

# Electronic Road Pricing Singapore's Experience

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## Singapore



**Land Area** : 680 km<sup>2</sup>  
**Road** : 3,100 km  
**E'way** : 150 km

**Population** : 4.5 million  
**Vehicle** : 770,000  
**Car** : 430,000



## Strategy

Integrate land use and transport planning

Building a comprehensive and efficient road network

Improving and expanding the existing public transport system

Establishing demand management measures



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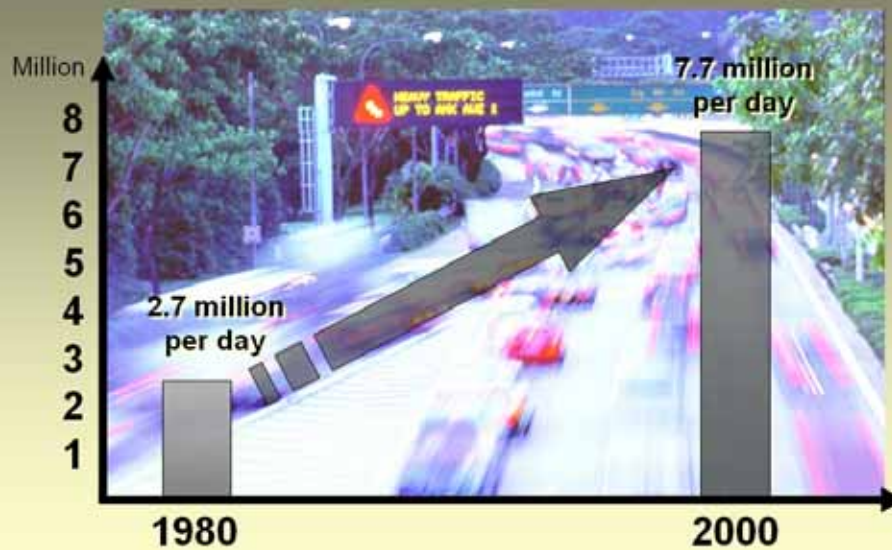
Building a comprehensive and efficient road network

