



Transport for Melbourne

Public Forum – Fixing Melbourne's Transport

Friday 24<sup>th</sup> August 2018; 1:30-4:30p.m.

60 Leicester Street, Carlton, Melbourne

# Melbourne Transport – Problems, Progress and Futures

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Public Transport Research Group

Institute of Transport Studies

Monash University



MONASH  
INSTITUTE OF  
TRANSPORT  
STUDIES

**Institute of Transport Studies (Monash)**

The Australian Research Council Key Centre in Transport Management



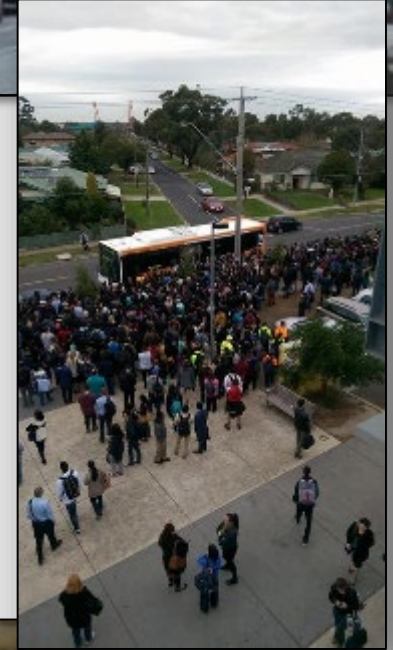
## Introduction

Transport in Melbourne

Public Transport in Melbourne

The Drivers of Change

The Future



# This presentation overviews Melbourne transport problems, progress and futures ...

## Issues Covered

- What is the transport context of Melbourne?
- What are the major public transport problems in service provision and development
- Outlines progress in service development
- Identifies Ideas for Bold Politicians



...and is structured as follows

**Transport in  
Melbourne**

**Public  
Transport  
in  
Melbourne**

**The Drivers  
of Change**

**Progress?**

**Ideas**



# Introduction

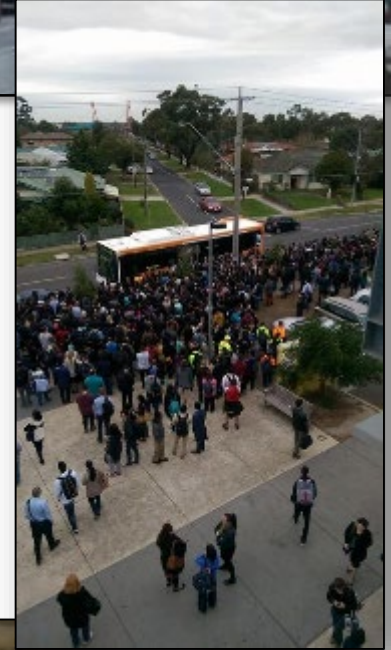
## Transport in Melbourne

### Public Transport in Melbourne

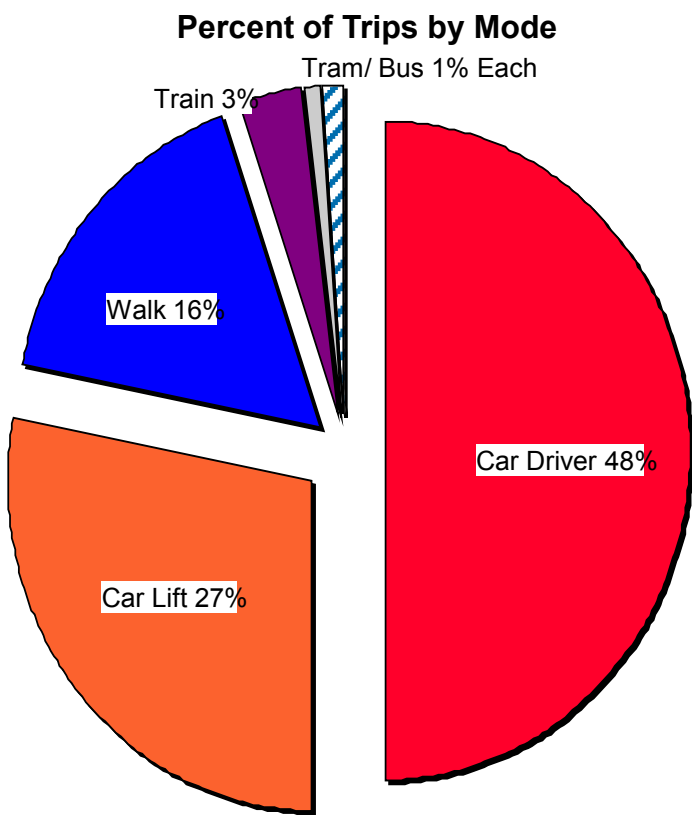
### The Drivers of Change

### Progress?

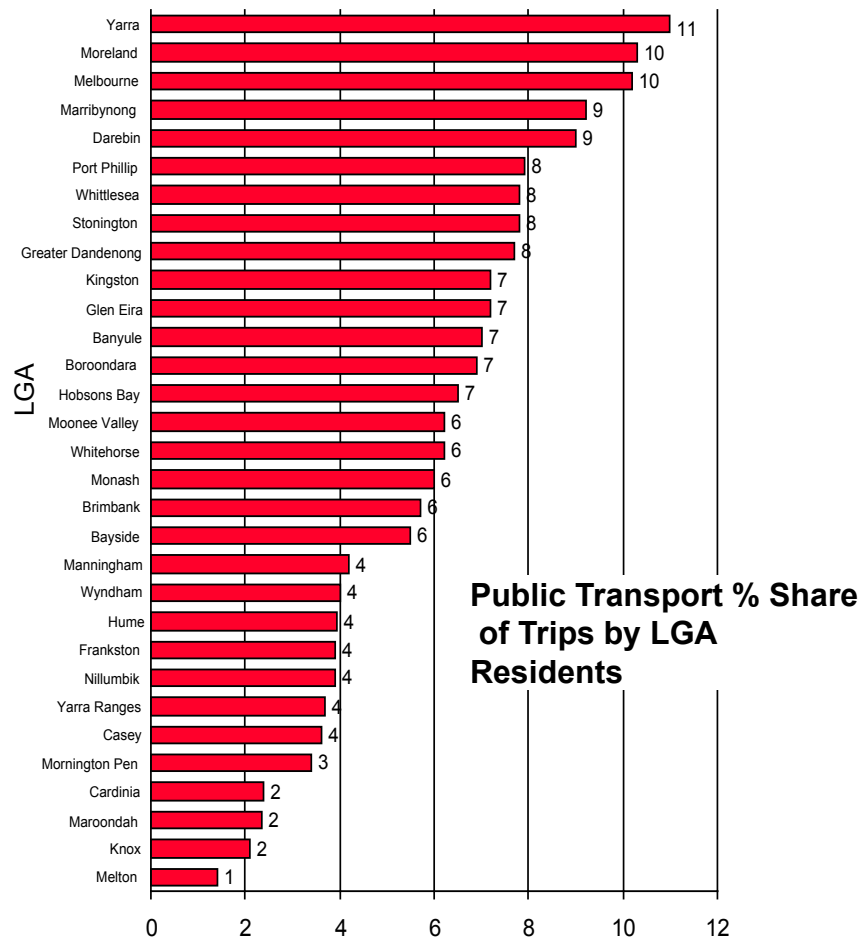
### Ideas



# Melbourne is a car based society – 75% of trips are by car



Source: Melbourne on the move – VATS 1994



# Car vehicle sales and ownership continue to rise

Total new passenger vehicles sold annually - Australia

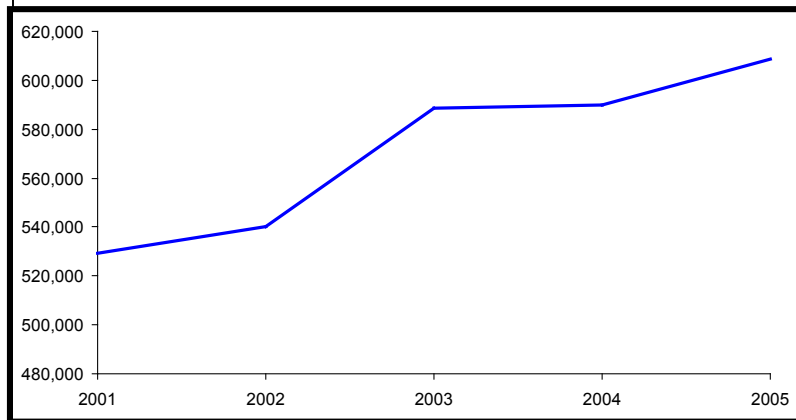


Figure 7.2: New passenger vehicle sales 2001-2005 (FCAI, 2006)

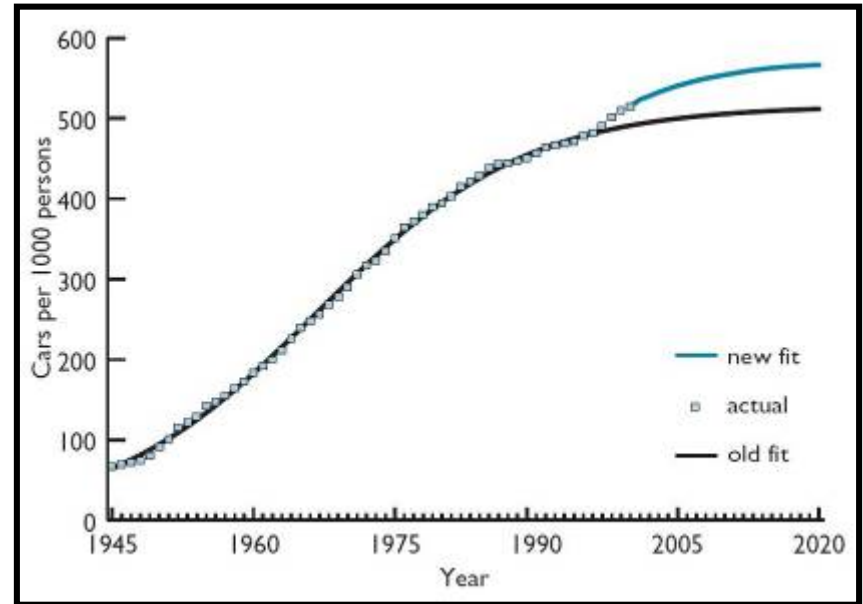
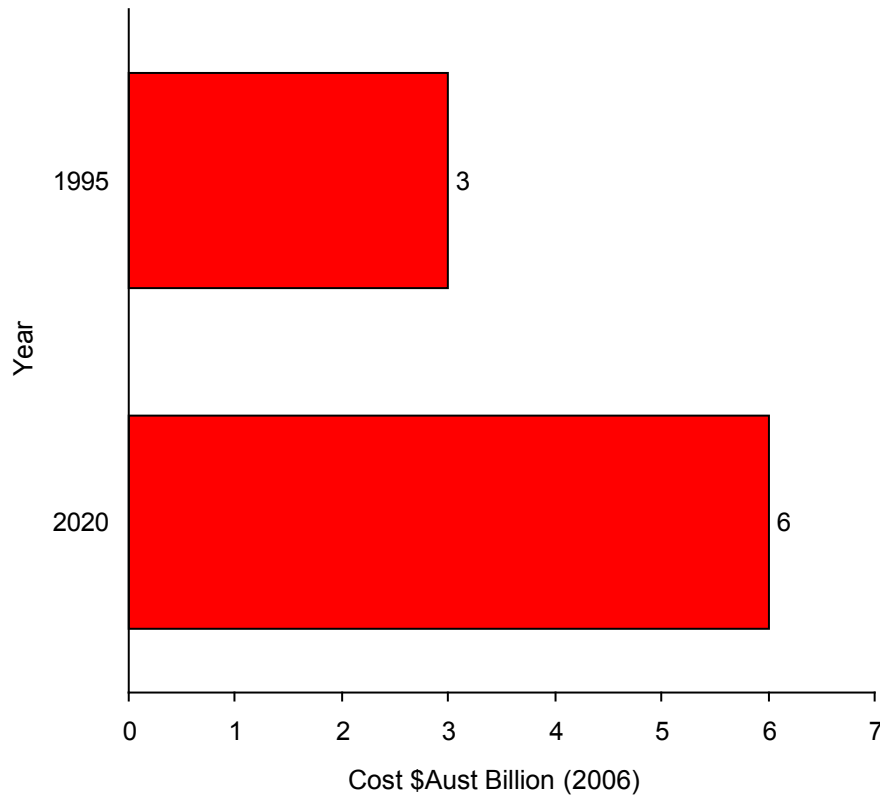


Figure 10.4: Revised projected per capita Australian motor vehicle ownership (BTRE, 2002, p.15)

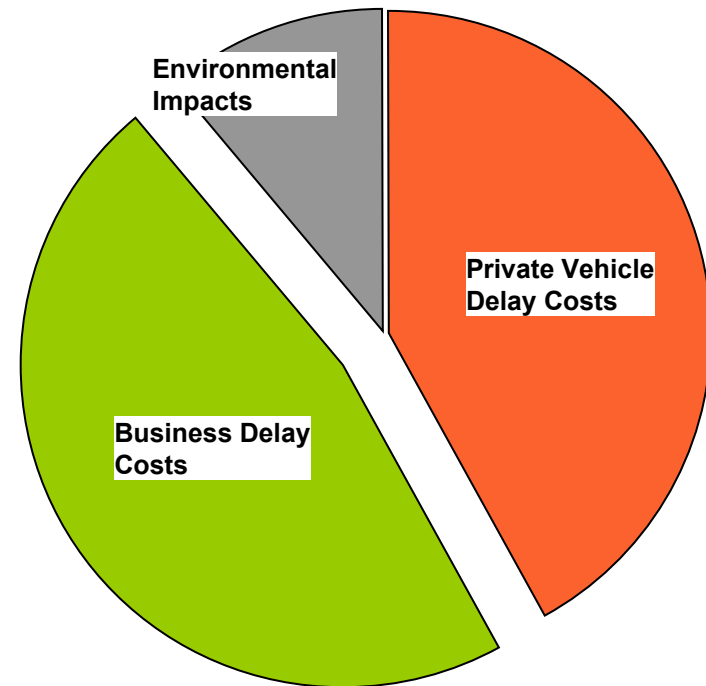
# Urban traffic congestion in Melbourne costs \$3B p.a. (2005) and will double by 2020

Cost of Urban Traffic Congestion - Melbourne

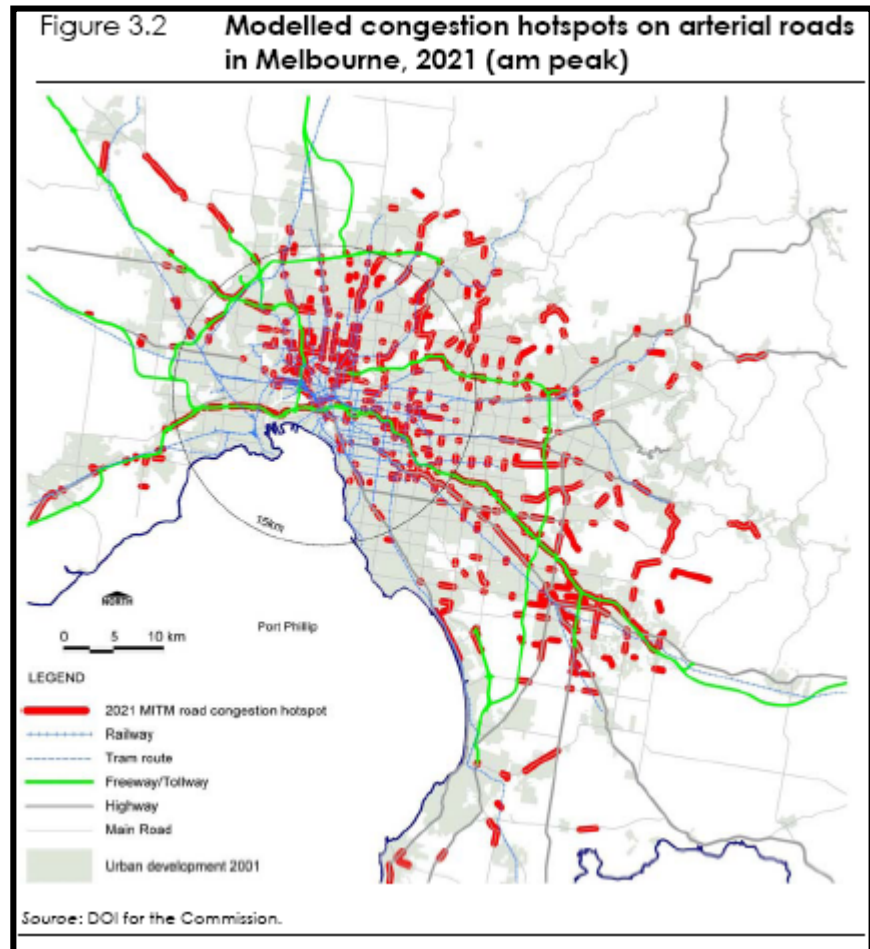
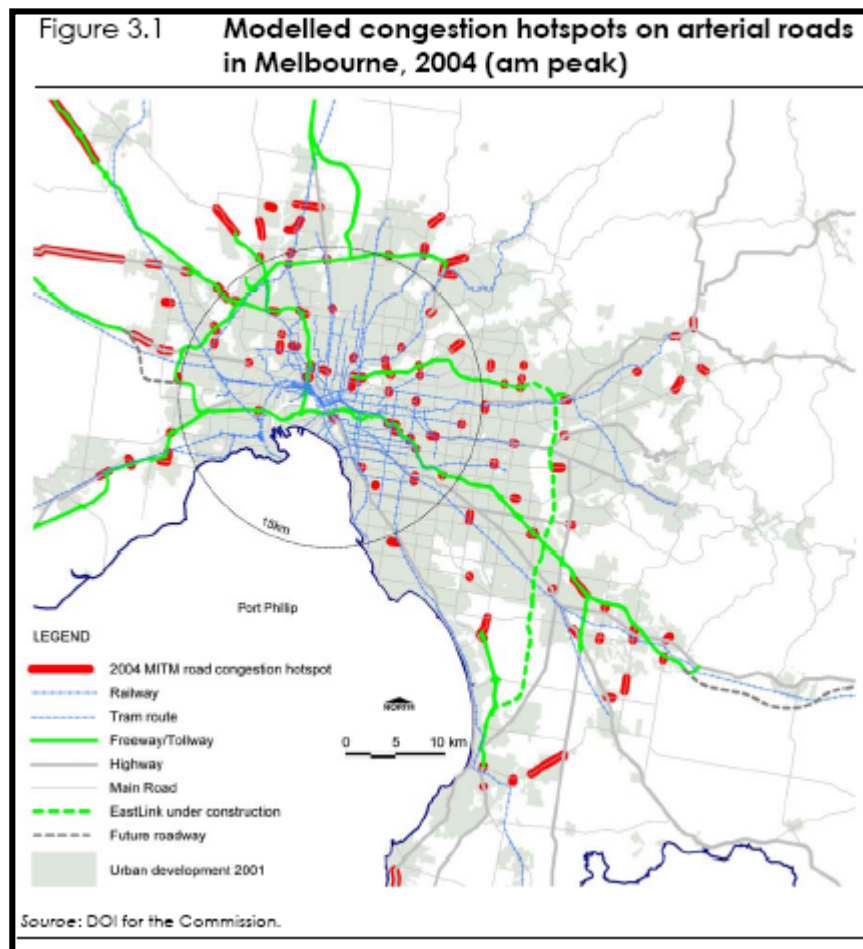


Source: BTRE (2006)

Share of 1995 Costs



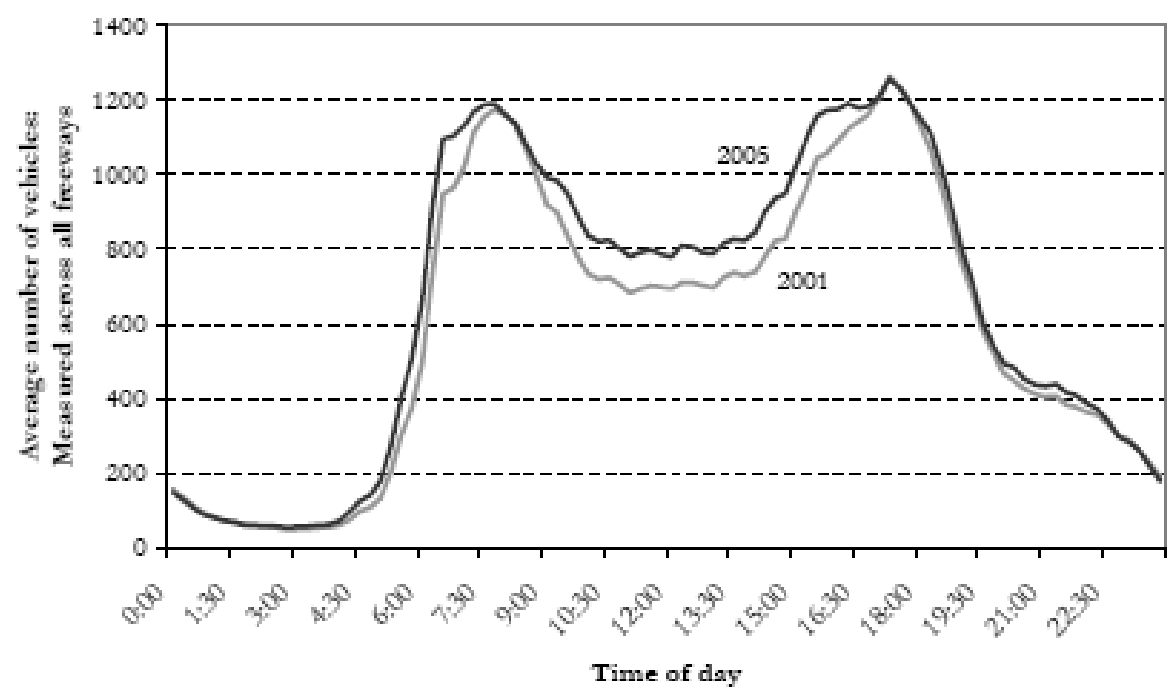
# Congestion 'hotspots' are expected to spread spatially....



Source: VCEC (2006) Inquiry into Managing Transport Congestion



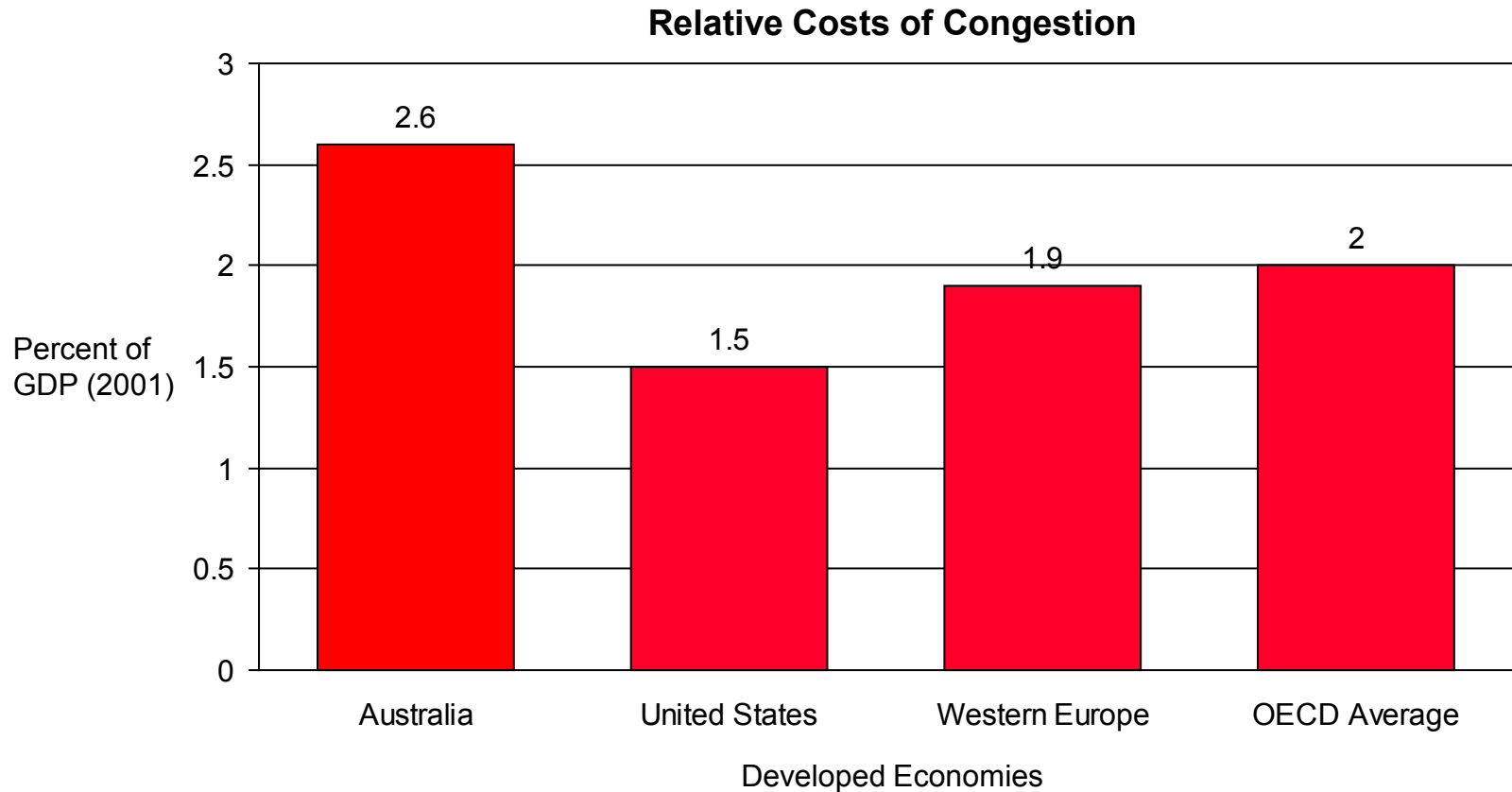
Figure 3.3      **Peak spreading on Melbourne's freeways**



Source: VicRoads.

