Singapore's Approach to a Car-Lite City

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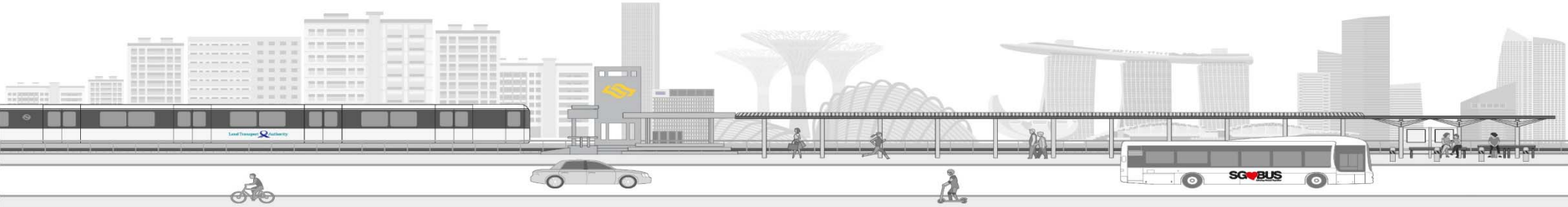
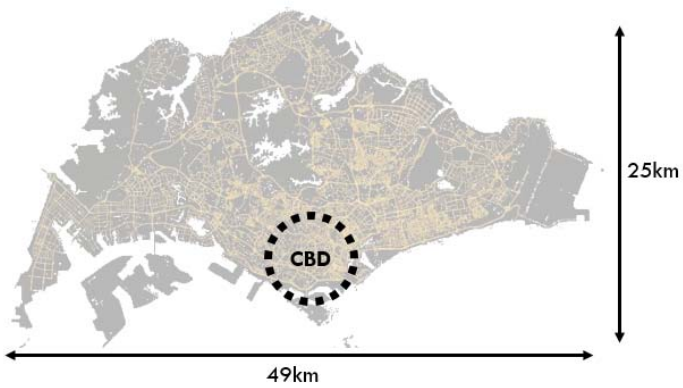
UITP Conference

