

**DEVELOPMENT OF SCHEDULED BUS SERVICES  
IN ASEAN COUNTRIES  
- CASE STUDIES OF CHIANG MAI, BATAM, AND SIEM REAP -**

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**Abstract:** As part of the Urban Public Transport Policy Framework (UPTPF), the Japanese Ministry of Land, Infrastructure and Transport (MLIT) has conducted studies in several major regional ASEAN cities to recommend practical solutions and frameworks for moving forward to create sustainable and comprehensive public transport policies. In 2003, Chiang Mai, Thailand was chosen as the first target city of this framework and the second city was Batam, Indonesia in 2004. MLIT also undertook a study in Siem Reap, Cambodia in 2006. The studies aimed to develop well-organized and sustainable urban public bus services in the cities where 1) a majority of public transport was operated as paratransit, 2) formal public transport was relatively poor, or 3) urban public transport did not exist. This paper briefly summarizes the studies conducted over the past few years in the selected cities and, from the study results, outlines a number of lessons learned.

**Key Words:** *Urban Public Transport, Bus, and Paratransit*

## 1. INTRODUCTION

“The Assistance Program for Forming Policies on Urban Public Transport in ASEAN Countries” is being conducted within the Urban Public Transport Policy Framework (UPTPF), which is a part of the Association of Southeast Asian Nations (ASEAN)-Japan Transport Partnership. As part of the UPTPF, the Japanese Ministry of Land, Infrastructure and Transport (MLIT) has conducted studies in several major regional ASEAN cities to understand

their urban transport systems and recommend practical solutions and frameworks for moving forward to create sustainable and comprehensive public transport policies.

In 2003, Chiang Mai, Thailand was chosen as the first target city of this framework. The second city studied within the UPTPF was Batam, Indonesia in 2004. With consideration of results from the preliminary surveys conducted in Siem Reap (Cambodia), Yangon (Myanmar), and Hanoi (Vietnam) in 2005, MLIT undertook a study in Siem Reap in 2006. The Japan Transport Cooperation Association (JTCA) implemented studies that were commissioned by MLIT. The authors also had opportunities to join the studies.

The studies were aimed at development of well-organized and sustainable urban public bus services in the cities where 1) the majority of public transport was operated as paratransit without schedules and routes, providing door-to-door service; 2) formal public transport was relatively poor, with low frequency and a lack of operating schedules and timetables; or 3) urban public transport did not exist. This paper briefly summarizes the studies conducted over the past few years in the selected cities and, from the study results, outlines a number of lessons learned.

## 2. CASE STUDY OF CHIANG MAI (THAILAND)

### 2.1 Background and Objectives of the Study

Chiang Mai is located in northwest Thailand and is a major center of regional economy, public administration, education, communications, and transport. The city is the capital of Chiang Mai Province and the Chiang Mai Metropolitan Area is 430 km<sup>2</sup> and possesses a population of approximately 615,600 people. The main municipal area occupies some 40 km<sup>2</sup> and contains a population of 178,100 as of 2003. Chiang Mai is also one of the premier tourist destinations in Thailand due to its well-conserved cultural heritage as well as its proximity to mountainous areas for trekking. In 2000, Chiang Mai hosted 3.3 million foreign tourists.

The magnitude of population growth and recent economic expansion has led to an explosion in the use of personal vehicles, both motorcycles and automobiles, and urban sprawl. The result has been a dramatic increase in traffic congestion, which is magnified by the dense urban area that prevents the construction of new roads as well as the widening of existing ones. Other problems include reduced traffic speeds, environmental degradation, and the negative impacts on the economy.



Figure 1 Map of Thailand  
Showing Chiang Mai

The major objectives of the study were to:

- Assess the urban transport issues and identify the factors that constrain the development of effective urban public transport; and
- Propose feasible and sustainable urban public transport policies and priorities to assist local governments in preparing an effective and environmentally-friendly urban public transport policy, program, and implementation schedule.

## **2.2 Urban Public Transport in Chiang Mai**

Typical urban public transport, such as rail service and large capacity bus services, does not exist in Chiang Mai. Formal bus service does exist, but it is used as inter-city, not intra-city. Urban public transport in the city is provided mainly by *songtaews*, minibuses, and larger buses and the majority of public transport in Chiang Mai operates as paratransit, an informal mode of public transport that operates typically without schedules and without routes, providing door-to-door service. The *songtaew*, a covered pickup truck with two or three parallel benches behind the driving cabin, seats about 10 passengers, and is the primary mode of public transport. *Songtaews* exist in large numbers and greatly add to the levels of traffic congestion in the municipality.