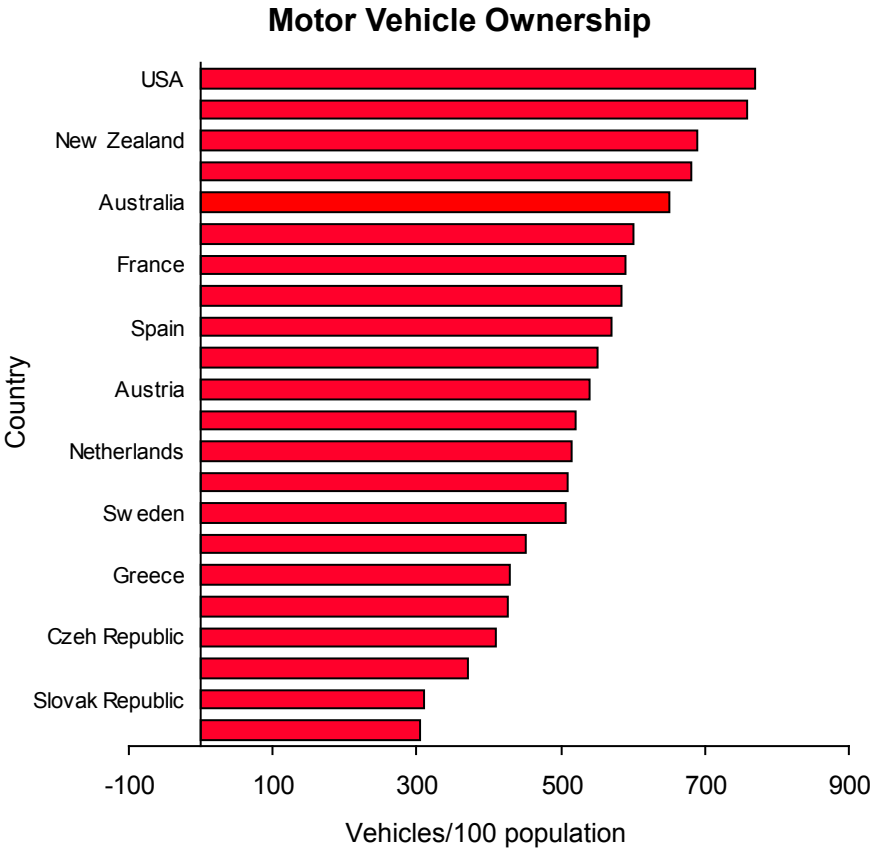
Source: VCEC (2006) Inquiry into Managing Transport Congestion

# While all developed economies are affected, in Australia impacts are greater...

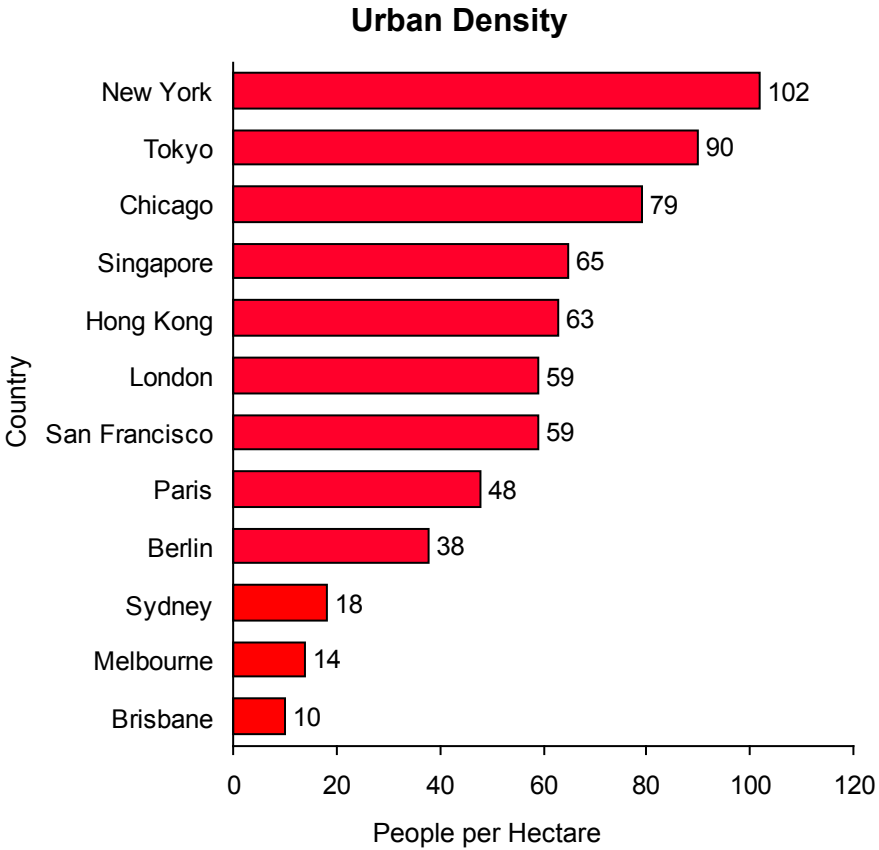


*Source: ARA (2006) National Passenger Transport Agenda*

...due to higher car dependency, low urban density, and.....

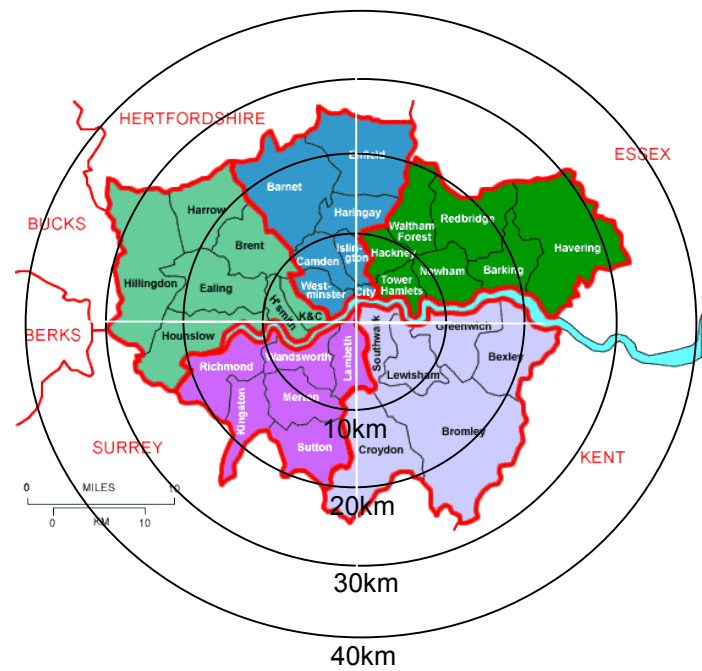
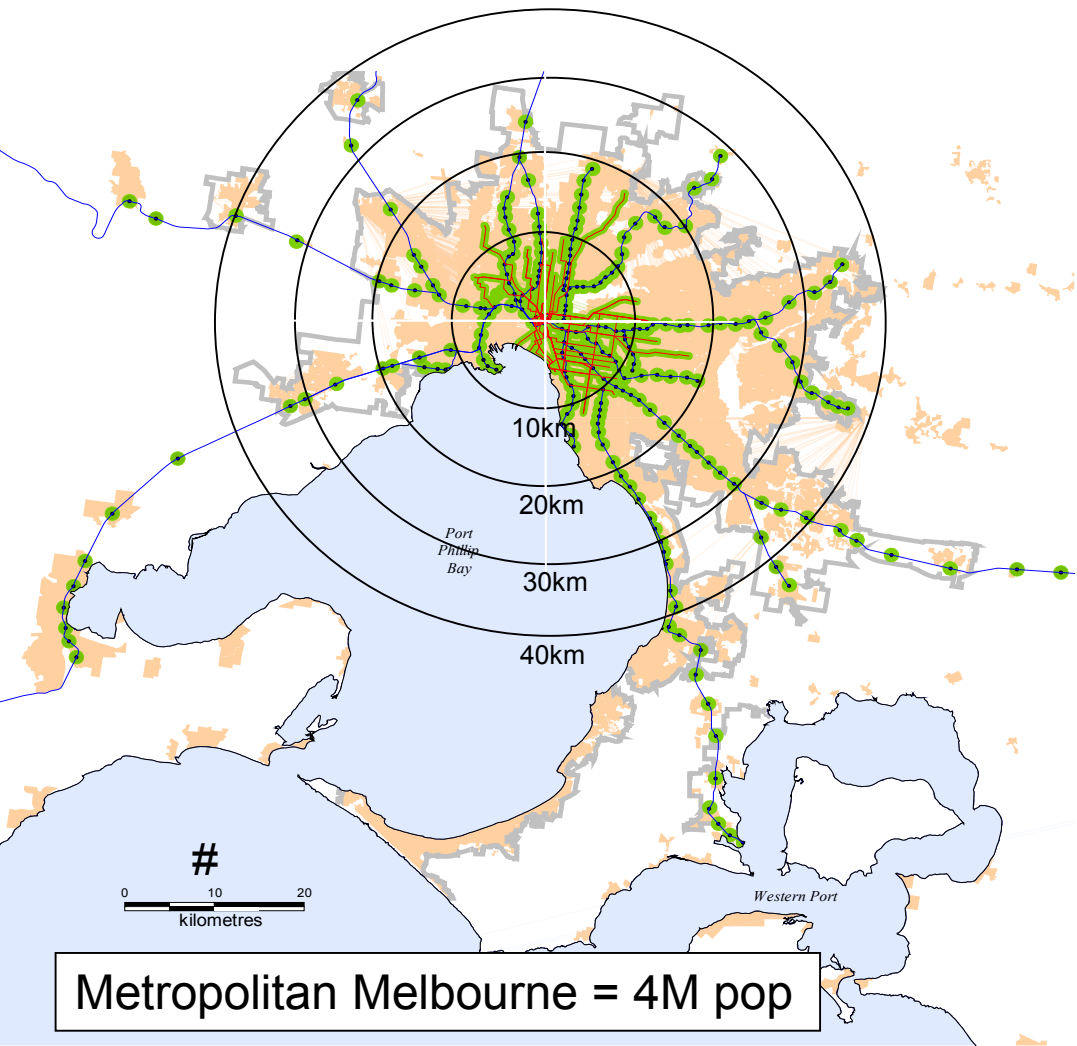


Source: OECD Factbook (2006)



Source: The Economist - Submission to the VCEC Inquiry into Managing Transport Congestion (2006)

...because our cities are GIGANTIC in scale



Introduction

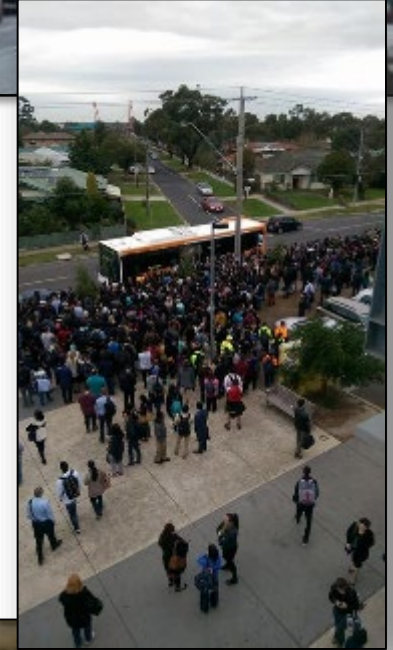
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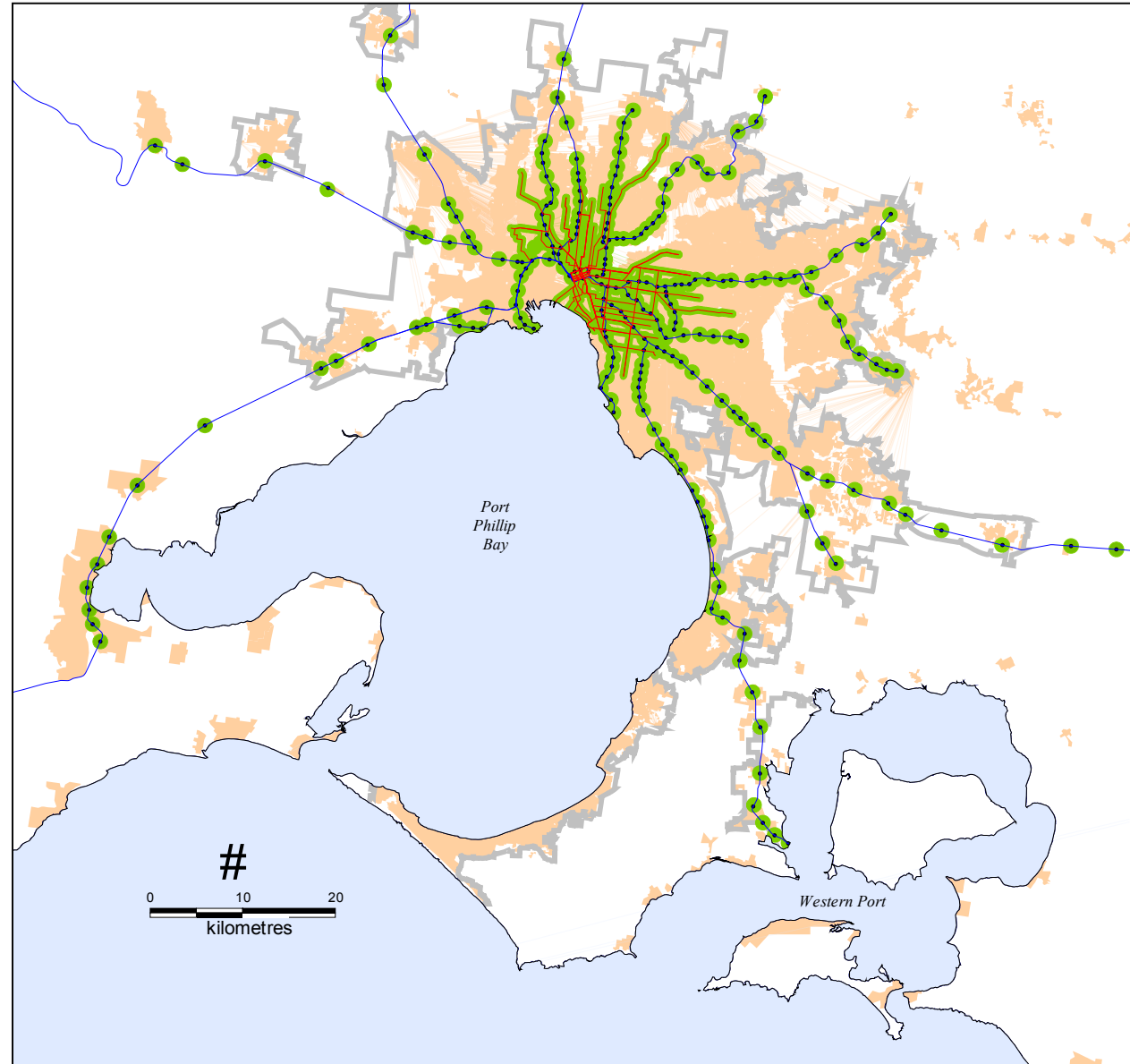
Ideas





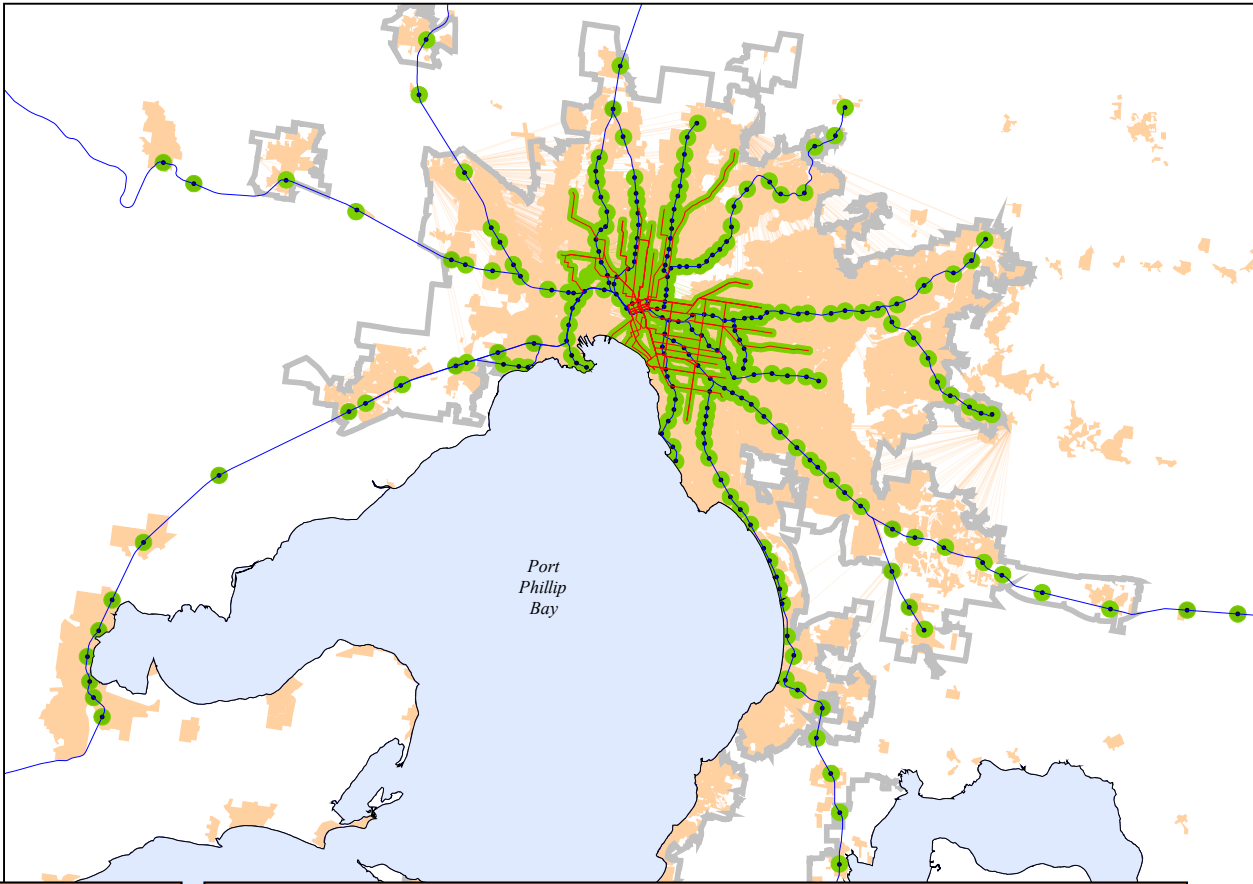
# Buses **ARE** Melbourne's public transport for most residents, which is a problem....

