MONASH University

Eastern Transport Coalition
October Meeting
City of Whitehorse, 379-396 Whitehorse Rd, Nunawading CIV3131
Thursday 26th October 2017

Melbourne Buses, Performance, Progress and Futures

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PTRG PUBLIC TRANSPORT RESEARCH GROUP

GROUP OF EIGHT AUSTRALIA

ITS (Monash)

Institute of Transport Studies (Mona

The Australian Research Council Key Centre in Transport

MONASH University

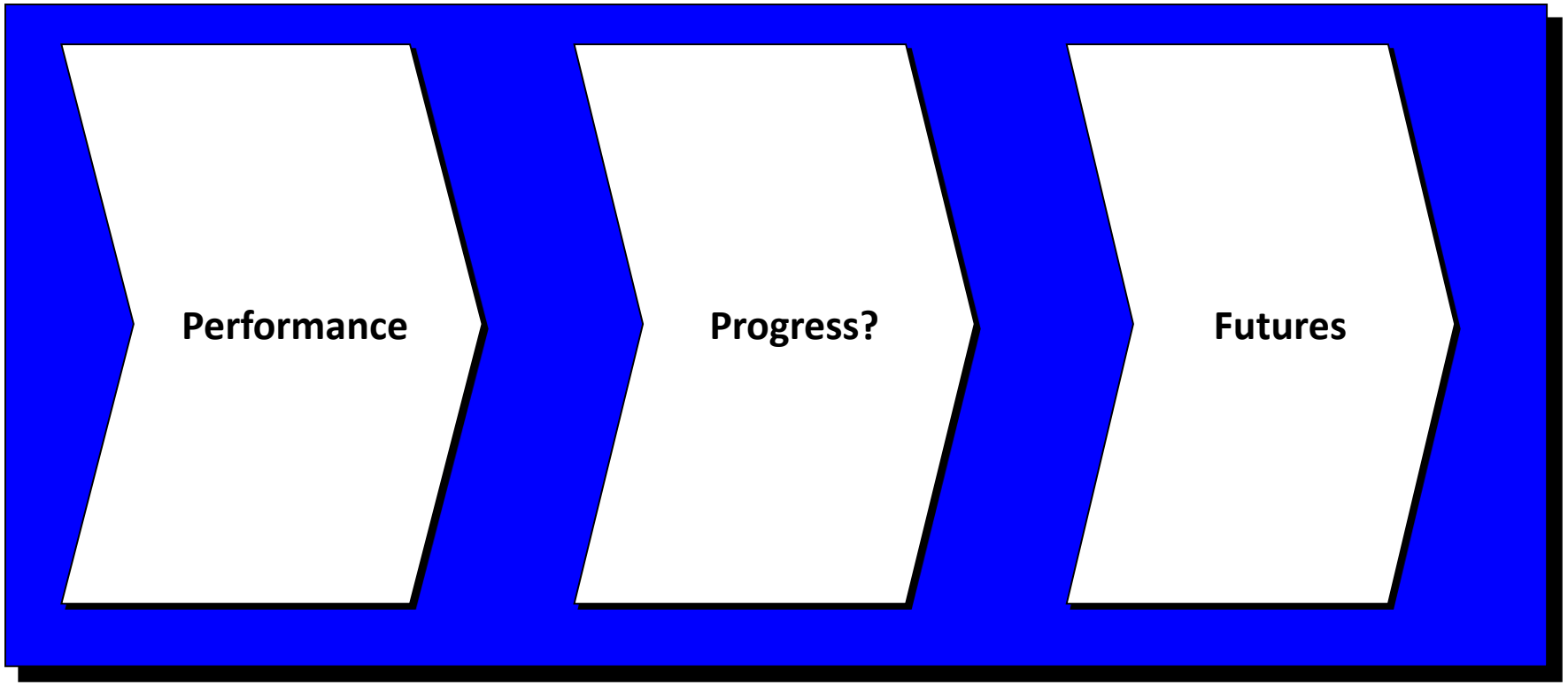
Introduction

Performance

Progress

Futures

This paper looks at Melbourne bus performance, progress and futures



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Introduction

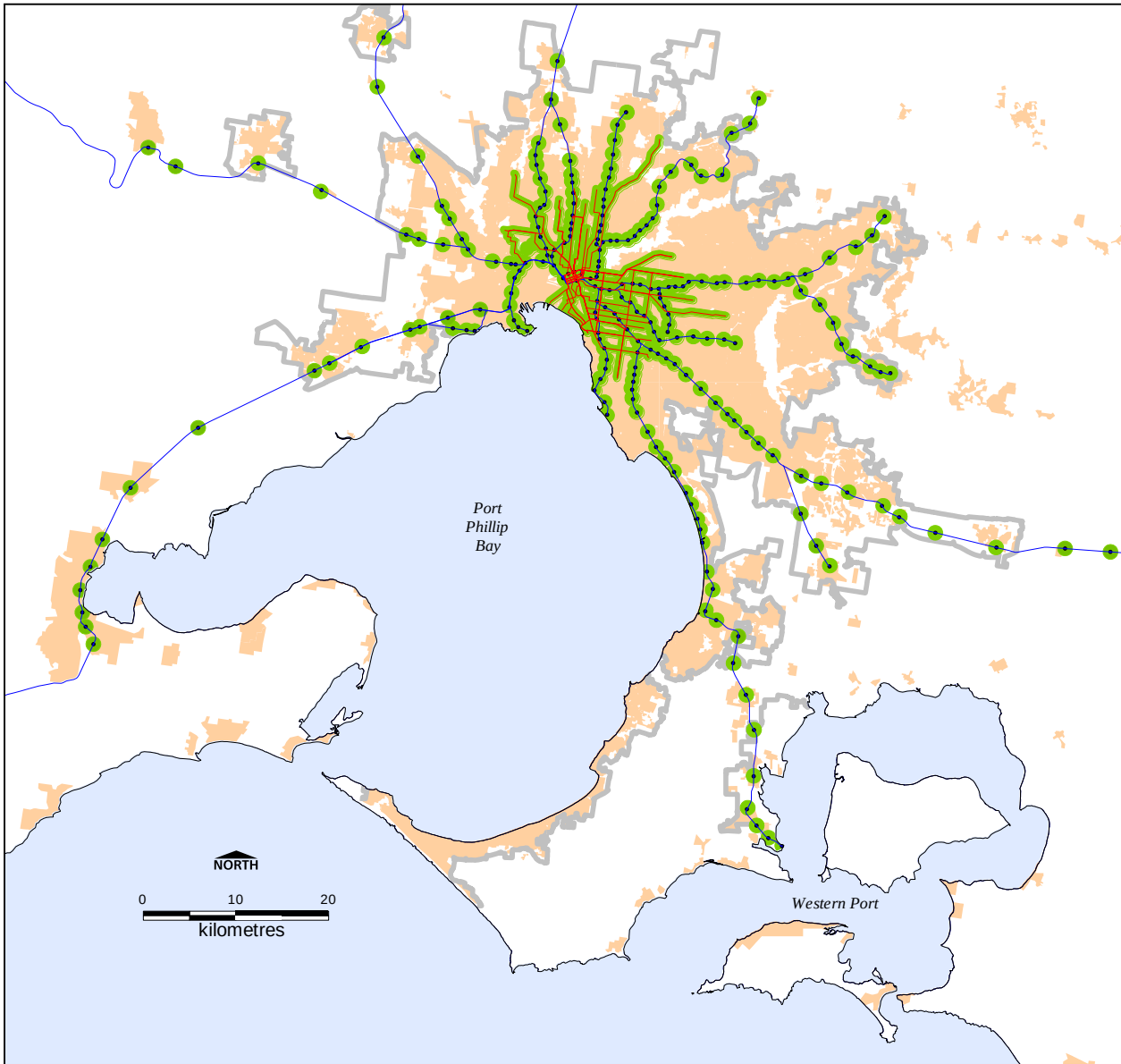
Performance

Progress

Futures

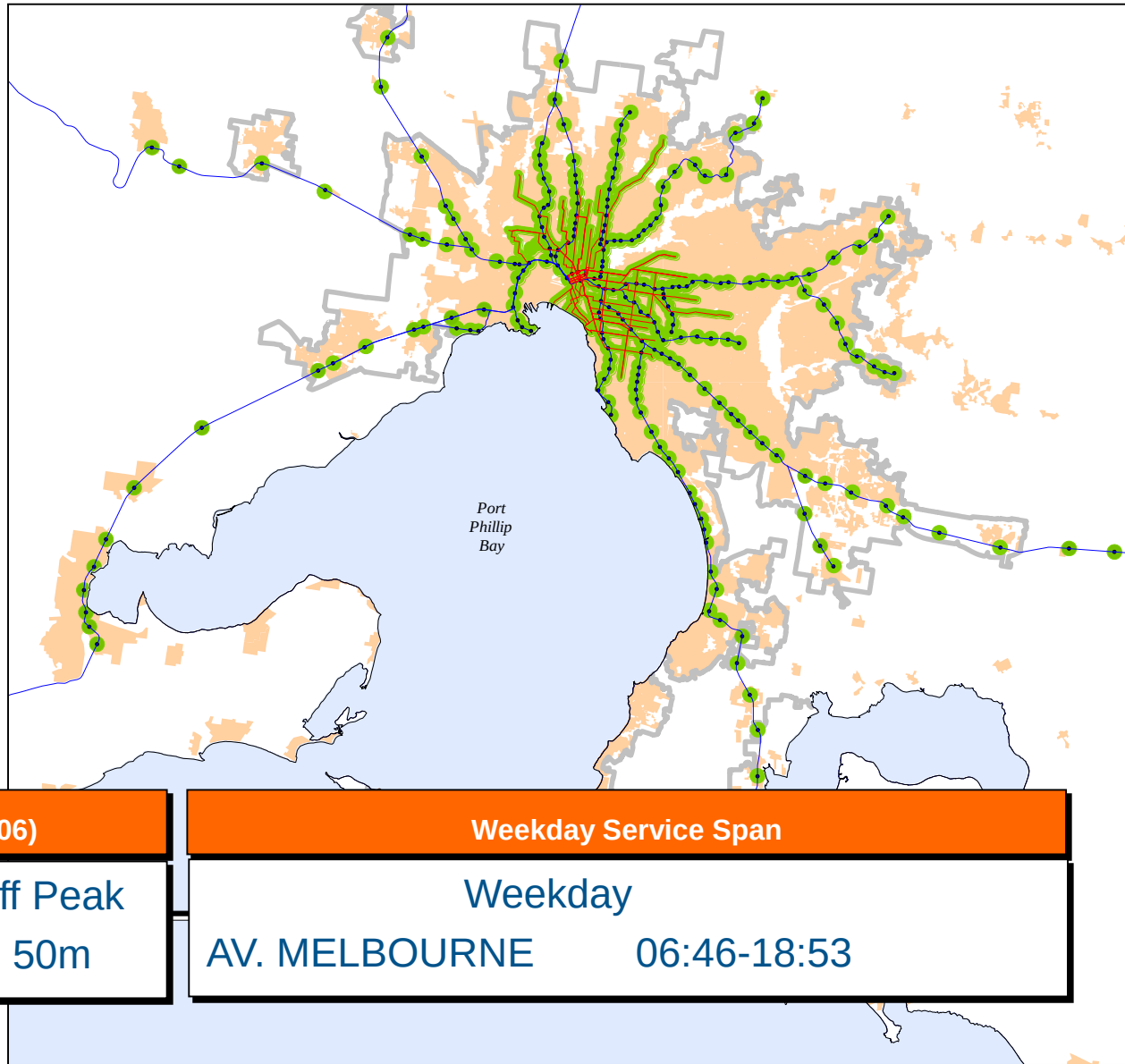
Buses ARE Melbourne's public transport for most residents, which is a problem….

- 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 bus was 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 bus was the only means of access to public transport. 0.98M



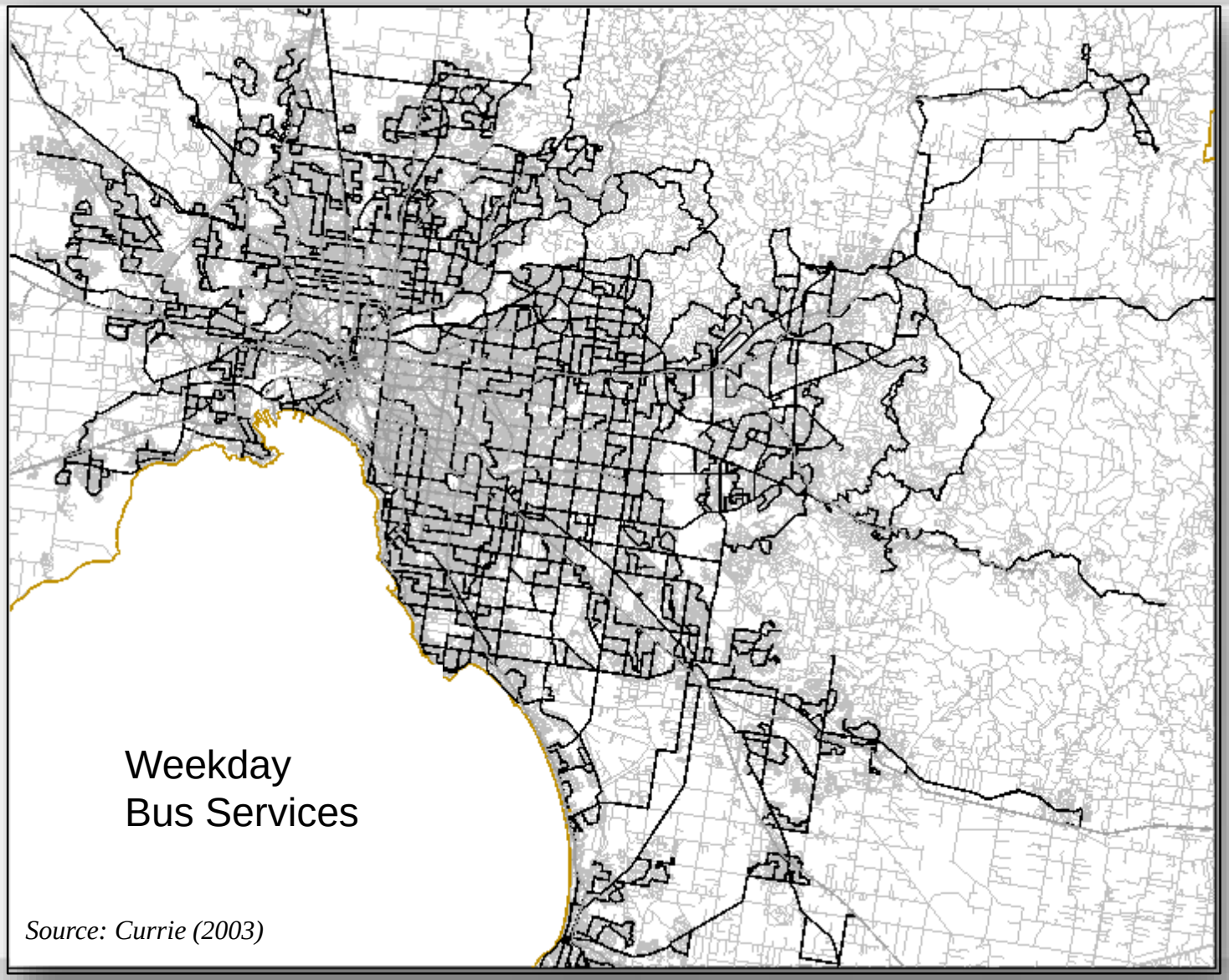
Weekday Service Frequency (2006)

