

Environmentally Sustainable Transport – Singapore's Experience

Kenneth Wong
Deputy Director (Policy)

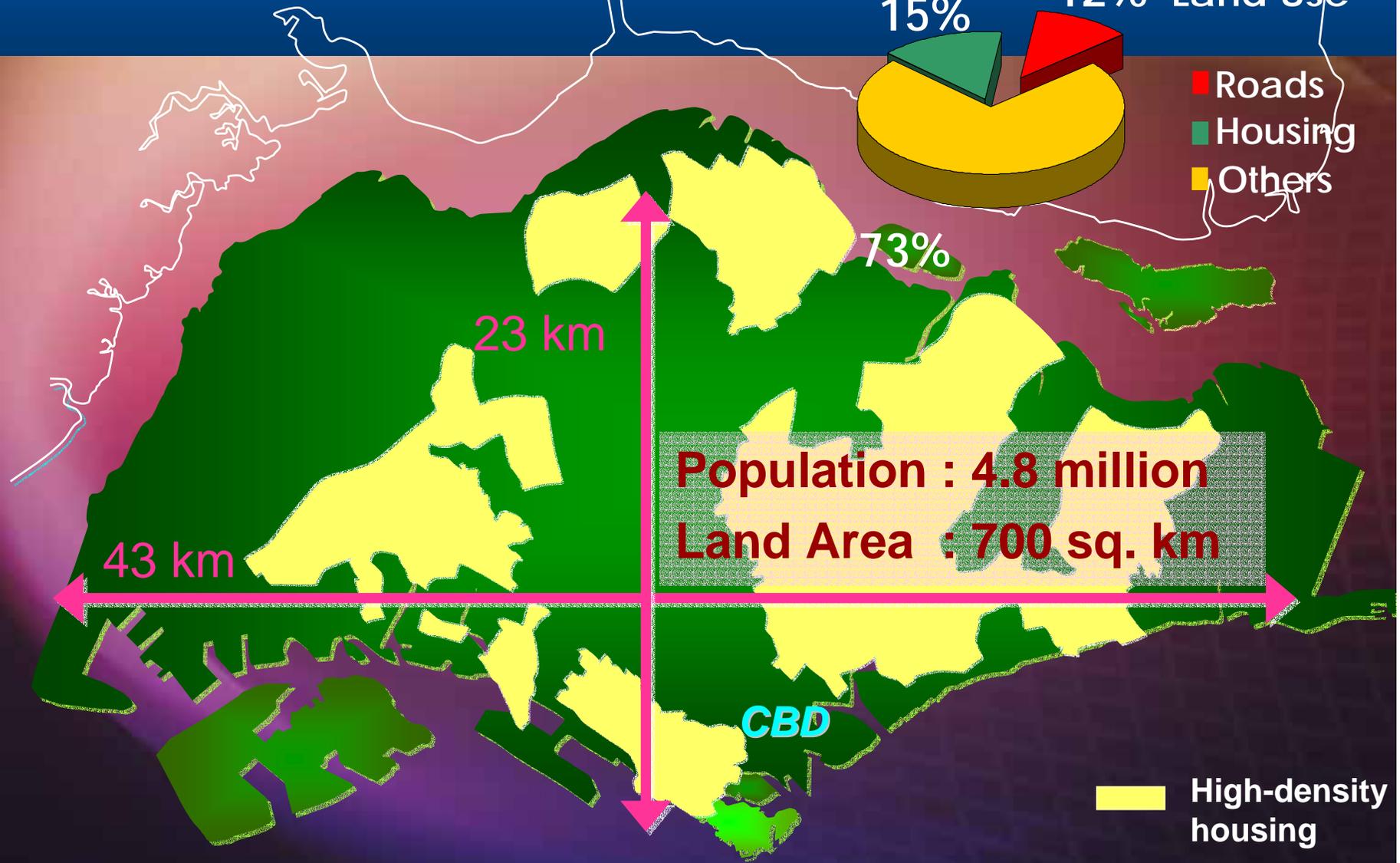
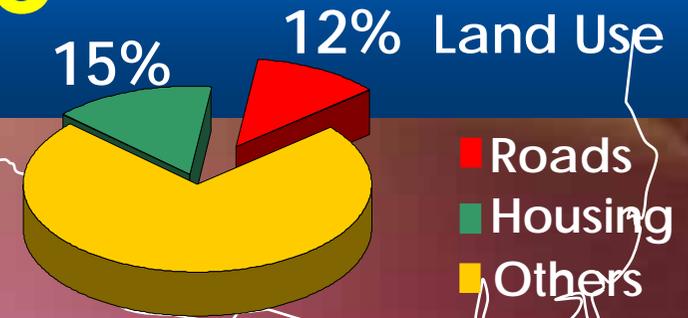
Land Transport Authority, Singapore

**Fourth Regional EST Forum
Seoul, Korea
24-26 February, 2009**

Outline

- **Background**
- **Environmentally Sustainable Strategies**
 - Integrated Planning
 - Making public transport a choice mode
 - Managing road usage
 - Green Transport
- **Summary**