- Over two thirds of Melbourne can only be serviced by bus services since rail and tram services lie considerable distances from where people live or where they want to travel to
- In 1996 the Metropolitan strategy team identified that 2.16M Melbournians lived in areas where buses were the only means of access to public transport. 0.98M lived within access distance of rail services



...because there arent many

- Over two thirds of Melbourne can only be serviced by bus services since rail and tram services lie considerable distances from where people live or where they want to travel to
- In 1996 the Metropolitan strategy team identified that 2.16M Melbournians lived in areas where buses were the only means of access to public transport. 0.98M



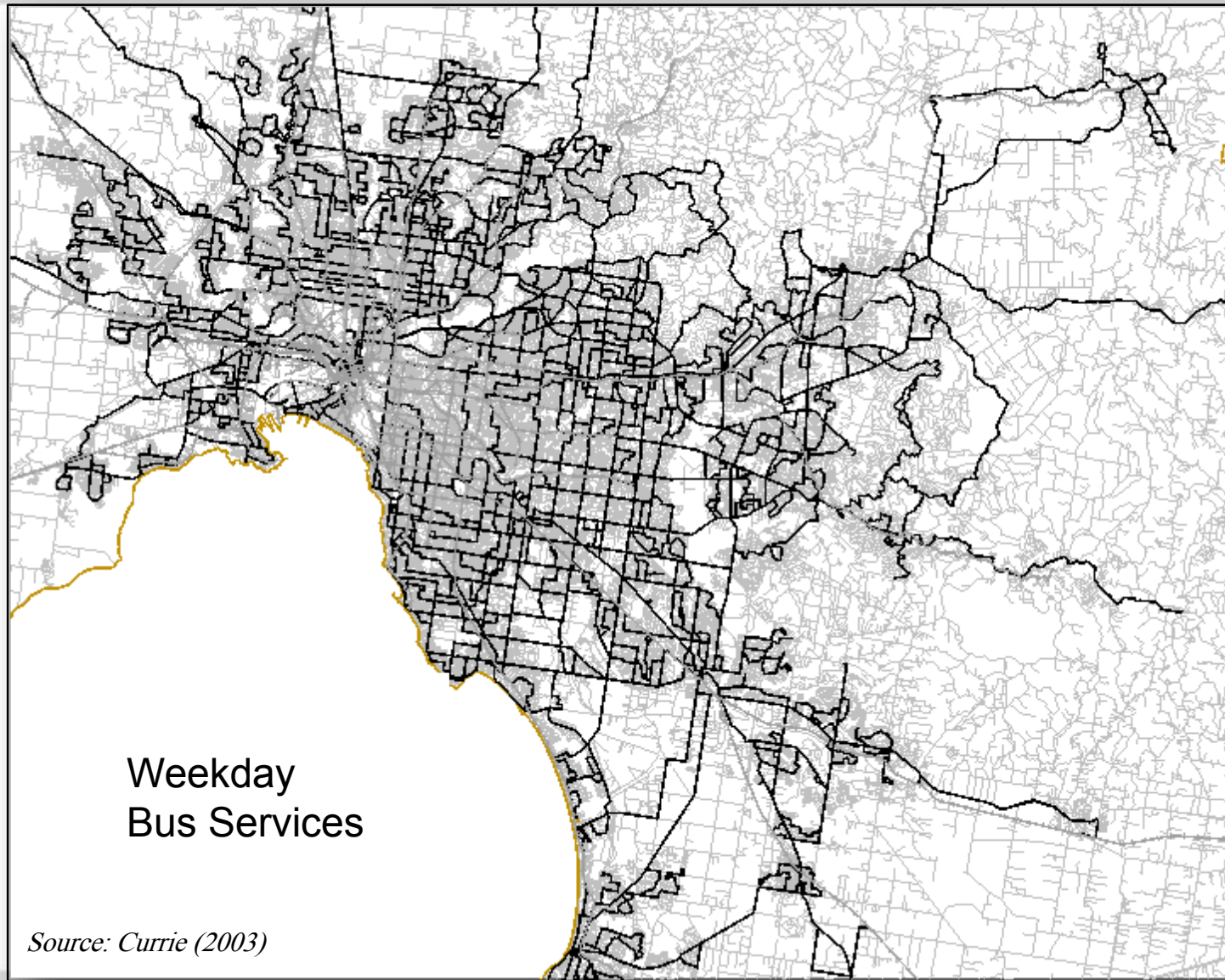
Weekday Service Frequency (2006)

	Peak	Off Peak
AV. MELBOURNE	40m	50m

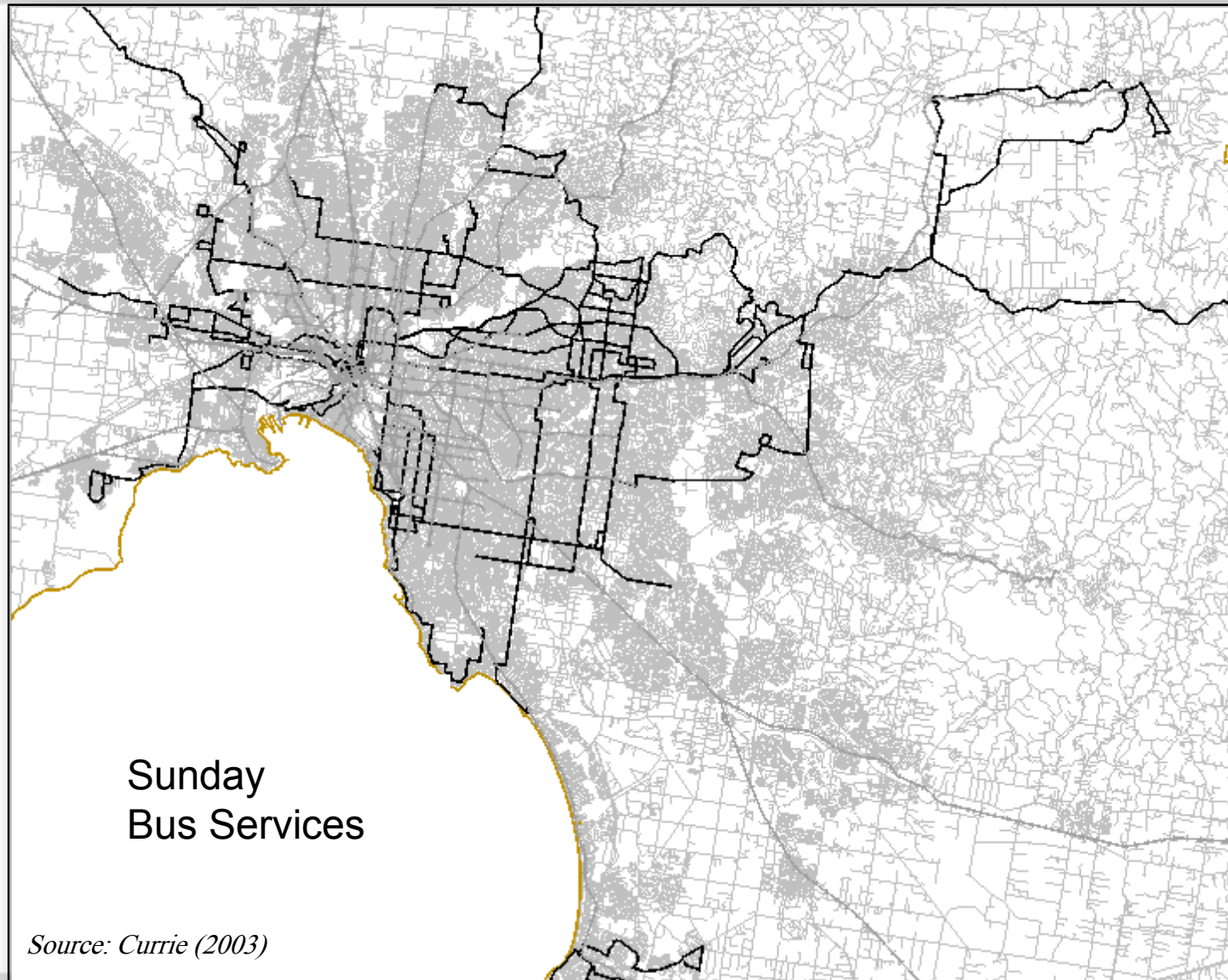
Weekday Service Span

Weekday
AV. MELBOURNE 06:46-18:53

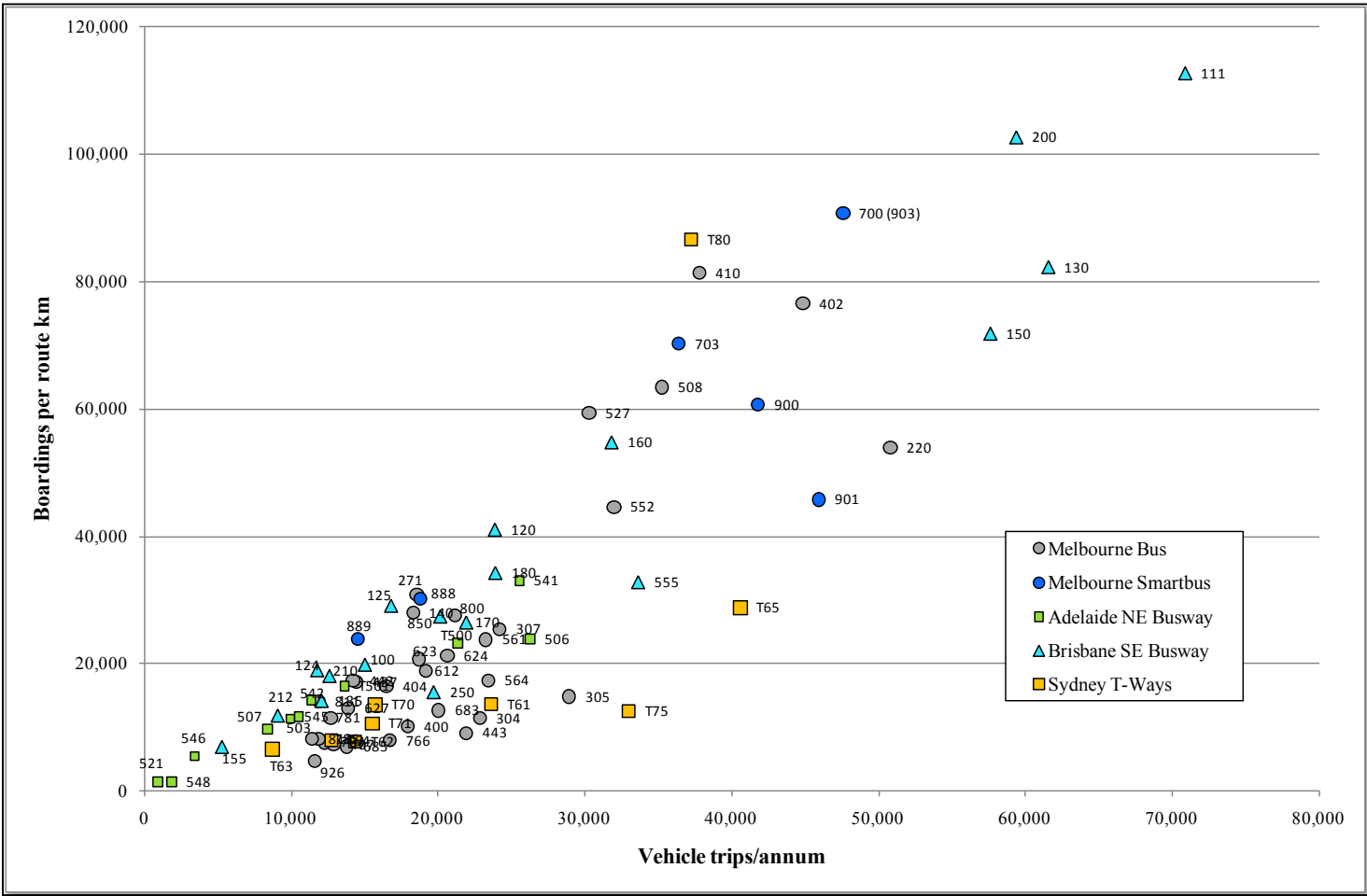
# The bus network on weekdays...



...contrasts somewhat with weekends



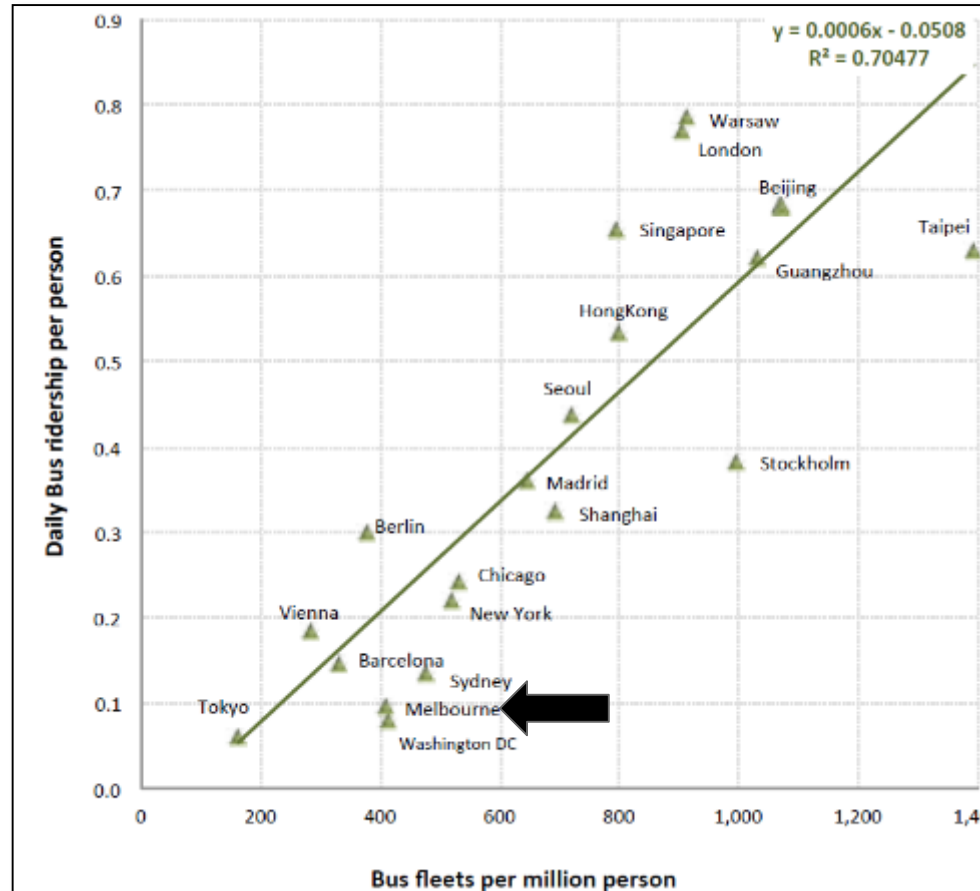
# Frequency drives Australian ridership performance



Source: Currie, G. and Delbosc A (2011) 'Understanding bus rapid transit route ridership drivers: An empirical study of Australian BRT systems' TRANSPORT POLICY Volume 18, Issue 5, September 2011, Pages 755-764



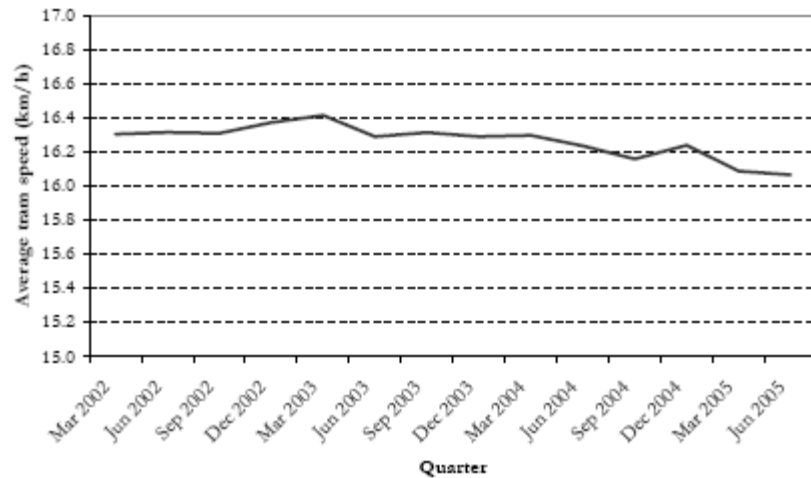
In general our bus service level is poor compared to world practice



Source: Pan D (2013) 'Key Transport Statistics of World Cities' Journeys Sept 2013

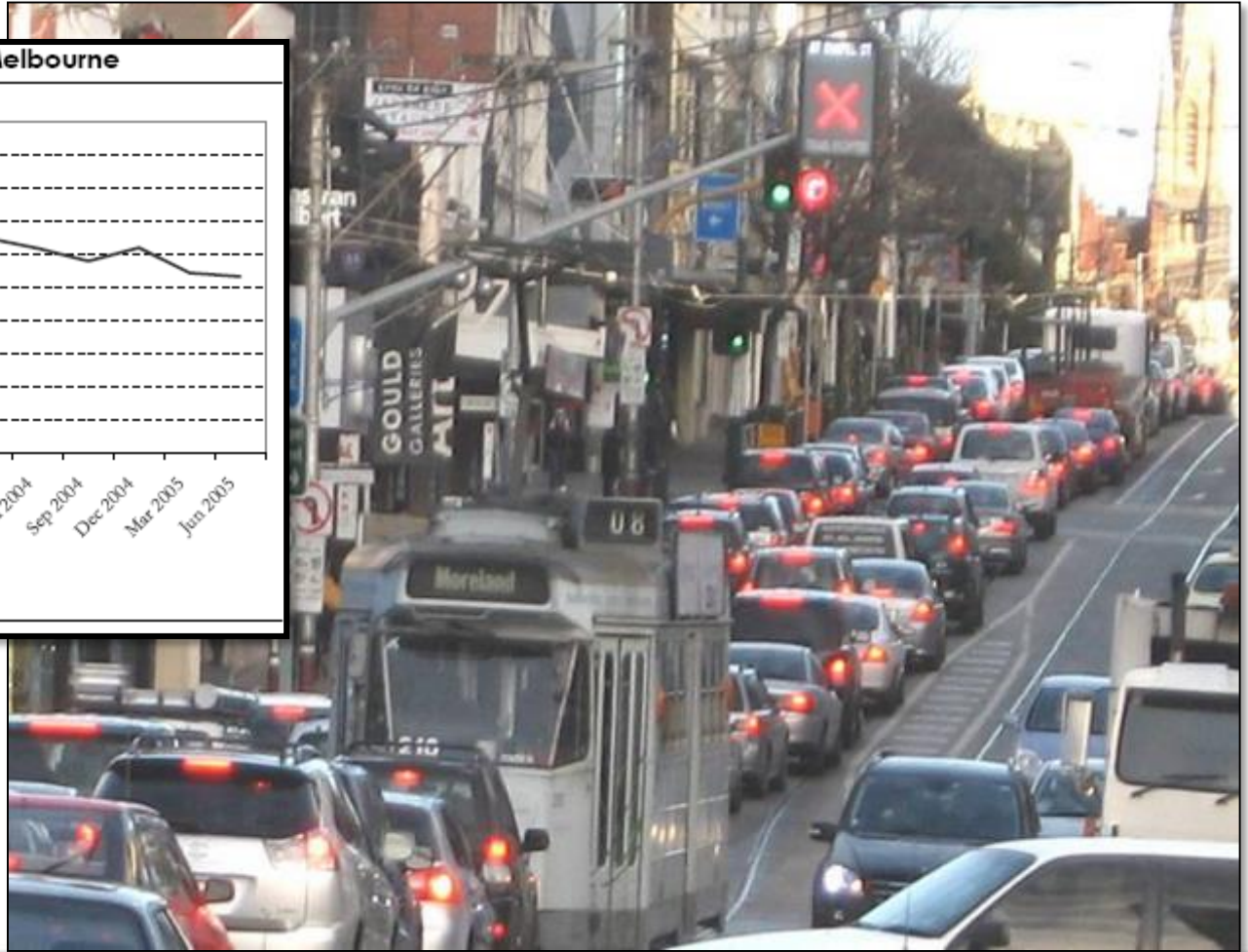
# Tram services are struggling in growing traffic congestion

Figure 3.7 Average tram speeds in Melbourne

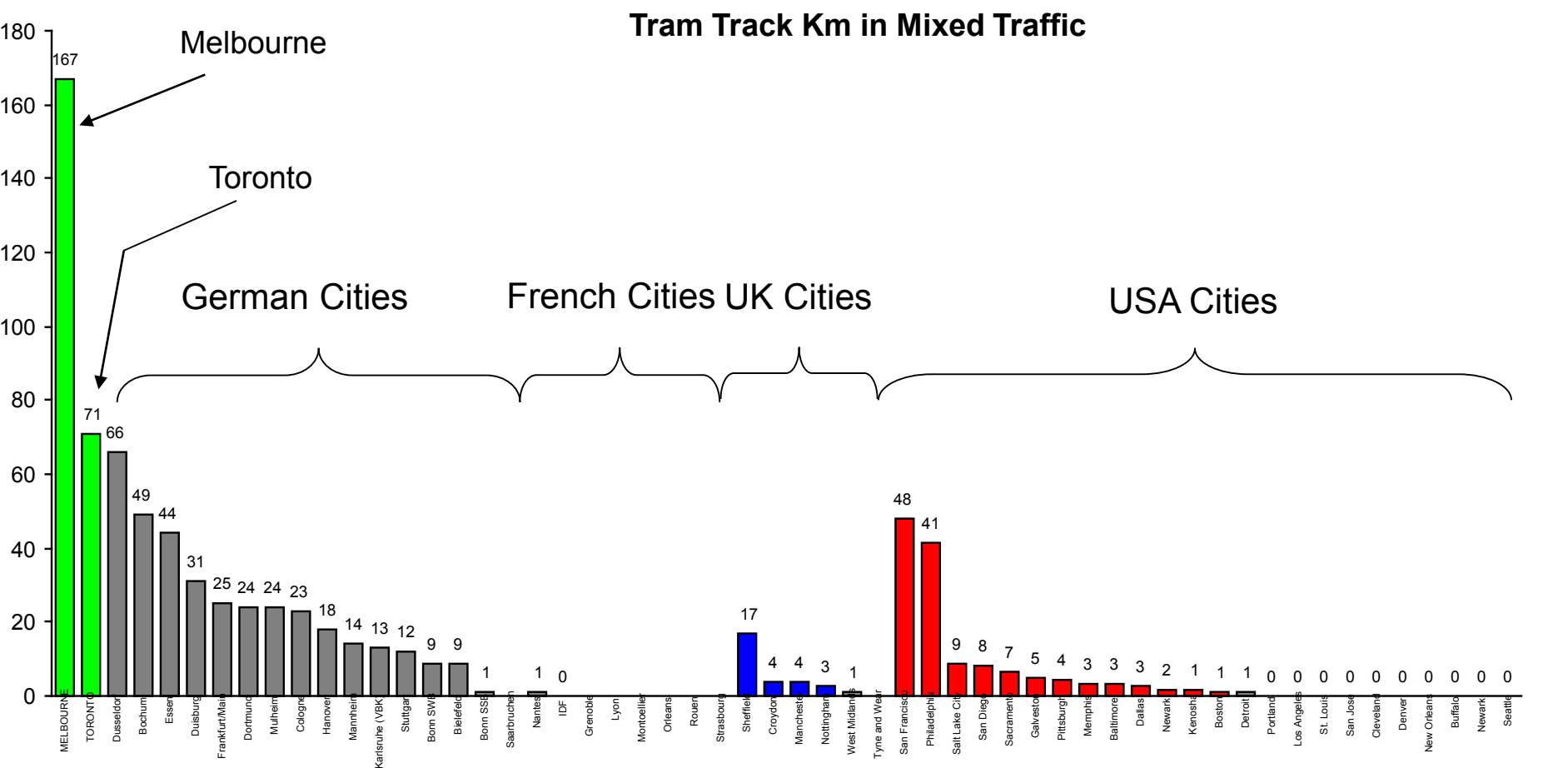


Source: DOI, sub. 55.