	Peak	Off Peak
AV. MELBOURNE	40m	50m

Weekday Service Span

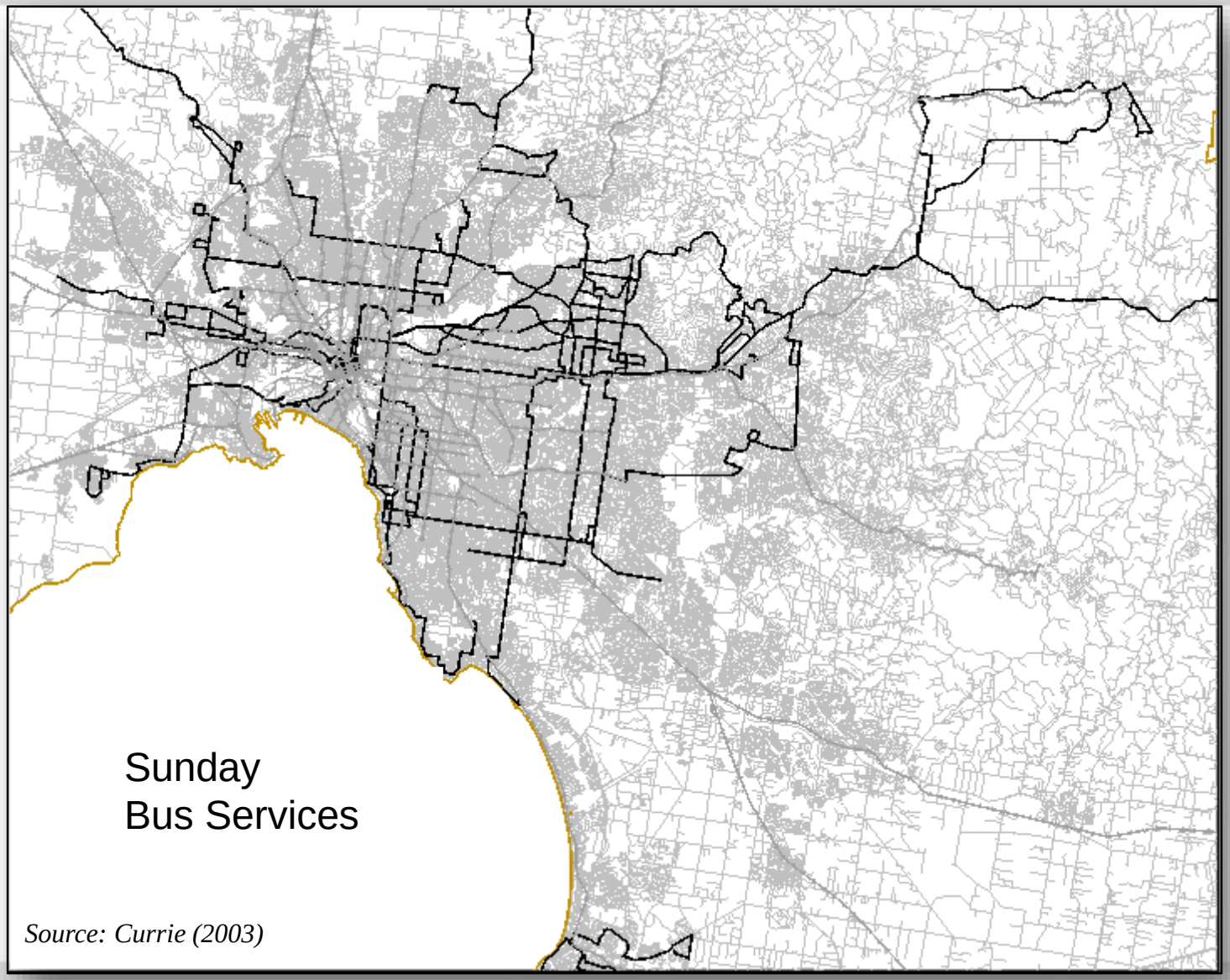
	Weekday
AV. MELBOURNE	06:46-18:53

The bus network on weekdays...



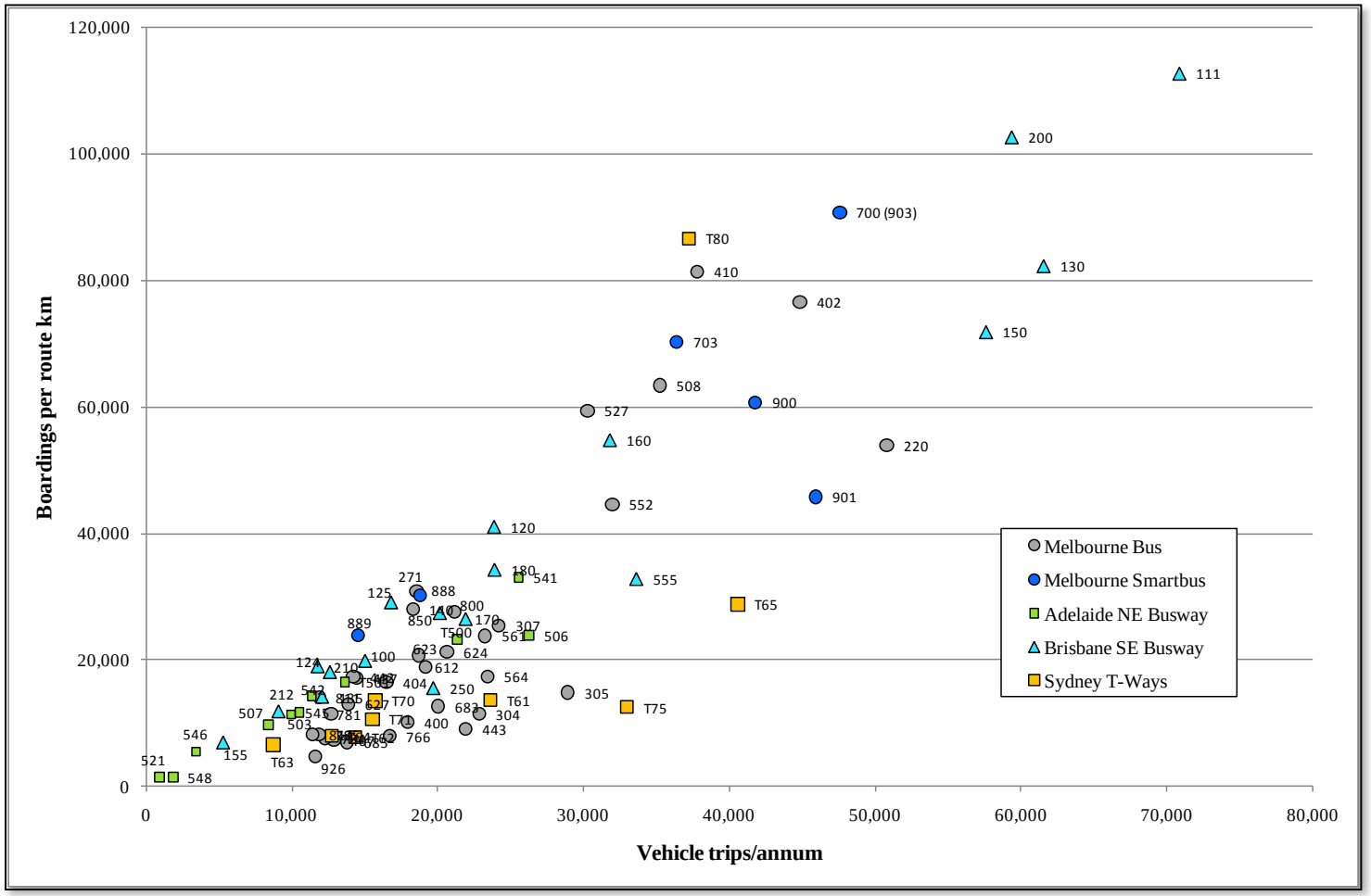
Source: Currie (2003)

…contrasts somewhat with weekends



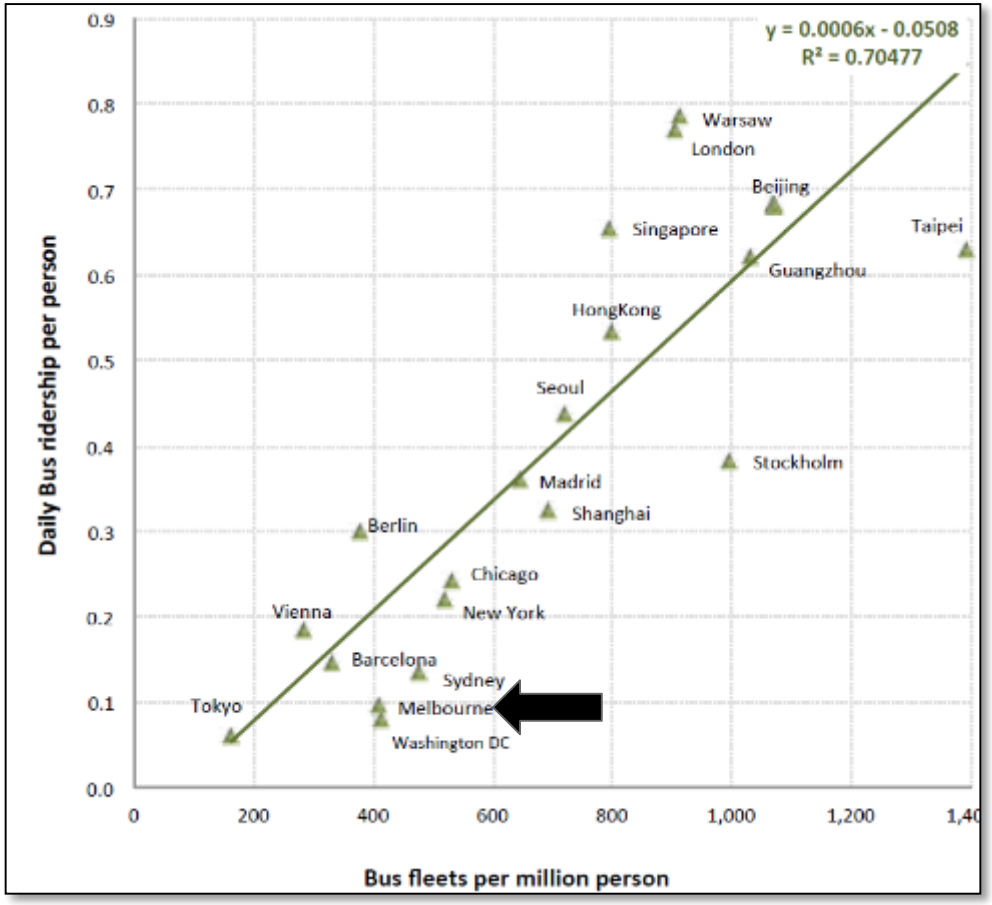
Source: Currie (2003)

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

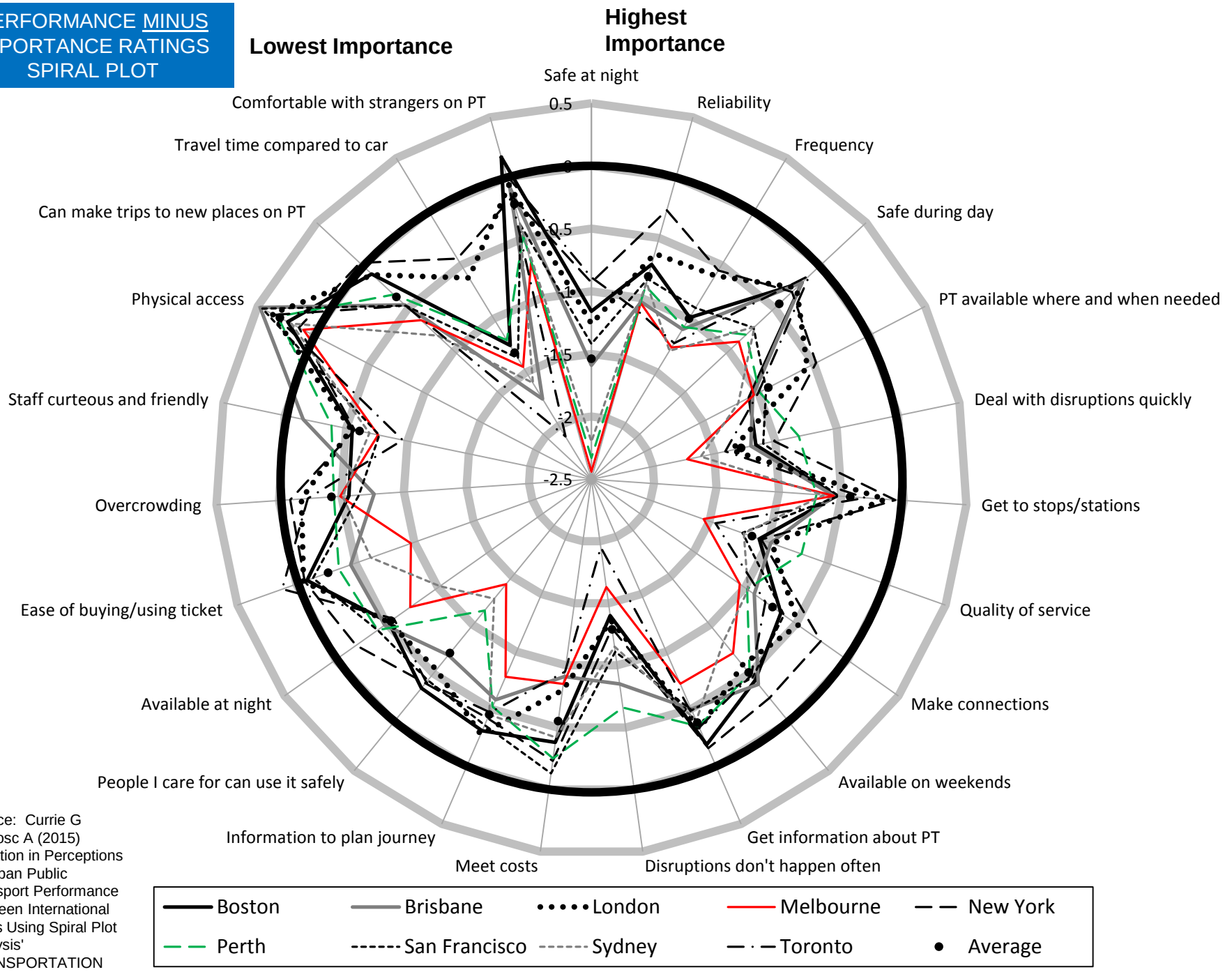
In general our bus service level is poor compared to world practice



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

So what do passengers think about these issues?

