current prices and RM 16.4 billion in present value in 1998, including the three (3) new rail-based transport systems. Average investment cost per km is between RM 140 to 180 million, except for the KTMB. All the costs invested before 1998 are converted into the present value of 1998 prices. The construction period and the costs allocated by year vary from company to company; however, in general, it takes 4 to 5 years for construction.

**Table 11.1.2 Comparison of Capital Investment by Line**

(Unit: RM Million)

| Items | KTM | | | STAR | |
|---|---|---|---|---|---|
| | North – South Line | Western Line | Batu Caves Extension | Ampang – Sentul Timur | Sri Petaling – Chan Sow Lin |
| 1) Length (km) | 105.0 | 48.0 | 7.6 | 15.2 | 11.8 |
| 2) Investment Cost | 1,147 | 746 | 163 | 2,061 | 1,761 |
| 3) Cost / km | 11 | 16 | 21 | 136 | 149 |

| Items | PUTRA | | PRT | LRT-1 | LRT-2 |
|---|---|---|---|---|---|
| | Section 1 | Section 2 | North Section | Cheras | Damansa |
| 1) Length (km) | 14.1 | 14.9 | 8.0 | 17.3 | 11.9 |
| 2) Investment Cost | 1,872 | 2,695 | 1,169 | 2,990 | 1,725 |
| 3) Cost / km | 133 | 181 | 146 | 173 | 145 |

Source: SMURT-KL Estimate based on KTMB, STAR, PUTRA, PRT data

Capital investment costs are classified into five (5) items. Table 11.1.3 shows the composition of each item for the LRTs and KTMB.

**Table 11.1.3 Composition of Capital Investment Items**

(Unit : percent)

| Item | LRT | KTMB |
|---|---|---|
| 1) Civil works | 40 – 55 | 3 |
| 2) Signal and Telecommunication | 10 – 25 | 30 |
| 3) Rolling stocks | 6 – 16 | 26 – 39 |
| 4) Machinery | 10 – 13 | 20 – 21 |
| 5) Others | 12 - 18 | 10 – 20 |

Source : SMURT-KL Estimate based on KTMB, STAR, PUTRA, PRT data

(2) Operating and Maintenance Costs

1) Operating cost

The number of employees was estimated based on the assumption that 20 employees per km are required to operate the rail-based transport systems. Electricity cost was assumed to be RM 13.04 per train km. The necessary number of trains in the years 2000, 2010 and 2020 were estimated based on the passenger demands and the corresponding train operation schedules, respectively. Unit cost of rolling stocks differs by company, and it falls between RM 2.5 million and RM 4.4 million. Table 11.1.4 shows personnel cost and electricity cost with the investment cost of additional trains to be required due to increase of passengers.

**Table 11.1.4 Estimation of Rail-based Transport Operating Costs**

(Unit: RM Million)

| Company | | | 1) Personnel | 2) Electricity | | | | (Add. Investment Cost of Train) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Name | No. | Line | | 1998 | 2000 | 2010 | 2020 | 1998 | 2000 | 2010 | 2020 |
| KTMB | 1 | N.S.Line | 37.9 | 40.0 | 90.0 | 125.9 | 215.9 | 297.6 | 133.3 | 173.6 | 430.9 |
| | 2 | W.Line | 15.5 | 18.0 | 81.1 | 88.4 | 176.8 | 288.3 | 378.7 | 65.1 | 722.3 |
| | 3 | B.Caves | 2.7 | 3.2 | 5.9 | 10.4 | 15.6 | | 62.1 | 46.5 | 55.8 |
| STAR | 4 | Amp.Line | 4.7 | 15.0 | 15.6 | 15.6 | 31.3 | 127.3 | | | 127.3 |
| | 5 | S.P.Line | 3.8 | 11.7 | 12.1 | 12.1 | 12.1 | 102.4 | | | |
| PUTRA | 6 | Section 1 | 4.3 | 14.0 | 19.3 | 19.3 | 29.0 | 308.0 | | | 8.8 |
| | 7 | Section 2 | 4.4 | 14.8 | 10.2 | 20.4 | 20.4 | 308.0 | | | |
| PRT | 8 | N.Section | 2.9 | 7.9 | 11.0 | 11.0 | 15.5 | 120.9 | | | 52.3 |
| LRT-1 | 9 | Cheras | 6.2 | | | | 35.6 | | | | 226.6 |
| LRT-2 | 10 | Damansara | 4.3 | | | | 24.5 | | | | 267.0 |

Source: SMURT-KL Estimate

2) Maintenance cost

Maintenance cost is estimated as a percentage of the investment cost of each item. Maintenance cost of rolling stocks is correlated to the number of passengers.

The following rates are used for estimation purposes.

1. Infrastructure 2.1 % of investment cost
2. Signal and telecommunication 4.5 % of investment cost
3. Rolling Stocks 1.5 % of investment cost
4. Machinery 1.5 % of investment cost.

### 11.1.3 Passenger Demand and Revenue

The number of passengers and revenue were predicted by the computerised transport simulation model. The summary of the predicted passenger demand and the corresponding revenue under the Area Pricing Scheme in the CBD from the year 2000 and onward is shown in Table 11.1.5.

**Table 11.1.5 Estimation of Passenger Demand and Revenue: 2000, 2010 and 2020 (with Area Pricing Scheme)**

(Currency Unit: Million RM)

| Company | Line | 2000 | | 2010 | | 2020 | |
|---|---|---|---|---|---|---|---|
| | | Passenger | Revenue | Passenger | Revenue | Passenger | Revenue |
| KTMB | N-S.Line | 115,817 | 62.9 | 168,451 | 81.8 | 269,116 | 138.3 |
| | W.Line | 163,487 | 84.9 | 232,994 | 107.2 | 372,636 | 193.8 |
| | Batu Caves | 15,159 | 8.7 | 27,601 | 15.9 | 37,672 | 21.7 |
| STAR | Ampang | 107,719 | 58.3 | 130,882 | 67.2 | 202,725 | 110.9 |
| | S.Petaling | 24,154 | 19.7 | 36,893 | 29.4 | 58,350 | 48.9 |
| PUTRA | Section 1 | 63,987 | 55.2 | 76,344 | 61.0 | 129,847 | 104.0 |
| | Section 2 | 42,675 | 27.9 | 73,409 | 48.2 | 120,688 | 84.8 |
| PRT | N.Section | 60,760 | 26.8 | 128,297 | 59.0 | 219,571 | 103.1 |
| LRT-1 | Cheras | | | 74,238 | 60.6 | 110,024 | 92.4 |
| LRT-2 | Damansara | | | 73,407 | 49.4 | 110,581 | 73.6 |

Source: SMURT-KL Estimate

### 11.1.4 Comparison of Costs and Revenues

(1) Indicators for Financial Evaluation

The following three indicators are applied for the financial analysis of the rail-based transport business. Out of the three indicators, the Financial Internal Rate of Return (FIRR) is the most important as an investment decision criteria.

**Table 11.1.6 Evaluation Indicators for Viability of Rail- Based Transport System**

| |
|---|
| 1) Income Statement Indicator<br>Operating Profit = Revenue – Operating Cost – Depreciation Cost<br>(Shorter the term of deficit is, more profitable is the investment)<br>2) Financial Statement Indicator<br>Net Cash Flow = Revenue – Operating Cost – Repayment -- Interest<br>(The project is feasible and free from revolving fund shortage if deficit turns out black within 8 or 9 years)<br>3) Investment Decision Indicator<br>Financial Internal Rate of Return = Total Discounted Present Value of Revenue<br>= Total Discounted Present Value of Cost<br>(If the FIRR turns out to be higher than the average interest rate, investment is proven feasible)<br>(Higher the FIRR is, the more profitable is the project) |

(2) Assumption for Calculation

The following assumptions are used for the analysis of cost revenue comparison.