Improving and expanding the existing public transport system

Establishing demand management measures



## Travel Statistics: Daily trips made



## Travel Statistics: Modal Split

Daily Bus trips : 3.0 million



Daily MRT/LRT trips : 1.0 million



Daily Taxi trips : 0.9 million



Total Daily Trips : 7.7 million (63% Public Tpt)  
Target: 75% by Public Tpt



## Public Transport System

MRT : 109 km, 65 stations



Buses : 260 routes, 3300 buses

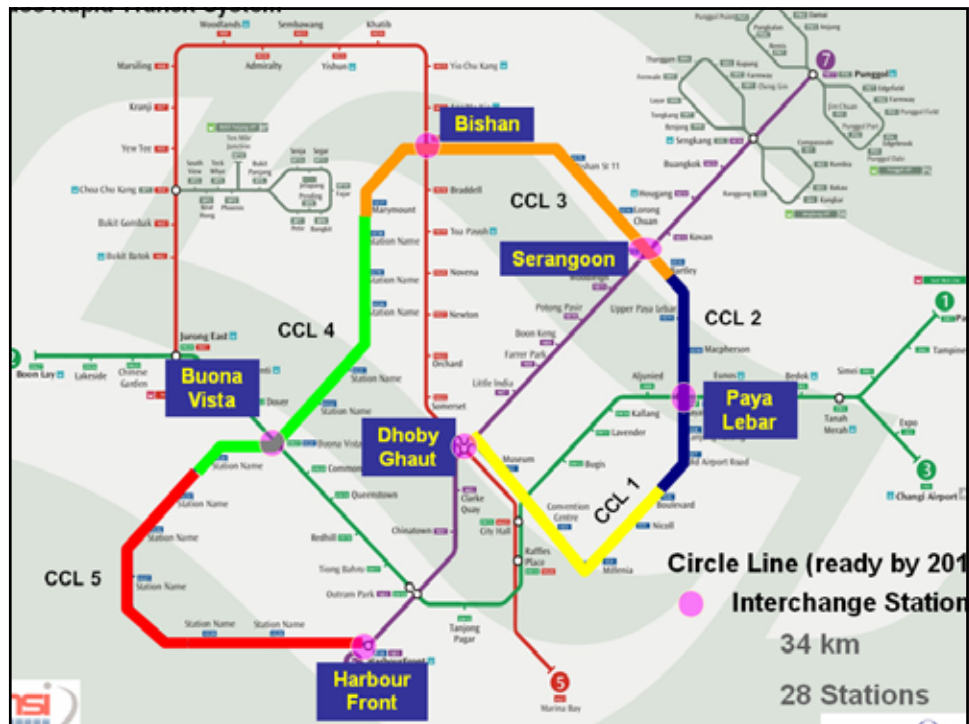


Taxis : 20,000

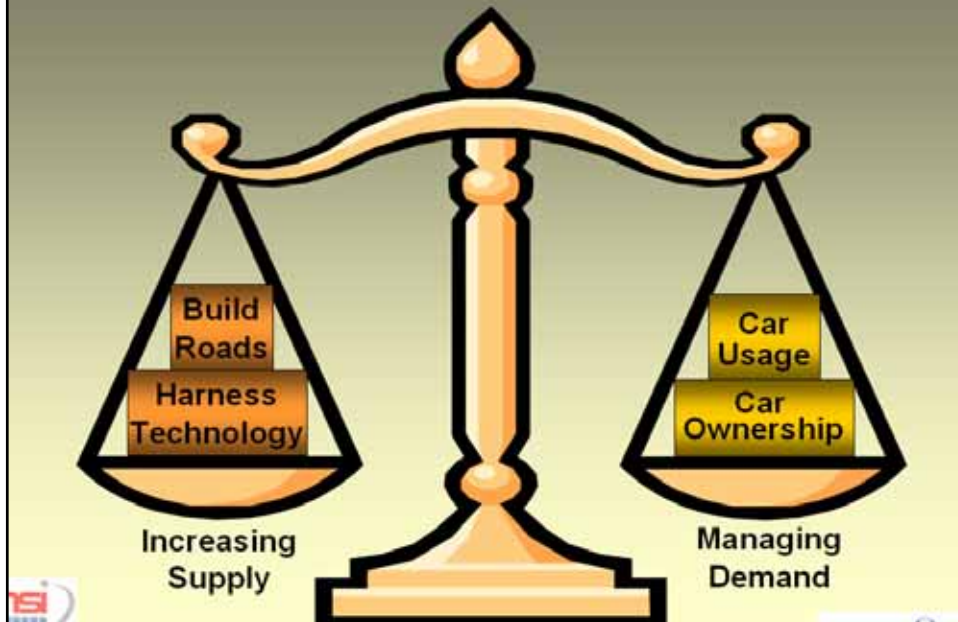


LRT : 19 km, 27 stations

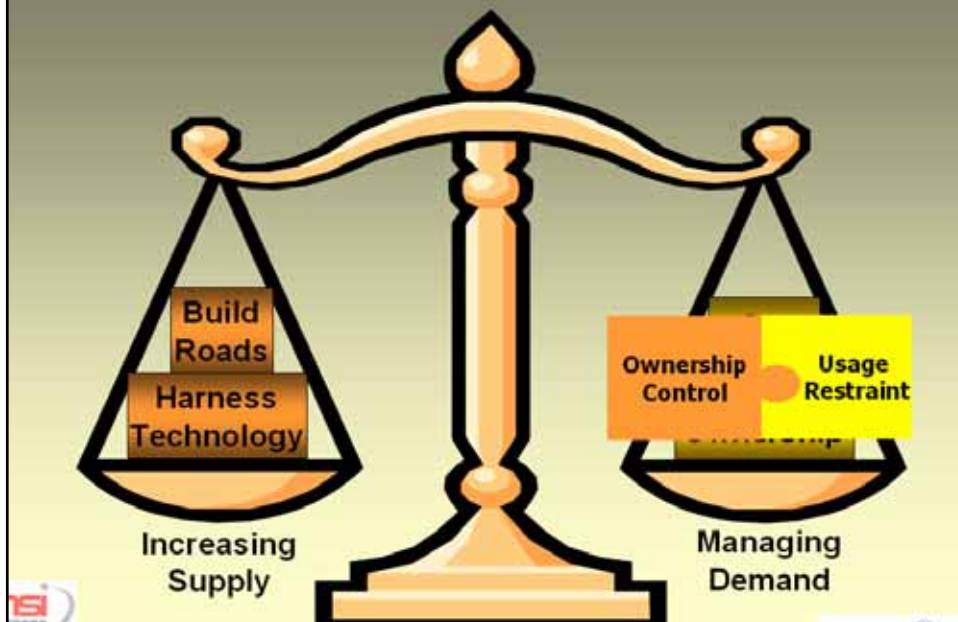




## Balancing Act: Demand vs Supply



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## Ownership Control: VQS

- Vehicle Quota System (VQS) was implemented in 1990
- Mechanism to regulate vehicle population
- Open Bidding - twice a month
- Certificate of Entitlement (COE) - valid for 10 years