PERFORMANCE MINUS IMPORTANCE RATINGS SPIRAL PLOT



Source: Currie G Delbosc A (2015) Variation in Perceptions of Urban Public Transport Performance Between International Cities Using Spiral Plot Analysis' TRANSPORTATION RESEARCH RECORD No. 2538 on pages 54-

Bus Passenger Views of Improvements – Reliability, Coverage, Frequency

Bus Passenger Opinions on Bus Improvement Priorities

	Improvement Options	Individual Score	Average Score
Reliability	Buses arriving and departing on time	6.22	6.16
	Buses connecting well with other transport services	6.10	
Temporal Service Coverage	Weekend services provided	5.93	5.71
	Buses operating until late at night on weekends	5.49	
Frequency	Buses running more often in peak hours	5.23	5.23
Information	Improved bus service information at stops	5.27	4.90
	Customer information buttons at stops	4.52	
Safety	Safer pedestrian crossings at bus stops	4.85	4.64
	Lighting and video surveillance at bus stops	4.43	
Comfort	Improved shelter and seating at stops	5.06	4.55
	Making it easier to get on and off buses	4.04	
Speed/TT	Bus trips take less time	4.11	4.11
Spatial Service Coverage	Bus services operating closer to home	4.14	3.71
	Buses operating to new destinations	3.27	

Notes: Scores range from 1 to 7

Source: Smart Bus project. Passenger and local community reseearch (YCHM, Nov. 1999)

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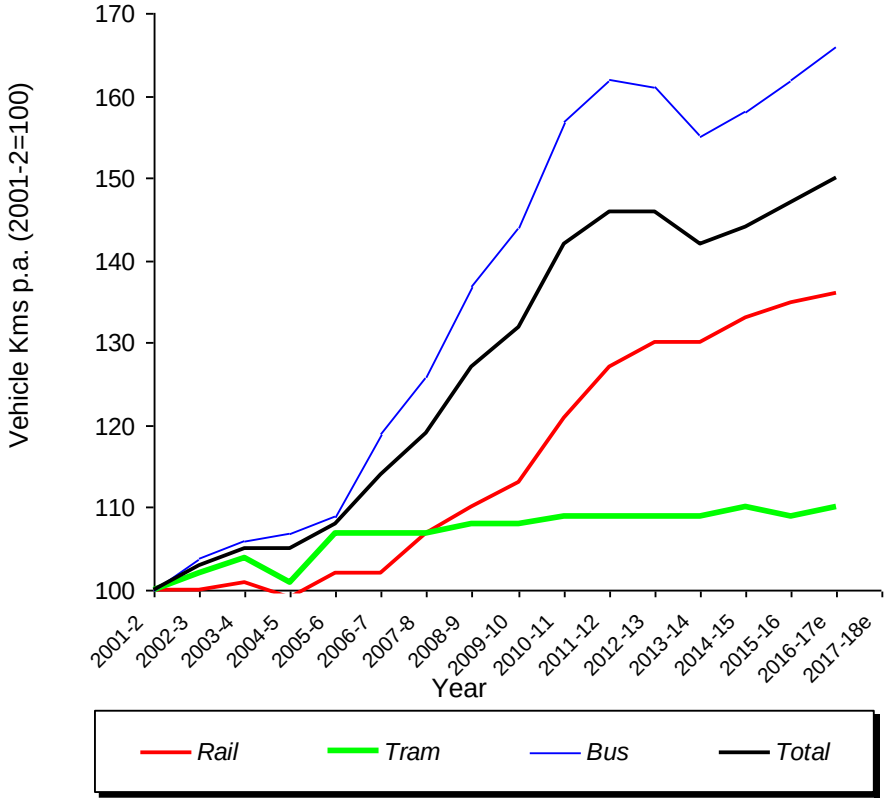
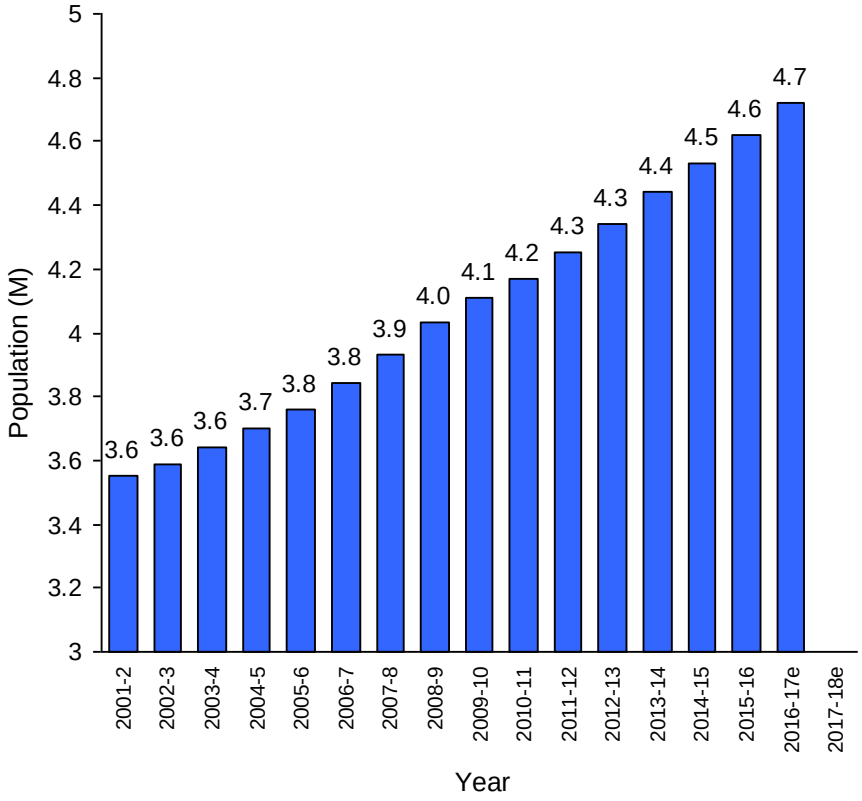
[OLD] Since 2001 PT service increased 63% (66% bus/ 36% rail, 10% tram) but - but population growth continues at a faster pace…

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

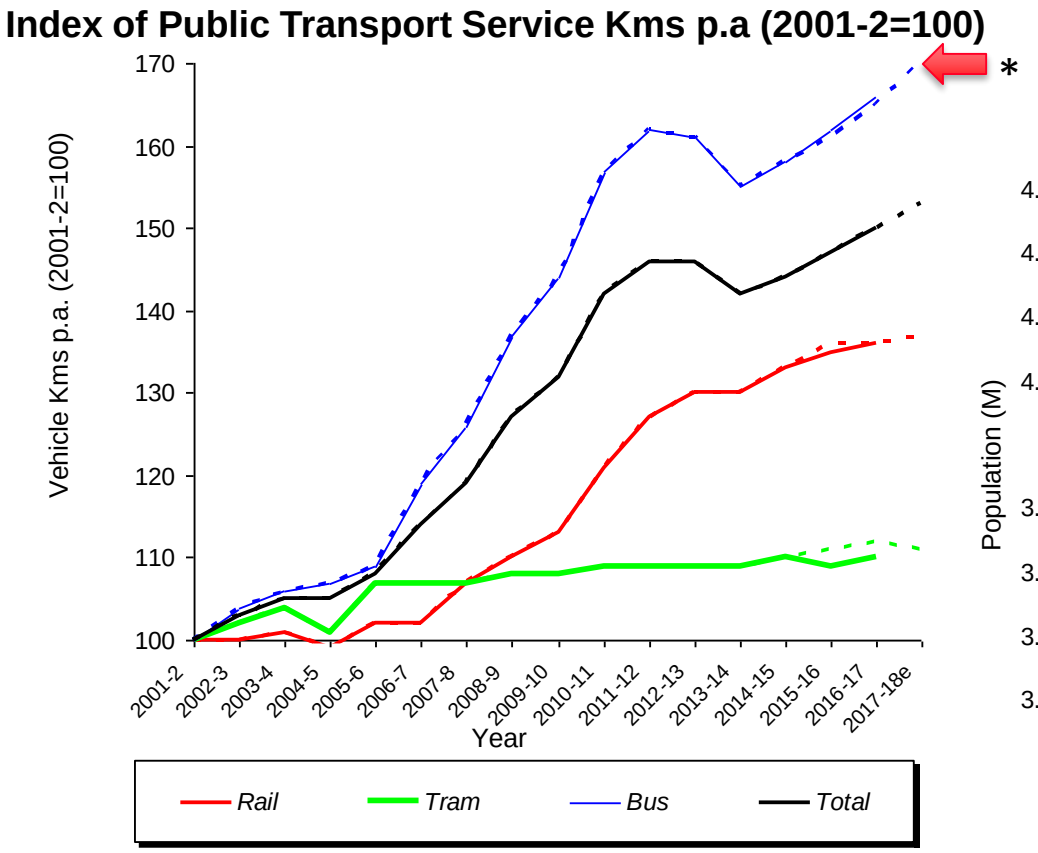


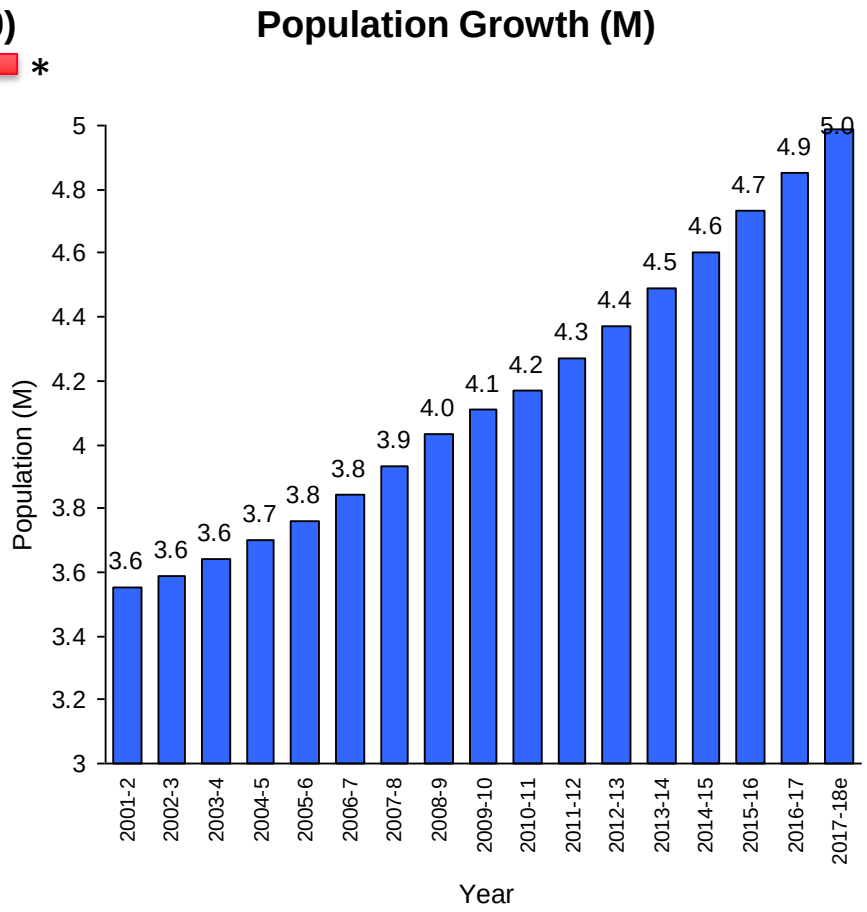
Population Growth (M)