Singapore





Background on Land Transport

Public Transport

MRT : 109 km, 67 stations



Buses: 325 routes, 3700 buses



Taxis : 24,000

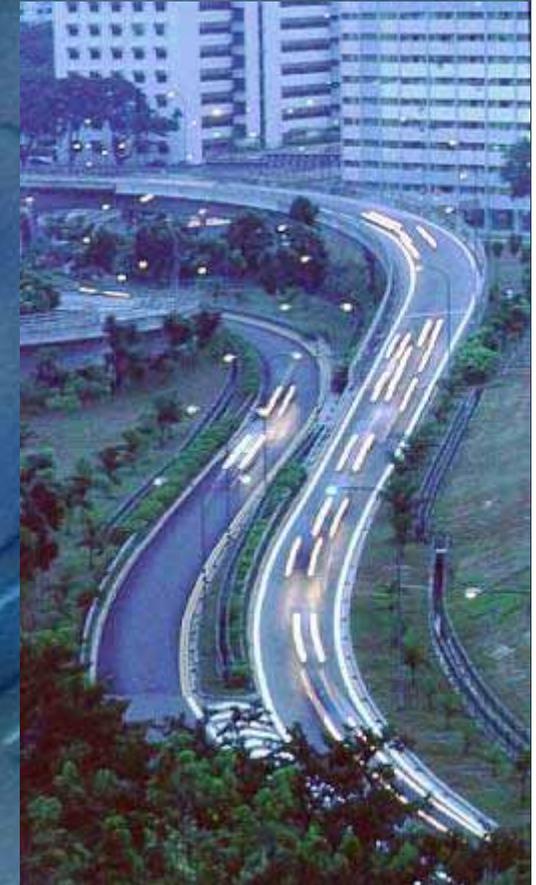


LRT : 29 km, 43 stations

Figs as of end 2007

Road Transport

Road Network - 3,300 km
Expressway Network - 162 km
Vehicle Population - 851,000
Car Population - 517,000
(60% of veh pop)



Figs as of end 2007

Travel Statistics

Daily MRT/LRT trips : 1.6 million



Daily Bus trips : 2.9 million



Daily Taxi trips : 0.94 million



Total Daily Trips: 8.9 mil (about 60% by public transport)

