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Strategic Urban Transport Policy Directions for Bangkok

World Bank
June 2007

Urban Transport Development Partnership

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THE URBAN TRANSPORT DEVELOPMENT PARTNERSHIP

The Urban Transport Development Partnership (UTDP) is a cooperation framework joined by the Asian Development Bank, the French Development Agency, the Japan Bank for International Cooperation, and the World Bank Group. It aims to support the Royal Government of Thailand to address the urban transport development issues in the Bangkok region.

This report is the first by the World Bank under this Partnership. The views expressed in the report are those of the authors. They do not necessarily reflect the views of any of the other three international development agencies in this Partnership, or of the Executive Directors of the World Bank Group and the governments they represent.

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STUDY PROCESS AND ACKNOWLEDGEMENTS

This study is an independent desk review of urban transport policy in Bangkok. It has drawn on recent authoritative studies supported by discussions with relevant government agencies and service providers. Using these outputs and analyses of existing data, a synthesis of improvement options and associated recommendations was made. The aim was to highlight beneficial directions for Thai policy makers in addressing urban transport challenges in the growing Bangkok region.

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CURRENCY EQUIVALENT

Currency unit = Baht (THB)

Exchange rate at March 1, 2007:
US$1.00 = THB34.40
THB1.00 = US$0.02908

GOVERNMENT FISCAL YEAR

October 1- September 30

WEIGHTS AND MEASURES

Metric units

1 meter (m) = 3.2 feet (ft)
1 kilometer (km) = 0.62 miles (mi)

PRICE UNITS

Prices in this report are expressed in approximately end 2006 prices unless otherwise noted

ABBREVIATIONS AND ACRONYMS

ADB	Asian Development Bank
AfD	Groupe Agence Francaise de Developpement (French Development Agency)
B	Billion
BCMA	Bus Control Management Authority (proposed)
BITA	Bangkok Integrated Transit Authority (suggested)
BMA	Bangkok Metropolitan Administration
BMCL	Bangkok Metro Company Limited
BMR	Bangkok Metropolitan Region
BMTA	Bangkok Mass Transit Authority
BOB	Bureau of Budget
BRT	Bus Rapid Transit
BTS	Bangkok Transit System
BTSC	Bangkok Transit System Corporation
CAI-Asia	Clean Air Initiative - Asia
CDM	Clean Development Mechanism
CLTCB	Central Land Transport Control Board
CMLT	Commission for the Management of Land Traffic
CNG	Compressed natural gas
CH_4	Methane
CO	Carbon monoxide
DLT	Department of Land Transport
DMT	Don Muang Tollway
DOH	Department of Highways
DRR	Department of Rural Roads
EDI	Electronic data interchange
EPPO	Energy Policy and Planning Office
ESB	Eastern Seaboard
ETA	Expressway and Rapid Transit Authority
EURO	European emission standard
FDI	Foreign direct investment
GHG	Greenhouse gas
GOT	Government of Thailand
GPP	Gross provincial product
GTZ	German Technical Agency for Cooperation
HC	Hydrocarbon
IEA	International Energy Agency
ITS	Intelligent transportation systems
IFIs	International financial institutions
JBIC	Japan Bank for International Cooperation
JETRO	Japan External Trade Organization
LPG	Liquefied petroleum gas
LTCB	Land Transport Control Board
M	Million
MRT	Mass rapid transit (rail)
MRTA	Mass Rapid Transit Authority
NESDB	National Economic and Social Development Board
NGOs	Non-governmental organizations
NMT	Non-motorized transport
NOx	Oxides of nitrogen
NO_2	Nitrogen dioxide
OCMLT	Office of the Commission for the Management of Land Traffic
OECD	Organization for Economic Cooperation and Development
ORR	Outer ring road
OTP	Office of Transport and Traffic Policy and Planning
pa	per annum
PDMO	Public Debt Management Office of Ministry of Finance
PLTCB	Provincial Land Transport Control Board
PM_{10}	Particulate matter (<10 microns)
$PM_{2.5}$	Particulate matter (<2.5 microns)
$PM_{1.0}$	Particulate matter (<1 micron)
PPM	Parts per million
PTT	Petroleum Authority of Thailand
PWD	Public Works Department
SEPO	State Enterprise Policy Office, Ministry of Finance
SO_2	Sulfur dioxide
SRT	State Railways of Thailand
TA	Technical assistance
THB	Thai Baht
TOR	Terms of Reference
TSP	Total suspended particulate
µg	micrograms
UNFCCC	United Nations Framework Convention on Climate Change
URMAP	Urban Rail Transportation Master Plan (for Bangkok)
UTDP	Urban Transport Development Partnership
3PL	Third Party Logistics
4PL	Fourth Party Logistics

SUMMARY AND RECOMMENDATIONS

Thailand's economic prosperity has been founded on exports, but in the future will increasingly depend on knowledge-based industries such as finance, education, business services, design and fashion, and environmental tourism, as it seeks to attract inward investment and spending. As the primary economic engine of the nation, Bangkok's internal efficiency and links to its economic hinterland and international gateways will become more decisive in ensuring Thailand's global competitiveness.

The effectiveness of transport policies, associated infrastructure and governance arrangements in Bangkok can therefore significantly impact on Thailand's economic performance. Consequently, the Urban Transport Development Partnership (UTDP)[1] commissioned this independent review of the urban transport sector in Bangkok and the surrounding metro-region. The objective of the review is therefore to highlight the key directions for economic and sustainable transport improvement in Bangkok.

A. WHAT IS THE TRANSPORT SCORECARD TO DATE?

Public investment in Bangkok's mega transport infrastructure such as expressways, motorways and highways has been completed to a high standard in recent years. Government coordination in the transport sector has improved greatly since the early 1990s. The first two stand-alone rail mass rapid transit lines (MRTs) are of high quality and were developed under innovative combinations of government and private sector finance. Bangkok's transport management is improving. The most notable success in recent years has been introduction of technical regulation to improve vehicle and fuel standards that also led to improved air quality. There is little obvious inefficiency at an aggregate level in the ability of industries to access employees as transport services are ubiquitous, if not always convenient or of high quality, and jobs and home locations can be largely chosen at will as prevailing policies permit both rich and poor, and low and high income jobs, to be located close by and throughout the city.

B. REMAINING CHALLENGES

Despite these considerable advances challenges remain and lie mainly within Government's area of influence including the efficiency and effectiveness of public investment in transportation, and the supporting policy, plans and programs which direct, coordinate, operate and maintain the investment:

- **Public transport quality in Bangkok is falling behind its peer cities in the region** including Shanghai, Guangzhou, Beijing, Kuala Lumpur, Seoul, and Taipei. Bus and MRT are not integrated and the quality of service from origin to destination for travelers in Bangkok is poor. **Mass Rapid Transport (MRT) infrastructure continues to be developed as stand-alone projects** rather than as part of an integrated public transport system. Despite planned investment of some THB165 billion (US$4.8 billion) in the five priority MRT lines, the dominant part of all transport investment, insufficient attention is being given to the way new MRT services will be developed to assist commuters to travel conveniently between their

[1] The UTDP is a knowledge-based partnership that is able to provide technical advisory support to the Government of Thailand. The goal of the UTDP is to help improve the effectiveness, efficiency, and sustainability of the Bangkok Metropolitan Region's multi-modal transport system. UTDP consists of four International Financial Institutions (IFIs), including the Asian Development Bank (ADB), Japan Bank for International Cooperation (JBIC), World Bank, and the French Development Agency (AfD).

multitude of origins and destinations. There are considerable risks that the anticipated demand and benefits will not be achieved. **Bus transport, which has the largest role in meeting daily travel needs in Bangkok, is stagnating** and the deficit for its provision has risen to unsustainable levels at the same time as heavy investment in new buses is needed.

- **Poor linkages within the transport system and between transport and activity centers and residential areas reduces mobility and quality of life** by failing to maximize the level of potential accessibility for people in the city so that they can participate in the activities that they value. At a local level the quality of sidewalks and pedestrian facilities which are used by everybody in Bangkok is deteriorating and reducing accessibility. Failure to strengthen linkages between MRT stations and activity centers and improve the quality of walking weakens MRT's potential role.

- **Bangkokians, both rich and poor, spend considerable time and expenditure traveling within Bangkok** on congested roads, crowded and dilapidated buses and non-integrated transport services, thus reducing quality of life and threatening future labor market and freight transport efficiency. Unreliability of travel times due to congestion further increases overall travel time as people must leave even earlier to ensure they will arrive at their destination by the desired time.

- **Road networks rely too much on primary roads with excessive traffic congestion**, with little serious attention being given to congestion mitigation using proven management and pricing approaches. A large fleet of aged, inefficient and polluting trucks and buses continues to operate reducing economic efficiency and harming human health. Priority is given to cars over freight and public passenger transport.

- **Logistic services are neglected**, and there is little understanding of the transport component of logistics so vital to supporting efficient economic activity. The available evidence is that overall logistics costs in Thailand are higher than for its competitors, that while the cost is declining it is doing so slowly, and that land transport inefficiencies remain a major barrier to further reducing logistics cost.

C. KEY DIRECTIONS FOR IMPROVEMENT

Based on the analysis presented in this report, several key directions for improvement have been identified.

Maximizing the Benefits of MRT and Minimizing the Risk (Section III)

Rail MRT is the main focus of major urban transport investments in Bangkok in the next six years. At the end of this time, the MRT network will be about 162 km in length. Demand forecasts show that even with a further increase to 200 km, the MRT system will only carry some 15% of all daily person trips. However, the completion of priority MRT lines quickly and in a coordinated way can provide valuable complement to the road system by providing a "relief valve" for congestion thus better integrating Bangkok and supporting the economy. But MRT is expensive to implement and operate.

Without concerted attention, there is a risk that the expenditure of billions of dollars on MRT in Bangkok could result in a severely suboptimal system with, for example, lines developed and operated independently, poor physical integration between lines, no integrated fare and ticketing systems, and concession arrangements that limit the Government's transport policy options.

There are severe constraints to addressing these issues in an environment where MRT projects are developed and managed under the auspices of three autonomous agencies using different financing and implementation arrangements, where concessioning is not soundly based, where land use planning and management is weak and where inertia in the bus system prevents integration of bus and MRT.

Specific areas recommended for government intervention to minimize the risk of MRT investments underperforming are set out below:

- **Using MRT where appropriate** – due to the high cost of MRT it is essential that MRT line coverage not be duplicated unless warranted by demand. There is the also opportunity for use of other, more cost-effective modes of public transport in the place of rail MRT for lines that have relatively low levels of demand. These alternative modes include light rail transit and, more importantly, bus rapid transit (BRT). The latter could be implemented more rapidly and at a much lower cost than MRT, while still providing substantial benefits. It offers a means to speedily implement an extensive rapid transit network that could be upgraded to MRT when warranted by demand.
- **Integrating bus and MRT –** poor integration of bus with MRT will have contributed to the lower levels of demand for the current MRT lines than was originally forecast. There is considerable opportunity to restructure bus routes to better serve the MRT system and hence to increase MRT's catchment area. By integrating bus, MRT and other public transport services the traveling public will be able to make more effective use of the transport system.
- **Facilitating walk access to MRT –** interventions to improve sidewalk and pedestrian access to MRT stations can often be achieved for very low cost but very high benefit and with low risk. Improving sidewalk access can have a substantial impact on MRT patronage.
- **Intensifying land use at MRT stations –** MRT can increase the accessibility of properties around stations, and lay the foundation for greater intensification of land use around the MRT system with enhanced economic and land use benefits. Actions which could support densification include increases in the allowable density of development and reducing car parking requirements for new buildings. Property taxes can be used to capture some of the increase in property values that result from the presence of MRT and raise additional funds to support increased MRT use.
- **Ensuring integrated and efficient delivery of MRT services –** imminent decisions need to be taken to lay the basis for effective and efficient MRT services covering:
  - **Improving MRT program development –** including sound and realistic project preparation with coordinated budgeting. Adequate treatment of safeguards including environmental impacts and resettlement and compensation.
  - **Complementary, integrative systems –** covering development of a single, common electronic ticketing system to be provided separately to operating concessions for rail or bus and other public transport modes; common marketing, branding and provision of information for public transport irrespective of who operates the service; and fare setting (both the structure and level of fares) that maximizes usage and community benefits by balancing the needs for fares that are affordable to users, make it easy for travelers to use the MRT system (and other public transport too), and enhances cost recovery of MRT.
  - **Improving coordination and management –** in the short term, this can be better achieved through specification and procurement of services in a standardized way[2] that encourages integration of MRT services (and bus too) even though different agencies are project owners and a variety of individual, private or State operators may be involved. In the long term, new institutional arrangements will be needed as described below.

[2] Under the Act on Private Sector Participation (PPSU) 1992

- **A new form of concession –** developing the gross cost concession model[3] for application to all future MRT lines recognizing that the different cost-recovery characteristics of individual MRT lines, the need for an MRT system that is integrated from the perspective of users and under the policy control of government, and allocation of risks associated with MRT lines to the concessionaire and the Government according to the party best able to manage them. ADB (2006b) developed a more detailed "model" contract that could be adapted for immediate use in Bangkok.

- **Developing a MRT infrastructure and services plan –** there is a need to update the long term MRT Masterplan, associated priorities and budgetary needs. An important focus of the Masterplan would be to examine how MRT would operate as a network, with integrated MRT services (coordinated with bus) linking the individual sub-regions of Bangkok. The scope of the recommended MRT Infrastructure and Services Plan would include developing a program of actions to implement the plan's recommendations.

Reforming and Modernizing the Bus System (Section IV)

The current bus system is deteriorating and losing patronage at the rate of 5% per annum. Despite the bus system's significant current and future potential role in meeting daily travel requirements, it is excessively costly, inefficient, in need of major investment and not sufficiently responsive to the needs of users. The accumulated deficit is about THB50 billion (US$1.5 billion) and has been growing by over 10% per year. It has been recognized for several years that there is urgent need for reform of the Bangkok Mass Transit Authority (BMTA), the State-enterprise monopoly bus operator and system manager, and the manner in which bus services are provided to reduce unit costs and improve services. There is potential for substantial improvement as has already been identified by BMTA itself and the State Enterprise Policy Office of the Ministry of Finance. Specific areas recommended for government intervention to commence the process of BMTA reform and more generally bus system modernization are set out below:

- **Substantial institutional change is needed to achieve improved services to the community and reduce financial losses** – while there may be aspirations that these benefits could be achieved through continuing internal reform of BMTA, history in Thailand and experience in other countries suggests that this is very difficult to achieve.

- **Separation of policy, regulatory, sector management and operational activities in the bus sector** is needed to start the process of institutional change – the recent proposal to establish a Bus Control Management Authority (BCMA) to take over the regulatory and management functions of BMTA is important in this respect.

[3] ADB (2006a) concluded that a "gross cost" form of concession contract for MRT is needed to achieve the desired outcomes of an efficient, integrated and flexible MRT system. Under such an arrangement, the government would pay for the cost of the infrastructure and services that each concessionaire provides. Payments would be related to patronage, commensurate with the ability of concessionaires to influence demand. Payments would also be linked to service quality. Fare revenue would be collected by a central agency using a single, common electronic ticketing system and with fare revenue accruing to the government to contribute to the cost of its payments to concessionaires. Such a concession form could also be described as an "availability-performance" contract. This differs from the current system in which each MRT line is operated independently and each concessionaire collects and retains fare revenue for their line and attempts to meet their costs from this and other sources of revenue without further recourse to government funds.

- **Corporatization of BMTA** and resolution of its over-staffing is needed to support better financial management – the legislation to enable corporatization exists and can be implemented quickly.
- **Provide bus services through period performance contracts** managed by an authority such as the proposed BCMA and selected using soundly based competitive tendering. Gross cost, performance based contracts with new private sector bus companies[4] and with sound contract arrangement are the best means for improving services and reducing costs while ensuring service integration. These changes will also overcome the current situation in which bus services in Bangkok are in practice treated as separate systems provided by BMTA and the private sector. Initially it may be possible to arrange for services to be provided under contract by the new corporatized divisions of BMTA to allow them the opportunity to develop their capacity to later compete in an open market with the private sector.
- **Procure new bus fleet** to improve the quality of buses in Bangkok. Due to the aged fleet there is a backlog of bus acquisition of some 2,000 buses which are required in the near future after which a steady program of annual bus purchase should be followed. In the longer term, there is no critical need for government to own buses in a system where the private sector could provide services and supply buses under contract to the government.
- **Redesign of the bus route structure and services** to reflect current and emerging demand patterns with a greater orientation to MRT stations, making greater use of bus priority and BRT to enable buses to bypass congestion, and encouraging contracted services provides the environment for greater productivity, rekindled patronage growth and reduced pressure on the State budget.

The impacts of bus reform are substantial and the risks considerable. Equally, taking no action has significant financial costs and detrimental impacts on the community, and is therefore not sustainable. An incremental approach could be taken, making changes when opportunities present themselves. However, the incremental approach risks being thwarted by vested interests, which are considerable, and benefits that are limited or which fail to materialize.

On occasions, a “big bang” approach to implementing the necessary change can be appropriate and in Bangkok’s case this approach seems to be the only viable way forward. The “big bang” would involve careful planning but speedy implementation and the painful changes needed, could be mitigated by compensation for individuals adversely affected by the change and significant improvement in transport services.

The Governor of the Bangkok Metropolitan Administration (BMA) is promoting the development of five BRT routes with construction of the first route having recently commenced. Usually, the major obstacle to development of BRT is neither financial nor technical but rather political acceptance. BMA’s BRT initiative is worthy of active support as BRT offers a viable alternative to rail MRT where passenger demand is low and more flexible public transport services are needed. Depending on circumstances, the cost of BRT could be a fifth to a tenth of the cost of rail MRT. BRT can provide a means for facilitating new public and private investment in bus services, fleet and facilities in Bangkok, and achieve faster implementation of rapid transit services in the city.

[4] Greater use of the private sector through competitive tendering could reduce costs of providing services by up to about 30%, as shown in Section IV.

Improving Walkability (Section V)

Improved walkability is needed for social and health reasons and to facilitate access to MRT and other public transport services. Despite walking being a vital component of most trips and a substantial means of travel in its own right, pedestrians and sidewalks are generally given low priority.

While there are substantial opportunities for physical improvements in sidewalks and increased investment, the key barrier is political and managerial. As an example, utility upgrading under sidewalks is being undertaken with little regard to pedestrians and oversight by government, resulting in inconvenience to pedestrians, long construction times, and poor quality restoration of sidewalks.

Achieving material and sustained progress on sidewalk quality and improved walkability requires elevation of walking to a high priority by local government politicians, political acceptance of accountability, backed up by appropriate asset management systems, remedial and on-going maintenance funds, and community feedback channels. Effective control of works on footpaths by utility agencies is critical. Performance-based contracts for monitoring and maintaining sidewalks could also be beneficial.

Developing a Strategic Road Development Plan and Logistics Plan and Program (Sections VI and VII)

Major road capacity was added to Bangkok's road network in the 1990s in particular. There is, however, a lesser pipeline of future road infrastructure projects now programmed to support ongoing road transport accessibility in Bangkok. An authoritative, consolidated road masterplan to guide new road investments throughout the Bangkok Metropolitan Region over the long term is needed which should be coordinated with planned major residential and commercial developments and other key urban infrastructure, serve major industrial and logistics land uses conveniently and efficiently, be translated into forward, funded, rolling annual programs of investment by each agency, and be incorporated into the Bangkok City Plan and other Provincial Town Plans.

A shift in the economy to emphasize knowledge-based industries requires deepening of economic clusters and geographic clustering to realize agglomeration economies. These industries form vital links in global and domestic supply chains and require fast, reliable and secure access to airports, seaports, and good quality national transport systems, to meet the requirements of downstream production processes. Thailand's inefficient land transport has been identified as a key impediment to future reductions in logistics cost and hence the nation's competitiveness. A more in-depth understanding of how transport functions in terms of logistics and the areas for priority improvement, and options for addressing these areas, is essential. It is recommended that NESDB's emerging logistics strategy aim to work with its strategic stakeholders including the Thai Federation of Logistics and key development partners such as the UTDP to prioritize the key problem areas by industry, and to assist in formulating comprehensive remedial strategies.

The government can facilitate continued reduction in freight transport costs by: (i) enhancing land use-transport links, eg access to industrial and warehouse areas; (ii) ensuring adequate road capacity to meet freight transport needs; (iii) improving the standard and appropriateness of trucks through regulatory changes, eg limiting the extent to which old trucks are continually recycled, allowing the introduction of larger trucks that reduce freight transport costs and which have axle distributions and suspension that cause less damage to roads than current trucks, and strict enforcement of truck standards; (iv) facilitating truck operations (including periodic re-examination of constraints on the movement of trucks in Bangkok to ensure that the balance meets the ongoing needs of the city); and (v) improving the standard of safety in the truck industry, covering drivers, vehicle loading and vehicles. This requires sufficient motivation and capacity in government to pursue such change over the medium term in conjunction with the private sector, seeking to maximize the level of self enforcement with sound auditing and enforcement arrangements.

Enhancing Public Finance (Section VIII)

The value of non-toll road infrastructure in Bangkok that deteriorates over time (and which therefore needs to be replaced periodically) is conservatively estimated at about THB111 billion (about US$3.2 billion). An annual average of about THB3.2 billion of investment is needed to replace the identified assets when they reach the end of their economic lives and THB4.1 billion for maintenance, giving direct total annual expenditure needed to sustain current assets of THB7.3 billion. Actual expenditure is less than this (eg maintenance is about half of the desired level), which will result in more rapid deterioration of current road assets than need be the case and thus higher costs over the long term.

Charges imposed on motorists for their use of roads play a critical role in influencing their travel decisions. If prices are below the costs involved, motorists will undertake more travel than is optimal, resulting in excessive congestion and negative economic, environmental and social consequences. Charges need to reflect not only the cost of wear and tear to roads, but also the cost of traffic management and environmental and congestion consequences of vehicle use. It will be only by coincidence that the revenue from economically optimal road use charges will generate revenue equal to the financial cost of providing roads. Given the level of congestion in Bangkok, revenue will almost certainly be considerably higher than this financial cost. The additional revenue could be used to support the development and provision of improved public transport in the city.

Road sector finance and management can be improved substantially, in particular through:

- **Comprehensive road maintenance and management systems**, which can play a vital role in strengthening agencies' ability to justify their spending plans and to use available funds to the best effect.
- **Refining the structure and level of current taxes and charges that are imposed on motorists**, including giving consideration to the introduction of a congestion charge, so that they provide a better signal to motorists on the cost that their travel will impose on others and hence to encourage them to only undertake worthwhile travel.

The poor financial performance of BMTA and measures to reduce the cost and improve the quality of bus services in Bangkok has been discussed previously. Notably, bus fares in Bangkok have risen at a rate over three times that of inflation over the last decade. This suggests that BMTA's financial shortfall is attributable relatively more to excessive costs than inadequate fares. The State Railways of Thailand (SRT) has annual losses that are even higher than for BMTA, though this covers operations throughout Thailand. It is likely that there is also considerable scope to reduce SRT costs. As discussed previously, there is a particular need to ensure that new MRT projects are the highest priority options and are well-conceived and cost-effective, and that concessions are financially realistic and meet other transport objectives, to ensure that public investment in these projects is both effective and efficient.

Enhance Institutional, Regulatory and Technical Capacity (Sections IV, VI and IX)

Improvement on a sustained basis requires that fundamental institutional, regulatory and technical capacity issues be addressed. It is recognized, however, that dealing with such issues requires considerable debate and resolve to develop an appropriate long term solution. Some needs have been identified above, eg improved coordination and management of MRT through a more standardized approach under the Act on Private Sector Participation (PPSU) 1992, reform of the bus sector, and improved traffic management. In addition, there is a need for better strategic management of public transport, which can be best achieved with introduction of a suggested Bangkok Integrated Transit Authority (BITA). The creation of BITA would permit:

- **A more appropriate distribution of transport responsibilities between levels of government and between government and the private sector**, with the preferred extent of national government direct involvement in Bangkok transport declining over time.
- **Separation of policy and management functions from public transport operations**, with operations provided on a contractual basis.
- **Improved integration of public transport development and management** by bringing public transport management under a single authority, with a clear policy framework, performance criteria and reporting mechanisms to ensure the BITA is held responsible for the sound functioning of the public transport system.

The decision to implement a BITA and determining its form will require detailed consideration by policy makers. An interim mechanism would be to revitalize the dormant but long standing Commission for the Management of Land Traffic (CMLT), which consists of key Ministers and the Governor of Bangkok, to undertake key integrated transport and land use planning functions using sections of the Office of Transport and Traffic Policy and Planning (OTP) to provide full time secretariat support, backed up by use of relevant functions from other agencies. This would require CMLT or a body with similar status and authority to be chaired by the Minister of Transport. Once a decision to establish BITA is made, the BITA would absorb MRTA and the urban rail MRT delivery parts of BMA and SRT and the proposed BCMA while OTP would continue to exist as the transport planning and policy agency. The modified CMLT (as recommended) would continue to provide the high level political coordination of land use and transport in the BMR.

Substantial improvement in Bangkok's traffic management is possible but needed reforms have been neglected in recent years. Fundamental and sustained improvement requires creation of a single traffic authority rather than the current situation where both BMA and the Metropolitan Police have shared responsibilities, variable technical capacity, with neither accountable for traffic improvements nor the associated problems. The vesting of the principal traffic management responsibility in BMA is preferred as it is an elected body, and recognizing that traffic management has close linkages with land use, roads and other infrastructure and their management. Clearly, the police would have a vital and complementary role in enforcement.

More generally, there is a need to take account of the considerable environmental consequences of transport in decision making, both by the public as transport users and by government in its guidance of the transport sector. This requires full recognition of the environmental impacts of transport and consideration of the appropriate instruments to be used to ameliorate them. It is likely that a wide range of complementary actions will be needed, including moral suasion, improved means for charging for road use, targeted financial support for public transport, better traffic management and regulation of road vehicle standards.

D. STRATEGIC ACTION PLAN

The recommended strategic action plan proposed for further consideration is shown in Section X.

I. WHY STUDY URBAN TRANSPORT POLICY DIRECTIONS

A. BACKGROUND

1. The Government of Thailand (GOT) has plans for substantial development of transport in Bangkok in the future. Amongst these are plans to implement five new or extended mass rail transit (MRT) lines in Bangkok over the period 2007 to 2013. The projects, with a total length of 118 km and an estimated total investment of around THB165 billion (US$4.8 billion), aim to increase public transport ridership and reduce the use of private cars with anticipated related improvements in mobility, air quality, congestion and fuel consumption. Development of an integrated transport system requires most importantly the design of integrated services to assist commuters to move conveniently between their origins and destinations, at affordable fares, and often with a variety of alternative modes for the journey.

2. Also required are improvements to bus and the various other public transport modes. Bus is especially important, as even after MRT is implemented and carrying around 15% of all daily person trips, bus (and other public transport) will carry an estimated 31% of all person trips not involving a journey by MRT. Additionally, a quarter or more of all the 15% of trips by MRT would access or egress MRT stations by bus. Supporting infrastructure whether they be MRT stations, or bus stops and bus-MRT interchanges, and ticketing and information systems, should be designed to support these services through provision of easy access to stations and transfer between modes if required. The current period of preparation and updating of MRT project designs and procurement plans provides a valuable opportunity to carefully consider how to capitalize on, and maximize the benefits of, the MRT investments, by achieving fully integrated transport services. To achieve an integrated system, will involve the progressive resolution of a series of policy, planning, institutional, and regulatory challenges.

3. Traffic congestion is severe in Bangkok and the adjacent region but long standing, and well understood, obstacles to effective traffic management remain. Also neglected, but fundamental to the competitiveness of the economy, is an efficient logistics industry which is impacted by urban traffic conditions in the Bangkok region.

4. International financial institutions (IFIs), including the Asian Development Bank (ADB), Japan Bank for International Cooperation (JBIC), World Bank, and most recently the French Development Agency (AfD), have joined together to support the GOT's urban transport development agenda under an Urban Transport Development Partnership (UTDP). The UTDP is a knowledge-based partnership, providing technical advisory support to the GOT's development and implementation of urban transport strategies, policies, plans, programs, projects and related regulatory and institution-building activities. The ultimate goal of the UTDP is to help improve the effectiveness, efficiency, and sustainability of the Bangkok Metropolitan Region's multi-modal transport system.

5. Since late 2005, ADB has provided a technical assistance (TA) to advise the GOT on: (i) options for public transport integration; (ii) development of an MRT concession model; (iii) analysis of options and implications of integrated fares and ticketing; and (iv) development of an MRT financial model. Discussion has been on-going between the GOT and JBIC on JBIC loans to finance the priority MRT projects. The World Bank has also provided advisory services to the GOT on the procurement methods and private sector financing modalities.

6. As a subsequent step, ADB is supporting a TA on integrated ticketing. It is also agreed between the government agencies and IFIs that this study of Strategic Urban Transport Policy Directions is needed to clarify what other policy, institutional, and investment actions should desirably be taken to ensure a high economic return on the heavy investment in MRT and a significant

improvement in urban transport performance. The World Bank has agreed to support the consultant services required for this study. This report is the final report of the study.

B. OBJECTIVES AND SCOPE

7. Bangkok is on a path to become one of the major world cities. Key attributes of cities which can compete globally are (OECD 2006):

- **adequacy, quality and efficiency of public and private infrastructure** investment and its management;
- **livability with high quality of life, green spaces and an attractive urban landscape** contributing to economic success attracting foreign investors as well as highly qualified professionals and tourists;
- **efficiency and flexibility of transport services** to support convenient communication; and
- **effective governance** balancing responsibility and revenue raising functions among national, metro-regional and local levels.

8. The primary objective of the study is to provide strategic advice to government policy makers on existing problems that could undermine Bangkok's emerging global role. Particular emphasis is given to the performance of planned MRT investment because of its magnitude, but more generally the breadth, depth and causes of urban transport problems in the BMR are considered and potential options and a practical sequence of actions – a strategic action plan – to address these problems is outlined. The specific objectives of the work were to:

- **Update and report on current urban transport management and performance**.
- **Diagnose key policy, planning, institutional, regulatory and management issues** that would constrain the performance of public transport services including the heavy investment in MRT system.
- **Recommend a strategic urban transport action plan**, with a menu of proposed policy and institutional actions, for the government to resolve these issues.

9. The scope of work involved the following tasks:

- **Task 1: Overview of Bangkok Transport** – describe scale, performance and challenges.
- **Task 2: Demand Growth Scenario** – broadly describe key contributing factors (demographic dynamics, personal income growth, land use, etc) to the future growth of urban travel demand and transport performance.
- **Task 3: Mass Transit Infrastructure and Services** – assess current performance of the mass transit systems including rail MRT and bus and potential for complementary improvement measures.
- **Task 4: Bus Sector Modernization** –. summarize progress to date, identify the key issues, and analyze options for change.
- **Task 5: Strategic Transport Management** – diagnose land use and transport management, traffic management, including bus priority, walkability, and private vehicle demand management problems and potential, and options for improvement.
- **Task 6: Logistics** – assess transport challenges confronting the logistics sector and broadly identify improvement options.

- **Task 7: Strengthening Government Organization and Management –** diagnosis of the ability of current governance and institutional arrangements to meet emerging urban transport needs in particular to ensure development of an integrated and efficient MRT and bus and wider public transport system, options for improvement, and practical initial steps to desirable change.
- **Task 8: Strategic Action Plan** – synthesize the practical options into a strategic action plan with a menu of proposed actions.
- **Task 9: The Role of IFIs and Urban Transport Development Partnership** – describe the role of the IFIs, and the available means by which they can best provide support for medium-term urban transport development in the Bangkok Metropolitan Region, under the framework of the UTDP.

C. WORKSHOP ON URBAN TRANSPORT POLICY DIRECTIONS

10. A workshop for relevant senior policy makers and members of the UTDP to discuss appropriate urban transport policy directions for Bangkok was held on June 14, 2007. The main purpose was to encourage frank and open discussions about challenges, desired outcomes and directions for improvement. Details of the workshop program and attendees and its conclusions are included in Annex G. The findings of this independent study on urban transport directions were also presented as one input to the workshop. The presentation on the study is included in Annex H.

II. OVERVIEW AND CHALLENGES

11. This section provides an overview of recent trends and the current situation with regard to transport in the Bangkok Metropolitan Region (BMR), emerging challenges and the current capacity of institutional arrangements to address these challenges. It draws on Annex A, which describes the current transport system and emerging trends in more detail. Later sections of the report provide a strategic diagnosis of the underlying causes and directions for improvement.

A. SETTING

12. The BMR includes the City of Bangkok, the nation's capital, and five neighboring provinces. The provinces in the BMR are rapidly suburbanizing, with development following the major road corridors in the region. Metropolitan growth is also spilling over into provinces adjacent to the BMR (PCI 2005). The City of Bangkok is governed by the Bangkok Metropolitan Administration (BMA), but national government agencies undertake many projects in Bangkok and are responsible for key transport infrastructure in neighboring provinces. In 2003, the BMR's population was estimated as 10.4 million or 16% of the total for Thailand as shown in Table A.1. Its contribution to the national economy, as measured by Gross Provincial Product (GPP), was around 68% (PCI 2005). With the rapid growth in the economy real household income has been increasing, which is in turn driving increased motorization and travel demand. A little over 40% of the population of the BMR lives outside the region under the jurisdiction of the BMA. The BMA accounts for one-fifth of the total 7,760 square kilometers in the BMR. The direct sphere of influence of Bangkok now extends beyond the BMR, with the concept of an extended BMR with a population of some 17.5 million people.

13. Due to the rapid pace of development urban growth has been largely unplanned and the provision of adequate urban services has lagged growth. BMA's ability to manage land use and development is improving but is still weak. The influence of transport investments, particularly roads, on the location of development is therefore significant. Problems related to planning in the BMR are typically exacerbated by the high level of independent action by national planning and transport agencies, industry agencies and local governments. Development has therefore largely followed

expansion of arterial road corridors creating inefficient forms of development often known as "superblocks" whereby large land parcels are developed in a non-contiguous, inefficient fashion and rely almost entirely on major roads such as expressways and highways for access, thereby requiring use of these roads by both local and long distance traffic which adds to traffic congestion on them.

14. Thailand's 10th National Development Plan (2006-2011) sees Thailand moving toward being a more geographically specialized economy. Along with a shift to a lesser reliance on exports of agricultural products, it is desired that Thailand develop as a knowledge-based economy with niches in particular industries such as finance, education, technical consultancies, business services, design and fashion, and environmental tourism (PCI 2004). Webster (2006) describes this approach as enhancing Thailand's comparative and competitive advantages by centering on associated "amenity" services. Given rising incomes and other changes, manufacturing in Thailand is becoming more specialized around sectors such as vehicle production (pick-up trucks), petrochemicals, consumer appliances/electronics, certain types of electrical and mechanical intermediate goods, and agro-processing. Increased value added in these areas requires deepening of economic clusters and geographic clustering to realize agglomeration economies (Webster 2006). These industries form vital links in global and domestic supply chains and require fast, reliable and secure access to airports, seaports, and good quality national transport systems, to meet the requirements of downstream production processes.

B. CURRENT TRANSPORT

15. In 2005 it was estimated there were about 19.4 million linked[5] person trips made each day in the BMR, with 46% by private motorized modes (eg car, pick-up, motorcycle), 3% by rail mass rapid transit (MRT), 37% by bus, and 14% by walking and other non-motorized transport (NMT) modes (see Table 1). Overall patronage on public transport has been declining, despite the opening of two rail MRTs since 1999 and rising use of these lines. GTZ (2003) reports that bus patronage has been declining by around 5% pa. It has been forecast that MRT could carry 15% of person trips by 2015 if a substantial network was present. It now seems unlikely that such an extensive network will be available by that time. Moreover, given past experience with overly optimistic demand forecasts for MRT, it is probable that demand will be much lower than indicated in Table 1 in 2015.

Table 1: Forecast Travel Demand in the BMR

	2005	2015
Population (M)	10.8	13.0
Travel Demand		
Person trips/day (M)	19.4	23.4
Mode of travel (%)		
Private modes	46	40
MRT	3	15
Bus & other public transport	37	31
Walk	14	14
Total	100	100
Motor Vehicles		
Number of in-use vehicles (M)	3.1	na
% household with no vehicle	25	na

Source: Various – see Annex A

[5] Linked trips include all stages of a contiguous journey. For example a ride in a bus with a transfer to MRT to reach the final destination is one linked trip, even though it involves two stages. Unlinked trips are for individual stages of a journey between origin and destination. As there are no transfer tickets for public transport in Bangkok, ticket sales indicate the number of unlinked trips made on public transport and exaggerates the number of journeys.

16. Bangkok's in-use national motor vehicle fleet was about 2.9 million in 2003[6]. Bangkok accounts for about 22% of the nation's registered motor vehicles including 57% of the private car fleet, 12% of national motorcycles and 42% of the combined truck and bus registrations. Pick-ups, almost all diesel engine powered, are widely used as a personal vehicles particularly in urban areas. Over the period from 1994 to 2003, Bangkok's motor vehicle fleet grew at an average rate of 3.3% per annum, thus increasing by a third over this period. The number of cars, vans and taxis grew at the relatively faster rate of 7.0% per annum over this period, while the number of motorcycles remained unchanged. Despite rising vehicle ownership in Bangkok, it was estimated in 2005 that 25% of all households did not own or have access to a vehicle (ie car or motorcycle), a reduction of almost a half from the estimated 45% of households that did not own a car ten years earlier.

17. The road network is characterized by the presence of very wide primary roads and small local side streets roads (known as "soi") that run off them. It is estimated that there are some 6,850 km of road in the BMR, comprising: (i) 520 km of expressway and special/national road and 1,450 km of rural road that are under the jurisdiction of the national government; (ii) 1,220 km of arterial road, 410 km of sub-arterial road and 2,450 km of local streets (sois) for which the BMA is responsible; and (iii) an indicative 800 km of road for which neighboring provinces are responsible[7]. There are few medium-width distributor roads effectively connecting the primary roads. The first urban expressway, the First Stage Expressway, which is a toll road opened in 1981. Since that time an extensive series of major road and expressway projects have been completed.

18. Traffic congestion in Bangkok is severe but in recent years traffic speeds have tended to remain stable at around 10 to 20kph (ie moderate to high congestion) in the central area with congestion spreading outwards geographically and to the off-peak periods including weekends. Congestion on primary roads is persistent throughout the day, and is exacerbated by the need for these roads to carry local, medium and long distance traffic and the combination of superblocks and traffic management that increase the distance that needs to be traveled. The cost of excessive traffic congestion in the BMR was estimated in 1998 at THB163 billion (about US$4 billion in 1998 prices) for additional travel time, vehicle operating costs, and extra crew costs, which was equal to 2.5% of GDP (OCMLT and Dorsch 1998). Traffic growth since that time and environmental damage would increase this cost.