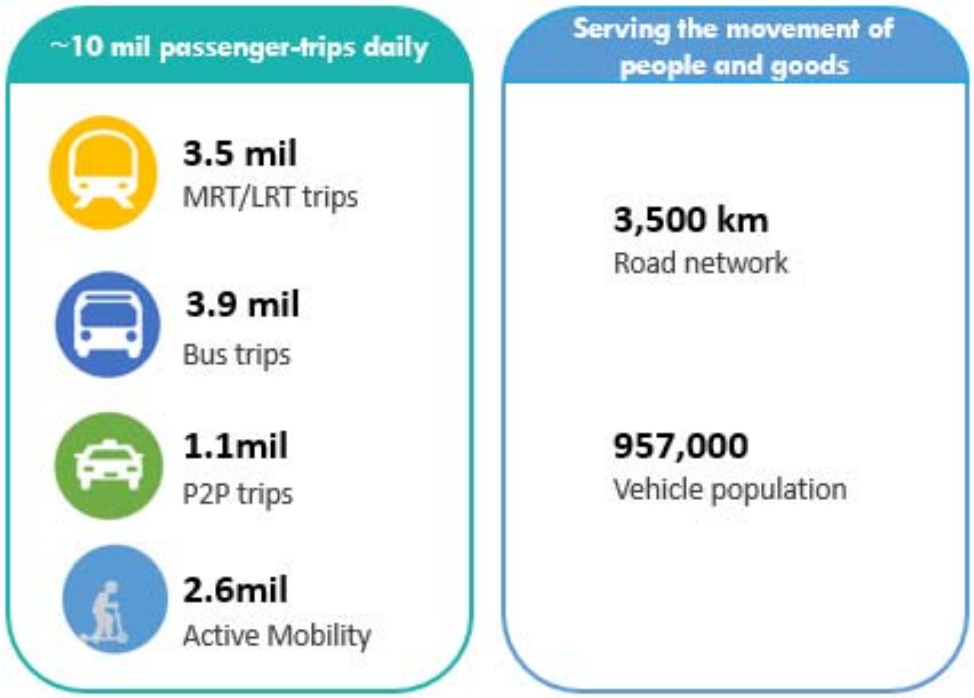
Brussels, 23 January 2020



Singapore – Nation, Island, City-State

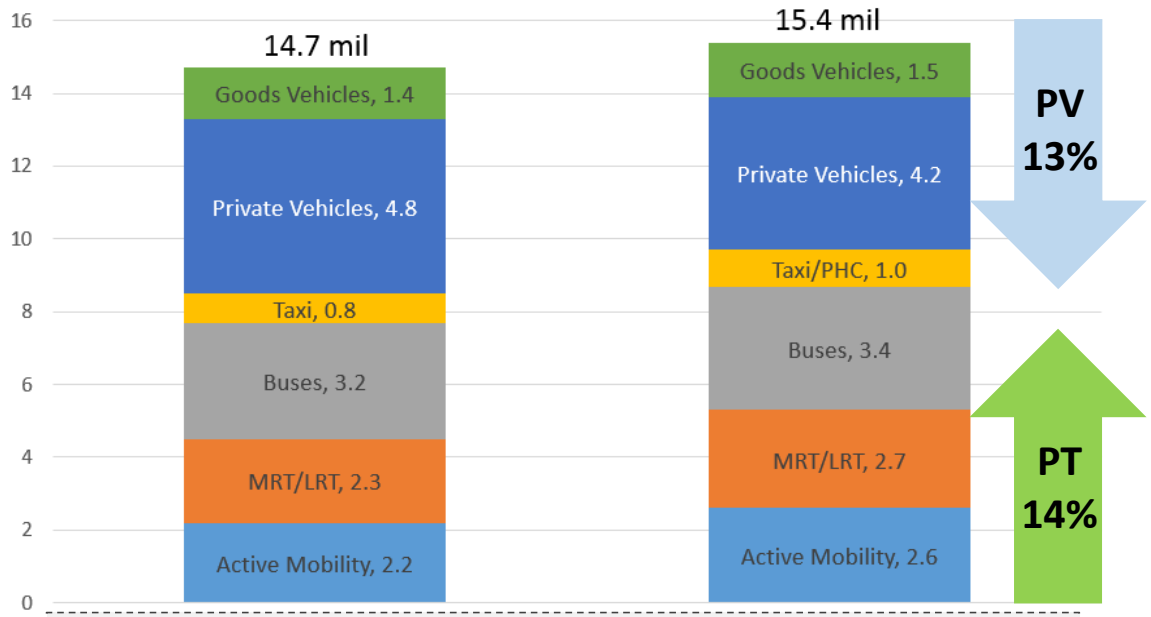


- Singapore is one of the most densely populated countries in the world: **5.6 million people** living in **720km²**



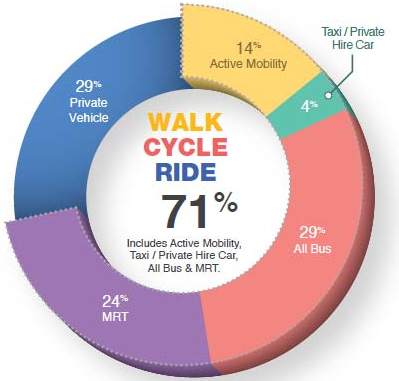
Growing Mobility Demand

- In 2016, **71%** of trips are made by **WCR** , walking, cycling and riding public transport
- By 2040, we expect mobility demand to **increase by ~50%**, with 90% of peak period trips to be on WCR modes
- There will also be a need to cater for a rapidly aging population

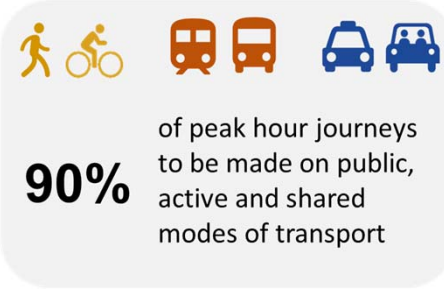


Travel Demand by Different modes of Transport (daily trips in millions)