Figs as of end 2007

Make Public
Transport a
Choice Mode

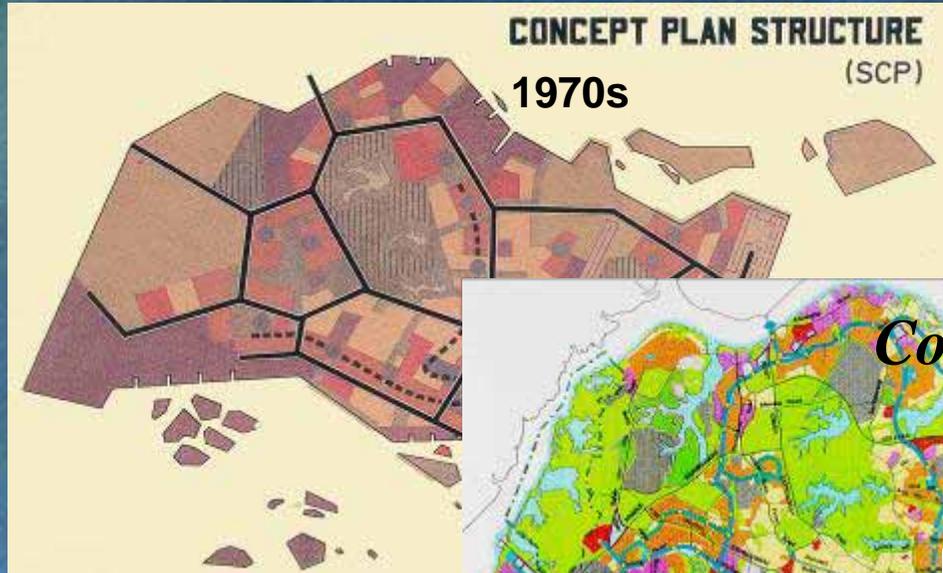
Green
Transport

*Environmentally
Sustainable
Strategies*

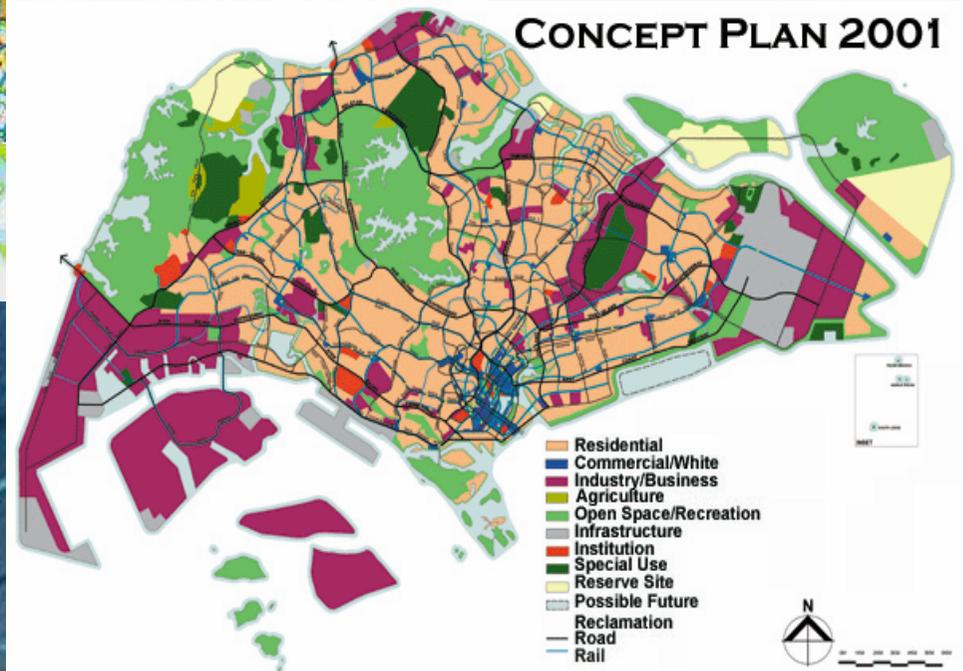
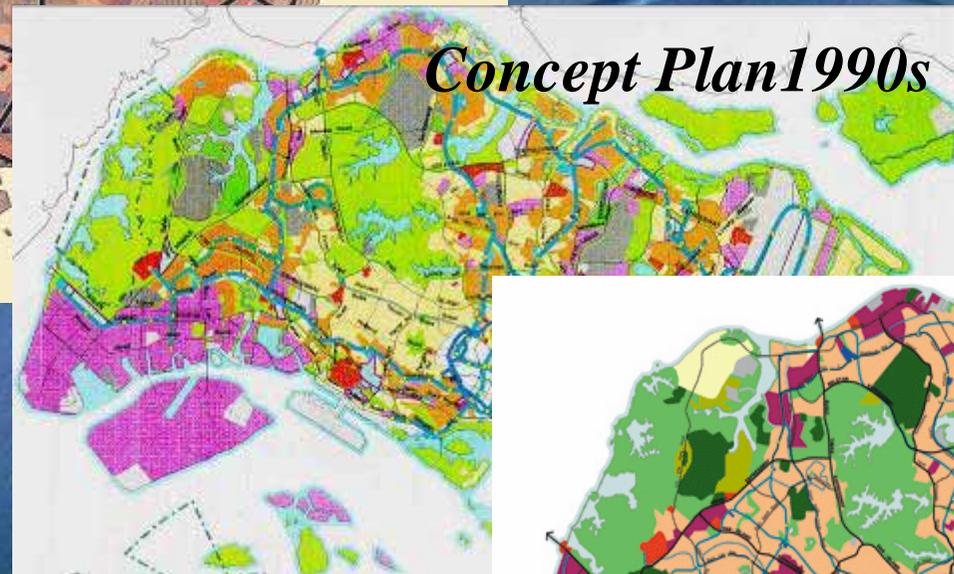
Integrated
Planning