Public transport has a number of benefits from the viewpoint of patrons, for instance: (i) door-to-door service by red *songtaews* limits the need of passengers to access bus stops; (ii) dense service among many corridors provides high levels of accessibility and short waiting time for passengers; and (iii) due to the high number of transfer points in the city, wide ranges of available travel destinations are accessible. Prior attempts to regulate them into fixed routes and schedules/standard service were resisted by the powerful *songtaew* cooperatives and the unwillingness of most *songtaew* drivers to cooperate as the perception is that any change (be it operational, institutional, and/or regulatory) would reduce profits.

## **2.3 Issues and Proposed Improvement Measures**

The Study Team assessed public transport situation in Chiang Mai, both from an operations and institutional/regulatory perspective, by reviewing previous reports, interviewing relevant individuals, conducting interview surveys of public transport passengers and operators, and then proposed recommendations and strategies for public transport development. In this section, proposed improvement measures will be briefly touched on, although it is noted that these recommendations are short-term measures and only a part of comprehensive measures proposed in the study.

### *Level of Service for Riders*

To deal with poor service provision in the city center (in terms of inadequate service coverage, relatively slow vehicle speeds, highly variable travel and arrival times, and the lack of a fixed schedule), the following initiatives were recommended: (i) conducting comprehensive passenger demand and service quality surveys; (ii) implementing a fixed route network and rationalizing the existing *songtaew* route network; (iii) implementing a fixed schedule; and (iv) introducing minibuses on major corridors and trunk routes with *songtaews* providing a feeder service. As one of the most important operational recommendations, introducing minibuses would be a means of improving service quality, improving the image of public transport in Chiang Mai, improving the vehicle fleet and lessening the impact on the environment, and serving as the harbinger and impetus for potential future initiatives.

### *Municipal Transport Authority*

In Chiang Mai Municipality, there is no single entity responsible for the whole of public transport and this has caused a fragmented approach to transport in Chiang Mai and hindered progress in public transport. As public transport is both an urban and regional issue, the oversight department that has the decision-making, enforcement, and regulatory authority of public transport should be housed at the municipal level. Creating this organization would involve the assembly of all of the relevant actors in one department, which would enable more streamlined decision-making. Building technical and human resource capacity is also critical to the success of any operational or institutional improvement.

### *Public Participation in Public Transport Process*

One opinion that appears to have been somewhat absent from the discussion of the future of public transport is that of the general public. Involving interested, competent, and prominent members from the public and business community in the entire discussion of the future of transport in Chiang Mai and giving them a voice are critical to its success. Working groups bringing together the various stakeholders including officials from the organization in charge of public transport; operators including *songtaews*, minibuses, and tuk-tuks; general public, both users and non-users of public transport; business leaders; and any relevant non-governmental organizations (NGOs) could be created to discuss various proposals and monitor the results in order to move transport development in a sustainable future direction.

### *Competition and Service Regulations*

Without input from the government, Chiang Mai's public transport offerings grew despite the lack of regulations and guidelines, and subsequently have created an urban public transport system that operates independently, deriving its network and service quality from individual operator choices. Private operators are capable of providing affordable urban public transport, however, service quality does not meet a minimum level of quality and there is an oversupply leading to low profitability. By moving to concessions, the service levels can be impacted tremendously because competition for the market will occur. This will also entail the creation of a tendering process and regulations for potential bidders. Within a contract for a specific route or area, the government can set minimum baseline requirements for the level of service, assuming that certain aspects of the service vary between services. These requirements could include items such as a corporate structure for organizations bidding on the concession, operating hours, and maximum number of vehicles per route.

### *Songtaew Cooperative*

The majority of the public transport system in Chiang Mai is currently organized to encourage independent owners and operators. Even though drivers are somewhat regulated (licenses, vehicle registration), they are still encouraged to operate independently and there are no oversight. This leads to a number of issues including: (i) an unsustainable level of traffic congestion; (ii) high levels of service duplication; (iii) low revenues; and (iv) a lack of quality of service. In order to completely implement recommendations such as feeder services, fixed routes, etc., cooperative management must take a more active role in daily operations and enforce the changes that will take place. They need to create an atmosphere that encourages adherence to government regulations, where high competition against other drivers is not necessary to generate revenues, and where service quality and level of service are a central focus.

One potential measure is to disband cooperatives and create companies. The new companies would oversee daily operations, be fully responsible for the actions of its drivers, and take a

more formal approach to the provision of public transport. This could entail some if not all of the following changes to the current cooperative operation: (i) increased administrative responsibilities; (ii) addition of a management/organization structure to oversee the company; (iii) creation of contracts with drivers that outline responsibilities; (iv) creation of driver schedules, and operating hours; (v) standardization of maintenance; (vi) fare standardization and some method to verify this; and (vii) creation of customer service mechanisms.