Results for OCTOBER 2004 1st Open Bidding Exercise			
Category		Quota	QP(\$)
A	Car (1600cc & below) & Taxi	2,523	23,001
B	Car (Above 1600 cc)	1,145	23,001
C	Goods Vehicle & Bus	678	6,300
D	Motorcycle	507	652
E	Open	1,340	22,000



QP : Quota Premium

## Usage Restraint: ERP



- Implemented in 1998 to replace the Area Licensing and Road Pricing schemes

- A Dedicated Short-Range Communications System
- In-vehicle Unit & CashCard for payments of road usage charges



## Electronic Road Pricing

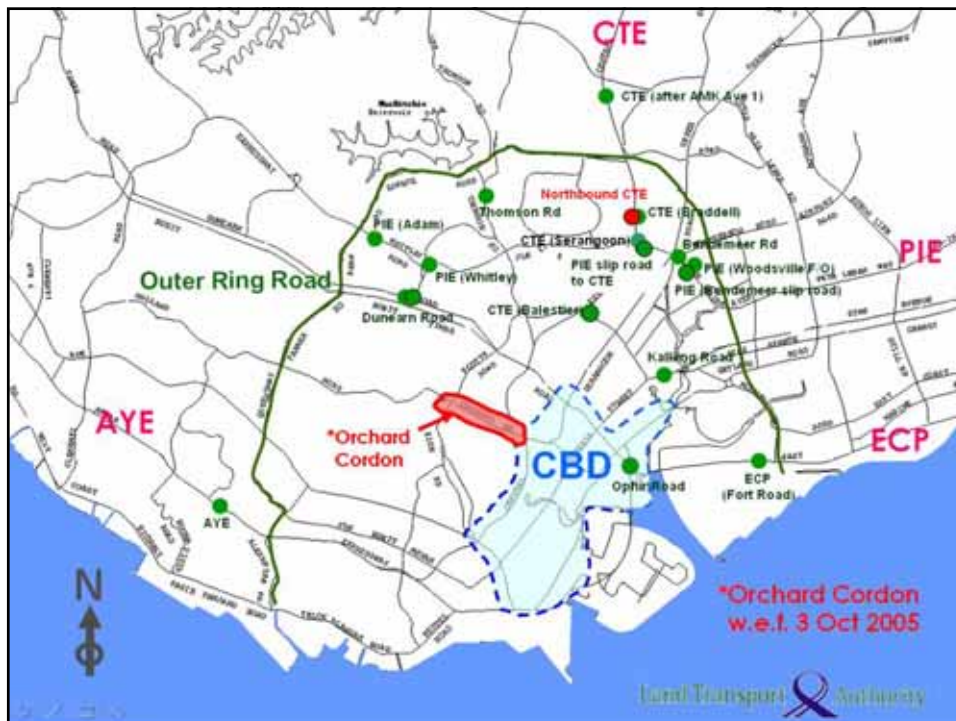
### In-vehicle Units (IU)

- Different types for different categories of vehicles
- allow variable pricing
  - facilitate pre-paid with stored-value smart cards





# ERP Gantry



## Number of ERP Gantries

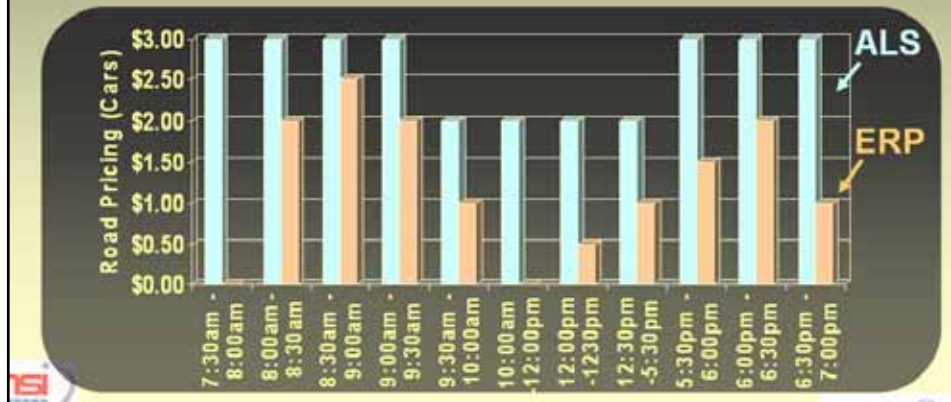
As of 1 September 1998:	33 (27 in CBD; 6 along ORR)
Before 1 August 2005:	45 (28 in CBD; 17 along ORR)
As of 1 August 2005:	46 (the first evening charging gantry at northbound CTE)
From 3 October 2005:	48 (an Orchard cordon with operating hours from noon to 8pm, Mondays to Saturdays)