Source: Department of Transport/ Public Transport Victoria Annual Reports

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

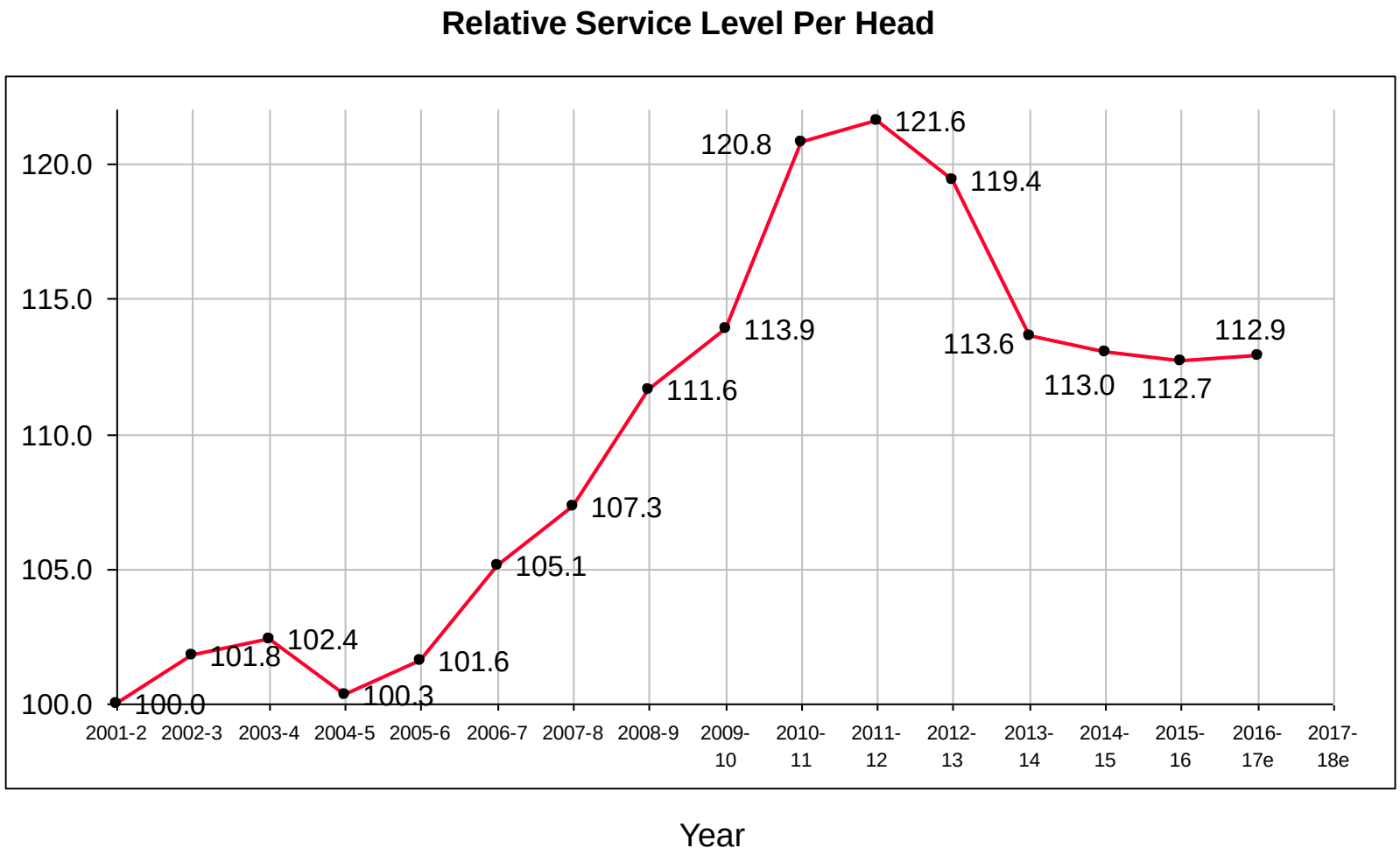




Source: Department of Transport/ Public Transport Victoria Annual Reports

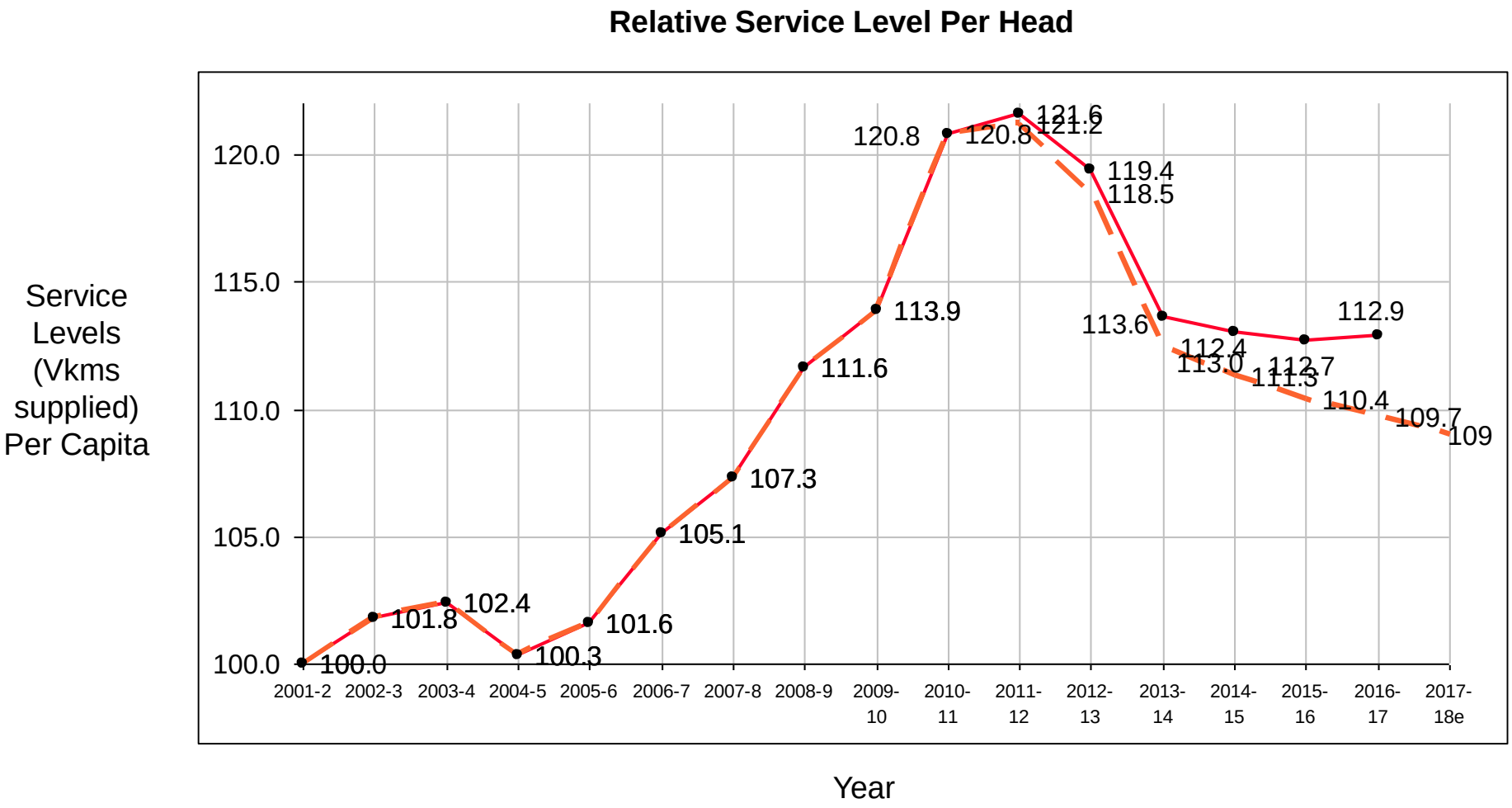
*Note: * More bus services sooner initiative (~$2.5M 2016-2020); New bus services initiative ($.3M-$9Mp.a. 2015-2020)*

[OLD]…in last 10 years, per person service increased 22% then declined since 2011 (we have declined by 9% points); recent trend is flat



Source: Department of Transport/ Public Transport Victoria Annual Reports

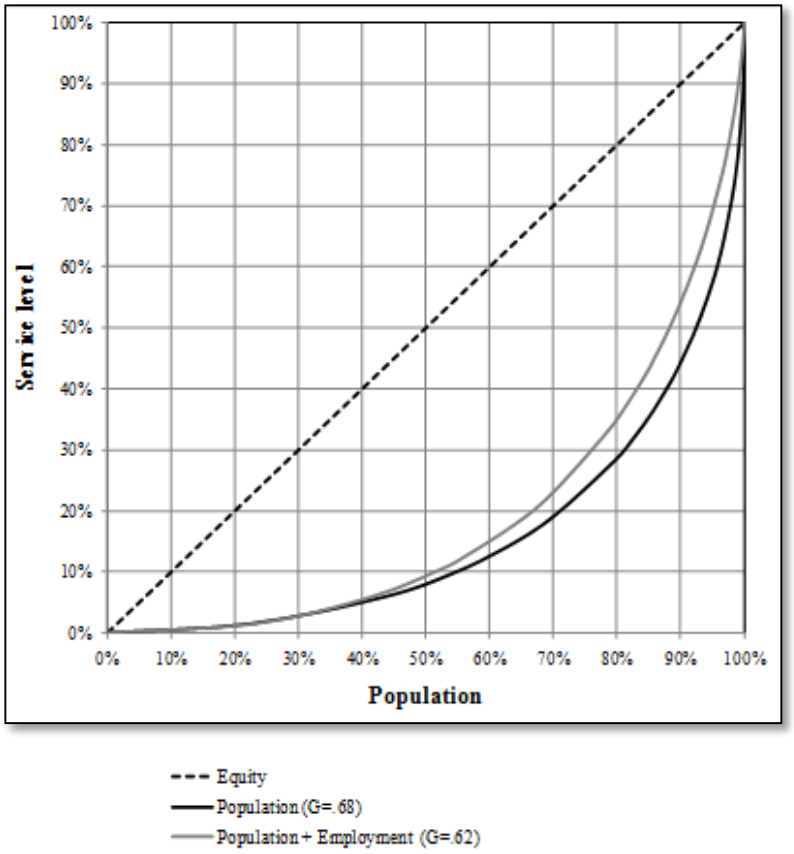
[NEW]..in last 10 years, per person service increased 21% then declined since 2011 (we have declined by 12% points); recent trend is decline



Source: Department of Transport/ Public Transport Victoria Annual Reports

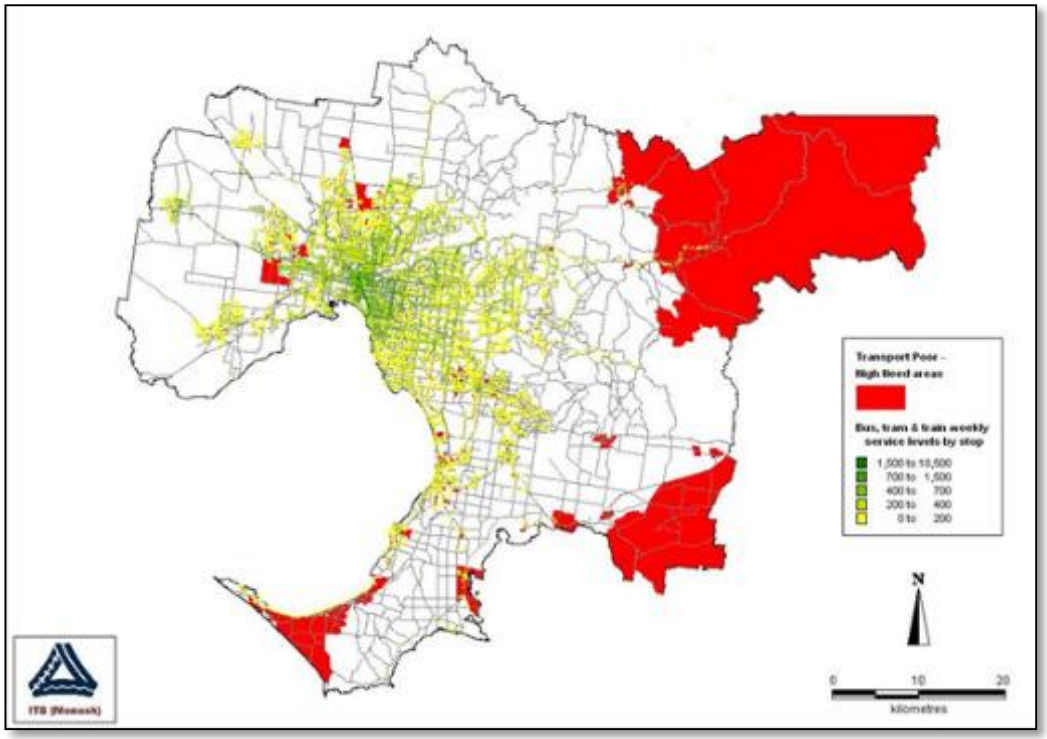
Melbourne has BIG inequity in PT service– many high need areas with no service areas on the urban fringe; bus is a big part of this

Service Supplied by Population



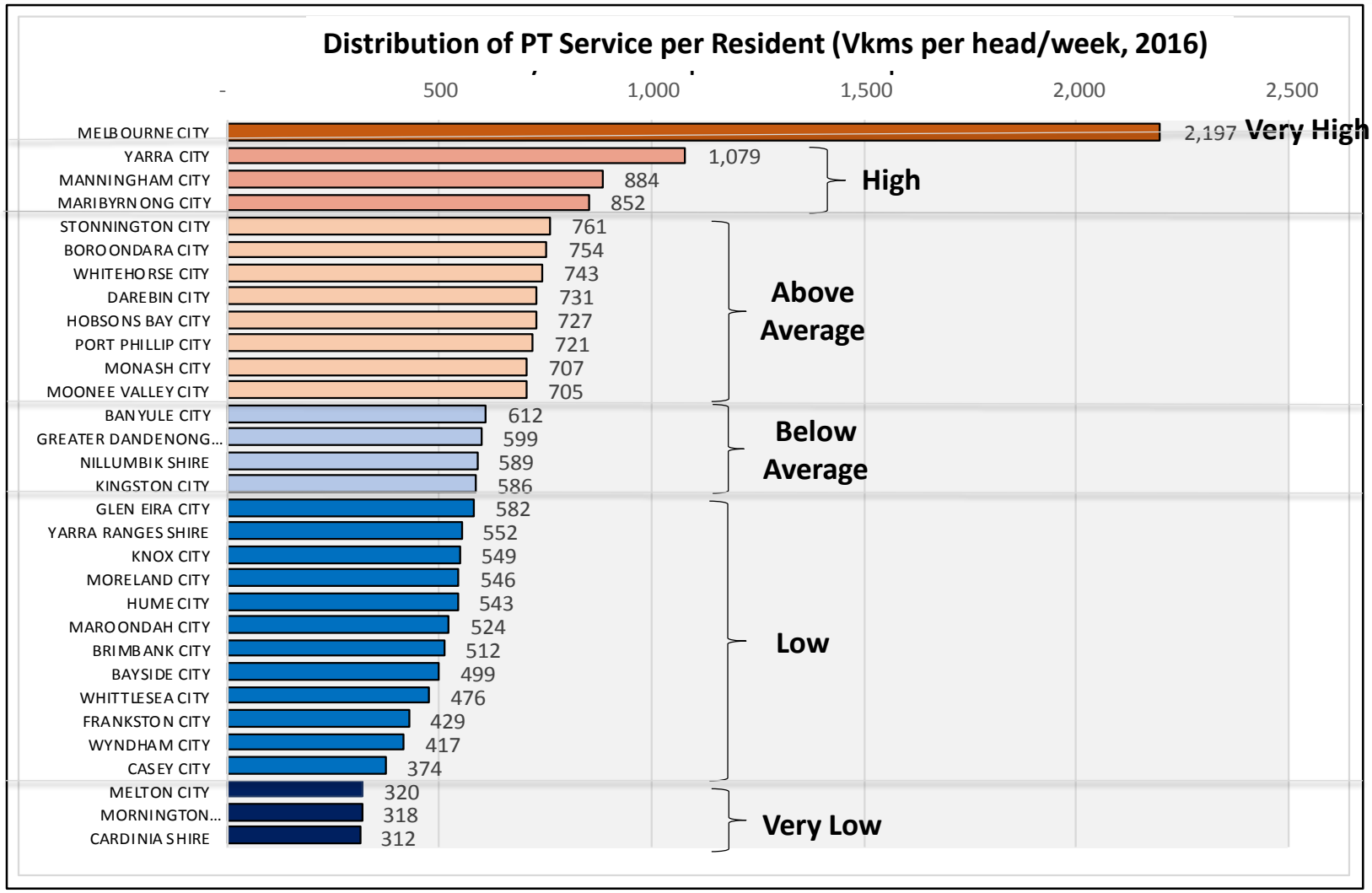
Source: Delbosc A and Currie, G. (2011) 'Using Lorenz Curves to Assess Public Transport Equity' JOURNAL OF TRANSPORT GEOGRAPHY Volume 19, Issue 6, November 2011, Pages 1252-1259