## 2.4 Summary of the 2003 Study

Urban public transport in Chiang Mai has been developed from the bottom up, which has provided employment opportunities for individuals and has met people's preferences for door-to-door transport services through its rudimentary route system. However, it has also created an environment with too many vehicles on city streets acting independently, causing congestion and led to the formation of a transport network, which does not meet the needs of the developing city.

Because the central government has implemented new policies that focus on making Chiang Mai an international hub and tourism city, a safe, user-friendly, and high service quality public transport need to be developed for the future. In order to develop urban transport in Chiang Mai, closer coordination and cooperation among various stakeholders, particularly between the government and existing operators and drivers, are essential

## 3. CASE STUDY OF BATAM (INDONESIA)

### 3.1 Background and Objectives of the Study

Batam is one of the largest islands of Indonesia's Riau Archipelago and lies 20 km southeast of Singapore. The area of Batam is 415 km<sup>2</sup>. The Government of Indonesia has strategically developed the island, with an emphasis on industry, trade, tourism, and transshipment. Batam is also a major weekend getaway destination for Singaporeans and a major recipient of foreign/private investment for its industries. Economic growth has been strong in recent years, leading to increased population and vehicle growth and placing a strain on the existing transport infrastructure and services. Moreover, formal public transport in Batam was relatively poor, with low frequencies, and lack of operating schedules and timetables as of March 2005. Most public transport users in Batam depend heavily on illegal operators, which gives those operators a sense of legitimacy.



Figure 2 Map of Indonesia and Batam

The ultimate objective of this study was to formulate an island-wide Bus Transport Development Strategy to enable sustainable and efficient public transport in the future, integrating the island's plan for the so-called Bus Pilot Project (BPP) to introduce higher service levels. A Study Team in Japan (STJ) and Study Team in Batam (STB) were formed and

this study was undertaken in partnership with the both teams. This paper only details aspects relevant to the BPP.

### 3.2 Bus Pilot Project (BPP) in Batam

Supported by the Central Government and Batam Local Authority (BLA) and to be operated on a single pilot corridor from Sekupang (on the northeast part of the island) to Batam Center (one of the major downtown areas and economic centers), the BPP will bring an entirely new concept in service and quality to public transport services in Batam, with scheduled, frequent, and punctual service in large comfortable vehicles that only stop at regulated bus stops along a fixed route.



Figure 3 Initial BPP Route and Future Network

The Central Government and BLA envision that successful implementation of the BPP will: (i) lead to improved perception of bus transportation and an increasing public transport mode share on the island; (ii) provide the impetus for extending this system; and (iii) provide the impetus for systematizing all public transport on the island under the auspices of a single organization that can coordinate routes, schedules, operating policies, and fares.

### 3.3 Issues and Recommendations for the Bus Pilot Project

STJ assessed the current transport situation in Batam by reviewing previous reports and studies that had been conducted. Information on the transport situation and the BPP was also gathered through field surveys and interviews with government officials, public transport providers, and local transport institutions in Batam. STJ also undertook a questionnaire survey of over 400 people. Based on the results of the study, STJ proposed recommendations and strategies for the BPP. This section particularly focuses on major short-term recommendations, although STJ proposed other comprehensive recommendations for the BPP in the study, such as a) safety and training, b) passenger information, and c) fare and ticketing system.

#### 3.3.1 Network and Operation

Infrastructure for the BPP corridor was nearly complete and ready for its mid-2005 unveiling. Network and operating characteristics for the BPP had yet to be finalized, including: (i) scheduling; (ii) a feeder route for Tiban; (iii) fares; (iv) ticketing systems; (v) integration with existing network and routes; and (vi) maintenance. The Batam Industrial Development Authority (BIDA) is responsible for planning and managing land development on the island. As such, the aspirations of the Land Transport Authority (LTA) – an authority under BIDA – to build bus stops on the island are subject to BIDA approval for the provision of land for construction. As of March 2005, the planned BPP route did not directly serve ferry terminals at Sekupang and Batam Center, as BIDA did not permit LTA to place bus stops inside the

seaports. As such, planned BPP stops were some distance away and extremely inconvenient for ferry riders.

#### *Route Network*

Coordination among relevant organizations to secure space inside Sekupang and Batam Center ports and obtaining agreement from BIDA to permit placement are required. LTA and the operators must come to an agreement with BIDA to assure the placement of infrastructure within these facilities as well as the right of entry to these vehicles. STJ recommended that a formalized, written agreement (possibly a mayoral decree) be concluded among these key stakeholders. STJ proposed the following process: (i) delineate space needs and long-term benefits; (ii) create schematics of possible stop options; and (iii) seek compromise and consensus.