1. Project Life : 30 years from the commencement of the operation
2. Depreciation Period : 50 years for infrastructure, 20 years for telecommunication and machinery, and 25 years for rolling stocks.
3. Salvage Value : To be estimated in the last year of the project life.
4. Loan condition : There are two types of loans; soft loan and commercial loan. Soft loan is a government loan, conditioned at 6 - 8 % interests with 15 years repayment period. Commercial loan means a bank loan, conditioned at 11 % of interest with 30 years repayment period including 15 years grace period.
5. Tax allowance : Allowance period of 10 years, and allowance of 60% of investment tax

(3) Financial Evaluation of Rail-based Transport Systems

1. Operating Profit : Almost all the lines will suffer from deficit for the project life. In other words, revenue cannot cover the operating and maintenance costs.
2. Net Cash Flow : Almost all the lines will be operated in deficit throughout the project life, which implies that all companies will face the financial problem of shortage of fund.
3. FIRR : All the lines indicate lower FIRR than the average interest rate.
4. Net Present Value (NPV) : Revenue and cost will be balanced if net present value becomes zero by discounting at the average interest rate, which is between 5.95 % to 8.20 %. NPV of all the lines turned to be negative; thus all the lines are unprofitable.
5. Comparison between Revenue and Operating Costs: Years required to cover operating costs by annual revenue after the commencement of the operation. In the case of KTMB North - South Line, profit cannot cover the operating cost at all throughout the project life, even excluding depreciation cost.

**Table 11.1.7 Summary of Financial Analysis**

(Unit: RM Million)

| Company | Line | 1)Operating Profit | | 2) Net Cash Flow | | 3) FIRR | 4) Operation Costs = Revenue. |
|---|---|---|---|---|---|---|---|
| | | 2010 | 2020 | 2010 | 2020 | % | Year |
| KTMB | N-S.Line | -165 | -222 | -6,937 | -25,573 | - | - |
| | Western Line | -68 | -109 | -3,942 | -13,978 | - | 17 |
| | Batu Caves | -10 | -12 | -258 | -1,032 | - | 4 |
| STAR | Ampang Line | -56 | -35 | -5,953 | -22,392 | - | 13 |
| | Sri Petaling Line | -77 | -57 | -6,217 | -23,155 | - | 26 |
| PUTRA | Section 1 | -48 | -15 | -4,256 | -15,459 | - | 8 |
| | Section 2 | -100 | -63 | -5,572 | -21,048 | - | 20 |
| PRT | North Section | -13 | +24 | -2,085 | -7,312 | - | 5 |

| Company | Line | 1)Operating Profit | | 2) Net Cash Flow | | 3) FIRR | 4) Operation Costs = Revenue. |
|---|---|---|---|---|---|---|---|
| | | 2030 | 2040 | 2030 | 2040 | % | Year |
| LRT-1 | Cheras Line | -60 | -19 | -6,181 | -22,484 | - | 3 |
| LRT-2 | Damansara Line | -22 | +3 | -3,286 | -11,848 | - | 2 |

Source : SMURT-KL Estimate

### 11.1.6 Policies and Viability of Public Transport

(1) Policy for Revenue Increase

Policy 1: Area Pricing -- This scheme has been already included in the transport demand forecast and revenue estimation.

Policy 2: Fare Deduction -- 20 percent fare deduction would increase revenue by 18 percent. It will give significant effects but is not sufficient to cover the deficits.

Policy 3: Allowance to Commuter Pass by Employer -- Provision of public transport allowance would bring about an increase in passenger demand by 1.52 times. The impact of this policy is the most significant.

Policy 4: Accelerated Integration of Railway Lines – The effect will gradually occur in small amount.

Policy 5: Diversification of Railway Business – It will take time to produce results.

(2) Commuter Pass Case

Among the five policies mentioned above, Policy 3 is the most effective policy. This is the policy where employers pay a certain amount of the cost of the commuter pass, similar to the current practice in most companies which give parking allowance to employees commuting by car. Table 11.1.8 indicates the results of the financial analysis of the commuter pass. Both the income statement indicator and the financial statement indicator are significantly improved, compared with the case where merely the Area Pricing Scheme is applied. Railway lines with a less than 10-year deficit period are the following four lines, although the investment indicator, FIRR, shows that even these four railway investments are not viable.

**Table 11.1.8 Financial Analysis : Commuter Pass Case**

| Line | Deficit period | FIRR |
|---|---|---|
| KTMB Batu Caves Line | 3 years | 1.7% |
| PRT North Line | 7 years | 3.8% |
| LRT Cheras Line | 6 years | 2.1% |
| LRT Damansara Line | 1 year | 3.8% |

Source : SMURT-KL Estimate

(3) Passenger Demands Required for Viable FIRR

The "Estimation" of railway passengers in Table 11.1.9 indicates the estimated number of passengers after implementing the commuter pass allowance. 'Needed' number of passengers in the table indicates the number of passengers needed to make the project feasible. On an average, 1.8 times more passengers are needed to obtain a feasible FIRR.

**Table 11.1.9 Required Number of Railway Passengers**

(Unit: thousand persons/day)

| Company | | 2000 | | | | 2010 | | | |
|---|---|---|---|---|---|---|---|---|---|
| Name | Line | Estimation | Needed | Shortage | Ratio | Estimation | Needed | Shortage | Ratio |
| KTMB | N.S.Line | 176 | 264 | -88 | 1.50 | 256 | 384 | -128 | 1.50 |
| | W.Line | 249 | 286 | -37 | 1.15 | 354 | 407 | -53 | 1.14 |
| | Batu Caves | 23 | 30 | -7 | 1.30 | 42 | 55 | -13 | 1.30 |
| STAR | Ampang Line | 164 | 196 | -32 | 1.20 | 199 | 239 | -40 | 1.20 |
| | S.P.Line | 37 | 160 | -123 | 4.32 | 56 | 244 | -188 | 4.35 |
| PUTRA | Section 1 | 97 | 170 | -73 | 1.75 | 116 | 203 | -87 | 1.75 |
| | Section 2 | 65 | 204 | -139 | 3.14 | 112 | 351 | -239 | 3.13 |
| PRT | N.Section | 100 | 103 | -3 | 1.03 | 195 | 201 | -6 | 1.03 |
| LRT-1 | Cheras Line | 117 | 173 | -56 | 1.48 | 167 | 246 | -79 | 1.47 |
| LRT-2 | Daman. Line | 116 | 157 | -41 | 1.35 | 168 | 227 | -59 | 1.35 |

Source : SMURT-KL Estimate

In sum, the revenues will not be able to completely cover the construction costs and the operation costs. Some projects are nearly viable if Area Pricing Scheme, transportation allowance for public transport users and fare reduction were applied. Therefore the following measures should be taken in order to make rail-based transport system viable.

- Implementation of Area Pricing in the CBD
- Introduction of a commuter pass allowance through preferential tax arrangement
- Reduction of fares by 20 % through government guidance
- Transfer facility improvement by government initiative
- High density urban development in the area surrounding the railway stations

### 11.1.7 Assistance from Government for Rail-based Transport Development

(1) Justification of Public Assistance for Rail-based Transport

Many countries have similar deficit problems in urban public transportation. The availability and scope of public support varies from country to country. The following are four reasons to justify public sector assistance for rail-based public transport, and will have to be considered in future policy.

- Huge initial investment cost : The initial investment cost is too large to be covered by a private company through revenues in the early operating stage.
- Alleviation of traffic congestion : Rail-based transport system contribute to reduced traffic congestion on the road network.
- Reduction of air pollution : Promotion of rail-based transport lead to reduction of social cost, such as air pollution, noise pollution, and saving energy.
- Economic externality : Even though the financial internal rate of return (FIRR) is low, which implies that the projects are not profitable, if economic internal rate of return (EIRR) is higher than the opportunity cost of capital, public transport has a favourable impact on the society.

(2) Present Government Policies to Support Rail-based Transport

The following measures have been applied to support rail-based transport systems by the Government.

1) Long Term Government Loan

The government provides 20 % - 30 % of the capital investment in form a government loan at 6 % - 8 % interest and a repayment period of 30 years, with a 15 years grace period.

2) Low Lease of Right of Way

Right of way patches are owned by asset corporations of the government and leased to private railway companies at low lease rates.

3) Tax Allowance

A 60 % investment tax allowance is given to LRT/PRT companies for 10 years.

4) New Fund Raising Organisation

The government has created a special agency titled 'Infrastructure Development Corporation' (IDC) under the Ministry of Finance, and the IDC issues a 10.5 billion RM long term government bond.