2016 Mode share

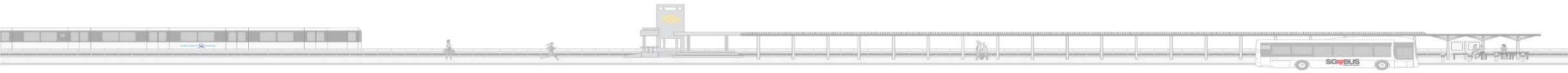


By 2040

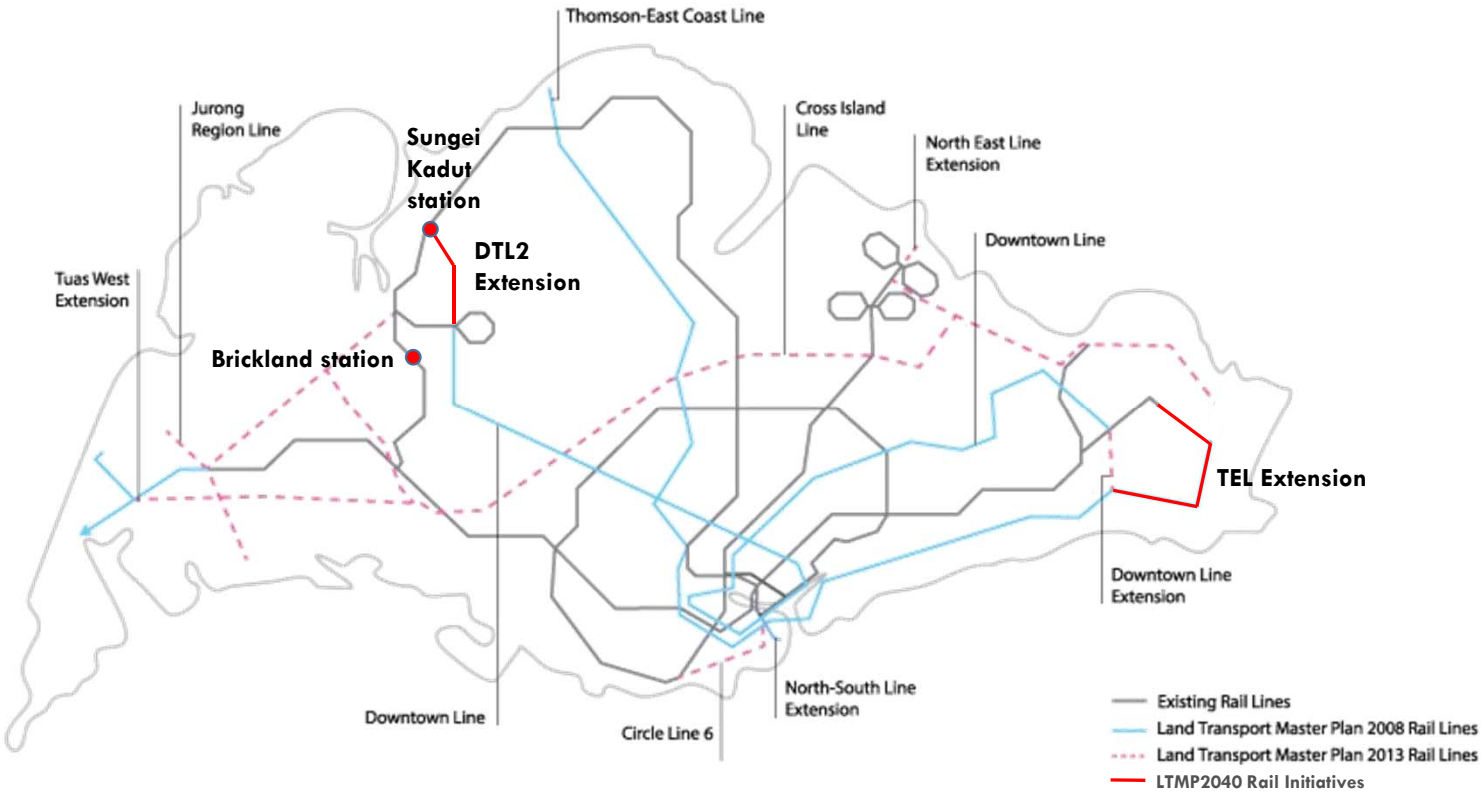


** Data Source: HITS 2016*

“Pull” Measures – Building a High Quality Public Transport System

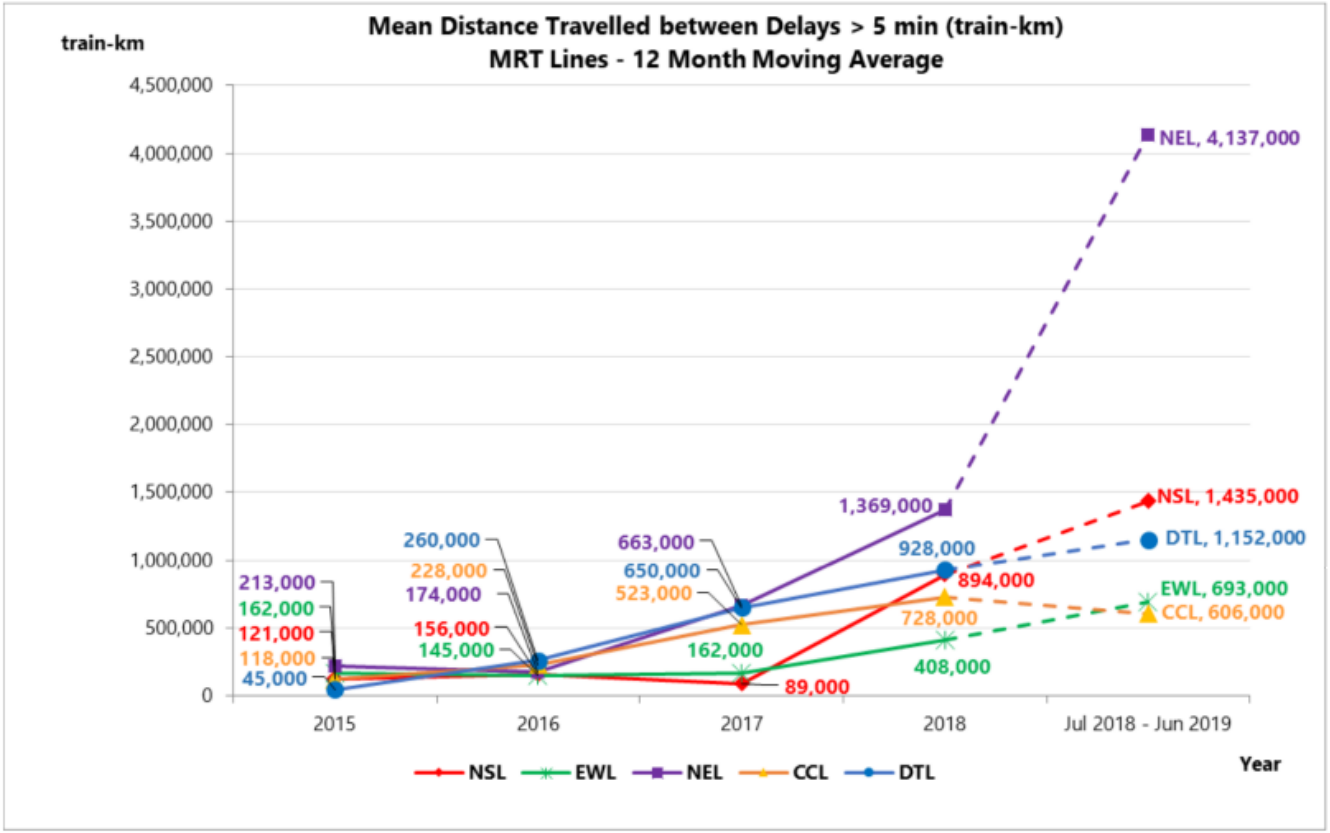


Rail Masterplan (up to 2040 and beyond)