Source: VCEC (2006) *Inquiry into Managing Transport Congestion*



# Melbourne is the worlds biggest “streetcar” system



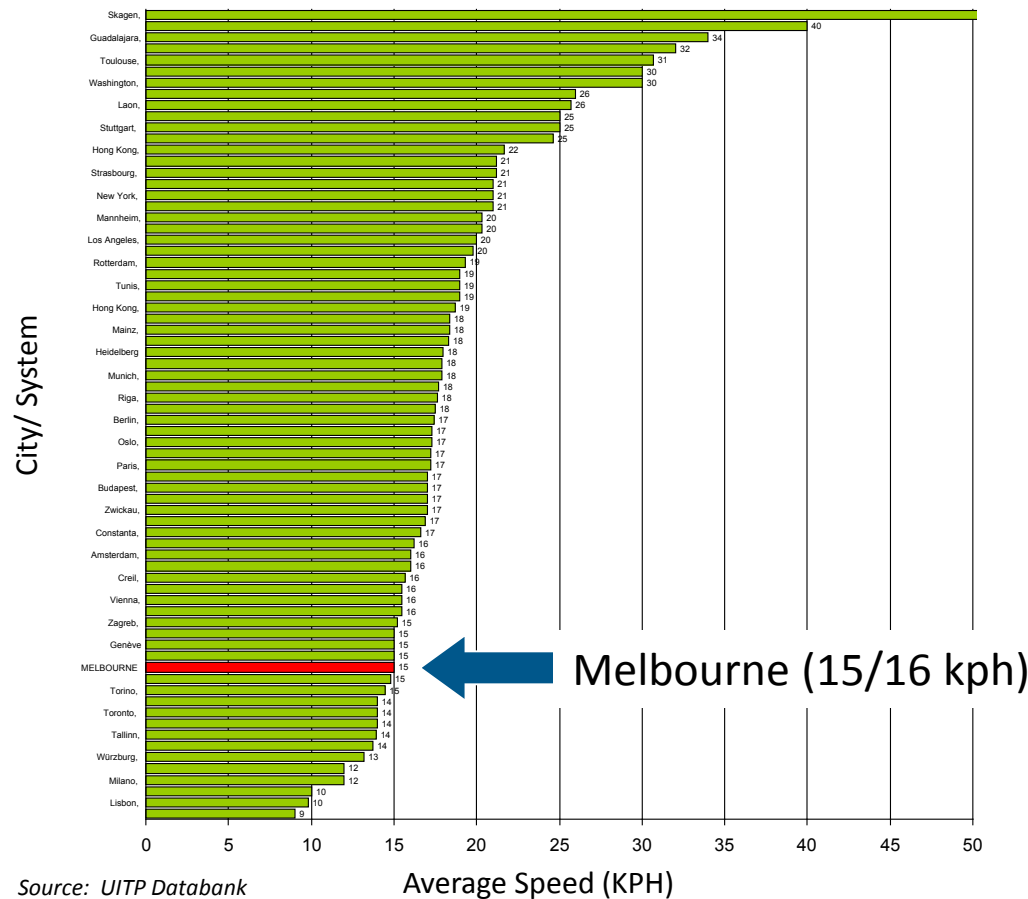
Source: Currie G and Shalaby A (2007) ‘Success and Challenges in Modernising Streetcar Systems – Experience in Melbourne and Toronto’  
Transportation Research Record No 2006 Transportation Research Board Washington DC ISSN 0361-1981 pp 31-39 2007





# Mixed Traffic service impedes performance

## Average Operating Speeds – World Tram/Light Rail Systems



### Melbourne Tram Reliability

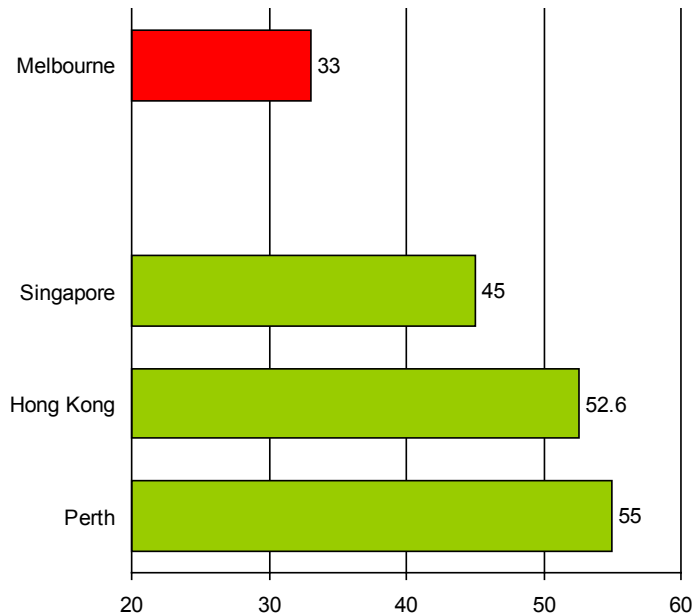
- 33% of services are considered to be NOT running on time
- On time defined as arriving more than 1 min early of more than 6 mins late

Source: Track Record



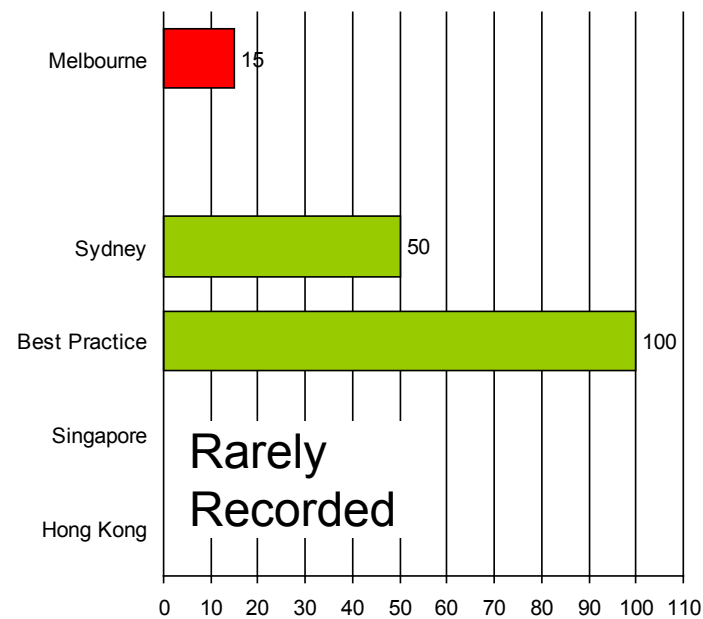
# Better performing railways are built on new not old infrastructure and strong resilience/reliability

## Average Speed (Kph)



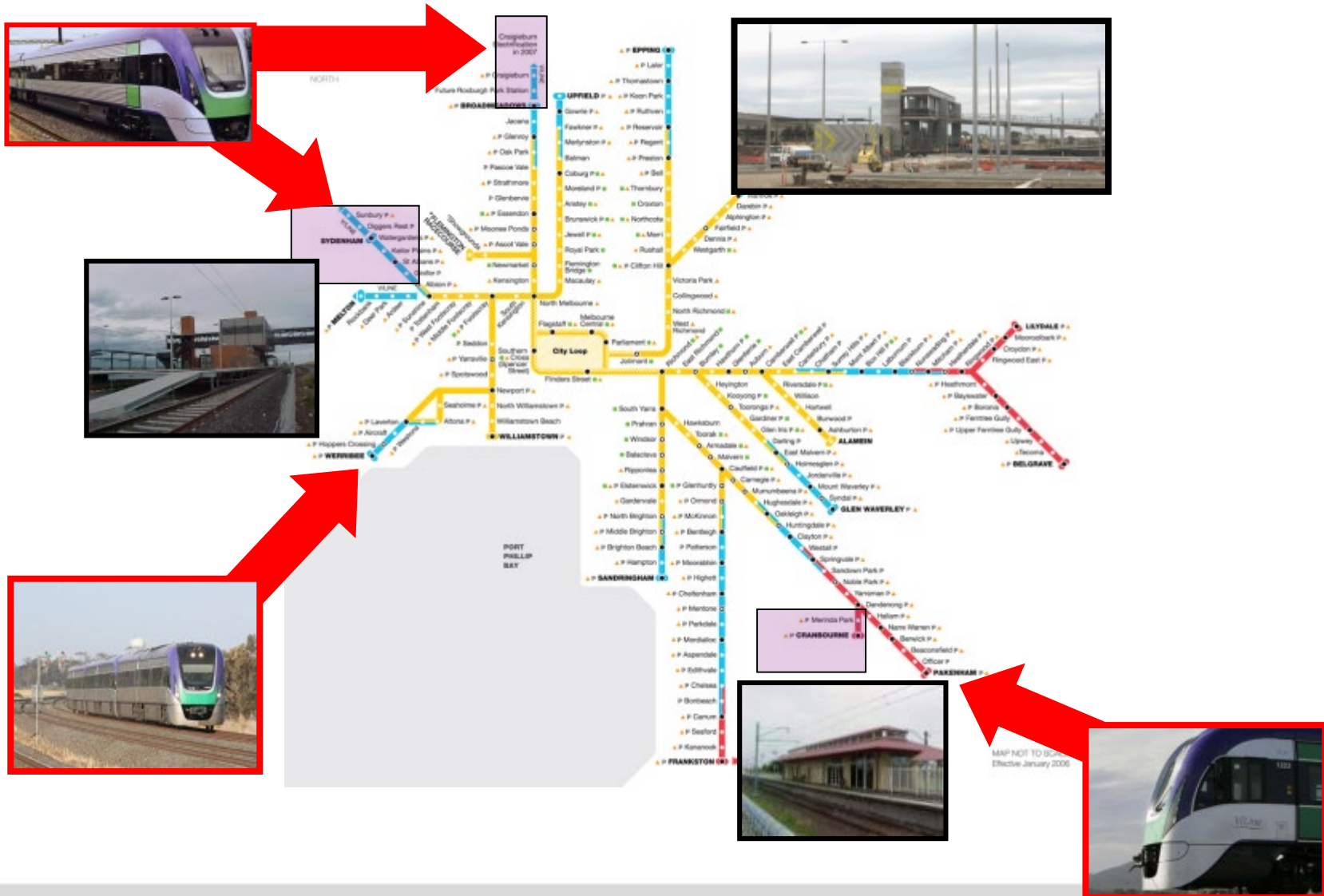
Av. Speed (Kph)

## Breakdowns in Service (000 kms)

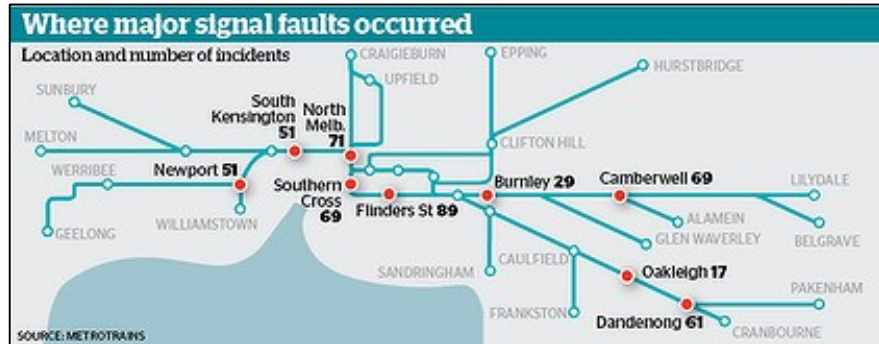


Av. Speed (Kph)

...yet expanding rail, thus making it more complex, has been our approach to mass transit expansion



Unplanned disruptions are common; e.g. reported signal faults; 1,900 p.a. (5+/day)



### Reported Signaling Disruptions

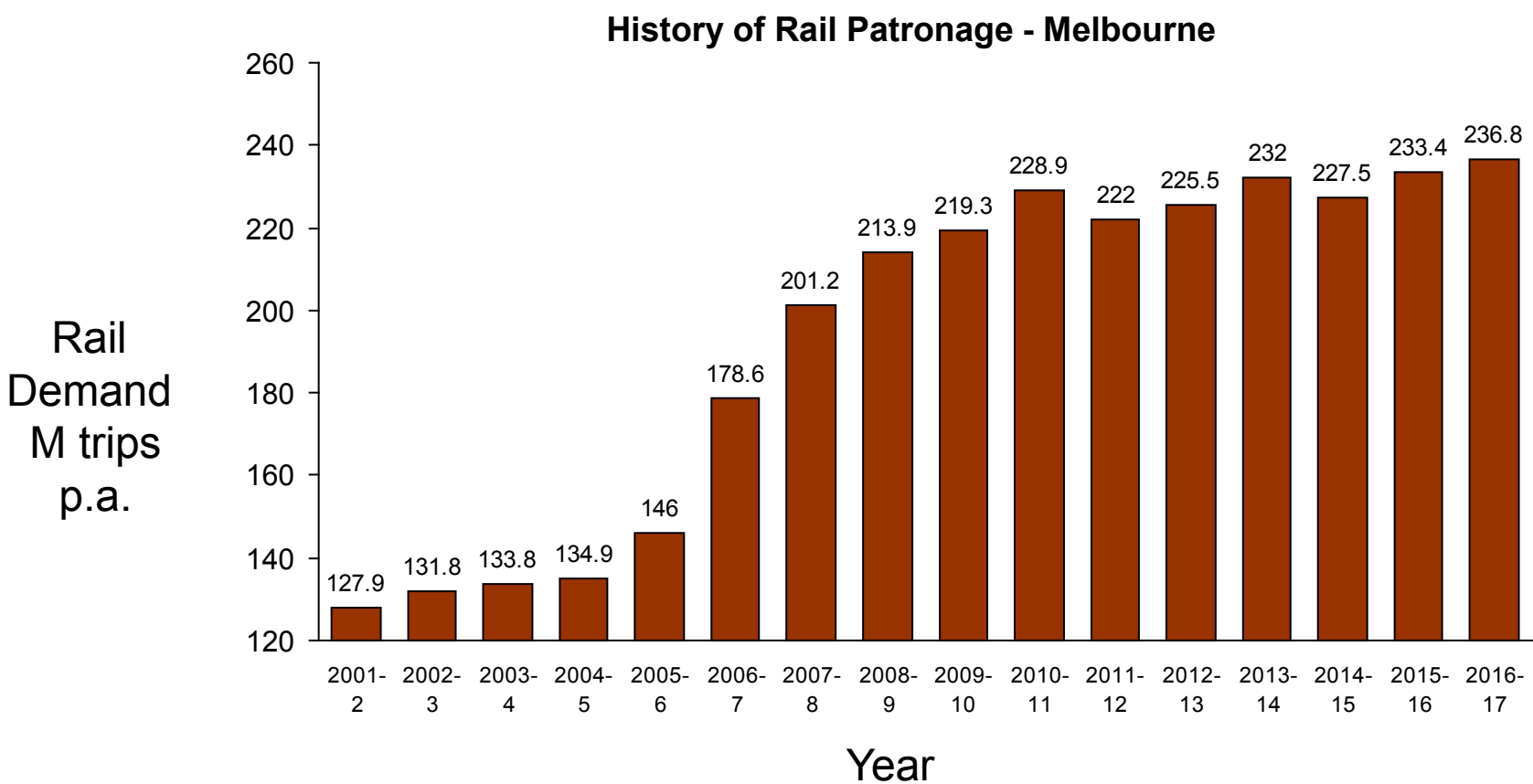
- 1,900 signal failures p.a. (12 months to August 2013)
- 5.2 per day
- Biggest Locations:
  - Flinders Street Station 89
  - North Melbourne 71
  - Newport 51

### Metro Trains

"We are installing advanced computer technology which improves control of the signalling system, but our field equipment is outdated and requires replacing,"

Source: Adam Carey, The Age, 'Signal failures are causing chronic rail delays' 23/10/2013

# Melbourne rail demand growth has been impressive by any standard



Source: Department of Transport/ Public Transport Victoria Annual Reports



However the rail network has reached capacity in many places



# How Transit Orientated is Melbourne Development?

## **Density**

– the concentration and compactness of development within geographic space

## **Diversity**

– the land use mix including the balance and compatability of users with each other (and transit)

## **Design**

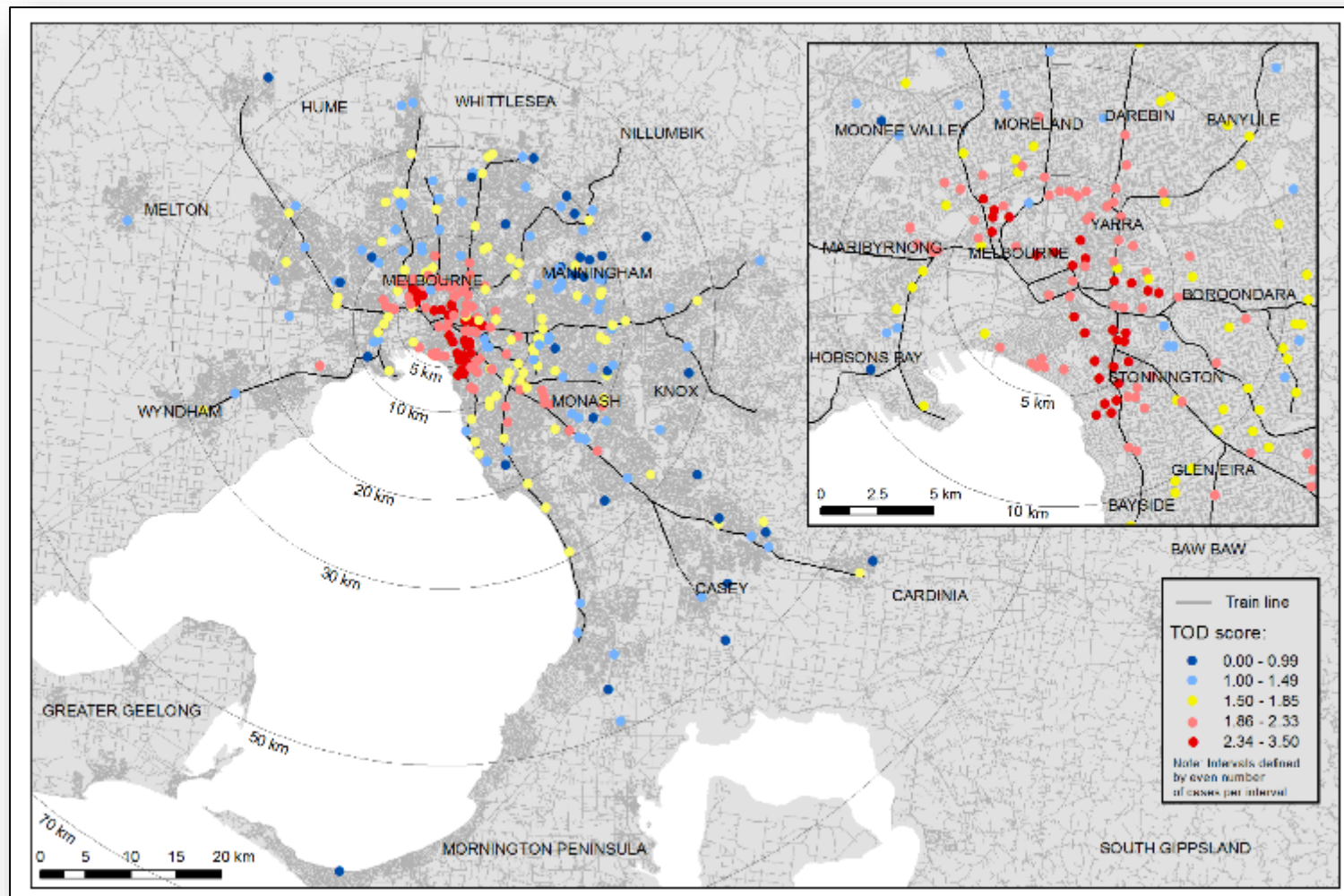
– which relates how the various land uses are combined, linked and presented in terms of ease of access and attractiveness



*Source: Cervero and Kockleman (1997)*



# The Transit Orientation of Development – OVERALL Melbourne – only in central areas



Source: Aston L, Currie G and K Pavkova (2016) 'Does Transit Mode Influence the Transit-Orientation of Urban Development? - An Empirical Study' JOURNAL OF TRANSPORT GEOGRAPHY Vol 55 (2016) pp83-91

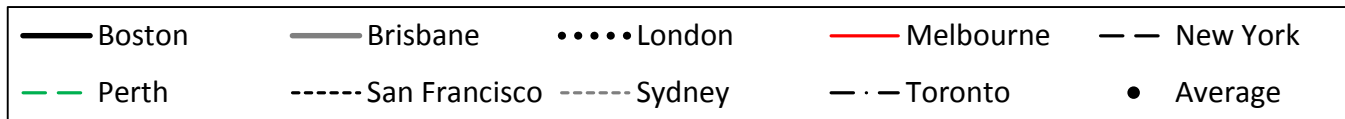
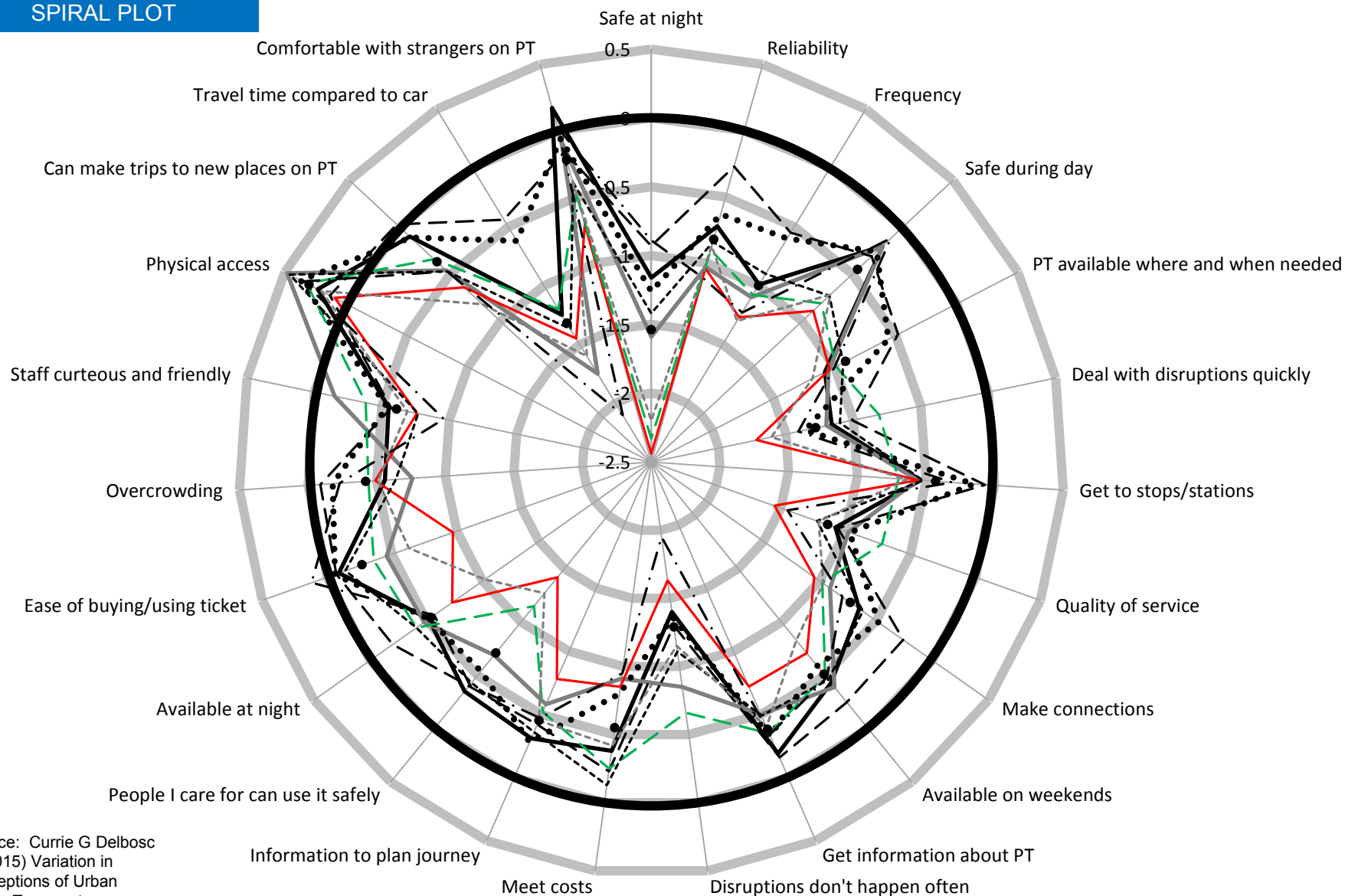
# So what do passengers think about these issues?