5) Government Bond for Outstanding Interest

The amount of RM 4.5 billion bond is planned to be allocated to KTMB, STAR and PUTRA as a loan through the United Engineers Bhd.(UEM), for purchasing rolling stocks and for the outstanding interest of commercial bank loans.

(3) Analyses on the Needs of Further Assistance

Although the proposed rail-based transport preferential measures were taken, some rail-based transport system would not be viable financially. Thus the following analysis is undertaken for the ten lines, which were found to be barely profitable, in order to appraise effective policies, which should enhance sound management of the rail-based transport systems in the future.

| | |
|---|---|
| Alternative 1: | Comparison between revenues and operating costs excluding depreciation costs. |
| Alternative 2: | Comparison of costs in cases where infrastructure cost is deducted from the initial investment cost. |

Alternative 1

Assuming that transportation allowance is given to commuters, the revenues would be sufficient to cover the costs, except for the two lines, the Petaling Line of STAR and the North-South Line of KTMB.

- Petaling Line of STAR would not have sufficient revenues to cover costs. The reasons are the comparatively small number of passengers and the low growth rate.
- N-S line of KTMB is another line where revenues were found to be insufficient to cover costs. This is due to the relatively low revenue and high operation costs derived from its long distance operation.

Alternative 2

The Infrastructure cost for all ten lines is huge, amounting to RM 6,895 million. Thus deduction of the infrastructure cost decrease the financial burden to a large extent. However, in the case of KTMB, infrastructure cost amounts to merely 3 percent of the total investment cost because the Government has borne most of the infrastructure costs in the past. Consequently the deduction of the infrastructure costs would not improve the financial situation of KTMB significantly.

- North-South Line of KTMB, Sri Petaling Line of STAR, and PUTRA Section 2 will suffer from operating deficit for a long time.

- Ampang Line of STAR and Section I of PUTRA would generate operational profit as of year 2000.
- As for PRT, LRT–1 (Cheras), and LRT–2 (Damansara) lines operating profit will increase remarkably.

Although the financial situation can be improved by infrastructure investment assistance, the net cash flow analyses still shows shortage of fund. Major causes of the shortage are attributable to the high interest rate of loans, particularly the short term loan, which was adopted to balance the annual fund shortage.

**Table 11.1.10 Balance Between Revenue and Operating Cost by Line**

(Unit: RM Million)

| | | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| KTMB | Revenue | 96 | 98 | 101 | 104 | 106 | 109 | 112 | 115 | 118 | 122 | 124 |
| North-South | Ope.Cost | 153 | 153 | 153 | 153 | 153 | 153 | 153 | 153 | 153 | 153 | 192 |
| Line | Balance | -58 | -55 | -53 | -50 | -47 | -44 | -42 | -39 | -36 | -32 | -68 |
| KTMB | Revenue | 129 | 132 | 135 | 138 | 142 | 145 | 149 | 152 | 156 | 160 | 163 |
| Western | Ope.Cost | 118 | 118 | 118 | 118 | 118 | 118 | 118 | 118 | 118 | 118 | 126 |
| Line | Balance | 11 | 14 | 17 | 20 | 23 | 27 | 30 | 34 | 37 | 41 | 36 |
| KTMB | Revenue | - | - | - | 16 | 17 | 18 | 19 | 20 | 21 | 23 | 24 |
| Batu Caves | Ope.Cost | - | - | - | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 17 |
| Line | Balance | - | - | - | 4 | 5 | 6 | 7 | 8 | 9 | 11 | 7 |
| STAR | Revenue | 89 | 90 | 91 | 93 | 94 | 95 | 97 | 98 | 100 | 101 | 102 |
| Ampang | Ope.Cost | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 |
| Line | Balance | 42 | 43 | 44 | 46 | 47 | 48 | 50 | 51 | 53 | 54 | 55 |
| STAR | Revenue | 30 | 31 | 32 | 34 | 35 | 36 | 38 | 39 | 41 | 43 | 45 |
| Sri Petaling | Ope.Cost | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 |
| Line | Balance | -10 | -8 | -7 | -6 | -4 | -3 | -1 | 0 | 2 | 3 | 5 |
| PUTRA | Revenue | 84 | 85 | 86 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 |
| Section 1 | Ope.Cost | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 |
| | Balance | 42 | 43 | 44 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 |
| PUTRA | Revenue | 42 | 45 | 47 | 50 | 53 | 56 | 59 | 62 | 66 | 69 | 73 |
| Section 2 | Ope.Cost | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 46 |
| | Balance | 7 | 9 | 12 | 14 | 17 | 20 | 23 | 26 | 30 | 34 | 27 |
| PRT | Revenue | - | 44 | 48 | 52 | 56 | 60 | 65 | 71 | 77 | 83 | 90 |
| (Monorail) | Ope.Cost | - | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 |
| | Balance | - | 16 | 20 | 24 | 28 | 32 | 37 | 43 | 49 | 55 | 62 |
| | | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
| New LRT | Revenue | 140 | 147 | 153 | 160 | 167 | 174 | 182 | 190 | 198 | 207 | 216 |
| Cheras | Ope.Cost | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 88 |
| Line | Balance | 74 | 80 | 86 | 93 | 100 | 108 | 115 | 123 | 132 | 140 | 129 |
| New LRT | Revenue | 112 | 116 | 121 | 126 | 131 | 137 | 142 | 148 | 154 | 160 | 167 |
| Damansara | Ope.Cost | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 61 |
| Line | Balance | 64 | 69 | 74 | 79 | 84 | 89 | 95 | 100 | 106 | 113 | 105 |

Source : SMURT-KL Estimate

## Table 11.1.11 Summary of Operating Profit Analysis

(Unit: RM Million)

| Year | KTMB | | | STAR | | PUTRA | | PRT | LRT-1 | LRT-2 |
|---|---|---|---|---|---|---|---|---|---|---|
| | N - S Line | Western Line | Batu Caves | Ampang | Sri Petaling | Section 1 | Section 2 | N.Section | Cheras | Damansara |
| 2000 | -104 | -34 | | 3 | -44 | 6 | -34 | | 29 | 32 |
| 2001 | -102 | -31 | | 4 | -43 | 7 | -32 | -6 | 35 | 36 |
| 2002 | -99 | -28 | | 5 | -42 | 8 | -29 | -3 | 41 | 41 |
| 2003 | -97 | -24 | -3 | 7 | -40 | 9 | -26 | 1 | 48 | 46 |
| 2004 | -94 | -21 | -2 | 8 | -39 | 10 | -24 | 5 | 55 | 51 |
| 2005 | -91 | -18 | -1 | 9 | -38 | 10 | -21 | 10 | 63 | 56 |
| 2006 | -88 | -14 | 0 | 11 | -36 | 11 | -17 | 15 | 70 | 62 |
| 2007 | -85 | -11 | 2 | 12 | -34 | 12 | -14 | 20 | 78 | 68 |
| 2008 | -82 | -7 | 3 | 13 | -33 | 13 | -11 | 26 | 87 | 74 |
| 2009 | -79 | -4 | 4 | 15 | -31 | 14 | -7 | 32 | 95 | 80 |
| 2010 | -121 | -11 | -2 | 16 | -29 | 15 | -13 | 39 | 79 | 67 |
| 2011 | -114 | -1 | -1 | 22 | -27 | 20 | -9 | 44 | 89 | 74 |
| 2012 | -107 | 10 | 0 | 27 | -25 | 25 | -5 | 50 | 99 | 81 |
| 2013 | -100 | 21 | 1 | 33 | -22 | 31 | 0 | 56 | 109 | 89 |
| 2014 | -92 | 33 | 2 | 39 | -19 | 37 | 5 | 62 | 120 | 96 |
| 2015 | -84 | 45 | 3 | 45 | -16 | 43 | 11 | 68 | 131 | 104 |
| 2016 | -75 | 59 | 3 | 52 | -13 | 50 | 16 | 75 | 143 | 112 |
| 2017 | -66 | 73 | 4 | 59 | -10 | 57 | 22 | 82 | 156 | 121 |
| 2018 | -56 | 88 | 5 | 67 | -7 | 64 | 29 | 90 | 169 | 130 |
| 2019 | -46 | 104 | 6 | 74 | -3 | 72 | 35 | 98 | 182 | 139 |
| 2020 | -149 | -7 | -1 | 60 | 0 | 70 | 42 | 99 | 160 | 120 |

Source : SMURT-KL Estimate

Note: Cheras and Damansara lines start operation in 2020.