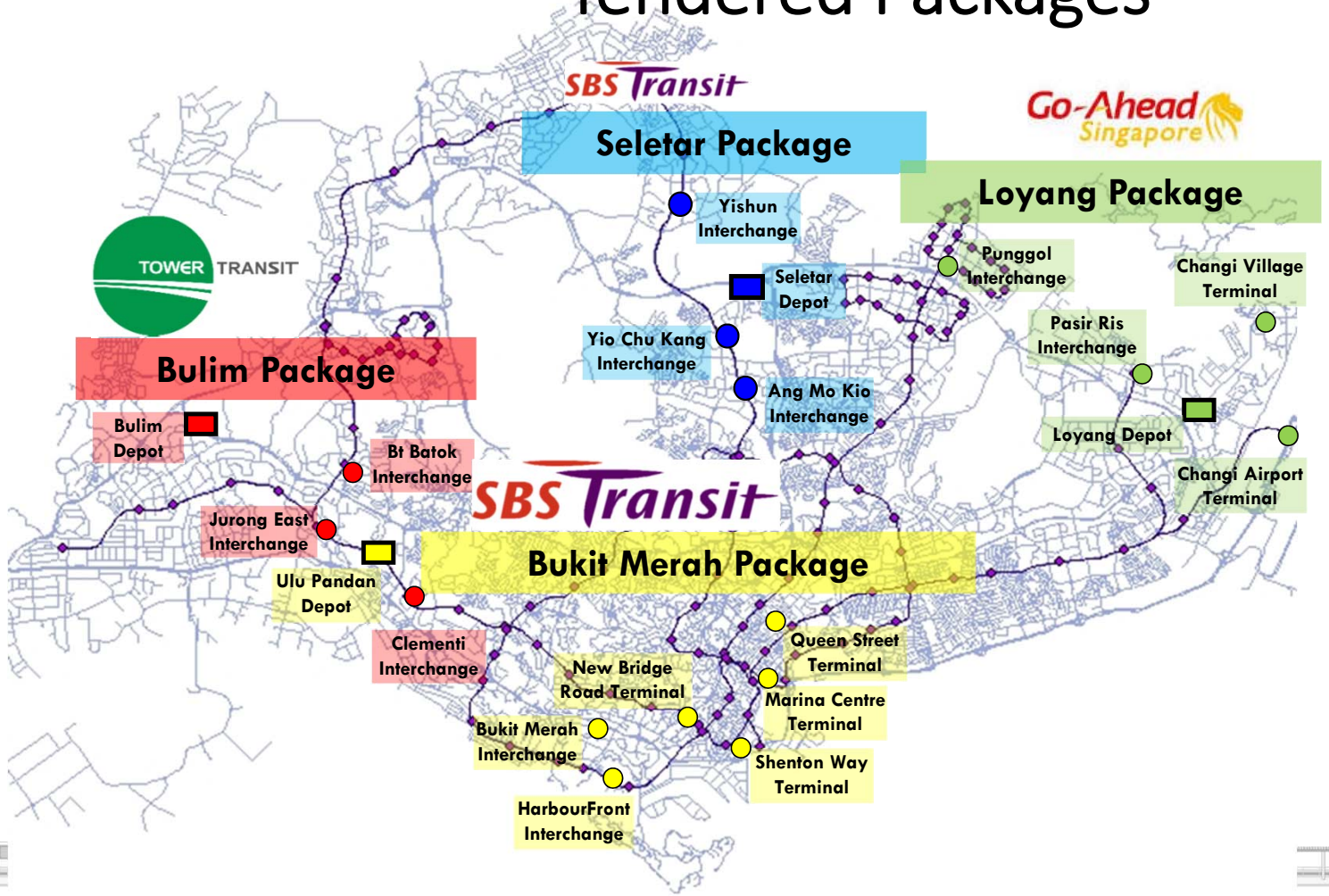
- Today, we have 230km of rail network. Estimated eventual state: more than 400km of rail network
- Today: **6.4-in-10 households** within 10-min walk from MRT station
- By 2030: **8-in-10 households** within 10-min walk from MRT station

Rail Reliability to Meet 45-minute City Target



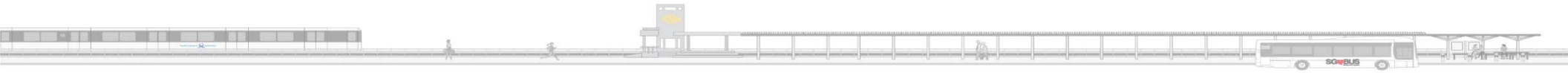
- MKBF an indicator of rail reliability.
- MKBF for overall MRT network in 2019 **more than 1mil train-km between delays.**
  - More than 5 times that in 2017.

Open and Contestable Market – Bus Network Tendered Packages



- Over 300 bus services
- All bus routes in Singapore are grouped into 14 packages for economies of scale to attract new bus operators
  - Area-based, centered around depots
  - Each depot has 300 – 500 buses
- The 4 packages on this slide are tendered.