PERFORMANCE MINUS  
IMPORTANCE RATINGS  
SPIRAL PLOT

Lowest Importance

Highest Importance





Introduction

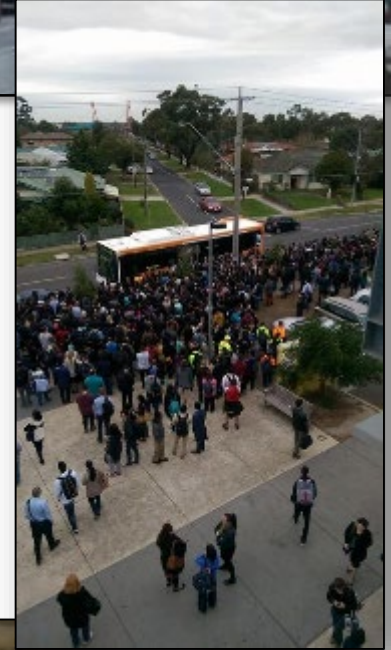
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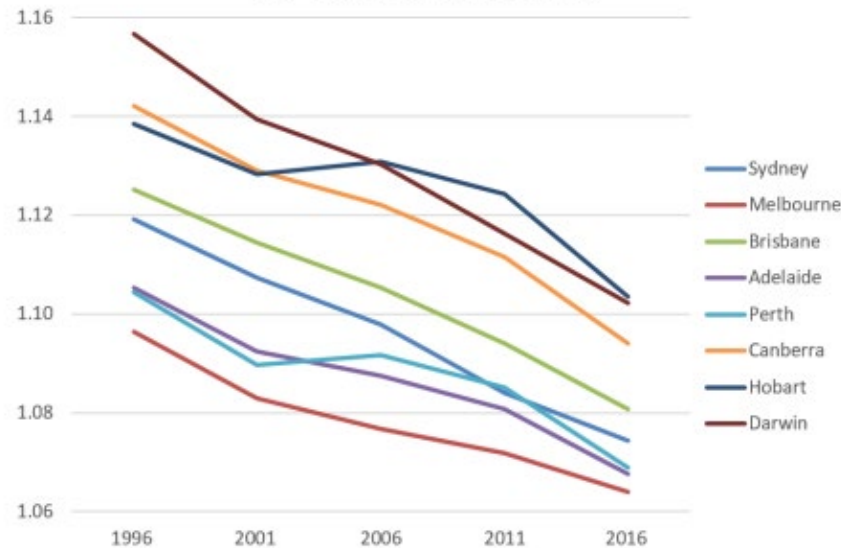
# Growth in urban travel and car ownership continues to rise

- **Since 1996 car travel has increased at 1.9% p.a. (Challenge Melbourne - issues in metropolitan planning for the 21st century Oct 2000)**
- **Forecasts suggest metropolitan travel will increase by around 20% by 2020 without action to address current trends (NCCC Study)**



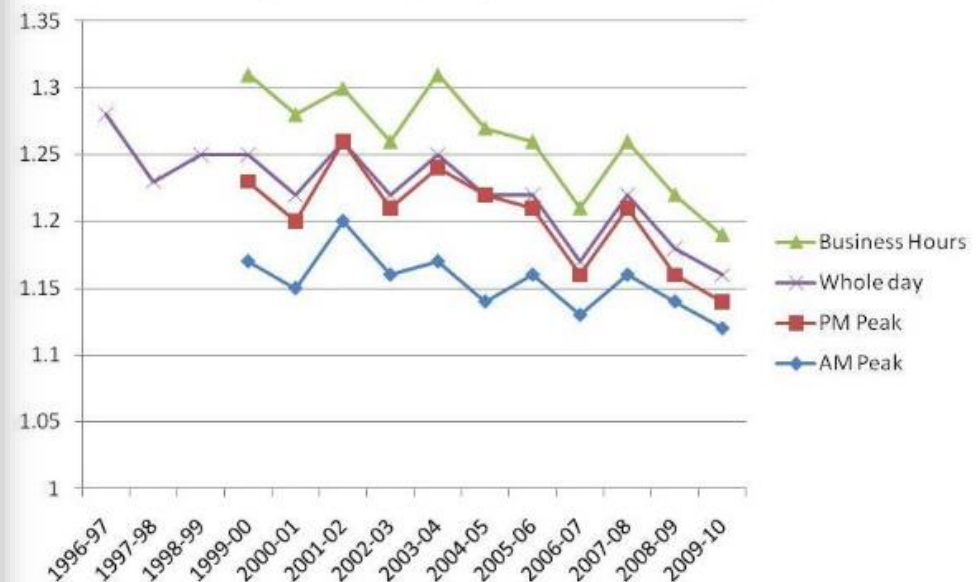
# While traffic grows occupancy plummets – more cars, filling more roads carrying less people - shared mobility is in decline

Indicative car commuter occupancy  
(car only journeys to work)



ChartingTransport.com

Average car occupancy - Melbourne Freeways



Source : Charting Transport ([www.chartingtransport.com](http://www.chartingtransport.com))

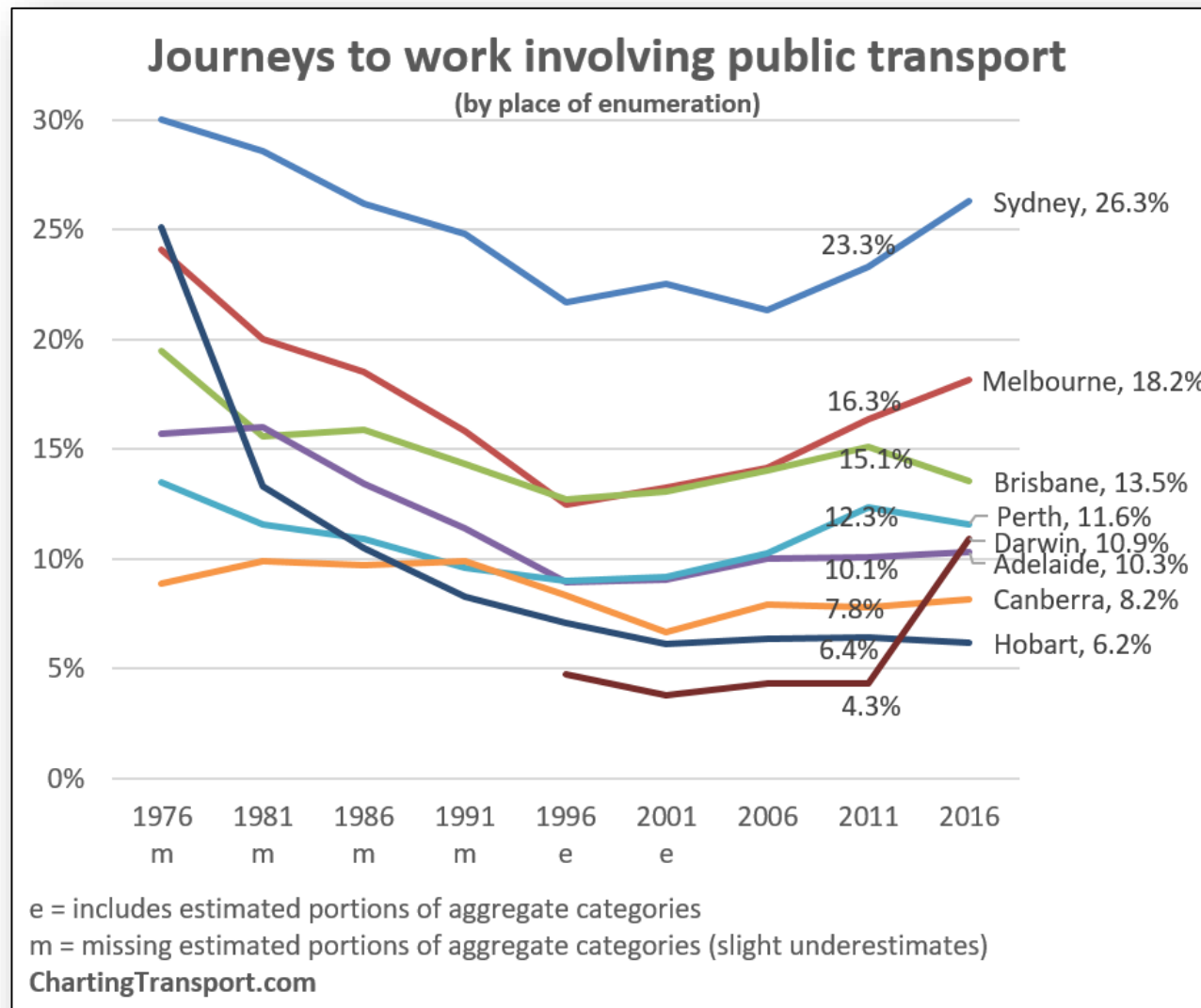


# Meanwhile road freight volume is expected to double in 20 years

- **Melbourne road freight movements total around 170M tonnes p.a.. This has grown by 120% between 1971 and 1997.**
- **Truck traffic forecast to double over the next 20 years (Challenge Melbourne)**
- **The efficient movement of commercial traffic has been directly linked to a competitive economy and the affordability of consumer products**

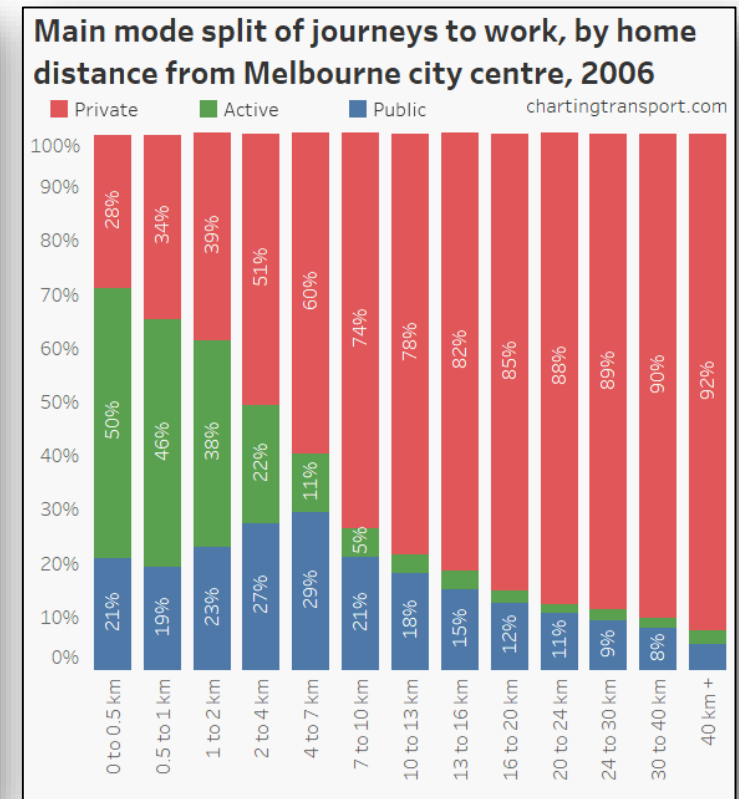
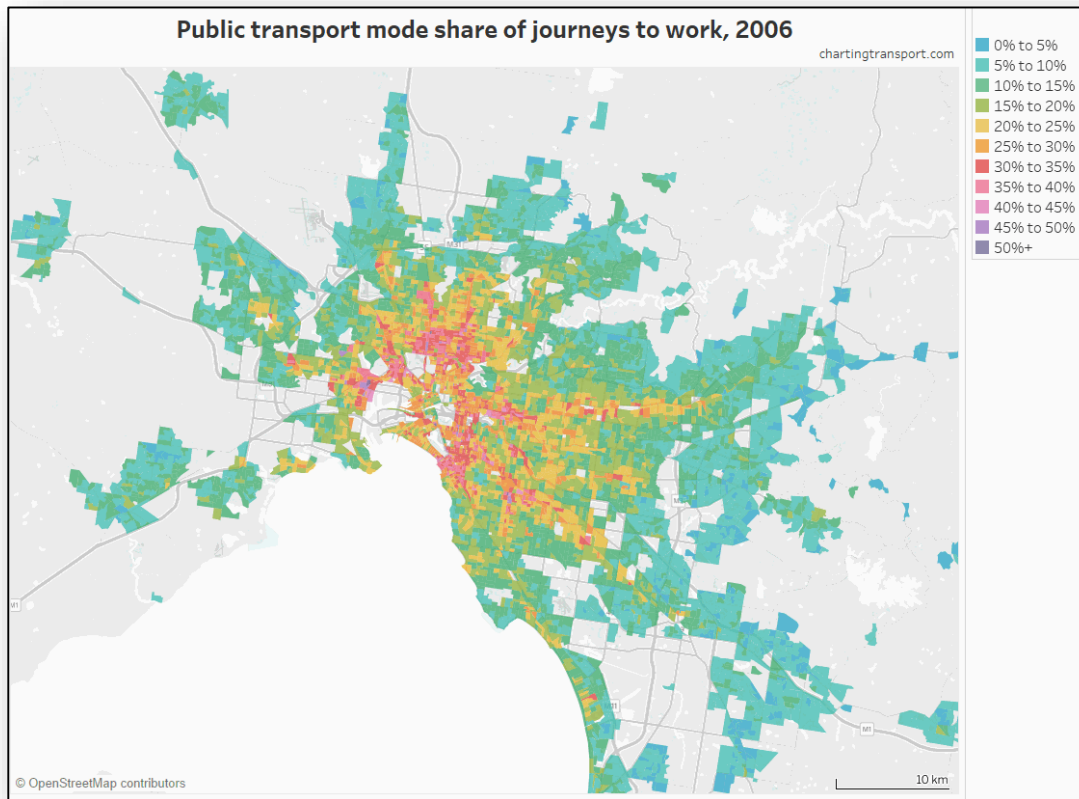


# Peak transit use and share is up; but only in transit rich inner areas – We have TWO WORLDS in Melbourne for travel; but overall car dominates



Peak transit use and share is up; but only in transit rich inner areas – We have TWO WORLDS in Melbourne for travel; but overall car dominates

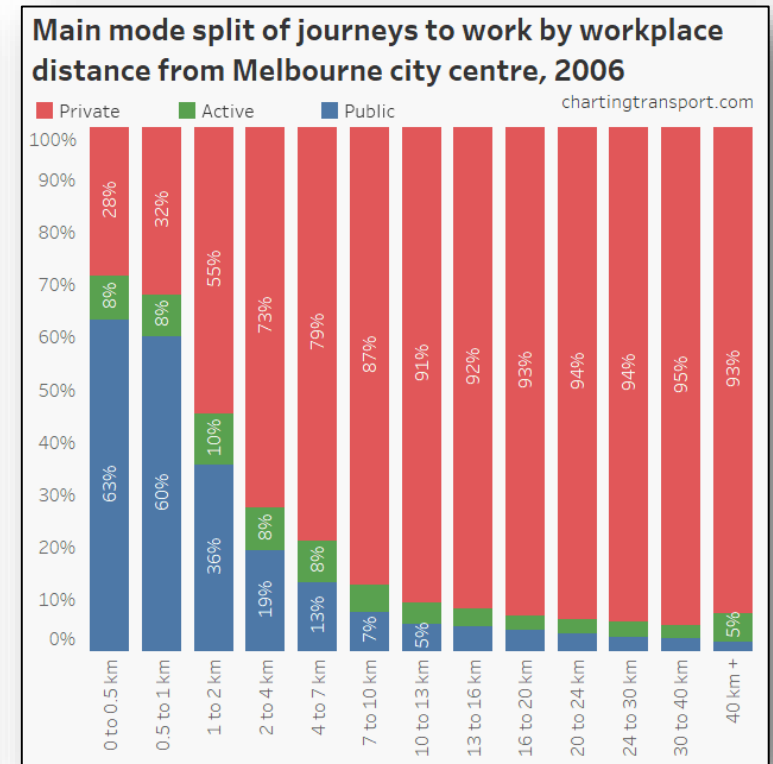
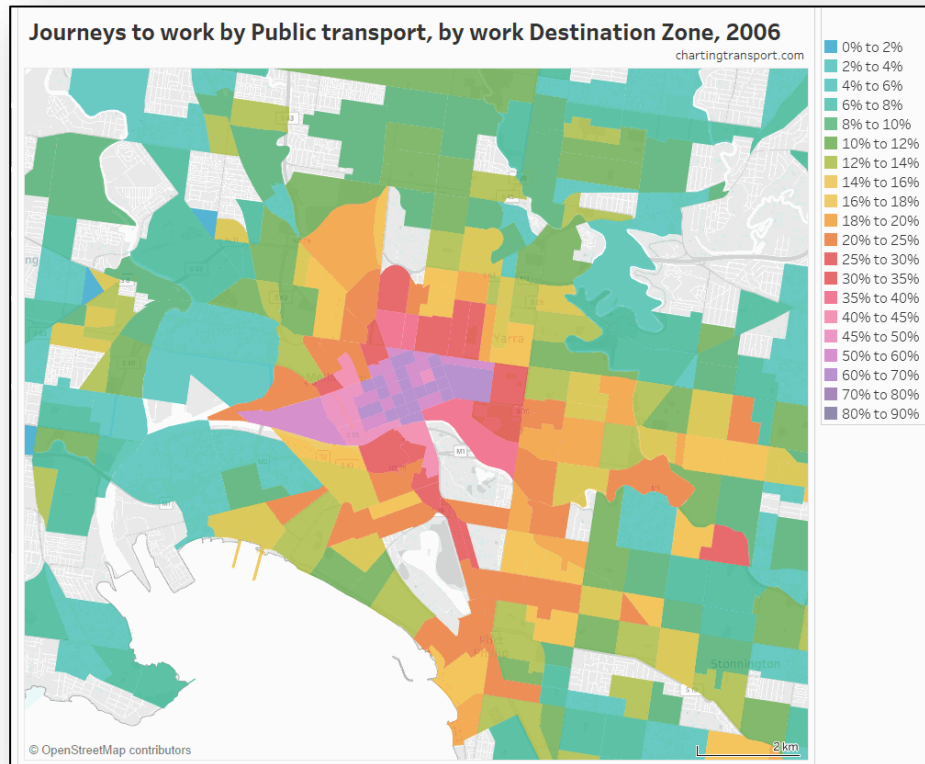
## Home – Journey To Work by PT Trend



Source : Charting Transport ([www.chartingtransport.com](http://www.chartingtransport.com))

Peak transit use and share is up; but only in transit rich inner areas – We have TWO WORLDS in Melbourne for travel; but overall car dominates

## WORK – Journey To Work by PT Trend



Source : Charting Transport ([www.chartingtransport.com](http://www.chartingtransport.com))

In general we have also stopped being active – this has led to ‘the epidemic of obesity’

### Lifestyle underpins Australia's growing obesity problem

The Dieticians Association of Australia says television and less active lifestyles have contributed to increased rates of obesity.

The Australian Institute of Health and Welfare (AIHW) has released a report showing **nine million adult Australians carry excess weight.**

The report estimates at least 16 per cent of men and 17 per cent of women are obese, with a further 42 per cent of men and 25 per cent of women considered overweight.

Ms Collins says **lifestyles have changed significantly over the last century.**

**"We use our cars more,** most people have jobs where they sit down, most of us don't do as much work around the house, or even the yard.

**"There just aren't the same opportunities to be active."**



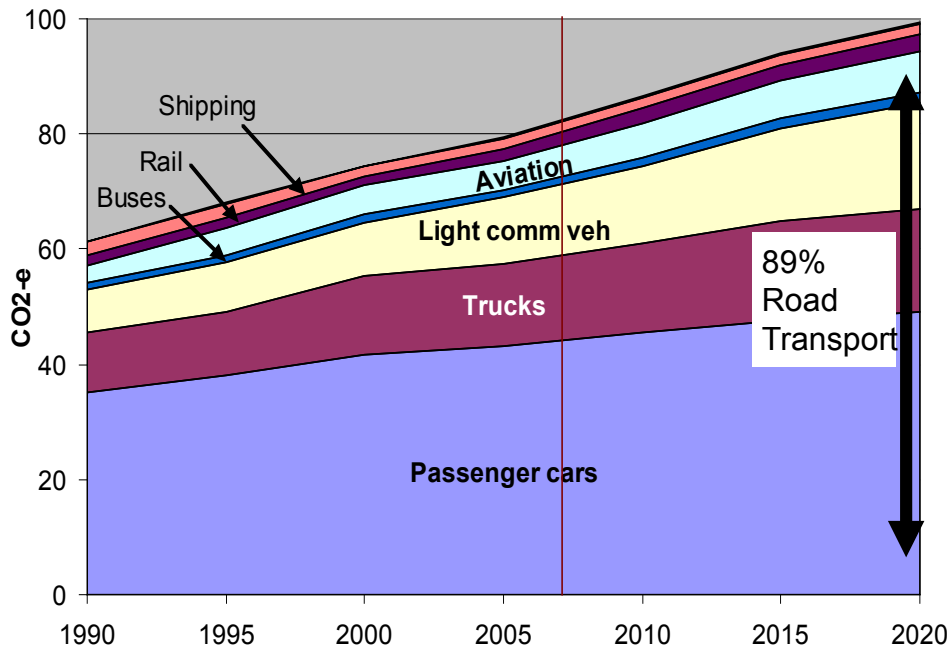
**Figure 4: Active travel distance and overweight/obesity**  
(Melbourne Statistical Division travel data included in absence of Australian national data for children's active travel distance)  
(Sources: Christie et al, 2004; International Obesity TaskForce, 2009)

Source: ABC News Online – September 2003



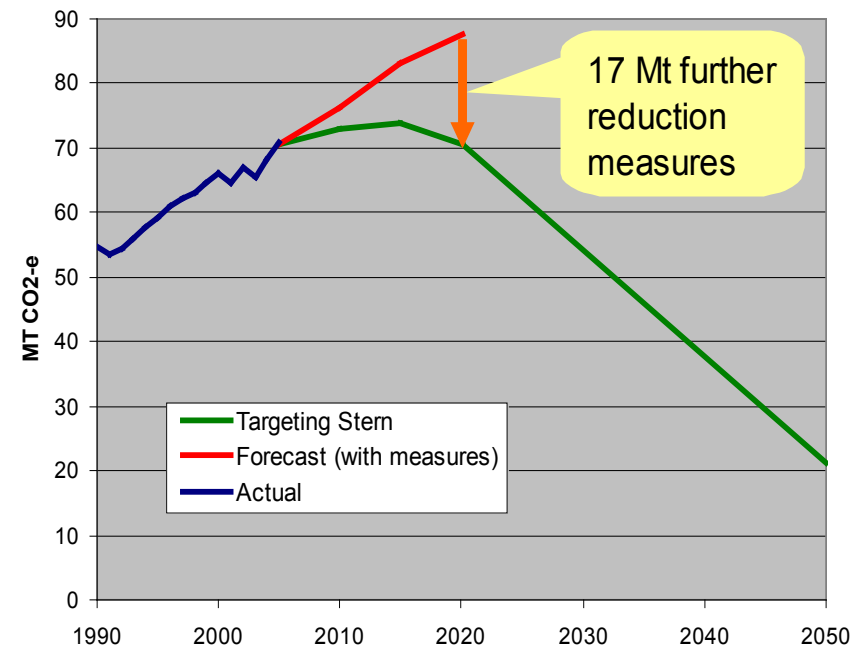
# Road dominates increasing greenhouse emissions - BIG change is needed to meet the 'Stern' Target

Transport emissions - actuals and forecast



Source: Australian Greenhouse Office (2006)

Road Transport Emissions

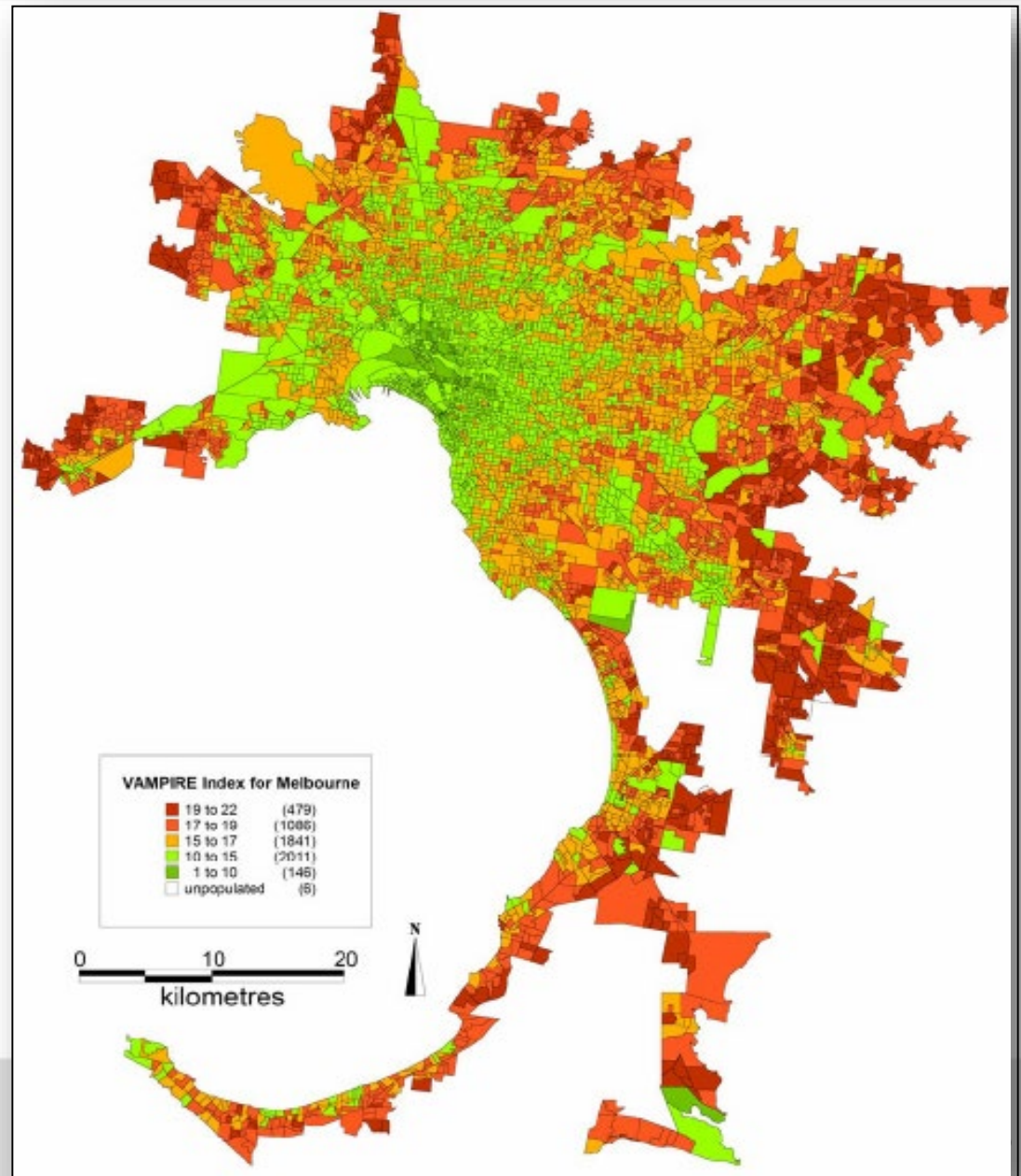


Source: Bus Association of Victoria (2007)