19. Urban bus services in the BMA are managed by Bangkok Mass Transit Authority (BMTA), which controls a fleet of 12,200 buses – 3,600 buses are operated by BMTA, with the rest operated by the private sector under the authority of the BMTA[8]. Since the 1997 financial crisis, there has been growth in the use of air-conditioned vans for point-to-point commuter services – at first they functioned illegally but are now regulated by the BMTA. In July 2002, there were 5,330 of these vans. BMTA is generally not permitted to operate buses older than 10 years but due to financial pressure buses are being utilized for longer periods[9]. Due to high levels of traffic congestion bus productivity is

[6] These in-use data available from unpublished data sets of Thailand's Department of Land Transport are about half of the cumulative vehicle registration figures normally published which fail to account for almost all vehicles that are scrapped or are no longer fit to operate.

[7] Based on current information from BMA, DOH, DRR and ETA. Other estimates are also available, eg PCI et al (2005) reports 4,700 km of public road in the BMR.

[8] The private sector operators are generally described as "sub-contractors" to BMTA. In practice they operate more as licensees, being granted the right to provide services on routes specified by BMTA and obliged to pay BMTA a license fee and charge fares approved by BMTA, but otherwise operating as independent agents.

[9] In late 2006, the average age of the BMTA fleet was 14 years. Buses retired from BMTA service are sold to the private sector who operate services in Bangkok under license to BMTA. Buses operated by the private sector

cont. on next page

low. High staffing levels and other inefficiencies burden BMTA even further. Various studies have examined reforms to make the bus system more efficient. World Bank (1999) recommended the phased privatization of the system around BMTA's various zones and associated depots and the introduction of modern, more commercial management practices. Similar recommendations were made in GTZ (2003), Planpro et al (2003), Meakin (2005) and Center for Transport Strategy, University of Queensland (2006). GTZ (2003) and Planpro et al (2003) also recommended implementation of bus lanes on a major scale and use of Bus Rapid Transit (BRT) in Bangkok to provide a more economical means for satisfying some of Bangkok's mass transit needs.

20. A limited traditional rail network is present in Bangkok under the authority of the State Railways of Thailand (SRT). It is primarily at-grade and is double track on most sections. The railway system serves freight and both inter-city (and regional) and urban passenger traffic. Water transport services are operated in the Chao Phraya River and two major canals, and have an important though minor role.

21. Mass Rapid Transit (MRT) has been recommended as part of a suitable transportation system for many years. A MRT masterplan update called the *Urban Rail Transportation Master Plan* (URMAP) was completed in 2001 and further updated in 2004 (URMAP2). These studies provided a framework for subsequent planning and engineering studies and implementation of individual projects and programs particularly for urban rail transit developments in the BMR. URMAP sought to make best use of existing rail lines and facilities as part of an optimum metro rail system for Bangkok.

22. Bangkok's first MRT, the US$1.7 billion Bangkok Transit System (BTS – also called the Skytrain or the initial Green Line) was officially opened in December 1999. The BTS was wholly privately financed, with implementation and operation undertaken by the Bangkok Transit System Corporation (BTSC) under a concession agreement with the BMA. It consists of two lines totaling 23.5 km, has 23 stations and traverses some of Bangkok's busiest streets and activity centers. Present patronage is around 430,000 passengers per average working weekday. The second MRT system, the Blue Line subway that was opened in August 2004, is a 20.0 km underground system. The line was constructed using national government funds. A private consortium, the Bangkok Metro Company Ltd (BMCL), provides rollingstock and electrical and mechanical equipment and operates services under a concession to the Mass Rapid Transit Authority (MRTA). Present patronage is around 180,000 passengers per average working weekday. A 28.0 km airport rail link connecting central Bangkok and the city's new international airport (Suvarnabhumi Airport) in the east is under construction and is likely to be ready for commercial operations in 2009.

23. Poor air quality is a serious environmental hazard in Bangkok, with transport being a major contributor to air pollution. Improved control measures for fuel quality and new vehicle emission standards being implemented has resulted in some improvements in Bangkok's air quality although continued growth in vehicles and industrial activity will place further pressure on air quality in the future. Very fine particulate matter is a particular hazard to human health because they can penetrate deep into the lungs. World Bank (2003) estimated the cost of PM_{10} (particles less than 10 microns in diameter) in the BMR in 2000 as being over US$620 million. The aged diesel truck and bus fleet operating in Bangkok (and Thailand) are large emitters of particulate matter. Low average vehicle speeds, exacerbated by stop-start driving, increase the pollution generated by motor vehicles in Bangkok.

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are likely over 20 years in age and are re-engined every two years or so with second hand or new engines and have their bodies rebuilt typically at five to seven year intervals.

24. There is a high level of institutional fragmentation in Bangkok, with many government departments, agencies and state-owned enterprises having responsibilities related to urban transport and which can independently take to Cabinet proposals of major strategic impact. Such a large number of agencies complicates the process of coordinating policy and actions. The large number of agencies arises to some extent from the presence of the BMA and five provincial governments in addition to the national government, though the effect is exacerbated by a lack of clarity over the respective roles of these governments and hence duplication of their involvement in some areas. As an example, the first three rail MRT lines in Bangkok have been implemented independently through three agencies (BMA, MRTA and SRT), with unnecessary duplication of skills and, perhaps unsurprisingly, three different forms of financial arrangements for the lines and with poor physical integration between them.

C. FUTURE TRANSPORT DEMAND

25. Growth in future personal trip demand in Bangkok is be expected to be faster than population growth, which is forecast to be around 1.6% pa to 2017 (PCI 2005). The Office of Transport and Traffic Policy and Planning (OTP) has forecast that daily trip making could increase by 53% over the 20 year period 2006 to 2026, representing a growth rate of 2.2% per annum (OTP 2007b). While the outward expansion of the urban area may place some pressure for trip distances to rise, it is expected that this will be largely offset by changing land use that will enable people to undertake most of their activities in the region where they live. Increasing suburbanization and a possible slight decline in central area population density are expected to place increased reliance on motorized personal modes of transport. This forecast suggests that over the period to 2026, there will be an additional 0.44 million daily person trips by motorized means of transport in Bangkok each year.

26. PCI (2005) forecast that, in 2015 and with the development of an extensive MRT system (around 200 km in length), 40% of all person trips would be made by private motorized modes, 15% by rail MRT, 31% by bus, and 14% by walking and other NMT modes (see Table 1). About a quarter of MRT users were expected to use bus to travel to and from MRT stations. These shares suggest a decline in the use of private motorized transport, a rise in the use of public transport and a constant share of travel by non motorized transport modes compared with 2005 (see para 15). However, optimism bias is generally pervasive in forecasting of public transport demand, and there is a significant risk that the forecast trend of an increasing share of travel by public transport will not be achieved.

27. Thailand's economy has depended on external trade and the logistics, including the road freight industry which has facilitated the nation's impressive trade performance. Between 1990 and 2004 total exports grew by just over 10% per annum while imports grew by just over 8% per annum. It is expected freight transport will continue to grow at rates slightly higher than GDP growth in the future and that transport will maintain, and probably increase, its share relative to that for rail transport (see Amos 2007). Hence, in the long term road freight growth rates of the order of 7% per annum would seem to be likely. Over the next 10 years this would mean the demand for road freight would almost double.

D. PROPOSED RAIL MRT DEVELOPMENT

28. At the end of 2006, Cabinet approved a new plan for the proposed priority mass rapid transit railway projects for the BMR with a total length of 118 km and an estimated total investment of around US$4.5 billion. The projects, described in Table 2, will proceed in parallel and will be completed by 2012. An additional eight kilometer connection between the airport line (under construction) and the northern red line is also proposed. These lines appear to form the backbone of an ultimate MRT network which is now in need of updating. Notably, the MRT network currently proposed for priority implementation includes some lines that are in close proximity with other lines, and does not include any lines in the north east of Bangkok where rapid urban growth is expected. The

network is also shorter than that assumed to be present in forecasts of future travel demand described in PCI (2005).

29. The November 2006 Cabinet resolution indicated that the government will finance fixed infrastructure including depots through public financing, with the private sector undertaking supply and electrical and mechanical (E&M) systems including trains and operations and maintenance for the MRTA's Purple and Blue Line extension[10] and BMA's Green Line extensions. The same Cabinet resolution indicated that SRT would operate its Red Lines, including possibly the Airport Link now under construction, but with operations outsourced under contract. There also remains a need to determine the basis on which consider the other necessary policies, strategies, investments and actions which are needed to maximize the value of the MRT system, including links for pedestrians and a complementary bus system and land use changes.

Table 2: Currently Approved MRT Extensions

Line	Length (km)	Profile	Imple-menting Agency	Capital Cost of Fixed Infrastructure (THB billion, 2006 prices)
Red Line North and North East	41	at-grade & elevated	SRT	53.9
Green Line North extension	13	elevated	BMA	14.7
Green Line South East extension	14	elevated	BMA	14.9
Blue Line Subway extension to west of river	27	elevated & subway	MRTA	52.6
Purple Line to North West	23	elevated	MRTA	29.2
Total	118 km			THB165.3B

Source: OTP

E. CHALLENGES

30. A previous review of urban transport in Bangkok (World Bank 1999) noted the following issues:

- **Fragmented Institutional Structure.** Dispersed responsibilities and a resultant lack of accountability for addressing challenges and implementation of comprehensive solutions.
- **Lack of Strategic Focus**. Government transport policy has been substantially shaped by the emphasis given by individual government agencies to the construction of megaprojects. The statutory Bangkok City Plan lacks authority for BMA because it is unrelated to any short term, fiscally constrained, plans and programs. Current planning procedures are also ineffective as an instrument of implementation. Town Plans for other provinces in the BMR share similar difficulties.
- **Transport System Management and Operations.** Although buses carry 30% to 40% of daily passenger demand they likely carry the majority of peak period passenger traffic while using only around 20% of urban road space. But the efficiency of public transport has been inhibited by fundamental structural problems.

[10] Thus the proposed concessions would be similar to the existing Blue Line Subway concession held by BMCL although this concession also included investment in the depot.

31. The current study notes that progress has been made on some of these issues, as is discussed in subsequent sections of this report. Even so, there remain aspects of many of the issues that continue to be generally true today. Subsequent sections examine these and other issues in the context of the situation as it existed in early 2007. The current study concludes that five particular issues need to be addressed:

- **ensure the integrated and effective development of rail MRT** to make best use of planned substantial investment;
- **reform and modernize the urban bus system** and the manner in which bus services are provided to reduce unit costs and improve services;
- **improve walking conditions** for social and health reasons and to facilitate access to MRT and other public transport services;
- **enhance the institutional, regulatory and technical capacity** for government to better manage transport, including traffic, in Bangkok; and
- **develop a strategic road development plan and program and the road freight transport component of a national logistics plan** to ensure sufficient road capacity to meet future needs.

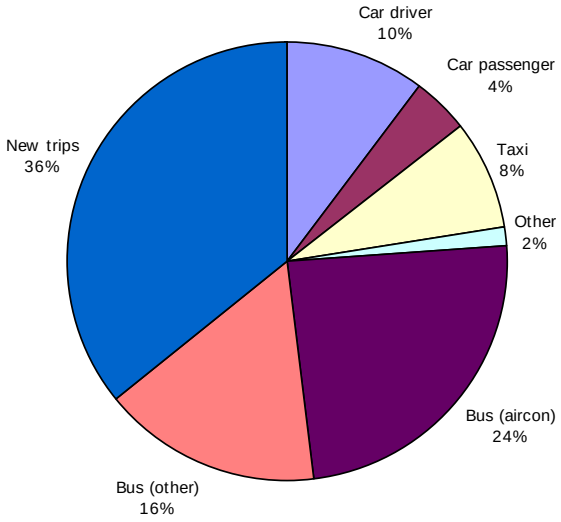
32. Following sections elaborate on the broad range of issues facing transport in Bangkok, and the reasons for ascribing particular importance to these five measures.

III. RAIL MASS RAPID TRANSIT INFRASTRUCTURE AND SERVICES

A. MAXIMIZING THE BENEFITS OF MRT AND MINIMIZING RISK

33. Rail MRT (simply referred to as MRT hereafter) is expensive to implement and operate. It is a cost-effective means of transport only where there are large volumes of passengers to be carried. The average capital cost for MRT in Bangkok to date has been about US$60 million per km (in mid 1990s prices) for the 23.5 km elevated Skytrain or initial Green Line operated by Bangkok Transit System Corporation (BTSC) and US$155 million per km (in late 1990s prices) for the 20.0 km Blue Line Subway operated by Bangkok Metro Corporation Limited (BMCL) for all the infrastructure and an initial set of rollingstock. MRT is more high risk than is commonly expected, as witnessed by the lower levels of demand for the first two lines and the poor financial performance of both BTSC and BMCL.

Figure 1: Sources of Skytrain Patronage



Source: PAS/EPS (2001)

34. In addition to successfully attracting people from other transport modes including car drivers, the Skytrain allowed considerable travel that had been previously suppressed due to poor public transport and high traffic congestion to occur (see Figure 1). However, overall demand was considerably lower than forecast. There is clear evidence from around the world that "optimism bias" is especially prevalent in urban

rail projects, and that an attitude of "build and passengers will come" cannot be taken with regard to MRT. A study of twenty-seven passenger rail projects showed that, on average, actual demand in the first year of operation was on average only 49% the of demand that had been forecast for that year, with 40% of the projects having demand that was 60% or less of the forecast demand (Flyvbjerg et al 2006). The risk of MRT investments underperforming can be reduced by using MRT only where essential and using other modes where they are more cost effective, ensuring the MRT system is fully integrated from the point of view of users, integrating bus and MRT services to increase the catchment area for the MRT system, facilitating walking to and from MRT stations to increase the attractiveness of the system, and intensifying land use in the vicinity of stations to further increase demand.

Using MRT Where Appropriate

35. The high cost of MRT means that it should be used only where there is a high level of confidence that there will be substantial travel demand. Achieving this can be facilitated by increasing the catchment of MRT stations. While an essential feature of MRT systems is that lines intersect to increase the range of locations between which people can travel via transfers, building lines too close together over long lengths means that they cannibalize each other's demand, and therefore weaken the merit of each of the lines. It therefore essential that line coverage not be duplicated until demand warrants. There are some sections of MRT in Bangkok that are in closer proximity than is desirable, in particular the northern section of the red and green lines, and blue and green lines to the west of the river. Furthermore, the division of MRT responsibilities among three agencies (BMA. MRTA and SRT) even with OTP taking a central planning role, increases the likelihood that MRT lines will be duplicated and the optimum MRT investments are not sought as each agency focuses on its own interests.

36. More generally, there is the opportunity to consider use of other, more cost-effective modes of public transport in the place of MRT in Bangkok for MRT lines that have relatively low levels of demand. These alternative modes include light rail transit and bus rapid transit (BRT). It might be possible to use these other modes as part of a phased strategy, with the modes being replaced with MRT if demand should rise to a level that is beyond their capacity.

Delivering Integrated MRT Services

37. The experience in Bangkok to date indicates that the best means forward is for the government to construct fixed MRT infrastructure and for the provision of trains and services to be undertaken by private sector operators operating under concession agreements (ADB 2006a). The GOT is broadly following this approach. A number of issues are related to ensuring that integrated MRT services are delivered to the public, and these are addressed in Section B below.

Integrating Bus and MRT

38. MRT may be able to generate sufficient demand to justify their presence if land use development is intense along their alignment. However, even in densely populated cities, many people using MRT access them via another public transport service. To date, there had been little formal integration of other public transport in Bangkok, which is essentially bus, with MRT. This will have contributed to the lower levels of demand for the current lines than was originally forecast. Serving the MRT should not be the sole role of bus in Bangkok because, even with a fully developed MRT system, much travel demand will occur between locations that cannot be easily reached by MRT including some travel along the MRT alignments where for cost and travel time reasons some people will prefer to use bus. Nevertheless, there should be considerable opportunity to restructure bus routes to better serve the MRT system and hence to increase their catchment area and demand. There is a complementary need to provide bus stops that are immediately next to stations and good quality footpaths to walk between the bus stop and station entrance.

Facilitating Walk Access to MRT

39. At present, existing MRT stations are often developed in very constrained areas, with staircases and some escalators (about two meters wide) accommodated within a two to three meter wide sidewalk. Major sidewalk congestion occurs. Set-backs[11] of adjacent buildings in future will provide the opportunity of ensure that stations integrate better with local land-use. Further direct links between station concourses and adjacent developments are expected which while carried out for commercial reasons will take pressure off sidewalks.

40. In many cases, interventions to improve sidewalk and pedestrian access to MRT stations can be achieved for very low cost but very high benefit and with low risk. Improving sidewalk access can have a substantial impact on MRT patronage. Revealed passenger behavior indicates that people are generally willing to walk up to about 5 minutes to access a station, which indicates that they may typically walk up to a little over 400 meters at an average walking pace of 5 km/hr. Reducing passengers' perception of the walk-in time by 5% could increase walk-in demand by 10% because it expands the area from which people perceive they are within their 5 minute limit. Reducing the perceived travel time can be achieved by both improving footpaths so that people have a higher average walk speed and by making the walk seem less unpleasant by, for example, providing a smooth pavement surface, reducing obstructions along the sidewalk and providing shade. The investment by BMCL and BTSC in escalators at stations, with continuing investment by BTSC, achieves both of these outcomes, ie reducing travel time and making it more pleasant. Not all sidewalk and pedestrian improvements need involve major new investment. In many cases, improved management to minimize undesirable construction impacts, management around busy market areas in the vicinity of stations to ensure "clutter free" zones and routine maintenance to ensure the integrity of sidewalk facilities.

Intensifying Land Use at MRT Stations

41. MRT can increase the accessibility[12] of lands around stations, and lay the foundation for greater intensification of land use around the MRT system. It is expected that improved accessibility would be a major driver of commercial developments to form more intense activity centers centered on, and within 400 meters of stations, thus enhancing MRT usage. Through facilitation of activities close to the stations, the potential foci of local precincts, the economic benefits of MRT would be enhanced.

42. However, generally speaking land parcels of suitable sizes are not generally available for development, and are not provided as part of MRT concessions. An improved outcome is possible in the future as an extensive MRT network of lines and services is created. Achievement of major activity centers around future MRT stations and intersections of lines requires specific development planning, with a commercial perspective, around the most suitable stations. Actions which could be beneficial to support property densification to occur could include increasing the allowable plot ratio[13] and reducing car parking requirements for new buildings, thus taking advantage of the increased land value made possible by MRT. This is a complementary approach to achievement of greater integration of services which also requires an emphasis on pre-planning of the "network" rather than "individual projects."

[11] The BMA's site controls which are largely exercised the time of building approval provide for a set back of six meters from major main road frontages.

[12] Not all such accessibility benefits can be attributed to MRT as they are already along existing major road corridors.

[13] Plot ratio is the ratio of total floor space to site area.

43. The property taxation system is inadequate and financial mechanisms to raise additional funds from MRT development through value capture for possible contribution to general revenue of government or to be hypothecated for transport improvement do not exist, but should be developed and seriously considered for adoption (refer Annex C). Improved property taxation is a broader issue than for transport alone, and will need to be pursued as part of a process of financial decentralization.

B. ENSURING INTEGRATED AND EFFICIENT DELIVERY OF MRT SERVICES

44. MRT is the main focus of major urban transport investments in Bangkok in the next six years. Despite the high investment, the completion of priority MRT lines quickly and in a coordinated way can provide valuable support to the road system through providing a "relief valve" for congestion thus better integrating Bangkok and supporting the economy. But a focus on only rail infrastructure will not solve Bangkok's transport problems given the cost and time to implement projects, the scale of anticipated growth in travel demand, and the distribution of travel demand around Bangkok. Moreover, there has been an undue emphasis to date on infrastructure, with less attention given to how services should be provided, linkages between MRT and other modes of transport, pricing and ticketing, and broader associated issues such as land use. Without concerted attention, there is a risk that the expenditure of billions of dollars on MRT in Bangkok could result in an irretrievably suboptimal system with, for example, lines developed and operated independently, poor physical integration between lines, and no integrated fare and ticketing systems.

45. There is much understanding on the way forward with MRT but imminent decisions need to be taken to lay the basis for effective and efficient MRT. This understanding has been developed by studies commissioned by URMAP (1 and 2) and the more recent ADB funded technical assistance to the GOT (ADB 2006a and b), within the framework of the UTDP, and includes recognition that:

- MRT needs to be complemented by a balanced program of policy and investment in other modes and a **shift to the delivery and management of integrated transport services** to move Bangkok's citizens quickly, safely and conveniently from 'A' to 'B' irrespective of what modes are needed to accomplish the journey or who operates them.
- **Complementary integrative systems** are needed covering:
  - fare setting (both the structure and level of fares) that maximizes usage and community benefits by balancing the needs for fares that are affordable to users, making it easy for travelers to use the MRT system (and other public transport too), and enhancing cost recovery of MRT;
  - development of a single, common electronic ticketing system to be provided separately to operating concessions for rail or bus and other public transport modes;
  - Common marketing, branding and provision of information on each public transport mode and mode irrespective of who operates the service; and
  - specification and procurement of services in a way that encourages integration of MRT services (and bus too) even though different agencies are project owners and a variety of individual, private or State operators may be involved[14].

[14] ADB (2006a) concluded that a "gross cost" form of concession contract for MRT is needed to achieve the desired outcomes of an efficient, integrated and flexible MRT system. Under such an arrangement, the government would pay for the cost of the infrastructure and services that each concessionaire provides. Payments would be related to patronage, commensurate with the ability of concessionaires to influence demand. Payments would also be linked to service quality. Fare revenue would be collected by a central agency using a single, common electronic ticketing system and with fare revenue accruing to the government to contribute to the cost

cont. on next page

- **Appropriate governance including funding arrangements**. Section IX summarizes the findings of ADB (2006a) but also updates and extends it to describe options for extension to the bus sector (and other modes).

46. ADB (2006a) recommended a series of practical actions to move forward on MRT:

- **Improved program development** – including sound and realistic project preparation with coordinated budgeting, to be achieved by expanding the scope of planned design reviews, and preparation of a thorough business case for each line that indicates, amongst other matters, financial viability and the extent of system integration, with the business case providing information that is needed to develop a sustainable concessioning model. Safeguards including environmental impacts and resettlement and compensation also need to be addressed.
- **Developing the gross cost concession model** – for application to all future MRT lines recognizing that the likely different cost-recovery characteristics of MRT lines and the need for an MRT system that is integrated from the perspective of users and under the policy control of government. ADB (2006b) developed a more detailed "model" contract which should be adapted for immediate use in Bangkok.
- **Improved coordination and management** - through new institutional arrangements that avoid the inevitable fragmented outcomes that result from development of individual MRT lines by, at present, three disparate agencies.

47. Today in 2007 Bangkok is in the same position as in early 2006 which ADB (2006a) described as follows:

> *"Having embarked on a program for major expansion of the rail lines, early action in the first three areas is needed to avoid locking in sub-optimal and largely irreversible decisions. Material progress in these three areas will bring about substantial "once-off" benefits. However, to sustain these benefits and realize new opportunities requires progress with … improved coordination and management. Although experience shows that improving institutional arrangements may sometimes be painful and time consuming,… it is possible to commence with a more limited form of coordinating organization and to transfer more authority to it over time."*

C. DEVELOPING A RAPID TRANSIT INFRASTRUCTURE AND SERVICES PLAN

48. An update of the format URMAP2 MRT master plan is needed and be extended to include others forms of rapid transit (eg BRT) including the related services. The current five priority MRT lines proposed for early and parallel implementation in general have a sound logic in that they may well form a suitable backbone of an ultimate MRT network but the following deficiencies are noted:

- the economic priority (ie in terms of community benefits) of each line is unknown;
- the financial performance of each line, which has implications for on-going financial support from government, is not known;
- a detailed and fresh review of the business case for each of the initial lines would reveal some potential for optimization, including their location, technology and phasing;

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of its payments to concessionaires. Such a concession form could also be described as an "availability-performance" contract. This differs from the current system in which each MRT line is operated independently and each concessionaire collects and retains fare revenue for their line and attempts to meet their costs from this and other sources of revenue without further recourse to government funds.

- the program is ambitious in timing and construction of all lines in parallel may overheat the construction market with escalation in prices;
- appropriate design of initial MRT lines ideally requires confirmation of the long term structure of MRT lines and how they will operate as a network of services to ensure stations designs can facilitate coordinated services and passenger transport, inter-operation of services where appropriate, and appropriate treatment of major interchange locations (with bus) and major activity nodes where land use intensification would be desired;
- given the major suburban development to the north east of Bangkok, it is important to define what future lines should be developed to serve this sub-region;
- future lines will generally have lower forecast levels of demand than priority lines even though some of the latter will not achieve operational financial cost recovery – lighter forms of rail or bus-based rapid transit technologies may be appropriate in these situations, at least until the medium term; and
- inadequate attention to complementary investments to promote safe, convenient sidewalk access to stations in part because this is the responsibility of BMA and not other MRT delivery agencies.

49. An appropriate Rapid Transit Infrastructure and Services Plan would have the following objectives:

- define service desired standards for connecting the principal origins and destinations within Bangkok (eg 90% of households to 90% of jobs, educational opportunities etc) in terms of proximity to stations, waiting times, and overall travel times;
- audit current modes in terms of their ability to provide a complete and seamless service to satisfy the desired standards;
- identify available technologies including heavy rail, MRT and BRT (high quality) and other good quality bus services and associated cost, and operating characteristics;
- forecast broad future transport demands for all major corridors in the BMR identifying feasible rapid transit technologies for each;
- identify a range of options for rapid transit lines with broad treatment of how they would operate as network of services using the identified suitable open technologies;
- define, the corridors and areas which cannot warrant the application of rapid transit infrastructure and are therefore remain the domain of other public transport, principally bus;
- identify suitable locations for transit-oriented activity centers and undertake initial strategic development planning as to the likely form, scale and phasing of development and likely benefits;
- identify broad costs for each MRT option and evaluate their operational, and broad economic and (operational) financial performance;
- identify a short list of the most promising options, and define, cost in detail;
- prepare detailed forecasts sensitive to the operational characteristics of each option;
- refine broad economic and (operational) financial performance of each line;
- identify needed actions on safeguards;
- recommend a suitable, prioritized long term rapid transport network for BMR;

- recommend suitable supporting strategic features of a modified bus and other supporting public transport network;
- define supporting governance, and integrative mechanisms (eg fares, ticketing, marketing etc); and
- define an implementation plan with funding needs and sources (whole of life).

D. SHORT TERM ACTIONS TO IMPROVE OUTCOMES

50. Practical action is needed to implement the gross cost concessioning and integrated fares and ticketing approach set out by ADB (2006a and 2006b) and being further assisted by an ADB TA[15] which commenced in February 2007. What still remains to be carried out urgently are:

- **Comprehensive design reviews of proposed lines** – design reviews should be undertaken from a whole of life point of view and after full consideration of how they will facilitate a network of rail and connecting bus services, and how the desired benefits can be retained with procurement with a variety of contracts and parties**.** Comprehensive project preparation is needed covering the business case, safeguards and so on, to ensure there are no unforeseen obstacles to implementation, and that the projects are meet the requirements of, external funding agencies thus shortening funding approval and implementation times.
- **Coordinated action and oversight to optimize current MRT investment** is needed for enhanced financial and transport outcomes.
  - **to oversee the design reviews**.
  - **to achieve greater standardization and integration** of feasibility studies, including more comprehensive study of private sector participation options, that are required to be undertaken by sponsoring agencies (ie MRTA, BMA and SRT) under the Act on Private Sector Participation (PPSU) 1992 which is Thailand's current framework for public private partnerships. Enhanced MRT-specific guidelines for options analysis, procurement and monitoring would be highly desirable to support NESDB's 1993 announcement on what the business case for an MRT project should include as recommended by ADB (2007).
  - **progress gross cost concession contract development** and to apply it to the concessioning of the operations for future MRT lines being developed.
  - ensure that the **procurement of new ticketing systems for MRT lines permits integrated ticketing to be achieved** which can in due course be extended to bus services.
  - ensures that the supply of other **critical technology systems permit full interoperability** – train control systems, the trains themselves should permit full interoperability with existing and future lines irrespective of the agency (ie MRTA, BMA and SRT) involved.
  - serious **deliberation on the appropriate long term governance arrangements** for MRT and all public transport modes, and possibly the road sector as discussed in Section IX of this report.
- **Develop the identified Rapid Transit Infrastructure and Services Plan** – see paragraph 48.

[15] TA 4904 -THA: Technical Assistance for Infrastructure Investment Advisory Assistance (Phase II). Refer also ADB (2007).

IV. BUS SECTOR MODERNIZATION AND REFORM

51. The critical role of bus transport in the future passenger travel task for the BMR was noted in Section II of this report. It is common for public policy attention to be placed on MRT because of its symbolism of modernity, its high explicit cost and its apex role in the public transport system. Buses currently carry twelve times as many passengers each day as the two current operational MRT lines. Even if the full potential MRT system is implemented, for which there is no current commitment, bus is likely to still carry twice as many passengers each day as MRT. Indeed, the success of MRT will be dependent on the quality of the complementary bus system. Passengers who use buses are likely poorer and more disadvantaged than those who use MRT. The consequences of a failure to give the bus system sufficient policy attention and resources could therefore be substantial in both transport and social terms.

A. CURRENT PERFORMANCE

52. The bus sector in Bangkok is literally in crisis with many problems. These problems have been studied and confirmed many times most notably by World Bank (1999), GTZ (2003), Planpro et al (2003), Meakin (2005) and Center for Transport Strategy, University of Queensland (2006) and include:

- declining demand due in part to declining service quality because of traffic congestion, associated unreliability, and services and timetables that are not responsive to current demand patterns;
- BMTA's fleet of 3,600 buses has an average age of 14 years and is polluting;
- the 3,400 bus fleet of BMTA's 35 private sub-contractors[16] is far older and even more polluting, though generally operating at the lowest possible short term financial cost;
- BMTA also have as private sector sub-contractors 1,175 green minibuses, 5,500 passenger vans and 2,000 soi minibuses[17] under the control of a large number of operating units (typically two vehicles per owner or less);
- an inflexible, non transparent regulatory regime discourages technical innovation, new investment and route and service changes that respond to user needs – routes and services have been little changed for many years;
- with a staff of over 18,000, BMTA has more than twice the number of personnel needed to operate efficient bus services (World Bank 1999; Meakin 2005);
- more generally, the monopoly power held by BMTA has encouraged conservative, bureaucratic and inefficient administration with limited accountability and responsiveness to consumer needs; and

[16] While described as sub-contractors, operations of bus services by the private sector under BMTA bear characteristics of operating under license. The private bus operators pay BMTA a license fee and operate on routes determined by BMTA, but retain fare revenue and must meet their costs from this revenue. BMTA generally purchases new buses, and sells them to the private sector sub-contractors when the buses are over ten years old.

[17] Although the soi-mini buses and green mini-buses have operated for many years the vans commenced illegally post 1997 (in the economic crisis) responding to a demand for more convenient passenger services not provided by BMTA and the availability of many people that had lost their jobs to operate these services. These services were legalized after the event and brought within the BMTA system of operations.

- BMTA's accumulated deficit was THB47 billion (US$1.4 billion) at the end of 2005 and has grown over the three years to 2005 at an average amount of THB5.1 billion (US$150 million) pa in 2005 prices.

53. Meakin (2005) attributes the causes of these problems principally to:

- **Lack of a Rational Transport Policy and Systematic Planning** – there is no coordination between urban development planning and public transport planning. There is no formal planning process for the introduction of public transport services. In the absence of any mechanism to make the bus system responsive to demand the bus network has become 'frozen'. The addition of bus capacity is incremental, not comprehensive, so the network has become inefficient. An example of this is that neither BTSC nor BMCL have been able to develop new integrated bus feeder services either using BMTA buses or their own.

- **Inappropriate Regulatory Framework** – BMTA holds an effective monopoly of bus services in Bangkok and has a power to sub-license private operators on its routes. This creates a conflict of interest between BMTA's roles as a regulator and an operator. BMTA has often used its regulatory powers to protect its commercial interests. BMTA and MOF (2006) in their joint action plan report to the high level committee formerly in place to address BMTA's deficit recognized these deficiencies. There is no systematic monitoring or planning process so that route parameters are not related to demand. The procedure for licensing operators to routes is not transparent and there is no element of competition to select the most competent operator. The license conditions are frequently over-ridden by political directives, for example on fares.

- **Inadequate Enforcement of Rules and Regulations** – enforcement efforts are spasmodic and seldom sustained.

- **Ineffective Policy and Regulatory Institutions** – there is still no single agency responsible for public transport policy and regulation, while no agency undertakes the essential service monitoring and planning process.

- **Inappropriate Operating Structures and Company Size** – the industry consists of BMTA, 35 private bus sub-contractors operating 3,400 buses, and a very large individual sector. This fragmentation of the industry is a direct result of the BMTA monopoly. While the structure itself is not the problem the associated lack of investment capacity and capability to operate more comprehensive and demand responsive services is the major drawback.

B. PREVIOUS PROPOSALS FOR REFORM

Drivers of Change

54. The key drivers necessitating change to the bus system in Bangkok are: declining demand, which reinforces other observations that the current system is not responsive to the needs of users; BMTA's huge and rising accumulated deficit and its low level of technical efficiency, which are unnecessary and costly to the public purse; the advancing age of the bus fleet in use in Bangkok, with substantial investment needed to upgrade to more comfortable and less polluting buses; continuing challenges from traffic congestion and MRT development; and opportunities arising from MRT development and BRT initiatives.

Previous Reform Proposals

55. The 1999 World Bank study recommended the phased privatization of the system around BMTA's various zones and associated depots and the introduction of modern, more commercial management practices. An essential component was the creation of a professional bus management agency to plan the bus network, procure services from private sector operators, and monitor the

provision of services (World Bank 1999). State Enterprise Policy Commission (2000), also proposed similar arrangements for bus and other transport modes. The recent 2003 study by the German Agency for Technical Cooperation (GTZ) made similar recommendations to the State Enterprise Policy Office (SEPO) of MOF. GTZ also recommended major bus lanes and development Bus Rapid Transit (BRT) in Bangkok to provide a more economical way of satisfying some of Bangkok's mass transit needs in future. This approach was endorsed by Planpro et al (2003), Meakin (2005), and Center for Transport Strategy, University of Queensland, (2006).

56. A key component of the World Bank (1999) proposal was the creation of a Transport Commission for the BMR with the aim of representing all local governments in the region including BMA[18]. The main functions of the Commission were seen as being the planning and integrating of strategic land use and transport infrastructure and services in the entire region in accordance with local needs. In terms of bus (and other) public transport services the proposed bus management agency (described above) would be an agent of the Commission.

57. Since the late 1990s, SEPO had been working on an approach to bus sector reform with three essential strands (see also Bull 2003):

- **Corporatization of BMTA** – the application of the "Corporatization Act" requires the Minister of Transport to seek Cabinet's endorsement for corporatization. An immediate outcome is that BMTA would become a bus operator (although State-owned) without a self-regulation function. As a corporatized entity BMTA would not be entitled to automatic debt-financing by government thus promoting improved financial discipline;
- **Creation of a New Urban Bus Regulator** – the proposal was for creation of a Bus Control Management Authority (BCMA)[19] whose duties would include specifying service standards, contracting of services and monitoring of operating compliance; and
- **Use of Performance Based Contracts** – all revenues from bus operation to be collected by a central agency with bus operators to be paid on a per-km (or other) basis depending on the social and commercial nature of the bus service. In essence, the proposal is for a **gross cost contract where operator(s) are paid fees for delivering services for which the quantity**

[18] Since the early 1990s, proposals have been made to transfer BMTA to BMA. In principle the concept of having bus services planned and procured locally is sound although initial proposals neglected the need to consider bus services commencing and finishing outside BMA and in the other local government areas within the BMR. Central Government found the idea attractive if only to offload the responsibility for future debt obligations to BMA. BMTA staff offered their support if their State-enterprise employment conditions could be retained. Planpro et al (2003) made similar proposals to that of World Bank (1999) via the creation of a regional transit planning agency with board-level political oversight from all constituent local governments. Despite the transfer to a different level of government the critical issue for Bangkok is the appropriate structure for planning and procuring efficient and effective bus services. This is a separate but fundamental issue to which level of government is responsible. Meakin (2005) reports that during 2005 BMA was not committed to the transfer of responsibility for bus transport to BMA and had imposed conditions for such a transfer that include: raising fares to eliminate operating deficits, resolution of BMTA's accumulated debt, operation to be under a performance-based contract, and unprofitable operations to be funded by government through a budget for public service obligations. As a promising sign, in late 2006 Cabinet gave permission for BMA to operate new fare paying bus services on their proposed BRT line, offering potential for a wider development of locally planned and procured bus services.

[19] It is not clear whether this proposal would override the provisions of the Land Transport Act and the roles of the Central Land Transport Control Board (CLTCB) and Provincial Land Transport Control Boards (PLTCBs) who administer this function conservatively at present in Bangkok and other provinces in and adjacent to the BMR respectively.

and quality are specified. This then is a complementary concept to that recommended for MRT by ADB (2006a and 2006b) and is a near essential requirement for integration of ticketing, and simplifies the ability to introduce integrated multi-modal fares, and integrated multi-modal public transport services.

58. SEPO's approach is consistent with the first steps proposed by the World Bank and GTZ studies. While SEPO considered the potential for new private operators to take over parts of BMTA's monopoly, they stopped short of making recommendations on this unpopular topic.

Recent BMTA Reform Proposal

59. The most recent government-led, though now not current, proposal to reform BMTA built on the SEPO approach (BMTA et al, 2006) proposed:

- purchase of 2,000 new air-conditioned, compressed natural gas (CNG) fuelled buses to replace an equivalent number of existing aged buses from its current fleet of about 3,600 buses;
- rebuilding of up to 2,000 of the existing better quality buses and re-powering them;
- purchase of a smart-card ticketing system for the new buses;
- implementation of a revised bus routing plan, which was based on services feeding into a number of major nodes with connecting routes that would require forced transfers for many passengers to reach their destinations; and
- introduction of a flat fare, initially at about Baht 10 per journey and with free transfer between buses used in a single journey, which would be a substantial reduction in average fares.

60. Initial, but likely overly optimistic, analysis by BMTA suggested that the proposal would broadly recover its costs assuming a major reduction in staffing levels and an initial 7.5% rise in patronage with the introduction of new buses and reduction in fares and subsequent 2% per annum growth. BMTA assumed it would retain a balance of about 15,000 staff after allowing for the early retirement of around 3,000 staff and the assignment of around 560 staff to the proposed regulator (BCMA). Other cost reductions were assumed to be achieved through the somewhat vague node-based route restructuring proposal and the use of CNG fuel[20]. It was also assumed that the capital costs of new vehicles would be paid for by the Government, as previously proposed by Cabinet.

61. Some drawbacks of the proposed reform noted in Center for Transport Strategy (2006) were:

- the proposed reforms would resolve only some of the issues being faced in Bangkok – other substantive reforms to encourage efficiency are needed;
- there are options to the purchase of NGV fuelled buses that could achieve similar environmental benefits at lower cost, for example, use of diesel fueled Euro III (or more stringent Euro IV) standard buses – the relative merit of the options depends on the future price of CNG and the ability to adequately maintain NGV buses;
- more detailed analysis was needed to ensure that the proposed changes to bus routes and services would meet passenger needs;

[20] A Cabinet directive setting the price of CNG at THB8.5/kg for five years results in the cost of using CNG being up to half the price of diesel for new buses for this period. However, this saving would be less when higher maintenance costs for CNG-fueled buses is taken into account, and would decline further if gas prices rose relative to diesel after the initial five year term of fixed prices.