Managing
Road Usage

(1) Integrated Planning



- Long Term Landuse and Transport Plans

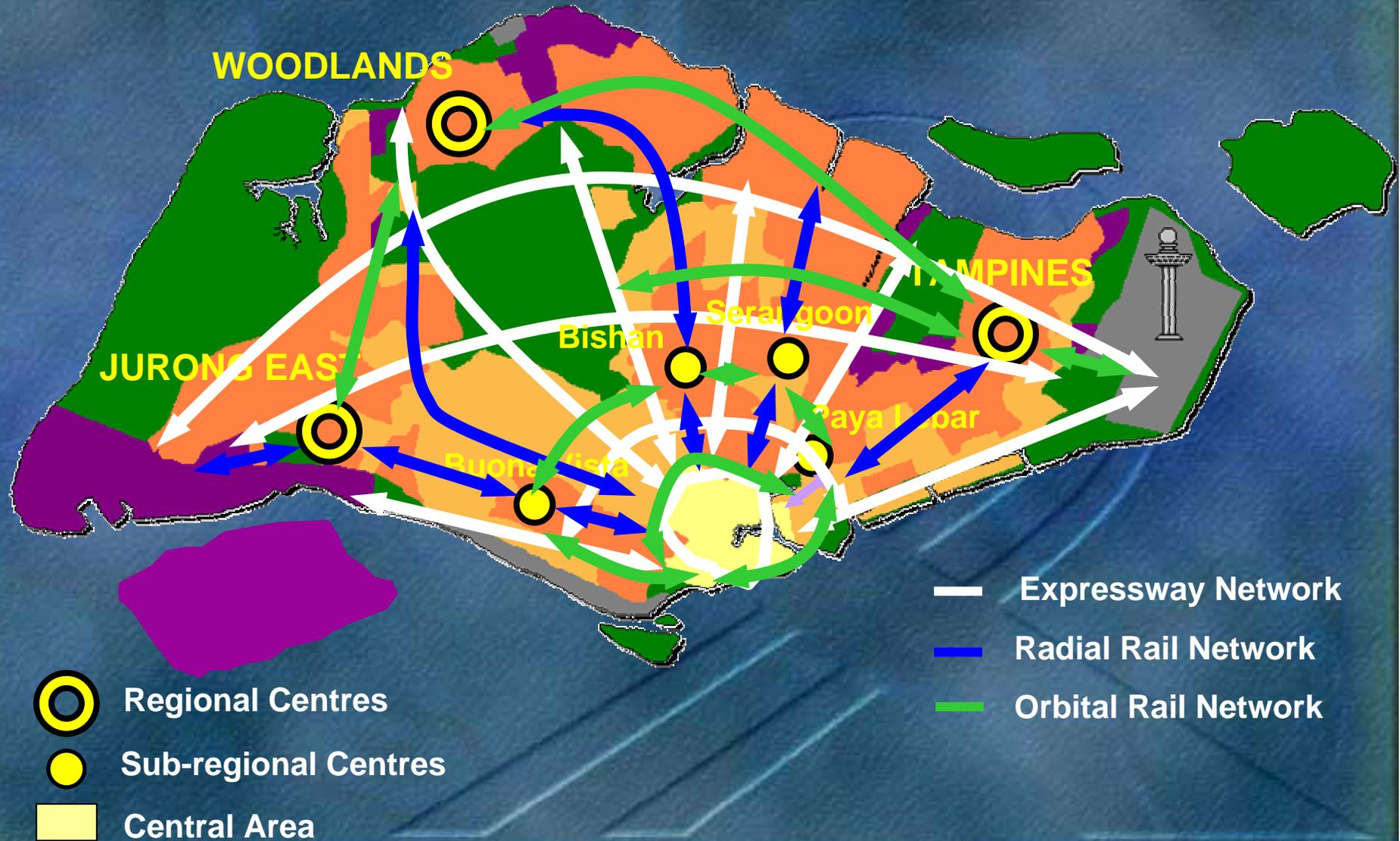


(1) Integrated Planning

- Integrate land use
 - Reduce demand for road space
 - ‘access’: the ability to reach goods service, activities & destination
 - => Reduce distance travelled
- Integrate inter-modal transport facilities with building developments for seamless connectivity
- Coordinated between government agencies to integrate transport with land use planning