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



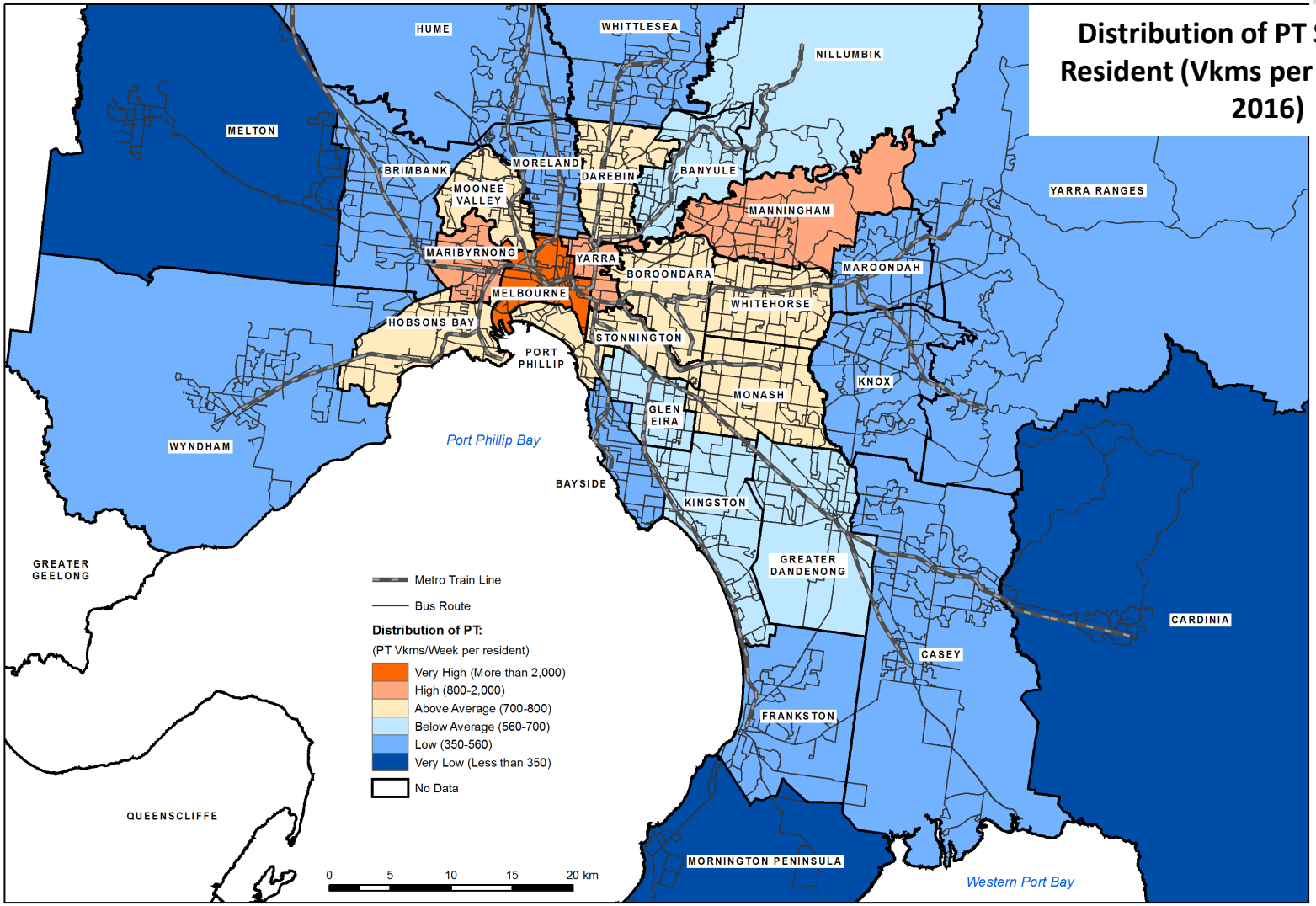
Source: Currie, G. (2010) Quantifying spatial gaps in public transport supply based on social needs, JOURNAL OF TRANSPORT GEOGRAPHY 18 (2010) 31–41

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



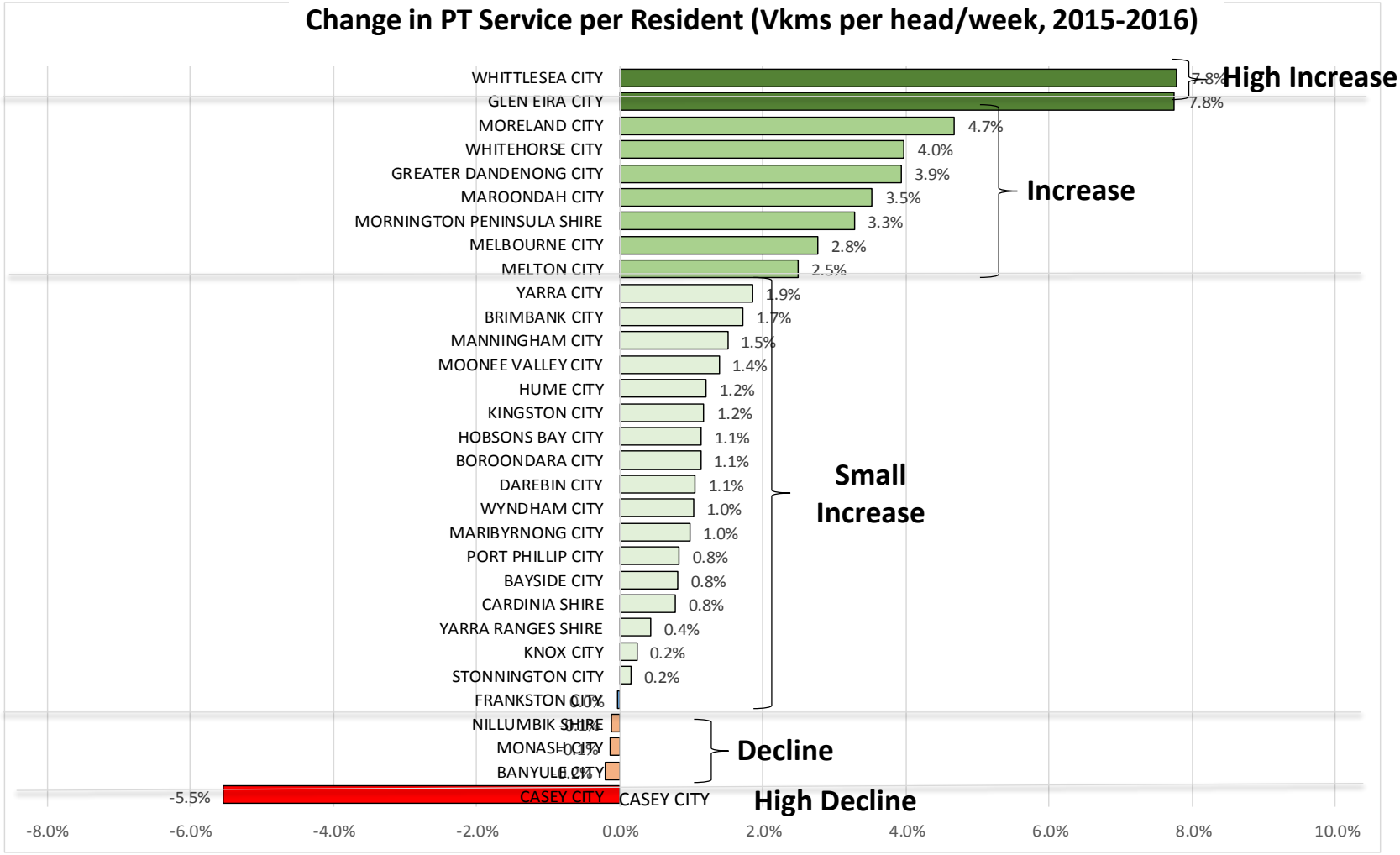
Source: PTRG analysis of the GTFS file data for Melbourne. Includes bus, rail and tram. Weekly data extracted for the week 19th- 25th Sept 2016. Data production undertaken by Phillip Boyles and Associates

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



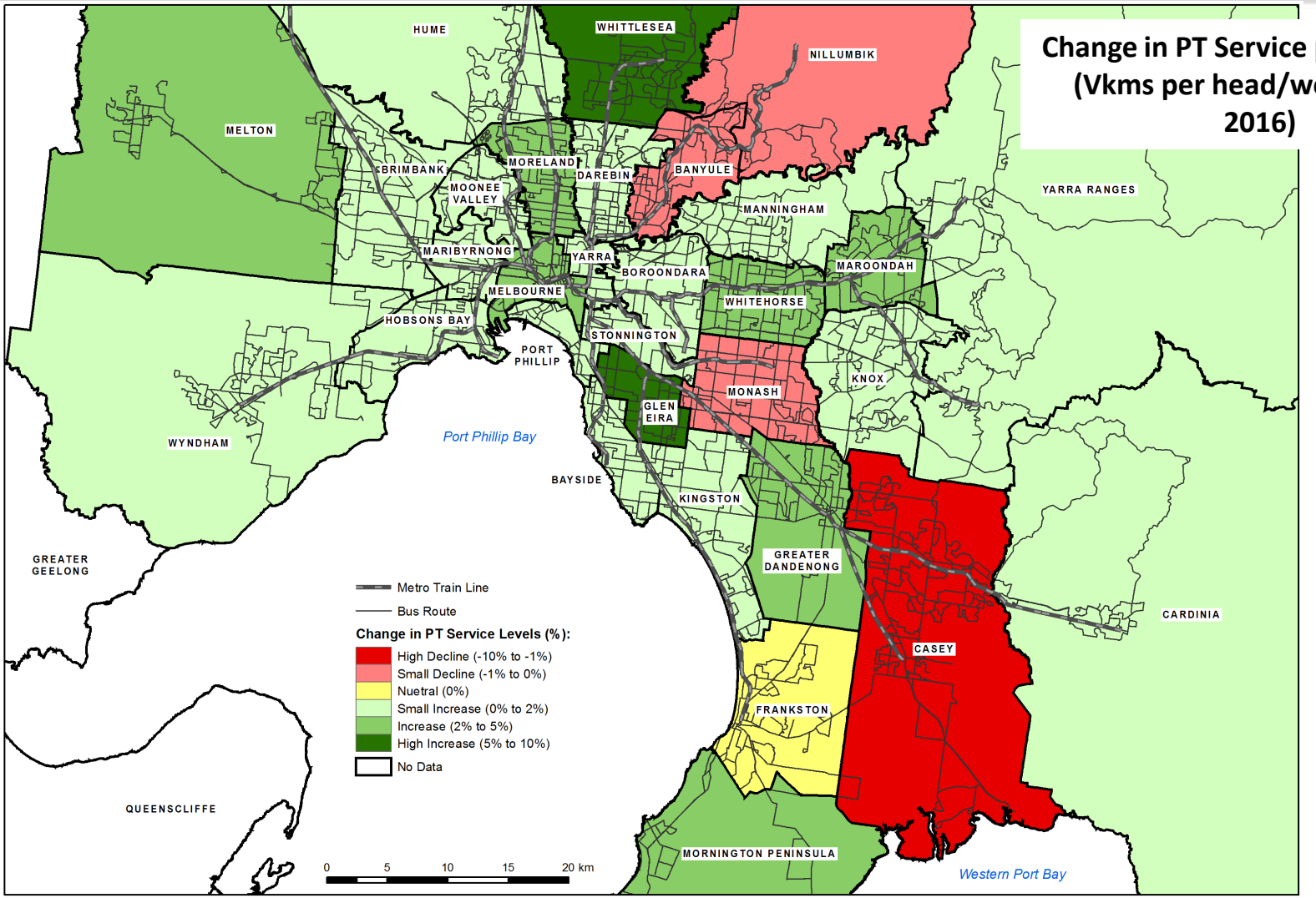
Source: PTRG analysis of the GTFS file data for Melbourne. Includes bus, rail and tram. Weekly data extracted for the week 19th- 25th Sept 2016. Data production undertaken by Phillip Boyles and Associates

Change in service is also uneven; some decline occurred 2015-2016…



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

...Notably in Casey, Banyule, Nillumbik and Monash.



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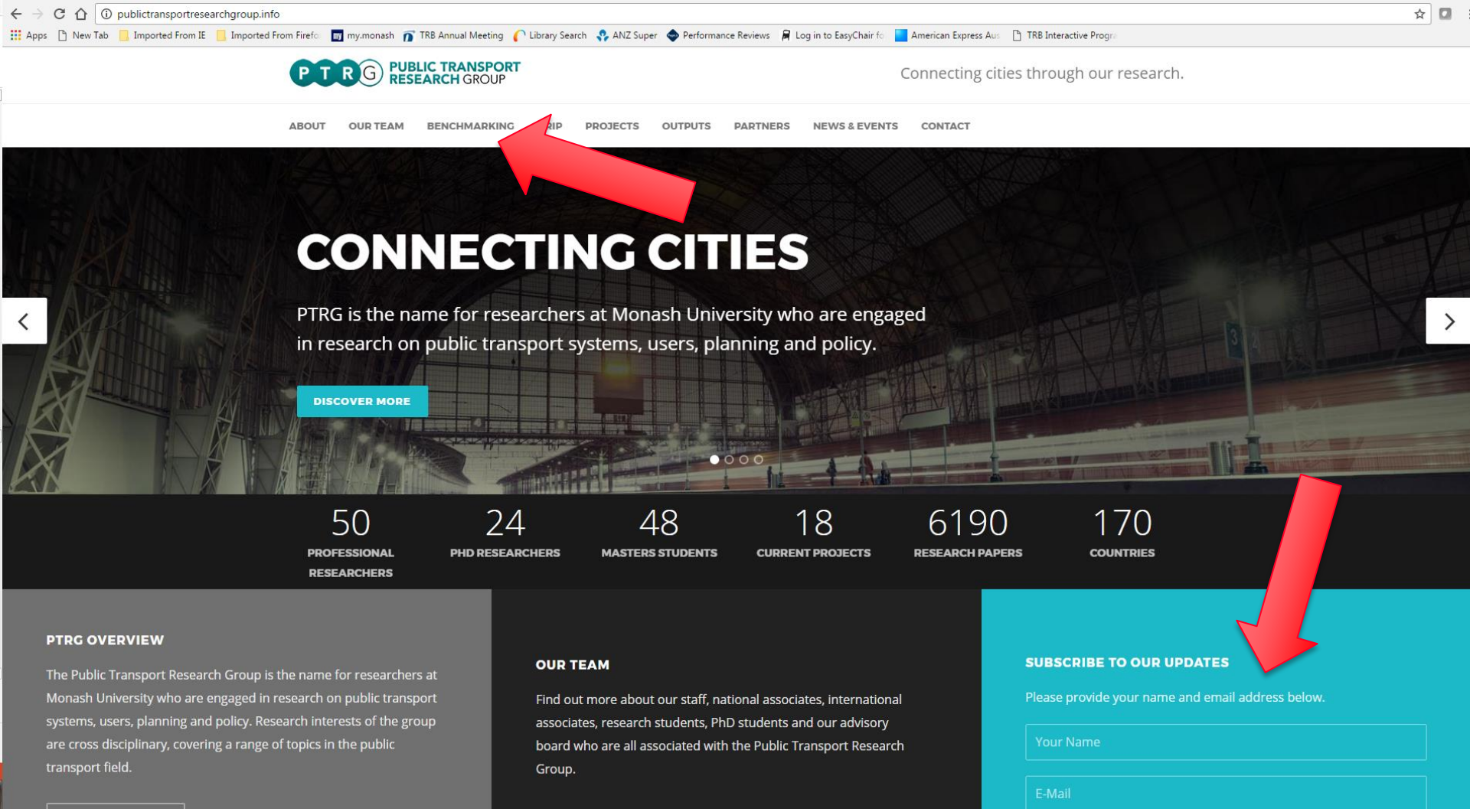

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Connecting cities through our research.

ABOUT OUR TEAM BENCHMARKING GRIP PROJECTS OUTPUTS PARTNERS NEWS & EVENTS CONTACT

PUBLIC TRANSPORT SERVICE LEVEL TRENDS IN LOCAL GOVERNMENT AREAS IN MELBOURNE

Objectives

- To measure the quantity of urban public transport provision in local government areas in Melbourne between 2015 and 2016
- To explore if and how urban public transport provision has kept pace with population growth.

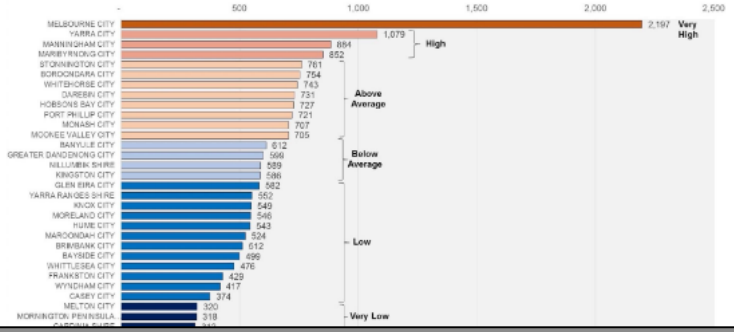
Method

- Compilation of public transport vehicle kilometres and urban population data for local government areas in Melbourne by year
- Comparison of public transport vehicle kilometres per capita by year.