Condition: Total Initial Investment Cost – Infrastructure Cost

(Operating Profit = Revenue – Operating Cost – Depreciation )

## 11. 2 Viability Analysis of Bus Transport

### 11.2.1 Current Bus Operation

Currently a total of 774 buses are operated in the Kuala Lumpur metropolitan area. Buses are largely divided into two groups by size, namely "small bus" and "large bus". Large buses are further classified into three types according to bus tpye.

**Table 11.2.1 Current Bus Operation in Kuala Lumpur**

| Bus Size | Small Bus | Large Bus | | | | |
|---|---|---|---|---|---|---|
| Bus Type | A | B | C | D | Total | Average |
| Number of Busses | 222 | 24 | 293 | 205 | 522 | - |
| Passenger Capacity | 44 | 77 | 69 | 66 | - | 71 |
| Seating Capacity | 31 | 48 | 43 | 41 | - | 44 |

Source : Interview with bus company in 1998.

### 11.2.2 Fixed Bus Operation Costs

(1) Fixed Costs of Bus Operation

Initial investment to start a bus transport business requires a considerable amount, 90 percent of which is used to purchase the buses. Therefore, it is vitally important for the companies to utilise the buses efficiently.

There are two types of cost for bus operations, one is the fixed cost and the other is the operating cost. Fixed cost comprises of 6 items which are calculated separately from the actual bus operations.

**Table 11.2.2 Unit Fixed Cost of Bus Operation**

| Fixed Cost Items | Bus Type | | | |
|---|---|---|---|---|
| | A | B | C | D |
| Capital Costs (Depreciation) | 3.173 | 6.350 | 6.737 | 6.233 |
| Long Term Interest Cost | 2.539 | 5.080 | 5.390 | 4.987 |
| Insurance Cost | 1.172 | 1.172 | 1.172 | 1.172 |
| Overhead Cost | 8.479 | 8.821 | 8.821 | 8.821 |
| Crew Costs | 11.250 | 11.250 | 11.250 | 11.250 |
| Road Tax | 0.645 | 0.645 | 0.645 | 0.645 |
| Total | 27.258 | 33.318 | 34.014 | 33.107 |
| Factor *) | 0.650 | 0.650 | 0.650 | 0.650 |
| Total Fixed Costs/Vehicle-hour | 17.718 | 21.657 | 22.109 | 21.520 |
| Total Fixed Costs/Vehicle-km | 0.394 | 0.481 | 0.491 | 0.478 |

Source : SMURT-KL Estimate based on Bus Companies' Data
Note : "Factor" indicates the percentage of hours for buses being used productively for operations. It is estimated at 65% for the calculation.

The most expensive item among the fixed costs is crew cost amounting to 25.9 to 41.3 percent, followed by the overhead cost. The crew cost is estimated based on an average monthly salary of RM 1200 for 1,370 bus drivers and their assistants.

The fixed cost per hour is estimated at RM 17.7 for bus type A, RM 21.6 for bus type B, RM 22.1 for bus type C and RM 21.5 for bus type D, as shown in Table 11.2.2. Fixed cost per *vehicle km* is obtained by dividing the fixed cost per hour by the base speed of 45 km/hour. Both fixed cost per *vehicle hour* and per *vehicle km* vary according to the price of the bus.

(2) Running Cost of Bus Operation

Bus operating cost per km is shown in Table 11.2.3. Unit cost used for the calculation is as follows; (a) fuel cost : RM 0.55 per litre, (b) lubricants cost: RM 3.12 per litre, (c) tyre unit cost: RM 1,460, (d) spare parts cost: RM 1,500,. (e) labour cost per month: RM 1,500 and (f) depreciation cost based on the purchase price of a bus.

**Table 11.2.3 Bus Operating Cost per Km**

| Items of Running Cost | Bus Type | | | |
|---|---|---|---|---|
| | A | B | C | D |
| Fuel Costs | 0.223 | 0.196 | 0.196 | 0.196 |
| Lubricant Costs | 0.003 | 0.003 | 0.003 | 0.003 |
| Tyre Costs | 0.146 | 0.146 | 0.146 | 0.146 |
| Maintenance Spares Costs | 0.041 | 0.041 | 0.041 | 0.041 |
| Maintenance Labour Costs | 0.117 | 0.117 | 0.117 | 0.117 |
| Depreciation Costs | 0.381 | 0.762 | 0.808 | 0.748 |
| Total Running Costs/vehicle-km | 0.911 | 1.265 | 1.312 | 1.251 |

Source : SMURT-KL Estimate

(3) Bus Operation Cost by Speed

Bus operating cost vary with the bus operating speed. Running cost by speed was estimated by applying the authorised speed-cost curve.

**Table 11.2.4 Bus Operating Cost by Running Speed**

(Unit: RM)

| Driving Speed | Small Bus | | | Large Bus | | |
|---|---|---|---|---|---|---|
| | Running Cost | Fixed Cost | Total | Running Cost | Fixed Cost | Total |
| 10 | 1.386 | 0.394 | 1.780 | 1.961 | 0.486 | 2.447 |
| 15 | 1.289 | 0.394 | 1.683 | 1.824 | 0.486 | 2.310 |
| 20 | 1.201 | 0.394 | 1.595 | 1.700 | 0.486 | 2.186 |
| 25 | 1.124 | 0.394 | 1.518 | 1.591 | 0.486 | 2.077 |
| 30 | 1.056 | 0.394 | 1.450 | 1.494 | 0.486 | 1.980 |
| 35 | 0.998 | 0.394 | 1.392 | 1.412 | 0.486 | 1.898 |
| 40 | 0.949 | 0.394 | 1.343 | 1.344 | 0.486 | 1.830 |
| 45 | 0.911 | 0.394 | 1.305 | 1.289 | 0.486 | 1.775 |
| 50 | 0.881 | 0.394 | 1.275 | 1.248 | 0.486 | 1.734 |
| 55 | 0.862 | 0.394 | 1.256 | 1.220 | 0.486 | 1.706 |
| 60 | 0.852 | 0.394 | 1.246 | 1.206 | 0.486 | 1.692 |
| 65 | 0.852 | 0.394 | 1.246 | 1.206 | 0.486 | 1.692 |
| 70 | 0.862 | 0.394 | 1.256 | 1.220 | 0.486 | 1.706 |
| 75 | 0.881 | 0.394 | 1.275 | 1.247 | 0.486 | 1.733 |

Source : SMURT-KL Estimate

### 11.2.3 Viability of Bus Operation

(1) Required number of bus passengers

The bus operating cost and the required number of bus passengers by bus size are indicated in association with the bus operating speed and distance in Tables 11.2.5 and 11.2.6 respectively. Bus fare is fixed at the present level of RM 0.90 for one trip.