“Push” Measures - Private Transport Demand Management



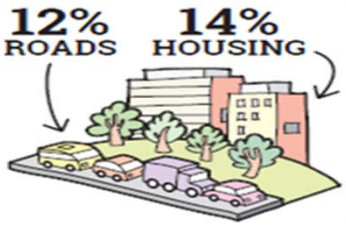
Overview of Vehicle Ownership & Usage Restraint Measures

Tax Type	Lever	Objective
Ownership	Vehicle Quota System (VQS)	To control supply of vehicles in Singapore (i.e. Certificates of Entitlement).
	Additional Registration Fee (ARF)	To influence demand for new vehicles by adding to the price of vehicles. Progressive tax that is tiered based on the open market value of the vehicle.
	Preferential Additional Registration Fee (PARF) rebate	To maintain a relatively young and road worthy fleet. Given if cars (only) are deregistered before 10 years of age.
	Vehicular Emissions Scheme (VES)	To incentivise the purchase of cleaner cars. Rebate/surcharge is given based on 5 pollutant readings (CO2, NOx, HC, CO, PM).
	Excise Duty	Imposed and collected by Singapore Customs.
Recurrent ownership	Road Tax	To reflect use of road space and road damage. There is a surcharge for vehicles more than 10 years old to encourage renewal.
Usage	Electronic Road Pricing (ERP)	To manage localised congestion.
	Fuel Duty/Special Tax	To encourage fuel conservation and discourage excessive use of vehicles to reduce congestion and pollution.

Vehicle Quota System

(Implemented 1 May 1990)

Aim of VQS

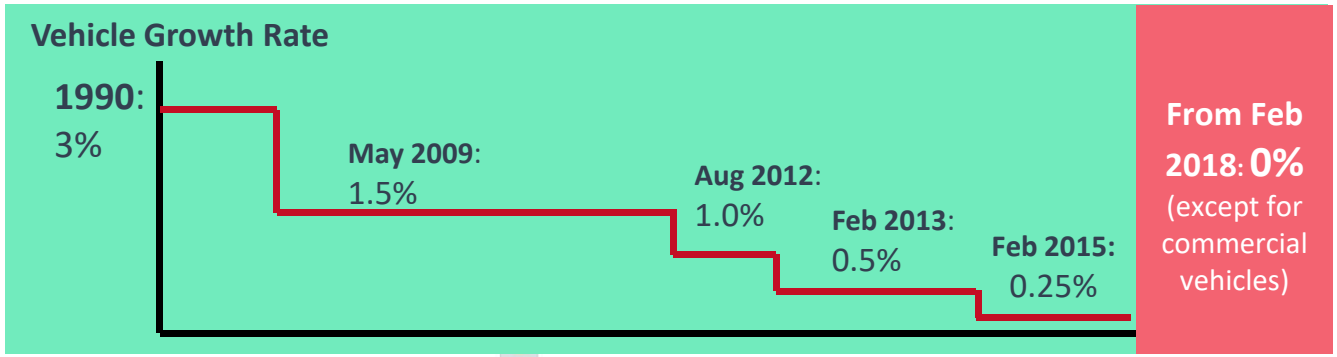


- Limit vehicle population at a level that can be sustained by our limited road space.

How?

- A Certificate of Entitlement (COE) is required to register a new vehicle. COEs are valid for 10 years and are allocated through an online open auction system, conducted twice a month.

- The Vehicle Growth Rate (VGR) determines the number of new COEs released. As future road supply growth is limited to serving new development areas and public transport, VGR has been set to zero from Feb 2018.



Vehicle Usage Restraint: Congestion Pricing

- Singapore was the first city to implement congestion pricing with the Area Licensing Scheme (ALS) in 1975.

- Electronic Road Pricing system (ERP) replaced ALS in 1998. ERP manages localised road congestion by
  - Time (peak hours)
  - Route
  - Destination (e.g. city bound)
  - Vehicle Type
  - Point and cordon charging systems

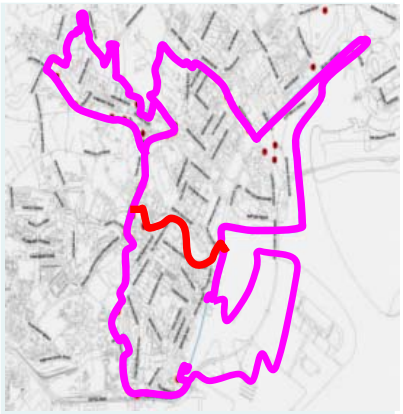
- Gantries are fitted with cameras, displays & sensors
  - 78 ERP gantries currently in operation

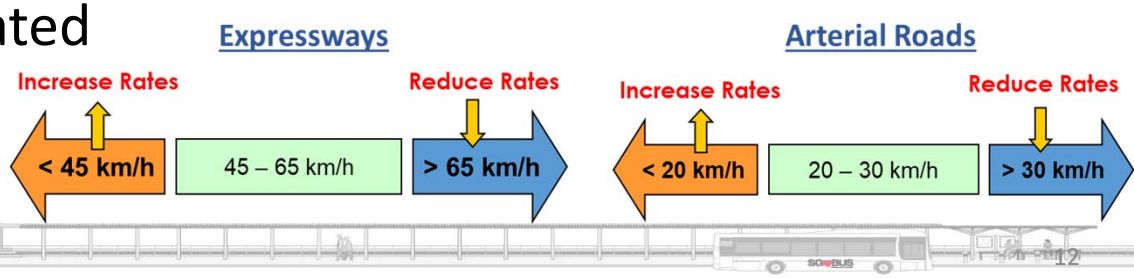
Area Licensing Scheme (ALS)