Key results

CHANGES IN PUBLIC TRANSPORT SERVICE LEVELS PER CAPITA ARE HIGHLY UNEVEN ACROSS MELBOURNE.

Fig. 1 Public transport service provision per capita by local government area in Melbourne, 2016
(Total weekly public transport vehicle kilometres per 1,000 people)



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ABOUT OUR TEAM **BENCHMARKING** GRIP PROJECTS OUTPUTS PARTNERS NEWS & EVENTS CONTACT

Objectives

- To measure aggregate urban public transport provision in Melbourne from 2001-02 to 2016-17
- To explore if and how urban public transport provision has kept pace with population growth.

Method

- Compilation of public transport vehicle kilometres (by mode) and urban population data for Melbourne by year
- Comparison of public transport vehicle kilometres per capita by year.

Key results

PUBLIC TRANSPORT SERVICE PROVISION PER CAPITA HAS BEEN DECLINING SINCE 2011-12 IN MELBOURNE.

Fig. 1 Public transport timetabled kilometres per year by mode in Melbourne (indexed: 2001-02 = 100)

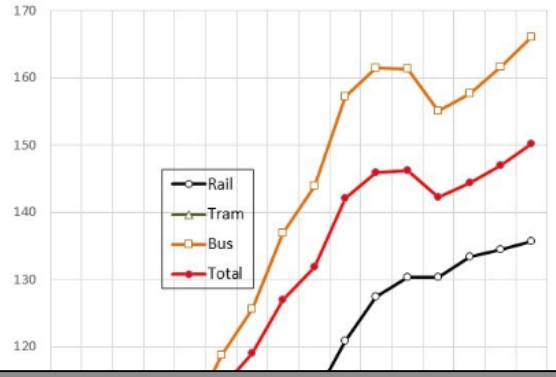
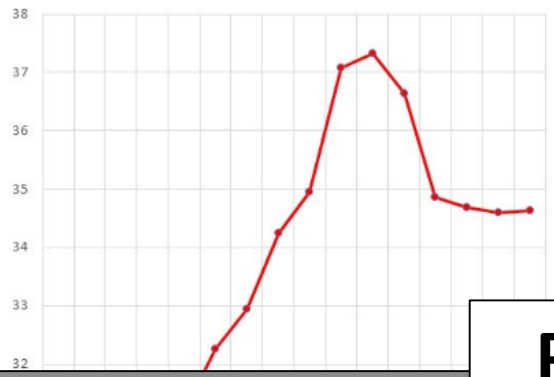


Fig. 2 Public transport timetabled kilometres per capita per year in Melbourne



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Introduction

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Futures

Bus Ridership Growth…we did a world review of methods of substantially increasing bus ridership - here are the findings

Issues Covered

- Behavioural studies (elasticity of demand)
- Bus Improvement Experience
- International Expert Delphi Study

Journal of Transport Geography 16 (2008) 419–429

Contents lists available at ScienceDirect

Journal of Transport Geography

journal homepage: www.elsevier.com/locate/jtrangeo

Effective ways to grow urban bus markets – a synthesis of evidence

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[c] Ian Wallis Associates Ltd., New Zealand

ARTICLE INFO

Keywords:
Bus improvement
Ridership growth
Public transport
Bus rapid transit
Urban transport

ABSTRACT

This paper provides a synthesis of the evidence on the patronage growth performance of bus improvement measures in urban settings. The evidence includes a summary of experience in Europe, North America and Australasia focusing on service improvement measures including network structure and service levels, bus priority measures, vehicles and stop infrastructure, fares and ticketing systems, passenger information and marketing, personal safety and security and synergy effects of measures. The source is the research literature and documented experienced from a series of studies undertaken by the authors over the last decade. It includes the results of an international bus expert 'Delphi' survey concerning bus improvement measures focussed on patronage growth. The paper synthesises the evidence to identify measures which are most likely to grow patronage including consideration of cost-effectiveness of measures.

1. Introduction

Improving the quality of urban public transport is one of many strategies proposed to improve mobility options for the transport disadvantaged (BIC 2003) and to address car dependence and the urban congestion, environmental sustainability and global warming concerns associated with car dependence (Booz Allen Hamilton, 2006; Victorian Competition and Efficiency Commission, 2006). Improving bus-based public transport has been considered a more cost-effective option compared to rail investment (US General Accounting Office, 2001; UK Commission for Integrated Transis sourced from a review of the literature and also from the results of several international consultancy studies undertaken by the authors over the last decade to identify the best ways of improving bus services (e.g. Booz Allen Hamilton, 2000a; Booz Allen Hamilton, 2002). This includes the results of a hitherto unpublished international 'Delphi' survey of bus planning experts aimed at identifying the most effective means of substantially growing urban bus markets (Booz Allen Hamilton, 2000a).

Section 2 of this paper presents a summary of behavioural research evidence concerning the sensitivity of bus patronage to changes in service features. Section 3 presents a review of interna-

Source: Currie, G. and Wallis, I. (2008) , Effective ways to grow urban bus markets – a synthesis of evidence, JOURNAL OF TRANSPORT GEOGRAPHY 16 (2008) 419–429

Behavioural evidence identifies a rank for improvement measures based on maximum possible impact

- Rank based on higher patronage growth impacts:
  1. Service Level Improvement (200% plus)
  2. Free fares (<=40%)
  3. Reliability (<20%)
  4. Travel Time (<15%)
  5. BRT (alone) (<10%)
  6. Soft Factors (<2-5 %)

Source: Currie, G. and Wallis, I. (2008) , Effective ways to grow urban bus markets – a synthesis of evidence, JOURNAL OF TRANSPORT GEOGRAPHY 16 (2008) 419–429

Bus improvement experience (Australia) suggests major BRT revisions, network restructuring and free CBD services (tram in Melbourne)

- Ranking of measures based on patronage impacts:
  1. Bus Rapid Transit Systems (market growth in the order of 20% - 70% at a corridor level)
  2. (Free) CBD Distributors (market growth around 50% - 200% affecting CBDs)
  3. Bus Network Area Restructuring (network-wide market growth around 10-30%)
  4. Express Bus (market growth around 15% - 30% but only affecting route catchments)
  5. Increased Frequencies/Minibus (market growth 10% - 40% at mainly a route level)
  6. Bus Priority Measures (10% - 50% at a route group/corridor level)
  7. Bus Marketing/Passenger Information, including TravelSmart (up to 20% at an area level).

Source: Currie, G. and Wallis, I. (2008) , Effective ways to grow urban bus markets – a synthesis of evidence, JOURNAL OF TRANSPORT GEOGRAPHY 16 (2008) 419–429

A UK study (TAS) identified network simplicity as THE most cost effective pax growth measure

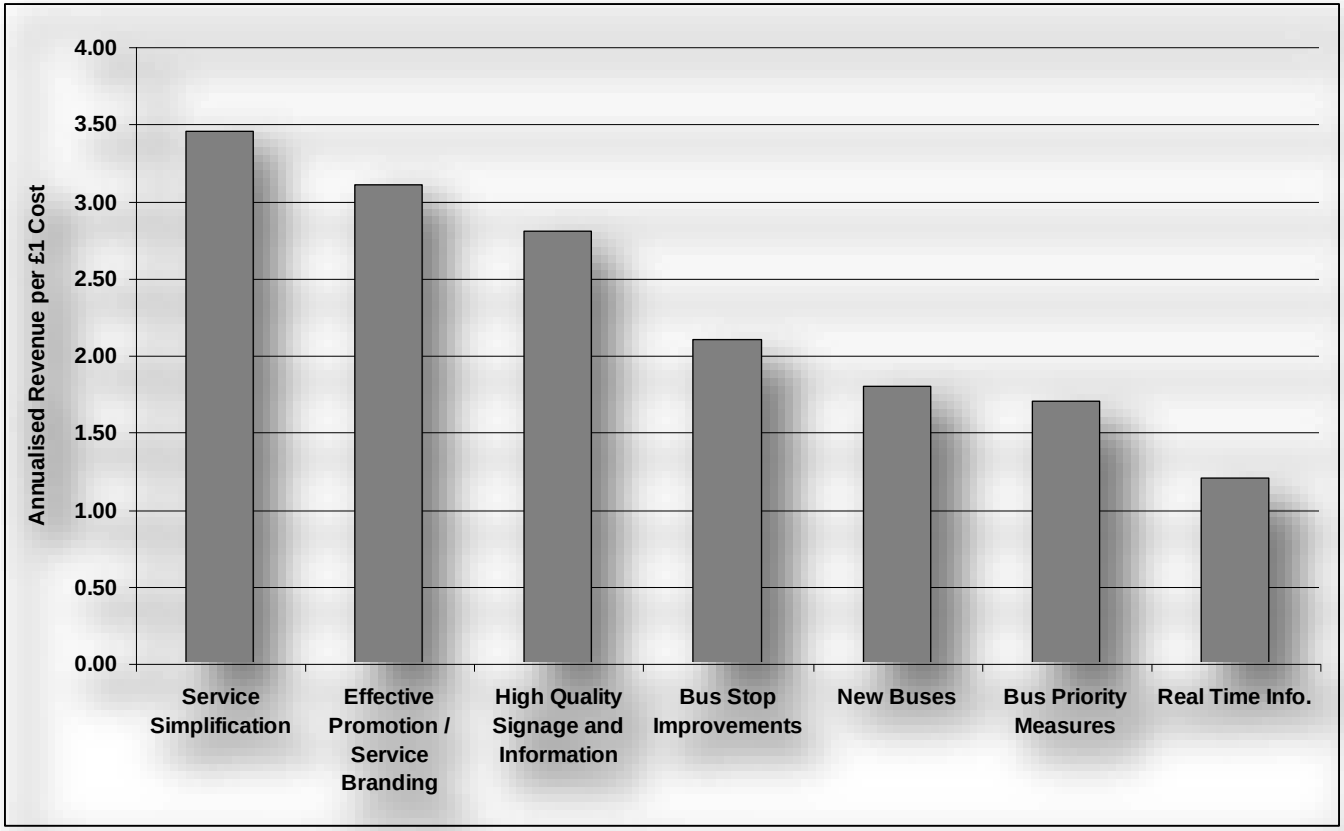


Figure 1 **: Cost Effectiveness of Bus Improvements –** ***UK***
Source : *(TAS Partnership ,2002)*

Source: Currie, G. and Wallis, I. (2008) , Effective ways to grow urban bus markets – a synthesis of evidence, JOURNAL OF TRANSPORT GEOGRAPHY 16 (2008) 419–429

The EU Jupiter project identified priorities in terms of effectiveness and cost effectiveness

JUPITER Rank for Highest Patronage Impacts

1. Service reliability based measures (busways, bus lanes, junction priority
2. Frequency of service
3. Passenger information based measures

JUPITER Rank for Highest Cost Effective Patronage Impacts

1. Low floor buses
2. Bus priority at traffic signals
3. New interchanges replacing inadequate facilities; and
4. Real time passenger information.

Source: Currie, G. and Wallis, I. (2008) , Effective ways to grow urban bus markets – a synthesis of evidence, JOURNAL OF TRANSPORT GEOGRAPHY 16 (2008) 419–429

The research identified many commonalities between alternative avenues of investigation

Synthesis of Factors to Effectively Grow Bus Markets

Behavioral Evidence

1. Service Level Improvement (200% plus at low service level)
2. Free fares (<=40%)
3. Reliability (<20%) (where reliability poor)
4. Travel Time (<15%)
5. Intrinsic BRT factors (<10%)
6. Soft Factors (<2 % - as a package <%10)

International Expert Survey

1. Service Level Increases (frequencies)
2. Bus reliability Factors (like BRT ROW)
3. Spatial coverage

Best Practice Systems

BRT systems due to high service level, reliability/ ROW segregation, simple marketing image

Bus Improvement Experience

Australia/Elsewhere

- Bus Rapid Transit Systems
- Increased Service Levels
- Bus Priority
- CBD Free Bus Systems

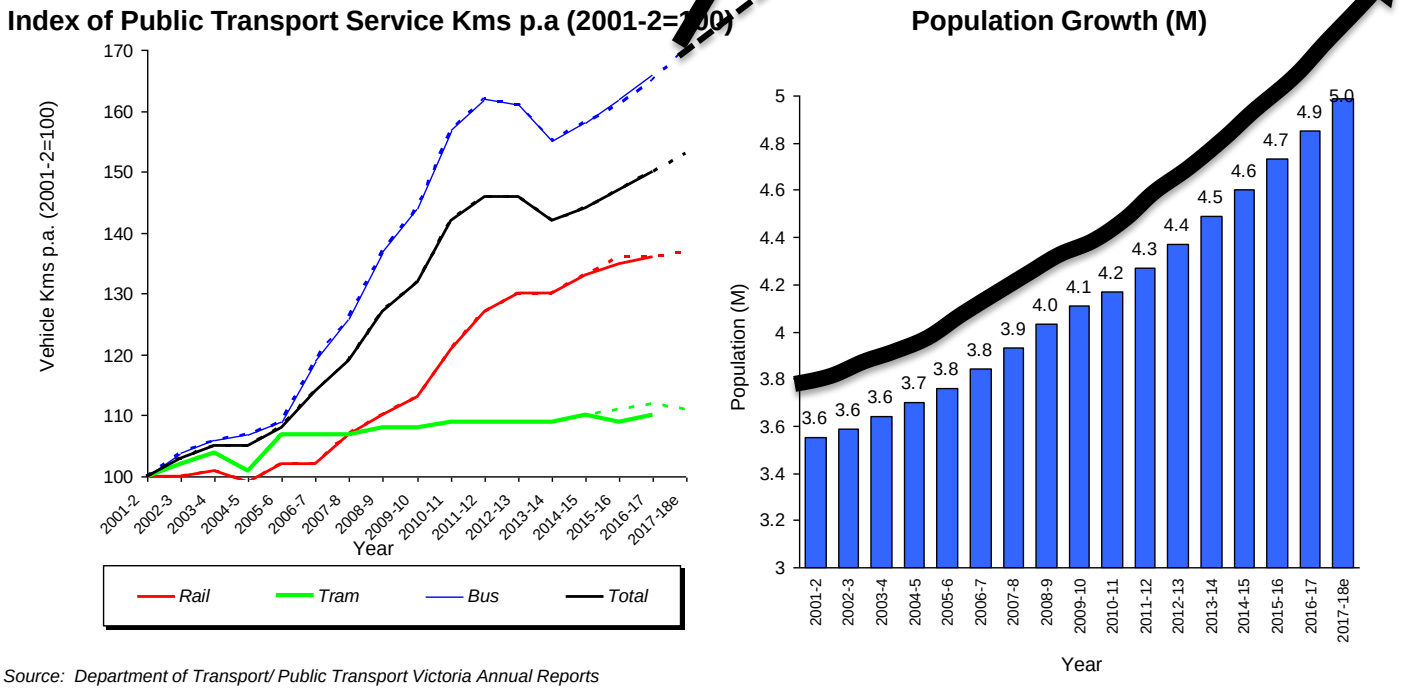
Cost Effectiveness

1. Service Simplification
2. Promotion/Branding
3. New Low Floor Buses
4. Bus traffic signal priority
5. Real time information systems