#### *Maintenance*

Drivers are required to conduct cursory inspections of vehicles both before and after shift as a preventative maintenance. An easy first step to improve preventative maintenance and unnecessary field breakdowns is to require drivers at the beginning and end of their shifts to inspect vehicles and their vital operating components. BPP drivers should be required to fill out a checklist prior to their departure for the day and when they arrive back to the depot to identify potential problems.

#### *Infrastructure*

Problematic junctions should be found and improved. STJ recommended that traffic engineering specialists for LTA be deployed along major routes to identify key capacity constraints such as: (i) inadequate timed signals; (ii) lack of signals; (iii) inadequate geometric configuration at intersections; and (iv) lack of dedicated turning lanes.

#### *Operations*

Proposed operations and scheduling need to be revised to maintain spare buses and distribute mileage evenly across the vehicle fleet. Though an operational schedule had been proposed by the BPP project team, the following modifications were suggested: (i) keeping one or at most two buses in the depots as spare buses throughout the day for contingency purposes; (ii) rotating the buses serving as the spares each day to more evenly distribute mileage among the fleet and to prevent overuse of certain vehicles; and (iii) scheduling for potential lag time for connections with the Tiban feeder route.

### 3.3.2 Organization and Regulation

Ministerial Decree #64 (2004) created the basis for the bus pilot project and Mayoral Decree #162 (2004) authorized the creation of a special team to propose the BPP. The project team consists of the Mayor, BLA, LTA, public transport operators, and consultants. The team did not involve the BIDA or the police. As of March 2005, they had identified the route, secured funding for the buses and operations, and started constructing bus stops, but had not yet identified or created an operating organization.

#### *BPP Organization*

Metrics and evaluation criteria need to be identified. The BPP project team must outline clear scope, roles, and responsibilities for BPP operational organization. At the same time, the team must identify evaluation criteria against which the successes or failures of BPP can be measured. This is critical for two reasons. First, along the project timeline, having these criteria

will enable the team to determine how the project is progressing and make changes if necessary. Second, a record of accomplishments (e.g. increase in ridership, revenues, decrease in illegal operations) will present a better picture to future private investors.

#### *Transport Related Organization*

Form a committee focusing on integration and coordination issues among key operators, LTA, and BIDA. Pertaining to placement of bus stops, other infrastructural provision, and enforcement, it is important that consensus be reached among operators and relevant entities and organizations, especially LTA, BIDA, and the police. In regards to the BPP, coordination among LTA, BIDA, and the police is essential to place bus stops in ferry terminals and to effectively enforce regulations.

#### *Regulations*

Regarding the number of bus company employees, STJ proposed to set average proportions of drivers to vehicles, maintenance workers to vehicles to some extent. Bus operators should also secure rest areas for drivers during peak period. These provisions aim to assist organizational operations of the BPP, as they need to hire suitable drivers. It will also provide insight for future contracts with private operators.

### **3.4 Summary of the 2004 Study**

At the conclusion of the study, the study teams held a seminar in Batam. The seminar participants included the BIDA, BLA, police, Government of Riau Province, public transport operators, as well as the Ministry of Communications. The seminar was a valuable opportunity for relevant organizations and entities including BIDA and the police to exchange opinions on future public bus services and share problems and perspectives on how to effectively promote future public transport development in Batam. Attendees confirmed the importance of formulating better regulations and enforcing them, improving the passenger level of service, and especially improving the services of legal buses to develop a better public transport in Batam.

In this study, STJ detailed several recommendations and strategies to improve the level of services for the BPP so that riders will choose BPP buses and legal public transport operators over illegal operators. One major point of emphasis is the need for BPP access to the ports. This means that the BPP project team should endeavor to place bus stops within such facilities, to improve mobility and accessibility. As maintenance is always an important issue, the project team should establish firm maintenance and upkeep procedures prior to service initiation. Organizational, regulatory, and institutional problems, however, are relatively more difficult to solve than the technical ones. Such issues require close cooperation and arrangements among related organizations and entities, as well as inclusion of all major players.

## **4. CASE STUDY OF SIEM REAP (CAMBODIA)**

### **4.1 Background and Objectives of the Study**

The Kingdom of Cambodia borders on Thailand, Laos, and Vietnam, and Siem Reap lies approximately 240 kilometers northwest of Phnom Penh, the capital of Cambodia. Siem Reap Province is divided into 12 Districts, 100 Communes, and 875 villages. The area of Siem Reap Province is 10,299 km<sup>2</sup> with a population of 732,000 in 2003. The population of Siem Reap District was 123,000 as of 2004 and approximately 70,000 people - 60 % of the district's



population - are concentrated in the urban area.