Electronic Road Pricing (ERP)

ERP Charges Based on Traffic Flow

- ERP utilises point and cordon based charging.
  - **Point charging**: used to maintain speeds along congested stretches of roads and expressways
  - **Cordon charging**: to maintain speeds within cordon, with uniform pricing across all entry points
- Charges based on travel speed and traffic flow measurements on roads associated with the charge point

Point	Cordon
	
Charging at strategic points	**Charging entering economic centres**

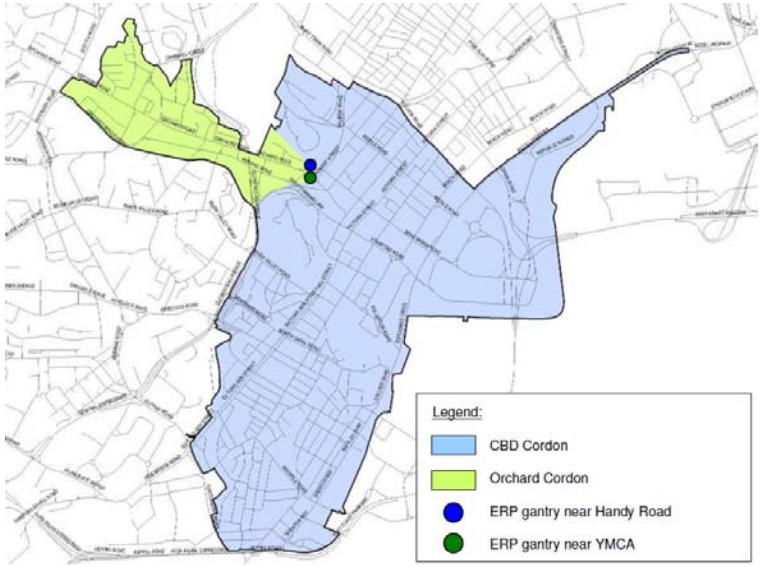


Case Study: The Orchard ERP Scheme

- Before 2005, Orchard Road was part of the Central Business District (CBD) cordon
- Orchard Road was designated as a separate cordon in Oct 2005
  - As a shopping belt, traffic patterns are different from the rest of the CBD
  - Traffic builds up from 12noon to 8pm, incl. Saturdays
- Since implementation, traffic flows on weekday evenings reduced by 36-39%
  - Proportion of through-traffic decreased from ~38% to 28-29% of total traffic

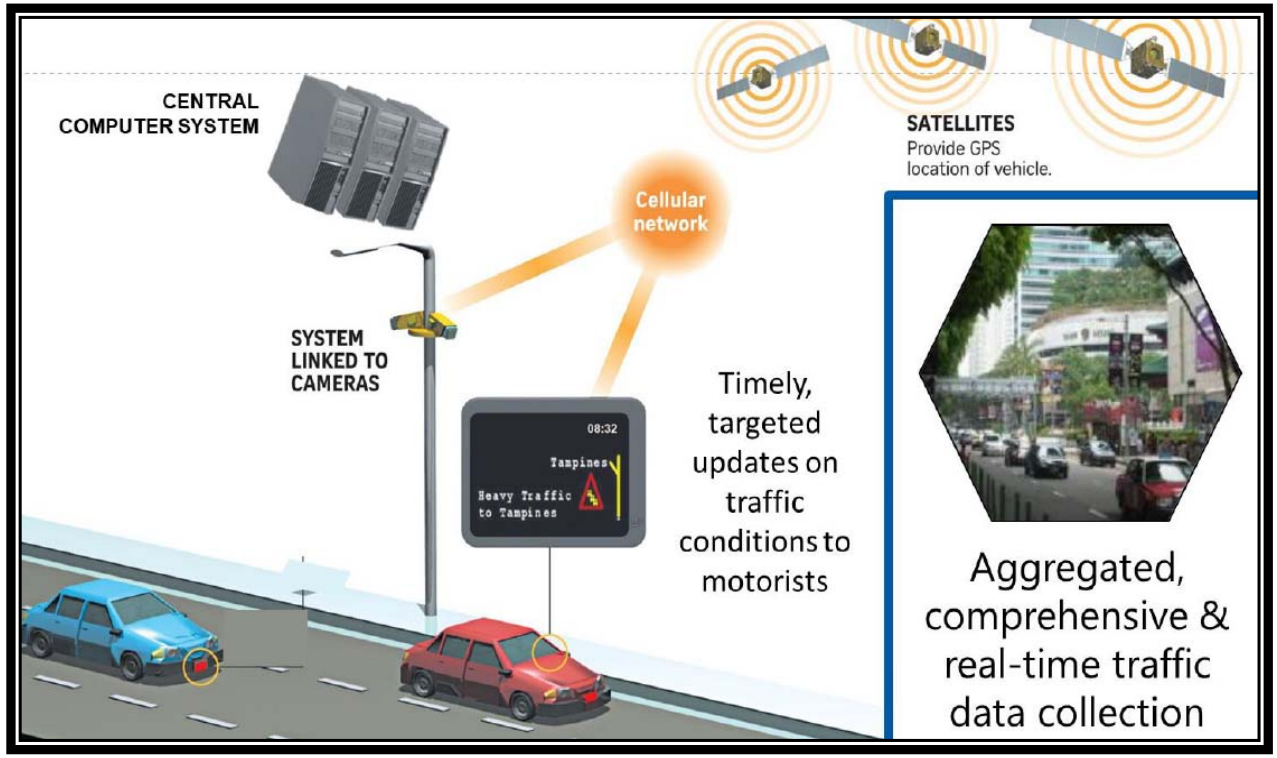
Table 2: Changes to Traffic Flows into Orchard Cordon on Weekdays