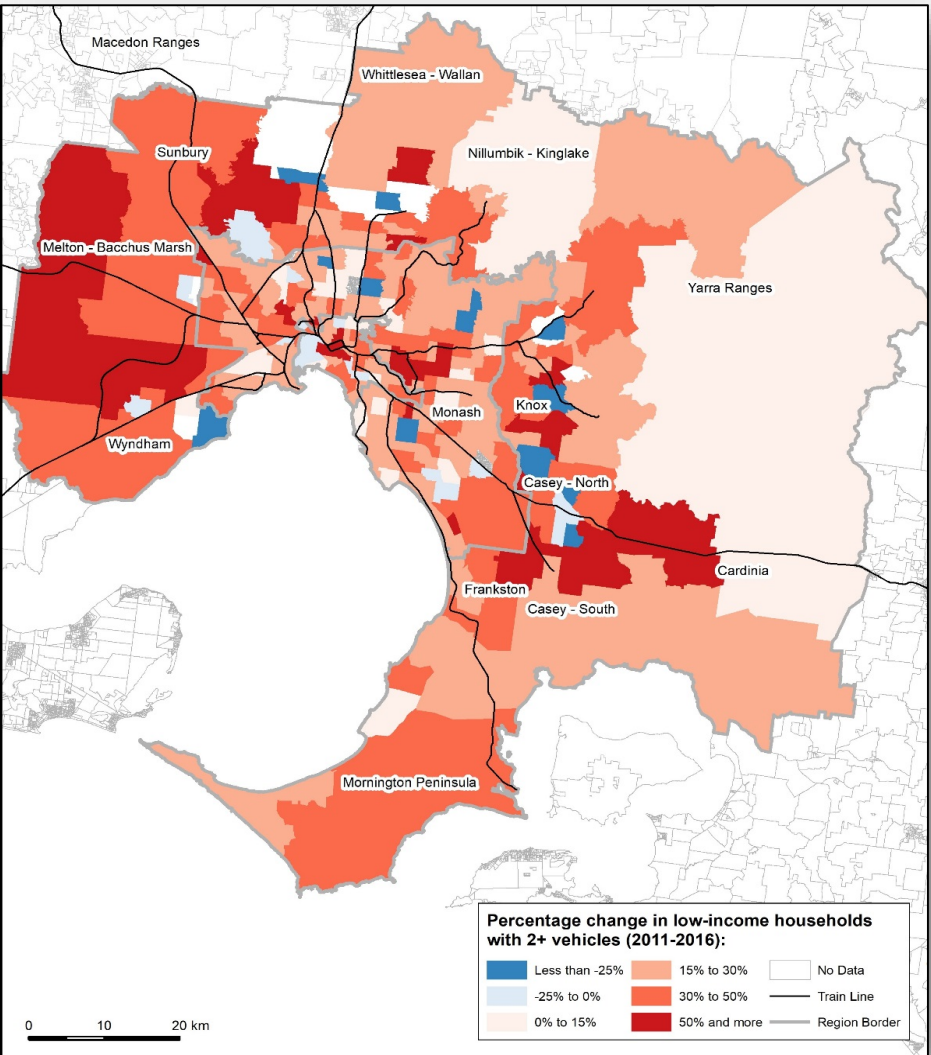
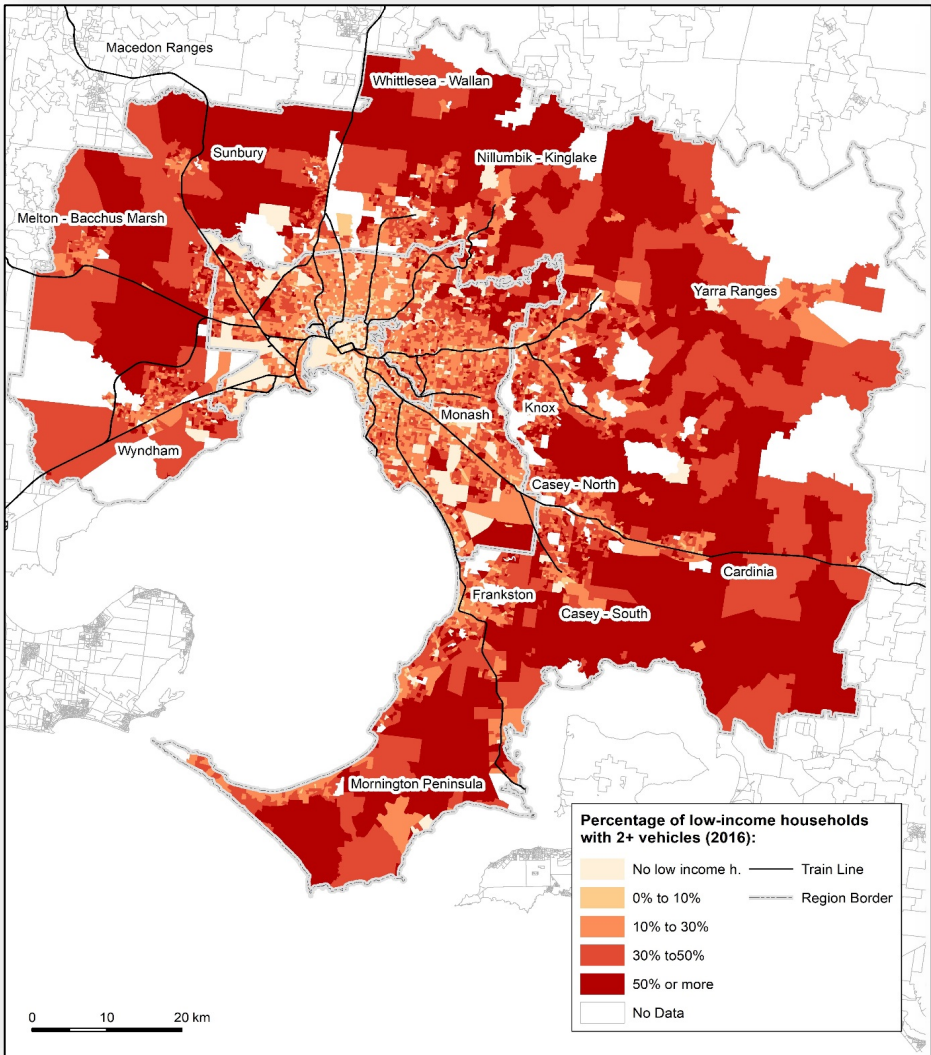
***To stabilise at 450ppm CO<sub>2</sub>e, without overshooting, global emissions would need to peak in the next 10 years and then fall at more than 5% per year, reaching 70% below current levels by 2050. - Sir Nicholas Stern***

# Research suggests that if fuel prices rise a high share of Melbourne residents are being marginalised

Source: Dodson J and Sipe N (2006)  
*Shocking the Suburbs: Urban location, housing debt and oil vulnerability in the Australian City*  
- 'vulnerability assessment for mortgage, petrol and inflation risks and expenditure' (VAMPIRE).



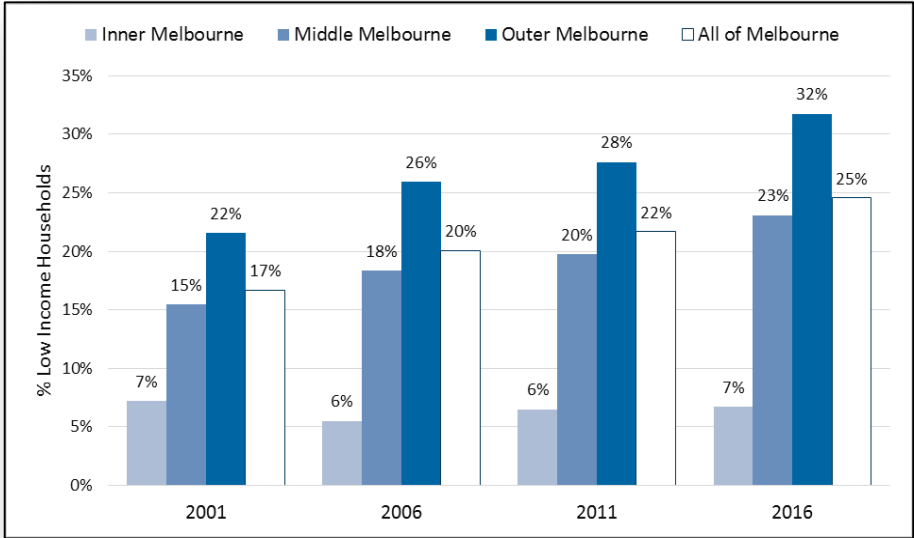
# Monash research has highlighted 'forced car ownership' in fringe urban Australia



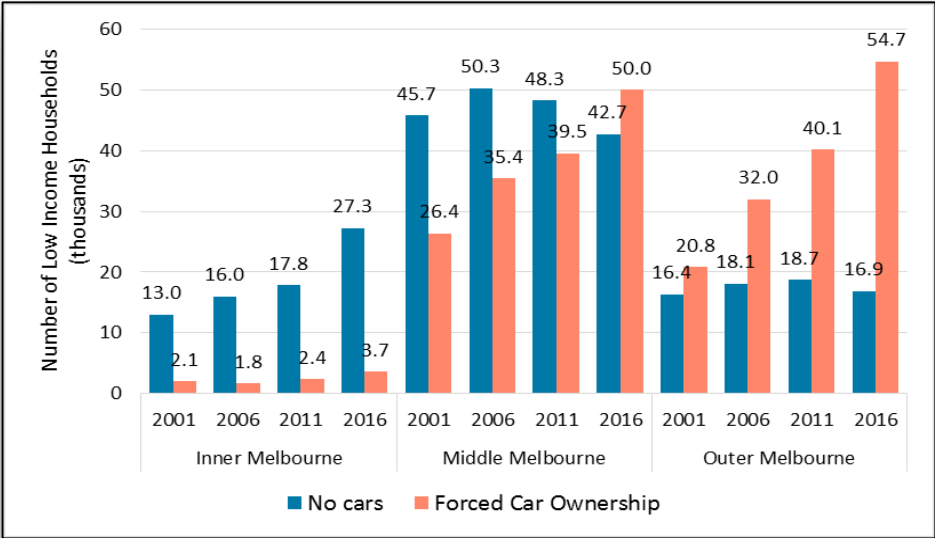
Source: Currie G, Delbosc A and Pavkova K (2018) “Alarming Trends in the Growth of Forced Car Ownership in Melbourne” Australasian Transport Research Forum 2018 Proceedings 30 October – 1 November, Darwin, Australia

# Research this year shows FCO is continuously growing mainly in outer Melbourne – it now dominates transport poverty over lack of transport

Share of Low Income Households with FCO by Areas and Census Year



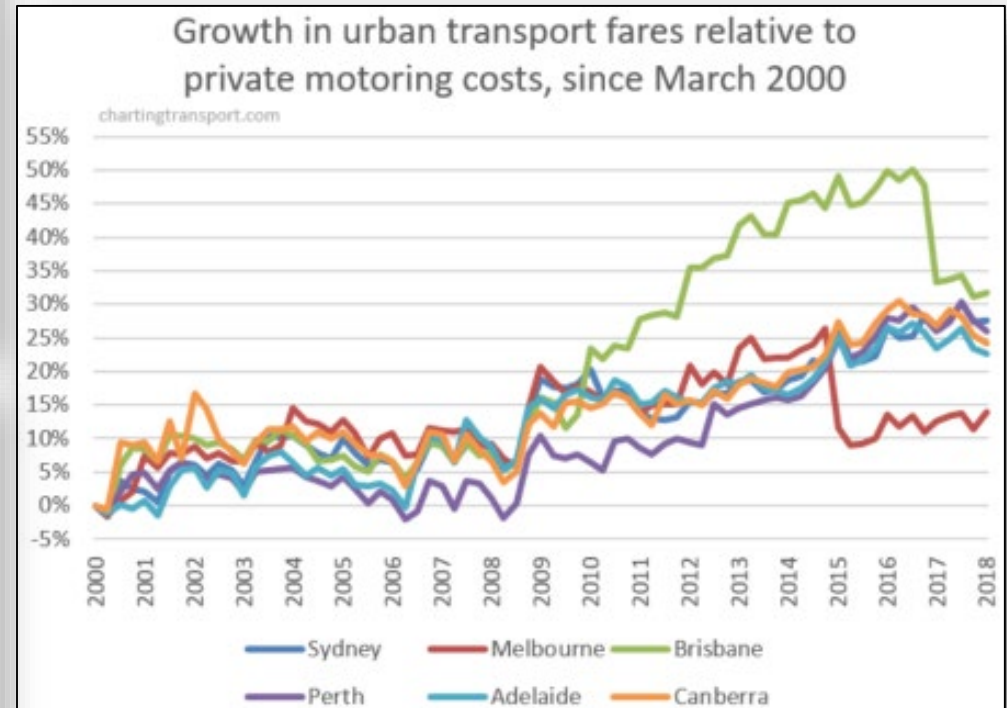
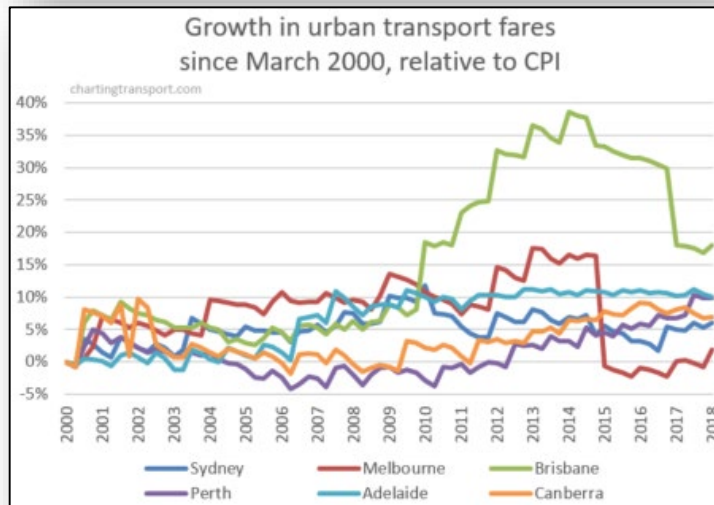
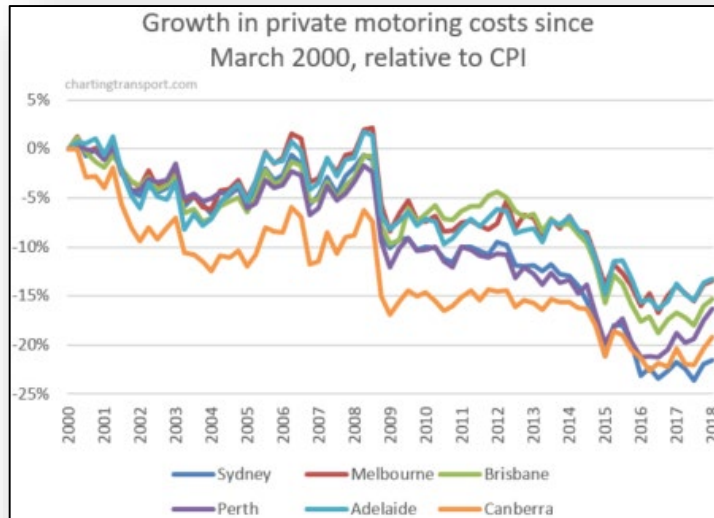
Trends low-income, no-car households versus forced car ownership households by region



Source: Currie G, Delbosc A and Pavkova K (2018) “Alarming Trends in the Growth of Forced Car Ownership in Melbourne” Australasian Transport Research Forum 2018 Proceedings 30 October – 1 November, Darwin, Australia



FCO is influenced by relative decline in car costs; which may assist poverty but PT ridership is harmed by poor relative price performance relative to car



Source : Charting Transport ([www.chartingtransport.com](http://www.chartingtransport.com))



Introduction

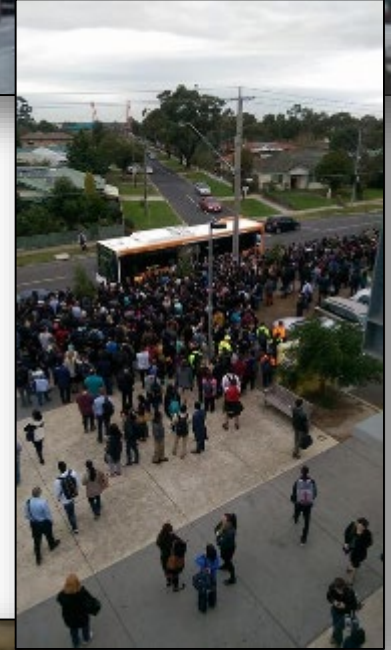
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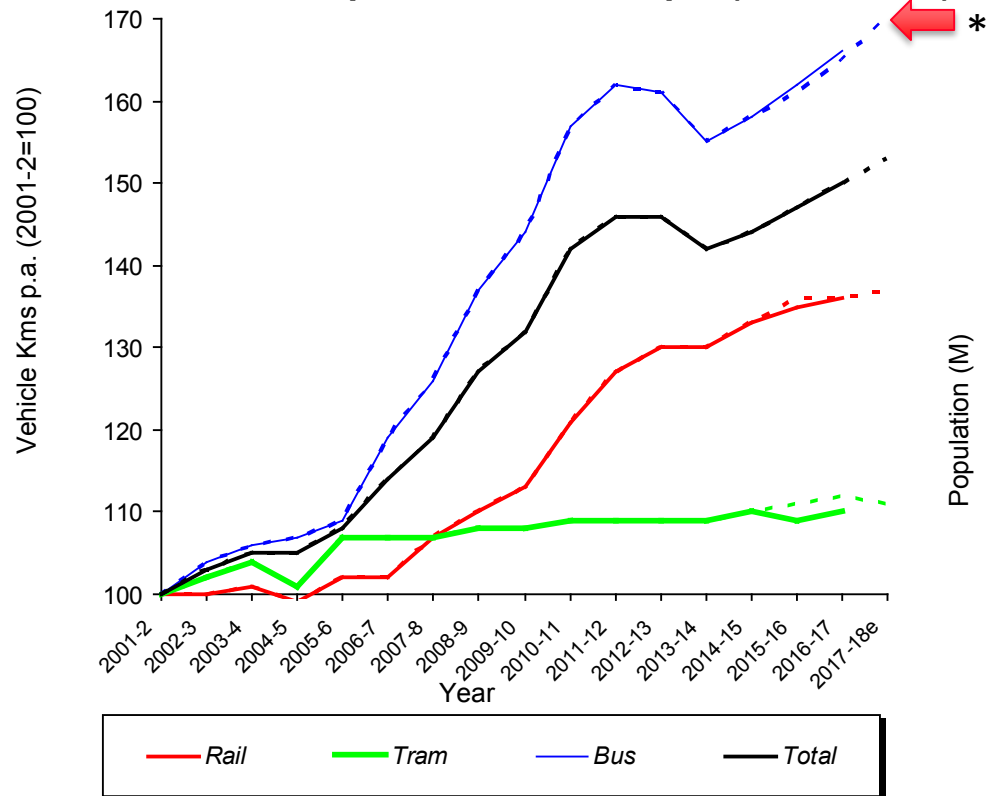
Progress?

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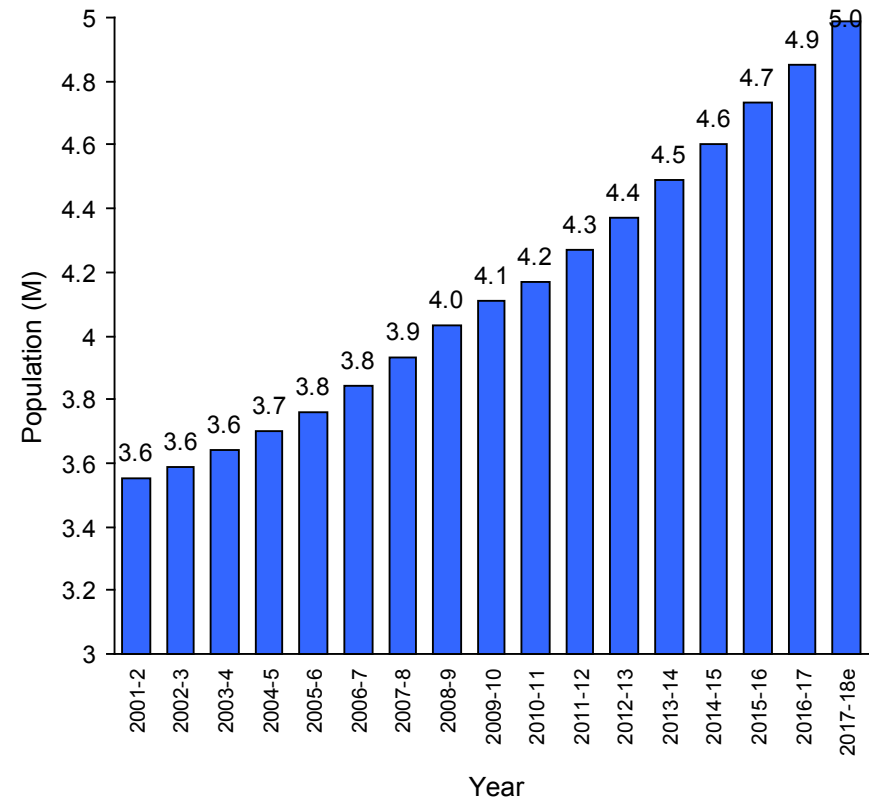


Since 2001 PT service increased 67% (70% bus/ 37% rail, 11% tram) but - but population growth continues at a faster pace...

