

Sustainable Transport – Singapore's Experience

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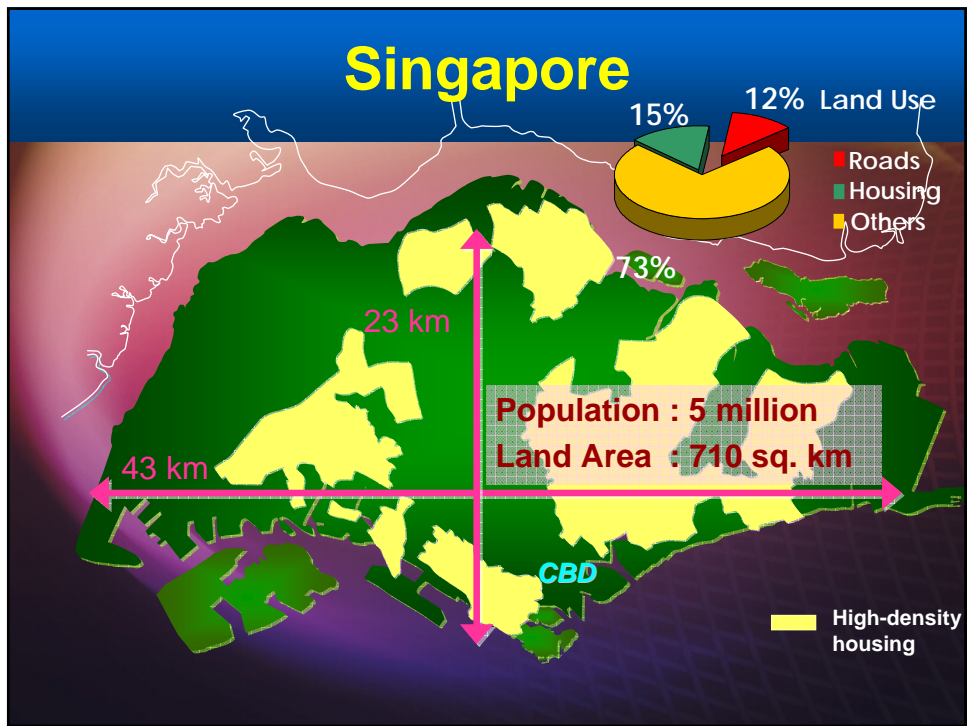
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Outline

- Background
- **Environmentally Sustainable Strategies**
 - Integrated Planning
 - Make public transport a choice mode
 - Manage road usage
 - Green Transport



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Road Transport

Road Network - 3,325 km

Expressway Network - 161 km

Vehicle Population - 925,518

Car Population - 576,988



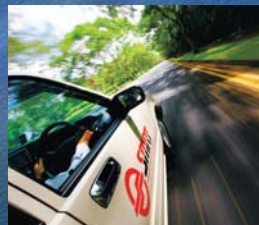
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Public Transport