Time Period	Starting ERP Rates[2]	Before[3]	Oct 05	Nov 05
8 – 9am	$0.00	7,250	7,350 (1%)	8,050 (11%)
9 – 10am	$0.00	7,000	7,650 (9%)	8,300 (19%)
7 – 8pm	$1.00	12,000	7,700 (-36%)	7,300 (-39%)



Next- Generation ERP Based on Global Navigation Satellite System Technology

- No more reliance on physical gantries
- Platform enables new capabilities and flexibility. E.g.,
  - Distance based pricing
  - Real-time traffic information and dissemination

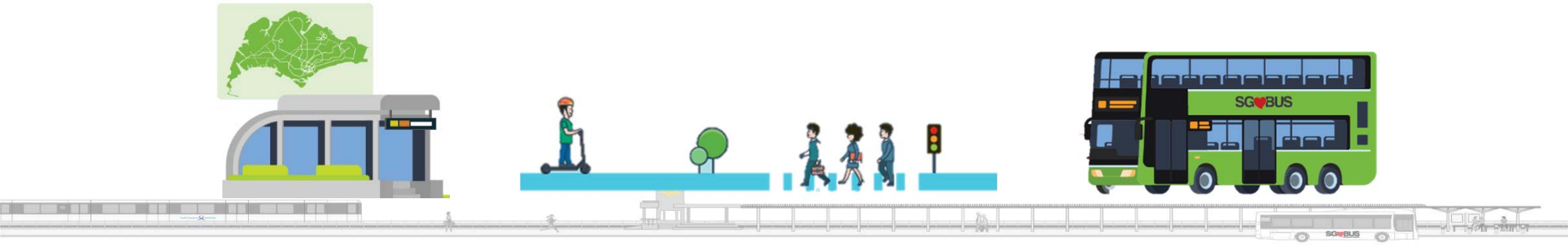


Conclusion: Going Car-lite

- Singapore's approach towards going car-lite is multi-pronged.

- WCR must be a viable and attractive alternative to cars. Our extensive investment in WCR infrastructure has enabled us to effect measures on vehicle ownership and usage.

- We remain open to new mobility solutions and technologies that can enhance our land transport system.

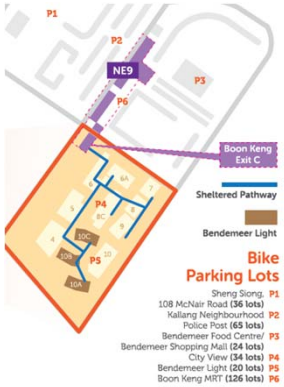


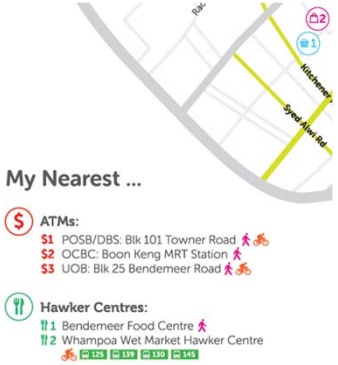

MINISTRY OF
TRANSPORT
Thank you!

Leveraging Behavioural Nudges

Travel plans for residential developments

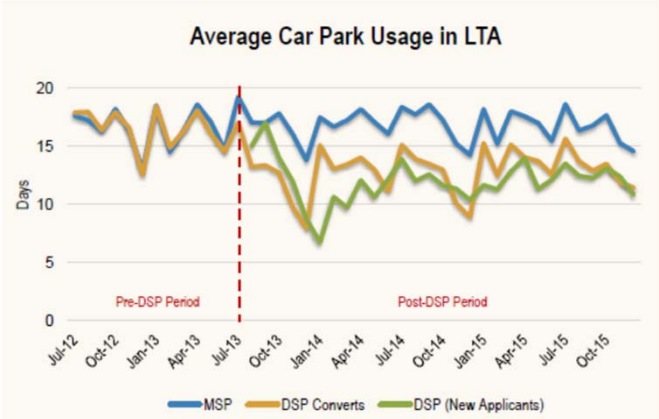
- New residents may be more amenable to changing travel behaviour
- Provide new residents with travel plans to encourage use of WCR modes