## ERP Operating hours

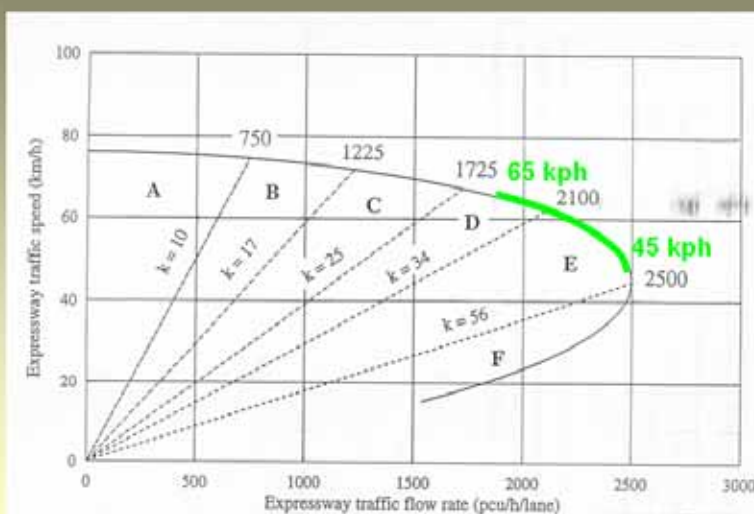
	CBD	Expressways & ORR*	Orchard Cordon
<b>Gantries</b>	19	18	11
<b>Operating hours</b>	7:30 am to 7:00 pm	7:30 am to 9:30 am & 6pm to 8pm for northbound	12:00 pm to 8:00 pm (Including Saturdays)

## Road Pricing Charges

- Varies by vehicle type
- Varies by location of gantry
- Varies by time of day

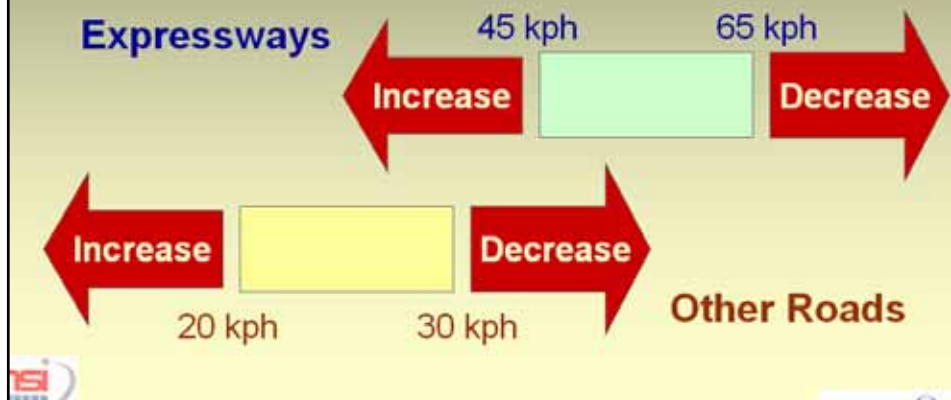


## Speed-Flow Curve (Expressway)



## Adjustment of ERP Rates

- To ensure **optimal use of road space**
- Reviewed every 3 months



## Operations Statistics

- **Transactions**
  - about 280,000 to 300,000 per day
- **Violations**
  - **No IU**
    - Fine of S\$70
  - **No CashCards or Insufficient value in card**
    - Manual payment: Administrative Charge of \$10
    - ePayment: Administrative Charge of \$8
    - Payment via SMS: Administrative Charge of \$4





## Electronic Parking System

## Electronic Parking System (EPS)

Using ERP technology for car park applications



## Electronic Parking System (EPS)



## Lessons Learnt

- Strong political will and commitment;
- Do not neglect traditional traffic management measures as traffic do not just disappear after road pricing;
- Clear pricing policy and framework;
- Good alternatives to driving: Push vs Pull factor;
- Choices for those who drive: Variable pricing;
- Conscious of true cost of driving to those who drive;
- Good public communications and educations;
- Mindful of privacy issues;
- Ample channels for enquires and appeals;
- Ample facilities for installation/inspection of IUs and sales/top-up/refund of pre-paid cards;
- Legislation issues for payment and enforcement;
- Security Framework; and
- Highly reliable system: Positioning, Enforcement and Payment (lots of tests).