MRT : 119 km, 74 stations



Bus : 344 routes, 4045 buses



Taxi : 24,700



LRT : 29 km, 43 stations

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Travel Statistics

Daily MRT/LRT : 1.7 million



Daily Bus : 3.1 million

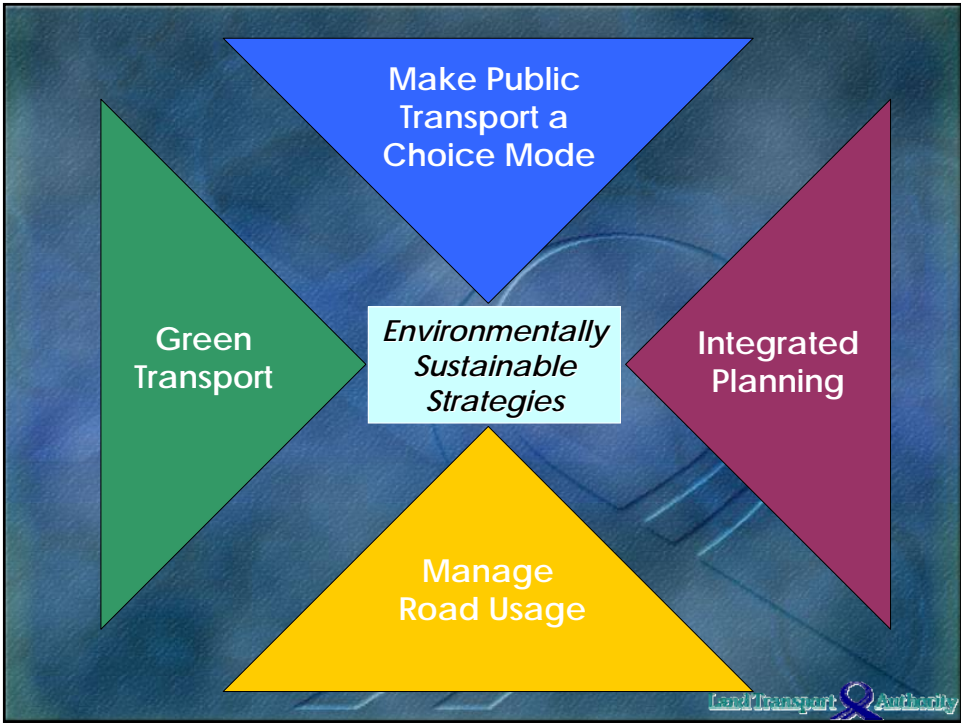


Daily Taxi : 0.8 million



Total Daily Journeys: 10 mil (56% by public transport)

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(1) Integrated Planning

CONCEPT PLAN STRUCTURE (SCP) 1970s

• Long Term Landuse and Transport Plans

Concept Plan 1990s

CONCEPT PLAN 2001

40-50 year plans

Legend for Concept Plan 2001:

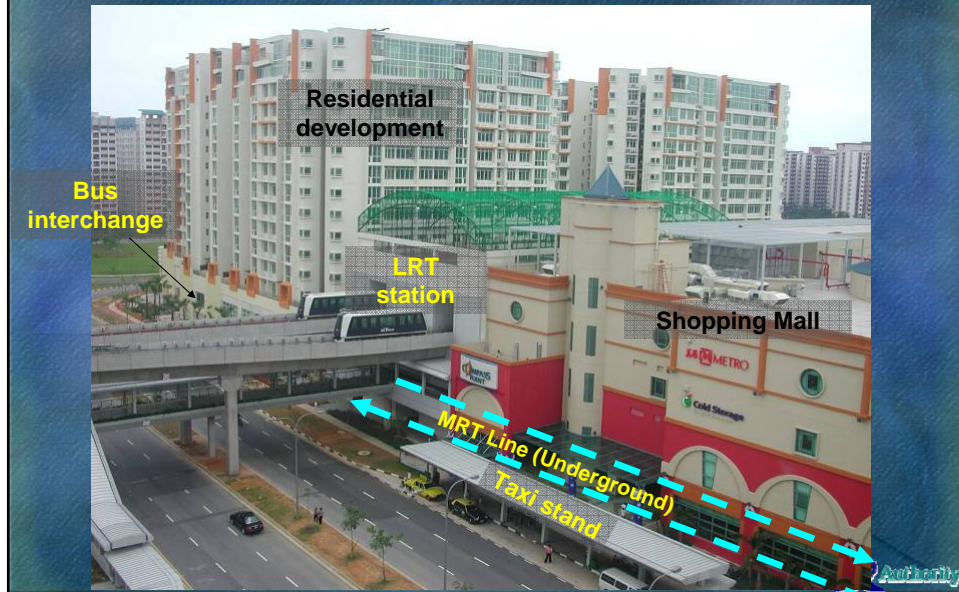
- Residential
- Commercial/White
- Industry/Business
- Agriculture
- Open Space/Recreation
- Infrastructure
- Institution
- Special Use
- Reserve Site
- Possible Future
- Reclamation
- Road
- Rail

Integrated Planning

- Improve 'access' to reach goods, services & activities => Reduce distance travelled and reduce demand for road space
- Integrate inter-modal transport facilities with building developments for seamless connectivity
- Close coordination between government agencies to integrate transport with land use planning