**Table 11.2.5 Required Number of Passengers for One Trip : Small Bus**

| Operating Distance (Km) | Small Bus | | | | | |
|---|---|---|---|---|---|---|
| | Speed : 10 km/hour | | Speed : 20 km/hour | | Speed : 30 km/hour | |
| | Operating Cost (RM) | Required Number of Passengers (persons) | Operating Cost (RM) | Required Number of Passengers (persons) | Operating Cost (RM) | Required Number of Passengers (persons) |
| 5 | 8.9 | 10 | 8.0 | 9 | 7.3 | 8 |
| 6 | 10.7 | 12 | 9.6 | 11 | 8.7 | 10 |
| 8 | 14.2 | 16 | 12.8 | 14 | 11.6 | 13 |
| 10 | 17.8 | 20 | 16.0 | 18 | 14.5 | 16 |
| 12 | 21.4 | 24 | 19.1 | 21 | 17.4 | 19 |
| 14 | 24.9 | 28 | 22.3 | 25 | 20.3 | 23 |
| 16 | 28.5 | 32 | 25.5 | 28 | 23.2 | 26 |
| 18 | 32.0 | 36 | 28.7 | 32 | 26.1 | 29 |
| 20 | 35.6 | 40 | 31.9 | 35 | 29.0 | 32 |
| 22 | 39.2 | 44 | 35.1 | 39 | 31.9 | 35 |
| 24 | - | - | 38.3 | 43 | 34.8 | 39 |
| 26 | - | - | - | - | 37.7 | 42 |
| 28 | - | - | - | - | - | - |

Source : SMURT-KL Estimate

**Table 11.2.6 Number of Passenger Required for One Trip : Large Bus**

| Operating Distance (km) | Large Bus | | | | | |
|---|---|---|---|---|---|---|
| | Speed : 10 km/hour | | Speed : 20 km/hour | | Speed : 30 km/hour | |
| | Operating Cost (RM) | Required Number of Passengers (persons) | Operating Cost (RM) | Required Number of Passengers (persons) | Operating Cost (RM) | Required Number of Passengers (persons) |
| 5 | 12.2 | 14 | 10.9 | 12 | 9.9 | 11 |
| 6 | 14.7 | 16 | 13.1 | 15 | 11.9 | 13 |
| 8 | 19.6 | 22 | 17.5 | 19 | 15.8 | 18 |
| 10 | 24.5 | 27 | 21.9 | 24 | 19.8 | 22 |
| 12 | 29.4 | 33 | 26.2 | 29 | 23.8 | 26 |
| 14 | 34.3 | 38 | 30.6 | 34 | 27.7 | 31 |
| 16 | 39.2 | 44 | 35.0 | 39 | 31.7 | 35 |
| 18 | 44.0 | 49 | 39.3 | 44 | 35.6 | 40 |
| 20 | 48.9 | 54 | 43.7 | 49 | 39.6 | 44 |
| 22 | 53.8 | 60 | 48.1 | 53 | 43.6 | 48 |
| 24 | 58.7 | 65 | 52.5 | 58 | 47.5 | 53 |
| 26 | 63.6 | 71 | 56.8 | 63 | 51.5 | 57 |
| 28 | - | - | 61.2 | 68 | 55.4 | 62 |
| 30 | - | - | - | - | 59.4 | 66 |
| 33 | - | - | - | - | 65.3 | 73 |

Source : SMURT-KL Estimate

Therefore, the following policy should be applied to bus transportation.

1. In the case of a small bus, at a speed of 10 km/h, service is feasible within an area of 10 km from railway stations if the number of passengers exceeds 20.

2. In the case of a small bus, at a speed of 20 km/h, service is feasible within an area of 10 km from railway stations if there are over 18 passengers.

(2) Viability of bus operation

The average bus operation distance per day is 180 km by 8 round trips, which means 11 km for a one way trip and 23 km for a round trip. The average speed in the City of Kuala Lumpur is about 10 km.

As shown in Table 11.2.7, bus operating cost for one day at a speed of 10 km/h is RM 320 for a small bus and RM 440 for a large bus, respectively. A small bus requires 356 passengers and a large bus requires 489 passengers, in order to recover the operation cost for one way at a fare of RM 0.90.

**Table 11.2.7 Required Number of Passengers for One Day Operations**

| | | Small Bus | | | Large Bus | | |
|---|---|---|---|---|---|---|---|
| 10 km/h | | One Trip | Round trip | One Day | One Trip | Round trip | One Day |
| Bus Operating Distance | km | 11 | 23 | 180 | 11 | 23 | 180 |
| Bus Operating Cost | RM | 20.0 | 40.1 | 320 | 27.5 | 55.1 | 441 |
| Number of Passenger Required | | 22 | 45 | 356 | 31 | 61 | 489 |
| | | Small Bus | | | Large Bus | | |
| 20 km/h | | One Trip | Round trip | One Day | One Trip | Round trip | One Day |
| Bus Operating Distance | km | 11 | 23 | 180 | 11 | 23 | 180 |
| Bus Operating Cost | RM | 17.9 | 35.9 | 287 | 24.6 | 49.2 | 394 |
| Number of Passenger Required | | 20 | 40 | 319 | 27 | 55 | 437 |
| | | Small Bus | | | Large Bus | | |
| 30 km/h | | One Trip | Round trip | One Day | One Trip | Round trip | One Day |
| Bus Operating Distance | km | 11 | 23 | 180 | 11 | 23 | 180 |
| Bus Operating Cost | RM | 16.3 | 32.6 | 261 | 22.3 | 44.6 | 356 |
| Number of Passenger Required | | 18 | 36 | 290 | 25 | 50 | 396 |
| | | Small Bus | | | Large Bus | | |
| 40 km/h | | One Trip | Round trip | One Day | One Trip | Round trip | One Day |
| Bus Operating Distance | km | 11 | 23 | 180 | 11 | 23 | 180 |
| Bus Operating Cost | RM | 15.1 | 30.2 | 242 | 20.6 | 41.2 | 329 |
| Number of Passenger Required | | 17 | 34 | 269 | 23 | 46 | 366 |

Source : SMURT-KL Estimate

If the bus operating speed is improved from 10 km/hour to 20 km/hour through the improvement of the traffic conditions, the following effects can be expected for a small bus.

1) Bus operation cost would be reduced by 10.3 percent (RM 320 - RM 287 = RM 33).

2) Bus routes could serve areas with lower passenger demands (10.4 %).

3) Operation distance can be increased from 180 km to 200 km (10% increase).

# Chapter 12

# Organisational and Institutional Arrangement

# Chapter 12 Organisational and Institutional Arrangement

Emphasis is placed on in this chapter on organisational and institutional aspects of urban transport problems. Such aspects are not concerned directly with urban transportation improvement, but they complement the Master Plan's realisation.

## 12.1 Current Urban Transport Related Organisations and Their Responsibilities

The government organisations are divided into two, which are the Federal Government and the Local Government organisations.

Generally speaking, the Federal Government deals with nation wide transportation plans, transport policy guidelines, and matters concerned with overall transport administration, while the Local Governments cope with urban transport problems under their jurisdiction. The Local Governments plan, execute and administrate road networks and urban public transport improvement (refer to Table 12.1.1).

The private sector has been involved extensively in transport facility development projects and operations since 1983, when the government declared the privatisation scheme as one of its National Policies. The private sector has been expanding its business field from traditional bus/taxi transport to toll road construction/operations and railway construction/operations.

## 12.2 Institutional and Organisational Problems

(1) Discrepancy between the metropolitan area and the local governments jurisdiction

There is no proper government organisation which deals with the metropolitan-wide problems as their responsibility. This is so because, the Federal Government organisations adopt a national point of view, and the local governments adopt a local one for the area under its jurisdiction.

(2) Insufficient function in transportation planning

Transportation planning related activities consist generally of information/data collection/storage, analysis of them, problem recognition, examination of countermeasures, establishing plans and implementation.

The transportation planning function is considered insufficient, mainly in the area of information/data collection activities, and the analysing activities.

