Singapore’s Approach to Developing a Sustainable, Integrated Transport System

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Overview

- Introduction
- Current Achievements
- Governance Framework
- Policy & Financing Framework
- Holistic & Integrated Approach
- Sustainable Strategies
- Notable Initiatives
- Conclusion
SINGAPORE

- Land Area: 699 km²
- Population: 4.5 mil
- Pop Density: 6200/ km²
- Labour Force: 2.4 mil
- Per Capital GDP: $45,000 (~US$30,000)
Singapore in 1970
Singapore Today

A First World City – Vibrant, Efficient, Safe, Clean, Green and Liveable
Roads/Vehicles

Road Network - 3,200 km (8500 lane-km)
Expressway Network - 150 km
Vehicle Population - 799,000
Car Population - 465,000 (~60%)
Cars/1000 residents - 117
Growing Travel Demand

- 1980:
  - Vehicle: 0.37m
  - Population: 2.4m
  - Trips: 2.7m/day

- 2005:
  - Vehicle: 4.4m
  - Population: 0.75m
  - Trips: 8.4m/day

增加的旅行需求
Smooth Flowing Roads
> 95% of expressways and major arterial roads during peaks are congestion-free (KPI 1)

Average speed within city centre during AM Peak

Source: World Cities Research, 2005
High-Quality Public Transport

Rail total: 138 km, 110 stations (>30% underground)

MRT: 109 km, 67 stations
LRT: 29 km, 43 stations

Total PT Trips = 5.2 m/day

1.4 m trips/day
2.8 m trips/day
0.99 m trips/day

Buses: 280 routes, 3400 buses, > 3600 route-km
Taxis: 23,000
Efficient Public Transport

>85% journeys on mass public transport take < 45 min during the A.M. Peak (KPI 2)

Journey Time Distribution on a Typical Weekday (Morning Peak)

% of Public Transport Journeys

- 85% of journeys completed in <45min
- More than 90% of journeys completed within an hour

85% of journeys completed in <45min

(Cumulative % of Public Transport Journeys)
Affordable Public Transport Fares
- Without Direct Operating Subsidies

- Bus/Train Fares among the lowest in the world

![Bar chart comparing fares in Singapore, Hong Kong, London, and New York for MRT and Bus services in 1995 (95) and 2004 (04).]
High PT Mode Share

AM Peak
- Public Transport: Bus, MRT, Taxi, Co Bus
  - 37%
- Private Transport: Cars, Motorcycle
  - 63%

Whole Day
- Public Transport: Bus, MRT, Taxi, Co Bus
  - 42%
- Private Transport: Cars, Motorcycle
  - 58%

Source: HIS 2004
Clean Environment

Pollutant Standard Index (PSI) in 2005

- **Good**: 88% (320 days)
- **Moderate**: 12% (45 days)
- **Unhealthy**: 0%
Key Success Factors

- Good governance
- Effective organisations
- Prudent/Sustainable financing
- Holistic and integrated approach
- Sustainable and innovative strategies
- Effective implementation
Governance Framework

Ministries. Each headed by a Minister (a Member of Parliament)

- Ministry of National Development
- Ministry of Transport
- Ministry of Environment & Water Resources
- Other Ministries

Statutory Boards (SB). Each SB’s Chairman & Board is appointed by the Minister

- Urban Redevelopment Authority
- Land Transport Authority
- National Environment Agency
- Other Statutory Boards

Landuse, Transport, Environment
Good Governance - 4 Key Principles

- **Leadership is Key**
  - Eschew corruption
  - Do what is right, not what is popular
  - Be pragmatic
  - Provide long term vision

- **Reward for Work, Work for Reward**
  - Self-reliance, not welfare
  - Meritocracy for best use of talent

- **A Stake for Everyone, Opportunities for All**
  - Singapore a global city and choice home
  - Promote collective responsibility
  - Beyond physical stakes
  - Preserve core values and interests

- **Anticipate Change, Stay Relevant**
  - Stay nimble and flexible
  - Be better organised than competitors
  - Exploit opportunities even in adversity
  - Turn constraints into advantages
Transport Management Framework

Ministry of Transport

4 Statutory Boards

LTA (Land Transport Authority)
Overall land transport planning, development & management

Public Transport Council (PTC)
Regulates bus, ticket payment services and public transport fares

Civil Aviation Authority of Singapore (CAAS)
Overall air transport management

Maritime & Port Authority (MPA)
Overall sea transport management
Legislative Powers

Ministry of Transport

(LTA)

Empowered to develop & manage land transport under:
- LTA Act
- Rapid Transit Systems Act
- Street Works Act
- Parking Places Act
- Road Traffic Act
- Motor Vehicles Act

Public Transport Council (PTC)

Empowered to regulates bus, ticket payment services and public transport fares under:
- Public Transport Council Act
Unification of Land Transport Agencies

4 Agencies

1. Registry Of Vehicles (ROV)
2. Mass Rapid Transit Corporation (MRT Corpn)
3. Roads & Transportation Divisions of Public Works Department (PWD)
4. Land Transport Division of the Ministry of Communications

1-stop Agency

Unified

Land Transport Authority

(Since 1 Sep 95)
One-Stop (all modes & all aspects) National Agency on Land Transport that:

- Formulates policies and strategies;
- Plans road & rapid transit networks to meet future travel demand;
- Develops road & rail infrastructure and manages the design & construction of projects;
- Manages traffic and maintains road structures & facilities; and
- Regulates public transport services and vehicles.