Integration of Transport & Landuse in Sengkang Town

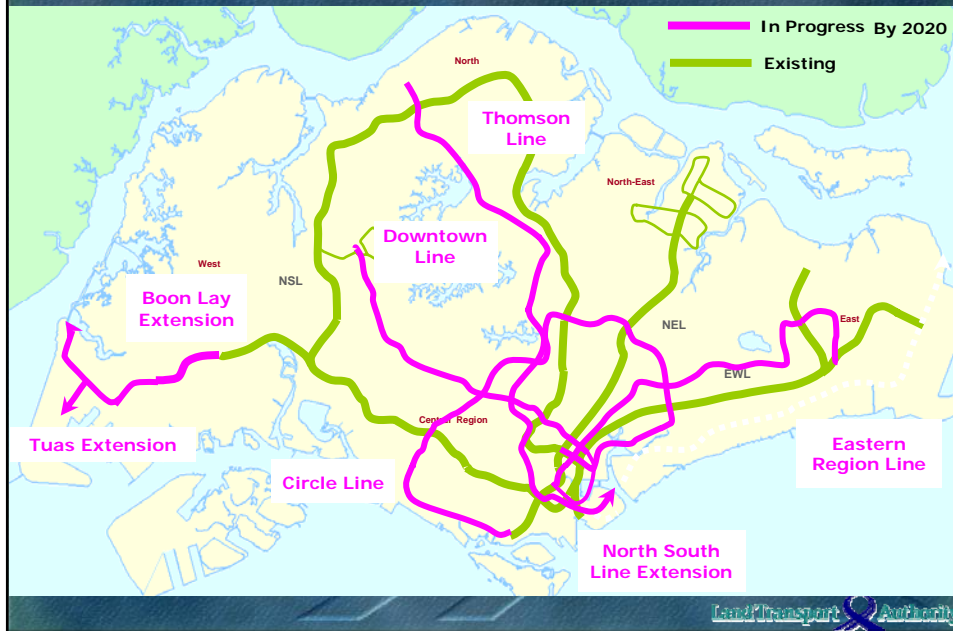


(2) Make Public Transport a Choice Mode

- Expand rail network
- Extend bus priority
- Provide travel information
- Enhance Physical Accessibility



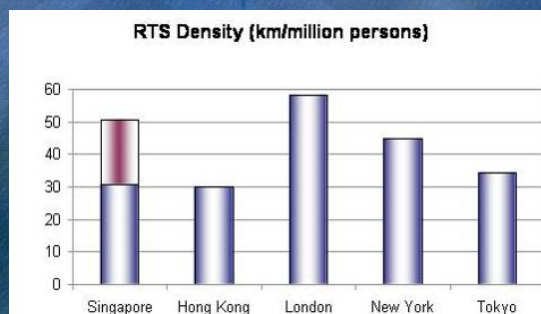
Expand Rail Network



Doubling of Rail Network by 2020

By 2020

- RTS network will nearly double from 148 km today to 278 km
- RTS density will increase from 31 km per million persons today to 51 km per million persons
 - Average of 5-minute walk (400 m) to an MRT station in the city
 - Comparable to cities like New York, London

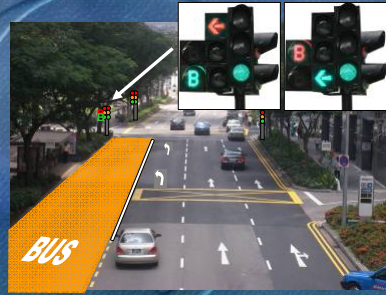


Extend bus priority

Full Day Bus lanes

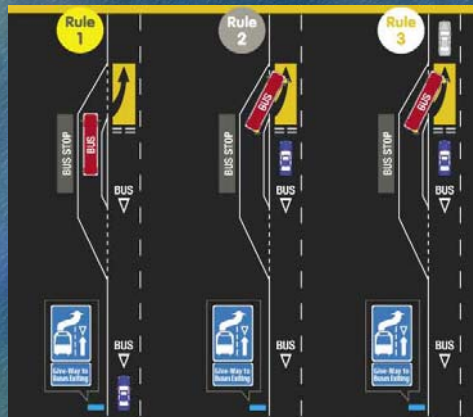


Bus Priority at Junctions



Extend bus priority

Mandatory Give-Way at Bus Bays



In short, motorists must now do the following:

1. SLOW DOWN at the first Give-Way Triangle and watch out for buses exiting the bus bay.
2. STOP after the second Give-Way Triangle and before the Give-Way Lines to give way to exiting buses.
3. DO NOT STAY in the Yellow Bus Box.

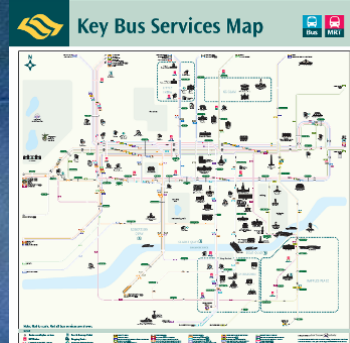
Note: Diagram is not drawn to scale.