## Table 12.1.1 Urban Transport Related Organisations

| Federal Government Organisations | Major Functions on Urban Transport |
|---|---|
| Prime Minister's Department | |
| Economic Planning Unit | To formulate objectives, policies and strategies in development planning<br>To plan the five-year development plans.<br>To coordinate and prepare the development budget for the five-year plans.<br>To coordinate the Privatisation programme. |
| Federal Territory Development and Klang Valley Planning Division | To coordinate development plans in the Klang Valley area. |
| Ministry of Transportation | |
| Road Transport Department | To update the revenue collection system.<br>To register and license drivers of motor vehicles.<br>To ensure that motor vehicles are roadworthy.<br>To reduce the rate of road accidents.<br>To maintain records of information pertaining to motor vehicles and drivers. |
| Department of Railways | To control rates of fares and tariffs by examining all proposals for change in the structure and rates of fares, tariffs or charges submitted by any railway company.<br>To formulate regulations and prescribe minimum standards.<br>To ensure compliance of safety standards.<br>To enforce regulations (issuance, suspension and withdrawal of railway licenses, etc)<br>To study proposals for new railway schemes and make recommendations for the approval of the Minister<br>To determine the performance standards of the services of the railway company through statistical formats and reports. |
| Railway Asset Corporation | To administer and manage lands, properties and rights for railway services.<br>To develop infrastructure facilities for railway services. |
| KTMB | To provide a modern, efficient and competitive rail transport system. |
| Ministry of Works | |
| Public Works Department | To plan, design and construct infrastructure projects, mainly, roads, water supplies, Government buildings, airports, ports and jetties.<br>To operate and maintain roads, water supplies and certain Government buildings.<br>To provide technical advice to the Government at federal, state and district levels. |
| Highway Planning Unit | To conduct periodical traffic count surveys and issue a report on traffic volume annually<br>To formulate national road and highway network system plan and programme<br>To assist state government and other agencies |
| Malaysian Highway Authority | To supervise and execute the design, construction and maintenance of highways as determined by the Government. |
| | To supervise and execute the design and construction of the rest and service areas and other facilities that may be deemed necessary along highways. |
| | To collect toll from the users of highways and other dues from the utilisation of facilities along highways. |
| | To plan and conduct research to ensure the efficient utilisation of highways and other facilities along highways. |
| Ministry of Entrepreneur Development | |
| Commercial Vehicle Licensing Board | To process and issue licenses of all classes of commercial vehicles in Peninsular Malaysia (including condition of licenses)<br>To determine the terms and conditions attached to all classes of commercial vehicle licenses issued (fares, operation area, passenger capacity or type of goods, maximum load weight).<br>To formulate policies, roles and regulations pertaining to licensing of commercial vehicles, and monitor their impact on the efficiency of the road transport industry. |
| Ministry of Home Affairs | |
| Royal Malaysian Police | To maintain law and order. |

Source: "Information Book", City Hall Kuala Lumpur, 1993
"Dealing with the Malaysian Civil Service - 2nd Edition", Pelanduk Publications (M), 1994

## Table 12.1.1 Urban Transport Related Organisations (Continued)

| Local Government Organisations | Major Functions on Urban Transport |
|---|---|
| City Hall of Kuala Lumpur | |
| City Economic Planning Unit | To formulate policies and strategies on the Socio-Economic Development of the Federal Territory of Kuala Lumpur.<br>To co-ordinate and monitor development projects.<br>To manage all data and information on the development of Kuala Lumpur.<br>To ensure that infra-structure development and public facilities are planned and implemented to promote urban economic activities such as property development, business, transport, finance, tourism and others.<br>To ensure an integrated development of the industrial sector which will contribute to the urban economic growth. |
| Urban Transport Department | To co-ordinate and manage the implementation of the Monorail project and Light Rapid Transit(LRT) System in Kuala Lumpur and areas connected to it.<br>To plan and research on the development of an urban transportation system that covers public and highway transportation.<br>To control urban development in terms of transportation system.<br>To design and implement urban transportation projects financed by the government through City Hall Kuala Lumpur(bus/taxi stops, terminals for city buses and inter-town express buses and taxis).<br>To co-ordinate and manage public transport facilities and services financed by the government through City Hall Kuala Lumpur. |
| Public Works and Traffic Management Department | To plan, design and implement road projects in the Federal Territory.<br>To co-ordinate with private agencies in the planning and developing of road systems in the Klang Valley.<br>To co-ordinate with the relevant agencies on matters relating to road system and traffic management in Kuala Lumpur City.<br>To improve on road designs and to increase road capacity to cater to the needs of the increasing traffic volume.<br>To plan and implement traffic management schemes to improve traffic flow.<br>To maintain road networks to specific standards for the safety and comfort of road users.<br>To minimise road accidents.<br>To contribute towards a healthy environment, improve public transportation and promote pedestrian traffic. |
| Enforcement Directorate | To manage metered parking areas (privatised concept) and manual parking areas.<br>To control and enforce traffic rules and regulations.<br>To conduct operations to eradicate illegal activities such as illegal car/motorcycle attendants,.... |
| Other Local Government Organisations | Similar to City Hall of Kuala Lumpur. |
| Selangor State | |
| Municipalities of Selangor State | |

Source: "Information Book", City Hall Kuala Lumpur, 1993
"Dealing with the Malaysian Civil Service - 2nd Edition", Pelanduk Publications (M), 1994

### (3) Problems in providing transport facilities

Facility development in the transport field has changed in recent years from government to private sector financing, say through the BOT method.

The advantages of the BOT scheme are generally accepted as the government does not need to spend its scarce budget on development projects. However, it should be noted that the following problems might occur as a result of adopting such a scheme.

- The private sector takes the initiative in transport facility development.
- The private sector tends to execute profitable projects and the surplus, which could be used for other unprofitable but indispensable projects otherwise, will belong to the private sector, and not to the public sector.
- The order of priority of the development projects might be changed.
- Indispensable projects in a master plan might be delayed, because of low financial viability.

In Malaysia, particularly during this economic recession period, concern that BOT projects may be abandoned has been increasing.

(4) Weak enforcement function

1) Bus transport service

The stage bus transport still has a very important role in the urban transport field. However, it was discovered in the course of the Study that some bus routes were not being operated as scheduled. It was also observed that passengers had to wait for a bus for a much longer time than expected. This is a fatal defect of the service. Some buses disembark passengers on a very busy trunk road, where no bus stop is located, disturbing the heavy traffic flow.

With regard to feeder bus services to/from the stations of the newly opened rail-based transport systems, some feeder bus services to/from KTMB commuter service and LRT System (I) were suspended, because they were not profitable. The LRT System (I) has recently begun its own feeder bus service along its route and the newly opened System II operates the service by using an affiliated bus company. The government is promoting multi-modal transport services to enhance public transport, and these suspensions are, therefore, considered to be inconsistent with that policy.

2) Areas without public transport service

Some areas, including newly developed residential areas, are not covered by public transport services. These poor public transport service areas force people to own their own private transport modes, and promotes its usage. The Study team is of the opinion that the public sector should secure freedom of travel for every person in an area, including children, the handicapped and the elderly.

(5) Lack of incentives to promote public transport systems

It appears that the Malaysian society attaches higher priority to private car usage in comparison to enhancing the use of public transport systems. For example, according to the SMURT-KL Building Survey, more than 90 % of commuters, who are using public transport (bus) are not given any commuting allowances by their companies, while 75 % of car users are provided with parking allowances. Furthermore, more than 20 % of commuters using the private mode are given a fuel allowance.

Private cars are very convenient, fast and comfortable transport modes compared to public transport, particularly the road-based public transport. Therefore, people would, as long as society accepts the current institution, continue to use private transport modes even if the level of service of public transport mode were improved substantially.

## 12.3 Recommended Organisational and Institutional Arrangements

(1) Establishment of a Klang Valley Transportation Authority

A new transportation authority, covering the Federal Territory of Kuala Lumpur and Municipal Councils, including Ampang Jaya, Selayang, Kajang, Petaling Jaya and Subang Jaya, is extremely necessary. The basic functions of the new authority are envisaged as follows:

- Independent Federal Government authority
- The above mentioned local governments will be under the control of the authority with regard to metropolitan-wide transportation matters
- Possess the administrative powers to approve, along with the concerned authorities, BOT transport related projects in the area
- Possess its own financial resources for funding, including revenues from the recommended Area Pricing Scheme, creation of special tax, possible government budget, and so on
- Issue licenses for public transport operations, including the stage bus service, the feeder bus service and the rail-based modes; and
- Keep close relations with the recommended Klang Valley Transportation Research Institute in order to strengthen its planning capability.

The Figure 12.3.1 shows the possible organisation chart of the new authority. Due consideration and co-ordination will be necessary in order to realise such an authority based on further study.

(2) Establishment of Klang Valley Transportation Research Institute

There is a wide scope of sound transportation related data, because transportation is one of the basic needs of human beings. If one wishes to understand transportation problems, he/she would need information on the population, income level, car ownership, employment by industry, business distribution by type, geographical situation, transportation networks and of course traffic volume on roads by vehicle type and number of passengers using public transport by route, for example.

In addition, excellent planning skills are necessary in order to address existing and future urban transport problems, coupled with state-of-the-art computer software and hardware with proper peripheral devices.

Therefore, it is recommended that "Klang Valley Transportation Research Institute" be established to understand, examine and plan necessary measures specialising in urban

transportation problems within the Klang Valley region. This institute does not necessarily have to be a transport specific organisation, but part of a much broader institute, that covers the whole range of urban problems, such as an institute of Urbanisation Issues.