Major industries of the province include tourism, agriculture, forestry and fishing. Siem Reap is home to the Angkor Archaeological Park (AAP), a World Heritage site, and since its establishment the city has seen a growing number of tourists each year. In Siem Reap, the development of a safe and user-friendly form of urban public transport is crucial in order to promote the sustainable development of Siem Reap as a more competitive city for tourism. As traffic congestion is generated by commuter traffic, the reduction of traffic congestion and preservation of the urban environment of Siem Reap are recognized as top priorities in the development of Siem Reap's urban area.



Figure 4 Map of Cambodia and Siem Reap

With consideration to the aforementioned priorities, the main objective of the study was to propose environmentally-friendly strategies for the development of urban public transport in Siem Reap. The focus area of the study was the central area of Siem Reap including routes between the city center and the Angkor Archaeological Park (AAP).

#### 4.2 Urban Transport in Siem Reap

As in other cities in Cambodia, urban public transport, such as bus and rail transport, does not exist in Siem Reap and characteristics of traffic patterns completely differ between local citizens and tourists. The main transport modes for citizens are motorcycles, passenger cars, motorcycle taxis, share-ride pick-up trucks, and bicycles, while tourists tend to use motor coaches and minivans operated by tourism agencies, in addition to taxis, motorcycle taxis, bicycle rentals, and tuk-tuks.

Owing to the growth of the tourism industry, traffic volume in Siem Reap has been rapidly increasing for the last decade, and is concentrated on specific routes and the city center. Although the current traffic congestion in Siem Reap is not severe compared to Phnom Penh and other ASEAN metropolitan areas, traffic congestion is becoming a serious problem and there are many potential factors that could worsen it in the near future, such as the growing local population, increasing numbers of tourists, and higher levels of motorcycle ownership. It is most likely that traffic accidents and traffic-related pollution, such as air, noise and vibration, will become more serious, and even local citizens will come to recognize them as major social ills. Road infrastructure in Siem Reap is also still insufficient. There are unpaved roads, though road infrastructure has been rapidly improved with the assistance of international donors.

These issues have already lessened the attractiveness of Siem Reap as a major city of tourism. It might also be concluded that the traffic problem facing Siem Reap make urban and tourism development unsustainable in the near future if countermeasures are not proactively

implemented.

### **4.3 Recommendations for the Future Urban Public Transport in Siem Reap**

The study was undertaken in partnership with the Cambodian Ministry of Public Works and Transport (MPWT), and the study team outlined a number of strategies for the development of urban public transport in Siem Reap. Some of the major recommendations among proposed strategies are shown below.

#### **4.3.1 Development of a New Urban Transport System**

Limited availability of well-organized urban public transport and insufficient traffic regulations and enforcement encourage the use of private vehicles including bicycles and motorcycles. In addition, for those who cannot take bicycles or motorcycles, the absence of user-friendly public transport has a negative impact from the viewpoint of poverty reduction. In order to realize the sustainable development of Siem Reap, the introduction of the urban public bus, along with infrastructure development, strengthening institutions and improving regulations, is considered to be one of the most practical and sustainable measures to tackle the transport-related issues mentioned above from a long-term perspective.

The Study Team proposed long-term strategies aiming at the further development of tourism sector and sustainable development of Siem Reap as a international city of tourism through the development of well-organized and user-friendly urban public bus which will eventually lead to a decrease in traffic congestion, improvements in traffic safety, and conservation of the urban environment. As understood in the transport context in Japan, the urban public bus is a share-ride transport mode by an automobile, which is intended to carry numerous persons with specified routes and time schedules. Because motorcycle taxis, share-ride pick-up trucks, and tuk-tuks in Siem Reap are not considered as urban public buses according to this way of thinking, of the need to develop a new public transport system in Siem Reap is significant.

#### **4.3.2 Approaches to Introducing Urban Public Bus Services in Siem Reap**

The Study Team summarized approaches to introducing urban public bus services in Siem Reap as follow.

##### *Development of Operational Plans*

Operational plans identifying potential bus routes need to be developed. Based on an analysis of traffic characteristics of local citizens and tourists in Siem Reap, the Study Team identified seven potential bus routes: 1) three routes targeting local citizen; 2) two routes targeting tourists; and 3) three routes targeting both local citizen and tourists as shown in Figure 5. Among the seven potential routes, the Study Team selected two routes as the most prioritized routes: 1) Puok – Siem Reap; and 2) Prasat Bakong – Siem Reap, based on the following aspects: 1) Relatively long routes on trunk roads which have sufficient potential demand because of advantages against motorcycle taxis and bicycles regarding travel speed, fare, and comfort; 2) Routes which have space to develop bus-related facilities; 3) Routes which could secure means of transport for a poverty group having their residence in suburban areas of Siem Reap.