Index of Public Transport Service Kms p.a (2001-2=100)



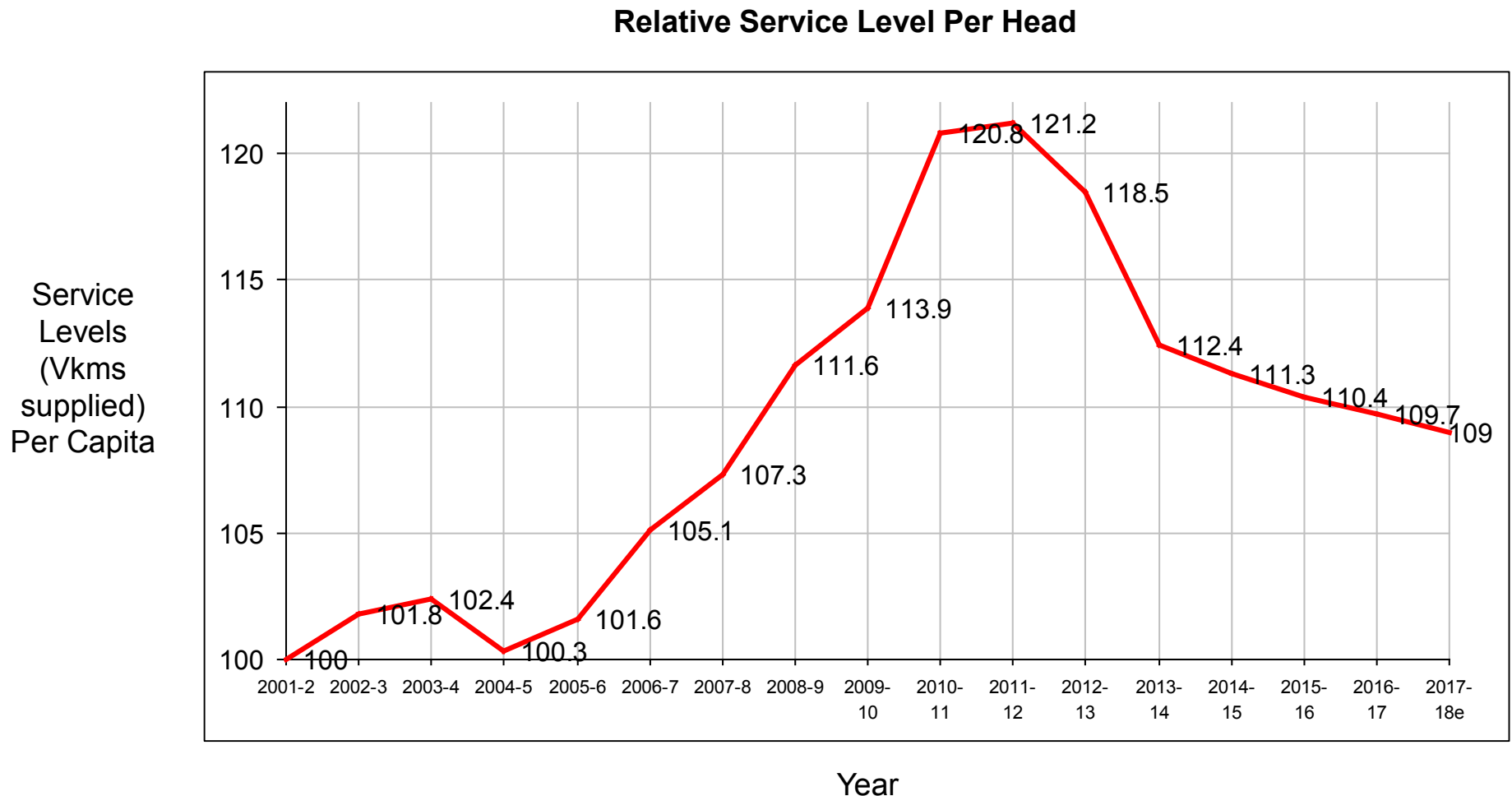
Population Growth (M)



Source: Department of Transport/ Public Transport Victoria Annual Reports

Note: \* More bus services sooner initiative (~\$2.5M 2016-2020); New bus services initiative (\$3M-\$9Mp.a. 2015-2020)

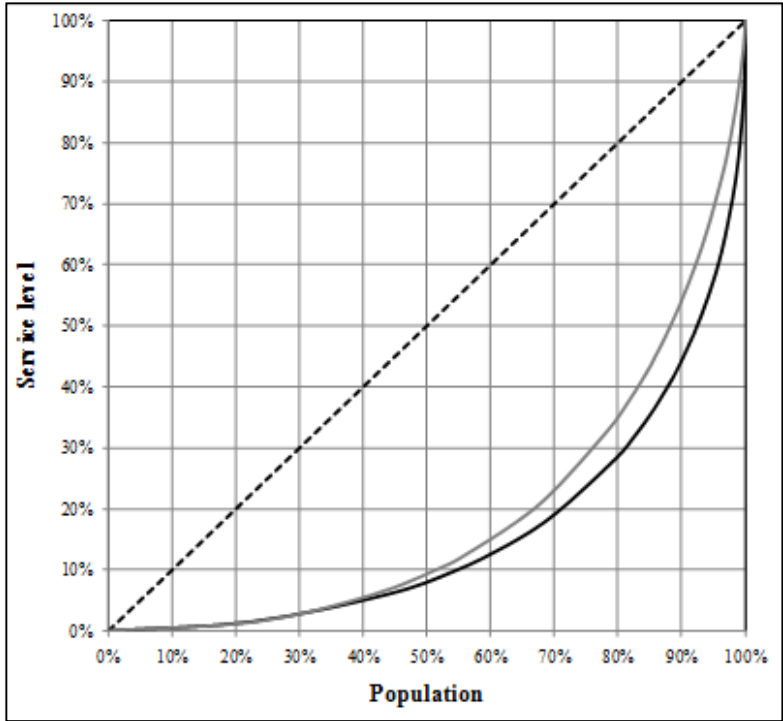
...in last 10 years, per person service increased 21% then declined since 2011 (we have declined by 12% points); recent trend is decline



Source: Department of Transport/ Public Transport Victoria Annual Reports

# Melbourne has BIG inequity in PT service– many high need areas with no service areas on the urban fringe

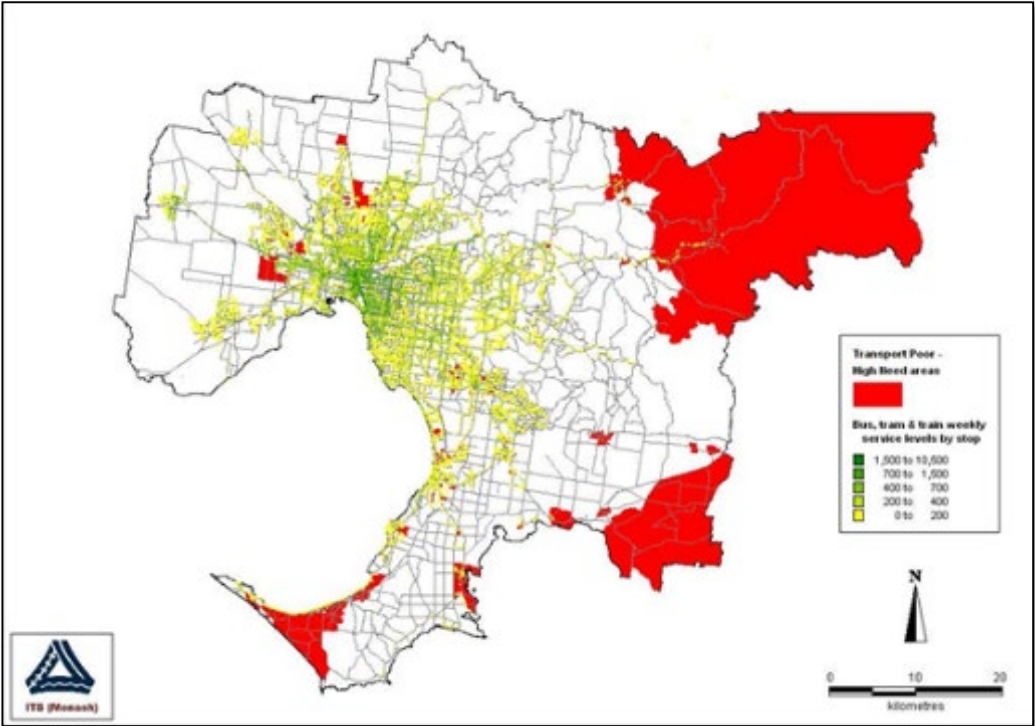
Service Supplied by Population



-- Equity  
— Population (G=.68)  
— Population + Employment (G=.62)

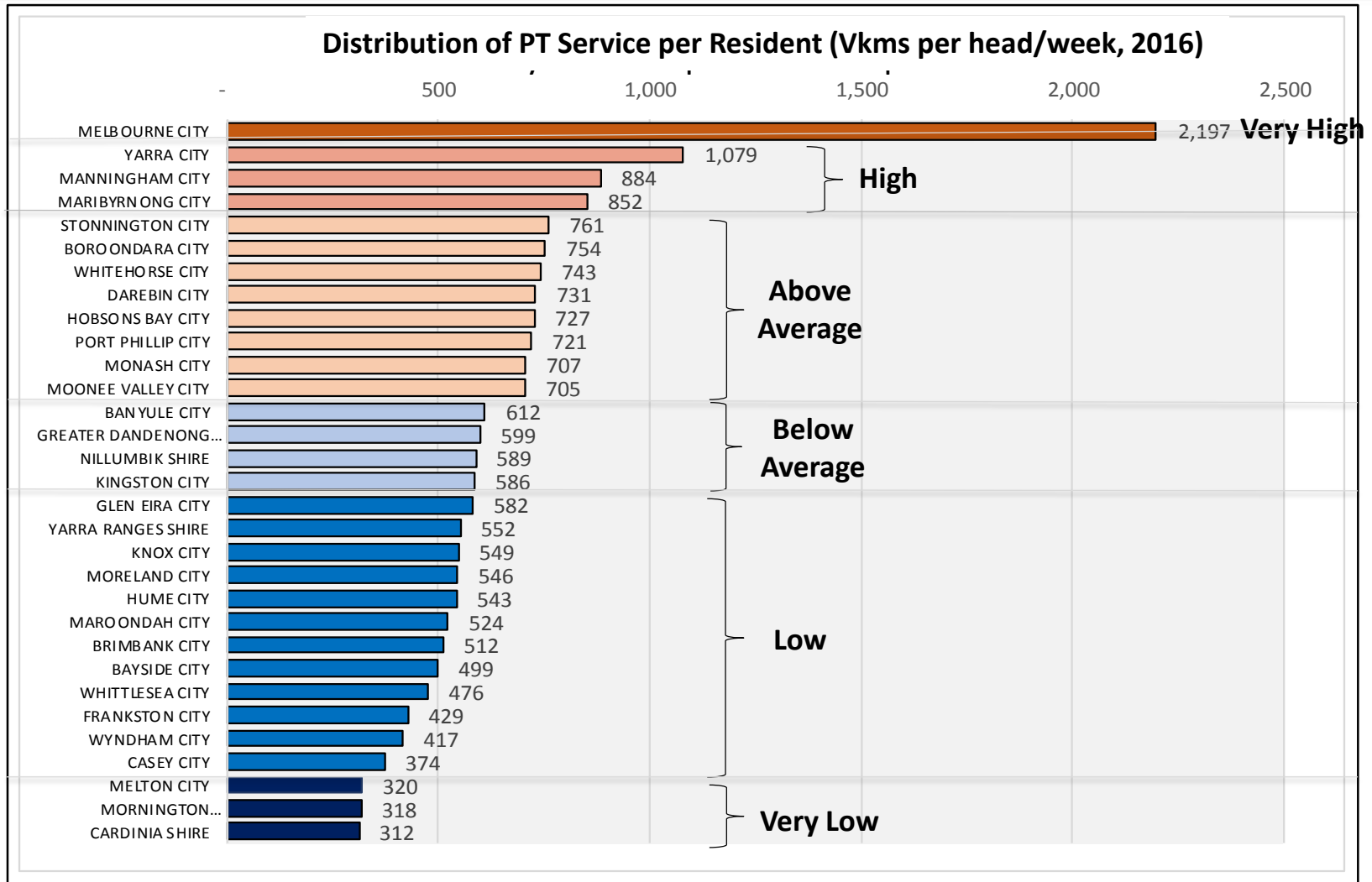
Source: Delbosc A and Currie, G. (2011) 'Using Lorenz Curves to Assess Public Transport Equity' JOURNAL OF TRANSPORT GEOGRAPHY Volume 19, Issue 6, November 2011, Pages 1252-1259

Service Supplied (Green) – Highest Social Need Areas (Red)



Source: Currie, G. (2010) Quantifying spatial gaps in public transport supply based on social needs, JOURNAL OF TRANSPORT GEOGRAPHY 18 (2010) 31–41

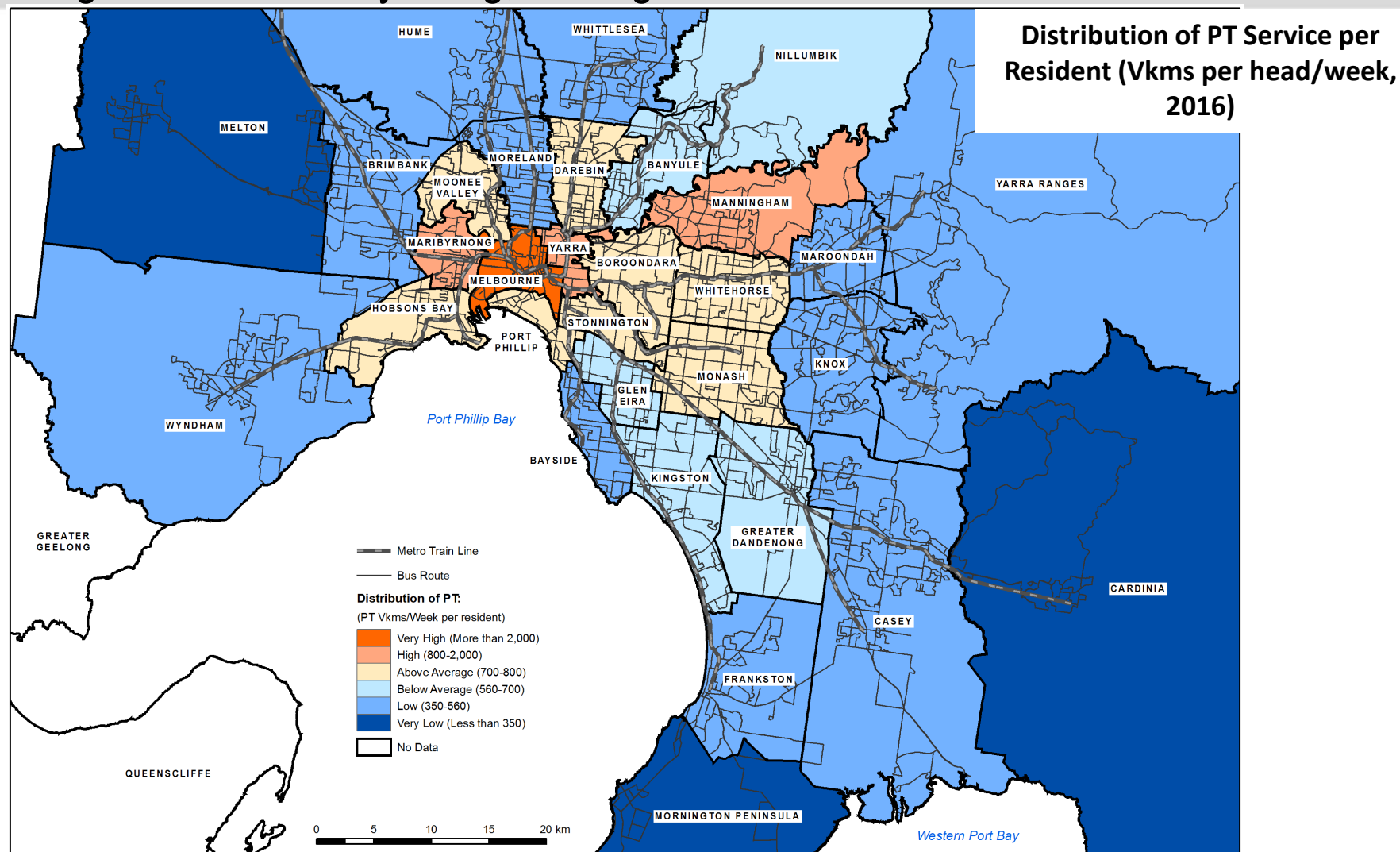
In 2016, 18 of our 30 LGA's have below average service per resident...



Source: PTRG analysis of the GTFS file data for Melbourne. Includes bus, rail and tram. Weekly data extracted for the week 19<sup>th</sup>- 25<sup>th</sup> Sept 2016. Data production undertaken by Phillip Boyles and Associates



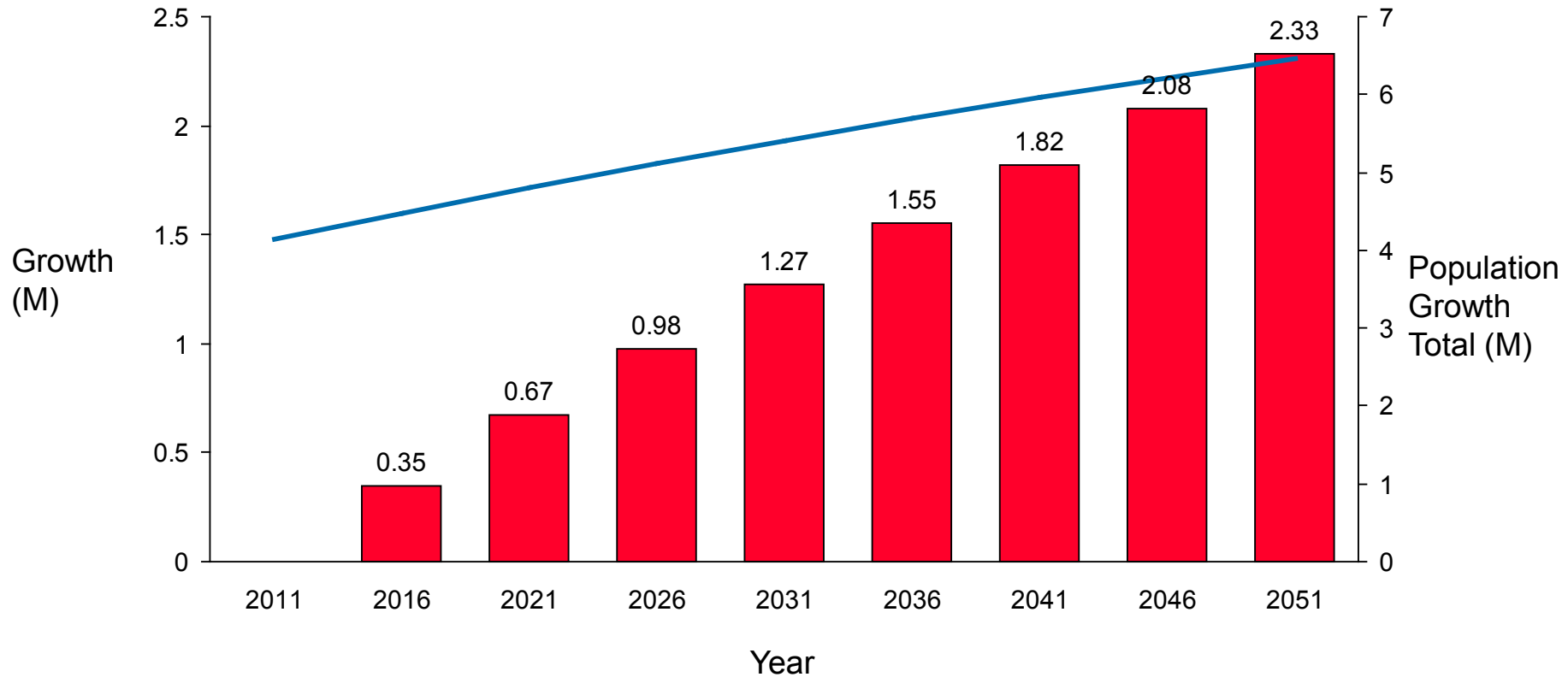
Cardinia, Mornington & Melton have lowest service/head; Melbourne, Yarra, Manningham and Maribyrnong, the highest



Source: PTRG analysis of the GTFS file data for Melbourne. Includes bus, rail and tram. Weekly data extracted for the week 19<sup>th</sup>- 25<sup>th</sup> Sept 2016. Data production undertaken by Phillip Boyles and Associates

# Melbourne is expected to increase in size by another 1-2M people in 20-30 years

Forecast Melbourne Population Growth

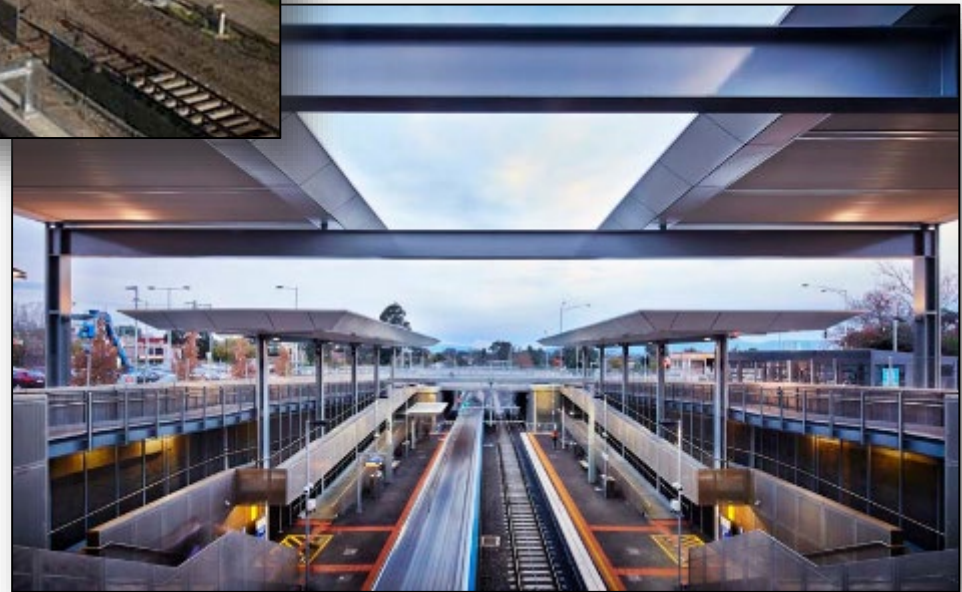


Source: *Victoria in Future* (2012)

Melbourne Metro; exciting but capacity upgrade is long overdue now – current start date is 2026!



# Melbourne rail grade separations; exciting some capacity relief but not an increase in service





# Where is tram and bus priority? – SmartBus; downgraded?





Introduction

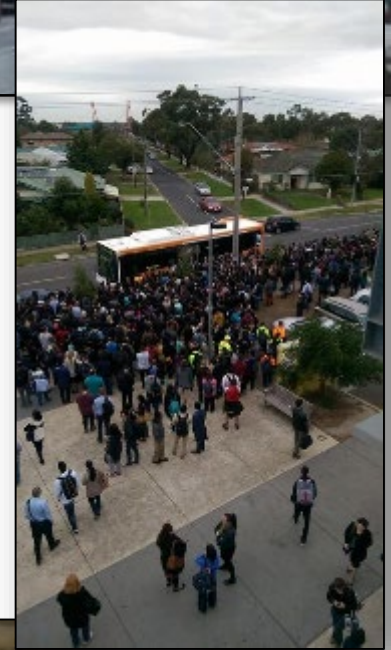
Transport in Melbourne

Public Transport in Melbourne

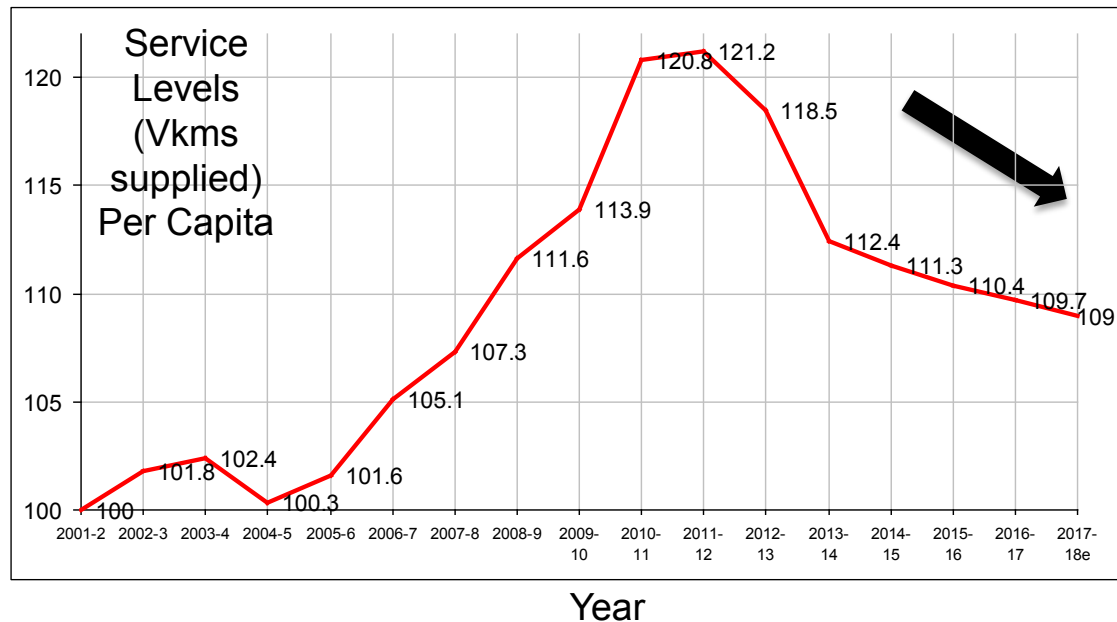
The Drivers of Change

Progress?