- the proposed nodal service structure requires seamless transfers for passengers, which is likely to require additional substantial investment in off-street terminals – alternatively, on-street transfer could be made more attractive but would require more through running of services than implied by BMTA's service concept;
- the proposed electronic ticketing system would not be comprehensive and little consideration was given to how it should be integrated with MRT and other modes – it was to cover only a little over half of BMTA's bus fleet, leaving the remainder of BMTA's buses and all private sector buses outside the ticketing system;
- it was proposed to retire some 2,000 ticket sellers with the introduction of electronic ticketing, but this could be counterproductive as longer passenger loading times would increase the cost of operating buses by more than the saving in the cost of ticket sellers apart from reducing service speed and demand; and
- there was no consideration of the impact of the proposals on private bus operators – the use of new buses by BMTA with lower fares would attract patronage from private bus operators, leaving the private operators to either seek compensation from the Government for the loss of patronage or possibly in some cases to cease providing services.

62. The reforms proposed by BMTA contain some useful concepts, but require more detailed consideration to ensure that they provide net benefits for the public transport system as a whole.

C. DIRECTIONS FOR CHANGE

63. Five key areas of change emerge from past and current studies as being essential to the future effectiveness and efficiency of the bus system in Bangkok: to improve bus service planning to better meet the needs of passengers; to better insulate buses from traffic congestion; to use BRT where it is more cost-effective than other modes; to identify measures that can reduce the cost of providing bus services; and to improve bus system management.

Bus Service Planning (including integration with MRT)

64. Development of complementary and coordinated bus services that both feed to MRT stations and service passengers whose trips lie within the MRT corridor but for whom MRT is not convenient, is essential. A major structural change to the bus network is long overdue as the pattern of routes is largely unchanged since the 1960s even though the city form has dramatically changed. The continued extension of the length of bus routes supported by flat fare structures on many routes has contributed to the bus systems' problems by creating an inefficient demand pattern and unreliable services that are highly vulnerable to congestion. A major revision to bus routes needs to be undertaken and although this requirement has been recognized by OTP, BMTA and SEPO, the Central and Provincial Land Transport Control Boards resist fundamental change.

Bypassing Congestion

65. Traffic congestion has reduced bus operating speeds and reliability, and falling productivity of the fleet has added to costs and fares and contributed to the 'vicious circle' of passenger losses and declining service and so on (World Bank 1999). Bangkok used to have an extensive network of bus lanes developed from the 1970s and then modified with the major change to the one-way traffic system by the police in the early 1980s. But generally speaking as congestion has increased bus lanes have been abandoned or traffic allowed to use lanes compromising their role in giving priority to buses. The types of bus lane most at risk have been 'with-flow' bus lanes which travel in the same direction as traffic. The most successful bus lanes, as they are largely self-enforcing, are those that travel in the opposite direction to one-way traffic while at the same time providing a short cut for buses through the road network. Such 'contra-flow' bus lanes exist in Rajaprop and Lan Luang roads and several other locations.

66. There is still scope for improving the scope and effectiveness of bus priorities as part of a comprehensive approach to traffic management, particularly in support of heavy investment in MRT which when opened, will relieve traffic in adjacent corridors. Carefully planned bus priorities will both assist MRT by facilitating access to MRT stations, support convenient bus travel along MRT corridors for passengers that do not find MRT attractive, and also in corridors that do not have MRT. Bus priority lanes implemented along MRT corridors would also limit the ability of new traffic to fill the space vacated by car drivers who switch to MRT.

Introducing BRT

67. Dramatic improvements to the speed and reliability of bus services can be achieved using Bus Rapid Transit (BRT). BRT is distinguished from small scale bus priority lanes which operate in mixed traffic often providing priority at intersections, with large sections of dedicated exclusive bus lanes, often on their own rights of way. Complementary measures such as increasing the spacing of stops, providing limited-stop services, speeding passenger boarding by reducing or eliminating on-vehicle fare purchase and improved vehicle design, such as low floor and wider doors, impact significantly on the quality and speed of BRT. The Governor of Bangkok has recently promoted the development of several BRT routes – with some segregation but also on-street mixed traffic operation. The following projects are being given priority:

- construction of the first BRT route, stretching 16.5 km from Chong Nonsi to Ratchaphruek, will begin in March 2007 and cost THB1.9 billion; and then
- the 38 km Don Muang-Min Buri-Suvarnabhumi route estimated to cost THB4.5 billion.

68. The BMA plans four more BRT routes. Careful attention to how buses will operate in the mixed traffic sections is essential in particular at major intersections where buses will compete with traffic for space, and in addition, to planning adjustments to bus routing structures to optimize both bus operation and passenger travel in the BRT corridors.

69. BMA's first BRT route will face initial obstacles including low demand, traffic conflicts and, until quality is sufficiently improved, less public acceptance than would be possible with high quality BRT. However, BMA's BRT initiative is worthy of active support as BRT offers a viable alternative to rail MRT where passenger demand is low and more flexible public transport services are needed. Depending on circumstances, the cost of BRT could be a fifth to a tenth of the cost of rail MRT. BRT can provide a means for facilitating new public and private investment in bus services, fleet and facilities in Bangkok, and achieve faster implementation of rapid transit services in the city.

Optimizing Bus Costs

70. The use of CNG-fueled buses is a practical means for governments to communicate to the public their intention to promote improved environmental outcomes. However, neither the technical nor financial merit of CNG-fueled buses appears to be overwhelming. The buses are more expensive, require more sophisticated maintenance that will take time to develop, and use considerable energy to compress the gas. Higher engine temperatures increase wear and maintenance needs, and higher fuel consumption requires either larger fuel tanks on buses (which can be difficult to accommodate) or more frequent refueling (which adds to costs because of the need to take buses out of service to refuel them). These effects involve more use of resources, which in turn add to emissions and offset some of the advantages of using CNG. Modern diesel-fueled engines produce low levels of emissions using technologies that are better known and thus easier to maintain. A better understanding of the relative merits of each option is needed to support sound decision making on the future procurement of buses in Bangkok to ensure that costs are minimized taking into account their life-cycle environmental impact. Whatever approach is adopted, there is a need to ensure the skills and resources are available to ensure it is implemented effectively and that the benefits of the approach can be sustained in the long term.

71. For various reasons, BMTA bus operations are not efficient. As a result, costs are much higher than need be the case. An analysis of costs in FY2004-05 suggests that operating and maintenance costs could fall slightly if BMTA could attempt to introduce reforms internally, but could be 30% lower with private sector operations (see Table 3). Even if the higher cost of private sector capital is taken into account, the private sector could supply and operate buses at a significantly lower cost than BMTA. Evidence for similar savings in operating and maintenance from the competitive tendering of former public bus services are to be found in other places, for example savings of 50%-55% in Great Britain, 20%-30% in Scandinavia, 30%-46% in the USA, 22%-38% in Australia and about 40% in New Zealand (Wallis and Hensher 2005).

Table 3: Effect of Institutional Arrangements on the Cost of Bus Services

	Estimated bus costs (relative to current BMTA costs) where bus services are provided by:		
	Current BMTA	**A More Efficient BMTA**	**Private Sector**
New Euro II airconditioned bus			
Operating, maintenance & depot costs	100%	93%	71%
Bus capital cost	100%	97%	122%
Total cost	100%	94%	84%
Secondhand non-airconditioned bus			
Operating, maintenance & depot costs	100%	95%	69%
Bus capital cost	100%	93%	104%
Total cost	100%	95%	71%

Source: Center for Transport Strategy (2006)

72. These data indicate the potential to substantially improve the financial sustainability of bus services in Bangkok by reducing the unit cost of providing services. Without these savings, government will need to continue to provide substantial subsidies or reduce the level of service provided to the community. Both of these options represent transfers of costs and benefits between different groups in the community for which there is no technical merit. The international experience clearly indicates that private operators are better able to minimize costs if provided with suitable opportunities and incentives. Means for achieving this are discussed in the next subsection.

Bus System Management

73. BMTA performs a range of roles, covering policy and strategy, regulation, program management and service delivery. As is discussed further in Section IX, there are inherent conflicts between these functions. Moreover, when combined with its monopoly over the management and provision of bus-based public transport in Bangkok, they provide incentives for institutional behavior that is not necessarily in keeping with the public interest. The extent of over-staffing, excessively high costs, declining patronage and high subsidy indicate that BMTA has captured for itself financial benefits from the taxpayers at large and benefits that should have otherwise accrued to those who use the bus system or who might have used it if more effective services were available. BMTA played an important role in integrating bus services in Bangkok when it was first created in the late 1970s. However, the model on which it was based has been found to be wanting in other places in the world, for similar reasons to those that have emerged in Bangkok. The GOT, and BMTA itself, are aware of these limitations, and have proposed reforms. There is a clear and urgent need to refine and implement needed changes.

74. Recent studies have identified options to improve bus management in Bangkok, eg Center for Transport Strategy (2006) building on the proposals of BMTA et al (2006) and World Bank (1999). Essential to such improvement are:

- institutional change is needed if improved services are to be provided to the community and financial losses reduced – while there may be aspirations that these benefits could be achieved through continuing internal reform of BMTA, history in Thailand and experience in other countries suggests that this is very difficult to achieve;
- policy, regulatory, sector management and operational activities in the bus sector need to be separated – the proposal to establish a Bus Control Management Authority (BCMA) is important in this respect;
- corporatization of the bus service activities of BMTA and resolution of its over-staffing is needed to support better financial management;
- provision of bus services through period contracts to an authority such as BCMA using soundly based competitive tendering, contracts and contract arrangement is the best means for improving services and reducing costs while ensuring service integration – this will also overcome the current situation in which bus services in Bangkok are in practice treated as separate systems provided by BMTA and private companies; and
- new bus procurement is needed to improve the quality of buses in Bangkok.

75. A new ticketing system to improve revenue management and customer service is desirable. The ideal outcome is an integrated ticketing system that covers all public transport in Bangkok, ie including bus, MRT and water-based modes, though this may need to be a medium to longer term objective given the cost and complexity of such a scheme. Implementing electronic ticketing for bus alone will be a considerable challenge because buses present a harsh environment for sensitive electronic equipment and the cost of electronic ticketing is high relative to current fares. Further consideration is therefore needed to determine the best way forward to improving ticketing for buses, with a need to ensure that whatever system is eventually adopted is able to be integrated with the system used for MRT.

76. Essential needs for provision of bus services through contracts are:

- A well considered contracting system with attention given to all issues prior to initiating contracts. In the absence of this sound context, contract provision of public transport will fail irrespective of how well individual contracts are specified and implemented.
- Contracts need to specify the functions of the contractor; allocate risk to the party best able to manage it; include incentives for each party to meet the intended outcomes of the contract; have performance conditions that can be easily monitored and enforced; have conditions that allow contractors to improve their performance if it should dip and for the contract to be terminated in instances of inadequate performance; have the capacity to accommodate changes that inevitably occur over time while also having the integrity to prevent abuse; and allow for transitional arrangements at the beginning and end of contracts.
- To meet the needs of an integrated system, contracts should be for a region or broad corridor as this gives operator the flexibility to modify routes to better serve the community and reduce costs. The BMCA should remain responsible for strategic network planning, but should allow contractors to have the lead role in refining networks and schedules for their services. Contract areas should minimize the extent of direct competition with other bus service operators to avoid undesirable operating practices as companies try to maximize their share of the market. Instead, the focus of competitive tendering should be on competition “for the market” (ie the

contract) rather than "in the market" (ie competing head on with other operators). It would be preferable that individual contracts should involve the use of no more than several hundred buses to avoid diseconomies of scale and to promote competition for the market.

- Contracts could typically be for about ten years comprising two five year terms with the second term conditional on key outcomes having been achieved and continued satisfaction by the contractor with the terms of the contract.
- Ticketing and fare collection and management should be undertaken by a third party to ensure transparency and system integration.
- A "gross cost" form of concession should be used, with the government (through BCMA) retaining all fare revenue and the contractor being paid the full cost of providing services as indicated through the bidding process.
- Requests for Tenders should specify the payment structure for contracts, with preferably only one variable on which bids should be made. Hence, for example, the government could indicate that payments would comprise an amount per passenger that it specifies, and a residual amount per month that tenderers would submit bids for.

D. INITIATING CHANGE

77. The impacts of bus reform are substantial and the risks considerable (see Table 4). Equally, taking no action has significant financial costs and detrimental impacts on the community, and is therefore not sustainable. An incremental approach could be taken, making changes when opportunities present themselves. However, the incremental approach risks being thwarted by the vested interests shown in Table 4, and the potential benefits will not materialize.

78. On occasions, a "big bang" approach to implementing the necessary change can be appropriate and in Bangkok's case this approach seems to be the only viable way forward. The "big bang" would involve careful planning but speedy implementation and the painful changes needed could be mitigated by rapid improvement in transport services through focusing on development of BRT routes and services and facilitating new public and private investment in services, fleet and facilities.

79. Whichever approach is adopted, a necessary first step is to establish the BCMA and corporatize BMTA. Essential powers for the BCMA are to: (i) be responsible for the strategic planning and delivery of bus services in Bangkok; (ii) plan and arrange for the delivery of bus services through contracts, and manage contracts; (iii) arrange for the collection and management of fare revenue for the bus system; (iv) act as the safety and security regulator for the bus system; and (v) own bus and depot assets to the extent needed to protect continuity of service and justified through value-for-money analysis with these assets leased to bus service contractors within the context of their contracts.

80. In the short term it may be necessary for the BCMA to negotiate contracts with existing private bus operators and BMTA (which would after corporatization simply be a government owned bus operating company) as an interim measure to competitive tendering of all bus services. The success of a contract-based bus system will depend on there being a substantial number of operators to ensure competitiveness for the market, and to provide robustness so that remaining operators can step in if any individual operator should fail. For this reason, it is undesirable that there be any operator that is so dominant that it can influence the market. Accordingly, there will be an eventual need to divide BMTA into a number of sub-units that could bid individually for contracts. These smaller units could eventually be privatized, leaving the government to focus on the task of managing the bus system, a task that cannot be undertaken by others, and leaving the private sector to provide services under the policy guidance and management of government. Equally, it is inefficient to have a huge number of small bus service contracts, and it will be necessary for some of the currently small private operators to consolidate to have the scale and professional competence to tender for service contracts.

Table 4: Impact of Bus Reforms on Stakeholders

Stakeholder	Action Required	Potential Advantages	Potential Disadvantages	Risk	
				Nature of Risk	Probability
Users					
Users	None	Improved service and/or lower fares	Services for some existing users may change	Reforms are implemented poorly & services deteriorate	Medium
National Government:					
MoF/MoT & Cabinet	Separate regulatory & operational activities of BMTA and corporatize the latter	Major reduction in subsidy needed for bus services and more satisfied users when the changes take effect	High immediate cost for funding staff redundancies	Costs could be higher than expected and/or dissatisfied BMTA staff could take industrial action	Medium-High
CLTCB/ PLTCBs & DLT	Permit major changes to method of approval of services at least on once-off basis	Major revision to bus routes to be more demand responsive	Disruption to passengers even with careful service planning	Vocal minority disadvantaged by service changes could gain disproportionate media coverage	High
Public Transport Operators					
Staff from BMTA earmarked for BCMA	Accept new role separate from colleagues at BMTA	Improved independence & transparency	Staff not qualified & unable to adjust to new modus operandi	Staff unable to perform duties or fail to understand new role	Medium-High
Other BMTA staff	Accept major change & uncertainty and, in some cases, redundancy	Capable staff can gain higher remuneration & more job satisfaction in new incentivized environment	Staff are unable to adjust to change	Majority of retained staff do not perform as expected	Medium-High
Existing private bus operators	Need to accept more dynamic planning & operational responsibilities	Operators are more innovative & demand responsive and make new investment	Operators do not have capital, will or interest to improve operations	Private operators fail to take advantage of new environment	Low-Medium
New private operators	Take advantage of new opportunities to provide services	New operators are more innovative & demand responsive and make new investment	None	None	None
MRT operators	Coordinate with bus operators to develop integrated services for mutual benefit	Mutual benefit for benefit of all including passengers	More competition from invigorated bus operators	Integrated MRT-bus services not developed to extent possible	Low

Source: Study Team

81. There is no critical need for government to own buses in a system where the private sector provides services under contract to the government. Public ownership of buses that are in turn leased to contractors can take advantage of the lower cost of capital available to the government and can improve the transition if an incumbent contractor should fail or not win an ongoing contract, though these gains may be offset by poor management of the buses by contractors. Conversely, private operators may be able to purchase buses at lower prices through efficient purchasing to offset their higher cost of capital and, over time, it is likely that emergence of third party owners of buses would both reduce bus costs and facilitate the transfer of buses from one contractor to another if needed when contracts expire or are terminated. On balance, private sector provision of buses will reduce the demand on public sector capital and reduce the demand on management at a time of significant other change in the bus sector. Government will need, however, to determine the minimum acceptable standard of buses that are to be used and establish a system to enforce these standards on contractors.

V. PEDESTRIANS AND OTHER NON-MOTORIZED TRANSPORT

82. Relatively poor facilities are provided for the 2.7 million trips are made each day in Bangkok by walking and other non-motorized forms of transport. Yet, these trips are important for social reasons because they are made disproportionately by the poor, for environmental reasons because they do not involve the use of fossil fuels, and for health reasons because they provide the opportunity for exercise. This section considers actions that could improve services for these travelers.

Walkability

83. Sidewalks are broadly the responsibility of the agency that is responsible for the associated road. While DOH and DRR have some responsibility for roads in the BMR, most are under the jurisdiction of BMA and the neighboring provinces. BMA's Public Work Department, Department of Environment, and City Law Enforcement Department are the departments most involved with physical sidewalk infrastructure. The last two have clear tasks of cleaning and law enforcement (mainly related to street vending). BMA's Department of Public Works has more complex responsibilities, involving planning, maintenance, and coordinating with users of sidewalks, particularly utility agencies. The private sector has also become involved in some instances, with government facilitation, such as the development of the skywalk underneath sections of the elevated Skytrain MRT. Two-thirds of the length of sidewalk in the BMA is 2.0 meters or less in width, with the average sidewalk being about 1.8 meters wide.

Figure 2: Construction Impacts on Walkability

Source: Study Team

84. BMA has put considerable effort into upgrading the surface of footpaths. Even so, there remain a number of major limitations with the general nature and quality of sidewalks that makes walking in Bangkok much less pleasant that need be the case. These include:

- as a result of historic decisions on the allocation of space in the road right-of-way, footpaths are generally narrow;

- the narrowness of sidewalks results in vehicular access from roads to properties being at road level, with a frequent need for pedestrians to step up and down at each driveway;
- BMA and others have generally found it easier to leave old structures and foundations in the sidewalk area in place, resulting in many obstructions to pedestrians, of which some are dangerous; and
- Utility agencies, their contractors and staff involved in construction on adjacent properties often move sidewalk pavement blocks or otherwise damage sidewalks, and do not restore them afterwards.

85. While there are substantial opportunities for physical improvements in sidewalks and increased investment, the key barrier is political and managerial. As an example, major utility upgrading was occurring along sidewalks in Bangkok in early 2007 with substantial during-construction disruption. More significantly the sidewalks were not re-instated to their previous, or an improved quality. The opposite is true with completed utility works leaving behind uneven, broken and soiled sidewalks, as shown in Figure 3.

Figure 3: Poor Utility Works Quality

Source: Study Team

86. Material and sustained progress on sidewalk quality and improved walkability requires elevation of walking to being a high priority by local government politicians, political acceptance of accountability, backed up by appropriate asset management systems, remedial and on-going maintenance funds, and community feedback channels. Effective control of works on footpaths by utility agencies is critical. Performance-based contracts for monitoring and maintaining sidewalks could also be beneficial.

Other Non-Motorized Transport

87. Non Motorized Transport (NMT) such as bicycles and other pedal-powered non motorized vehicles have a minor role in much of developed Bangkok due to the poor availability of suitable facilities (eg cycle lanes) and the unfavorable operating environment where competition with cars, motorcycles, and buses is unsafe, and due to close proximity to tail-pipe emissions, harmful to health. However, in adjacent provinces of the BMR and outlying areas of BMA, there is a more significant NMT activity which could be enhanced at low cost, as there is less traffic, less congestion on much of the road network, and more open space to develop facilities. Improved NMT could have a modest benefit to lower income groups living in these outer suburban areas of Bangkok.

VI. ROADS AND TRAFFIC

A. ROAD NETWORK

Historic Road Development and Current Plans

88. Urban growth in Bangkok was originally to the north and the east. Since the early 1970s there has been an extensive program of bridge and road building that has continued these trends but has also permitted urban development to the west of the Chao Praya River. Currently in Bangkok several agencies have responsibility for road planning, investment and maintenance:

- **Department of Highways (DOH)** which has an important role in developing national motorways and highways which in the BMR and environs have included the Outer Ring Road (ORR) and connecting motorways;
- **Department of Rural Roads (DRR)** which develops roads and bridges nationwide and has recently completed extensive Level 1 and Level 2 roads, which were planned in the early 1990s by its predecessor the Public Works Department, in the western suburbs of Bangkok;
- **Expressway and Rapid Transit Authority (ETA)** which develops expressways nationwide and since the government administrative reforms of 2002 is responsible for all tolling facilities on DOH motorways and its own expressways; and
- **Bangkok Metropolitan Administration** which develops local roads in Bangkok including small soi improvements. Few local roads have been completed in recent years and those that have been are dual carriageway multi-lane roads.

89. The first urban expressway, a toll road, the First Stage Expressway (FES) developed by ETA opened in 1981. Since that time an extensive series of major road and expressway projects have been undertaken by relevant agencies with most completed by the end of the 1990s. They have included the following toll roads: the Don Muang Tollway, the Ramintra-Atnarong Expressway, the Bangkok-Chonburi Highway, parts of the Outer Ring Road (ORR), and the Bangna-Bangpakong Expressway. There are extensive non-tolled major roads including the Middle Ring Road, sections of the ORR, as well as many other bridge and distributor road projects.

90. At present, there are many proposals by responsible agencies but limited concrete plans for implementation of major new roads to serve the BMR in the medium to long term.

Inefficient Land Development and Absence of Hierarchical Road Networks

91. It has been recognized since the Sixth Plan (1986 to 1991) that there is an imbalance in road where investment is biased to mega-projects, at the expense of needed supporting investment in secondary roads, including distributor and local roads. The absence of sufficient distributor and local roads had led to the development of “superblocks” which are large tracts of uncoordinated urban development and vacant land parcels within, and following, the primary road corridors within which discontinuous narrow local roads provide access to individual housing developments. The attendant problems of this form of development include:

- **Excessive congestion on primary roads** – in the absence of a good secondary (ie distributor) road network the primary roads must be used for local and long distance trips;
- **Inconvenient and circuitous travel** for private and public modes of transport attempting to access or egress developments within the superblock; and
- **Large parcels of underutilized land with poor accessibility** and high servicing costs.

92. During the Seventh Plan (1991 to 1996), the ADB's Bangkok Urban Transport Project (Loan 1195-THA) implemented over 1992 to 2002 was designed to promote improved accessibility and develop a coherent road hierarchy in the developing suburbs west of the Chao Praya River. In addition to funding an important distributor road component of the road network in western Bangkok, the ADB Project aimed to fund two components designed to encourage efficient urban development:

- **Bangkok Regional Structure Plan** – to be executed by the National Economic and Social Development Board (NESDB) this was intended to develop an authoritative structure plan (for land use) for the Bangkok Region which would establish regional objectives, identify desirable development directions and priority infrastructure packages to support them, improve coordination among public sector agencies and provide better guidance for investment opportunities in the private sector. It was proposed that priority infrastructure packages for roads and other infrastructure (eg drainage) would be passed to line agencies to design and implement. Due to an eventual restriction in the available budget, this component did not proceed as planned but the concept remains important; and
- **Distributor Roads Study** – A TA Grant to the former Public Works Department (PWD) to prepare a distributor roads project in the western sector of Bangkok to introduce the concept of a road hierarchy for the first time into Bangkok and to demonstrate the importance of road planning in fostering efficient urban development.

93. The ADB Distributor Roads Study recommended a four level classification of roads (ie hierarchy):

- **Level 1, Trunk Roads** – being high grade limited access dual carriageway routes providing for through traffic and providing access to the next level of roads;
- **Level 2, Primary Distributor Roads** – having high capacity junctions, preferably grade-separated, with limitations on frontage access; These roads form the major road network in the urban area;
- **Level 3, Secondary Distributor Roads** – these roads form the major collector road system connecting between local roads and primary secondary roads. They incorporate high capacity at-grade junctions and parking and loading restrictions; and
- **Level 4, Local Roads** – connecting to developments and minor streets. Environmental issues are important.

94. The ADB Distributor Roads Study recommended a full road hierarchy on much of the western side of the river in the area between the river and surrounding the western ORR. However, the recommendations of the study were not adopted and PWD proceeded to implement only Level 1 and Level 2 roads.

95. The integration of road and land use planning remains important but BMA's ability to control land development while improving is still weak. Similarly, the Department of Public Works and Town Planning (created in the 2002 government administrative reforms) the development authority for other local government areas outside Bangkok has little ability to control land use. One fundamental drawback is that all residential subdivisions are approved by the national government's Department of Lands. Other national government agencies also have a significant influence on the direction and pace of development through major road building and other infrastructure provision. It appears that these national government agencies do not place great weight on the BMA City Plan and other Provincial Land Use Plans which usually eventually incorporate their committed and planned projects.

96. While BMA attempts to mitigate some of the problems of superblock development through minor road building these usually take the form of short section of "missing link" such as by connecting two sois. Little new local road construction has been undertaken in recent years. BMA's

Department of City Planning has developed a plan to create minor roads and missing links over the next 20 years but they acknowledge there may be significant obstacles in implementing these roads. Difficulties with land acquisition appear to have been the main barrier. Planning for implementation of distributor and local roads still remains as an important task if new superblocks and associated problems are to be avoided. BMA is the most likely organization to plan, design and implement these local roads.

Need for a Consolidated Road Masterplan Including Road Hierarchy

97. Bangkok, and the surrounding region, has benefited from the extensive major expressway, motorway and highway development that has been completed in recent years. These major roads were planned from the mid-1980s onwards. With economic and population growth, congestion is increasing and spreading over a larger geographic area.

98. Although it can be argued that the radial expressways which opened in the 1990s may have increased congestion in the central area of Bangkok, much of the road investment such as the Outer Ring Road (ORR) and distributor roads in western Bangkok have assisted in structuring land use on a more efficient area-basis within the then existing urban footprint, rather than promote corridor development. While the current focus of transport investment in Bangkok is on rail-based MRT, road investment and improved traffic management are also important as part of a balanced approach to transport. Buses too will benefit both directly and indirectly from a well structured road network. Presently, however road planning and investment appears to be moving slowly. Given the long lead times to plan and implement roads it is important that serious preparation for future investment be elevated in priority. OTP and the various road agencies themselves have developed road plans but none have the authority to act as a single agreed roads' masterplan for all agencies.

99. An authoritative, consolidated road masterplan to guide new road investments throughout the BMR and adjacent urban urbanizing provinces over the long term is needed and should:

- include all levels of road including toll roads and distributor and local roads;
- be followed by all road agencies;
- coordinate with planned major residential and commercial developments and other key urban infrastructure;
- serve major industrial and logistics land uses conveniently and efficiently;
- be translated into forward, funded, rolling annual programs of investment by each agency; and
- be incorporated into The Bangkok City Plan and other Provincial Town Plans.

B. TRAFFIC MANAGEMENT

100. Traffic congestion imposes a large cost on Bangkok through reduction in productivity and convenience and excessive noise and tail pipe emissions as described in Section II and Annex A. The technical challenges to improving transport and traffic management are well known:

- inadequate management of strategic land use and individual developments which give rise to travel;
- demand for vehicular travel in excess of supply; and
- inefficient traffic management with emphasis on vehicle flow rather than persons.

101. Until the recent implementation of MRT systems there was no alternative to the use of the road network. Future development of MRT will provide further similar opportunities. There is also considerable scope for reducing congestion impacts through better management of traffic including buses as described in Section IV and improving the walking environment for pedestrians as described

in Sections III and V. Management of parking can also be greatly improved to discourage unnecessary vehicle trips and to facilitate efficient traffic circulation and access to car parks.

102. But why, if congestion is severe, and there are clearly opportunities to mitigate congestion through improved traffic management, is this matter so little discussed seriously in professional circles? One probable answer is that as little sustained improvement has been achieved in addressing traffic congestion in recent years raising the issue is regarded as pointless. This is short sighted. A key barrier to progress is the fragmentation of institutional responsibilities for traffic management.

Weaknesses in Current Arrangements for Traffic Management

Limited Accountability

103. Dealing with the challenges of modern traffic and transport management in a major city such as Bangkok requires a highly professional approach to traffic and transport management implemented by a competent corps of traffic experts, engineers and scientists and complemented by appropriate enforcement expertise. While the technical measures to more efficiently and effectively manage the transport and traffic management system are well known, the key barrier is institutional:

- BMA and the Metropolitan Police[21] (for BMA ie City of Bangkok) have a shared role in traffic management;
- As a large multi-function local government for Bangkok City, which is the majority of the BMR in terms of activity, it would be desirable that BMA has a major role in traffic management[22], and planning and implementation of complementary infrastructure such as intersection traffic islands and channelization, sidewalks and local roads. This role would be facilitated by the close link of effective traffic management with BMA's responsibilities for parking control, land use management and sidewalk and pedestrian crossing facilities maintenance.
- At present however, the Metropolitan Police play the active role in traffic management through manual control of traffic signal controllers. With the recent construction of their new major traffic control centre (incorporating Closed Circuit Television feeds from camera's of BMA, ETA and others and communication links with on street police officers) in Bangkok's northern suburbs this role is unlikely to change although the current metropolitan police force structure which employs ordinary police (who rotate through traffic and other duties) from the 69 police stations in Bangkok does not seem suited to the requirements of modern traffic control.
- The outcome is that responsibility is fragmented with limited accountability for improving performance. Neither the police nor BMA are performing as needed to address Bangkok's traffic and transport management challenges and neither are accountable due to the fragmentation of functions.

[21] BMA's main responsibilities for street management are provision and maintenance of signs and markings, sidewalks and a shared involvement with urban traffic signal control with the Metropolitan Police. The metropolitan police have the main responsibility for urban traffic control in Bangkok although in neighboring provinces in the BMR (and elsewhere) where the provincial police have authority they appear to have less interest in urban traffic control and local governments (eg Pattaya City on the Eastern Sea Board) may have a significant traffic control function.

[22] Even though BMA installed a computerized Area Traffic Control System in the 1990s it is largely not used in peak periods because the police override it.

Inappropriate Priorities

104. By observing what happens on Bangkok's street system, it can be concluded that the current priorities for traffic and transport management in order of importance are private vehicles (cars), followed by buses, freight vehicles (trucks) and, lastly, pedestrians. To achieve the maximum benefit to the economy these priorities should be reversed with the priority order being:

- Pedestrians – because walking is non polluting and improved walking conditions can reduce car travel and enhance accessibility at very low cost and walking (not as part of trip by another mode) represents 14% of all person trips;
- Freight vehicles (trucks) – because as discussed in Section VII, efficient freight movement underpins the economy;
- Buses – as they carry high passenger volumes and use road space efficiently and with their future increased role in complementing MRT will carry more persons than cars; and lastly
- Private vehicles (cars) – as they carry low passenger volumes relative to road space used.

Need to Consolidate Authority and Capacity for Professional Traffic Management

105. It is clear that the main authority for traffic management should be given to the police or the BMA. As BMA is an elected body and as traffic management has close linkages with land use, roads and other infrastructure and their management, the central traffic management role would ideally be vested with them, but clearly the police would have a vital and complementary role in enforcement.

106. This approach is adopted in many cities in the world but is not the only solution and depends on the structure and size of local administrations and the scale of urban areas which may be of a regional dimension. In China, for example, the police under the Public Security Bureau of each Province are responsible for traffic management, and while this arrangement is not without problems, in the larger Chinese cities, they manage traffic effectively and are improving in capability. A solution vesting the main powers for traffic management for Bangkok with the Metropolitan Police in Bangkok, would be unlikely to work without major structural change in the way traffic management as a function is treated within the police and without considerable capacity enhancement. The proposal to vest the main authority for traffic management in a single body is not new and the only barrier is lack of political willingness to tackle the considerable power of an incumbent agency.

VII. LOGISTICS

107. Logistics cost for Thailand are estimated to be around 16-19% of GDP (NESDB 2007, OTP 2007) which is very high compared to estimates for USA (10%), EU (7%), Japan (11%) and Australia (9%) (JETRO 2003; EPS/PAS 2005). Estimates for around 2000, indicate that the transport component of logistics cost represented 46% in USA, 41% in EU and 40% in Australia, with transport being the single largest component of logistics cost. Nevertheless as a whole, non-transport activities (inventory, storage, and administration) were estimated to be more economically significant than transport. The Government has recognized the importance of logistics. NESDB is developing a logistics strategy for Thailand which in the period 2006 to 2010 aims "to establish a world class logistics system to support Thailand as Indo-China's trade and investment center." The need for more efficient logistics is also recognized by the Thai Federation of Logistics, which notes slow logistics improvements in Thailand and the need for improvements to support Thailand's competitiveness (Bangkok Post, 2007). Since over 90% of Thailand's commercial freight transport is carried by road transport, with the share being almost 100% in the BMR, brief consideration is given in the following sections to truck transportation in the context of the broader logistics industry. Annex E provides further supporting detail.

A. CURRENT PERFORMANCE AND NEW REQUIREMENTS

108. It was noted in Section II that Thai economic policy makers wish to facilitate a shift in the economy to place less reliance on exports of agricultural products and to develop Thailand as a knowledge-based economy. Due to necessity as Thailand's production costs have risen, manufacturing is becoming more specialized, around vehicle production (pickup trucks), petrochemicals, consumer appliances/electronics, certain types of electrical and mechanical intermediate goods, and agro-processing. Increased value-added in these areas requires deepening of economic clusters and geographic clustering to realize agglomeration economies (Webster 2006). These industries form vital links in global and domestic supply chains and require fast, reliable and secure access to airports, seaports, and good quality national transport systems, to meet the requirements of downstream production processes.

109. What is the likely impact on the direction the BMR and environs may develop in the long term in the context of Thailand as a whole? The transport implications of this new desired direction are summarized in Table 5. Based on the description in Annex E of the report, Thailand's logistics industry is presently not well equipped to satisfy these new requirements.

110. Although roads infrastructure such as new motorways and expressways have benefited the logistics industry greatly Thailand's logistics industry lacks sufficient quality 'soft' infrastructure and adequate policy to address the following deficiencies:

- **Inadequate use of Electronic Data Interchange (EDI)** for reducing paperwork and improving efficiency in supply chain management – EDI is a critical tool for Just-in-Time logistics necessary for high value goods manufacture (eg electronics, automobile) particularly where these industries are part of global supply chains.
- **Unclear enforcement** of Bangkok's truck restrictions by the police, no effective laws governing vehicle use and use of tachographs meaning a significant abuse of drivers and vehicles.
- **Unclear and outdated laws and definitions** – Customs tariffs definitions are open to various interpretations. Some transport regulations do not reflect international practice (Personal Communication 2005).
- **Poor traffic management** – in addition to congestion, circuitous routing on major highways and arterial roads to U-Turn and access terminals and factories.
- **Inefficient, aged fleet** – industry has tolerated maintaining larger fleets, as much of Thailand's truck fleet is old and largely makes use of aged 6 and 10 wheel trucks. These vehicles are heavily depreciated and although, neither fuel efficient nor environmentally friendly, appear to be cheap to purchase and maintain. Hence, at present, a small proportion of the total truck fleet makes use of modern technology vehicles. For example, in Bangkok, trucks have an average age of more than 12 years. The many impediments to change and optimization of logistics which have been identified would seem to limit major reductions in logistics costs in the future without appropriate intervention. The costs of inefficient logistics to the economy and hence Thailand's competitiveness are likely large but have remained hidden as the nature of the industry is to pass on costs: from logistics firms to shippers, and from shippers to consumers.

111. Until recently, government policy on logistics has been passive and the efficiency gains that have been achieved are largely due to the endeavors of logistics firms and shippers alone. It has been recognized by government and industry that there is a need for greater adoption of EDI (and related technologies such as Information Communications Technology), and enhancement of human resource capacity in the industry and so on.

Table 5: Transport Implications of Desired Economic Strategy

Sub-Region	Key Functions/ Desired Niches	Current Trends & Needs	Transport Implications
Bangkok and BMR	• Corporate and international headquarters function. • Knowledge activities center, including finance, education, technical consultancies, business services, and design / fashion.	• Increasingly dominated by the knowledge sector. • Manufacturing is rapidly becoming less important and hence heavy manufacturing should be discouraged from locating in Bangkok. • New Suvarnabhumi International Airport will promote the global city functions of Bangkok.	• Polycentric urban structure is needed with sub-centers within the Outer Ring Road (ORR) close to planned MRT stations. • New net residential growth should be in suburban sub-centers within 10-30 km radius of CBD. • Bangkok traffic congestion costly. Truck ban limits flexibility and thereby increases logistics costs.
Central	• Agri-industry, including processing, production inputs, and related producer services. • Heavy construction materials production center.	• Considerable foreign investment in the Bang Pa-in area, particularly in autos (Toyota, auto parts, appliances, electronics, camera / optics, etc). • Saraburi is a center of heavy construction materials production.	• Plays an important role in terms of handling and trans-shipping agricultural products in agri-business. • Auto-parts and specialized electronics require access to ESB and international airports without passing through Bangkok (ie using ORR).
East	• Higher value manufacturing and time responsive / customized/flexible manufacturing. • Physical distribution centering on major sea ports, including supply chain management services. • Research and development, including human resources development.	• Chon Buri is the second most important international financial center in Thailand after Bangkok. • Port expansion at Laem Chabang, associated with expansion of export processing and industrial estates nearby is needed together with better supply chain management services.	• Heavy industry primarily located here & is spreading westwards along the Gulf (eg Bang Pakong area). • ESB road system in local centers often congested as are connecting roads to Bangkok and to ORR. Intensive congestion occurs on east of Bangkok around ORR where there are many truck and container terminals.
West	• Tourism, recreation, leisure, and hospitality functions. • High-tech and software industry, including R&D functions.	• Western Seaboard to capitalize on amenity, environmental and agricultural potential, and access to Bangkok. • Excellent comparative advantage for tourism, agri-industry, and some types of education / research functions.	• Reliable and convenient connections to west coast highway. To avoid congestion problems, and to enhance safety, requires planning of town and local road networks along with the highway to separate traffic functions and structure urban development.