~ 3500 staff (incl 1200 professionals)
Organisation Structure of LTA

- Chairman & Board
- Chief Executive

- DCE Policy, Plan, Regulate
- DCE Execute, Manage, Maintain

- Policy and Planning
- Vehicle and Transit Licensing
- Innovation and IT
- Corporate Services
- Rail Projects
- Roads
- Engineering
- Safety and Contracts

3500 Staff
1200 Professionals
8 Groups
80 Divisions
Holistic Management

Landuse

Ministry of National Development
- Overall urban planning

Housing and Development Board
- Develop public housing

Transport

Ministry of Transport
- Overall land transport planning, development & management

(LTA)

Public Transport Council (PTC)
- Regulate bus and ticketing services, and public transport fares

Environment

Ministry of Environment and Water Resources
- Overall environment protection and public health management

Others

- Jurong Town Corp
- National Parks Board
- Singapore Land Authority
Policy and Financing Framework

- Government funds infrastructure cost
- No direct operating subsidies
- Self sustaining and efficient private Public Transport Operators (PTOs)
- Users pay for usage
- Balance commuter interests with PTOs’ long-term viability
- Light-touch regulation
Decision on Infrastructure Investments

2 Criteria:

- **Economic Viability**
  - Benefits $\geq$ Costs

- **Financial Viability**
  - Operating Revenue $\geq$ Operating Costs
Rail Asset Replacement Grant

Average life of first set of operating asset

Cost of New Set of Operating Asset

Cost of 1st set of operating assets

Inflation

Replacement Grant

Historical Cost

RG

HC
Rapid Transit Development Framework

- Fund
  - Government
  - Infrastructure Costs
    - Proposal
    - $

- Plan & Implement
  - LTA
  - Economically & Financially Viable Projects
    - Completed System

- Operate & Maintain
  - Private Operators
  - No Operating Subsidies
    - Set & Enforce Standards

- Regulate
  - LTA
    - LTA
      - LTA
        - LTA
Road/Rail Development Approval Process

Identification, Travel demand Forecasting, Feasibility Studies

Concept Design & Cost Estimation (Civil, E&M & Land Costs, Time Savings, Operating Costs, etc)

Economic Evaluation, Ranking and Shortlisting (Benefit/Cost Ratio, Net Present Value)

Preliminary Design (Alignment Study, Interfacing Developments)

Ministerial Committees

Funding Approval by Development Planning Committee (DPC)

Approval by Master Plan Committee (MPC) for Land Safeguarding
Viable Public Transport Industry

- Infrastructural & train capital costs borne by Government
- 2 main bus/train operators
- Operators are efficient, self-sustaining/profitable with no direct operating subsidies given
- Bus operators given territorial monopolies in return for their Universal Service Obligation (USO)
- Bus operators enjoy certain vehicle tax concessions
- Encourage no-fare revenue (eg commercial space at stations)
- Bus/train fares regulated (by Public Transport Council)
- Service standards of bus/train/taxi operators are regulated
- Taxi industry has been liberalised (fares & new entrants)
Vision for Excellence

A World Class Land Transport System

A Great City to Live, Work and Play In

An Enterprising Agency, Embracing All in Caring for our Clean and Healthy Environment - Today, for Tomorrow
Strategies on Land Transport

Integrate transport and land use planning

Improve public transport

Manage demand for road usage

Expand road network and maximise capacity

A World Class Land Transport System
Sustainable, Integrated Approach

**Landuse**
- Long-term Urban Planning, Integration of Developments

**Transport**
- Develop/Expand Rapid Transit
- Improve Bus Services
- Integrate Bus/Rail Network & Ticketing
- Enhance Commuter Accessibility
- Conducive Financing and Industry Framework
- Integrated Landuse/Transport Planning

**Environment**
- Emission Standards, Cleaner Fuels, Enforcement,
- Green Vehicles, Education

**Optimise Road Network**
- Vehicle Ownership Restraint
- Vehicle Usage Restraint
- Traffic Management/ITS
- Enhance Safety & Accessibility
- Judiciously Expand Road Network

**Promote Public Transport**

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**Notes:**
- Improvements in transportation systems and planning
- Integration of landuse, transport, and environmental strategies
Strategic Landuse/Transport Planning

PLANNING STRATEGIES

- Strict development control to ensure compliance and facilitate orderly development

PLANNING PROCESS

Concept Plan
(every 10 years)
Strategic long-term plan for next 40-50 yrs that guides Singapore's physical growth

Master Plan
(every 5 years)