Source: Currie, G. and Wallis, I. (2008) , Effective ways to grow urban bus markets – a synthesis of evidence, JOURNAL OF TRANSPORT GEOGRAPHY 16 (2008) 419–429

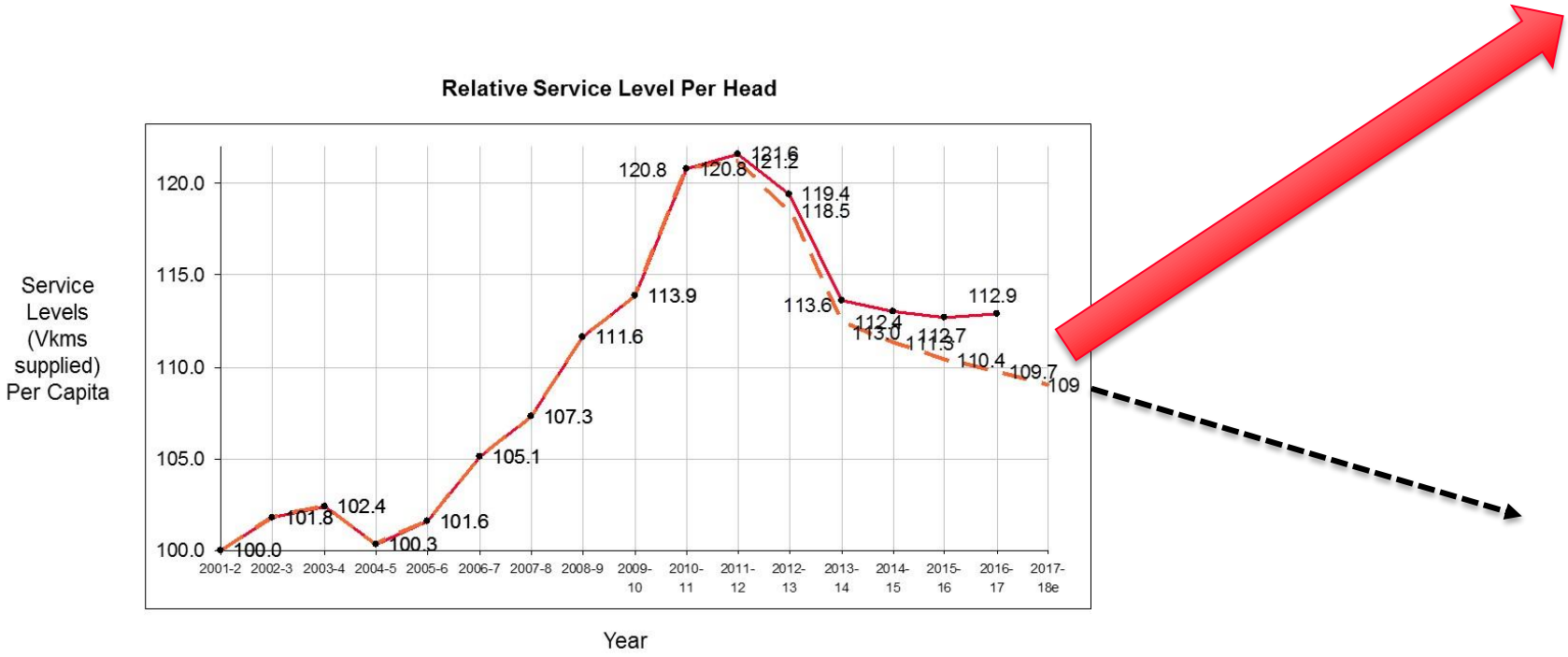
So what do I think we should do with buses?

We have to invest ; not to keep up, but to EXCEED growth…



Source: Department of Transport/ Public Transport Victoria Annual Reports

…we need to stop going backwards and go FORWARDS per capita



Source: Department of Transport/ Public Transport Victoria Annual Reports

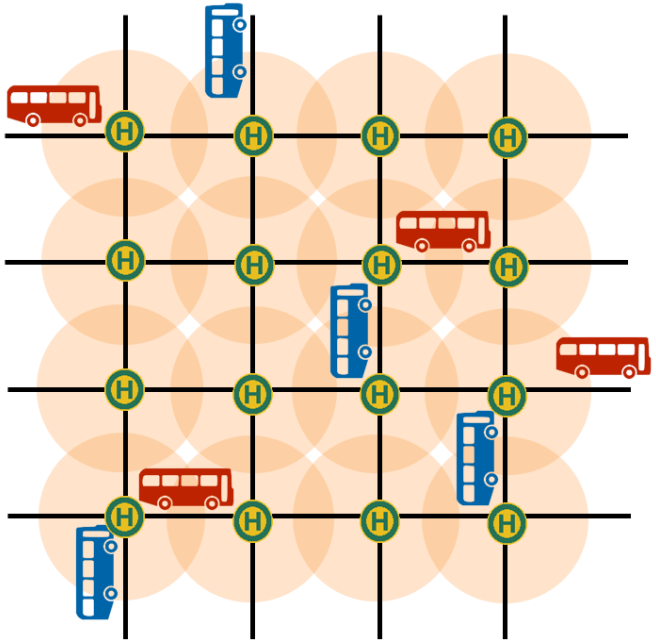
On balance Mass Transit is Effective; Social Transit is Weak and hard to justify

	Mass transit	Social transit
Network characteristics	Direct service; long stop spacing; low density	Circuitous service; short stop spacing; high density
Operational characteristics	Frequent, long spans	Infrequent, short spans
Ridership	High	Low
Societal benefits	Reduced congestion, agglomeration benefits, economic benefits	Increased social inclusion, environmental justice
Customer type	Choice	Captive
Typical demographics	Employed persons, younger age groups	Unemployed, retired, very young and very old, ethnic minorities

I favour Route Concentration over Social Transit and seeking new 1st/Last Mile solutions (including longer walk access)

Social Transit (is Dead)

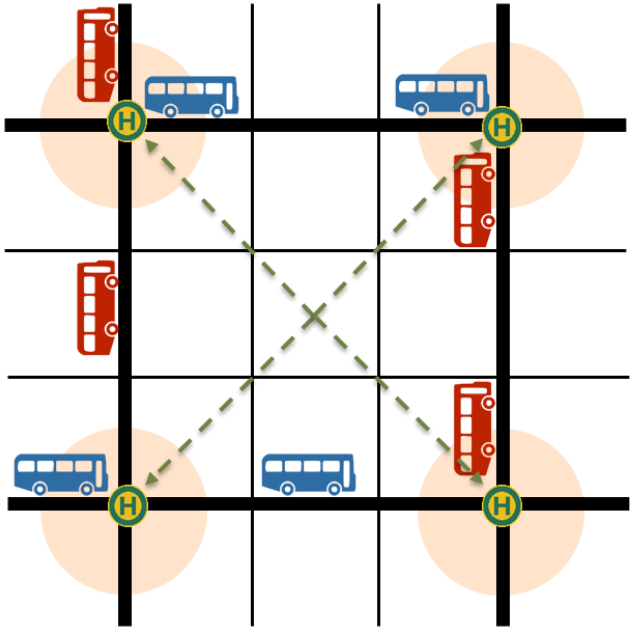
High density/ low frequency vs.



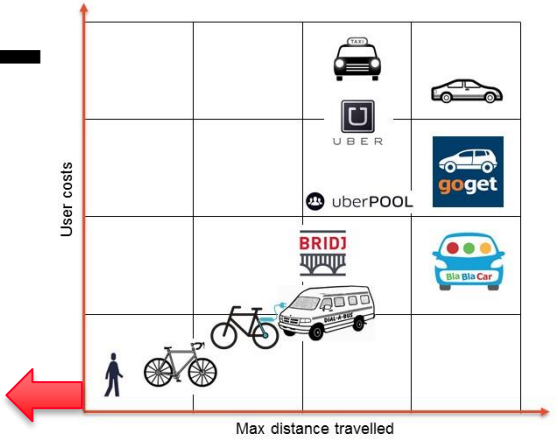
+ area coverage
– frequency
↯ waiting time, reliability

Route Concentration

High frequency/ low density

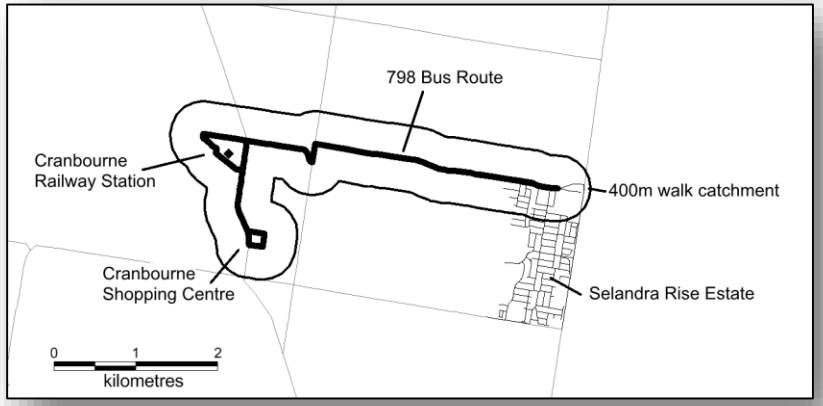


+ frequency
– area coverage
↯ first/ last mile problem

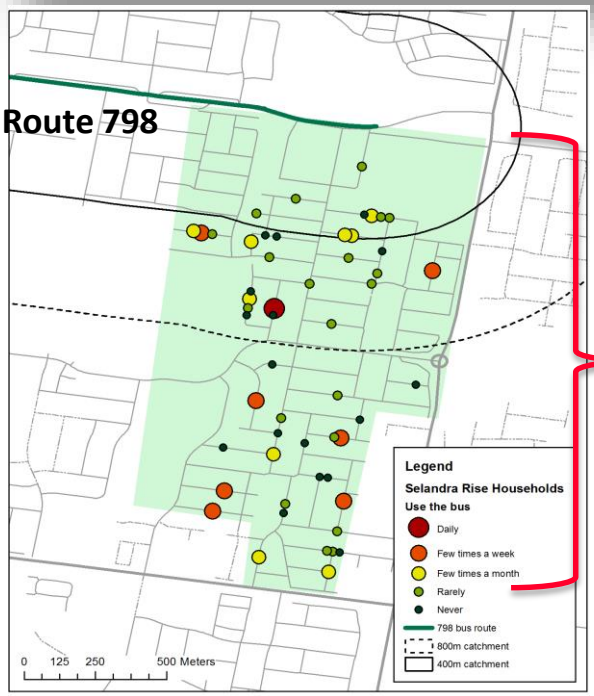


Source: Graphics from the SEPT-GRIP PhD Research of Nora Estfaller

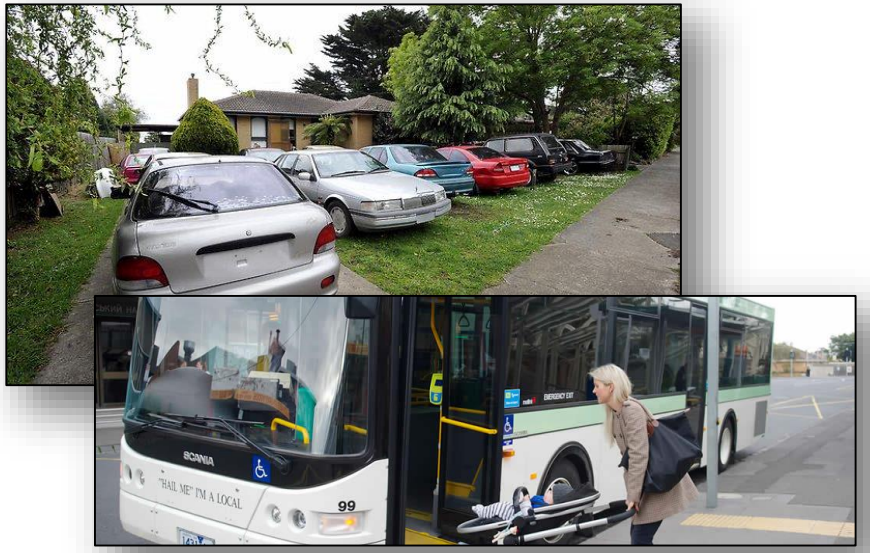
e.g. strong uptake route 798 Cranbourne/ Selandra Rise



- Connects to Cranbourne train station and shopping centre
- Runs every 20-30 minutes
- Good service span
  - 5:30 – 22:30 weekdays
  - 6:30 – 24:00 Saturday
  - 7:00 – 21:30 Sunday



Long Walk Access Distance to a quality frequency



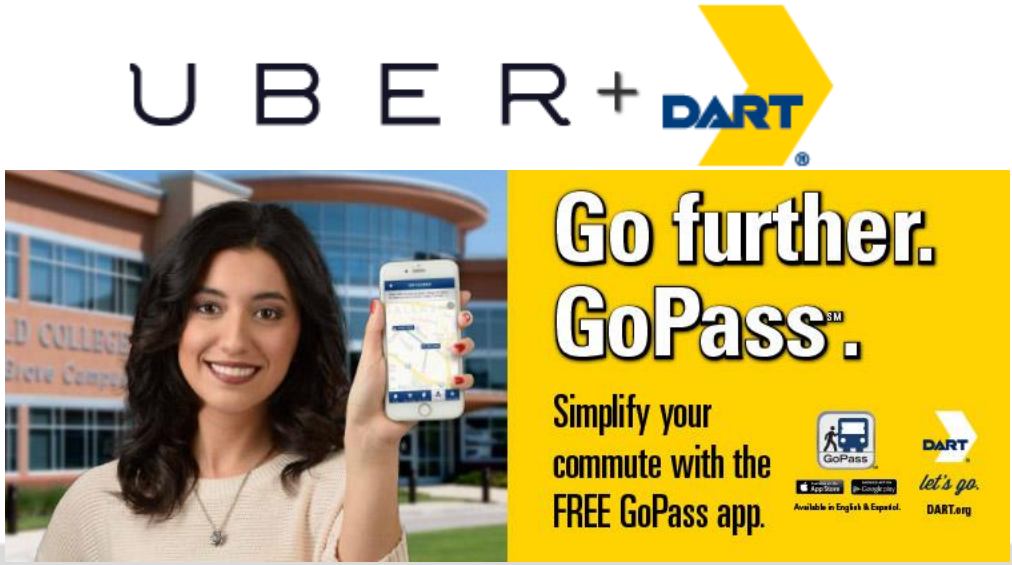
Source: Delbosc A, Currie G, Nicholls L and Maller C (2016) Social Transit as Mass Transit in Suburban Greenfield Development' TRANSPORTATION RESEARCH RECORD Vol 5 2543, pp. 62 –70

Uber/Lift is a bus problem but also (with car/bike share) a possible 1st/Last Mile solution (but this might be wishful thinking)