Source: Based on information in PCI (2004) and Webster (2006)

B. GOVERNMENT ROLE

112. What can be done to improve freight transport's performance in the context of broader logistics? In the first instance, there is a need for the government to focus on aspects where its performance affects the functioning of the logistics industry. With regard to land use and transport, this will involve:

- **Improving the integration of land use and transport**. Ensuring that land use controls facilitate the development of warehouses in close proximity to the arterial road system and with good access to it.
- **Ensuring adequate road capacity**. Ensuring that there is sufficient road capacity to meet freight transport needs, including good links to intermodal facilities such as ports and rail terminals.
- **Improving the standard and appropriateness of trucks**. While new trucks current sold in Thailand are, in technological terms, near best world practice, more is needed to improve the suitability of current in-use trucks. This will require: (a) limiting the "grand-fathering" of historic trucks that allows new bodies to be continually rebuilt on old chassis with old engine technologies and hence perpetuates low quality of trucks; (b) recognizing the eventual need for industry to use larger trucks by allowing the introduction of such trucks (eg articulated trucks with lengths of about 25 meters) that have axle distributions and suspension that cause less damage to roads than current trucks; and (c) strict enforcement of truck standards.
- **Facilitating truck operations**. The current limitation on the movement of trucks in Bangkok imposes an inevitable cost on the community, both in financial and environmental terms by requiring use of smaller, less efficient vehicles. There appears to be a general acceptance that this cost is acceptable, thought it is not well understood. Options for managing the movement of trucks in Bangkok need to be re-examined periodically to ensure that the balance meets the ongoing needs of the city.
- **Truck safety**. A major shift in government policy in countries has been a focus on improving the standard of safety in the truck industry, covering drivers, vehicle loading and vehicles. This requires sufficient motivation and capacity in government to pursue such change over the medium term in conjunction with the private sector, seeking to maximize the level of self-enforcement with sound auditing and enforcement arrangements.

113. Government also has a more general role in facilitating logistics, in particular with regard to:

- **Standardization of definitions** for containers (and pallet sizes), data formats, customs tariffs and vehicle types to enhance industry efficiency and aid enforcement and compliance auditing.
- **Low-cost interventions to assist the transport industry** and its customers to develop basic capabilities in priority electronic commerce areas which may include: adoption of common software/ standards for commerce and operations (eg consignment tracking, access to real time information on network conditions, electronic systems that produce hand held delivery receipts; systems that permit a greater understanding of the real cost of moving freight building on the evolution of e-bidding for work and the effect this is having on driving costs down.
- **Support to model EDI/logistics activities**, a competitive environment and external investment/ influence to ensure further advancement.

- **Better management of strategic interchange functions** through rationalization and access improvement to the many chaotic dispersed truck terminals now principally located near the ORR.

114. Nevertheless, by its nature logistics is a diverse industry with many thousands of firms engaged in various aspects of the logistics and constituent transport task. A more in-depth understanding of how transport functions in terms of logistics and the areas for priority improvement, and options for addressing these areas, is essential. It is recommended that NESDB's emerging logistics strategy aim to work with its strategic stakeholders including the Thai Federation of Logistics and key development partners such as the UTDP to prioritize the key problem areas by industry, and to assist in formulating comprehensive remedial strategies.

VIII. PUBLIC SECTOR FINANCE

115. Consideration is given in this section to income and expenditure in the road sector and the financial performance of public transport. More detailed information is given in Annex B and in Sections III and IV with regard to MRT and the bus system respectively.

A. ROAD SECTOR

Income and Expenditure

116. Four agencies of the national government have direct responsibilities for aspects of roads and their use in the BMR: DOH, DRR, DLT and OTP. In addition, the BMA and the five other provinces in the BMR also have responsibilities for road expenditure, though data are currently available only for the BMA. Total expenditure for the available agencies is estimated at THB9.8 billion in 2003 and THB10.2 billion in 2004. This expenditure does not cover the cost of traffic enforcement or other public costs that result from road use, for example the cost of street lighting and policing and costs that may be incurred by government as a result of accidents and air pollution. Of inevitable interest is the extent to which motorists meet the costs that they impose.

117. Financial imposts on motorists in Bangkok currently comprise:

- tolls imposed for use of expressways[23];
- charges specified in the Motor Vehicle Act (MVA) and the Land Transport Act (LTA) that are collected by the national government's Department of Land Transport (DLT) – the charges including a tax on new vehicles, and annual vehicle, driving license and similar fees, with some allocated directly to the BMA; and
- Excise Tax, Municipal Tax, Oil Fund, Conservation Fund and Value Added Tax (VAT) that are imposed on fuel and collected by the national government with the Municipal Tax directed to local governments.

118. In terms of financial cost-recovery, tolls for use of expressways in Bangkok are the only formal charge that is linked to the use made of roads. ETA has in recent years collected sufficient revenue to cover the cost of providing and operating the expressways that are recorded in its accounts. There is a similarity between the revenue collected by DLT under the MVA and the LTA in the 2003 and 2004 financial years and expenditure in the BMR in these years, but in the absence of hypothecation the link is tenuous. Nevertheless, the charges are imposed on motorists and hence can

[23] Detailed financial data were obtained for Bangkok ie BMA and subsequently estimates made for the BMR. DOH has toll roads in the BMR but not in the BMA.

be seen as a form of cost-recovery. The allowed maximum rates for taxes and charges under the MVA and LTA which were reached many years ago are now very low because of the effect of inflation

119. None of the five imposts on fuel is hypothecated (ie dedicated) to meet the cost of providing roads, nor is there any indication that any are intended primarily for this purpose. The VAT imposed on fuel and imposts for the Oil Fund and Conservation Fund are intended for purposes generally unrelated to transport, and so should not be considered a user charge. However, it may be argued that there is at least a partial link between the revenue raised from the Municipal Tax and Excise Tax and road expenditure given that these are not general taxes in the economy and revenue from them is used to finance roads. It is estimated that revenue from taxes on fuel used in the BMR that could be considered a road use charge was about THB16.5 billion in 2003 and THB17.7 billion in 2004.

120. A comparison of this revenue with the cost of providing roads in the BMR shows that motorists in the BMR pay considerably more to government than is spent directly on providing roads. Even if account was taken of the additional, indirect costs that governments incur, it is likely that motorists would still pay more in total than the costs they impose on the government. Similarly, it is expected that an adjustment to take account of the extent to which motorists based in Bangkok use roads outside the city would not change this conclusion. However, this comparison of costs imposed by motorists and revenue obtained from them is of limited technical usefulness because: (i) the absence of formal designation of charges as road use fees and hypothecation of revenue from the fees to road expenditure means there is no clear link between costs and revenue; and (ii) the moderately low sensitivity of fuel consumption with regard to its price means that fuel is an attractive tax base for the generation of revenue for general government purposes, and so taxes on fuel serve a broader role than only recovery of costs from motorists.

Charging Motorists for their Use of Roads

121. In addition to their role in generating revenue, prices for goods play a critical role in ensuring that consumers understand the worth of a product and make decisions on use of the product that are based on this understanding. Ensuring that the prices of goods reflect their underlying value in terms of the resources involved is important for economic efficiency. Charging motorists for their use of roads is no different than for other goods and services, and of no less importance. In economic terms, the charge should be equal to the marginal social cost that motorists impose. This will include not only the cost of wear and tear to roads that they cause, but also the cost of traffic management, the value of the environmental consequences of their vehicle use, and the cost of congestion that results from their travel. A consequence of the last item in particular is that economically optimum road use charges will vary with the level of congestion, ie they will vary by location and time of day. In this manner, user charges are needed to encourage motorists to make sound decisions regarding their use of vehicles (ie to achieve economic efficiency) as well as to generate revenue to cover the cost to government of providing roads (ie financial cost recovery). Priority should usually be given to the former objective, with modifications made as necessary to achieve any specific revenue needs. It will be only by coincidence that the revenue from an economically optimal road use charge will generate revenue equal to the financial cost of providing roads.

122. No estimate of the marginal social cost of vehicle use in Bangkok is available, but it is likely to be high for most of the day because of the level of traffic congestion. As a result, it is also likely that the total revenue from economically optimal road use charges in Bangkok would be higher than the financial cost of providing roads. A case can be made that the surplus revenue should be used to subsidize public transport in recognition of the latter's environmental and decongestion benefits.

123. Of the imposts levied under the MVA and LTA, only a tax on new vehicles generates significant revenue. However, this tax is not a sound means for charging road users for the cost of providing roads as it is incurred only once and has no impact or close relationship with the extent to which motorists use their vehicles and thus impose costs on the government. Similarly, the cost of

accommodating large vehicles on roads is much higher relative to their use of fuel than for smaller vehicles, and so fuel tax alone is an imperfect means for charging motorists for their use of roads. There is, therefore, a case for a two-part fee for road use, ie an access charge such as vehicle registration or ownership tax that varies between vehicle types plus a use charge such as a fuel tax. The ideal access charge would be low for small vehicles and would rise exponentially with vehicle size in recognition of the wear and tear that larger vehicles cause to roads. Such an access charge would be more appropriately imposed as an annual charge than a one-off charge when vehicles are purchased to more closely link payment of the fee and the vehicle use.

124. However, even if set to best reflect the economic costs imposed by various vehicles, such a conventional two-part charge will not fully take account of the cost of traffic congestion. This can be achieved only with direct charges that vary with the level of congestion on roads. At their simplest, a charge to take account of the cost of congestion can be applied by imposing a fee for all vehicles entering a congested area, such as was implemented in London in 2003. The sophistication, and hence effectiveness of congestion pricing, can be improved by varying the charge for the area or for various sub-areas by time of day (as occurs in Singapore) and yet further still by charging motorists according to the kilometers of travel that they make on roads with the charge varying by each section of road (as is being examined in various places, but not yet implemented).

125. It is concluded that current charges for use of roads in the BMR could be substantially improved to provide a better signal to motorists on the full cost of their travel and hence to encourage them to only undertake travel with a value greater than this cost. There is a need to consider the most appropriate and acceptable means for achieving this in Bangkok.

Long Term Cost of Sustaining the Current Road System

126. Over the long term, sustaining current road assets requires: (i) annual maintenance expenditure; (ii) periodic maintenance expenditure; and (iii) replacement of current assets when they reach the end of their economic lives. Detailed data on these costs are not available, but an indicative analysis presented in Annex B provides general guidance on the scale of the costs involved. Greater confidence should not be ascribed to the values than is consistent with the nature of the analysis. The analysis suggests that in the BMR, in 2006 prices and excluding toll roads:

- the value of road infrastructure that deteriorates over time (and which therefore needs to be replaced periodically) is conservatively estimated at THB111 billion (about US$3.3 billion) – this understates the total value of the depreciable infrastructure because it excludes the value of bridges, street lighting and the traffic signal system; and
- the average annual cost of replacing quantified life-expired current assets is about THB3.2 billion and the annual cost of maintenance is about THB4.1 billion, giving direct total annual expenditure needed to sustain the assets of THB7.3 billion.

127. Expenditure on roads in the BMR in 2004 was about THB4.9 billion for investment and THB2.0 billion for maintenance and operations. This indicates that current expenditure on maintenance is about half of that which is ideally needed. The extent to which current investment expenditure is for expansion/upgrading of current infrastructure versus refurbishment of current life-expired assets is not clear, but it is likely that the latter is also less than is needed over the long term. It appears that the neither the DRR nor BMA have effective road maintenance and management systems, unlike DOH. Moreover, routine maintenance is funded through annual government budget processes, with no certainty that allocated maintenance budgets match the funding obligations of the road agencies. Road maintenance and management systems provide a sound basis for planning and programming routine and periodic maintenance that can both strengthen agencies' ability to justify their spending plans and use the available funds to the best effect.

Conclusions

128. While some of the analysis is indicative, it suggests that:

- less is being spent on maintenance than is desirable, which will result in more rapid deterioration of current road assets than need be the case and thus higher life-cycle costs;
- comprehensive road maintenance and management systems can play vital roles in strengthening agencies' ability to justify their spending plans and using the available funds to the best effect;
- it is likely that motorists pay more to government through taxes and charges than the costs they impose on the government, though this comparison of costs and revenue is of limited technical usefulness; and
- there is a need to more carefully set the structure and level of taxes and charges that are imposed on motorists so that they provide a better signal to motorists on the cost that their travel will impose on others and hence to encourage them to only undertake travel with a value greater than this cost.

B. PUBLIC TRANSPORT INCOME AND EXPENDITURE

129. The poor financial performance of the BMTA is discussed in some detail in Section IV of this report. Notably, bus fares in Bangkok have risen at a rate over three times that of inflation during the last decade. This indicates that BMTA's financial shortfall is attributable more to excessive costs than inadequate fares. The State Railways of Thailand (SRT) has annual losses that are even higher than for BMTA, though this covers operations throughout Thailand. The opportunity to reduce the costs currently incurred by BMTA without loss of quality of service is discussed in Section IV – it is likely that there is also considerable scope to reduce SRT costs.

130. A comprehensive analysis of the financial performance of the current MRT lines in Bangkok operated by BTSC (for the Green Lines) and BMCL (for the underground Blue Line) is not available. However, the Green Lines were funded wholly by private investors and financial institutions, which have lost money in the course of subsequent financial restructuring. It appears that BTSC is now able to generate sufficient revenue to meet its operating costs and reduced capital base. In the case of the underground Blue Line, the government financed civil works infrastructure, with BMCL financing electrical and mechanical infrastructure and trains. It appears that revenue generated by BMCL is well below that expected. It will be rare that rail MRTs can generate sufficient revenue to make a substantial contribution to the cost of assets. Section III addresses issues related to making effective use of rail MRT in Bangkok. Given the likelihood of a need for government financing of even higher shares of infrastructure for future lines than has occurred in the past, there will be a particular need to ensure that new projects are both the highest priority options and are cost-effective, and that concessions are financially realistic.

IX. GOVERNMENT ORGANIZATION AND MANAGEMENT

131. Governments' influence over transport occurs through its provision of public infrastructure, its operation in some instances of services, and its regulation of transport infrastructure and services undertaken by others in the community[24]. The effectiveness and efficiency of the transport system will be substantially influenced by how well governments undertake these functions. This section focuses on key needs and opportunities in government activities.

A. CURRENT PERFORMANCE

132. There are a large number of government agencies with responsibilities in the transport sector in Bangkok, as shown in Table A.5 in Annex A and as reported in previous studies (eg World Bank 1999). These agencies involve national government line agencies, public enterprises and statutory authorities that are responsible to the national government, regional government and provincial governments. Agencies of provincial and lower levels of governments in the BMR have only a modest role in transport. It is inevitable that the large number of agencies creates ambiguity and conflict, and makes decision making more cumbersome. Equally, competition in the development of policy and strategy can be useful as a means for generating and testing proposals, though it is vital that there be a mechanism to allow competing views to be resolved and integrated into a coherent plan. Some specific observations of current institutional performance are:

- despite the major and generally beneficial reforms of transport institutions in 2002 there is still a "silo approach" evident with weak coordination between agencies, though there is not a level of uncertainty and failure that the large number of disparate agencies suggests could be the case;
- while there is room for further progress, the technical capacity of staff in government agencies has continued to rise;
- planning, programming and budgeting processes are generally adequate, though areas for improvement are in optimizing project concepts and designs, presenting sound business cases for proposals, and managing optimism-bias especially in implementation programming;
- less attention has been focused on delivering projects on time, or for small and medium scale infrastructure such as local roads (a responsibility of BMA) which is vital to support the proper functioning of the principal road network;
- recurrent expenditures for operation and maintenance of transport facilities and services are often not planned and programmed on a quantitative basis, with negotiated allocations handed down on an annual basis with possible interruptions to funding putting the safety and quality of facilities at risk; and
- BMTA operates is in an unenviable situation yet urban bus transport will have a major role in passenger transport in the BMR for the foreseeable future. Major modernization is needed but in a way that encourages greater efficiency, with probably a greater role for the private sector in operations.

[24] The term 'regulation' is used in this report as rules set by governments that constrain how the public (both individuals and other legal entities) may behave, ie it is implemented and enforced by law. This differs from government management of its activities in the transport sector, which covers planning, provision of infrastructure and services, and management of its regulatory activities.

133. Improvement can be, and is in practice occurring, with regard to these and other matters. Some, such as traffic enforcement, are discussed elsewhere in this report. The remainder of this section considers five major areas where institutional change could substantially improve transport outcomes in Bangkok:

- the distribution of transport responsibilities between levels of government and the private sector to ensure each can undertake their tasks in a way that results in consistent and integrated outcomes for the transport sector as a whole;
- the division of functions in the transport sector to improve the effectiveness and efficiency of transport outcomes;
- management of transport in the BMR to ensure integrated outcomes for the region as a whole;
- improving the integration of public transport development and management in Bangkok; and
- enhancing the integration of land use and transport planning in the BMR.

B. A FRAMEWORK FOR ASSIGNING INSTITUTIONAL FUNCTIONS

A Hierarchy of Transport Organization

134. World Bank (2002) provides a helpful means for ensuring a coherent approach to transport planning and management, noting that urban transport strategy operates at three levels:

- **Strategy for the city** – which is the concern of the GOT and BMA and other local governments in the region, which have the responsibility for formulating regional development policy, for allocating intergovernmental funding transfers, and for establishing the legal framework within which lower-level authorities and agencies operate;
- **Strategy of the city** – which is the concern of BMA and other local governments as they are responsible for determining their own internal priorities, supplementing the resources available from local sources, and allocating the resources at their disposal to achieve city objectives – it is also the concern of citizens who may not be well heard or represented through the local political process; and
- **Strategy in the city** – which is the concern of implementing agencies, both private and public sector, who have the responsibility for performing tasks for which they are responsible, and who may have some degree of technical autonomy in undertaking these duties.

135. Figure 4 shows a general allocation of functions that supports transport integrity, minimizes the overlap between levels of government and community institutions, and which draws on the respective strengths of these institutions. Comparing current participating agencies with Figure 4 suggests:

- GOT agencies undertake “for the city” functions as is desirable;
- GOT agencies are very heavily involved in “of the city”, even in the region for which BMA is responsible (and almost entirely so in the remainder of the BMR); and
- GOT agencies are also extensively involved in “in the city” functions.

136. That is, there is arguably too much “top-down” involvement of national agencies in Bangkok and too little “bottom-up” involvement from BMA and other local governments. Additionally, local government political representatives and the public have had little opportunity to influence the urban transport agenda. Central government policy has been to decentralize, with more powers being granted to BMA and other local governments. But progress has been slow. The substantial involvement of GOT agencies in lower level activities can be attributed to factors such as the unitary form of govern-

ment in Thailand that gives considerable power and responsibility to the national government, a "vertical fiscal imbalance" whereby the national government has the most substantial revenue generating powers and primarily spends the proceeds of this revenue through its own agencies rather than transfer it and corresponding spending obligations to lower levels of government, and a higher level of technical and institutional competence in national government agencies. Moreover, the primacy of Bangkok in Thailand and the sensitivity of transport issues provide a perceived imperative for the central government to deal extensively with metropolitan issues. This places pressure on national government agencies, which must attempt to develop and maintain the capacity to deal with all aspects of national and metropolitan transport.

Figure 4: Allocation of Strategic Functions

Strategy level	Function	Agency	Comments
"For the city"	National roads Public enterprises Tax levels Intergovernmental transfers Regulation and competition policy Vehicle registration and safety	Ministry of construction Ministry of economy Treasury Treasury Ministry of economy Ministry of transport	Private sector construction Sometimes municipal May be function of a quasi-independent commission
"Of the city"	Urban structure planning Strategic transport planning Local road management Public transport planning and procurement Traffic management Law enforcement Road safety	Planning department Transport department Roads department Public transport agency Traffic department Police department Interdepartmental unit	 Direct responsibility to mayor Sometimes national
"In the city"	Public transport operations Road construction and maintenance Local facility consultation	Private companies Private companies NGOs and individuals	Franchised or contracted Some force account maintenance typical Sometimes under formal public inquiry laws

Note: NGO = nongovernmental organization.
Source: Authors.

Source: World Bank (2002:154)

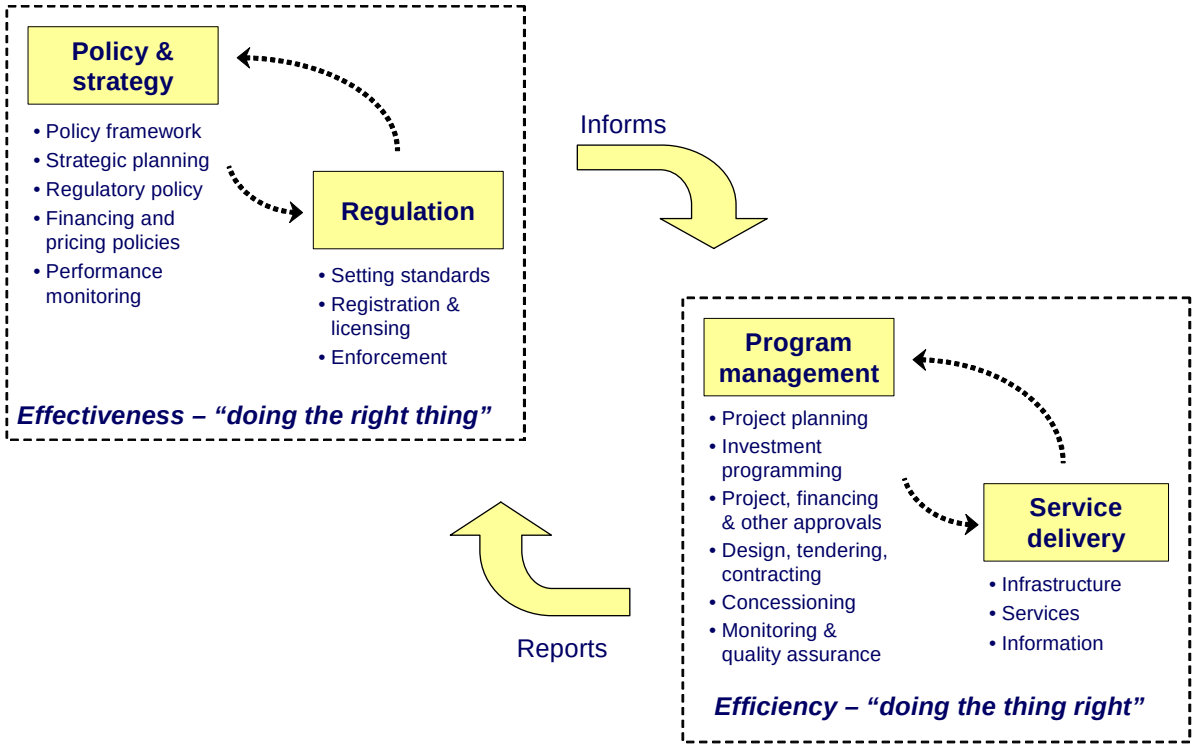
137. These factors are not unchangeable, but will be influenced by broader factors than enhanced public management in the transport sector. However, the principle of "subsidiarity" has merit, whereby responsibilities are allocated to the lowest practicable level of government, facilitates governance by more closely linking the community with those responsible for planning, implementing and operating transport infrastructure and services. It also avoids the complexity that occurs when there are multiple agencies from different levels of government working on similar matters. Therefore, when consideration is being given to matters that have a bearing on the allocation of institutional responsibilities for transport in Bangkok, there will be considerable advantage in testing concepts that move in the direction of reducing the need for direct national government involvement in lower level activities in Bangkok. In the medium term a shift towards greater involvement by local government, in particular BMA with its elected Governor, and other political representatives appears crucial. This will need to be complemented with the necessary technical skills in local government to undertake the increased responsibilities, the management capacity and systems in local government to control the work, and the strategic framework and oversight from the national government needed to guide.

Structuring Transport Activities

138. In addition to consideration of the "vertical" distribution of transport functions between levels of government, the "horizontal" distribution of functions within any given level will have a substantial impact on the effectiveness and efficiency of activities in the transport sector. The activities undertaken by transport agencies can be categorized as (see also Figure 5):

- **policy and planning**, which involves identifying future strategic needs and developing the policies and plans required to achieve government objectives. It also includes monitoring and evaluating the performance of outcomes against government objectives, using this information to refine strategies, and identifying strategic resource needs;
- **regulation**, which involves establishing and applying technical standards for safety, security and environmental performance of public transport, and economic regulation needed in response to market failure;
- **program development and management**, which involves translating policies, strategies and regulatory requirements into specific actions such as programs and projects and providing oversight and monitoring of their delivery; and
- **service delivery**, which involves delivering, or ensuring the delivery, of transport infrastructure and services.

Figure 5: Categorizing the Government Transport Functions



Source: Study Team (based on an initial concept by Professor Philip Charles, University of Queensland)

139. These categories of activity serve two broad objectives:

- **effectiveness**, which is related to ensuring that choices are directed to achieving the things that the community values, with clear linkages from the desired outcomes to the outputs of government activities that are needed to achieve the outcomes to, in turn, the controls, services or other outputs that need to be delivered to achieve these outcomes; and
- **efficiency**, which is to provide the identified controls, services or other outputs that have been decided on at the lowest possible cost.

140. This approach has a number of implications for institutional management, for example, it:

- identifies the need to establish clear policies and implementing strategies so that those involved in delivering transport infrastructure and services have an explicit understanding of what is expected of them;
- ensures a productive tension between those responsible for strategic planning, project development and delivery;
- reinforces the need for clear allocation of tasks to agencies to avoid ambiguity about which agency is responsible for each of them;
- indicates the need for performance management systems that are transparent and hold managers accountable for delivery of agreed outputs;
- shows a need to separate conflicting functions, in particular;
  - to separate regulatory from operational activities to avoid the conflict of interest that arises from an agency regulating itself;
  - more generally, to separate decisions on effectiveness from those regarding efficiency so that each area of activity is undertaken with a clear focus; and
  - to separate commercial activities from non-commercial activities so that the former are undertaken in a businesslike way with a unmistakable commercial imperative; and
- indicates that the private sector can be used to deliver services within a clear framework set by government, and that the choice of whether to use government agencies or the private sector to deliver services is a decision that should be based on the approach that has the lowest cost.

141. The government has recognized some of these needs, with the proposed Bus Control Management Authority (BCMA) representing a positive move forward to clearer management of bus services in Bangkok. There remains a continuing need to use this form of analysis as a template to review and assess options for institutional arrangements, to provide explicit strategies, and to establish and monitor performance in the undertaking of the various tasks.

C. ENHANCING LAND USE AND TRANSPORT INTEGRATION IN THE BMR

142. Recent and expected continuing growth in the region of the BMR outside the jurisdiction of the BMA will create an increasingly anomalous situation in which seven governments will have a significant role in managing transport in the BMR (ie the national government, BMA and five provincial governments), and adjacent provincial governments in facing urban and industrialization pressures. Good coordination and cooperation between the agencies of these governments will mitigate some of the discrepancies that will inevitably occur with such distributed responsibilities. The major role of national government agencies in operational activities in the transport sector in the BMR will facilitate this coordination, while acknowledging that this is not an ideal long term arrangement for the reasons discussed in the previous section. Rather, the need to expand the geographic coverage of strong and coordinated local government to encompass the BMR and enhancing local government's capacity will become increasingly necessary to support the sound development and delivery of integrated transport infrastructure and services for Bangkok.

143. Travel demand is heavily influenced by land use. While people make their own individual decisions about where to undertake their activities and how to travel, guidance and approval of urban development by government and its provision of transport infrastructure and public transport services can reduce the extent to which people need to travel and encourage them to use public transport and non-motorized transport that are less environmentally damaging and intrusive. Government capacity in land use planning and development controls has progressed, but there remains considerable

opportunity for further improvement. Two areas of particular need are evident. The first is the need to recognize the interaction between transport and land use, and to establish and enforce land use controls for developing areas of Bangkok that enhance the livability and sustainability of the metropolitan area. The second is to facilitate redevelopment in currently built-up areas to complement development of transport infrastructure, with a particular opportunity to increase the density of urban development along the current and planned MRT lines (see Section III for a more detailed discussion of this matter).

144. In general, statutory planning arrangements are in place to allow BMA and provincial governments to control land use in the interest of better urban outcomes. Two elements that limit their ability to successfully use these arrangements appear to be a full understanding of the importance and use of the available controls and, more importantly, the incentives and support to ensure they are applied appropriately.

145. Establishing a formal political level board (with members drawn from the BMA, provincial governments and national ministries supported by a suitable technical secretariat) that is responsible for facilitating and coordinating land use/transport development in the BMR would directly lead to better outcomes and would also raise awareness of key issues and provide a means for initiating changes that could improve the effectiveness of current systems.

D. INTEGRATING PUBLIC TRANSPORT MANAGEMENT

146. To be effective, public transport must be seen by users as a seamless, integrated system offering a reasonable quality of service. Anything less will lead to a continued downward spiral of declining public transport use, financial pressures, reduced quantity and quality of services and hence further loss of patronage, and so on, that has occurred in Bangkok and other cities around the world in the past. It is perhaps inevitable that rising income allows people to use private cars instead of public transport. However, the quality of the urban environment suffers. Institutional limitations that constrain the provision of good public transport therefore impose a high cost on the community. There is no single agency that is responsible for ensuring the provision of such public transport at present. Three agencies (BMA, MRTA and SRT) are involved in the provision of MRT, BMTA has considerable powers with regard to bus services but is hampered by conflicting objectives and, indeed, the monopoly power that it holds, and BMA is exploring BRT. The Central and Provincial Land Transport Control Boards resist changes in bus routes and licensing arrangements and are a major impediment to change. The current public transport system is testament to poor coordination, indeed a near absence of it, with deficient physical integration of infrastructure, lack of service, ticket or fare integration, and variable service quality. The effectiveness of current and future capital expenditure on MRT and potential expenditure on BRT and improved buses will, to an extent, be wasted if this situation is not addressed.

147. At a minimum, there is a need for improved coordination between current agencies that are responsible for guiding and delivering public transport in Bangkok. Previous studies have suggested arrangements such as a transit committee to undertake this task (eg Planpro 2003, World Bank 1999 and SEPO 2000). The membership of such a committee could include the BMA and provincial governments as well as public transport agencies. In conjunction with the proposed BCMA, this could be a significant start to a longer term evolution in the management of public transport management in Bangkok. However, delivering truly integrated public transport will continue to be extraordinarily difficult given the current situation in which individual institutions responsible for public transport have the financial and institutional authority to act independently and in their own interests. A previous examination of possible arrangements for an institution responsible for improving coordination of public transport development, management and delivery (named, for convenience, the Bangkok Integrated Transit Authority – BITA) considered four possible options (ADB 2006a). Two are elaborated below (see also Figure 6 and Figure 7):

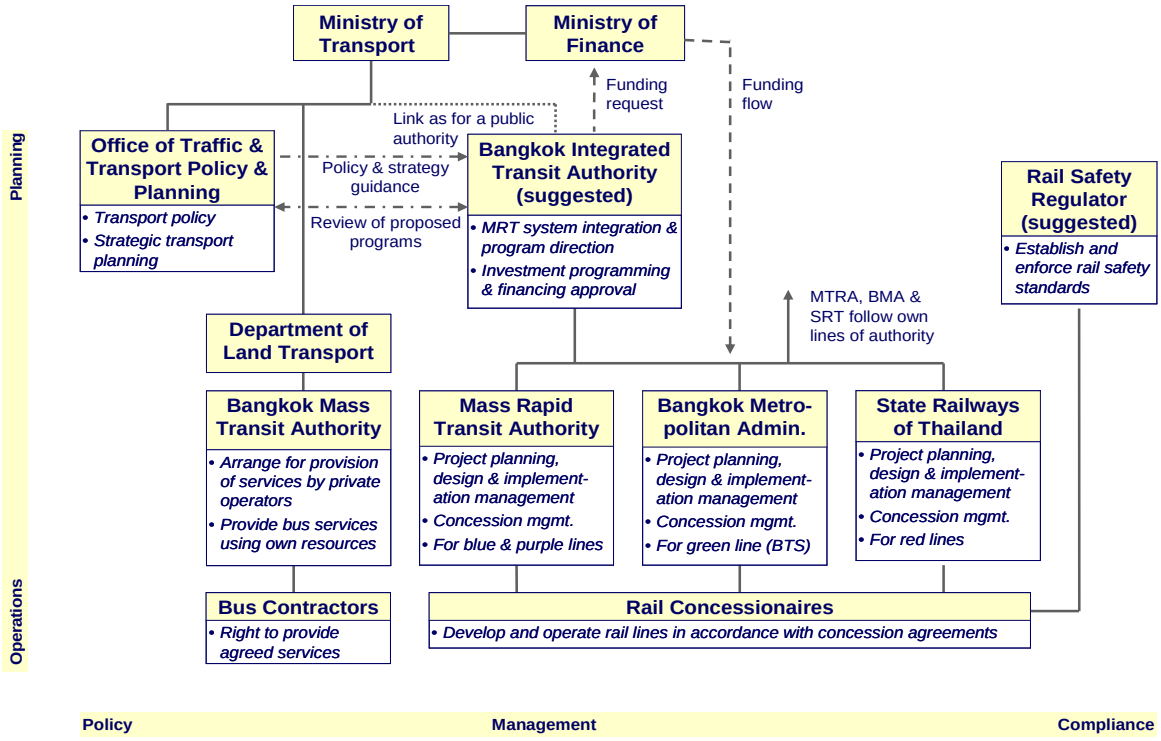
- **Managing BITA**. In this option, BITA would have a stronger role for managing rail system development, with the role of BMA, MRTA and SRT being project delivery and concession management under the control of BITA. The delivery agencies would require BITA's approval to implement MRT projects and follow its instructions regarding the form of concession agreements. BITA's effectiveness would still be constrained by the independent powers of the delivery agencies. A weaker alternative to this option is that BITA would have less strong powers and would simply play a coordinating role. There are no known examples of such an arrangement in other places where individual lines in an integrated urban MRT system are developed and managed by different agencies.
- **Full BITA**. In this option BITA would be responsible for ensuring the provision of a fully integrated public transport system for Bangkok, including at a minimum MRT and bus. It would therefore absorb the MRT functions of BMA, MRTA and SRT and the proposed BCMA. This would substantially improve the prospects for a seamless public transport system. A less strong level of integration would be for the BITA to cover only MRT, at least in the first instance. Examples of similar organizations are Transport for London, the Land Transport Authority in Singapore, and the Verkehrsverbund in Germany.

148. As indicated in ADB (2006a), these arrangements could be introduced in a phased manner. However, it is preferable that the BITA have at least the authority indicated in Figure 6 from the outset. The responsibility of BITA could be expanded over time as it demonstrates its ability to meet the objectives set for it and the benefits of integrated MRT development, and broader public transport integration, becomes better understood. The trade-off to the benefit of enhanced public transport with the Full BITA is the risk that it would, as the sole agency responsible for public transport management, behave in a monopolistic manner and become less responsive to the needs of public transport users and the broader policy objectives of the Government. This argument can be made with regard to most ministries in government, which also hold a broad monopoly with regard to their activities. However, the presence of risk requires remedial measures to be built into arrangements establishing a Full BITA – for example, a clear policy framework for the agency, and performance criteria and reporting mechanisms to ensure the BITA is held responsible for the sound functioning of the public transport system.

149. The decision to embark on BITA and in what form will require detailed consideration by policy makers. An interim mechanism would be to revitalize the dormant but long standing Commission for the Management of Land Traffic (CMLT)[25] which consists of key Ministers and the Governor of Bangkok to undertake key integrated transport functions using relevant sections of OTP to provide full time secretariat support. OTP could act as a secretariat to this interim arrangement by drawing on its own skills and resources and those in other relevant agencies (eg MRT concessions management from MRTA, bus route contract management from BMTA ie BCMA). Once a decision to establish BITA is made, the BITA would absorb MRTA and the urban rail MRT delivery parts of BMA and SRT, and the proposed BCMA while OTP would continue to exist as the transport planning and policy agency. The modified CMLT (as recommended) would continue to provide the high level political coordination of land use and transport in the BMR along the lines described in paragraph 143.

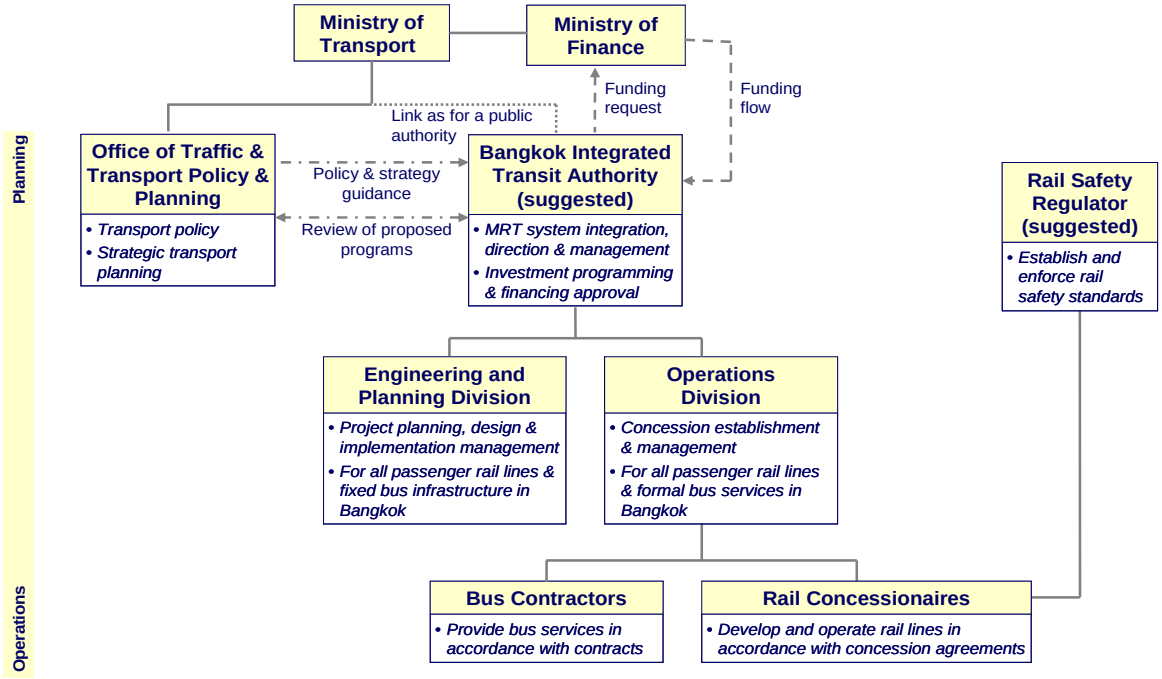
[25] The effectiveness of CMLT as a coordinating mechanism whose charter was to deal with Bangkok traffic and transport challenges including mega-projects was proven from 1992 to 2002 (the time of the major government reforms under the previous government). This effectiveness stemmed from the authority CMLT derived from being chaired by the Prime Minister and the creation of its full time secretariat the Office of the Commission for the Management of Land Transport (OCMLT) in 1992 to coordinate both plans and funding requests.