Urban Design and Conservation Plans
Long-term Planning for Sustainability

Singapore’s long-term landuse/transport plan
Strategic Transport Models

- Provides travel demand forecasts and traffic simulation for infrastructure planning, policy studies and traffic management
- Facilitates development of Road and Rail Masterplans
- Regulate updating and data collection
Public Transport-Centric Development

**Centralisation – Denser, Higher**
- Reduce car dependency
- Favour public transport

**Decentralisation – Closer to home**
- Reduce the need to travel
- Facilitate peak spreading

**Integration - Intensification along rail corridors**
- One-stop convenience
- Seamless journey
High-density/High-rise Residential Towns

- No of major towns: 25
- % of population: 85%
- Dwelling units/town: 20,000-70,000

CBD

High-density housing

Major Town
Integration with Developments

Sengkang New Town
(95,000 Dwelling Units ultimately)
Seamless Integration – Dhoby Ghaut Interchange
Expand Rapid Transit Network

Long Term RTS

Km

No of Stations

>500 km

RTS Stations

RTS Network
Public Transport Improvements

• Reform bus industry in 1970 by merging 10 poorly managed bus companies
• Promote Bus/rail integration
• Integrated contactless smartcard ticketing system
• Bus priority schemes (bus lanes, etc)
• Covered linkways for commuters
• Air-conditioned bus interchanges
• Low-floor/Wheelchair accessible buses
• PT Security systems
• Advanced telematics
Managing Demand for Road Usage

Vehicle Ownership Control

- High Upfront Cost
  - Custom Duty (20%)
  - Additional Registration Fee (110%)
  - COE Premium

Road Usage Restraint

- Recurrent Usage Cost
  - Road Pricing
  - Petrol Duty
Ownership Control - Vehicle Quota System

- Implemented in 1990 to regulate vehicle population
- Cap annual vehicle growth rate to < 3% (vs about 7% prior to implementation)
- Certificate of Entitlement (COE) for all vehicle purchases - valid for 10 years (8 years for taxis)
- Open e-bidding (twice a month), 5 vehicle categories

COE Open Bidding

**OCTOBER 2004 1st Open Bidding Exercise has ended on 06/10/2004 16:00 hrs**

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<th>Category</th>
<th>Quota</th>
<th>OP($)</th>
<th>PQP($)</th>
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<td>D  Motorcycle</td>
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<tr>
<td>E  Open</td>
<td>1,340</td>
<td>22,000</td>
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</tr>
</tbody>
</table>

QP : Quota Premium
PQP: Prevailing Quota Premium
World’s First Road Pricing System

Implemented 1975

Area Licensing Scheme (ALS)

Since 1998

Electronic Road Pricing (ERP)
ERP System

- In-Vehicle Unit (IU) & Cash Card
- Central Computer & Processing System
- Enforcement Cameras
ERP Coverage

- Expanded coverage in time & space

- Total 48 gantries (incl CBD, major arterials & Expressways)
Dynamic ERP Rates

- To ensure use of road space is optimised
- Review at 3-monthly intervals

Expressways

- Increase 45 kph
- Decrease 65 kph

CBD/Other Roads

- Increase 20 kph
- Decrease 30 kph
Effect of ALS / ERP

Data are scaled to 100 for base year 1975 (before ALS).
Optimise Road Network

- Judiciously expand road network to meet constrained demand
  - Only 8% increase in lane-km over last 10 years vs 17% vehicle growth

- Maximise capacity by leveraging on technology
  - Computerised traffic signal system (GLIDE)
  - ITS incident management and real-time traffic information (EMAS, J-eye, Traffic Scan)
New Underground Expressway

- 12km long
- SE Asia's longest tunnel (9km)
- Cost S$1.8 billion
- Expected completion - 2008
Environmental Sustainability

- Emission Standards
  - Euro IV from 1 Oct 2006
- Cleaner Fuels
  - Only unleaded petrol & reduced sulphur diesel (eg. ULSD)
- Green Vehicles
  - Tax incentives and rebates
  - Encourage CNG buses/taxis, Hybrid cars
- Enforcement/Legislation
  - eg periodic inspection, enforcement on smoky vehicles
- Education
Sharing with the World

Delegates from some 50 countries worldwide have visited LTA

~ 100 overseas delegations visited LTA in 2006
Sharing with the World

- A dedicated Division of Land Transport Authority (LTA)
- A one-stop focal point for governments, organisations and professionals around the world to:
  - tap Singapore’s know-how and
  - exchange best practices in land transport management and development

www.LTAacademy.gov.sg
Key Training Areas

- **Land Transport Policy & Planning**
- **Public Transport Management**
- **Rail Transit Development & Systems**
- **Traffic & Road Management**
- **Vehicle Licensing & Standards**

- Training is delivered by senior LTA staff who are the domain experts
- Programmes can be customised to meet the needs of overseas governments/organisations
Conclusion

• Holistic and visionary approach to urban development, transport and environment management
• Long-term strategic planning for sustainability
• Integration of landuse and transport planning
• Prudent policies that promote sustainability, ie public transport (esp rail), demand management and environmental sustainability
• Innovative strategies & effective implementation
• Good governance and excellent organisations
Thank You

Singapore

Land Transport Authority (LTA)