Integrate Planning of Road & Rail Network

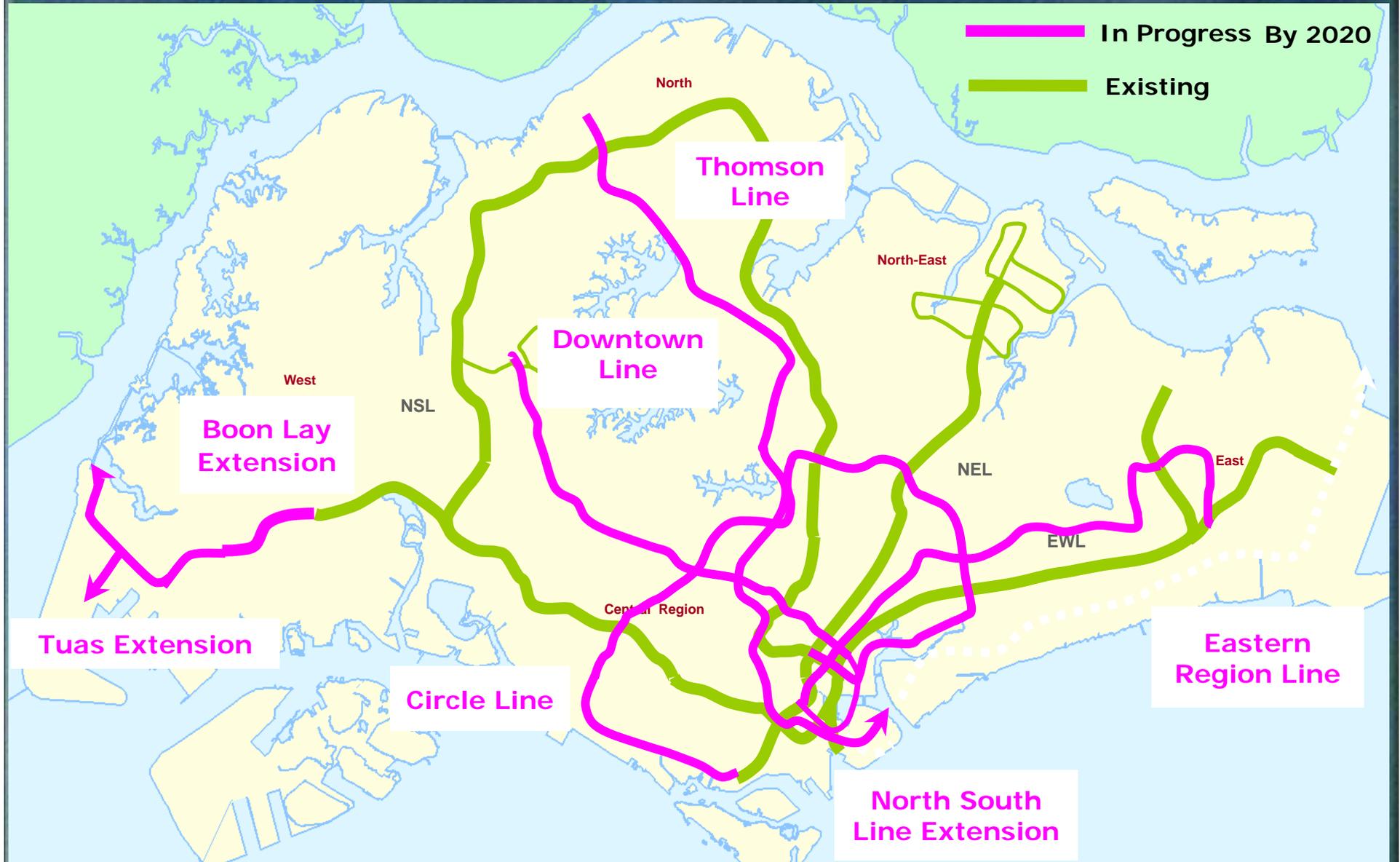


(2) Make Public Transport a Choice Mode

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



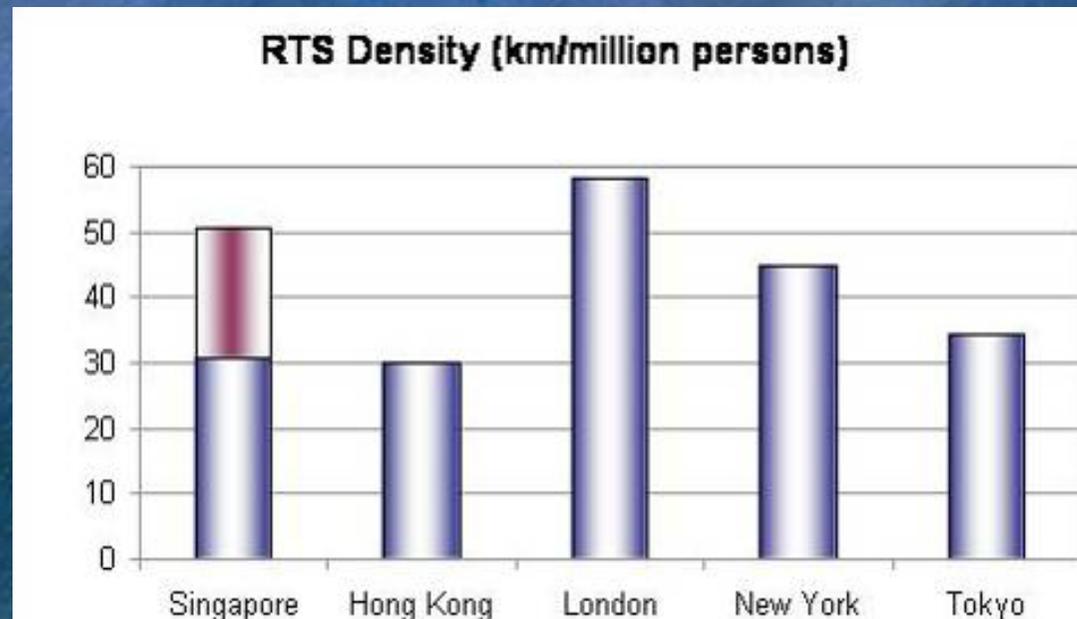
Expand Rail Network



Doubling of Rail Network by 2020

By 2020

- RTS network will double from 138 km today to 278 km
- RTS density will increase from 31 km per million persons today to 51 km per million persons
 - Short 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