It should be mentioned that close co-operation with the new "Klang Valley Transportation Authority" is important, though the institute itself is independent.

It would be effective and efficient, with respect to transport modelling and related technical works, to invite some foreign expatriates in the initial stage, who have professional knowledge in transportation planning including its technical aspects.

Figure 12.3.2 shows the possible organisation chart of the new institute.

(3) Measures to enhance public transport usage

The promotion of a commuting allowance for public transport mode users is recommended, coupled with a revision of the Income Tax Law for enhancing public transport usage.

On the other hand, the Study team recommends the implementation of the "Area Pricing Scheme", and an increase in the tax rate on allowances to commuters using private transport modes, including the parking lot allowance.

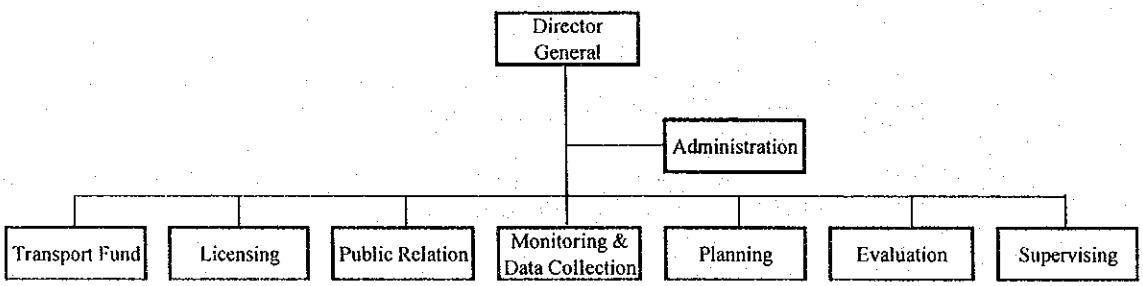


**Figure 12.3.1 Presumable Organisation Chart of the Klang Valley Transportation Authority**

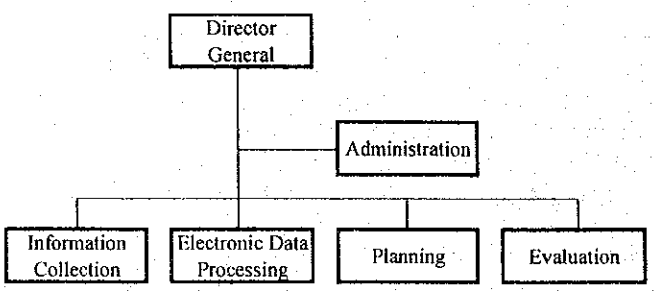


**Figure 12.3.2 Presumable Organisation Chart of the Klang Valley Transportation Research Institute**

# Chapter 13

# Conclusions and Propositions

# Chapter 13 Conclusions and Propositions

## 13.1 Directions of Policies and Strategies for Urban Transportation

(1) Urban Structure and Trend of Urban Development

Under the past urban development, the Kuala Lumpur metropolitan area has developed with business districts in the CPA, and residential districts around its peripheries. Housing complexes have been developed in suburban areas but the newly developed areas are rarely served by public transport. Thus most people moved to the suburban housings under the premise that they would use automobile to get to their work place and other travel destinations.

In contrast, large-scale urban commercial complexes, consisting of office building, shopping centre, hotel and condominium, have been developed in the CPA and its peripheral areas. Recent large-scale urban developments in Kuala Lumpur, including KLCC, KL Central, Mid-Valley, and among others, will attract an enormous amount of additional trips to these areas.

Increase in job opportunities within the city centre together with the dispersal of residential development in the suburb has resulted in an increase in commuting distances. These factors, combined with the increasing automobile ownership, would make the metropolitan area a car-driven society.

(2) Desirable Future Urban Transportation System

Two main directions can be considered for the future urban transportation system development in the Kuala Lumpur metropolitan area. One direction is to follow the past trend and to accept the present automobile society and its advantages; the other is to change the existing system into a public transport oriented society. In the former case, it may be impossible to avoid further increase in traffic congestion and the deterioration of the environment. In contrast, the latter case cannot be achieved without the development of an efficient urban public transport system. It is also necessary, to some extent, to enforce people to shift from automobile use to public transport by applying transportation demand management measures.

Taking into consideration that the Kuala Lumpur metropolitan area is not a large urban area with dispersed land use, the most realistic approach is to combine these two directions and to enjoy the benefits incurred from both. In other words, it is desirable to develop transport facilities for both automobile and public transport, as an alternative mode of transport, and to give users an opportunity to select one of the two modes according to the time, place, and purpose of their travels.

(3) Future Traffic Demand

Future traffic demand was predicted based on the assumption that additional rail-based transport systems would be developed and that automobile use would be controlled. In other words, an increase of automobile usage is expected, although the currently planned rail-based transport system will be developed together with the proposed trunk bus

systems, which supplement those areas which are not served by the rail-based transport systems. By enhancing the public transport system, it is estimated that the share of public transport modes would increase from the current 19.7 percent of the total trips made by motorised modes to 27 percent in 2020.

## 13.2 Recommended Urban Transport Policy Measures

(1) Immediate Measures to Alleviate Traffic Congestion in CPA

1) Transportation Demand Management : Area Pricing Scheme

One of the main objectives for solving the traffic problems in the metropolitan area is to preserve its function as the Capital City and to support social and economic activities. The CPA is considered to be as the most significant core district in the metropolitan area. The CPA, however, has suffered from chronic traffic congestion, thus one of the most important issues for urban transportation is how to cope with the concentrated automobile traffic in the CPA, and how to provide safe, convenient, and attractive transportation facilities.

Area Pricing Scheme should be introduced as a short-term measure to control automobile traffic demand in the CPA during the morning and evening peak hours. Employing this scheme would bring about a reduction of around 7,200 vehicles in the peak hours. In other words, it would be a reduction of about 15,000 vehicles per day. This is about 12 percent of the total inbound traffic volume coming into the CPA during the morning peak hours.

It is most appropriate to bring the Area Pricing Scheme into effect after the completion of the rail-based transport system developments and also after the introduction of the trunk bus system supported by exclusive bus lanes.

2) Traffic Control and Management Plan : A Package Plan

It is important to provide exclusive bus lanes to improve the bus operation and to make bus transport more reliable and attractive to the people. Since most of the main roads inside the CPA have merely four lanes, it is difficult to provide the bus priority lanes without reducing the existing level of service for private vehicles. Therefore, the introduction of a reversible flow lane system is recommended at the same time to maintain the existing number of lanes for private vehicular traffic for heavier traffic direction.

In addition, in order to increase the capacity of the road network in the CPA, it would be effective to adopt a package of traffic control and management plans, which includes the improvement of traffic signal control system, the improvement of the Puduraya roundabout, and so on. The package plan is expected to contribute significantly to alleviate traffic congestion in the CPA in the short-term.

3) Pedestrian Facility Development

It is of importance to create well-designed pedestrian facilities. People are willing to walk a short distance if such a comfortable environment was available, consequently it would lead to a reduction in automobile use. In developing pedestrian facilities it should be reminded that the facilities should be such that they may be used safely by the

handicapped, infants and the elderly. Such an environment enables people to walk to/from railway stations without discomfort and brings about the promotion of public transport usage.

(2) Promotion of Public Transport

1) Introduction of Trunk Bus System

SMURT-KL Home Interview Survey revealed that the modal share of public buses, excluding school bus and factory bus, has decreased dramatically from 24 percent of the total person trips made by motorised modes to 8 percent during the last decade. This sharp drop in the bus share implies the strong preference of people to use private modes of transport, since conventional buses cannot excel private automobiles in speed, comfort, reliability and convenience.

Therefore, in order to revitalise bus transport, it is necessary to introduce a faster and more reliable public transport than the existing bus transport; otherwise people will continue to shift to private mode of transport.

There are two options in public modes of transport. One is the rail-based transport system and another is the trunk bus system.