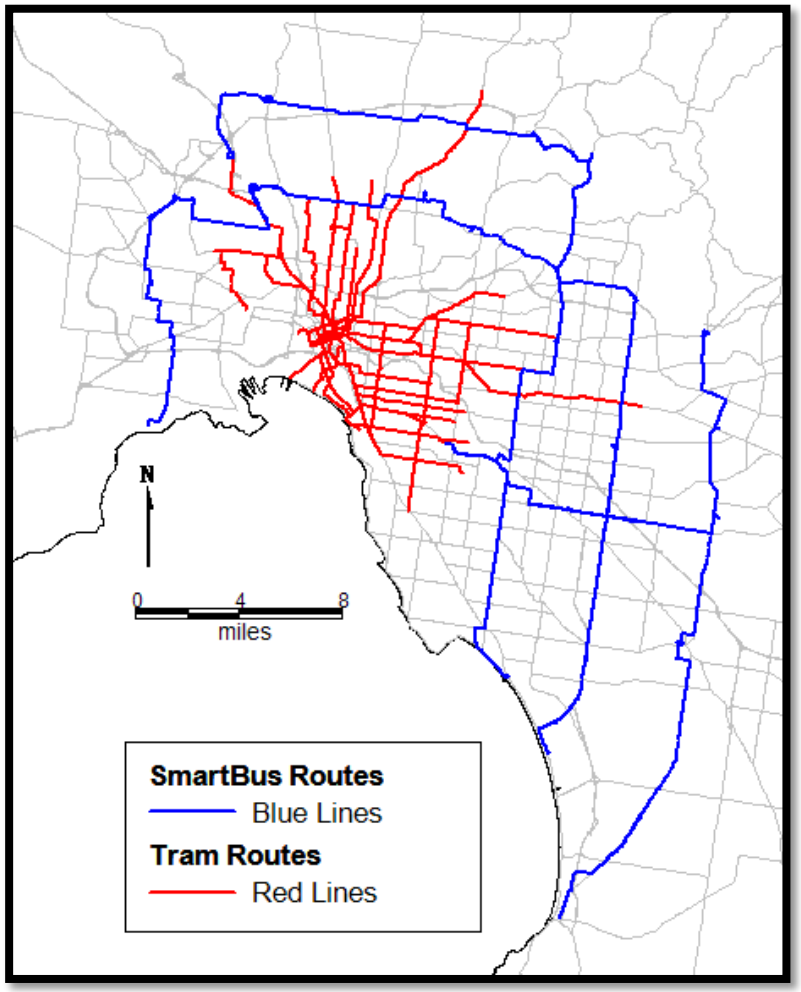
Uber/Lyft Impact on PT in USA

- net change 6% reduction
- net increase for rail (+3%)
- net decline for bus (-6%) and light rail (-3%).

Source: Clewlow RR and Mishra GS (2017) 'Disruptive Transportation: The Adoption, Utilization, and Impacts of Ride-Hailing in the United States' ITS UC Davis



We need more (and better resourced) SmartBus



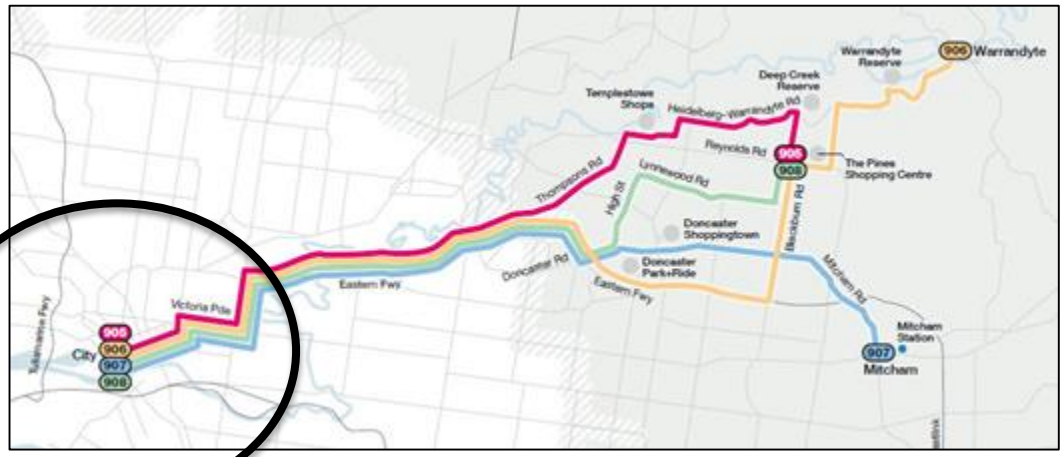
Tram

- Streetcar/Light Rail
- 23 routes/ 500 cars
- High frequency; 7.5 min headway
- Short Routes; Round Trip Time = 110 mins

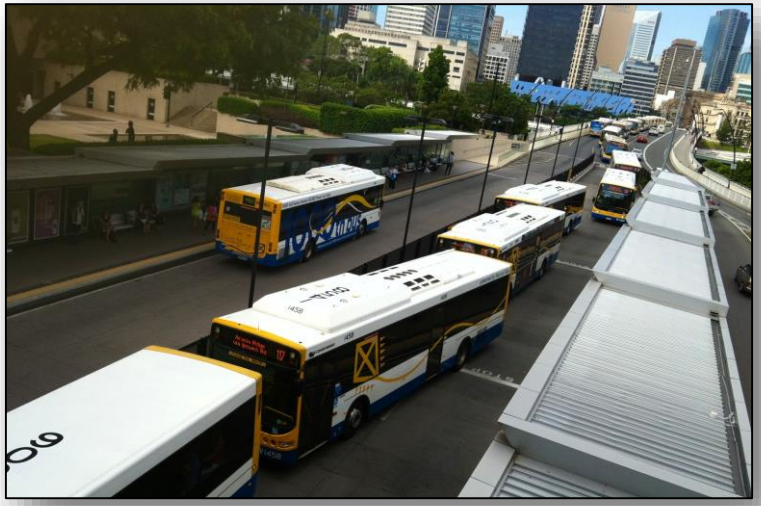
SmartBus

- 8 routes
- 200 buses
- Low frequency; 15 min headway
- Long Routes; Round Trip Time = 238 mins

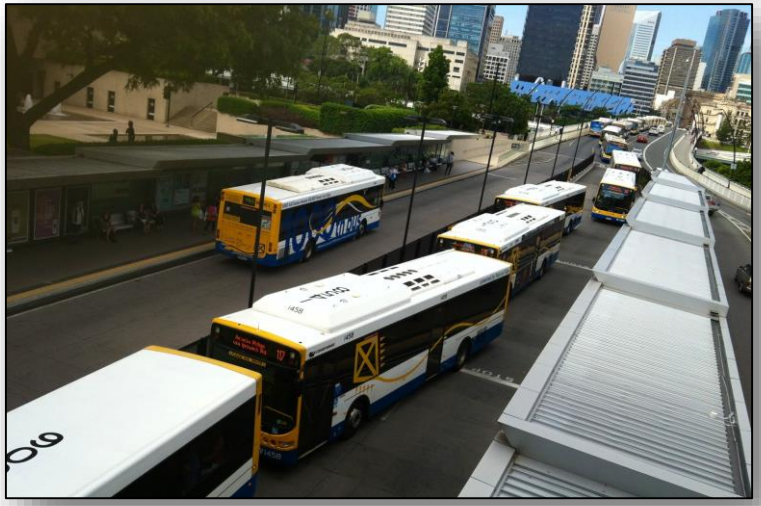
For DART; its time to talk city bus tunnels like Brisbane (perhaps part of future rail/Metro 2?)



Bus Rapid Transit (Rubber Tired Rail) or LRT should be part of the plan including urban densification as part of project…

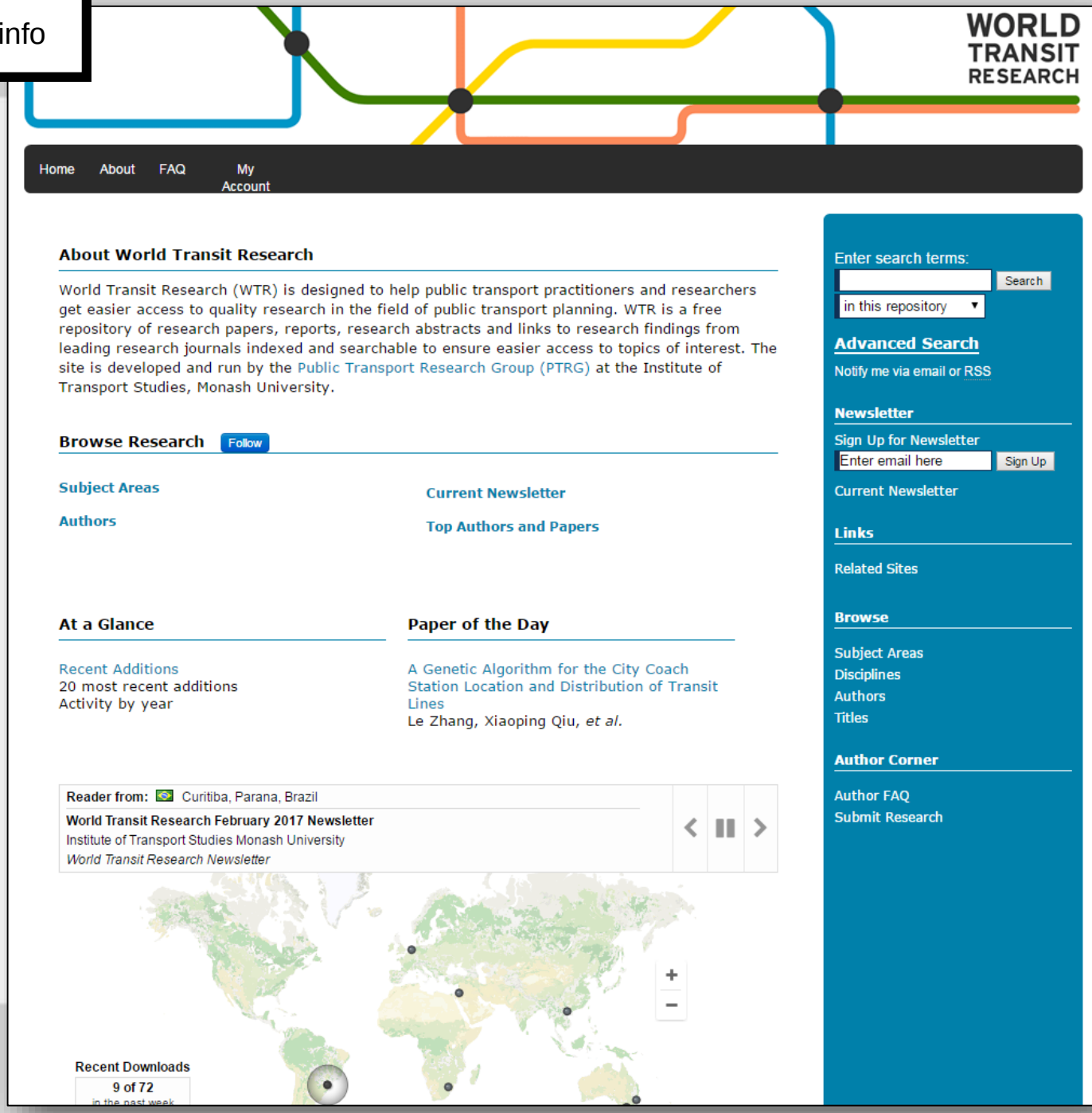


Bus Rapid Transit; Rubber Tired Railways; cost effective but not as good?



There may be new ways to bring the Train to the City

www.worldtransitresearch.info



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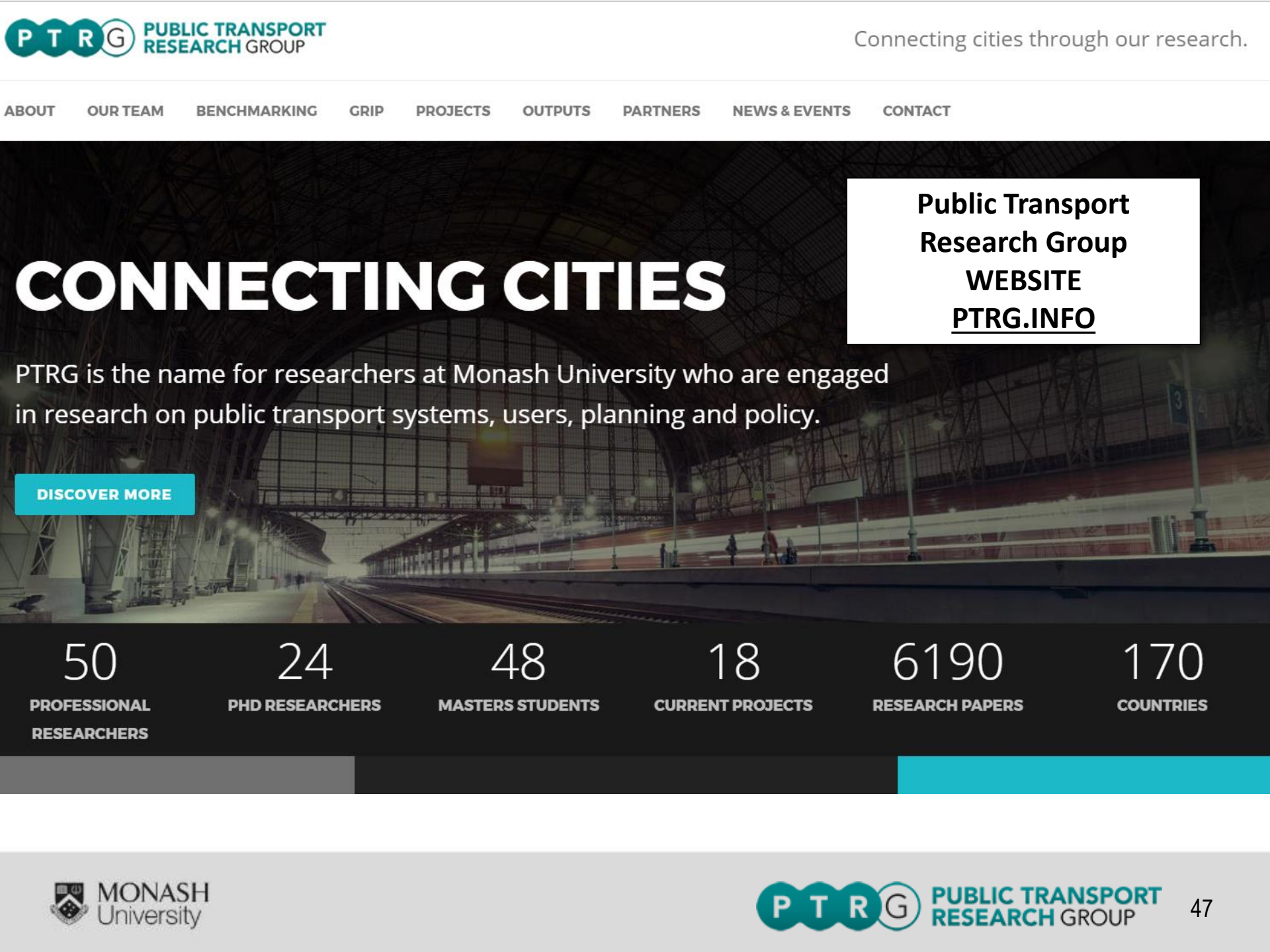
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