Mandatory Give-Way at Bus Bays

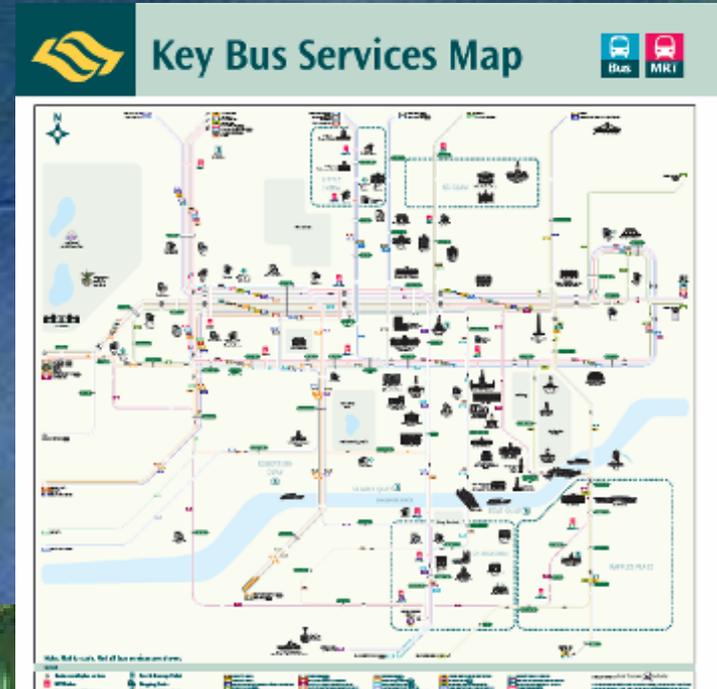


Bus Priority at junctions



Provide Travel Information

- Bus service information posters
- Key Bus Services Map
- Real-time bus arrival information panels
- SMS for bus arrival info



Enhancing Physical Accessibility

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



Managing Road Usage

An aerial photograph of a large, multi-level highway interchange. The roads are elevated and curve in various directions, with several lanes visible. A red and white double-decker bus is prominent on one of the lower levels. In the background, a city skyline with several high-rise buildings is visible under a blue sky with scattered white clouds. The overall scene depicts a modern urban transportation infrastructure.

- **Manage demand for road use**
- **Leverage on technology**
- **Develop road network**

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

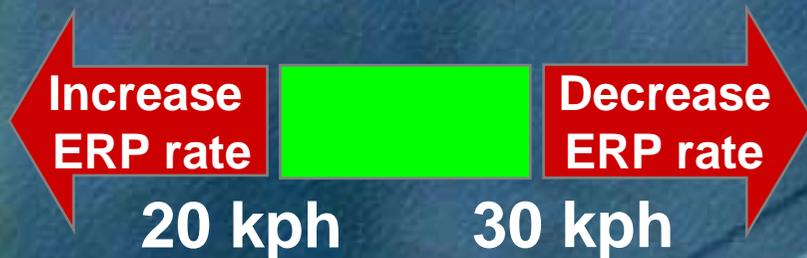
Electronic Road Pricing
(ERP)

Electronic Road Pricing (ERP)

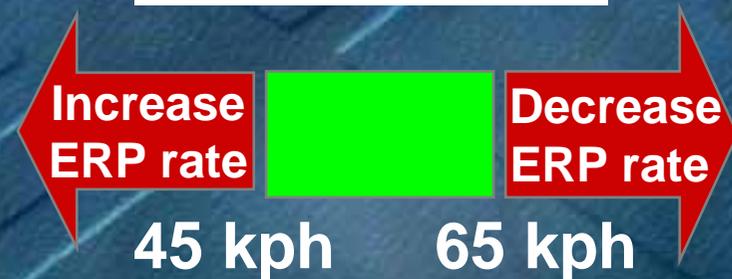
- ERP is a congestion management tool
- Pay-as-you-use principle
- Review speed range at 3-month interval, adjust ERP rates



Arterial Roads



Expressways



An aerial photograph of a multi-lane highway bridge spanning a river. The bridge is supported by concrete pillars and has several lanes of traffic. The surrounding area is lush with green trees and vegetation. The text "Green Transport" is overlaid in yellow on the image.