Since the rail-based transport system needs huge initial investment and the fares tend to be relatively high to cover the operating and maintenance costs as well as the initial investment costs if projects are implemented under a privatisation scheme. This high fare results in low ridership and insufficient revenue, and as a consequence, all of the rail operators have been facing financial problem. Thus, the development of rail-based transport system is limited to areas where sufficient passenger demand is expected, and the system, without doubt, cannot cover the whole metropolitan area.

As for conventional buses, the operation speed is slower than automobiles and their operation is not punctual due to traffic congestion. In order to overcome this drawback of the existing bus operation, it is proposed that a trunk bus system be introduced, which has railway-like operation using the exclusive right of way for bus operation. Since the trunk bus system makes use of the existing road space, initial investment cost can be minimised.

The system should be introduced in the Damansara, Kepong, Genting Kelang, and Cheras corridors. Some roads, however, are currently being improved under the privatisation scheme, and immediate implementation there seems difficult because it requires negotiations to the change of concession condition with the concessionaire company. In the short term, it is proposed that the trunk bus system be introduced on 6-lane sections as there will be no such problems. These include the section with six lanes on Jln. Syed Putra, Jln. Phang, Jln. Ipoh, and Jln Pudu.

In addition, although the southern part of the PRT had been planned in tandem with a large-scale urban development, the project has been frozen due to the recent recession. This section would have competed with the KTMB and Putra, LRT System (II) anyway. Therefore, the southern section of the PRT should be replaced by a trunk bus system.

In the CPA, these trunk bus routes should be connected with the existing and proposed exclusive bus lanes, together with the reversible flow lanes, to secure reasonable bus operation speeds by giving priority to bus operation.

Furthermore, it is desirable from a long-term viewpoint for some of these trunk bus systems to be converted into rail-based transport systems which have more passenger capacity. In particular, the trunk bus routes in Damansara and Cheras should be converted into a LRT system and connected with a new underground section along Jln. Raja Chulan. It is desirable for the underground expressway, as mentioned below, and the underground section of the LRT to be constructed simultaneously.

2) Support for Rail-based Transport System

a. Important role of rail-based transport systems

Rail-based transport systems are considered to be superior to buses. It is predicted that about 1.4 million passengers, accounting for 12 percent of the total person trip demands, would use the rail-based transport systems, on the assumption that expansion of the feeder services, improvement of transfer facilities, and introduction of a common fare were realised. If the rail services were not provided, all the users would rely on automobiles or buses. Thus, a tremendous amount of person trip demands would be carried by road transport, and this, in turn, would result in serious traffic congestion and deterioration of the urban environment.

b. Crisis of rail-based transport system

Totally segregated from automobile traffic, rail-based transport systems are considered to have great potential as a core public transport mode in the future. However, at present, it is difficult to attain financial viability due to insufficient revenue. The PRT project was suspended as of November, 1998. Rail-based transport systems presently in service include KTMB, the LRT System (I), and a part of the LRT System (II), but all the lines have suffered from the low passenger demands. It is evident that the operations of the rail-based transport systems will fail sooner or later if the trend in low ridership continues.

c. Improvement of feeder bus service

Under the present situation, the rail-based transport systems in the metropolitan area are inconvenient to use due to the lack of feeder bus services, in particular, for KTMB lines. These facts diminish the advantages of the rail-based transport systems, such as punctuality, reliability, and high speed. In this sense, feeder bus services may be the most important means to increase the number of passengers.

d. Improvement / development of transfer facilities

There are several existing and planned rail-based transport systems in the metropolitan area. The system should work well if the impedance for transferring to other lines is minimised by improving the transfer facilities. Therefore, it is necessary to provide better transferring facilities, such as moving walks and so forth. The most crucial transfer point that can pointed out is between the Sultan Ismail station, the P. Ramlee station, and the Wawasan station, which are the interchange stations between PRT and LRT System(II).

e. Transport allowance for employees commuting by pubic transport

The low ridership of the rail-based transport systems is attributable to the expensive fare. Consequently the reduction in "Out of Pocket" transport costs would lead to an increase in

passenger demands. For employees using car parks, the employers reimburse the cost in most cases, whereas few employers reimburse the public transport cost for their employees. Therefore, it is proposed that a transport allowance be provided for the employees using public transport through the preferential treatment in taxation. If the transportation allowance could be deducted from the company profit, most employers are likely to give transport allowance to employees. In this way, the financial burden on both the employees and the employers will be reduced, and the number of passengers may be expected to increase.

f. Needs of financial assistance for rail-based transport system by public sector

Complete BOT or BOO are hardly effective for the rail business, even under special conditions where the right for land development along the corridor is given to the concessionaire companies. As has been adopted in other countries, it is necessary to construct part of infrastructure under financial support by the Government. This can be justified by the following reasons.

Economic analyses have revealed that rail-based transport systems bring significant benefits to the society by reducing traffic congestion and by improving urban environment, and rail-based system development projects are feasible in terms of economics.

On the contrary, financial analyses have shown the difficulties of operating rail-based transport as a business, and conclude that the projects are not feasible by any means. Thus, intervention by the public sector is justified to support the rail-based transport systems.

Further studies are necessary to explore how much and what kind of supports will be needed.

(3) Enhancement of Road System

As for road network planning, the future road network, which will be formed by additional privatised project roads added to the existing road network, can be regarded as the basis to establish a road network development plan. The following are recommendations to amend the planned road network.

1) Road development in CPA and needs of transportation demand management

The road capacity in the CPA will not be able to increase to a great extent due to difficulties in land acquisition. It is expected, however, that more traffic will be attracted to the CPA rapidly due to the on-going and planned urban developments, and the construction of the expressway plunging into the CPA will also induce more traffic by providing easy access to the area. Thus it is proposed that a new underground expressway be developed under Jln. Raja Chulan, linking Jln. Parlimen and Jln. Tun Razak and the Middle Ring Road (II) to fulfil the gap between demand and supply.

However, it is predicted that traffic demand will surpass the road capacity in the CPA even if several roads are developed and improved. In this regard, transportation demand management measures such as the Area Pricing scheme, should be applied throughout the planning period by monitoring the traffic condition at each stage.

2) Importance of minor arterial roads and local roads

By examining the future traffic demand and the network configuration, several new arterial roads and local roads have been proposed to supplement the planned road network in the Study area. Since almost all the BOT project roads are major trunk roads, there is a concern that development of only trunk roads in the absence of minor arterial road development will cause the division of the community and deterioration of the environment. Roads have not only a traffic function but also a variety of functions such as a guideline to form an urban area by providing a framework. Therefore it is recommended that minor arterial roads and local roads be built at the same time as the construction of the major trunk roads.

3) Priority of road development

The order of road construction is also important, since the development of a road will affect the traffic demand on the roads in the surrounding area, in particular, parallel roads. It will also affect the financial situation of the privatised road projects directly. In this regard, attention should be paid to the trend in traffic demand in the corridor, and a careful feasibility study should be conducted on the implementation schedule of the new roads, such as the Wangsa-Karamat Highway, the KL North-East Highway, and the eastern part of the proposed underground expressway.

## 13.3 Establishment of a New Transportation Organisation

The Kuala Lumpur metropolitan area has sprawled over and it has already extended beyond the administrative boundary of the City of Kuala Lumpur. Many people commute to the city from outside of the city every day; thus the planning of urban transport facilities and operation, such as road network, railway lines and bus routes cannot be dealt with only within the city

Consequently urban transportation problems and issues of the Kuala Lumpur metropolitan area cannot be dealt with by the City of Kuala Lumpur. Taking the current situation into account, it is recommended that a metropolitan-wide transportation organisation be created. The organisation should have a transportation planning function, monitoring function, traffic control function, transportation demand management function, as well as supervising function on transport facility development.

Among the policy measures recommended in the Study, the Area Pricing Scheme and the trunk bus system should be implemented by the new authority. Execution of the Area Pricing Scheme should be handled by the new organisation and the revenue should be used for relevant expenditure. The facilities of the proposed trunk bus system, such as bus shelters, the traffic signals for bus passengers close to the bus stops, and among others, should be developed by the new transport authority as well. In turn, the authority shall have the right to collect the charges from bus companies which operate their buses on the routes.

In conclusion, the transport authority is required to deal with the urban transportation problems and to implement a variety of policy measures in the metropolitan area.