• Improve bus speeds by 7%

Provide Travel Information

- Bus service information posters at all 4000 bus stops
- Key Bus Services Map
- Real-time bus arrival information panels at selected bus-stops
- SMS for bus arrival info



Bus arrival info panel



Enhancing Physical Accessibility

- Barrier-free access routes at all MRT stations
- Wheelchair accessible buses
- Barrier-free road and related facilities



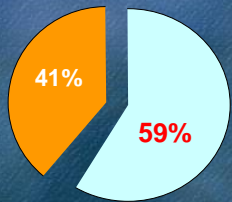
Key Target by 2020

- Increase AM peak modal share on public transport from 59% to 70%

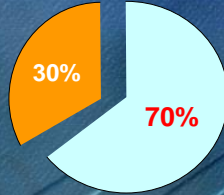
 - Private Transport

 - Public Transport

2008 Mode Share
(am peak)



Target 2020 Mode Share
(am peak)



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(3) Manage Road Usage

- Manage demand for road use
- Leverage on technology



Manage Demand for Road Use

Ownership Control

Vehicle Quota System
(i.e. COE)

Other Ownership Costs

- Additional Registration Fee
- Excise Duty
- Road Tax

Usage Restraint

Petrol Duty

Electronic Road Pricing
(ERP)

Demand Management

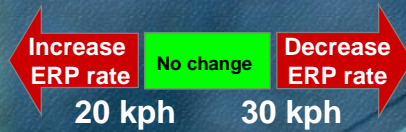
- Ownership Measures:
 - Vehicle Quota System
 - Regulate growth of new vehicles at 1.5% per annum
 - New vehicle owners to bid for a Certificate of Entitlement (COE)
 - Other Ownership Costs
 - Additional Registration Fee (100% of Open Mkt Value)
 - Excise Duty (20% of Open Mkt Value)
 - Road Tax
- Usage Measures:
 - Electronic Road Pricing (ERP)
 - Petrol Duty

Electronic Road Pricing (ERP)

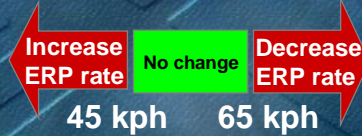
- Implemented in 1998, ERP is a congestion management tool
- Replaced manual Area Licensing Scheme (ALS)
- Pay-as-you-use principle
- Review speed range at 3-month interval, adjust ERP rates



Arterial Roads



Expressways

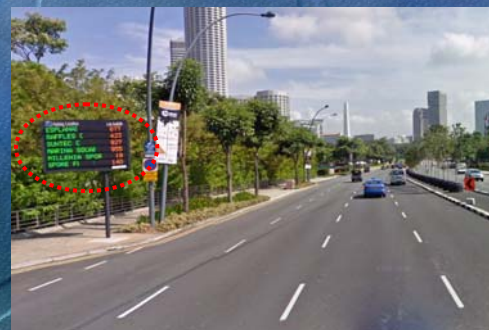


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Parking Guidance System

- Guide drivers to the nearest parking facility with available parking lots
 - Reduce circulating traffic looking for parking lots and adding to congestion

Motorists will be better informed of availability of parking spaces



Electronic signboard on number of vacant parking lots in buildings

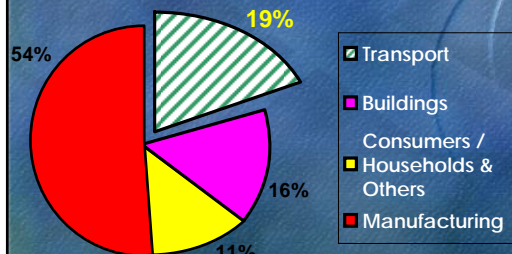
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Environmental Sustainability

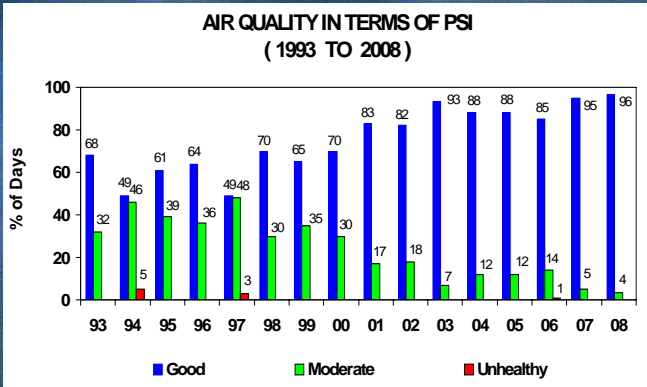
- Gearing our Transport Practices & Policies towards Supporting Environmental Aims

CO₂ Contribution by Sector (2005)



Ambient Air Quality

- Pollutant Standards Index (PSI), based on 5 key pollutants (SO₂, NO₂, CO, Ozone, PM10) measured in accordance with USEPA guidelines.