Figure 6: Institutional Structure with a "Managing BITA"



Source: Derived from ADB (2006a)

Figure 7: Institutional Structure with a "Full BITA"



Source: Derived from ADB (2006a)

X. STRATEGIC ACTION PLAN

150. This current review of Bangkok's urban transport directions finds that Bangkok's transport management is improving. The most notable success in recent years has been in the technical controls to improve vehicle and fuel standards leading to improved air quality. Major transport infrastructure such as expressways, motorways and highways have been completed to a high standard. Similarly, the first two stand-alone Bangkok MRTs are high quality and developed under innovative and different combinations of government and private sector finance.

151. The financing and net cost concessioning models used for these MRTs however are not likely to be easily applied to future MRT due to expected lower cost recovery of future lines, and the need for government to exert policy control to better integrate MRT systems including ticketing and fares, and integrate with the bus system. But the aged bus system is stagnant and constrained from improving by the current monopoly arrangements and there are barriers to efficient route and service development most likely able to be achieved by better use of the private sector. Hence, it is concluded that while transport infrastructure provision has been done well when viewed in terms of individual projects there is now a need to shift to thinking in terms of integrated public transport networks and services.

152. In the roads sector, there is also a need for a forward looking approach also to develop a new long term road plan for the BMR and the needed major and local road investments to guide and assist in the management of efficient land development in the region. As for MRT and public transport, instead of only consideration of road infrastructure, consideration of how the road network and key strategic interchanges impact on the efficiency of logistics supply chains, is a recognized priority.

153. This review confirms that therefore the following issues are in urgent need of policy consideration by government:

- ensuring the integrated and effective development of MRT and its efficient operations;
- reforming the State-enterprise monopoly bus operator, the BMTA and modernizing the provision of bus services;
- attention to improving walking conditions to improve mobility within the city as the relatively small investment benefits everybody and complements MRT and public transport investment;
- enhancing the institutional, regulatory and technical capacity for government to better manage transport, including traffic, in Bangkok; and
- developing a strategic road development plan and program to allow the programming of improvements that will ensure sufficient road capacity to meet future needs and the road freight transport component of a national logistics plan.

154. All of these five issues are important and positive early action can favorably impact large numbers of persons at relatively low cost. However, improvement on a sustained basis requires addressing the fundamental institutional, regulatory and technical capacity issues. Such change can be made either rapidly, or in a more gradual manner. Both of these approaches have their merits. The former secures the full benefits of change more quickly, though there is less time for consultation and those affected by the change have less time to adapt. Conversely, the latter allows those involved more time to gain a consensus regarding the best way forward, but risks the full extent of change being stalled by those opposed to the change. The choice is likely to vary with regard to specific decisions, with benefits to be gained from allowing time to debate and develop appropriate long term solutions in some cases (eg with regard to the proposed Bangkok Integrated Transit Authority - refer Section IX), while others (eg actions to improve walkability) might be implemented more rapidly. It is essential though that a reform program is identified and pursued in a sustained manner.

155. In the meantime, it is not desirable or necessary to delay in taking action. There are considerable improvements which can be made on each of the five issues. In the immediate future, progress on institutional, regulatory and technical matters for MRT development can be made through:

- greater standardization and integration of feasibility studies, including more comprehensive study of private sector participation options, that are required to be undertaken by sponsoring agencies (ie MRTA, BMA and SRT) under the Act on Private Sector Participation (PPSU) 1992 which is Thailand's current framework for public private partnerships. Enhanced MRT-specific guidelines for options analysis, procurement and monitoring would be highly desirable to support NESDB's 1993 announcement as recommended by ADB (2007).
- an interim mechanism while policy makers debate the proposed Bangkok Integrated Transit Authority would be to revitalize and adjust the dormant but long standing Commission for the Management of Land Traffic (CMLT), which consists of key Ministers and the Governor of Bangkok, to undertake key integrated transport and land use planning functions using sections of OTP to provide full time secretariat support, backed up by use of relevant functions from other agencies

156. The recommended strategic action plan is shown in Table 6.

XI. ROLE OF INTERNATIONAL FINANCIAL INSTITUTIONS AND THE URBAN TRANSPORT PARTNERSHIP

157. The central problems identified in this report concern institutional and regulatory issues, the need for new research tools and methods to facilitate a shift to integrated service delivery (for MRT, public transport as a whole and logistics) rather than a focus solely on infrastructure delivery, and knowledge on leading practices on sustainable urban transport operations and management, including private sector participation.

158. The international financial institutions (IFIs) represented in the Urban Transport Development Partnership (World Bank, ADB, JBIC and AfD) have a great deal of experience in these areas and could therefore offer assistance in several areas:

- knowledge products, improved tools, and related capacity building;
- support for developing appropriate sustainable transport planning frameworks at national and city levels; and
- targeted investment to promote, and possibly finance leading practices on sustainable urban transport, and minimize risks.

159. Appropriate **knowledge products** could include new survey methods (eg for logistics problem analysis), policy analysis approaches, planning tools and models, monitoring frameworks, and technical training to enhance human capacity, to assist in improving the quality of policy making and of infrastructure in terms of relevance (effectiveness), performance (efficiency) and value for money.

160. Support to new **sustainable transport planning frameworks** could include:

- technical assistance for proposed MRT infrastructure and services plan (see Section III);
- support to develop new regulatory arrangements, and pilot demonstrations of MRT concessioning processes and integration methods and new bus tendering (Sections III and IV).
- advice on development of a new consolidated road masterplan including links to strategic land development (Section VI);

- support to establishment of new institutional arrangements and its supporting legal framework including for traffic management (Sections VI and IX);.
- technical assistance for evaluating policy options;
- preparation of guidelines for the participation of the private sector in urban transport (and in other sectors);
- technical assistance support to strengthen available transport models and procedures to account for energy and environmental impacts of transport proposals;
- advice on vehicle restraint measures, parking management, bus priority measures, and on-street busway management; and
- support for strengthened land development control and management practices and value capture.

161. Significant funds are already being spent on developing urban transport in Bangkok and other Thai urban centers. Relatively small **investments in demonstration of new approaches** and guarantees to provide investor confidence can assist in maximizing the benefits of committed investments. These may include, for example:

- investments guarantees for concessions or franchises – these instruments which might be appropriate in the Bangkok MRT and public transport context. A partial risk guarantee covers the risk to a party contracting with government (for example an MRT concessionaire or a bus franchisee) of non-performance by government of the terms of the contract. This might be used to assist the development of a new concessioning regime, or to strengthen private sector confidence in infrastructure concessions; and
- assistance in the planning, and possibly financing, co-ordination of modes, including feeder systems integrated with new MRT systems.

Table 6: Recommended Actions

Time Scale	Integrating development of rail MRT	Reforming & Modernizing the Bus Sector	Developing a strategic road plan & program and efficient logistics	Improving walking conditions	Enhancing institutional, regulatory & technical capacity
Short Term ⬇	• Standardization and integration of MRT including PPP using 1992 PPSU Act. • Optimize current MRT investments eg integrated ticketing, inter-operable systems, minimize life cycle costs through redesign. • Undertake Rapid Transit Infrastructure and Services Plan. • Develop investment program.	• Update reform & modernization plan for BMTA. • Corporatize BMTA. • Create new urban bus regulator. • Redesign bus routes and services.	• Prepare a consolidated strategic long term major & local road plan & program. • Study logistics priority issues on quantitative basis. • Develop action plan and investment program. • Debate and plan for single Bangkok Traffic Authority.	• Elevate priority of walking & non motorized transport. • Develop improved asset management system for sidewalk investment, utility status and maintenance planning. • Strengthen approval and enforcement of utility works standards & encroachments. • Establish community hot line for reporting of walkability violations.	• Debate and plan for proposed Bangkok Integrated Transit Authority. • Consider interim mechanism using revitalized CMLT.
Medium Term ⬇	• Implement program of new MRT lines and services and integrated transport.	• Introduce competition through private investment in provision and operation of bus services.	• Implement program of new roads and facilitate efficient road freight & logistics e-services.	• Continue	• Implement Bangkok Integrated Transit Authority.
Lead agency	MOT	MOF & MOT	MOT	BMA	MOF & MOT

Source: Study Team

ANNEX A: BANGKOK TRANSPORT

This section of the report briefly overviews the present transport situation, development context and current trends in the BMR through a description of:

- Development context including key contributing factors (demographic dynamics, personal income growth, land use, etc) to the future growth of urban travel demand;
- Current transport supply and demand characteristics;
- MRT and Bus Rapid Transit (BRT) investment plans; and
- Future travel demand under a BMR development scenario based on a continuation of current trends.

A.1 DEVELOPMENT CONTEXT

The BMR includes the City of Bangkok, the nation's capital, and five neighboring provinces. Development is following the major road corridors and the neighboring provinces (within the BMR) are rapidly suburbanizing. Metropolitan growth is spilling over into provinces adjacent to the BMR as they become urbanized and industrialized (PCI 2005).

In 2003, the BMR's population was estimated as 10.4 million or 16% of the total for Thailand as shown in Table A.1 and its contribution to the national economy, as measured by Gross Provincial Product (GPP) was around 68% (PCI 2005). Per capita GPP in the BMR is 150% greater than that for the whole country. By 2017, the dominance of the BMR within the nation is expected to increase with the projected population forecast to reach 13.6 million people or over 19% of that for Thailand. Real GPP in the BMR is projected to increase by 258% or almost 6% pa in the period 2003 to 2025.

With the rapid growth in the economy real household incomes are increasing which is driving increased motorization and travel demand.

Table A.1: Forecast population growth in Bangkok and BMR

Area	Population (persons)		Growth Rate (% per annum)
	2003	2017	
Bangkok (BMA)	6,502,000	8,066,000	1.6
Nearby Provinces			
Samut Prakan	1,025,000	1,347,000	2.0
Nonta Buri	906,000	1,346,000	2.9
Nakhon Pathom	800,000	1,007,000	1.7
Phatum Thani	702,000	1,211,000	4.0
Samut Sakhon	446,000	592,000	2.0
BMR Total	10,381,000	13,569,000	1.9
Thailand	63,665,000	70,016,000	0.7

Source: Northern Train Expansion Project by PCI (2004), OTP and National Statistics Office, Thailand (2004)

Bangkok is governed by the Bangkok Metropolitan Administration (BMA) but the national line agencies may undertake projects in Bangkok and neighboring provinces. Development has largely followed expansion of road corridors creating inefficient forms of development often known as "superblocks" whereby large land parcels are developed in a non contiguous, inefficient fashion and rely almost entirely on major roads such as expressways and highways for access requiring both local and long distance traffic movement to mix thus exacerbating traffic congestion.

The process of suburbanization is driven by lower land prices and lower development costs but is permitted by the wide availability, and increased reliance on, motorized modes of passenger transport. Some poorer segments of the population tend to live on the fringe of Bangkok but many others live in low income areas in and around central Bangkok. Those located at the edge of Bangkok would usually face the highest transport costs and difficulties in accessing employment and key community services.

Due to the rapid pace of development urban growth has been largely unplanned and the provision of adequate urban services has lagged growth. BMA's ability to manage land use and development is improving but still weak. The first Bangkok City Plan (Zoning Plan) was prepared by the former Department of Town and Country Planning, and gazetted in 1992. This was handed over to BMA, which created a new division to administer the plan. The plan was updated in 1997 and has been extended from 2002 until 2006 when a new BMA zoning plan was to have been enforced. Although BMA now has a Department of City Planning, in practice, the zoning plan has had little impact on the type of developments in each of BMA's 13 zones. BMA can impose controls on individual buildings in terms of (1) setbacks along specified roads and within specified areas, (2) their gross floor area and proportion of a site to be occupied, (3) and parking requirements. A fundamental drawback is that all subdivisions[26] are approved by the Government's Department of Lands who also administers a system of annual land tax. Other Government agencies also have a significant influence on the direction and pace of development through major road building and other infrastructure provision. So far, the BMA City Plan seems to follow rather than guide developments and plans of other agencies in Bangkok.

The influence of transport investments, particularly roads, on the location of development is therefore significant. The problems are typically exacerbated as national planning, transport (roads, expressways, public transport), and industry agencies and local governments each work in "silos" with limited coordination.

Thailand's 10th National Development Plan (2006-2011) sees Thailand moving toward being a more geographically specialized economy. Along with a shift to less reliance on exports of agricultural products, it is desired to develop Thailand as a knowledge-based economy with niches in particular industries such as finance, education, technical consultancies, business services, and design and fashion, and environmental tourism (PCI 2004). Webster (2006) describes this approach as enhancing Thailand's comparative and competitive advantages by centering on associated "amenity" services.

Due to necessity as Thailand's production costs have risen, manufacturing is becoming more specialized, around vehicle production (pickup trucks), petro-chemicals, consumer appliances/electronics, certain types of electrical and mechanical intermediate goods, and agro-processing. Increased value added in these areas requires deepening of economic clusters and geographic clustering to realize agglomeration economies (Webster 2006). These industries form vital links in global and domestic supply chains and require fast, reliable and secure access to airports, seaports, and good quality national transport systems, to meet the requirements of downstream production processes.

A.2 TRANSPORT NETWORK AND PERSON DEMAND CHARACTERISTICS

A.2.1 Network

The road network is characterized by the presence of very wide primary roads and small local side streets roads (known as "soi") that run off them. It is estimated that there are some 6,850 km of road in the BMR, comprising: (i) 520 km of expressway and special/national road and 1,450 km of rural road that are under the jurisdiction of the national government; (ii) 1,220 km of arterial road, 410 km of sub-arterial road and 2,450 km of local streets (sois) for which the BMA is responsible; and (iii) an

[26] Divisions of land parcels for housing or other urban development.

indicative 800 km of road for which neighboring provinces are responsible[27]. There are few medium-width distributor roads effectively connecting the primary roads. The first urban expressway, the First Stage Expressway and a toll road, opened in 1981. Since that time an extensive series of major road and expressway projects have been completed.

Urban bus services are managed by Bangkok Mass Transit Authority (BMTA), which controls a fleet of 12,200 buses – 3,600 buses are operated by BMTA, with the rest operated by private sector sub-contractors. Since the 1997 financial crisis, there has been growth in the use of air-conditioned vans for point-to-point commuter services – at first they functioned illegally but are now regulated by the BMTA. In July 2002, there were 5,330 of these vans.

Until 2000 BMTA was not permitted to operate buses older than 10 years but due to financial pressure buses are being utilized for longer periods. Since 2001 BMTA have extended various maintenance contracts with suppliers. In late 2006, all of the BMTA-own fleet was over 10 years old and the average age was 14 years as shown in Table A.2. Eventually when these buses are retired from BMTA service they are sold to private sector sub-contractors to BMTA for use in Bangkok.

Table A.2: Average Age of BMTA Bus Fleet at end 2006

Type of Bus	No of Buses	Age
Non Airconditioned		
Cream-red	1,546	17
While-blue	48	17
White-blue (rented)	80	11
Sub-total (non airconditioned)	1,674	15
Airconditioned		
Cream-blue (Benz)	295	17
Cream-blue (Isuzu)	100	13
Cream-blue (Hino)	80	13
Articulated (Benz)	52	13
Articulated (Icarus)	43	13
NGV (MAN)	44	15 (Not operational)
NGV (Benz)	38	15
EURO II	797	10
EURO II	500	7
Sub-total (airconditioned)	1,949	13
Total Fleet	3,623	14

Source: MOF/SEPO & BMTA (2006)

Due to high levels of traffic congestion bus productivity is low. High staffing levels burden BMTA even further. Various studies have looked at reforms to make the bus system more efficient. The 1999 World Bank study recommended the phased privatization of the system around BMTA's various zones and associated depots and the introduction of modern, more commercial management practices. The 2003 study by the German Agency for Technical Cooperation (GTZ) made similar recommendations.

[27] Based on current database information from BMA, DOH, DRR and ETA. Other estimates are also available, eg PCI et al (2005) reports 4,700 km of public road in the BMR.

GTZ recommended major bus lanes and development of Bus Rapid Transit (BRT) in Bangkok to provide a more economical way of satisfying some of Bangkok's mass transit needs.

The existing rail network serving Bangkok is not extensive. It is primarily comprised of an at-grade railway with double track on most alignments. The railway system serves freight, inter-city (and regional) and urban passenger traffic. Water transport services are operated in the Chao Phraya River and two major canals and has an important though minor role.

Mass Rapid Transit (MRT) has been recommended as part of a suitable transportation system for many years. A MRT masterplan update called the "Urban Rail Transportation Master Plan (URMAP)" was completed in early 2001 and further updated in 2004 (URMAP2). It provides a framework for subsequent studies and implementation of individual projects and programs particularly for urban rail transit developments in the BMR. URMAP's work on developing an optimum MRT network for Bangkok depends critically on the use of existing rail lines and facilities. The long term rail MRT plan is currently under review.

Bangkok's first MRT, the US$1.7 billion Bangkok Transit System (BTS) or the initial Green Line, was officially opened on December 5, 1999. BTS consists of two lines totaling 23.5 km, has 23 stations and traverses some of Bangkok's busiest streets and activity centers. Present patronage is around 430,000 passengers per day (average Monday to Friday demand). The second MRT system, the Blue Line subway, is a 20 km subway system is operated by a private consortium, Bangkok Metro Company Ltd (BMCL), under a concession to the Mass Rapid Transit Authority (MRTA). The system opened in August 2004. Present patronage is around 180,000 passengers on an average weekday.

The 28.0 km airport rail link[28] connecting central Bangkok and the city's new international airport (Suvarnabhumi Airport) in the east is under construction and is likely to be completed by 2009.

Present fares of BTS and the Blue Line subway are calculated on a different basis and are operated independently. Thus, a journey involving both lines requires purchase of a second ticket and payment of a second flagfall. The result is a non-uniform and non-integrated fare structure.

Bangkok's in-use[29] national motor vehicle fleet was about 2.9 million in 2003 as shown in Table A.3. Bangkok accounts for about 22% of the nation's registered motor vehicles including 57% of the private car fleet, but only 12% of national motorcycles and 42% of the combined truck and bus registrations. Pick-ups, almost all diesel engine powered, are widely used as a personal vehicles particularly in urban areas. Over 1991 to 2003, Bangkok's motor vehicle fleet grew at a rate of 3.3% per annum thus increasing by a third over this period. The number of cars, vans and taxis grew at the relatively faster rate of 7.0% per annum over this period, while the number of motorcycles remained unchanged. Despite rising vehicle ownership in Bangkok, it was estimated in 2005 that 25% of all households did not own or have access to a vehicle (ie car or motorcycle), a reduction of almost a half from the estimated 44.5% of households that did not own a car in 1995.

[28] The new Suvarnabhumi airport line started construction in March 2005 and was due to be completed by November 2007 but it appears likely that completion may be delayed by over a year due to slower than expected land acquisition.

[29] These in-use data available from unpublished data sets of Thailand's Department of Land Transport are about half of the cumulative vehicle registration figures normally published which fail to account for almost all vehicles that are scrapped or are no longer fit to operate.

Table A.3: Number of In-Use Vehicles in Bangkok

Type	1994	2003	Average growth rate 1994-2003 (% pa)	2003	
				Share of the fleet in Bangkok (BMA)	Bangkok as % of fleet in Thailand
Car	716,591	1,162,704	5.5%	39.6%	57.5%
Microbus & Passenger Van	241,120	149,613	-5.2%	5.2%	49.0%
Van & Pick up	245,942	583,045	10.1%	19.9%	21.0%
Urban taxi	22,256	63,228	12.3%	2.2%	99.6%
Motor-tricycle taxi (Tuk Tuk)	3,645	7,394	8.2%	0.3%	42.6%
Motorcycle	851,853	857,460	0.1%	29.2%	11.5%
Truck	73,145	75,800	0.4%	2.6%	14.2%
Bus	17,457	26,225	4.6%	0.9%	28.1%
Other	13,220	11,248	-1.8%	0.4%	12.0%
Total	2,185,229	2,936,717	3.3%	100.0%	21.9%

Source: Department of Land Transport * Other includes vehicles such as tractors. Non motorized vehicles excluded.

The average speed on major roads is 15.5 km/hr during the morning rush hour and 22.6 km/hr in the evening rush hour in 2003 (OTP 2003). These speeds are typical of other major cities although comparisons are difficult. There are very limited historical data on traffic speeds in Bangkok for the early 1990s that can be validly compared to the 2003 data although anecdotal information suggests that in the period 1990 to 1995 (and even through to 1997 and the Asian economic crisis) due to major construction of road and rail systems along or intersecting major roads in Bangkok's central business district that traffic speeds were very slow and associated pollution severe.

These effects due to construction and the interruption to normal economic growth mask the effects of urban area expansion whereby traffic speeds tend to remain stable at around 10 to 20 kph (ie moderate to high congestion) in the central area but the congestion spreads outwards geographically and also to the off-peak periods including weekends.

Improving traffic flows and giving priority to buses along major roads could provide considerable emission reductions and fuel efficiency improvements. Traffic congestion appears to be rising due to increased economic activity and the growth in the vehicle fleet. While the costs of congestion in the BMR are no doubt considerable in this study a detailed estimate was not made. Estimates of congestion for Bangkok made previously tend to be literally "back of the envelope" calculations of unknown reliability and based on substantial definitional differences: some refer to the BMA (ie City of Bangkok) and others to the BMR, and most are believed to refer to absolute congestion assuming all congestion could be removed which is not economically feasible.

For example, Dorsch Consult et al (1998) "The Transport Policy and Planning Project (TP3)", Final Report, June. Prepared for OCMRT calculated the annual economic cost as THB163 billion (approximately US$4 billion) consisting of THB116 billion of passenger delay, THB27 billion in extra vehicle operating cost and THB20 billion in extra crew cost. The cost of accidents and environmental damage were not estimated.

World Bank (1992) using simplified transport modeling estimates that a 20% reduction in congestion cost (time and vehicle operating cost but excluding externalities) would be over US$800 million in 1989 prices[30] (about US$1.2 billion in 2006 prices). A 20% reduction in congestion cost may better approximate optimal congestion (which is the amount of congestion with optimal pricing of road use) than most other estimates. This estimate is of a similar order to that estimated for major Australian cities (Sydney and Melbourne)[31]. Overall, it is concluded that the excess cost of congestion excluding externalities in Bangkok would be in excess of a billion US$ each year.

Congestion is often made worse by the poor distribution of road space with a bias to both major roads (such as regional highways and expressways) and small lanes and streets but with an inadequate quality, standard and spatial pattern of distributor roads forcing both long and short distance trips to mix unnecessarily.

The varied vehicle mix and the many different road users including pedestrians have different needs that are frequently conflicting. Trips on foot are also significant (14% of all daily trips and a components of trips by all other modes) but rarely do planners adequately give priority to the needs of pedestrians and non motorized transport (NMT) which are not polluting.

To date, the new rail MRTs have not demonstrably led to high activity land use developments around MRT stations in either central Bangkok or around their suburban stations possibly due to land use constraints (fragmented ownership of land parcels) and the timing of property market cycles. This is not to say that that major investments in new developments have not occurred (eg Paragon Complex at Siam Square and Central Office World between Siam Square and Ratchaprasong intersection) but that they also had the benefit of key central locations, access to major roads although the nearby presence of the new rail MRT stations may have been a deciding factor in the choice of location for the relevant investment.

Urban air quality is a serious urban environmental hazard and transport (ie mobile sources) is the main direct and indirect contributor to air pollution in Bangkok. The Air Quality Monitor (World Bank 2002) showed that overall average ambient concentrations of key pollutants which were well below prevailing ambient air quality standards, and which are among the strictest in Asia, had declined over time or remained constant. However, there was evidence that notable exceedances of the air quality standards were being experienced for particulate matter (PM), Ozone and most of the other pollutants.

Very fine particulate matter[32] which can penetrate deep into the lungs is known as PM_{10} and poses the most severe impact on human health. World Bank (2003) estimated the cost due to PM_{10} in the BMR in 2000 as being over US$620 million. Vehicle speeds have a major impact on the rate at which fuel is consumed and emissions are emitted. As speeds fall fuel consumption and emissions usually increase rapidly. Greenhouse gases are directly related to fuel use which is increasing despite recent higher world oil prices.

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[30] Thailand Bureau of Trade and Industry Consumer Price Indices show that prices have increased by at least 70% between 1989 and 2006.

[31] Luk et al (1994) defined congestion delay in as the difference between uncongested (ie free flow) conditions and congested or peak hour conditions. He estimated that the cost of this congestion in 1992, including time and vehicle operating costs but excluding externality costs, for Sydney (population of 4 million) and Melbourne (population of 3 million) were A$2.1 billion and A$1.8 billion respectively in 1992 prices. However, these cost estimates would overstate the cost of optimal congestion by two to three times by using uncongested conditions as the basis for the estimate. While the value of time for travelers in Bangkok is about one-sixth of those in Australia, the level of congestion in Bangkok is much higher.

[32] Below 10 microns in diameter or finer. It is now common to measure $PM_{2.5}$.

Because of mixed, largely unplanned land use, typically occurring in downtown Bangkok residential dwellings, offices, shops, restaurants, schools and hospitals are usually located adjacent to major roads. Many lower income professions including policemen, bus and taxi drivers, vendors and much of the general population are exposed to pollutants on a daily basis. This high exposure to vehicle emissions increases the severity of the potential impacts at the roadside.

The aged diesel truck and bus fleet operating in Bangkok (and Thailand) are large emitters of particulate matter. As diesel powered buses and trucks may be completely rebuilt and re-engined several times (with second hand imported engines) they tend to remain in the fleet a long time despite the introduction of new vehicles complying with the latest emission standards.

Improved control measures for fuel quality and new vehicle emission standards being implemented has resulted in some improvements in Bangkok's air quality although continued economic growth, along with sharp increases in vehicle growth and increased industrial activity, will be expected to increase ambient pollutant levels in the future. These control measures will to some extent mitigate the growth of pollution but rises in average ambient concentrations and roadside concentrations are likely as well as an increased incidence of standards being exceeded.

A.2.2 Current Person Transport Demand

In 2005 it was estimated there were about 19.4 million linked person trips and 16.7 million linked mechanized[33] trips per day with about 25 million unlinked mechanized trips (Personal Communication 2007).

Patronage on public transport in general is in steady decline despite increases in ridership on the two rail MRTs. Policy Appraisal Services et al (2001) estimated that in the main corridors served by BTS total public transport passenger demand declined by about one-third between 1995 and 2000 most probably due to a decline in economic activity, population levels and income. With the growth in the economy total trip making appears to be increasing again although GTZ (2003) too reported that bus patronage declining by around 5% pa through the late 1990s and early 2000s.

In summary, daily travel demand in Bangkok has the following features:

- 19.4 million linked person trips per day estimated in 2005 (Personal Communication 2007);
- 46% of all person trips including walk trips are made by private modes (eg car, pick-up, motorcycle) with 3% by rail MRT, 37% by bus, and 14% by walking and non motorized transport modes (NMT);
- 25% of all households had no private vehicle in 2005 down from 45% in 1995;
- In November 2005, patronage on the Bangkok Transit System and Blue Line subway were, respectively, 430,000 passengers/average weekday and 180,000 passengers/-average weekday[34];

[33] A mechanized trip is one which has one or more legs using a mechanical mode of transport as opposed to one which has all legs using non mechanized modes such as walk or bicycle. Linked trips are the trips between origin and destination. Unlinked trips are for individual stages of a journey between origin and destination. Hence, data on ticket sales for each mode are also the equivalent of unlinked trips.

[34] Patronage, or ridership, is the number of boardings, ie passengers getting onto a train, bus or other mode of public transport. The numbers presented in this report are generally average patronage per weekday (Monday to Friday). Annual patronage is about 330 times average weekday patronage because daily patronage on weekends is lower than during the week. Patronage during the week varies between days, with Fridays usually being the busiest day.

- BTS patronage has grown steadily from around 140,000 passengers per day in April 2001, a growth rate of just under 20% pa[35]; and
- Bus patronage is steadily declining by around 5% pa.

A.3 PLANNED RAIL MRT INFRASTRUCTURE

At the end of 2006, The Royal Thai Government (RTG) approved a new plan for the proposed priority mass rapid transit railway projects for the Bangkok Metropolitan Region (BMR) with a total length of 118 km and an estimated total investment of around US$4.5 billion. All of the projects are intended to proceed in parallel and be implemented by 2012 and consist of the MRT lines shown in Table A.4 and Figure A.1. Figure A.1 also shows a proposed additional 8 km connection between the airport line (under construction) and the northern red line (Bang Su to Hua Mark).

Table A.4: Planned MRT Lines and Schedule (as at end 2006)

MRT Line	Date of Tender	Date of Start of Implementation	Date of Opening
SRT Lines Construction			
Red Line North East: Bang Su – Taling Chan	April 2007	October 2007	April 2010
Red Line North: Bang Su – Rangsit (includes Bang Su Central Station)	October 2007	April 2008	April 2012
Red Line: Bang Su – Hua Mark	December 2007	June 2008	Mid 2012
MRTA Lines Construction & Operation			
Purple Line: Bang Su – Bang Yai	May 2007	December 2007	Available December 2010
Operating concession for Purple Line	May 2007	May 2008	Start: July 2011
Blue Line extension: Bang Su – Bang Khae	September 2007	April 2008	Available April 2012
Operating concession for Blue Line extension	May 2007	May 2008	Start: December 2012
Green Lines Construction & Operation			
Green Line extension	December 2007	June 2008	Available October 2010
Operating concession for Green Line extensions	July 2007	April 2008	Start April 2011

Source: PDMO

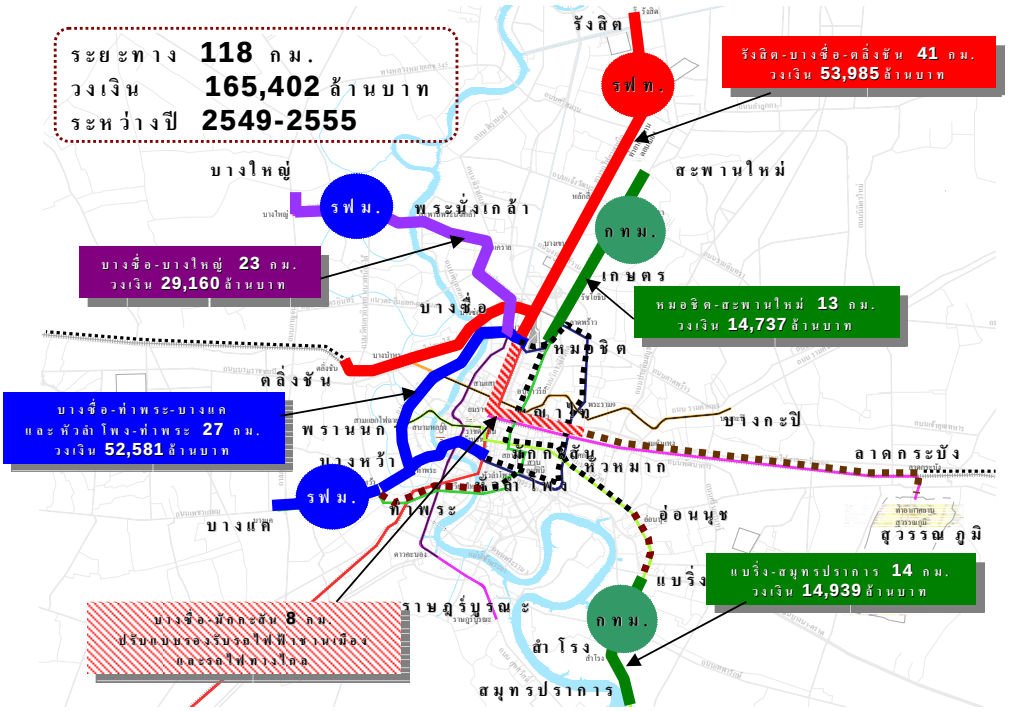
The MRT lines are to be implemented by three separate agencies: Mass Rapid Transit Authority (MRTA) for the purple and blue lines, State Railways of Thailand (SRT) for the red lines, and Bangkok Metropolitan Administration (BMA) for the green lines. SRT will initially operate the red lines[36]. Both MRTA and BMA are proposing to engage private sector concessionaires to operate their MRT lines.

[35] This trend partly represents patronage "ramp up" as people took time to change their travel behavior in response to the new, though substantially more expensive, travel mode. It will not be sustained indefinitely. No data on trends in passenger growth are available for the Blue Line subway.

[36] SRT are proposing to outsource the operations of the Airport Line which is now under construction. The contract for construction includes the supply of an initial fleet of nine electric trains.

The completion of priority MRT lines quickly and in an coordinated way can serve to provide valuable support to the road system through providing a “relief valve” for congestion thus better integrating Bangkok and supporting the economy.

Figure A.1: Rail Mass Rapid Transit Network Approved in November 2006



Source: OTP (2006)

A.4 PROPOSED BUS RAPID TRANSIT

Recognizing that bus transit has an important role to both provide mass transit services in its own right as well as support rail mass transit, in 2002 OTP commissioned the BMTA Route Planning and Scheduling Project which recommended 227.5 km of on-street BRT. The priority Bus Rapid Transit (BRT) routes identified were eight radial BRT routes, with the top two being Phetchburi Road and the surface road under Dong Muang (airport) toll road. OTP has recently completed the final design of two of the priority BRT routes. Refer Figure A.2.

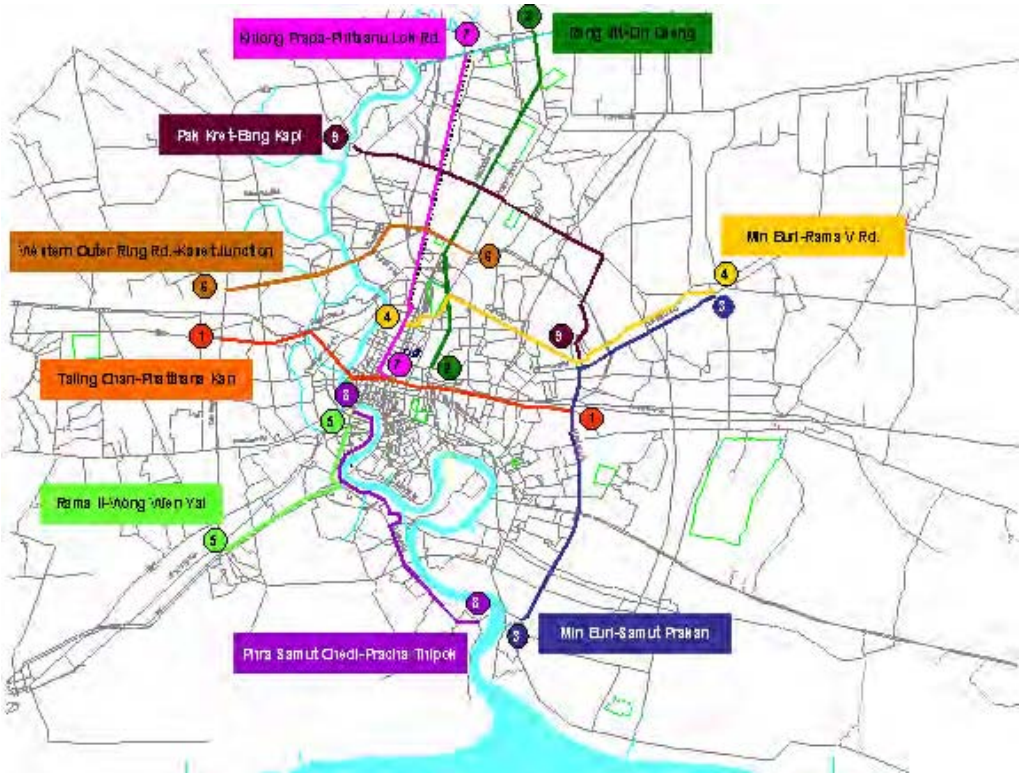
While these are promising concepts, on-street BRT which is proposed is likely to encounter significant practical difficulties in implementation and operation. It appears this BRT concept has no current status.

The Governor of Bangkok has recently promoted the development of several BRT routes – with some segregation but also on-street mixed traffic operation. The following projects are being given priority:

- The construction of the first BRT route, stretching 16.5 km from Chong Nonsi to Ratchaphruek, will begin on March 1, 2007 and cost THB1.9 billion.
- The second to be constructed is the 38 km Don Muang-Min Buri-Suvarnabhumi route estimated to cost THB4.5 billion.

The BMA plans four more BRT routes. A major obstacle to progress with BMA’s first BRT route was overcome at the end of 2006, when Cabinet gave permission to BMA to operate their own fare paying bus services.

Figure A.2: OTP Proposals for BRT Routes



Source: Plan Pro et al (2003) "OTP BMTA Route Planning & Scheduling Project"

A.5 LOGISTICS

Truck transport is vital component of the broader logistics industry[37]. Trucks carry vital freight between factories and farmlands and ports and distribution centers often located in urban areas or along highways that traverse urban areas.

Heavy trucks with 10 wheels or more (including three axle vehicles and trucks with trailers) have been restricted from operating in Central Bangkok, the area mainly defined as being within the Middle Ring Road (MRR), for over 20 years. They are banned from entering the city between 6 am and 9 pm every day except public holidays. They are however restricted to certain defined main roads such as expressways and the major highways. The main exceptions to this restriction are concrete trucks and trucks carrying easily damaged farm goods which are permitted to operate on some routes and in some time periods (mainly between 10am and 3pm). This ban has existed for than three decades in more or less the same form. Although policies which impose undue restrictions on trucks will also may also increase the cost of goods to the consumers and if carried to extremes erode the competitiveness of

[37] Logistics is generally considered to comprise four, interrelated activities: transport; warehousing; inventory; and administration and order processing. As a consequence, freight transport cannot be addressed in isolation, but rather is a part of logistics which is in turn integrated with the entire modus operandi of business. Nevertheless, transport is still important because its cost and convenience will have a bearing on where businesses locate, where they source their materials, how they manage their material and products, the transport modes that are used, and the types of transport services used. Changes in these factors will affect the relative mix of transport and other resources that are used by companies.

individual firms, and industries and the economy, it has been politically easier to impose restrictions (time, area, route-based) on truck transport rather than private vehicles.

Estimates of logistics cost for Thailand indicate that it would be around 16-19% of GDP which is very high compared to estimates for USA (10%), EU (7%), Japan (11%) and Australia (9%) (JETRO 2003; EPS/ PAS 2005). In EU and Australia and almost certainly in the other countries, there has been continued reductions in logistics cost which have underpinned economic growth. As shown in Section VII and Annex E of this report, there are many impediments to change in Thailand which would seem to limit major reductions in logistics costs in the future without intervention.