Ideas

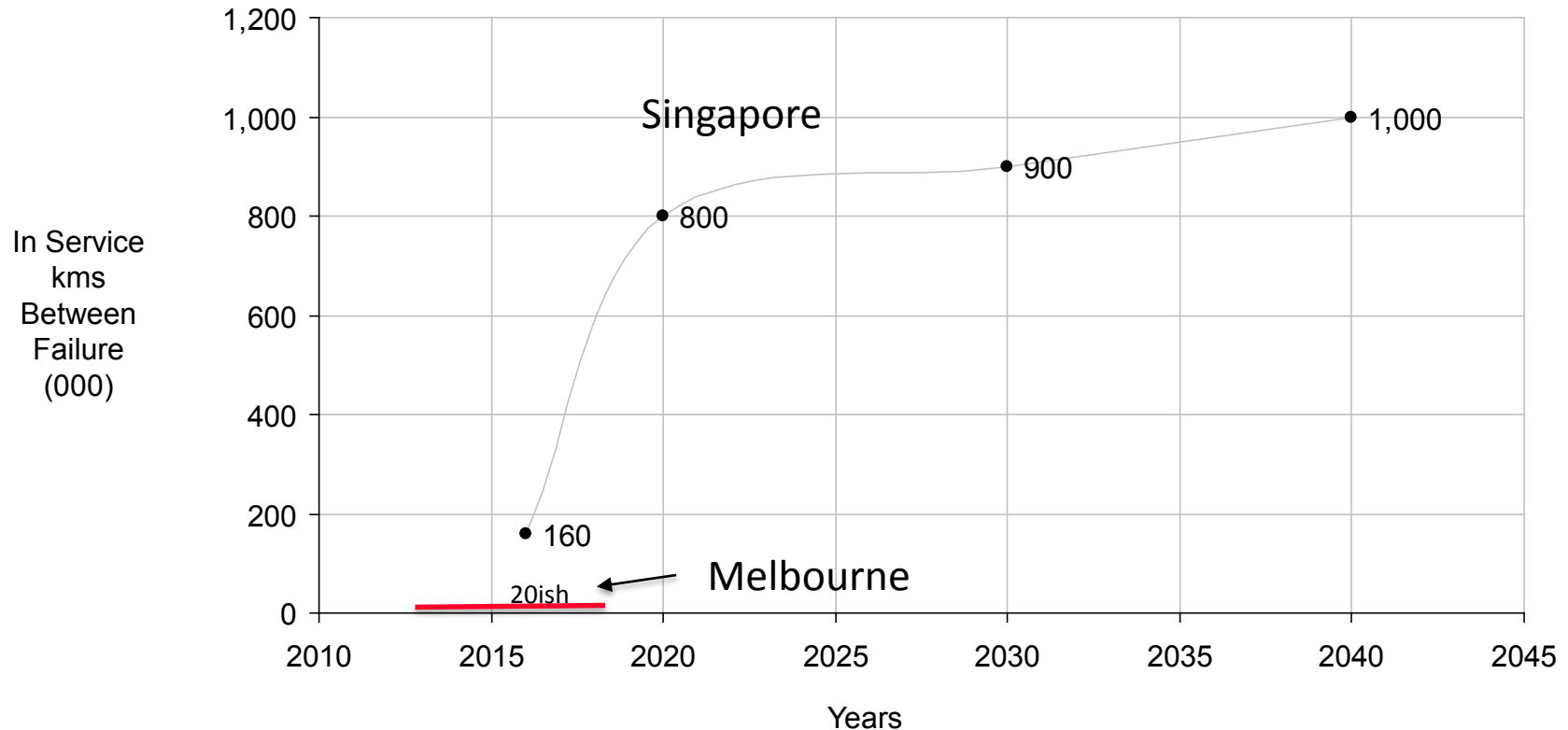


# INVEST, INVEST, INVEST, INVEST – SERVICE LEVELS



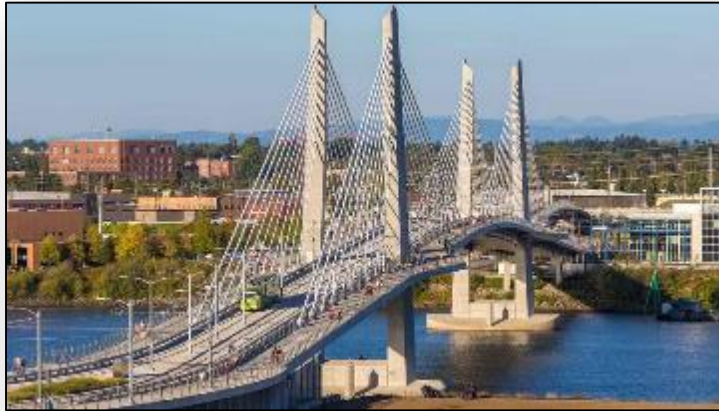
# INVEST, INVEST, INVEST, INVEST – RAIL RELIABILITY

Singapore Plan for Rail Reliability Improvement



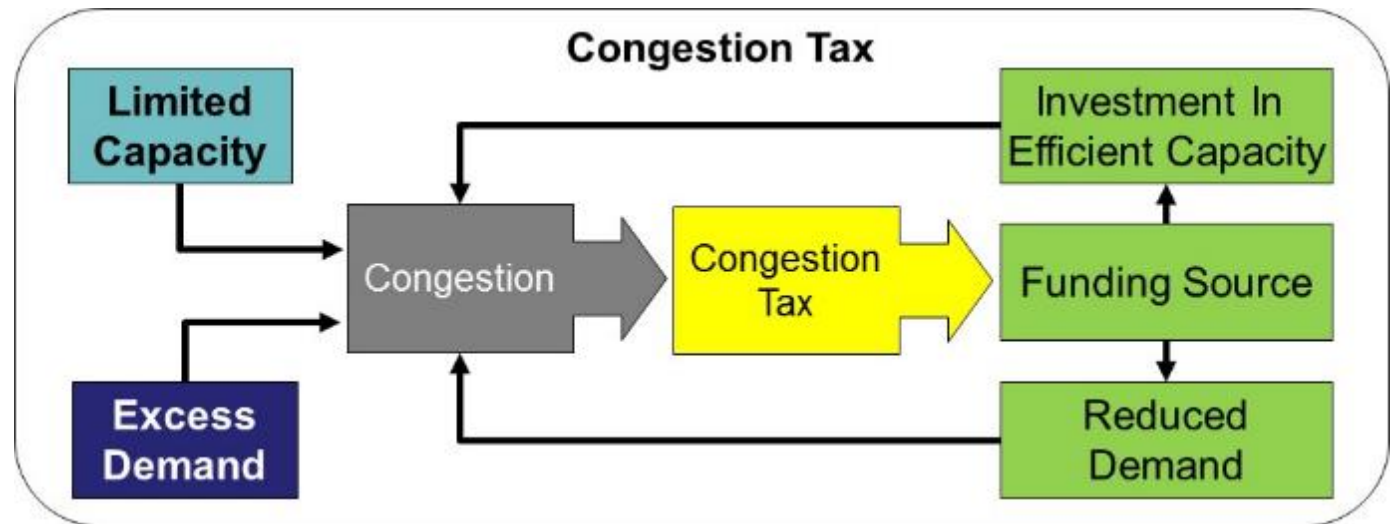
Source: Land Transport Authority of Singapore

# Get Sustainable Funding



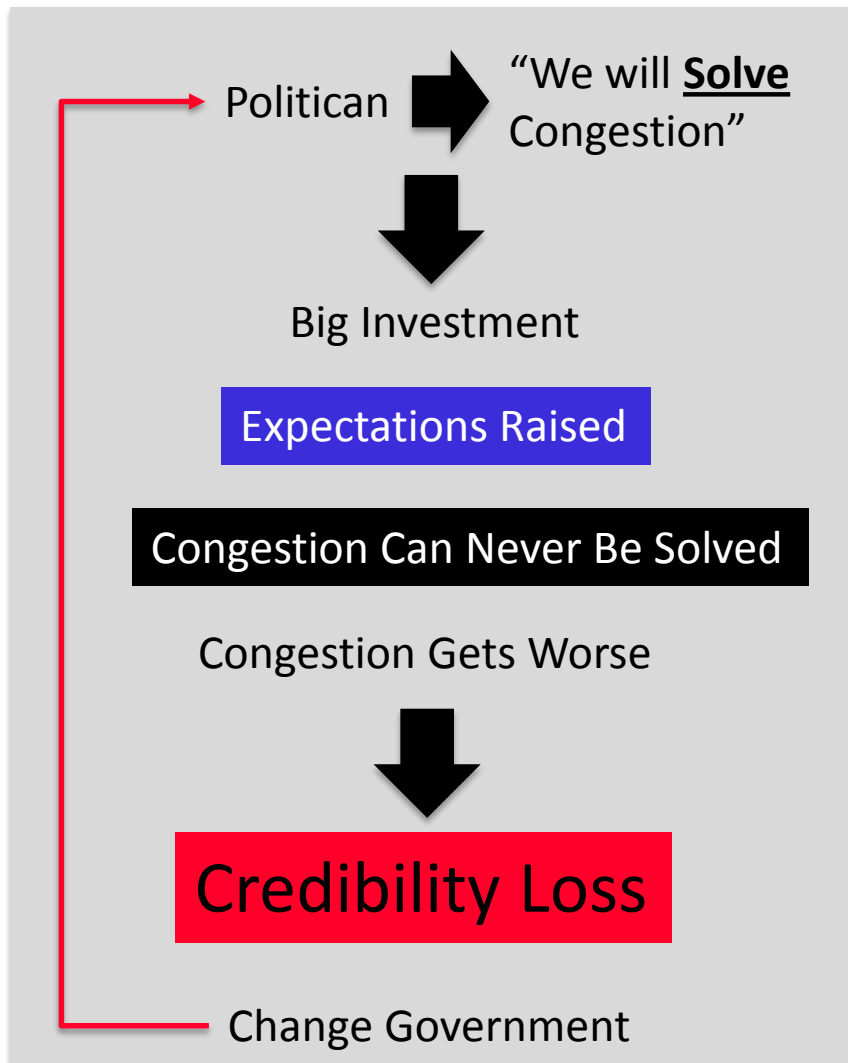
Employment Tax /  
Versement Transport

## MAKE THE PROBLEM FUND THE SOLUTION

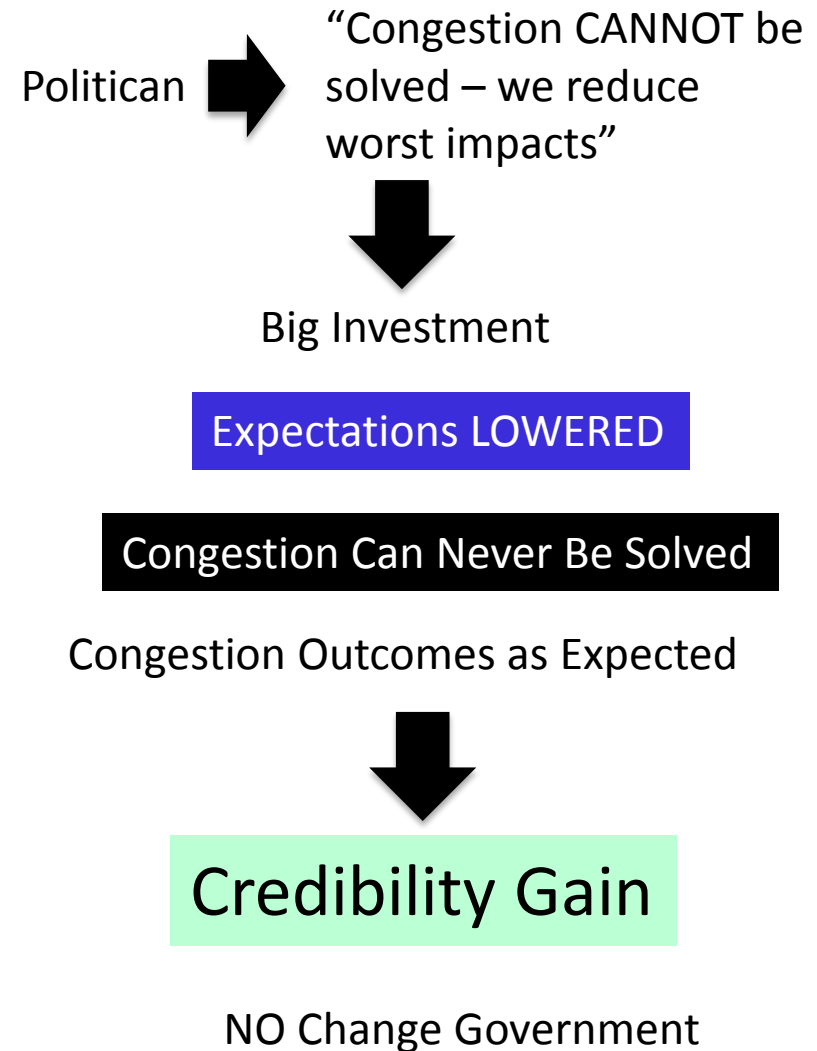


# Take a new approach to discussing Congestion “**SOLUTIONS**”

## NEGATIVE SPIRAL

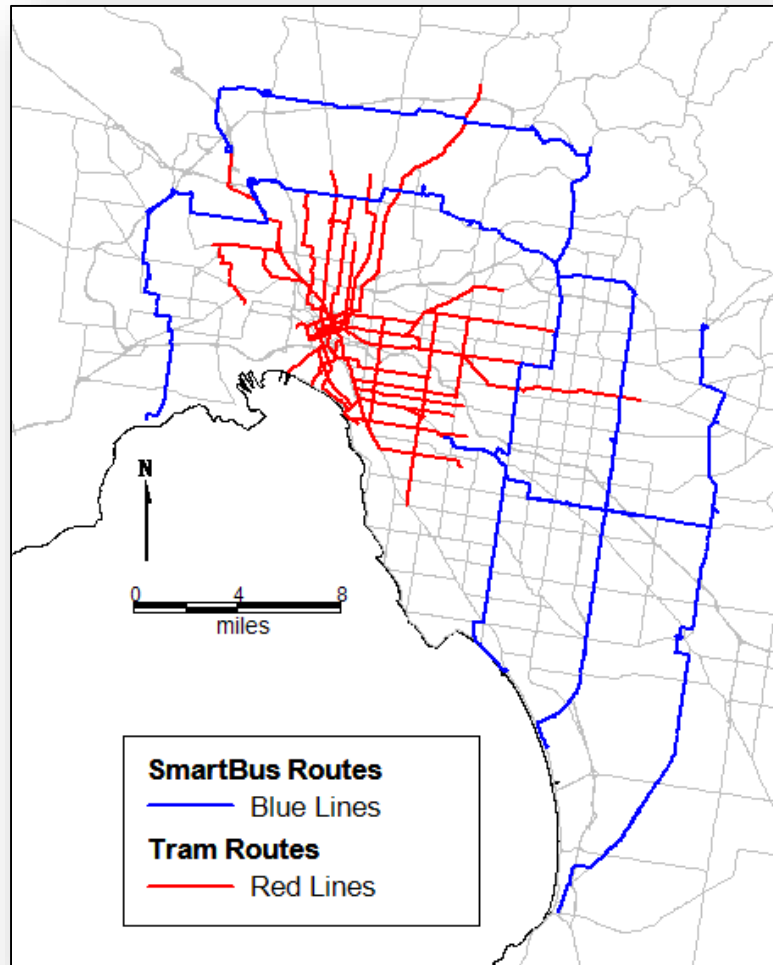


## POSITIVE APPROACH

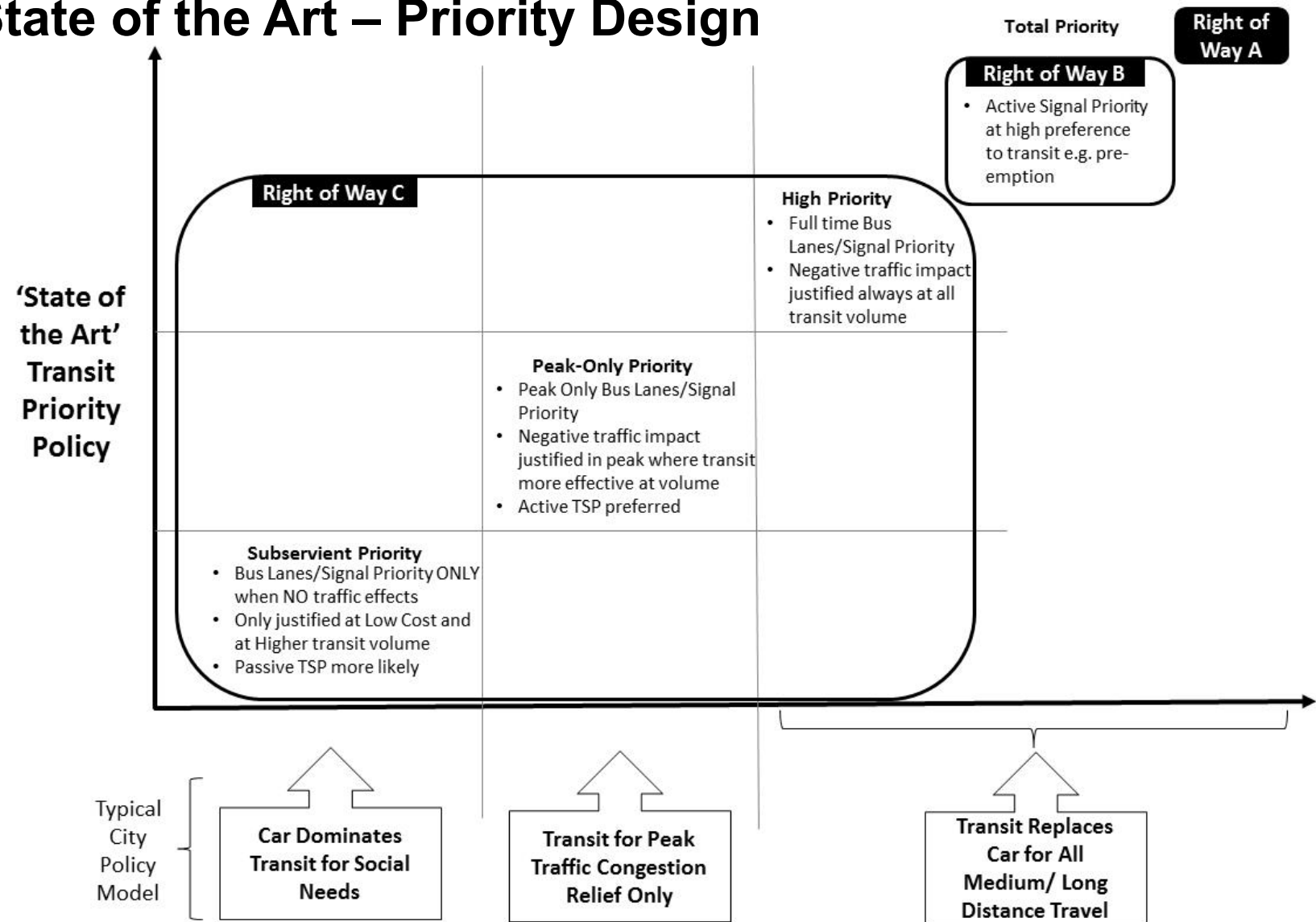




# INVEST, INVEST, INVEST, INVEST – TRAM/BUS RAPID TRANSIT



# State of the Art – Priority Design



Source: Currie G (2016) 'Managing On-Road Public Transport in Traffic' in Bliemer M Mulley C and Moutou C Handbook on Transport and Urban Planning in the Developed World, Edward Elgar Publishing Ltd UK



# PhD Student – James Reynolds – PRAGMATIC Priority - Exploring the political Legitimacy of transit priority




Melbourne

Toronto

**‘War on the car is over’: Ford moves transit underground**

11. Bus & Tram Priority Implementation  
James Reynolds



Zurich

1977 plebiscite **51% Vote** for surface transit priority

Case for transit priority  
Strong →

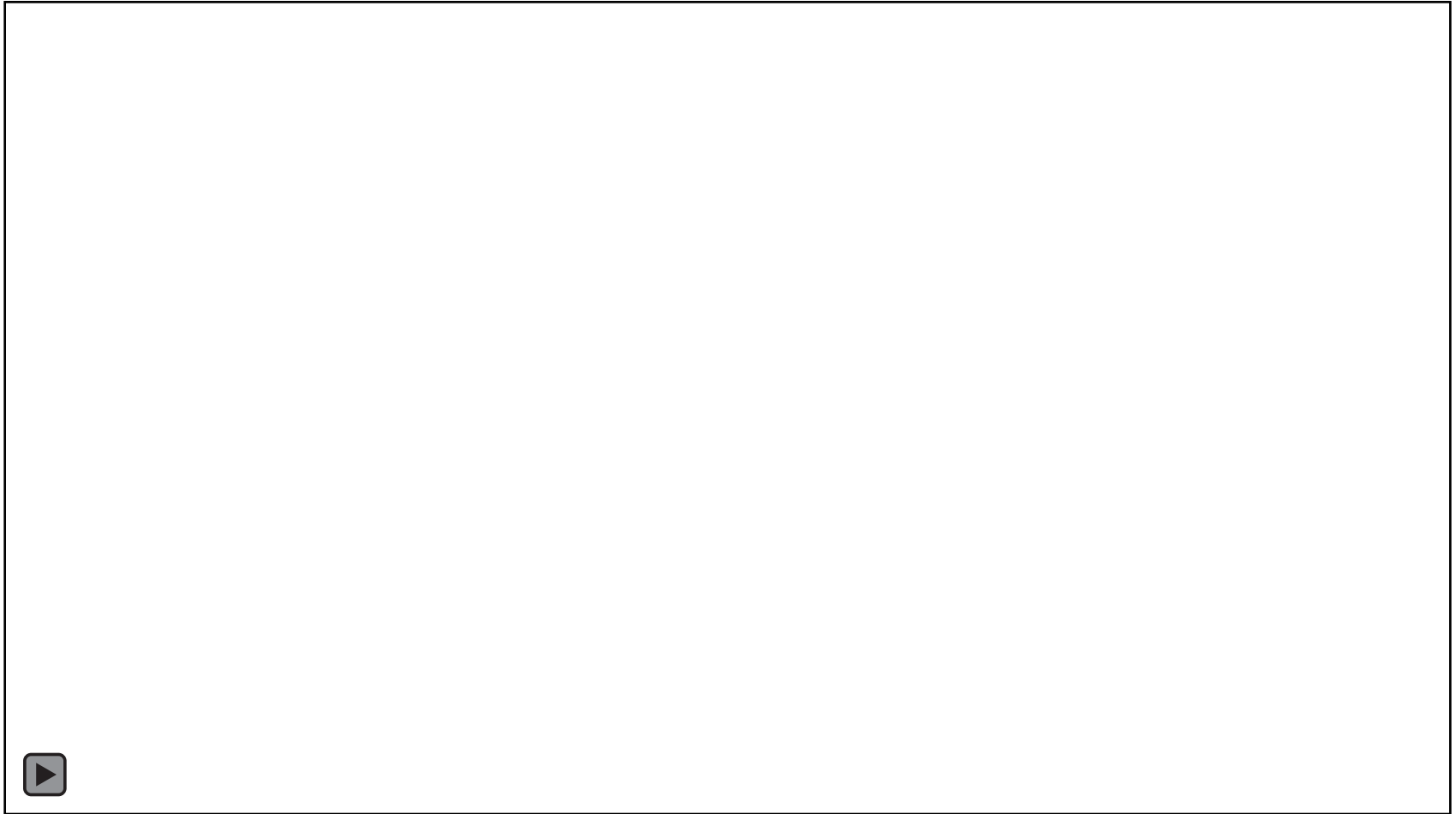
Weak

# Developing Pragmatic strategies for cities with weak political support

1. Subservient transit priority
2. Grade separation
3. Incremental and bottom-up approaches
4. Trials and pop-ups  
eg.  
**Boston Tests Faster Bus Service Simply By Laying Out Orange Cones**
5. Building legitimacy through public enquiries



# New Modes – Transit Synthesis – The Trackless Tram





## About World Transit Research

World Transit Research (WTR) is designed to help public transport practitioners and researchers get easier access to quality research in the field of public transport planning. WTR is a free repository of research papers, reports, research abstracts and links to research findings from leading research journals indexed and searchable to ensure easier access to topics of interest. The site is developed and run by the Public Transport Research Group at the Institute of Transport Studies, Monash University.

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The **Public Transport Research Group** is the name for researchers at the Institute of Transport Studies, Monash University who are engaged in research on public transport systems. The group is run by Professor Graham Currie, the Chair in Public Transport at Monash University. Research interests of the group are varied but loosely focus on research associated with public transport and strategic planning, travel demand management, travel behaviour, transport economics, land use and transit, travel modelling, operations modelling and planning for major special events.

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