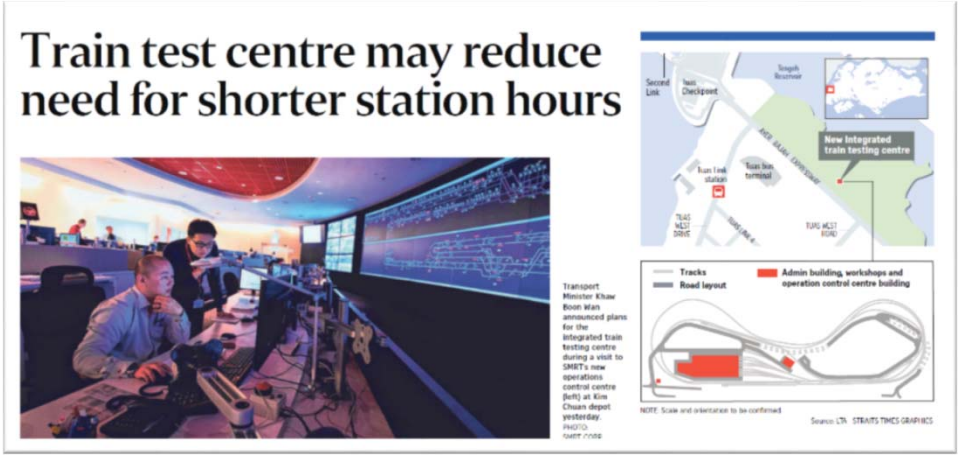


Daily season parking

- Convert monthly season parking into daily charges
- Reduce sunk cost effect of parking and to make cost of parking more salient



Ensuring Rail Reliability



Train test centre may reduce need for shorter station hours

Transport Minister Khaw Boon Wan announced plans for the integrated train testing centre during a visit to SMRT's new operations control centre (left) at Kim Chuan depot yesterday.

New Integrated train testing centre

Tracks
Road layout
Admin building, workshops and operation control centre building

NOTE: Scale and orientation to be confirmed

Source: LTA STRAITS TIMES GRAPHICS

Re-signalling

Since 2012

North South East West Lines Sleeper Replacement

2012 – 2016

3rd Rail Replacement

2015-2017

Power System Replacement

Since 2018

New Trains for oldest 66 Kawasaki Heavy Industries Trains

Since 2018

Replacement of Track Circuits for detection of train position

Since 2018

Purchase Price of a Car in Singapore

VES (+$10,000 surcharge)

Registration Fees ($220)

COE ($33,000)

Additional Registration Fees (100% OMV)

Goods & Services Tax# (7%)

Excise Duty (20% OMV)

- **Category A**
- **OMV $20,000**
- **VES Band C1**

Total basic cost*: ~$89,000

 # GST is imposed on vehicle sale price minus regulatory charges (RF, ARF, COE)

** Excludes certain costs such as sales commission of motor dealers, Road Tax, insurance etc.*

Comparing Purchase Prices

Toyota Corolla (Category A)

From ~21,000€ (~S$ 32,000)

From ~US$ 19,000 (~S$ 26,000)

From ~SG$ 93,000

BMW 330i (Category B)

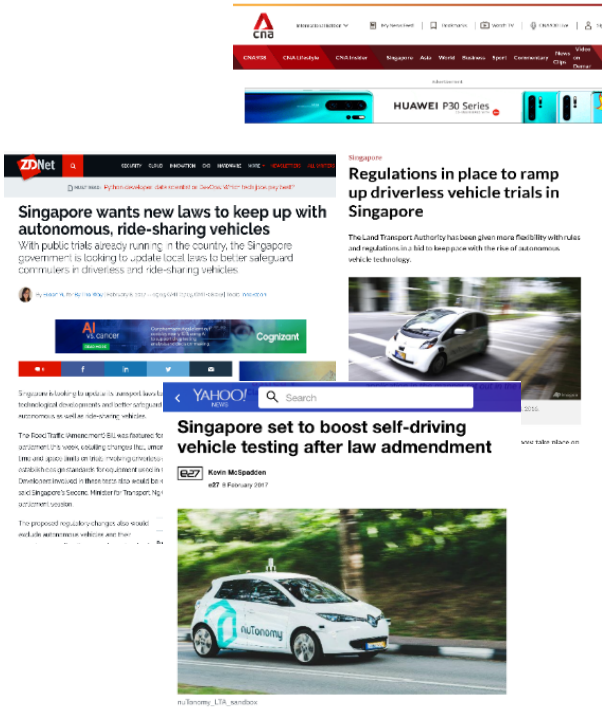
From ~45,000€ (~S$ 68,000)

From ~US$ 41,000 (~S$ 56,000)

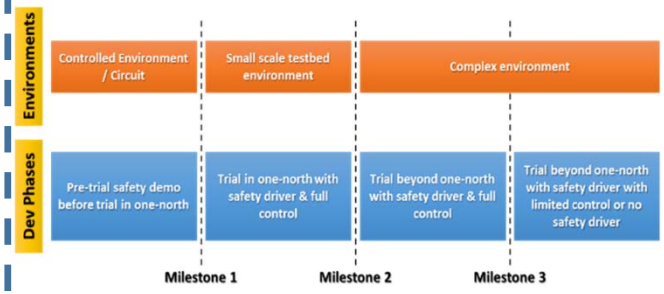
From ~SG$ 221,000

Enabling an (Autonomous) Future

Regulatory Sandbox



Testing Regime



CETRAN

Standards Regime

Technical Reference 68 – Autonomous Vehicles

Autonomous Vehicles Pilot Town Deployments

- Singapore plans to undertake a pilot deployment of AVs as public transport in the upcoming development areas of Punggol, Tengah and the Jurong Innovation District (JID) in early 2020s

- Expansion of AV trial area to all of western Singapore (around 1000km)