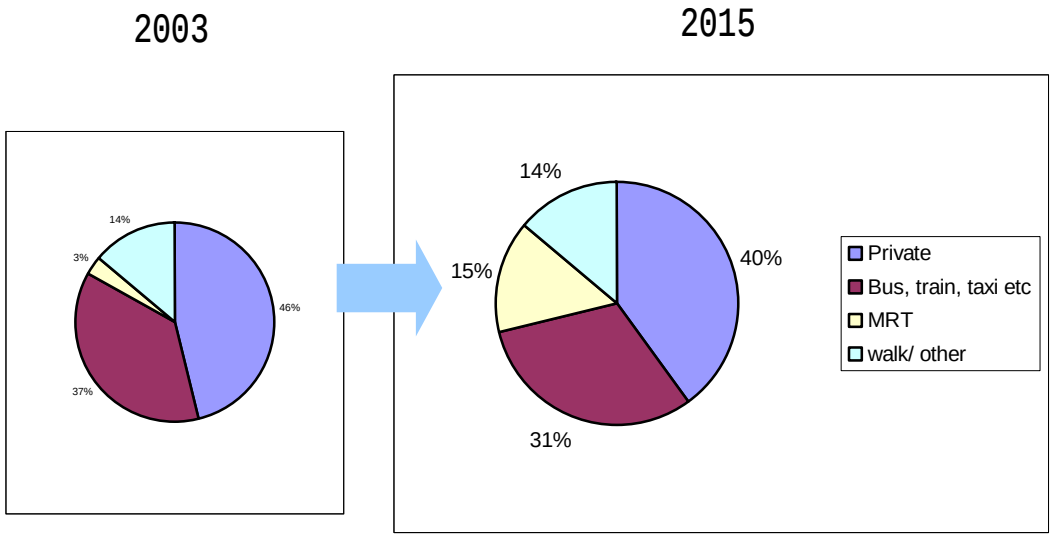
A.6 FUTURE TRANSPORT DEMAND

Detailed transport forecasts should be prepared based on desired economic, spatial, and transport development scenarios and associated policy inventions. However, it was not possible in this study to develop forecasts sensitive to these factors.

Growth in future personal trip demand would be expected to be faster than population growth which is forecast to grow at a rate of around 1.6% pa to 2017 (PCI 2005). OTP's recent revised forecasts for their data base modeling (OTP 2007b) show that daily trip making is expected to increase by 53% over the 20 year period 2006 to 2026, representing a growth rate of 2.2% per annum. Based on average growth of 1.9% pa, travel demand could rise to about 23.4 million person trips per day in 2015 from the 19.4 million trips in 2005. Along with increasing household incomes, increasing suburbanization and a possible slight decline in central area population density, an increased reliance on motorized personal modes is likely, all other things being equal.

PCI (2005)'s forecasts indicate that by around 2015 with the development of a substantial MRT system that 40% of all person trips including walk trips would be made by private modes (eg car, pick-up, motorcycle) with 15% by rail MRT, 31% by bus, and 14% by walking and non motorized transport modes. However, perhaps a quarter of MRT users would use bus to travel in and out of MRT stations (see Figure A.4).

Figure A.4: Current and Forecast Person Trip Mode Split in BMR to 2015



Source: Personal Communication (2007)

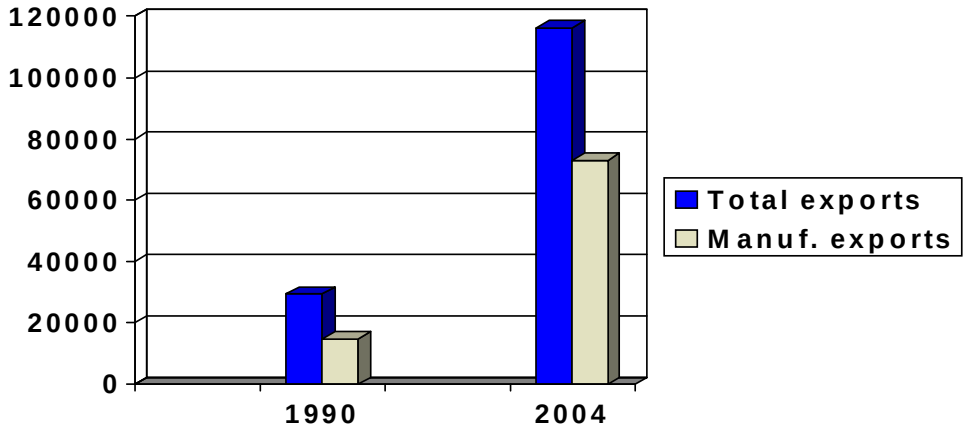
Thailand's economy has depended on external trade and the logistics, including road freight industry, has facilitated the nation's impressive trade performance shown in Figures A.5 and A.6 respectively, showing that from 1990 to 2004:

- Total exports in terms of constant US$ in 2000 prices grew by just over 10% per annum in the 14 year period to 2014 while the component represented by manufactured exports grew at a similar rate; and
- Total imports in terms of constant US$ in 2000 prices grew by just over 8% per annum in the 14 year period to 2014 while the component represented by manufactured exports grew at a similar rate.

In the future, based on these recent trends it would be expected that road freight transport will continue to grow at rates slightly higher than GDP growth and maintain, and probably increase, its share versus rail transport.

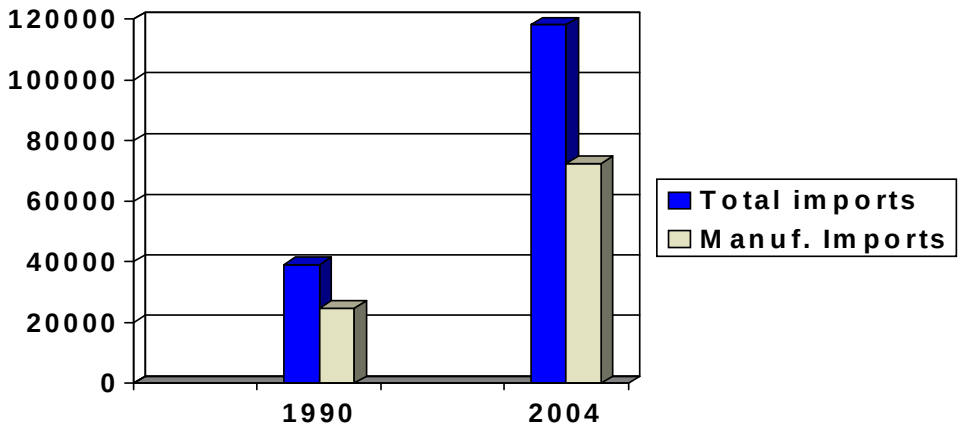
Hence, in the long term road freight growth rates of the order of 7% per annum would seem to be likely. Over the next 10 years this would mean the demand for road freight would almost double.

Figure A.5: Thailand Exports 1990 and 2004



Source: Amos (2007). Exports are measured in millions of constant 2000 US$.

Figure A.6: Thailand Imports 1990 and 2004



Source: Amos (2007). Imports are measured in millions of constant 2000 US$.

A.7 CURRENT INSTITUTIONAL AND FINANCING ARRANGEMENTS

Well aligned, authoritative plans, sound governance and adequate resources (human and financial) is essential for securing a well planned transport system and sustainable services. These topics were considered here in a general sense focusing on the clarity of institutional arrangements and allocation of functions to agencies (including issues of strategic direction, coordination and technical capacity), the processes by which they operate, and the adequacy of financial resources.

A.7.1 Current Institutions and Their Functions

Several agencies are responsible for various aspects of transportation in Bangkok. Coordination has improved since the government's reforms announced in September 2002 whereby key road, rail and rail functions of various government agencies were brought under the control of the Ministry of Transport. The key functions of government with respect to transport are mapped by the main transport agencies responsible for rail MRT, bus and other public transport, roads and traffic and street management and shown in Table A.5. Figure A.7 displays the key organizational arrangements for rail MRT planning and delivery as it existed towards the end of 2005/early 2006. Today, the only difference is the Mass Transit Committee and its three sub-committees which were established by Royal Decree in September 2005 appear to be no longer active in the form promulgated.

The main observations that can be made on the present distribution of functions for land transport are as follows:

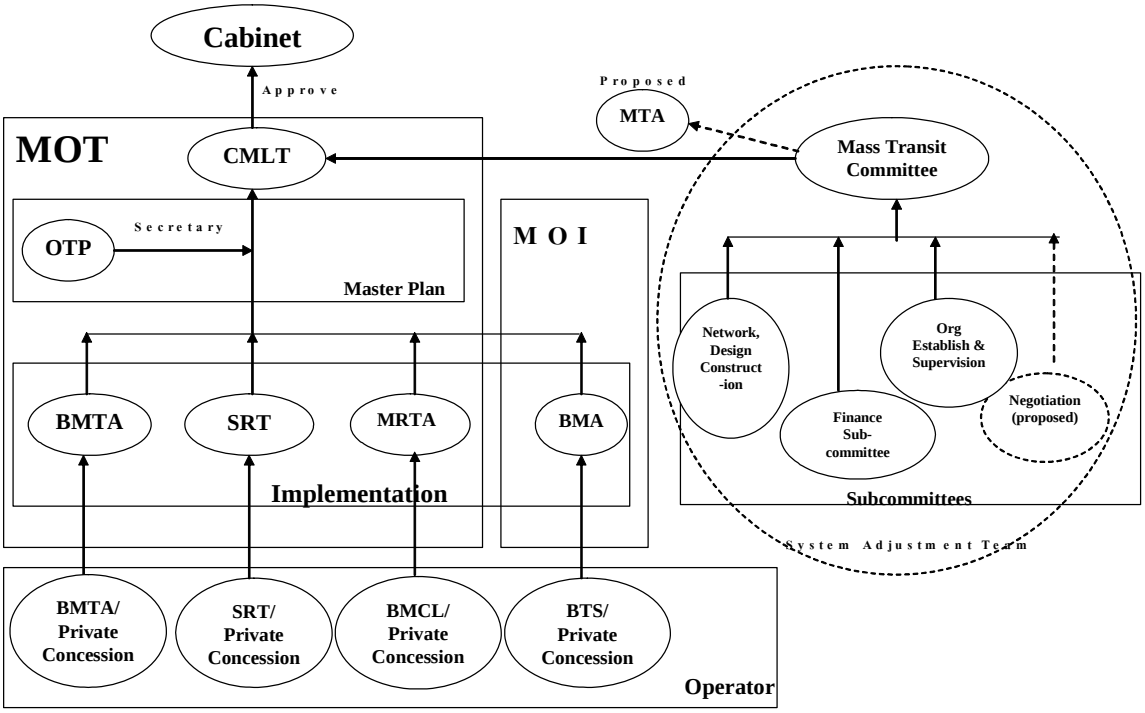
- OTP acts as coordinating agency reporting through the Minister of Transport to the Cabinet to achieve overall system integration and development. Prior to the government administrative reforms of October 2002, OTP's forerunner the Office for the Commission for the Management of Land Traffic (OCMLT) reported to the Committee for Management of Land Traffic (CMLT) which was chaired by the Prime Minister. CMLT still exists today although it has been inactive since October 2002. Although OTP has had some success in coordinating the transport investment plans of each agency there is still no agreed comprehensive transport framework for the BMR. Each agency continues to develop its own budget requests.
- Not shown in Table A.5 are the National Economic and Social Development Board (NESDB) who have an important role national economic issues and their spatial dimension and have a leading role in approvals for mega-projects involving the private sector under the Thailand Act on Private Participation in State Undertakings (PPSU) 1992.
- There are weak but arguably sufficient linkages between OTP, NESDB and MOF.
- Rail mass transit projects are being undertaken by three separate agencies and/or State Enterprises: MRTA; SRT and BMA, even though since the reforms of 2002, MRTA and SRT report to the Minister of Transport while BMA still reports to the Minister of Interior.
- The Expressway and Rapid Transit Authority and the Department of Highways build major expressways, highways and motorways in the BMR but still have significant independence. Similarly, the Department of Rural Roads builds major bridges and suburban roads in the BMR.

Table A.5: Current Transport Agency Functions

Function	Transport sector agencies			
	Rail and MRT	**Other Public Transport**	**Roads & Road Vehicles**	**Traffic & Street Management**
Policy and Planning				
Policy and Planning	MOT/OTP & SRT	MOT/OTP & DLT	MOT/OTP, DOH & ETA	BMA & OTP
Program development and management for infrastructure provision				
Design	MOT/OTP, SRT, MRTA and BMA	MOT/OTP, DLT	DOH, ETA, DRR, BMA	BMA
Construction preparation & management	MRTA, SRT, BMA	BMTA, Harbors Department under MOT	DOH, ETA, DRR, BMA	BMA
Delivery of works	MRTA, SRT, BMA & private contractors	BMTA and Harbors Dept. (MOT) & private bus and water transport operators	DOH, ETA, DRR, BMA & private contractors or concessionaires in case of DMT and SES II toll roads.	BMA
Maintenance	SRT, BTS, BMCL	BMTA and Harbors Dept. (MOT) & private bus and water transport operators	DOH, ETA, DRR, BMA	BMA
Financing	Government budget for SRT, Blue Line and Green Line extension civil works	Government budget and revenue from passenger fares	Government budget, private financing in case of DMT and SES II toll roads.	Government budget
Service delivery, including operations & maintenance				
Provision	BMCL, BTS, SRT	BMTA & private bus and water transport operators	DOH, ETA, & private concession-aires for DMT and SES II toll roads	BMA, Traffic Police
Ticketing and marketing	BMCL, BTS, SRT	BMTA & private bus and water transport operators	As above for toll collection	na
Service specification	MRTA, BMA, SRT	LTCB, DLT	na	na
Contracting	MRTA, BMA, SRT	BMTA	DOH, ETA, DRR, BMA	na
Contract compliance	MRTA, BMA, SRT	DLT, BMTA	DOH	na
Financing	BMCL, BTS, SRT	Government budget and revenue from passenger fares	na	na
Regulation & enforcement	Part of contract	DLT, Police and Harbors Department	Police DLT for vehicle registration/ fitness & driver authorization	Police

Source: Study Team. DMT is Don Muang Tollway & SES II is Second Stage Expressway

Figure A.7: Key Organizational Arrangements for Rail MRT (end 2005)



Source: Study Team

- Not shown in Table A.5 are the Pollution Control Department (PCD) under the Ministry of Environment and Natural Resources who with other agencies such as the Thai Industrial Standards Institute draft standards to be submitted to the National Environment Board (NEB) for eventual approval by Cabinet. There are weak links between these environmental agencies and transport sector agencies eg for setting environmental standards for previously proposed new CNG bus purchases by BMTA. BMA, the local government for the City of Bangkok, is described as an Independent Government Agency but has limited in powers compared to what may be expected of an equivalent city government in the west. BMA has an oversight role of the Skytrain and associated BTSC concession but is not well equipped with the necessary skills and resources to greatly expand its role in MRT. Its main responsibilities for street management are provision and maintenance of signs and markings, sidewalks and a shared involvement with urban traffic signal control with the metropolitan police.
- The metropolitan police have the main responsibility for urban traffic control in Bangkok although in neighboring provinces in the BMR (and elsewhere) the provincial police appear to have less interest in urban traffic control and local governments (eg Pattaya City on the ESB) may have a significant traffic control function.
- Department of Land Transport is private and commercial vehicle registration and inspection and driver licensing. The Land Transport Act governs the regulation of commercial vehicle operations (bus, truck) and the Act provides for the establishment of a Central Land Transport Control Board (CLTCB), and a provincial Land Transport Control Board in each province**.** The central CLTCB is the body which authorizes adjustments to bus routes and service levels in Bangkok while the provincial LTCBs in each neighboring province of the BMR do the

same for their jurisdictions. These bodies examine route proposals on an individual basis but are very conservative and decisions are often politicized.

- BMTA, the State-enterprise bus operator, operates bus routes in Bangkok, with many routes penetrating into the neighboring provinces of the BMR, BMTA operates in a non transparent and non commercial environment under very demanding traffic conditions. Its routes and services are little changed for many years and the accumulated deficit was THB47 billion at the end of 2005 and has been growing at around THB5 billion pa.

A.7.3 Assessment of Weaknesses

Various weaknesses have been identified:

- Despite the major and generally beneficial reforms of transport institutions in 2002 there is still a "silo approach" evident with weak coordination between agencies. Technical capacity is improving but not put to full effect within current structure.
- Planning, programming and budgeting processes are adequate for major mega-projects and other investments but there is little incentive for agencies to seek to contain outturn cost through appropriate design, or technology choices or seek to minimize life cycle costs.
- Less attention has been focused on delivering projects on time, or for small and medium scale infrastructure such as local roads (a responsibility of BMA) which is vital to support the proper functioning of the principal road network.
- Recurrent expenditures for operation and maintenance of transport facilities and services are often not planned and programmed on a quantitative basis with negotiated allocations handed down on an annual basis with possible interruptions to funding putting the safety and quality of facilities at risk.
- There is presently no agreed comprehensive and authoritative transport framework for the BMR. There are a variety of road and rail MRT master plans but a consolidated multi-modal plan is needed that defines the network of roads, MRT and public transport priority infrastructure; how it will operate as a system of integrated services, and the necessary the governance and funding arrangements.
- BMTA operates is in an unenviable situation yet urban bus transport will have a major role in passenger transport in the BMR for the foreseeable future. Major modernization is needed but in a way that encourages greater efficiency, and probably a greater role for the private sector in operations.
- There is arguably too much "top-down" involvement of national agencies in Bangkok and too little "bottom-up" involvement from BMA and other local governments. Additionally, local government political representatives and the public have had little opportunity to influence the urban transport agenda. National government policy has been to decentralize and handover more power to BMA and other local governments. But progress has been slow. Given the primacy of Bangkok, and the sensitivity of transport issues, central government Ministries and Cabinet still deal extensively with metropolitan issues. Despite this preoccupation with Bangkok, central government agencies have not been able to provide the strategic functional coordination which is demanded for effective strategic planning (World Bank 1999). In the medium term a greater involvement by local governments in particular BMA with its elected Governor and other political representatives appears crucial.
- A current and likely ongoing key issue is the role of BMA (and other local governments) in planning and implementation of local roads and traffic management and provision of sidewalks. Due to budget constraints and difficulties with land acquisition, in practice BMA

builds few local roads and when it does they tend to be more major (dual 4 lane) carriageways or bigger. As a large multi-function local government for Bangkok City, which is the majority of the BMR by activity, it would be desirable that BMA has a major role in traffic management[38]. This role would be facilitated by the close link of effective traffic management with BMA's responsibilities for parking control, land use management and sidewalk provision, maintenance and provision of pedestrian crossing facilities. At present however, the police play the active role in traffic management through manual control of traffic signal controllers. With the recent construction of a major traffic control centre in Bangkok's northern suburbs this role is unlikely to change although the current metropolitan police force structure which employs ordinary police from the 69 police stations in Bangkok does not seem suited to the requirements of modern traffic control.

[38] Even though BMA installed a computerized Area Traffic Control System in the 1990s it is largely not used in peak periods because the police override it. Further details are provided in Section VI of this report.

ANNEX B: TRANSPORT FINANCE

B.1 ROAD SECTOR

B.1.1 Road Expenditure in the Bangkok Metropolitan Region

Four agencies of the national government have direct responsibilities for aspects of roads and their use in the Bangkok Metropolitan Region (BMR): the Department of Highways (DOH), Department of Rural Roads (DRR), Department of Land Transport (DLT) and the Office of Transportation and Traffic Policy and Planning (OTP). In addition, the Bangkok Metropolitan Administration (BMA) and the five other provinces in the BMR also have responsibilities for road expenditure, though data are currently available only for the BMA. Total expenditure for the available agencies was about THB9.8 billion in 2003 and THB10.2 billion in 2004 (see Table B.1). This expenditure includes the direct cost of providing roads and traffic control systems. However, it does not cover the cost of traffic enforcement or other public costs that result from road use such as the cost of street lighting and policing and costs that may fall on the government as a result of accidents and air pollution. Of interest is the extent to which motorists meet the costs that they impose.

Table B.1: Estimated Road Expenditure in the BMR

	Expenditure by Agency (THB million, current prices)[1)]					
	DOH	**DRR**	**DLT**	**OTP**	**BMA**	**Total**
2003						
Works						
Infrastructure Investment	663.9	1,564.3	-	-	3,177.2	5,405.4
Operation & Maintenance	364.0	26.5	-	-	922.7	1,313.2
Sub-total	1,027.9	1,590.8	-	-	4,099.9	6,718.6
Overhead & Planning	198.6	96.0	598.6	61.2	2,172.3	3,126.7
Total	1,226.5	1,686.8	598.6	61.2	6,272.2	9,845.3
2004						
Works						
Infrastructure Investment	709.8	900.1	-		3,272.6	4,882.5
Operation & Maintenance	528.5	385.0	-		1,144.4	2,057.9
Sub-total	1,238.3	1,285.1	-		4,417.0	6,940.4
Overhead & Planning	218.5	78.3	667.9	71.3	2,210.5	3,246.4
Total	1,456.8	1,363.4	667.9	71.3	6,627.5	10,186.8

(1) Excludes expenditure by the five provinces in the BMR, for which data is not readily available.
Source: Calculation from BOB data

B.1.2 Revenue from Road Users in the BMR

Financial imposts on motorists in Bangkok currently comprise:

- tolls imposed for use of expressways;
- charges specified in the Motor Vehicle Act (MVA) and the Land Transport Act (LTA) that are collected by the national government's Department of Land Transport (DLT) – the charges including a tax on new vehicles, and annual vehicle, driving license and similar fees, with some allocated directly to the BMA; and

- Excise Tax, Municipal Tax, Oil Fund, Conservation Fund and Value Added Tax (VAT) that are imposed on fuel and collected by the national government with the Municipal Tax directed to local governments.

In terms of financial cost-recovery, tolls for use of expressways in Bangkok are the only formal charge that is linked to the use made of roads. ETA has in recent years collected sufficient revenue to cover the cost of providing and operating the expressways that are recorded in its accounts (see Table B.13).

There is a similarity between the revenue from the collected by DLT under the MVA and the LTA (see Table B.2) and expenditure in the BMR in the same years (see Table B.1), but in the absence of hypothecation the link is tenuous. Nevertheless, the charges are imposed on motorists and hence can be seen as a form of cost-recovery. The MVA and LTA were implemented in 1979 and set out a schedule of initial rates and permitted increases to the rates. However, the upper limits to the rates were reached many years ago and current rates are extremely low (see Tables B.8 and B.9). The cost of administering the imposts under the MVA and LTA is included in Table B.1.

Imposts on fuel are also a means for collecting revenue from motorists. The current structure of fuel prices for the most commonly used fuel in Bangkok is shown in Table B.3. None of the taxes imposed on fuel is hypothecated to meet the cost of providing roads, nor is there any indication that any are intended primarily for this purpose. Accordingly, it is not possible to unambiguously derive the extent to which motorists meet the cost of providing roads described in Table B.1 through fuel taxes.

However, the VAT component of fuel taxes should not be considered a means for recovering the cost of providing roads because VAT is applied throughout the economy to generate general revenue for government. Similarly, the imposts for the Oil Fund and Conservation Fund are intended for stabilization and other purposes unrelated to transport, and so should also not be considered a user charge. The Municipal Tax is a conceivably appropriate user charge because it is used as general revenue for budgets that are in turn used to finance roads. It may be argued that Excise Tax is intended to serve the same role for the national government. As it is not applied throughout the economy, it is reasonable to identify at least a partial link between the revenue raised from Excise Tax and expenditure on roads. Fuel can also be an attractive general tax base because demand for fuel is relatively inelastic with respect to price, with the result that quite high levels of tax can be imposed without severely distorting the demand for fuel. However, the merit of fuel taxes as a user charge and national government expenditure on roads from its general budget provides a prima facie case for including excise as a notional user charge.

Table B.2: Estimated Revenue Collected by DLT in the BMR

Type of Revenue	Basis(1)	Revenue (THB million, current prices)	
		2003	2004
Vehicle Tax	MVA	4,982.8	5,257.5
Various Fees	MVA	206.2	246.9
Registration Fees	MVA	110.6	130.7
Vehicle Tax	LTA	691.3	764.4
Various Fees	LTA	13.4	17.8
Registration Fees	LTA	6.1	6.6
Driver's License Fees	MVA	152.0	171.4
License (vehicle operation staff)	LTA	8.1	14.8
License (transport operator)	LTA	6.1	8.1
Total		6,176.7	6,618.2

(1) MVA= according to Motor Vehicle Act; LTA = according to Land Transport Act (mostly on commercial transport).
Source: DLT

Table B.3: Fuel Price Structure in Thailand

	Fuel Prices on 27 February 2007 (THB/liter)				
	Regular Gasoline	**Premium Gasoline**	**Gasahol**	**High Sulfur diesel**	**Low Sulfur Diesel**
Ex-Refinery	16.019	16.467	16.956	16.695	16.295
Taxes					
Excise Tax	3.685	3.685	3.317	2.305	2.405
Municipal Tax	0.369	0.369	0.332	0.231	0.241
Oil Fund	3.260	3.460	1.500	1.500	1.500
Conservation Fund	0.070	0.070	0.063	0.070	0.070
Wholesale Price	23.403	24.050	22.167	20.801	20.510
VAT	1.638	1.684	1.552	1.456	1.436
Sub-total	25.041	25.734	23.719	22.257	21.946
Marketing Margin					
Margin	0.139	0.239	0.440	0.639	0.751
VAT on marketing margin	0.010	0.017	0.031	0.045	0.053
Retail Price	25.190	25.990	24.190	22.940	22.750

Source: EPPO

Estimated revenue from fuel taxes in Thailand is summarized in Table B.4. As indicated in Annex A, about 21.9% of in-use road vehicles in Thailand are registered in the BMA, with perhaps 25% more vehicles in the BMR than BMA, ie suggesting about 27% of in-use vehicles in Thailand are based in the BMR. On the other hand, data from the Ministry of Energy on petroleum products consumption by province suggests that 34% of fuel typically used by motor vehicles in Thailand occurs in the BMA and 45% occurs in the BMR. It is possible that some fuel reportedly used in the BMR may be consumed for regional travel. To be conservative in the current analysis, it is assumed that about one-third of national fuel use occurs in the BMR. This suggests that revenue from taxes on fuel used in the BMR that could be considered a road use charge would have been about THB25 billion in 2003 and THB27 billion in 2004 (ie one-third respectively of total revenue of THB75.5 billion and THB80.8 billion).

B.1.3 Comparison of Revenue from Road Users and Road Costs in the BMR

Table B.5 compares the cost of providing roads in the BMR with an estimate of the revenue generated from imposts on motorists that could reasonably linked to the cost of providing roads. ETA costs are not included in Table B.1, and so neither its costs nor toll revenue are included in Table B.5. The data in the table show that motorists in the BMR pay considerably more to government than is spent directly on providing roads. However, the government incurs costs in addition to those shown as a result of motoring, for example the cost of street lighting and policing and costs that may fall on the government as a result of accidents and air pollution. Accordingly, this comparison of costs and revenue is incomplete, but it is likely that even if these additional costs were taken into account motorists would pay more in total than the costs they impose on the government.

Table B.4: Estimated Revenue from Fuel Taxes for Fuel Sold in Thailand

	Fuel					Total
	Regular Gasoline	**Premium Gasoline**	**Gasahol**	**High Sulfur Diesel**	**Low Sulfur Diesel**	
2003						
Fuel Consumption (million liters)	4,550.3	3,082.2	2.6	17,450.8	99.5	25,185.4
Tax revenue (THB million)						
Excise Tax	16,768	11,358	9	40,224	239	68,598
Municipal Tax	1,677	1,136	1	4,022	24	6,860
Oil Fund	14,834	10,664	4	26,176	149	51,828
Conservation Fund	319	216	0	1,222	7	1,763
VAT	7,499	5,241	4	26,189	148	36,973
Total Tax	41,096	28,614	18	97,834	568	166,021
Comprising						
VAT, & Oil & Conservation Funds	22,651	16,121	8	53,587	304	90,564
Other (potential road use charge)	18,445	12,494	9	44,247	263	75,458
Total	41,096	28,614	18	97,834	568	166,021
2004						
Fuel Consumption (million liters)	4,631.2	2,969.8	59.6	19,519.3	104.6	27,284.5
Tax revenue (THB million)						
Excise Tax	17,066	10,944	198	44,992	252	73,451
Municipal Tax	1,707	1,094	20	4,499	25	7,345
Oil Fund	15,098	10,276	89	29,279	157	54,898
Conservation Fund	324	208	4	1,366	7	1,909
VAT	7,632	5,049	94	29,294	156	40,055
Total Tax	41,826	27,571	405	109,430	597	177,659
Comprising						
VAT, & Oil & Conservation Funds	23,054	15,533	187	59,939	320	96,863
Other (potential road use charge)	18,773	12,038	217	49,491	277	80,796
Total	41,826	27,571	405	109,430	597	177,659

Source: Derived from data from EPPO

Table B.5: Summary of Revenue from Motorists and Expenditure on Roads in the BMR

	2003	2004
Expenditure (THB billion, current prices)		
Investment & Maintenance	6.7	6.9
Overhead & Planning	3.1	3.3
Total Expenditure	9.8	10.2
Revenue (THB billion, current prices)		
Revenue from levies under the MVA and LTA	6.2	6.6
Fuel taxes that are potential road use charges	25.0	27.0
Total Revenue	31.2	33.6

Source: Tables B.1 and B.2, and derived from Table B.4

B.1.4 Appropriateness of Current Imposts on Road Users

In addition to their role in generating revenue, prices for goods play a critical role in ensuring that consumers understand the worth of a product and make decisions on use of the product that are based on this understanding. It is therefore important that the prices of goods reflect their underlying value in terms of the resources involved[39]. Such an outcome is important in supporting economic efficiency.

Charging motorists for their use of roads is no different, and of no less importance. In economic terms, the charge should be equal to the marginal social cost that motorists impose. This will include not only the cost of wear and tear to roads that they cause, but also the cost of traffic management, the value of the environmental consequences of their vehicle use, and the cost of congestion that results from their travel. A consequence of the last item in particular is that economically optimum road use charges will vary with the level of congestion, ie they will vary by location and time of day as well as by vehicle type. In this manner, user charges are needed to encourage motorists to make sound decisions regarding their use of vehicles (ie to achieve economic efficiency) as well as to generate revenue to cover the cost to government of providing roads (ie financial cost recovery). It will be only by coincidence that the revenue from an economically optimal road use charge will generate revenue equal to the financial cost of providing roads.

No estimate of the marginal social cost of vehicle use in Bangkok is available, but it is likely to be high for most of the day due to high levels of traffic congestion. As a result, it is also likely that the total revenue from economically optimal road use charges in Bangkok would be higher than the financial cost of providing roads[40].

As indicated in Table B.2 for imposts levied under the MVA and LTA, only a tax on new vehicles generates significant revenue. However, this tax cannot be reasonably considered a sound means for charging road users for the cost of providing roads as it is incurred only once and has no impact or close relationship with the extent to which motorists use their vehicles and thus impose costs on the government. Similarly, the cost of accommodating large vehicles on roads is much higher relative to their use of fuel than for smaller vehicles and so fuel tax alone is an imperfect means for charging motorists for their use of roads.

[39] Any taxes that are needed to generate general revenue for governments should be imposed in a manner that causes least distortion in the relative use of resources.

[40] A case can be made that some of the surplus revenue should be used to subsidize public transport in recognition of its environmental and congestion benefits.

There is, therefore, a case for a two-part fee for road use, ie an access charge such as vehicle registration or ownership tax that varies between vehicle types plus a charge on use such as a fuel tax. The access charge would be low for small vehicles and would rise exponentially with vehicle size (current heavy vehicle registration charges do not differentiate between trucks of above 7 tonne tare mass). Such an access charge would be more appropriately imposed as an annual charge than a one-off charge when vehicles are purchased to more closely link payment of the fee and the vehicle use. This would have the added benefit of reducing fluctuations in the revenue that occurs with changes in vehicle sales. Such two-part fees are the means for charging conventionally used by governments, though they may not always ensure the level of the access charge and fuel tax match the economic costs that various vehicles impose.

However, even if set to best reflect the economic costs imposed by various vehicles, such a conventional charge will not fully take account of the cost of traffic congestion. This can be achieved only with direct charges that vary with the level of congestion on roads. At their simplest, a charge to take account of the cost of congestion can be applied by charging a fee for all vehicles entering a congested area, such as was implemented in London in 2003. The sophistication, and hence effectiveness of congestion pricing, can be improved by varying the charge for the area (or for various areas) by time of day (as occurs in Singapore) and yet further still by charging motorists for the kilometers of travel that they make on roads with the charge varying by each section of road (as is being examined in various places, but not yet implemented).

It is concluded that current charges for use of roads in the BMR could be substantially improved to provide a better signal to motorists on the cost that their travel will impose on others and hence to encourage them to only undertake travel with a value greater than this cost.

B.1.5 Long Term Cost of Sustaining the Current Road Network in the BMR

Over the long term, sustaining current road assets requires: (i) annual maintenance expenditure; (ii) periodic maintenance expenditure; and (iii) replacement of current assets when they reach the end of their economic lives. Detailed data on these costs are not available, but an indicative analysis is presented in this Annex to provide general guidance on the scale of the costs involved. Greater confidence should not be ascribed to the values than is consistent with the nature and objective of the analysis.

Data on the estimated length of road in the BMR is shown in Table B.6. Based on analysis of recent road construction and maintenance costs, it is estimated that, in 2006 prices:

- the value of road infrastructure that deteriorates over time (and which therefore needs to be replaced periodically) is estimated at THB122 billion (about US$3.6 billion) – this understates the total value of the depreciable infrastructure because information on the value of bridges is not available;
- excluding expressways (ie toll roads), the value of identified depreciable road assets is about THB111 billion;
- the equivalent average annual cost of these non-toll road assets (equivalent to interest and depreciation) is THB8.6 billion per annum with the average annual cost of maintenance being about THB4.1 billion, ie a total of THB12.7 billion per annum to government to sustain the road network under the direct control of government; and
- excluding the cost of capital, the average annual depreciation for non-toll roads would be about THB3.2 billion, giving direct total annual expenditure needed to sustain the assets of THB7.3 billion (ie THB3.2 billion for depreciation and THB4.1 billion for maintenance).

Table B.6: Indicative Value and Cost of Current Roads in the BMR

	Road Category[1]					
	Express-way	Other Roads				Total
		Arterial Road	Sub-arterial Road	Soi	Sub-Total	
Length in BMR (km)						
ETA	173.2				0.0	173.2
DOH		346.2			346.2	346.2
DRR				1,447.1	1,447.1	1,447.1
BMA		1,215.4	407.0	2,453.7	4,076.1	4,076.1
Provinces[2]		240.0	80.0	480.0	800.0	800.0
Total	173.2	1,801.6	487.0	4,380.8	6,669.4	6,842.6
Indicative average unit road construction & maintenance costs						
Unit road construction cost (THB million/km)						
Road base, pavement & other (eg lights, traffic control etc)[3]	66.0	44.0	29.0	4.0		
Structures (bridges, drain pipes, etc)[4]	na	na	na	na	na	na
Total	66.0	44.0	29.0	4.0		
Unit average annual maintenance cost (THB million/km/year)	2.1	1.7	1.1	0.12		
Indicative value of depreciable road assets in the BMR						
Depreciable value, excl. structures (THB billion)	11.4	79.3	14.1	17.5	110.9	122.3
Average annual optimal expenditure to sustain the current assets (THB billion, 2006 prices)						
Equivalent average annual replacement cost[5]	0.88	6.12	1.09	1.35	3.16	9.44
Annual maintenance	0.36	3.06	0.54	0.53	4.13	4.49
Total annual cost	1.24	9.18	1.63	1.88	7.29	13.93

(1) All financial values are in 2006 prices, and are based on a brief examination. All financial values are indicative, and are intended to provide a broad understanding of costs rather than precise values.
(2) Detailed data not available. Indicative estimate only.
(3) Exclude infrastructure that will not deteriorate over time and hence need to be replaced at some future time, eg fill, road sub-base and service relocation.
(4) Sufficient data not readily available to enable the value of structures to be estimated.
(5) Based on an average economic life for depreciable assets of 35 years and an opportunity cost of capital of 7%. Excluding the cost of capital, average annual depreciation for all roads would be about THB3.5 billion
Source: Study Team estimates

While the average annual cost of maintaining and replacing life-expired assets for non-toll roads of THB7.3 billion may appear to be similar, if not marginally lower, than actual expenditure on investment and maintenance of THB6.9 billion in 2004 when inflation is taken into account (see Table B.5), the comparison is misleading because the latter expenditure includes expansion of the road system in addition to expenditure on the previously established road system. It is notable that expenditure in 2004 was about THB4.9 billion for investment and THB2.0 billion for maintenance and operations (see Table B.1), compared with indicative necessary expenditure of THB3.2 billion for depreciation and THB4.1 billion for maintenance. This indicates that current expenditure on maintenance of the current road system is less than is needed. It is possible that expenditure on refurbishment of current life-expired assets may also be less than is needed over the long term.

It appears that the neither the DRR nor BMA have effective road maintenance and management systems, unlike DOH. Moreover, routine maintenance is funded through annual government budget processes, with no certainty that allocated maintenance budgets match the funding obligations of the road agencies. Road maintenance and management systems provide a sound basis for planning and programming routine and periodic maintenance that can both strengthen agencies' ability to justify their spending plans and use the available funds to the best effect.

B.1.6 Conclusions

While some of the analysis in this Annex is indicative, it suggests that:

- less is being spent on maintenance than is desirable, which will result in more rapid deterioration of current road assets than need be the case and thus higher life-cycle costs;
- comprehensive road maintenance and management systems can play vital roles in strengthening agencies' ability to justify their spending plans and using the available funds to the best effect;
- it is likely that motorists pay more to government through taxes and charges than the costs they impose on the government, though this comparison of costs and revenue is of limited usefulness; and
- there is a need to more carefully set the structure and level of taxes and charges that are imposed on motorists so that they provide a better signal to motorists on the cost that their travel will impose on others and hence to encourage them to only undertake travel with a value greater than this cost.

B.2 PUBLIC TRANSPORT INCOME AND EXPENDITURE

The poor financial performance of the Bangkok Mass Transit Authority (BMTA) is shown in Table B.12 and is discussed in some detail in Section IV of this report. The State Railways of Thailand (SRT) has annual losses that are even higher than for BMTA (see Table B.14), though this covers operations throughout Thailand. The opportunity to reduce the costs currently incurred by BMTA without loss of quality of service is discussed in Section IV – it is likely that there is also considerable scope to reduce SRT costs.

A comprehensive analysis of the financial performance of the current rail mass rapid transit (MRT) lines in Bangkok operated by the Bangkok Transit System Corporation (BTSC – for the Green Lines) and the Bangkok Metro Company Ltd (BMCL – for the underground Blue Line) is not available. However, the Green Lines were funded wholly by private investors and financial institutions, who have lost money in the course of financial restructuring, though it appears that BTSC is now able to generate sufficient revenue to meet its operating costs and reduced capital base. In the case of the underground Blue Line, the government financed civil works infrastructure, with BMCL financing electrical and mechanical infrastructure and trains. It appears that revenue generated by BMCL is well below that expected. It will be rare that rail MRTs can generate sufficient revenue to make a substantial contribution to the cost of assets. Section III addresses issues related to making effective use of rail MRT in Bangkok.

B.3 DETAILED DATA TABLES

Tables B.7 to B.14 provide detailed information in support of discussion in the two previous sections.