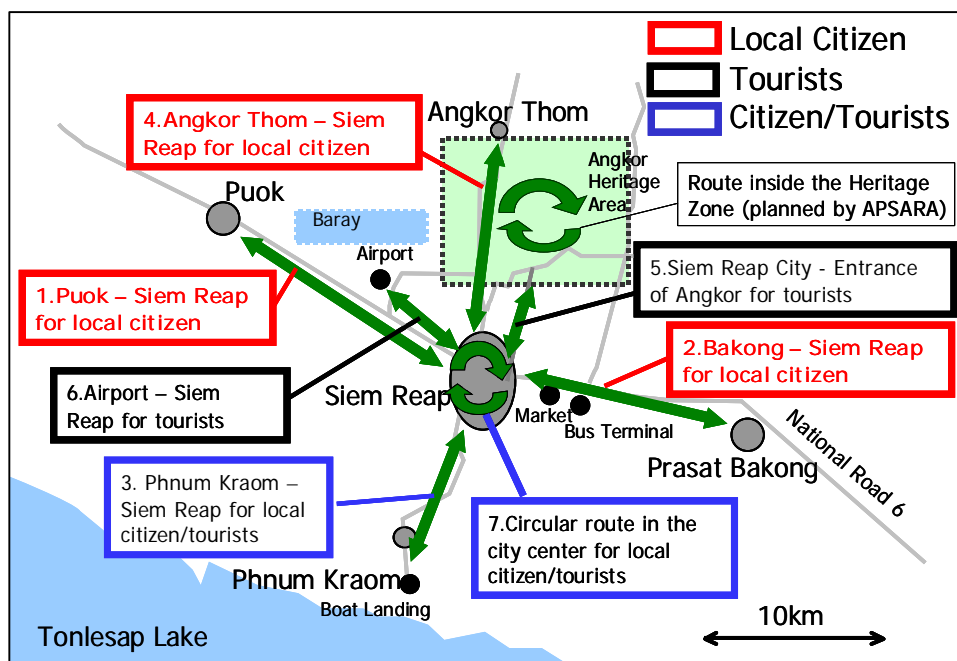


Figure 5 Identified Potential Bus Routes

#### *Raising Funds and Procuring Vehicles*

There are several other sectors such as water and sewerage, electric power, and rural development that need funding for the sustained growth of Siem Reap and sufficient subsidies are not expected put towards the urban transport sector. Therefore a few significant issues exist in order to initiate bus services such as how to procure inexpensive vehicles and how to raise funds for operation. This is a major issue in other countries as well considering many bus operators in cities worldwide do not make enough profit by freight revenue alone. In these circumstances, the utilization of secondhand and idle vehicles, advertisement revenue and profits from real estate could be effective measures. Public-private partnerships and mobilization of private resources also need to be examined.

#### *Infrastructure Development for Bus Operations*

The following facilities and infrastructure need to be developed prior to the introduction of public bus services: 1) roads along bus routes - parts of existing roads in Siem Reap still remain unpaved even on major trunk roads which lower the travel speed of vehicles; 2) bus terminals and stations with parking areas for bicycles and motorcycles so that passengers can take their vehicles to a designated location, park, then ride the bus between terminals/stations and their places of work; 3) bicycle paths to separate traffic by bicycles and motorcycles from buses and passenger cars in order to increase travel speed of vehicles and decrease number of traffic accidents; and 4) bus depots and maintenance facilities.

#### *Establishment of an Institutional Structure*

With regards to transport-related institutions, the most important measure is to clarify responsibilities of each organization such as the national government, the local government, the police, and operators. The national government needs to develop laws and regulations specific to bus services. The local government needs to develop infrastructure and bus-related facilities but should also tackle strengthening coordination among relevant entities, capacity building of local governmental officials, and improving the cooperation of various stakeholders.

### *Measures to Promote the Utilization of Public Transport*

The following measures and activities are necessary to promote the utilization of public transport in Siem Reap: 1) set and adequate and competitive fares compared to the fares of other transport modes; 2) establish parking restrictions for motorcycles and passenger vehicles and collect parking fees in the central part of the city; 3) conduct training for bus drivers, maintenance staff, and operation managers; and 4) conduct effective public relations activities.

### *Coordination with Motorcycle Taxi Drivers*

Coordination with motorcycle taxi drivers is essential and significant to effectively introduce urban public bus services in Siem Reap. Motorcycle taxis could be utilized on feeder routes, such as between bus stops and offices, schools, hospitals, and homes. Sufficient involvement, discussion and coordination with motorcycle taxi drivers through sharing problems and perspectives would be indispensable at early stage prior to the development of the new urban transport services in Siem Reap.