Green Transport

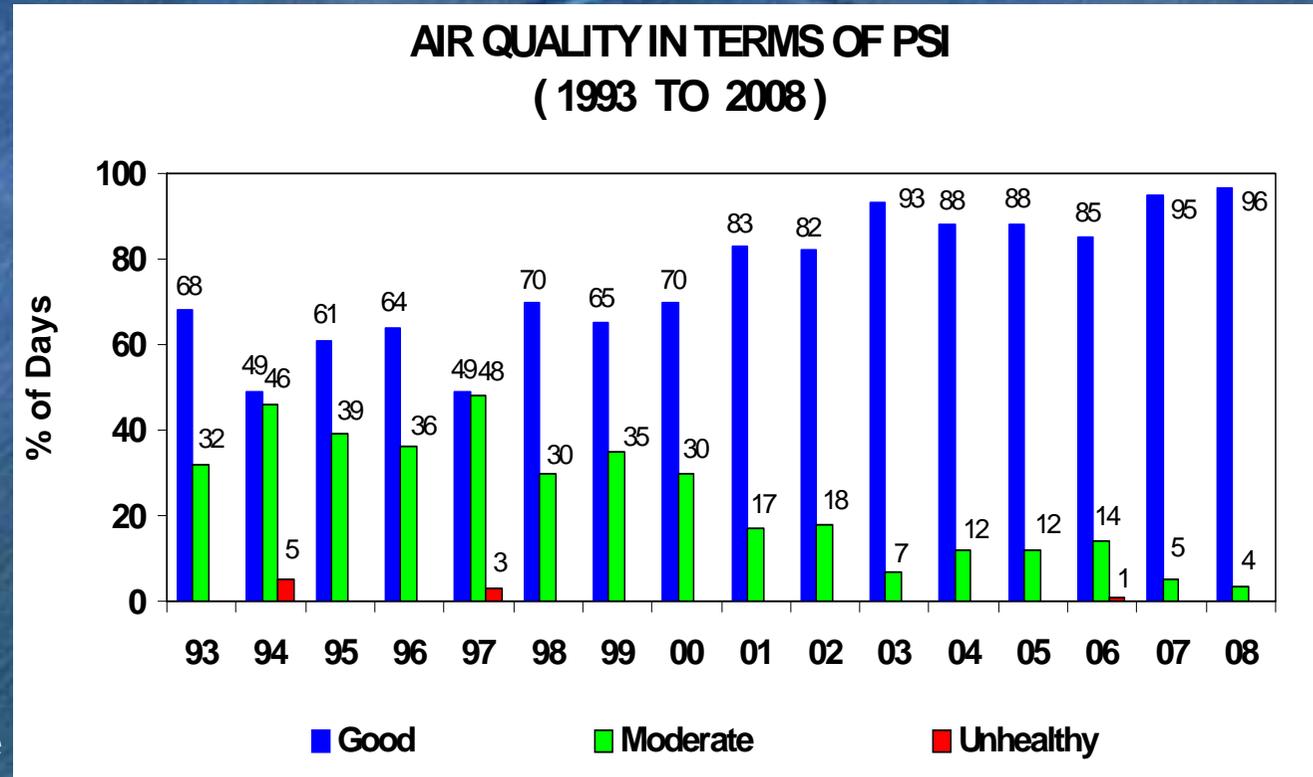
- Euro IV emission standard
- Green Vehicles Rebate Scheme
- Fuel Economy Labeling Scheme
- Non-motorised Transport

State of the Environment

- Ambient Air Quality**

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

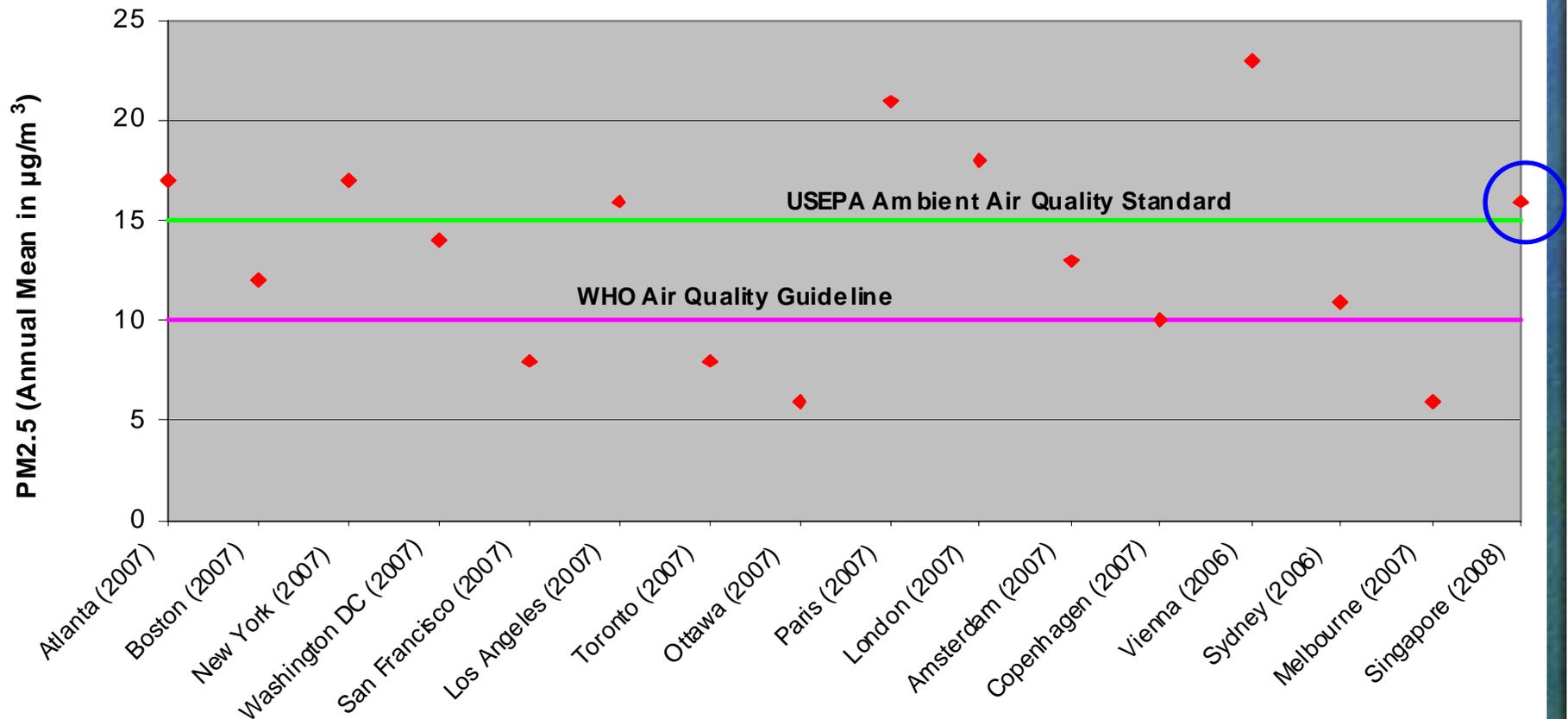
Air quality was affected by transboundary smoke haze in 1997 and 2006



Many developed cities, including Singapore, have yet to meet the recommended standard for PM2.5



The USEPA set the standard for PM2.5 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.