Table B.7: Tax Rates for vehicles registered under LTA

Vehicle Weight (kg)	Tax rate at February 2007 (THB)			
	Vehicles for fixed route transport	Vehicles for non fixed route transport	Small vehicles for transportation	Vehicles for private transportation
≤ 500	300	450	300	150
501-750	400	600	400	300
751-1,000	500	750	500	450
1,001-1,250	600	900	600	800
1,251-1,500	700	1,050	700	1,000
1,501-1,750	900	1,350	900	1,300
1,751-2,000	1,100	1,650	1,100	1,600
2,001-2,500	1,300	1,950	1,300	1,900
2,501-3,000	1,500	2,250	1,500	2,200
3,001-3,500	1,700	2,540	-	2,400
3,501-4,000	1,900	2,850	-	2,600
4,001-4,500	2,100	3,150	-	2,800
4,501-5,000	2,300	3,450	-	3,000
5,001-6,000	2,500	3,750	-	3,200
6,001-7,000	2,700	4,050	-	3,400
≥ 7,001	2,900	4,350	-	3,600

Source: DLT

Table B.8: Tax rate for vehicles registered under MVA

Vehicle Weight (kg)	Tax rate at February 2007 (THB)			
	Private car (more than 7 seats)	Interprovincial Taxi and Taxi	Taxi	Van & Pick up and Tractor (not farm vehicle)
≤ 500	150	450	185	300
501-750	300	750	310	450
751-1,000	450	1,050	450	600
1,001-1,250	800	1,350	560	750
1,251-1,500	1,000	1,650	685	900
1,501-1,750	1,300	2,100	875	1,350
1,751-2,000	1,600	2,550	1,060	1,550
2,001-2,500	1,900	3,000	1,250	1,650
2,501-3,000	2,200	3,450	1,435	1,950
3,001-3,500	2,400	3,900	1,625	2,250
3,501-4,000	2,600	4,350	1,810	2,550
4,001-4,500	2,800	4,800	2,000	2,850
4,501-5,000	3,000	5,250	2,185	3,150
5,001-6,000	3,200	5,700	2,375	3,450
6,001-7,000	3,400	6,150	2,560	3,750
≥ 7,001	3,600	6,600	2,750	4,050

Source: DLT

Table B.9: Ministry of Transport Annual Expenditure in Thailand

	Annual Expenditure (THB, million)			
	2003	**2004**	**2005**	**2006**
	2546	**2547**	**2548**	**2549**
Office of Transport and Traffic Policy and Planning				
Total Budget, comprising	136.0	158.4	172.9	373.4
(i) Admin & Overhead Costs	74.3	78.2	85.9	na
(ii) Planning & Studies	61.7	80.2	87.0	na
(iii) Design & Implementation of works	0.0	0.0	0.0	na
- Refurbishment of existing infrastructure				
- Expansion of infrastructure				
(iv) Operations & Maintenance	0.0	0.0	0.0	na
Department of Highways				
Total Budget, comprising	28,738.8	31,328.5	42,788.1	37,561.5
(i) Admin & Overhead Costs	4,568.9	4,647.9	3,741.9	4,501.1
(ii) Planning & Studies	83.6	50.0	89.8	150.5
(iii) Design & Implementation of works	15,555.9	15,264.7	26,991.7	23,286.9
- Refurbishment of existing infrastructure	104.3	2,200.0	2,465.0	800.3
- Expansion of infrastructure	15,451.6	13,064.7	24,526.7	22,486.6
(iv) Operations & Maintenance	8,530.5	11,365.8	11,964.7	9,623.0
Department of Rural Roads				
Total Budget, comprising	13,962.7	15,148.6	17,762.1	21,442.0
(i) Admin & Overhead Costs	794.8	870.4	906.7	980.3
(ii) Planning & Studies	0.0	0.0	0.0	0.0
(iii) Design & Implementation of works	13,141.4	10,854.8	13,077.5	15,661.2
- Refurbishment of existing infrastructure	0.0	330.0	0.0	0.0
- Expansion of infrastructure	13,141.4	10,524.8	13,077.5	15,661.2
(iv) Operations & Maintenance	26.5	3,423.4	3,777.8	4,800.5
Department of Land Transport				
Total Budget, comprising	1,330.2	1,484.1	1,645.6	1,807.1
(i) Admin & Overhead Costs	1,080.3	1,164.6	1,258.5	1,461.3
(ii) Planning & Studies	15.8	17.6	4.0	9.7
(iii) Design & Implementation of works	234.1	301.9	383.1	336.1
- Refurbishment of existing infrastructure	0.0	7.8	51.7	155.8
- Expansion of infrastructure	234.1	294.0	331.4	180.3
(iv) Operations & Maintenance	0.0	0.0	0.0	0.0

Source: BOB

Table B.10: Selected Income and Expenditure of the BMA

	THB (million, current prices)				
	2002	2002	2002	2002	2002
	2545	2545	2545	2545	2545
Expenditure	**15,578.8**	**19,195.8**	**20,452.6**	**22,200.1**	**25,620.8**
Public Work Dept	**2,261.7**	**2,574.9**	**2,578.4**	**4,780.7**	**4,807.0**
Overhead expenses	693.9	686.4	756.7	852.5	
Utilities expenses (e.g. phone bill, etc)	22.8	30.7	31.3	28.1	
Infrastructure, Land Acquisition, and Capital	1,335.5	1,822.8	1,751.3	3,846.2	
Others: subsidies, outsourcing	209.5	35.0	39.2	53.8	
Traffic & Transportation Dept	**404.7**	**1,414.1**	**1,581.2**	**438.0**	**828.2**
Overhead expenses	170.3	216.1	221.3	188.8	
Utilities expenses (e.g. phone bill, etc)	6.9	7.0	7.1	4.6	
Infrastructure, Land Acquisition, and Capital	215.9	1,170.8	1,324.9	233.1	
Others: subsidies, outsourcing	11.6	20.3	27.9	11.6	
Dept of Environment	**1,838.8**	**2,129.5**	**2,263.5**	**1,949.1**	**3,295.3**
Overhead expenses	366.6	354.8	386.7	389.3	
Utilities expenses	8.4	8.8	9.1	8.2	
Infrastructure, Land Acquisition, and Capital	159.8	152.7	190.1	50.5	
Others: subsidies, outsourcing	1,304.0	1,613.1	1,677.6	1,501.0	
Dept of City Planning	**65.2**	**72.9**	**126.6**	**124.3**	**251.3**
Overhead expenses	37.7	39.6	41.3	53.1	
Utilities expenses (e.g. phone bill, etc)	1.7	2.1	2.2	2.0	
Infrastructure, Land Acquisition, and Capital	3.2	23.9	5.0	15.3	
Others: subsidies, outsourcing	22.6	7.2	78.1	54.0	
City Law Enforcement Dept	**68.9**	**80.7**	**77.7**	**73.2**	**79.5**
Overhead expenses	55.6	57.2	57.7	64.1	
Utilities expenses (e.g. phone bill, etc)	1.9	1.9	2.1	1.9	
Infrastructure, Land Acquisition, and Capital	1.0	7.0	1.2	4.4	
Others: subsidies, outsourcing	10.5	14.6	16.7	2.9	
Central Budget	**2,165.0**	**2,725.1**	**3,139.0**	**3,867.1**	**2,906.3**
Department of Drainage & Sewage	2,238.6	2,663.9	2,768.6	2,719.6	2,930.6
Medical Service Department	2,256.0	2,238.2	2,291.5	2,287.2	2,514.5
Health Department	1,060.6	1,316.6	1,309.9	1,211.3	2,006.6
Education Department	420.6	621.4	713.5	997.5	1,295.2
Culture, Sport, and Tourism Department	906.2	1,015.6	1,046.4	1,098.3	1,153.0
Finance Department	584.2	940.5	1,082.3	1,065.8	1,126.2
Office of Permanent Secretary	545.9	592.8	661.7	643.8	694.1
Community Development Department	229.4	324.3	260.8	348.1	509.0
Strategy & Evaluation Department	339.7	275.8	259.5	203.0	506.8
Bangkok Fire and Rescue Department	-	-	-	21.4	386.5
The BMA Council Secretariat	115.8	128.0	201.7	224.9	172.3
Office of the BMA Civil Service Commission	40.3	43.7	50.3	57.0	57.5

	THB (million, current prices)				
	2002	2002	2002	2002	2002
	2545	2545	2545	2545	2545
Budget Division	-	-	-	45.3	50.4
The Bangkok Governor Secretary	37.2	37.6	39.9	44.3	50.3
Revenue	**26,529.0**	**35,255.6**	**42,535.4**	**41,745.5**	**35,000.0**
Regular Revenue	26,253.6	35,255.6	42,535.4	41,444.7	35,000.0
Taxes					
Collected by BMA	6,072.6	6,462.2	6,957.0	7,297.8	8,022.7
Collected by other agencies	16,642.1	25,347.2	28,294.4	27,695.5	25,490.0
Total Tax Revenue	22,714.7	31,809.4	35,251.3	34,993.3	33,512.7
Other Regular Revenue	23,669.0	32,757.8	36,535.4	36,668.7	35,000.0
Fees, fines, service charges	492.0	512.0	768.0	1,005.2	890.4
Revenue from Assets	170.9	186.1	242.0	346.1	276.9
Revenue from utilities, commerce, etc	16.0	17.9	20.2	23.2	30.0
Other revenue	275.40	232.5	253.9	300.83	290.0
Special Revenue	2,860.0	2,497.8	6,000.0	5,076.9	-

Source: BMA

Table B.11: Estimated Revenue in the BMR from Transport Taxes and Fees

Charge	Basis for the charge[(1)]	Year						
		1998	1999	2000	2001	2002	2003	2004
		2541	2542	2543	2544	2545	2546	2547
Vehicle Tax	MVA	3,973.6	4,020.6	4,053.5	4,279.2	4,550.1	4,982.8	5,257.5
Various Fees	MVA	127.6	138.4	143.9	151.0	167.2	206.2	246.9
Registration Fees	MVA	40.3	61.6	74.5	72.2	88.0	110.6	130.7
Vehicle Tax	LTA	631.1	606.4	622.5	595.8	635.0	691.3	764.4
Various Fees	LTA	3.4	3.6	3.9	4.0	10.6	13.4	17.8
Registration Fees	LTA	4.0	4.2	3.6	4.7	5.7	6.1	6.6
Driver's License Fees	MVA	146.4	138.9	130.1	130.1	130.8	152.0	171.4
License (vehicle operation staffs)	LTA	16.6	4.3	7.2	14.6	5.3	8.1	14.8
License (transport operator)	LTA	5.4	5.3	5.1	5.7	7.1	6.1	8.1
Total		4,948.4	4,983.3	5,044.2	5,257.2	5,599.9	6,176.7	6,618.2

(1) MVA= according to Motor Vehicle Act; LTA = according to Land Transport Act (mostly on commercial transport).
Source: DLT

Table B.12: Financial Performance of the Bangkok Mass Transit Authority (BMTA)

	Baht (million, current prices)			
	2002	**2003**	**2004**	**2005**
	2545	**2546**	**2547**	**2548**
REVENUE	**6,539.1**	**6,312.3**	**5,966.1**	**6,317.5**
Direct Revenue (tickets)	6,045.1	6,016.4	5,660.7	6,037.1
Indirect Revenue (through mini/micro/joint bus, van, rent-outs)	211.4	142.8	167.6	179.7
Other	282.5	153.2	137.8	100.7
EXPENSE	**10,055.8**	**10,926.4**	**10,692.6**	**11,624.2**
Admin & Overhead Costs	1,382.3	1,220.2	1,213.6	1,533.2
Planning & Feasibility Studies	0.0	0.0	0.0	0.0
Design & Implementation of Works	0.0	0.0	0.0	0.0
Refurbishment of existing infrastructure				
Expansion of infrastructure				
Operation & Maintenance	7,891.0	8,654.7	8,064.6	8,615.1
Operation	5,838.0	6,412.0	5,772.6	6,613.6
Maintenance	2,053.1	2,242.7	2,292.0	2,001.5
Financial expenses (i.e. interest payment)	782.5	1,051.5	1,414.5	1,475.9
PROFIT (LOSS)	**(3,516.8)**	**(4,614.1)**	**(4,726.5)**	**(5,306.7)**
Accumulated Profit (Loss)	**(32,342.8)**	**(36,956.8)**	**(41,683.3)**	**(46,990.0)**

Source: BMTA

Table B.13: Financial Performance of the Expressway and Rapid Transit Authority (ETA)

	Baht (million, current prices)			
	2002	**2003**	**2004**	**2005**
	2545	**2546**	**2547**	**2548**
INCOME STATEMENT				
Revenue from Operations	**3,901.85**	**4,989.60**	**5,219.89**	**5,321.05**
Toll Revenue	3,999.68	5,092.63	5,322.10	5,421.07
Discount	(97.83)	(103.03)	(102.21)	(100.02)
Operating Expenses	**1,938.24**	**2,121.76**	**2,227.98**	**2,267.43**
Salary Expense	636.73	732.96	836.91	920.78
Office Expense	518.89	627.68	519.51	541.93
Asset Depreciation	782.62	761.12	871.56	804.72
Profit from Operation	**1,963.61**	**2,867.84**	**2,991.91**	**3,053.62**
Other Revenues	**103.93**	**178.24**	**136.67**	**199.91**
Interest Revenue	3.12	4.25	15.06	48.62
Non-operating Revenue	00.81	173.99	121.61	151.29
Other Expenses	**1,237.13**	**2,088.83**	**1,896.91**	**2,568.28**
Interest payment	1,320.67	1,189.55	928.92	984.99
Interest from land rights management activities	207.53	207.53	207.53	207.53
Exchange rate loss (gain)	(291.07)	691.75	760.46	1,375.76
Net Profit	**830.41**	**957.25**	**1,231.67**	**685.25**
Accumulated Profit (loss)	**142.87**	**677.46**	**1,501.98**	**1,695.04**

	Baht (million, current prices)			
	2002	**2003**	**2004**	**2005**
	2545	**2546**	**2547**	**2548**
BALANCE SHEET				
Current Assets	**2,948.85**	**2,984.02**	**4,881.58**	**5,872.56**
Cash and Deposits	1,154.09	1,643.26	2,618.68	1,107.28
Temporary Investment (eg Time Deposit)	-	-	87.77	2,784.20
Account Receivable	79.05	66.51	83.93	71.49
Account Receivable (from Government)	927.99	780.44	749.93	666.96
VAT Refund in terms of credit	723.35	401.33	58.35	-
Other current assets	64.37	92.48	1,282.92	1,242.63
Non-current Assets	**153,902.96**	**152,370.03**	**154,898.24**	**158,121.78**
Land, Building, and Equipment	65,489.50	65,519.26	68,994.84	72,464.50
Expressway infrastructure	66,604.20	65,182.03	63,745.53	64,643.55
Works under construction	884.72	945.97	1,728.93	1,079.56
Receivable from partnership companies	16,816.00	16,816.00	16,716.00	16,416.00
Other non-current assets	4,108.54	3,906.77	3,712.94	3,518.17
Total Assets	**156,851.81**	**155,354.05**	**159,779.82**	**163,994.34**
Current Liabilities	**15,508.31**	**21,362.20**	**15,315.40**	**16,489.96**
Debt	374.00	473.33	461.19	1,199.41
Long-term debt (amount due within a year)	13,282.10	19,388.57	13,169.50	13,751.32
Account Payable	356.65	205.35	302.65	236.91
Interest	1,156.71	954.37	884.88	817.28
Other current liabilities	338.85	340.58	497.18	485.04
Non-current Liabilities	**105,705.26**	**79,925.18**	**86,026.11**	**77,538.13**
Borrowing (from government)	10,790.94	-	3,420.08	-
Domestic Borrowing (mostly State Banks)	77,220.58	73,895.31	77,561.81	73,148.67
Foreign Borrowing	10,491.61	-	-	-
Land Rights-related payables	7,180.91	6,006.96	5,014.35	4,308.90
Other non-current liabilities	21.22	22.91	29.87	80.56
Total Liabilities	**121,213.57**	**101,287.38**	**101,341.51**	**94,028.09**
Equity	**35,638.24**	**54,066.67**	**58,438.31**	**69,966.25**
Equity	10,191.12	28,146.41	31,758.77	42,465.71
Additional equity from other sources (eg donation)	28,055.78	27,306.45	26,553.33	25,805.50
Loss: exchange rate	(2,751.53)	(2,063.65)	(1,375.77)	-
Unallocated Profit	142.87	677.46	1,501.98	1,695.04
Equity	**35,638.24**	**54,066.67**	**58,438.31**	**69,966.25**

Source: ETA

Table B.14: Financial Performance of the State Railways of Thailand (SRT)

	Baht (million, current prices)			
	2002	2003	2004	2005
	2545	2546	2547	2548
Revenues from Operation	**8,064.10**	**8,652.21**	**8,647.31**	**8,488.33**
Freight and Transport	5,816.34	6,079.89	6,107.91	5,976.01
Asset Management	692.41	976.65	884.82	952.47
Fibre Optics Cable Revenue	920.75	942.79	955.21	745.52
Government Subsidy on Fare	56.75	59.72	58.57	56.61
Government Subsidy on Maintenance	6.28	-	-	62.56
Other Revenues	571.57	593.16	640.80	695.16
Expenses in Operation	**8,878.53**	**8,633.50**	**8,561.99**	**9,412.37**
Maintenance: tracks, buildings, signal equipments	1,801.51	1,337.02	1,138.86	1,163.13
Maintenance: rollingstock	1,960.58	1,978.32	1,941.04	2,110.17
Operating cost (Transport)	4,565.73	4,733.43	4,928.51	5,437.42
Management & Other Operation	524.91	554.29	522.68	651.07
Rail Police	25.80	30.44	30.90	50.58
Profit (Loss) from Operation	**(814.43)**	**18.71**	**85.32**	**(924.04)**
Other Revenues	**145.26**	**362.92**	**303.64**	**281.00**
Land compensation (interest included)	123.72	194.47	-	4.83
Profit from asset sales	21.54	11.21	9.55	32.49
Loan Interest subsidy from Government	-	157.24	294.09	243.68
Other Expenses	**4,700.25**	**6,009.57**	**8,202.68**	**5,745.54**
Retirement plans	1,759.30	2,112.60	3,287.12	2,463.21
Trust Funds Operation Expense		0.11		
Depreciation	1,373.07	1,366.43	1,867.20	1,707.93
Interest payment	1,986.72	2,038.90	1,959.32	1,779.28
Loss (gain) from accounting/exchange rate reasons	(418.84)	334.29	794.95	(448.56)
Loan interest from Government	-	157.24	294.09	243.68
Profit (Loss) from Railway	**(5,369.42)**	**(5,627.94)**	**(7,813.72)**	**(6,388.58)**
Profit (Loss) from Golf Courses	(0.23)	1.11	0.17	1.07
Net Profit	**(5,369.65)**	**(5,626.83)**	**(7,813.55)**	**(6,387.51)**
Government Subsidy for Loss	4,026.59	3,710.45	4,140.47	3,838.38
Change in Accounting Policy & Adjustments		(12,251.68)	(170.42)	
Accumulated Profit (loss)	**-15,544.08**	**-29,712.14**	**-33,555.64**	**-36,104.77**

Source: SRT

ANNEX C: VALUE CAPTURE

This annex outlines issues related to urban property taxation and opportunities for value capture. It draws on PAS/EPS (2001), and was prepared as part of an examination of the Bangkok Transit System in 2001.

C.1 EXISTING LAND VALUATION AND PROPERTY TAXATION

Local government collects and retains revenues from the following types of land and property tax:

House and Land Tax

The House and Land Tax (H&L Tax) is one form of property tax. It is imposed on buildings, other structures and a portion of land on which a building or structure is located. The tax is assessed at the rate of 12.5% of the so-called "annual value". A general definition of "annual value" means the amount of rent that should be collected if the property were to be put on lease. In the case where a property is being leased, the actual amount of rent is treated as the annual rent for the calculation of the H&L; provided it reflects the market rental price – otherwise the competent officer may calculate the annual value as he deems appropriate, or the amount that the property might reasonably be expected to let for from year to year. In doing so, officers often conduct field audits to check property rentals especially on commercial buildings. The annual value of each property will differ property by property.

There are certain exemption rules where the H&L Tax is not applicable. For example, when: (i) the building or structure is "closed up" for the whole year, with neither the Owner nor any person on his behalf, except the caretaker, living in such building or structure or on the land appurtenant thereto; or (ii) the building or structure inhabited by the Owner or by the caretaker, which is not used as warehouse or place for carrying on business. Note that in the case of (ii), the Owner must be an individual only and a corporate owner is not qualified for the exemption due to its commercial activities pursuant to several Supreme Court cases.

The Local Development Contribution Tax

Property that is subject to the Local Development Contribution Tax (the "Local Tax") is any piece of land, whether or not a building or structure is constructed thereon. This is potentially the major land tax revenue source. The owner of the land, whether individual or company, is required to pay the Local Tax in accordance with the so-called "medium value" of the land. In calculating the medium value of the land, the sale prices of the land in the same area from not less than three cases as honestly and recently transacted in a period not exceeding one year before the assessment, will be averaged as the medium value, and the value of the building or structure or item of cultivation are excluded. The medium value of land will be determined by the Board of Committee for assessing the medium value of the land (the "Committee") after considering the valuation reports prepared by the Department of Lands.

Any piece of land that is used in connection with the building, which is subject to H&L Tax, is eligible for the exemption from the Local Tax. In some cases, there may be an interpretation issue on how much of the land should be entitled to the exemption rule especially when only a small portion of land is used appurtenant to the building. Land used for agricultural purposes is exempt and this is a loophole that is widely used. As a practical matter, the officer in charge will consider the issue on a case-by-case basis and it may be that the main part of land may not be eligible for the exemption. The rate of Local Tax is fixed in the schedule attached to the Act and depends upon the medium value of land and increases gradually. For example, where the medium value exceeds Baht 30,000, the Local

Tax for the first Baht 30,000 per rai[41] is Baht 70 and the excess amount is Baht 25 for every Baht 10,000. In percentage term, the Local Tax accounts to approximately 0.25% of the land's medium value. There are some allowances and reductions where the land is used for agricultural purposes subject to the terms and conditions of the law. Each year BMA collects about Baht 6 billion of the H&L Tax, but only Baht 130 million of the Local Tax.

While the valuation cycle is intended to be every four years, land valuations have been frozen in recent years. Official valuations have typically been 20 to 25% below market prices as shown in Table C.1 for a portion of the BTS corridor. The medium price method fails to take into account the value on a parcel by parcel basis which would be particularly relevant to land within close proximity (say 500m) of BTS (ie Skytrain) stations that is expected to benefit from the accessibility conferred by BTS.

Table C.1: Comparison of Official Medium Land Valuations Versus Market Values (2001)

Location	Official Valuation (THB/sq meter)	Market Value (THB/sq meter)
Siam Square	52,500	63,000 – 75,000
World Trade	52,500 75,000	75,000 – 80,000
Ploenchit Road	65,000 75,000	75,000 – 87,500
Asoke	40,000 –52,500	50,000 – 75,000
Sukhumvit Road (Bang Na Expressway to Prakanong)	18,000 – 75,000	25,000 – 75,000

Source: Study Team

Summary and Conclusion

Under the present rating system land taxes are levied and collected on a land and rental value basis. The current approach and methodology of assessing a medium value for levying rates fails to capture true market values which is particularly relevant to land within close proximity to and enjoying the benefits of the BTS. There are a number of shortfalls associated with the existing property tax system which impact directly on revenue. These include:

- The impact of incomplete and unoccupied buildings in the vicinity of BTS which generate no property tax revenue for BMA as they are "closed up";
- Avoidance of land taxes by exploiting loopholes;
- Under estimates of true market rental values;
- Understating rental income; and
- Medium land values may be up to 20% below true market value and not updated on an annual basis.

C.2 PROPOSALS FOR VALUE CAPTURE

Although there have appear to have been private benefits conferred on property owners by BTS and in the future more substantial benefits will be experienced. However, BTS has been developed by the BMA and property owners are receiving windfall gains. Methods of value capture are well known in other countries but are only in a rudimentary state of development in Bangkok at present. The most promising proposals are:

[41] A rai is 1,600 square meters.

- Establish a market based approach to land valuations on an individual plot basis with valuations made at regular intervals;
- Adopt a special levy to add on to rates of land tax within defined areas around BTS stations (eg 500m) or generally along the BTS corridors – BMA attempted to use this approach for funding sewerage infrastructure in Bangkok in 2001.
- BMA to establish a more flexible approach to development plot ratios and relaxation of car parking requirements in the vicinity of BTS stations and this could be linked to a further additional levy on benefited developments.

ANNEX D: WALKING IN BANGKOK

While walking is a significant part of urban transport in many large cities around the world, most people in Bangkok prefer driving and riding. Heat, dust, air pollution, sidewalk's condition, and the distance of a trip are among many reasons unfavorably affecting the decision to walk in Bangkok. A 15 minute walk is seen to be more than just a walk, but a difficult and tiresome journey.

The introduction of mass rapid transit systems, ie BTS and MRT, has made walking a more relevant, attractive transport option. A 10 minute walk with a 15 minute subway ride could shorten a trip significantly (as opposed to driving the whole distance). Nevertheless, the walkability in Bangkok is partly constrained by the physical condition of sidewalks and related facilities (such as pedestrian crossing bridge and traffic signals). A road without or with a narrow sidewalk is dangerous for pedestrians and poorly paved and maintained sidewalks makes walking unpleasant. These minor factors affect the impression of, and preference toward, walking in a metropolitan area.

With recent investment decisions in mass rail transit systems, walking will become more important as a supplementary mode of urban transport in BMR. This section explores BMR's walkability starting from the physical and institutional aspects. The role of users and caretakers of sidewalk are explored, which includes the role of maintenance and sidewalk usage coordination. The challenges in walkability and sidewalk development are also identified in regards to multi-modal urban transport in BMR.

D.1 WHO USES SIDEWALKS?

While roads mainly serve vehicles and 'mechanized' transport, sidewalks are utilized in various ways. Telephone booths, bus stops, street vendors, and pedestrians are all use the sidewalk. The key users of sidewalks in BMR are:

- Pedestrians. Pedestrians use sidewalks as their transport infrastructure.
- Utilities. Electricity, water, telephone, and cable television use pipes and cables. The road network in the BMR is also used for these utilities.
    - Electricity (Metropolitan Electricity Authority, MEA). MEA's electrical poles are placed on the sidewalk. The sidewalk is occupied during equipment installation, maintenance, and repair.
    - Piped water (Metropolitan Water Authority, MWA). The installation and/or upgrade of underground water systems often makes use of a large part of the sidewalk and, perhaps, part of the road too.
    - Telephone (TOT, CAT). Beside telephone wires, which are usually placed on poles with MEA's electrical cables, telephone booths also take some space on the sidewalk.
    - Cable TV (UBC / TRUE Vision). Cables are placed with electrical and telephone wires.
- Businesses. There are two major types of business utilization.
    - Street vendors. In many locations around BMR, street vendors are common. They use a small area of sidewalk or by the curb to do business. In some area, street vending is illegal. There are many locations where street vendors can operate legally.
    - Advertising signs. On some roads, there are advertising signs located on the sidewalk.

- Others. traffic signs, bus stop, and taxi stops locate in various locations around BMR. They are mostly locate on and adjacent to sidewalks.

Negative externalities are sometimes caused by one user affecting another. For example, poorly-placed light poles near a bus stop leave too little space for pedestrians to walk (eg on Ekamai Road). Such inter-relationships are elaborated on below.

Examples of Sidewalk Utilization by Utilities

D.2 WHO MAINTAINS AND MANAGES SIDEWALKS?

The owner of the road is responsible for its sidewalks. The Department of Highway (DOH) is responsible for the roads along the national highway network and most parts of the Outer Ring Road (ORR), while the Department of Rural Roads (DOR) is responsible for secondary and distributor roads. The Expressway and Rapid Transit Authority of Thailand (ETA) is responsible for the expressways and inter-city motorways in BMR, but sidewalks are not provided along the expressway routes which are limited access, high speed roads. Most urban roads in Bangkok are under BMA and its district offices.

While BMA takes care of the main urban roads, its district offices are responsible for maintenance and clean sidewalks. In addition, BMA is responsible for coordinating with users of sidewalks, such as utilities and street vendors. Key related departments in BMA are:

- Public Works Department: planning, maintenance, (building) design approval and controls, coordination with utilities, land rights management, and research;
- Department of Environment: cleaning and waste treatment;
- City Law Enforcement Department: mainly street vendors control & other law violation (eg advertisement and signs, violation);
- Traffic and Transportation Department: traffic management system;
- Department of City Planning: district development plan preparation and enforcement; and
- District Offices: maintain and clean small sois.

Each department has a five year plan, which also includes matters relating to the construction, maintenance and management of sidewalks. The Department of Public Works, Department of Environment, and City Law Enforcement Department are the main three agencies that are involved the most with the physical aspects of sidewalk infrastructure. The latter two have clear tasks of cleaning and law enforcement (mainly dealing with street vendors), respectively. The Department of Public Work has complex responsibilities, involving planning, maintenance, and coordinating with users of sidewalks, particularly utility agencies.

BMA appears to have available sufficient finance for the activities regarding sidewalks, but the challenge lies in sidewalk management and coordination with related parties. Issues such as unaligned planning across agencies often result in repetitive digging on sidewalks and streets.

D.3 CHALLENGES

The key challenge to improved walkability in the BMR is the facilitation of an environment to enable clean, flat, convenient, and safe sidewalks to be provided and maintained:

- **Utility Coordination.** Although the utilities (such as telecoms, gas, water) benefit people in general and while it is inevitable that most of the associated infrastructure will be on the sidewalks, many sidewalks are constantly undergoing installation and maintenance works. One of the important challenges lies in the coordination among responsible agencies ie BMA, other local governments, utility companies, and their contractors. This is to reduce redundancy in construction work. In addition, BMA has minimal authority in enforcing contractors to comply with the rules of utilizing the sidewalk, nor for satisfactory reinstatement of the sidewalk to an "as before" or superior condition. Such authority lies with the utility companies, who through their contracts with firms undertaking utility works have the power to enforce needed conditions. In Bangkok in early 2007 major disruption to sidewalks was occurring due to utility installation leaving sidewalks badly broken and uneven. The poor quality of work appears to imply little or no care in workmanship or concern about being forced to conduct remedial works. It must be assumed that there is no political and management accountability for the situation.

- **Street vendor management.** There are different opinions on the street vendor issue. Some prefer no vendors on the sidewalk at all; some think that vendors make a walk more enjoyable. Street vendors are only permitted in specific locations identified by BMA, and the City Law Enforcement Department is responsible for enforcement. In 2005, there are 653 permitted location with 18,663 street vendors. In the same year, there were 211,938 violators.

- **Cleanliness and Pavement Quality.** While BMA and its district office provide cleaning services on sidewalks and streets, a clean sidewalk is also the responsibility of users. The challenge is to create awareness for pedestrians, street vendors, and utility companies in keeping the sidewalk clean. Enforcement of pavement standards should also be done appropriately. There are many uneven sidewalks around Bangkok which are difficult to walk on and often dangerous.

- **Widening of Sidewalks.** In some location, sidewalks are very narrow due to the expansion of roads and adjacent buildings. Widening sidewalks is difficult to achieve. The authorities would have to consider the trade-off between road space and the sidewalk, where the former is usually the priority. The appropriate sidewalk width is best determined early on in the road design phase.

- **Planning, Policy, and Implementation.** There are rules and guidelines in BMA relating to how sidewalks should be utilized and maintained. These rules are often neglected, violated, and not enforced. That is because there are too many parties involved with fragmented institutional authority

D.4 APPROACH TO IMPROVING WALKABILITY

Successful, well-maintained, and well-managed sidewalks appear in some specific locations in Bangkok. An example is the sidewalk around Rachaprasong junction. The presence of a major development (Gasyorn) who have a vested interest in retaining a clean, flat, uncluttered and attractive adjacent sidewalk is the reason for this situation. In other words, the development owner holds utility agencies and their contractors accountable for the quality of work on the sidewalk.

Engendering political accountability is therefore regarded as the key priority for creating the enabling environment to dramatically improve walkability in Bangkok. This would then permit the necessary planning, coordination, and enforcement to be undertaken effectively. Public feedback channels are needed to stimulate transparency and rapid action including the reporting of violations.

ANNEX E: LOGISTICS

Estimates of logistics cost for Thailand indicate that it would be around 16-19% of GDP (NESDB 2007, OTP 2007) which is very high compared to estimates for USA (10%), EU (7%), Japan (11%) and Australia (9%) (JETRO 2003; EPS/ PAS 2005). Estimates for around 2000, indicate that the transport component of logistics cost represented 46% in USA, 41% in EU and 40% in Australia, with transport being the single largest component of logistics cost. Nevertheless as a whole, non-transport activities (inventory, storage, and administration) were estimated to be more economically significant than transport.

The Thai government has recognized the importance of logistics. NESDB is working to develop a logistics strategy for Thailand which in the period 2006 to 2010 (the 10th National Plan period) aims "to establish a world class logistics system to support Thailand as Indo-China's trade and investment center." The need for more efficient logistics is also recognized by the Thai Federation of Logistics who says that improvements in Thailand's logistics is proceeding very slowly while the need to increase Thailand's competitiveness had become even more urgent now that competition in the region for investment has increased (Bangkok Post, 2007).

Since over 90% of Thailand's commercial freight transport is carried by road transport and in the BMR virtually all is road-based, for the purposes of this Annex of the report, we deal only with truck transportation in the context of the broader logistics industry.

E.1 CURRENT PERFORMANCE

Trucks carry vital freight between factories and farmlands and ports and distribution centers often located in urban areas or along highways that traverse urban areas. Heavy trucks with 10 wheels or more (including three axle vehicles and trucks with trailers) have been restricted from operating in Central Bangkok, the area mainly defined as being within the Middle Ring Road (MRR) for over 30 years as shown in Figure E.1. They are banned from entering the city between 6 am and 9 pm every day except public holidays. They are however restricted to certain defined main roads such as expressways and the major highways. The main exceptions to this restriction are concrete trucks and trucks carrying easily damaged farm goods which are permitted to operate on some routes and in some time periods (mainly between 10am and 3pm). This ban has existed in more or less the same form since its inception. Although policies which impose undue restrictions on trucks will also may also increase the cost of goods to the consumers and if carried to extremes erodes the competitiveness of individual firms, and industries and the economy, it has been politically easier to impose restrictions (time, area, route-based) on truck transport rather than private vehicles.

Figure E.1: Truck Restrictions

Source: Department of Land Transport

Logistics firms and broader industry have responded to the ban by locating terminals and manufacturing plants at first around the MRR and later inside and beyond, the Outer Ring Road (ORR) as the ORR was implemented. Prior to the completion of the ORR on the east and west of Bangkok in the 1990s, major costs would have been imposed on the logistics industry and the shippers of the goods, and would have included:

- Lower vehicle productivity;
- Unnecessarily large fleets (of generally older trucks[42]) including a greater tendency for manufacturing and other firms to maintain their own truck fleets (own-account); and
- Reduced reliability for delivery of inputs and distribution of finished goods a higher cost of obtaining inputs and serving markets;
- Reduced access and scale economics, which increases input costs and the cost of production.

The completion of the ORR, particularly the eastern section, facilitated all day and seven day a week (ie 24/7) access between the Eastern Seaboard (ESB) and factories located in the Central Region (and beyond) and therefore was likely to have reduced logistics cost benefiting wider industry. Some of the constraints imposed by Bangkok truck restrictions, were overcome through use of heavily loaded 6 wheelers and pick-ups for intra-Bangkok goods distribution.

Nevertheless, for many types of goods such as those in containers, transshipment and breaking down the container[43] is not a cost-effective alternative and despite the higher costs, it would be preferable to either plan the truck journey (involving long lead times) to avoid the ban or to wait beyond the MRR until the truck is free to move. The reduction in flexibility of truck movement would usually impose costs on both the truck /logistics industry and then be passed on to wider industry (the shippers), and ultimately consumers.

EDI is a critical tool for Just-in-Time logistics necessary for high value goods manufacture (eg electronics, automobile) particularly where these industries are part of global supply chains. JETRO (2003) also noted the low use of Electronic Data Interchange (EDI[44]) due to several factors:

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[42] In Thailand, where the most common truck is the 10 wheel truck until the early 1990s and probably still today, articulated vehicles are estimated to be only around 7% percentage of the total fleet. Until the completion of the ORR, estimates were that larger vehicles with 10 or more wheels operated less than 120,000 km per year on average (Project Appraisal Services Co Ltd, 1995) whereas in other countries vehicles of this size would be typically running over 400,000km per year. Trucks with 10 wheels or less have even lower productivity. The reasons for this low productivity are various and include: the large fleet of old vehicles which are in oversupply, the relatively small size of the country, Bangkok's traffic congestion and associated peak hour truck ban. The oversupply of old vehicles has also been a result of past Government policies which protected existing franchise holders and discouraged new investment in modern, productive vehicles.

[43] In East Asia, containers are often used only for maritime transport, and are stuffed and unstuffed in the ports. This eliminates most of the potential cost savings from containerization. Countries that encourage door-to-door movement of containers using multi-modal transport will be more competitive, and will spread trade benefits across larger areas (ADB et al 2005).

[44] Electronic Data Interchange (EDI), or more generally electronic commerce, is a vital part of managing the paperless flow of information necessary for procuring, shipping (by ship, truck or train etc), loading, transferring, receiving, payment and meeting any associated legislative requirements efficiently. For efficiency, the physical process and the electronic transactions must be synchronized. This is true whether the goods are involved in an international or domestic transaction. Because many of the information flows in the trade and transport industries are structured documents which are transmitted on a regular basis, EDI offers potential benefits. English

cont. on next page

- Difficulties in standardization of data formats among customers;
- Low adoption in many sectors of the logistics industry as they limited capital and low labor costs rendering EDI not cost-effective for them; and
- Limited adoption and differing requirements among associated organizations eg Thai Customs and banks.

Other barriers noted by JETRO (2003), Bangkok Post (2007), NESDB (2007) and (Private Communication 2005) were:

- Unclear enforcement of truck restrictions by the police;
- No effective laws governing vehicle use and use of tachographs meaning a significant abuse of drivers and vehicles (Private Communication 2005);
- Customs tariffs definitions are open to various interpretations;
- Poor transport laws coming from a variety of agencies. Some laws do not reflect international practice (Personal Communication 2005);
- Reliance on manual data input with high error rates and delays in checking an clearance of goods;
- Traffic management – in addition to congestion, circuitous routing on major highways and arterial roads to U-Turn and access terminals and factories;
- Peaking of truck movements due to the truck ban exacerbating congestion when heavy trucks are able to move.

Industry has tolerated maintaining larger fleets, as much of Thailand's truck fleet is old and largely makes use of aged 6 and 10 wheel trucks. These vehicles are heavily depreciated and although not fuel efficient nor environmentally friendly, and hence have a high life cycle cost, appear to be cheap to purchase and maintain. Hence, at present, a small proportion of the total truck fleet makes use of modern technology vehicles.

For example, in Bangkok, trucks have an average age of more than 12 years and therefore precede the EURO standards for diesel vehicles. High or gross polluters can easily have many times more PM emissions than pre-EURO buses (shown in Figure E.2 as EURO 0) which in turn when new have several times more PM emissions than a new Euro 2 truck.