### *Action Plan*

Step by step proceedings are required to start up the urban public bus and continually operate bus services: 1) planning phase including develop operational plans, financial plans, and development plans of infrastructure and facilities; 2) development phase including raising funds, finding operators, vehicle procurement, development of bus stops, depots, and maintenance facilities; 3) introduction of urban public bus; and 4) operation phase including measures promoting public bus, maintenance, and monitoring and evaluation.

There are various preparation activities at each phase however as described above, it is now at a start point of the first stage. Action can be taken by; 1) gathering materials and data, and sharing existing and prospective problems and perspectives among relevant entities, organizations, and stakeholders; 2) securing financial and human resources through consensus among relevant organizations; and 3) coordinating with other sectors such as water and sewerage, electricity, and rural development.

## **4.4 Summary of the 2006 Study**

The Study Team held a seminar in Siem Reap to outline the strategies, facilitate the exchange of opinions among relevant entities, and effectively promote the future public transport development by enabling participants to share problems and perspectives in Siem Reap. Both the Japanese and Cambodian sides made presentations on urban transport and bus services for future environmentally-friendly urban transport in Siem Reap.

The seminar had enormous significance in that attendees confirmed the importance of developing better urban transport in Siem Reap for the future. It was particularly recognized at the seminar that the urban public bus needs to be developed so as to secure means of transport for low income groups who reside in suburban areas of Siem Reap, and a sufficient discussion and coordination would be indispensable prior to its development. It also became clear that there are various issues with regards to urban transport in Siem Reap, such as traffic congestion, traffic accidents, urban environmental deterioration, budget restrictions, and insufficient enforcement of regulations.

## 5. SUMMARY OF THE THREE STUDIES

Table 1 provides a brief summary of the three cities where studies were conducted within the Urban Public Transport Policy Framework (UPTPF).

Table 1 Brief Summary of the Three Cities

	<b>Chiang Mai</b>	<b>Batam</b>	<b>Siem Reap</b>
<b>Characteristics of the city</b>	<ul style="list-style-type: none"> <li>- Located in northwest Thailand and a major center of regional economy, public administration, education, communications, and transport.</li> <li>- One of the premier tourist destinations in Thailand (hosted 3.3 million foreign tourists in 2000).</li> </ul>	<ul style="list-style-type: none"> <li>- One of the largest islands of Indonesia's Riau Archipelago and lies 20 km southeast of Singapore.</li> <li>- Has been strategically developed with an emphasis on industry, trade, tourism, and transshipment.</li> <li>- Major weekend getaway destination for Singaporeans and a major recipient of foreign/private investment for its industries.</li> </ul>	<ul style="list-style-type: none"> <li>- Lies approximately 240 kilometers northwest of Phnom Penh.</li> <li>- Major industries include tourism, agriculture, forestry and fishing.</li> <li>- Siem Reap is home to the Angkor Archaeological Park (AAP), a World Heritage site.</li> </ul>
<b>Social Economy</b>	<ul style="list-style-type: none"> <li>- Area of Chiang Mai Metropolitan is 430 km<sup>2</sup> and population is approximately 615,600 people as of 2003</li> <li>- Municipal Area is 40 km<sup>2</sup> and population is 178,100 as of 2003</li> <li>- Average family income is 3,384 USD as of 2003</li> </ul>	<ul style="list-style-type: none"> <li>- Area is 415 km<sup>2</sup> and contains a population of 562,000 as of 2003</li> <li>- Income per capita is 1,858 USD as of 2003</li> </ul>	<ul style="list-style-type: none"> <li>- The area of Siem Reap Province is 10,299 km<sup>2</sup> with a population of 732,000 in 2003.</li> <li>- The population of Siem Reap District was 123,000 as of 2004 and 60 % of the district's population are concentrated in the urban area.</li> </ul>
<b>Characteristics and Issues of Urban Transport</b>	<ul style="list-style-type: none"> <li>- Traffic congestion, traffic speed, urban environment are worsening.</li> <li>- Dense urban area prevents the construction of new roads as well as the widening of existing ones.</li> <li>- Urban public transport in the city is provided mainly by <i>songtaews</i>, minibuses, and larger buses.</li> <li>- Para-transit without schedules and routes, and providing door-to-door service.</li> <li>- <i>Songtaews</i> increase traffic congestion.</li> <li>- Difficult coordination with <i>songtaew</i> cooperatives.</li> </ul>	<ul style="list-style-type: none"> <li>- Existing public transport modes are bus and minivans with fixed routes.</li> <li>- Formal public transport was relatively poor, with low frequencies, and lack of operating schedules and timetables.</li> <li>- Most public transport users depend heavily on illegal operators such as taxis using sedan, minibus, and motorcycle taxis.</li> <li>- Had a plan to start up the Bus Pilot Project.</li> </ul>	<ul style="list-style-type: none"> <li>- Traffic congestion is generated by commuters and tourists.</li> <li>- Characteristics of traffic patterns completely differ between local citizen and tourists.</li> <li>- Urban public transport, such as bus and rail transport, does not exist.</li> <li>- Main transport modes for citizens are motorcycles, passenger cars, motorcycle taxis, share-ride pickup trucks, and bicycles, while tourists tend to use motor coaches and minivans operated by tourism agencies, in addition to taxis, motorcycle taxis, bicycle rentals, and tuk-tuks.</li> <li>- Traffic volume is concentrated on specific routes and the city center.</li> <li>- Road infrastructure is also still insufficient.</li> </ul>