Vehicular Emission Control

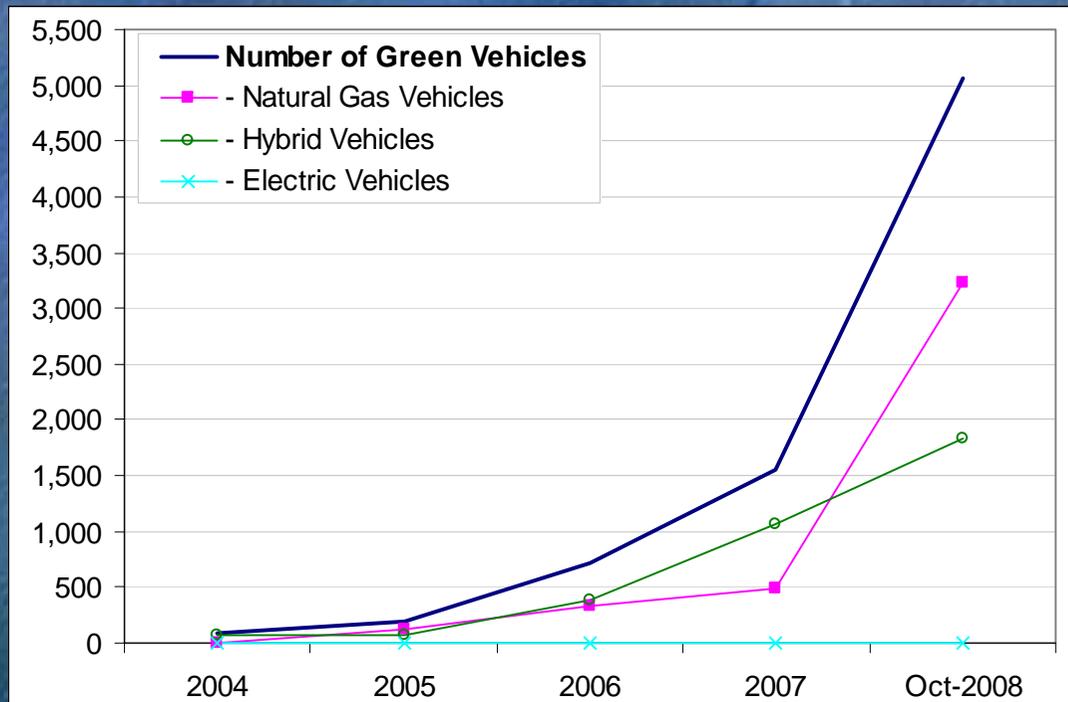
- Set stringent emission standards for registration of vehicles e.g. diesel vehicles must comply with Euro IV emission standards
- Cleaner fuel quality: Unleaded petrol, ULSD
- Mandatory periodic inspection of in-use vehicles : chassis dynamometer smoke test
- Enforcement against smoky vehicles



Green Vehicles Rebate

Hybrid, Electric cars & Natural Gas powered vehicles

- Rebate of 40% of upfront tax on cars



Fuel Economy Labelling Scheme

- Launched as a voluntary programme in 2003, aim is to provide buyers of passenger cars with fuel economy information at the point of sale.
- From Apr 2009, it will be mandatory for car retailers to display fuel economy labels on cars in their showrooms.

Fuel Economy Labeling Scheme

Make XYZ
Model XYZ12345

FUEL ECONOMY
8.0
km per litre
For city driving
when tested to UN ECE R 101

Comparison
Vehicles with engine capacities
1601 to 2000 cc
achieve 6.0 to 11.1 km per litre

Actual fuel economy will vary according to factors such as
vehicle condition, traffic conditions and driving habits.
NOTE: Test was performed without air conditioning

A joint SEC-NEA-NEC initiative
SINGAPORE GREEN LABELLING SCHEME

Details available at www.nec.gov.sg

Non-Motorised Transport

Walking - Pedestrian and Commuter Facilities

Pedestrian overhead Bridge, pedestrian crossings, covered linkways, Pedestrianisation of streets



Cycling

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



Summary

Improvement in energy consumption per capita

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



LTA Academy

LTA ACADEMY
SINGAPORE

Learning &
Programmes

Research &
Publication

Land Transport
Gallery

Strategic Partners



LTA Academy



>150 programmes, 5,000 delegates from 70 countries

Thank you