Although there are life-cycle economies in operating larger, modern vehicles there are numerous barriers to the introduction of these vehicles including: high capital costs; fragmented ownership[45]; high cost of spare parts; the pattern of road development and congestion in Bangkok.

There appear to be several reasons for the existence of generally small fleets including:

- Undue reliance on variable quality own-account operations[46] by manufacturers and producers. This view is supported by JETRO (2003), NESDB (2007), and Personal Communication

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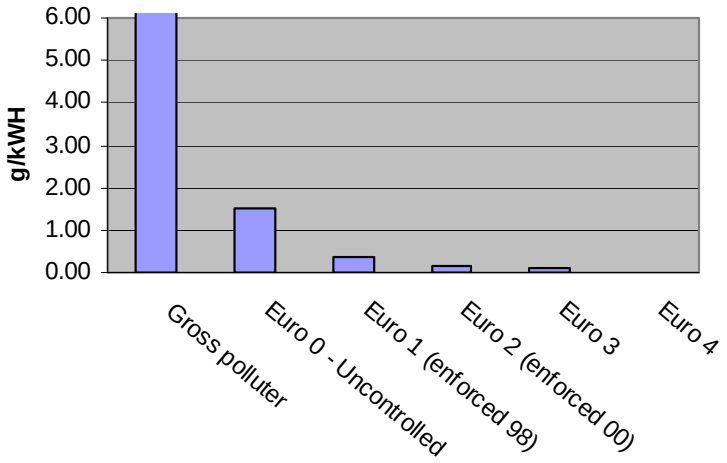
language documents are needed for international transactions and many small firms still today have limited English language ability (JETRO 2003).

[45] For non-fixed route trucks (3PL or 4PL) BMA operators appeared to own or control 25 trucks on average and for own-account trucks, average fleet size was 7 trucks. In reality, actual fleet size may be smaller as there is considerable sub-contracting of services.

(2005). In Thailand in 2002 DLT data show that there were 599,180 registered private (own account) trucks compared to 90,330 non-fixed route trucks (ie for-hire trucks or 3PL and 4PL). ADB et al (2005) also identified Thailand as being in a group of Asian countries for which penetration of specialized 3PL logistics providers is low.

Figure E.2: EURO Series of Particulate Matter Emission Standards for Diesel Vehicles



Source: Consultant

- The low costs of ownership of aged trucks and the undemanding system of vehicle registration (low registration charges as shown in Annex B) which rise to maximum of THB4,050 for a truck of tare mass greater than 7 tonnes and have been unchanged for many years and lenient annual fitness and emissions testing. Vehicle registration charges do not discriminate between vehicles on the basis of pollution potential or energy consumption. Policies encourage rebuilding of old diesel vehicles despite the presence of emissions standards for new vehicles. Despite the existence of a rudimentary in-use vehicle inspection systems administered by DLT some in-use vehicles continue to pollute excessively.
- The effects of the Bangkok truck ban which favor 6 wheelers and smaller trucks;
- Hang-over from the influence of the presence of the now defunct State-enterprise truck operator the Express Transport Organization who had various monopolies (including avoiding the truck ban and preferential access to Klong Toey port), a fleet of 830 of its own trucks, and a major reliance on use of sub-contractors;
- Limited capital for many operators and an apparent unofficial policy to favor small to medium sized firms; and
- Limits on investment by foreign professional logistics providers.

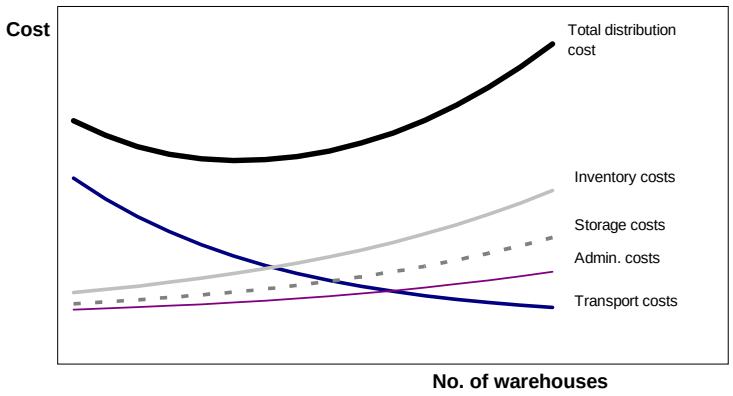
The four categories of logistic cost (inventory, storage, transport and administration) will be influenced by a range of factors, including the extent to which warehousing is centralized (rather than being dispersed). Using a larger number of warehouses reduces transport costs because distribution to the warehouses can be undertaken with larger vehicles and the cost of distribution from the warehouses involves shorter travel distances. However, administration, inventory and storage costs

[46] Freight transport is typically undertaken by four types of operator: own-account operators, ie companies whose primary business is not transport but who still transport their own goods; for-hire operators, ie commercial companies who transport goods for others now commonly known as 3PL (Third Party Logistics Providers); private users, such as trades people who use trucks to carry materials or goods; and government agencies that use trucks to support their activities. A new trend is 4PL (Fourth Party Logistics Providers) who are sub-contractors to sub-contractors.

rise with use of a larger number of warehouses. Total logistic costs can be minimized by selecting the appropriate number of warehouses. Refer Figure E.3.

These data reinforce the situation that other factors in addition to direct consideration of transport are taken into account in logistics decisions, which in turn are only one of the cost factors that influence decision making by firms that, in the end, affect issues such as the quantity, type and location of freight movement.

Figure E.3: Minimizing Total Logistics Costs



Source: Consultant, drawing on example in McKinnon (2003)

Thus total logistics cost is a result of joint optimization of all four cost components. Due to competitive pressures, industry (shippers) and hence logistics firms, in developed countries with fairly open markets, are constantly seeking to reduce logistics costs. In Europe over the 1990s, reported Euro-CASE (2000:42) the cost of logistics and transport markedly was estimated to halve over 1987 to 2003 with two of the principal reasons being:

- "the fall in transport costs resulting from transport deregulation, improved vehicle design, expansion of the motorway network and more efficient fleet management procedures. The savings are not always passed on to customers, but may be used to widen the catchment areas for customers and suppliers; and
- improved monitoring and tracking of goods, which alongside improved packaging and better security, is reducing the risks associated with long supply lines."

It is likely that a similar decline in Australian logistics costs occurred for broadly similar reasons, eg deregulation, improved vehicle design, use of larger trucks, outsourcing and more efficient fleet management. Having achieved these savings, in Australia the focus has shifted to non-transport components of logistics, especially as the lower transport costs and more efficient transport practices support innovation and new non-transport logistic practices to occur (EPS/ PAS 2005).

The system of vehicle classification[47] used (by DLT and administration and hence for enforcement by the police) is blunt and a "one size fits all" approach. Higher quality truck operators with modern fleet are treated the same as low quality operators using inferior vehicles.

Current heavy truck transport ownership and use charges are rudimentary and in no way achieve optimum use of transport infrastructure (road, rail etc) nor start to reduce externalities. Other costs of road use noted below are excluded also:

- Congestion costs – delays imposed by each vehicle on all others;
- Accidents, the portion of the total cost unfunded by insurance premiums;

[47] And maximum permitted axle loads which in Thailand are 10.0 tonnes. Allen (2006) reports the maximum load limit for a three-axle truck with two rear axles (with each axle having four wheels, ie giving a total of ten wheels on the truck) is 26 tonnes in Thailand.

- Environmental externalities: noise and tailpipe emissions – local and global; and
- Costs of enforcing heavy vehicle regulations.

Current truck freight tariffs are based on volume. JETRO (2003) states that current freight tariffs are computed by specifying the cost per 4-wheel (and 6-wheel or 10-wheel) truck. There is thus limited knowledge among many logistics or truck operators of the true costs of transporting goods. Activity-based costing (Personal Communication 2005) is rarely used in these circumstances but is needed to underline more competitive and modern logistics operations.

Differentiated charges, particularly on use, would in principle have a greater ability to minimize distortions between heavy and lighter trucks, and between rail, water and truck transport. Current charges lead to a situation where heavy trucks are most likely subsidized by medium and small trucks. In other countries, for example, New Zealand, Germany and others, mass – distance charging has been implemented to more selectively apply appropriate charges that reflect the costs of road provision and maintenance for each class of vehicle.

Another challenge for policy makers is to set technology standards that are realistic, affordable and that can be maintained locally. Setting overly ambitious standards which raise the prices of new vehicles and which are consequently unrealistic in terms of industry affordability may actually be counterproductive as too few of these vehicles would be purchased. That is, over 95% of the bus and truck fleet would still consist of very old vehicles with varying emissions and other externalities performance. An important related issue is to ensure whatever standard is chosen for new vehicles is that it be able to be maintained satisfactorily to ensure engines and emission systems perform as intended. For example, maintenance of Euro 3 and 4 engines and emissions systems require advanced maintenance skills involving specialized expertise and equipment which may not be available or affordable.

The many impediments to change and optimization of logistics which have been outlined above would seem to limit major reductions in logistics costs in the future without appropriate intervention. The costs of inefficient logistics to the economy and hence Thailand's competitiveness are likely large but have remained hidden as the nature of the industry is to pass on costs: from logistics firms to shippers, and from shippers to consumers.

Until recently, government policy on logistics has been passive and the efficiency gains that have been achieved are largely due to the endeavors of logistics firms and shippers alone. It has been recognized that there is a need for greater adoption of EDI (and related technologies such as Information Communications Technology), enhancement of human resource capacity in the industry and so on.

E.2 GOVERNMENT ROLE

What can be done to improve transport's performance in the context of broader logistics? The above discussion has highlighted that land transport, both the infrastructure and operations, are critical in enhancing efficient logistics. Thailand, and the BMR, is already generally well equipped with a good strategic road network. Thus, firms will have a wide range of choices of transport mode, warehouse location and ease of access to the port, airport and regional transport system. But due to the fragmented structure of the truck industry (many small operators and low level of resources), there are significant barriers to improvement.

While this has been a limited strategic review there are several opportunities which are likely to be beneficial:

- Reform and updating of vehicle charges as described in Annex B to include an access charge and an in-use charge that better reflects the full marginal social costs imposed;

- Standardization of definitions for containers (and pallet sizes), data formats, customs tariffs and vehicle types to enhance industry efficiency, and aid enforcement and compliance auditing;
- Low-cost interventions to assist the transport industry and its customers to develop basic capabilities in priority electronic commerce areas which may include: adoption of common software/ standards for commerce and operations eg consignment tracking; access to real time information on network conditions; electronic systems that produce hand held delivery receipts; systems that permit a greater understanding of the real cost of moving freight building on the evolution of e-bidding for work and the effect this is having on driving costs down;
- Support to model EDI/ logistics activities, a competitive environment and external investment/ influence to ensure further advancement;
- Better management of strategic interchange functions through rationalization and access improvement to the many chaotic dispersed truck terminals now principally located near the ORR;

Nevertheless, by its nature logistics is a diverse industry with many thousands of firms engaged in various aspects of the logistics and constituent transport task. A more in-depth understanding of how transport functions in terms of logistics and the areas for priority improvement, and options for addressing these areas, is essential.

It is recommended that NESDB's emerging logistics strategy aim to work with its strategic stakeholders including the Thai Federation of Logistics and key development partners such as the Urban Transport Partnership to prioritize the key problem areas by key industry, and to assist in formulating comprehensive remedial strategies.

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ANNEX G: SUMMARY FINDINGS OF TECHNICAL WORKSHOP

Integrating Urban Transport: Moving from Projects to Services

June 14, 2007 – Siam City Hotel

A technical workshop—**Integrated Urban Transport: Moving from Projects to Services**—was held on June 14, 2007 at Siam City Hotel. The objective of the workshop was to disseminate completed and on-going work under the Urban Transport Development Partnership (UTDP)[48] and to further the discussions on various issues relating to the rail mass rapid transit development in the Bangkok metropolitan area.

The participants of the workshop identified the following desirable outcomes for urban transport development in Bangkok:

- **Efficiency:** optimized infrastructure, reduced operating cost, improved cost recovery.
- **Environment:** reduced air pollution, improved environmental quality.
- **Energy:** more efficient use of energy, reduced oil imports.
- **Economy:** reduced logistics cost, increased competitiveness.
- **Land Development:** efficient land use and development.
- **Living Standards:** good accessibility, reduced congestion, more choices of transport services, better services, improved safety, improved affordability.

The workshop also identified a number of issues that constrained the achievement of the desirable outcomes:

- **Political economy.** Project prioritization is sometimes distorted by political influences.
- **Legal framework.** The current legal framework for implementation is weak, and a comprehensive legal basis is needed.
- **Land use and development.** There is no sustainable financing mechanism for urban transport. The increased values of land and properties due to improved transport infrastructure are not captured through mechanisms such as property tax and betterment charges.
- **Financing issues.** There are various options for financing urban transport projects, but few are explored.
- **Social obligation / fare control.** Large public transport projects are often tied to social obligations and subject to fare control. This reduces the financial attractiveness of the project. There should be clarity in policy on how the public service obligations are funded.
- **Coordination.** Urban transport is complex and many agencies are involved. However, coordination among agencies has been weak. This contributes to poor responsiveness and slow actions.

[48] The Urban Transport Development Partnership (UTDP) is a knowledge-based program for joint efforts among the Asian Development Bank (ADB), French Development Agency (AFD), Japan Bank for International Cooperation (JBIC), and the World Bank Group to support the government's urban transport development agenda.

- **Private sector participation.** Institutional capacity for public-private partnership (PPP) remains weak. There is need for setting better guidelines for private sector involvement in urban transport infrastructure provision and operation.

In discussing the way forward and priorities, the participants all shared the consensus as follows:

- The focus of urban transport development directions should be first on the movement of people and goods, instead of vehicles.
- Integrated transport planning is an important step forward.
- The enabling environment—an appropriate institutional, legal, and policy framework—is key for the comprehensive master plan to be formulated and implemented.
- Bus modernization is another priority, where routes must also be re-designed for improved efficiency and better integration with other modes of transport. The introduction of BRT is a plus. BRT could also nurture the demand for future MRT lines.
- Poor walkability is the outcome of poor accountability. To improve the city's walkability, performance-based contracts for the maintenance of the sidewalks could be considered and introduced on the pilot experiment basis.
- The urban transport challenges and issues in Bangkok are complicated (particularly at the implementation level), and with serious economic, social and environmental implications. Appropriate institutional arrangement and associated legal framework is a top priority for laying a sound foundation for improved urban transport service delivery.
- A coordinating body for urban transport matters is needed, and its functions should be defined carefully to suit the requirements for effectiveness. The coordinating body should be recognized at the legal level under a suggested new MRT Act which is considered necessary for the current situation with three urban rail agencies ie SRT, BMA and MRTA.

Agenda

Technical Workshop

INTEGRATED URBAN TRANSPORT: MOVING FROM PROJECTS TO SERVICES

June 14, 2007 -- Kamolmas Room, Siam City Hotel

08:30 – 09:00 Registration

09:00 – 09:10 Opening Speech: *Representative, UT Development Partnership*

09:10 – 09:20 Keynote Address: *Deputy Minister Sansern Wongcha-um, Ministry of Transport*

Session I **Building consensus on urban transport development outcomes** (1 hr)

Purpose: To discuss desirable outcomes regarding urban transport development in Bangkok Metropolitan area

Format: (1) A brief presentation on desirable outcomes

(2) Open discussion guided by a facilitator

(3) Summary of desirable outcomes

Key Question:

Linking transport investment and service provision to economic and quality of life outcomes

10:30 – 10:45 *Coffee Break*

Session II **Identifying issues and constraints** (1 hr 15 mins)

Purpose: To identify issues faced by line agencies and constraints regarding planning, policy, financing, regulation, management, implementation, and institution

Format: (1) Agencies' presentation: role, responsibilities, challenges, and actions

Presenters:

OTP – MRT / Transport (5 mins)

SEPO – Bus (5 mins)

PDMO – Finance (5 mins)

NESDB – Logistics (5 mins)

BMA – City Perspectives (5 mins)

(2) Consensus-building on key issues and constraints

Key Questions:

(1) Strengthening coordination between modes and across agencies

(2) Integrating land use and transport planning

(3) Integrating planning and financing process

(4) Addressing financial requirements and cost-recovery

12:00 – 12:15 Tools and Methodologies for the Development of Energy and Environmental Assessment – Presentation by French Development Agency (AFD)

12:15 – 13:15 *Lunch*

13:15 – 13:45 Strategic Urban Transport Policy Directions for Bangkok – Presentation by World Bank

Session III **Exploring ways forward** (1 hr 30 mins)

Purpose:	To discuss and explore possibilities to address issues and overcome constraints
Format:	(1) A brief presentation on the identified key issues
	(2) Breakout group discussion (each group proposes a list of actions)
Key Questions:	
(1) Identifying root causes of issues versus symptoms	
(2) Achieving practical approaches in short term	
(3) Identifying long term needs & key steps	

15:15 – 15:30 *Coffee Break*

15:30 – 15:45 Highlights of Technical Supports on Urban Transport Development – Presentation by Asian Development Bank (ADB)

Session IV **Prioritizing actions** (1 hr 30 mins)

Purpose:	To discuss priority actions needed to achieve the desirable outcomes
Format:	(1) Breakout group reports back on a list of proposed actions
	(2) Consensus-building on priority actions
	(3) Summary
Key Questions:	
(1) How to prioritize actions in terms of urgency, cost effectiveness, implementability, etc.	
(2) How to move forward in a coherent manner	

17:15 – 17:30 Wrap-up

17:30 – 18:30 *Cocktail Reception*

List of Participants

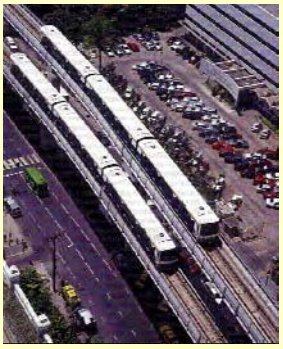
	First Name	Last Name	Organization
1	Mr. Reangsak	Tongsom	Office of Transport and Traffic Policy and Planning
2	Dr. Parinya	Tanadtang	Office of Transport and Traffic Policy and Planning
3	Ms. Chaninnart	Kouwsomran	Office of Transport and Traffic Policy and Planning
4	Ms. Kanthong	Bura	Office of Transport and Traffic Policy and Planning
5	Dr. Kanchit	Pewnuan	Office of Transport and Traffic Policy and Planning
6	Mr. Tetsuhisa	Kobayashi	Office of Transport and Traffic Policy and Planning
7	Ms. Pimpa	Sutinsak	Office of Transport and Traffic Policy and Planning
8	Mr. Theeraj	Athanavanich	Public Debt Management Office
9	Ms. Sunetra	Lekuthai	Public Debt Management Office
10	Ms. Paktra	Koonprateen	Public Debt Management Office
11	Mr. Supakorn	Pattarawichean	Ministry of Transport
12	Ms. Jintawadee	Suksri	Ministry of Transport
13	Mr. Chaiwat	Thongkamkoon	Department of Land Transport
14	Mrs. Sinporn	Withayawongruchi	Department of Land Transport
15	Mr. Ek	Sittivaekin	State Railway of Thailand
16	Mr. Jiradech	Kajohnsubsakun	State Railway of Thailand
17	Mr. Watcharachan	Sirisuwannatash	State Railway of Thailand
18	Mr. Prapat	Chongsabguan	Mass Rapid Transit Authority
19	Mr. Yiemchai	Chatkeo	Mass Rapid Transit Authority
20	Mr. Chukiat	Phota-Yanuvat	Mass Rapid Transit Authority
21	Mr. Chaisit	Gururatana	Mass Rapid Transit Authority
22	Dr. Pallapa	Ruangrong	State Enterprise Policy Office
23	Mr. Kiattikun	Thiamprasert	State Enterprise Policy Office
24	Ms. Penpan	Kittipornpaibul	State Enterprise Policy Office
25	Dr. Porametee	Vimolsiri	National Economic and Social Development Board
26	Mr. Visnu	Tivatansakul	National Economic and Social Development Board
27	Mr. James	Lynch	Asian Development Bank
28	Mr. Francois-Xavier	Duporge	French Development Agency
29	Mr. Herve	Breton	French Development Agency
30	Mr. Kritsa	Tangkavachiranon	French Development Agency
31	Mr. Paul	Williams	French Development Agency
32	Mr. Yosuke	Matsuda	Japan Bank for International Cooperation
33	Mr. Fumio	Kurosaki	Japan Bank for International Cooperation
34	Mr. Zhi	Liu	World Bank
35	Mr. Chanin	Manopiniwes	World Bank
36	Mr. Phil	Sayeg	World Bank
37	Dr. Indra	Tiwari	KMUTT

ANNEX H: PRESENTATION OF THE REPORT AT THE TECHNICAL WORKSHOP

Urban Transport Development
Partnership
Government of Thailand

Strategic Urban Transport Policy Directions for Bangkok

14 June 2007



Purpose of this independent study

- Thailand's economic prosperity will depend increasingly on knowledge-based industries
- Bangkok is Thailand's key economic engine
- Efficiency of Bangkok's internal transport & external links important
- World Bank as member of the Urban Transport Development Partnership (UTDP) commissioned this independent study of urban transport policy directions
- UTDP consists of four International Financial Institutions (IFIs), including the Asian Development Bank (ADB), Japan Bank for International Cooperation (JBIC), World Bank, and the French Development Agency (AfD)

Objectives for urban transport improvement

- A **practical objective** is to aim to make better use of resources through focused changes in institutional arrangements, planning and investment, and transport infrastructure operations
- With the **aim of achieving the following important outcomes**:
  - **livability** with high quality of life, green spaces and an attractive urban landscape contributing to economic success attracting foreign investors as well as highly qualified professionals and tourists
  - **competitive economy:** as a major world city Bangkok must **compete for investment globally**

Current transport scorecard

- **Significant improvement on many fronts but much still is needed:**
  - **Public transport quality in Bangkok is falling behind** its peer cities in the region - MRT infrastructure continues to be developed as stand-alone projects
  - **Poor linkages** within the transport system and between transport and activity centers
  - **Bangkokians spend considerable time and expenditure traveling**
  - **Road networks comprised of congested primary roads** with poor secondary road connectivity
  - **Logistic services are neglected**
  - **Land use planning and management weak but improving**

Bangkok transport task

	2005	2015
Population (M)	10.8	13.0
Travel Demand		
Person trips/day (M)	19.4	23.4
Mode of travel (%)		
Private modes	46	40
MRT	3	15
Bus & other public transport	37	31
Walk	14	14
Total	100	100
Motor Vehicles		
Number of in-use vehicles (M)	3.1	na
% household with no vehicle	25	na

MRT role to grow

Bus to remain dominant

Walking important too

Key topics

- **Maximizing benefits of MRT** and minimizing risks
- **Modernizing bus** and strengthening its role
- **Improving walkability**
- **Strengthening strategic road development and traffic** management
- **Facilitating efficient freight transport** & logistics
- **Enhancing public finance planning & investment**
- **Enhancing institutional and technical capacity**
- **Strengthening transport & land use** integration & management in all of the above

MRT challenges

- **Mitigating risks of MRT**:
  - Costs may exceed estimates
  - Ridership/revenue may be below forecasts
  - Supporting systems eg walking & bus may not be well integrated
  - Land use activity may continue dispersed pattern
- **Making the most of current MRT expansion plans –** optimal infrastructure and integrated operations

US$5B for 5 new lines

Directions for MRT

- **Develop an updated Rapid Transit Infrastructure and Services Plan**
- **Deliver integrated MRT services building on current initiatives**:
  - **Shift in focus to the delivery and management of integrated transport services**
  - **Complementary integrative systems:** fares (structure & level) to maximize usage and community benefits & enhance cost recovery
  - **Common electronic ticketing system** initially for rail MRT and then other modes as being studied with ADB support
  - **Common marketing, branding and provision of information**
  - **Procurement of services in a way that encourages integration of MRT services**: using the **gross cost concession model** on all MRT lines as being studied with ADB support
- **Facilitate walk access to MRT stations**
- **Intensify land use at MRT Stations** by harnessing accessibility conferred by MRT & working with property market preferences
- **Implement appropriate institutional arrangements and funding** (see later)

Issues for MRT improvement

- **Is planned MRT infrastructure optimal?** Can it be implemented as scheduled and for planned cost?
- **How to ensure right decision on appropriate form of concessions** for E&M including train operations and investment to achieve integrated operations?
- **How to address existing MRT concessions**?
- How to move forward with **appropriate MRT institutional arrangements**?
- Can **effective MRT/bus integration** be achieved?

Bus sector challenges

- **BMTA's accumulated deficit was THB47 billion (US$1.4 billion) at the end of 2005** and has been growing by THB5.1 billion pa in 2005 prices because of
  - **Lack of systematic transport policy and planning** – routes have changed little over time. Limited monitoring or planning process so that route parameters are not related to demand
  - **Inappropriate regulatory framework** – BMTA has an effective monopoly of bus services in Bangkok with the power to sub-license private operators on its routes ie conflict of interest between BMTA's roles as a regulator and an operator. BMTA has **little incentive to be efficient or to innovate**
  - **Inadequate enforcement** of traffic management rules and regulations – enforcement efforts are spasmodic and seldom sustained
  - **Lack of investment capacity and capability** to operate more comprehensive and demand responsive services
  - **Increasing congestion slowing bus operations**

Directions for bus reform & modernization

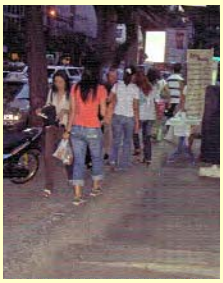
- **Bus service planning** (including integration with MRT)
- **Bypassing congestion** through bus priorities
- **Introducing BRT in carefully selected corridors to increase bus productivity and transform the image of bus** building on BMA's initiatives
- **Improved bus system management**
  - **major institutional change to improve services & reduce financial losses.** Policy, regulatory, sector management and operational activities need to be separated. The proposal to establish a Bus Control Management Authority (BCMA) is important in this respect
  - **corporatization of the bus service activities of BMTA and resolution of its over-staffing** is needed to support better financial management
  - **provision of bus services through well structured "gross cost" contracts** to BCMA using competitive tendering to improve services and reduce costs by up to 30% while ensuring service integration
  - **new bus procurement** is also needed

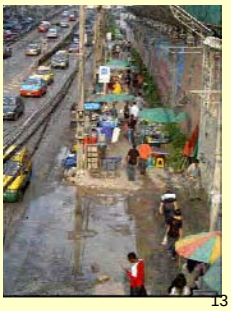
Issues for bus improvement

- **Fundamental issue is regulatory and institutional** reform which is painful
- There are **many stakeholders with potential negative short term impacts and risks but long term benefit** for Bangkok:
  - extensive and comprehensive changes required to BMTA status, regulatory framework, route planning and licensing etc
  - failure to address the current situation is risky also
- **Significant new investment** is also required

Improving walkability – key challenges

- **Utility coordination** is a key challenge:
  - Utility installation often leaves sidewalks badly broken
  - BMA has rules and guidelines are often neglected, violated, and not-enforced, due to fragmented institutional authority and too many parties involved
- **Sidewalk management** can be improved
  - Pedestrians, street vendors and utilities companies should be required to keep sidewalks clean and unobstructed
  - Pavement maintenance needs attention
- **Widening of sidewalks** means less road space
  - Wider sidewalks benefit all users
  - Trade-off between road space & sidewalks





Improving walkability – current examples

- **Good sidewalks** can be found where influential adjacent property users are located:
  - For example, Rachaprasong junction demonstrating clean, flat, uncluttered and attractive sidewalks
  - Other examples include outside embassies, government offices etc
  - Development owners holds utility agencies and contractors accountable for the quality of work on the sidewalk

Issues for improving walkability

- **How to instill political accountability** for sidewalks?
- **Supporting compliance and enforcement** also important
- **Adequate budget and asset management** to efficiently rectify problems and plan maintenance works

Roads and traffic challenges

- **Traffic congestion imposes a large cost on Bangkok** through reduction in productivity and convenience and excessive noise and tail pipe emissions:
  - **inadequate management of strategic land use** and individual developments which give rise to travel
  - **demand for vehicular travel in excess of supply**
  - **inefficient traffic management** with emphasis on vehicle flow rather than persons
- **Inefficient land development and absence of hierarchical road networks:**
  - **Excessive congestion** on primary roads
  - **Inconvenient and circuitous travel**
  - Large parcels of **underutilized land with poor accessibility** and high servicing costs

Directions for improved roads

- Need for a **Consolidated Road Masterplan including Road Hierarchy** to guide new road investments throughout the BMR and adjacent urban urbanizing provinces to:
  - **include all levels of roadways including toll roads** and distributor and local streets
  - **include investments to support surface/bus public transport (eg, BRT)**
  - **be followed by all road agencies**
  - **coordinate with planned major residential and commercial developments** and other key urban infrastructure
  - serve **major industrial and logistics land uses** conveniently and efficiently
  - be **translated into forward, funded, rolling annual programs** of investment by each agency
  - be **incorporated into The Bangkok City Plan and other Provincial Town Plans**

Directions for improved traffic management

- **Address current key weakness in the institutional structure of traffic management:** BMA & police's shared role leads to gaps, inefficiency and poor linkage to other street management functions
- **Create a single traffic management authority:** roles of police and BMA and other local governments to be resolved
- **Adopt new priorities** to emphasize the flow of:
  - Pedestrians first, then
  - Freight vehicles (trucks) & buses; and lastly
  - Private vehicles (cars)

Issues for improving roads and traffic

- **Single traffic management authority: new or existing?**
- **Creation of a new transport management culture** to emphasize person flow
- **Willingness of road agencies to coordinate road planning and investment** & associated works budgeting

Freight transport and logistics challenges

- **Cost of inefficient logistics to the economy & Thailand's competitiveness are large but have remained hidden** – estimated at 16-19% of GDP which is high compared to regional neighbors who are striving to further improve
- **Freight transport component is the single largest component of logistics cost**
- **National economic strategy** of increased reliance on knowledge based industries **will increase the need for efficient freight and logistics** - **NESDB is developing a national logistics strategy**
- **Motorways & expressways have benefited the logistics industry greatly** but Thailand's logistics industry **lacks sufficient quality 'soft' infrastructure and adequate policy** eg on electronic data interchange, standards, consistent enforcement, aged truck fleet

Directions for improving freight and logistics

- **Government should focus on where its performance affects the functioning of the largely private sector logistics** industry:
  - **Improving the integration of land use and transport:** facilitate the development of logistics centers in close proximity to major roads
  - **Ensuring adequate road capacity**: ensuring that there is sufficient road capacity to meet freight transport needs, including good links to ports and terminals
  - **Improving the standard and appropriateness of trucks:** new trucks current sold in Thailand are, in technological terms, near best world practice, but more is needed to address current in-use trucks
  - **Facilitating truck operations:** current truck ban imposes a cost on the community, both financial and environmental, by requiring use of smaller, less efficient vehicles. Options for managing the movement of trucks in Bangkok need to be re-examined periodically to ensure that the balance meets the ongoing needs of the city
  - **Improving industry safety:** covering drivers, vehicle loading and vehicles through maximizing private sector incentives & self-enforcement

Issues for improving freight and logistics

- **How to develop a cross-agency approach** covering ICT (Information Communications Technology), truck operations, import/ export requirements, traffic management, land use planning and appropriate legal basis?
- **How to prioritize** areas needing improvement?

Road management & finance - introduction

- Agencies
  - BMA and four national agencies (DOH, DRR, DLT, and OTP) have direct responsibilities for roads in Bangkok
- Expenditure
  - Total expenditure on roads in Bangkok was about THB 10 billion per annum in each of 2003 and 2004
  - This was used for construction of new roads, re-investment in existing roads and maintenance
- Financial information
  - There is no comprehensive and consolidated information on road assets and road finance

The value and cost of roads

- Indicative estimate of value of road assets in Bangkok:
  - value of road infrastructure that deteriorates over time (and which needs to be replaced periodically) is conservatively estimated at THB111 billion (about US$3.3 billion)
  - this excludes bridges, street lighting and the traffic signal system, and is approximate only
- Indicative estimate of the cost of sustaining current road assets
  - average annual cost of replacing life-expired current assets is about THB3.2 billion
  - annual cost of maintenance is about THB4.1 billion
  - this direct total annual expenditure needed to sustain existing assets of THB7.3 billion
  - current expenditure on maintenance is about THB2.0 billion, ie half that needed

The importance of good road use charges

- Road users charge (ie taxes & fees) have two roles
  - they generate revenue to meet the cost of providing roads
  - they are the market mechanism that ensures consumers understand the costs that they impose and hence can make sound decisions on use of roads
- If motorists under-estimate the costs they impose
  - they undertake more travel than is ideal, which
  - increases the cost of providing roads, congestion & pollution

Current & potential road use charges in Bangkok

- Imposts levied under the MVA and LTA
  - charges under the MVA & LTA are not an ideal form of charging for road use because they do not vary with use
  - the allowed maximum rates were reached many years ago are now very low because of the effect of inflation
  - only a tax on new vehicles generates significant revenue
- Fuel taxes
  - a better means for charging for road use
  - but still does not sufficiently take account of the much higher costs imposed by larger vehicles
- Options
  - fixed charges under MVA and LTA generally to cover administration costs
  - re-consider fuel taxes and introduce complementary higher fixed charges for large vehicles
  - consider the case for a congestion charge, eg cordon or area charge

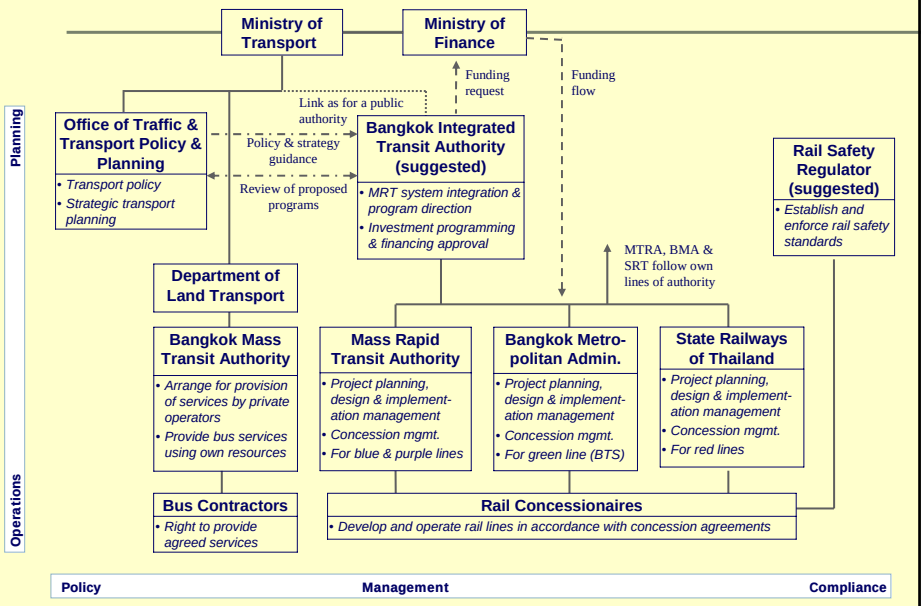
Institutional, regulatory & technical challenges

- Needs already discussed:
  - **coordination and management of MRT** development through a **more standardized approach** under the Act on Private Sector Participation (PPSU) 1992
  - **reform and modernization of the bus sector**
  - **improved road sector development & traffic management**
  - **more efficient freight transport** and logistics services
  - **Strengthened land use and transport integration**
- **Better management of public transport:**
  - best achieved with introduction of a suggested **Bangkok Integrated Transit Authority (BITA)** covering bus and MRT

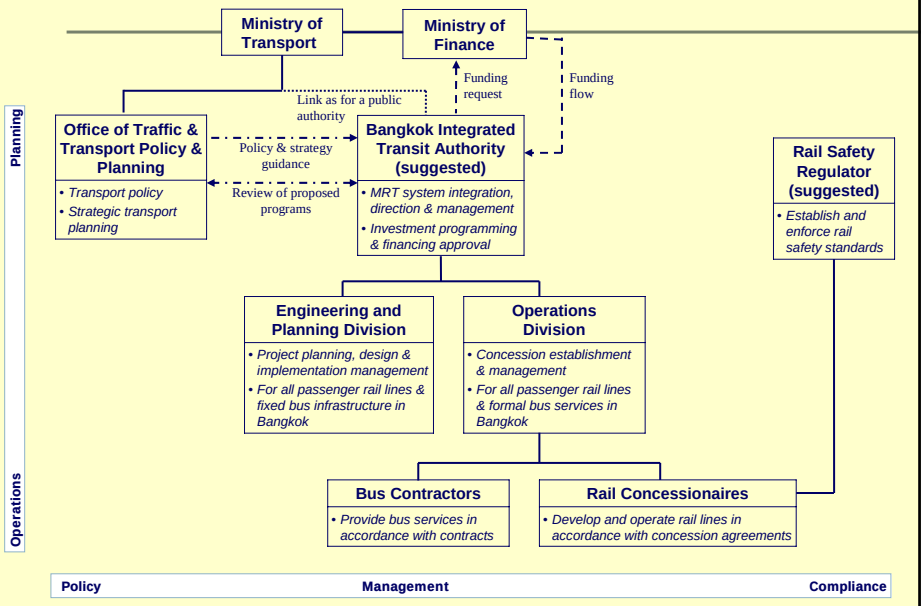
Bangkok Integrated Transit Authority

- Creation of **BITA would permit:**
  - **more appropriate distribution of transport responsibilities between levels of government and between government and the private sector**: national government direct involvement in Bangkok transport declining over time
  - **Separation of policy and management functions from operations**, with operations provided on a contractual basis.
  - **Improved integration of public transport development and management** by bringing public transport management under a single authority, with a clear policy framework, performance criteria and reporting mechanisms to ensure accounatbility
  - **Improved coordination of land use and transport** through the political composition of BITA
- **Two key options for BITA:**
  - Managing BITA
  - Full BITA

Institutional Structure with a "Managing BITA"



Institutional Structure with a "Full BITA"



BITA requires consideration but in the interim …

- **Would it would be possible to create a 'managing BITA' as follows?**
  - **revitalize the Commission for the Management of Land Traffic (CMLT)** which consists of key Ministers and the Governor of Bangkok to **undertake key integrated transport** functions. This would require CMLT or a body with similar status and authority to be chaired by the Minister of Transport
  - use **relevant sections of OTP to provide full time secretariat support with OTP drawing on the relevant functions of other agencies** (eg MRT concessions management from MRTA, bus route contract management from BMTA ie BCMA)
- **How realistic is it to assume a full BITA can be established**?

Progressing key priorities

- **Institutional** – decide overall approach & establish implementation committee chaired by the Minister with working groups on:
  - **MRT optimization** including concessioning to achieve integrated network, access improvements & MRT infrastructure and services plan
  - **Bus modernization** – new action plan needed by inter-departmental committee with supporting funding
  - **Roads and traffic improvement** – consolidated road plan, traffic management priorities and structure
  - **Road freight inputs** to National Logistics Plan