At the conclusion of each study, the Study Team held a seminar. Although existing transport operators and drivers often gave opposing opinions at the seminars, they were valuable opportunities for a wide range of attendees to share problems and perspectives, and exchange views on future public bus services. Table 2 provides an overview of major points of contention at the seminars.

Table 2 Major Points of Contention at the Seminars

<b>Chiang Mai</b>	<b>Batam</b>	<b>Siem Reap</b>
Although measures such as regulating paratransit into fixed routes and schedules / standard service were resisted by the powerful <i>songtaew</i> cooperatives and drivers, valuable feedback was received from stakeholders with diverse opinions	Some adverse opinions were stated, however it was confirmed that close cooperation and interaction among relevant organizations and entities, as well as inclusion of all major players, are required. Attendees confirmed the importance of formulating better regulations and enforcing them, improving the levels of passenger services, and especially improving the services of legal buses for sustainable development of the city.	Attendees confirmed the importance of developing better urban transport for the future from a long-term standpoint. It was particularly recognized that the urban public bus services need to be developed so as to secure a means of transport for low income groups who reside in suburban areas of Siem Reap, and sufficient discussion and coordination would be indispensable prior to their development (though some adverse opinions were voiced by existing transport operators)

Traffic-related situations and problems, issues for the future, development strategies, and other characteristics vary according to the circumstances of cities worldwide. For instance, variables may include major industries (tourism, industry, and/or economy), existing transport modes, and maturation stages of public transport as well as a scale of cities, population, and economic level. Therefore, measures and policies need to be specific to respond to the urban situation in each city and some of them differ even though the cities fall within the same country.

There are, however, also similar issues, which could lead to many valuable lessons for sustainable development and management of urban public transport as follows:

- Consensus building among relevant organizations and entities, in some situations, including various stakeholders such as operators, industry associations, local citizen, etc.
- Strengthening institutions and human resource development;
- Measures against paratransit such as clarification and sharing of roles, and strengthening regulation and enforcement;
- Coordination and cooperation with other transport modes;
- Enhance level of service quality of public transport;
- Develop maintenance facilities and proper maintenance of vehicles; and
- Discussing measures and policies from a long term standpoint.

Although organizational, regulatory and institutional issues are relatively more difficult to tackle than the technical ones, close coordination and arrangements among relevant organizations, entities, and stakeholders are essential in order to develop sustainable urban transport, which would be applicable to many cities. And confirmation of existing and an exchange of visions for the future are crucial to achieve this. These are, however, recognized as important matters, at the same time, very sensitive and severe challenges. Therefore, it would be beneficial to review issues, measures, and policies in various cities and share knowledge and lessons learned from them.

Through the studies it was observed that international consultants could play a coordinating role between various entities and organizations and in some cases mediate between different political commitments and standpoints. For a study with limited study duration and budget this was an intriguing revelation. Reports developed in the study could be utilized to share issues and visions, and lead to creation of opportunities for local relevant organizations and stakeholders to enter into discussion.

## **6. CONCLUSION**

The studies conducted in Chiang Mai, Batam, and Siem Reap are part of a larger set of projects that have been conducting in several regional ASEAN cities within the Urban Public Transport Policy Framework (UPTPF). This paper briefly summarized the results from the studies conducted over the past few years and outlined a number of lessons learned.

Many cities including not only capital cities and major metropolitan areas but also regional cities have experienced or will experience similar and different transport problems, issues and its measures. The outline and results of the studies undertaken in Chiang Mai, Batam, and Siem Reap can be also valuable for other cities. It would be beneficial to review those issues, measures, and policies in various cities and share the knowledge and lessons learned from them among relevant organizations. Opportunities for relevant organizations and entities to share such information and knowledge and exchange opinions are valuable for sustainable development of each city. In this regard, the focus should be to share them among not only transport organizations in a region, but also regions and countries, not only central government officials but also regional government officials, engineers, and consultants. It would be also necessary to establish a scheme for continuing cooperation and support during the studies as well as after to assist in their implementation and assessment.

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