Implementing Road and Congestion Pricing
-- Lessons From Singapore --

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Presentation Outline

- Singapore’s Statistics
- Challenges Faced by Singapore
- Strategies on Land Transport
- Electronic Road Pricing
- The Next Step
- Lessons Learnt
Area Licensing Scheme (ALS)

- ALS operated during morning peak period initially. Extended to evening peak in 1989, and whole-day in 1994.

Operating Hours of ALS

<table>
<thead>
<tr>
<th></th>
<th>Whole-Day licence (Peak &amp; Off-Peak hrs)</th>
<th>Part-Day (Off-Peak hrs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mon to Fri</td>
<td>7:30am to 6:30pm</td>
<td>10:15am to 4:30pm</td>
</tr>
<tr>
<td>Sat &amp; Eves of major Public Holidays</td>
<td>7:30am to 2:00pm</td>
<td>10:15am to 2:00pm</td>
</tr>
</tbody>
</table>
Components of ERP System

- In-vehicle Unit (IU) and the CashCard
- Equipment on the ERP gantry
- Central Computer System
Types of IUs

- Different types for different categories of vehicles - allow different road pricing charges for different categories.
Simple for Motorists

- At start of journey, insert CashCard into the IU. This initiates a checking process to ascertain that the IU and CashCard are working.
- On going through the ERP gantries, a deduction is made and balance displayed.
- At end of journey, remove CashCard.
Gantry Equipment

- Antennae
Gantry Equipment

- Antennae
- Vehicle Detectors
Gantry Equipment

- Antennae
- Vehicle Detectors
- Enforcement Cameras
The Control Centre

- 24-hour operations to ensure that all the ERP gantries are working properly
- Monitoring of all equipment
- Processing of financial transactions
- Processing of violation images
How Does It Work?

- Comms. Controller
- AVID Controller
  - Antenna Controller
  - ECS Site Controller
  - Detector Controller
  - Antenna Controller
How Does It Work?

Comms. Controller

AVID Controller

Antenna Controller
ECS Site Controller
Detector Controller
Antenna Controller
Concept Plan 1991 and 2001
Urban Redevelopment Authority provide public housing for the population

Ministry of National Development

Land Transport Authority (LTA) land transport planning and development

Housing & Development Board (HDB) provide public housing for the population

Urban Redevelopment Authority (URA) overall urban planning

Ministry of Trade & Industry

Jurong Town Corporation (JTC) industrial developer
Road Master Plan
Rail Master Plan

Legend:
- High Capacity
- Medium Capacity
- Low Capacity
- Sub regional Centre
- Regional Centre

Length: > 500 km
Mass Rapid Transit (MRT)

North-South Line
East-West Line

Length - 67 km
Stations - 42
Woodlands Extension

Length: 16 km
Stations: 6
Changi Airport Extension

Length - 6 km
Stations - 2
Changi Airport Extension

- 6 km, 2 stations
- Opened in 2001
North East Line (NEL)

Length - 20 km
Stations - 14
North East Line (NEL)

- Provides the north-east corridor with a direct rail link to the city
- Interchanges at Dhoby Ghaut and Outram Park MRT Stations
- 20km, 16 stations; fully underground
- $5 billion
- Opened in Jun 2003
Bukit Panjang LRT

- 8 km, 14 stations
- Opened in 1999
Sengkang LRT

- 11km, 14 stations
- Integrated with Sengkang MRT station
- East Loop Opened (Jan 2003)
- Fully-automated system
Punggol LRT

• 10km, 15 stations
• Integrated with Punggol MRT station
• Opening Year - 2005
• Fully-automated system
Circle Line (CCL)

- 33 km
- 29 stations
- 6 interchanges
- $6.7 billion
- 5 Phases

Suntec City  HarbourFront  Bishan  Paya Lebar  Serangoon
Integrated Development

ONE GIANT INTERCHANGE

The Dhoby Ghaut interchange, with five underground levels, will be the biggest station in the MRT network. C. CHANDRAS and LIM YONG bring you details of the $265-million station complex, which will have more than 20,000 people going through it in an hour during peak periods.

Model Use
Two towers of 10 storeys and seven storeys for retail and office space are included in the development at the station in the Land Transport Authority’s urban model for the better integration of land use, town and transport planning.

Straits Times 17 Oct ‘02

North-East Line
North-South Line
Circle Line
Integrated Development

New Station (North-East Line)

Orchard Road

Existing Station (North-South Line)

Circle Line

Travellators link North-East Line to North-South Line

Two 55-m travelling elevators
Boon Lay Extension (BLE)

- About 4 km
- Serves Jurong region
Criteria for Rail Development

Economic viability
Benefits > Costs

Financial viability
Revenue > Op. Costs
Government pays:

- Physical Infrastructure
- First Set of Operating Assets
- Inflationary Cost of Next Set of Operating Assets

No Subsidy on Direct Operating Cost
## Bus Services

<table>
<thead>
<tr>
<th></th>
<th>2002</th>
<th>2003</th>
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<tbody>
<tr>
<td><strong>Bus Interchanges</strong></td>
<td>22</td>
<td>22</td>
</tr>
<tr>
<td><strong>Bus Terminals</strong></td>
<td>21</td>
<td>18</td>
</tr>
<tr>
<td><strong>Bus Stops</strong></td>
<td>4,509</td>
<td>4,397</td>
</tr>
<tr>
<td><strong>Bus Fleet (Average)</strong></td>
<td>3,414</td>
<td>3,211</td>
</tr>
<tr>
<td><strong>Bus Routes (Nos.)</strong></td>
<td>265</td>
<td>261</td>
</tr>
</tbody>
</table>
Singapore Underground Road System (SURS)
Kallang / Paya Lebar Expressway

- Serve the north-east corridor
- Direct access into city area
Kallang / Paya Lebar Expressway

- 12km (9km underground)
- dual 3-lane & dual 4-lane
- cost S$1.6 billion
- Expected completion by 2006
Expressway Monitoring and Advisory System (EMAS)
Off-Peak Car Scheme (OPC)

- One measure introduced in tandem with road pricing.
- Started as Weekend Car Scheme in 1991 but replaced with OPC in 1994.
- Offers motorists the option to own cars at lower cost if use sparingly.
- A blunt tool that does not target specific time / place of congestion.