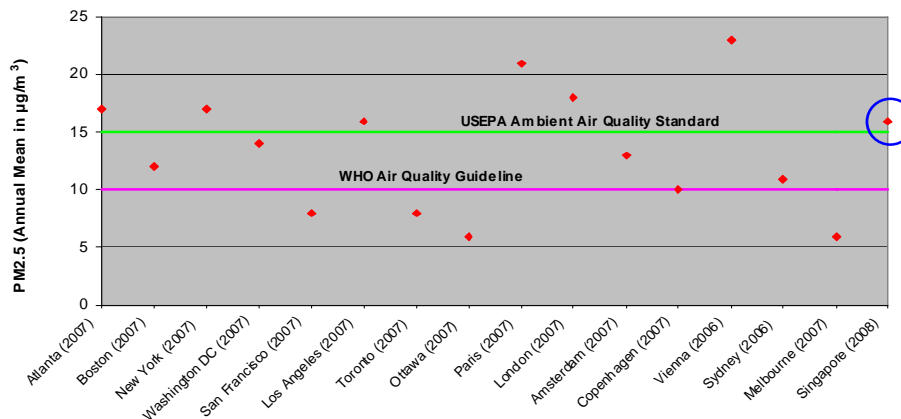


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Many developed cities, including Singapore, have yet to meet the recommended standard for PM_{2.5}



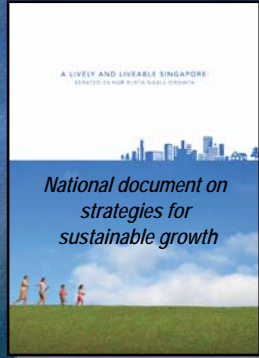
The USEPA set the standard for PM_{2.5} after studies showed that particulate matter air pollution is linked to 95,000 cases of chronic and acute bronchitis, 10,000 hospital admissions for respiratory and cardiovascular diseases, and hundreds of thousands of aggravated asthma cases in the US each year.



Energy Efficiency (EE) & PM2.5 Targets

Energy Efficiency (EE) Targets

- National EE Target of 35% improvements by 2030 (from 2005)



PM2.5 Target

- National target to reduce PM2.5 to 12µg/m3 by 2020
- 2008 Average annual PM2.5 level (16µg/m3)
 - USEPA standard (15µg/m3)
 - WHO standard (10µg/m3)

Initiatives to Reduce GHG & Energy

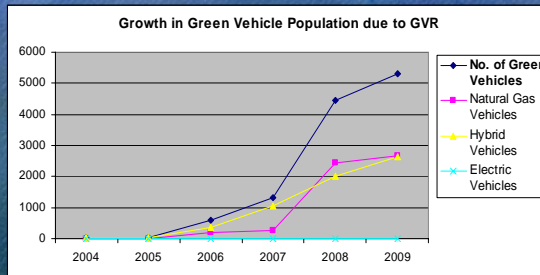
• Fuel Economy Labelling Scheme (FELS)

- Improve Fuel Efficiency of Vehicles
- Mandatory since April 2009



• Green Vehicle Rebate (GVR) Scheme

- GVR increased from 20% to 40% of OMV (open market value) in 2006



Other Initiatives to Reduce GHG & Energy

Diesel Hybrid Buses

- A feasibility study use of diesel hybrid bus trial in Singapore

Electric Vehicles (EVs)

- Setup taskforce to develop a blueprint for EV development in Singapore



LED Traffic Lights

- Long Lifespan
- Fewer Replacements



Greening of Road Infrastructure

- Use recycled material in road pavement construction



Non-Motorised Transport

Walking - Pedestrian and Commuter Facilities

Covered Pedestrian Overhead Bridge, pedestrian crossings, covered linkways

Cycling

- Parking facilities at MRT stations / bus interchanges
- Cycling via park connectors and access public transport nodes
- Foldable bicycles on board trains and buses



Sheltered cycling racks



Summary

Towards a Vibrant and Liveable City

- Integrated Planning
- Make Public Transport a Choice Mode
- Manage Road Usage
- Green Transport

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Terima Kasih.