



Friday 5th April 2024

Rail Industry Safety Standards Board

Horizons 5 – Forum 1 – Day 2 Panel

Deakin University, 727 Collins St, Docklands Melbourne,

How can (passenger) rail improve our life?

Prof Graham Currie FTSE
Public Transport Research Group
Monash Institute of Transport Studies
Monash University, Australia





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Introduction

Capacity

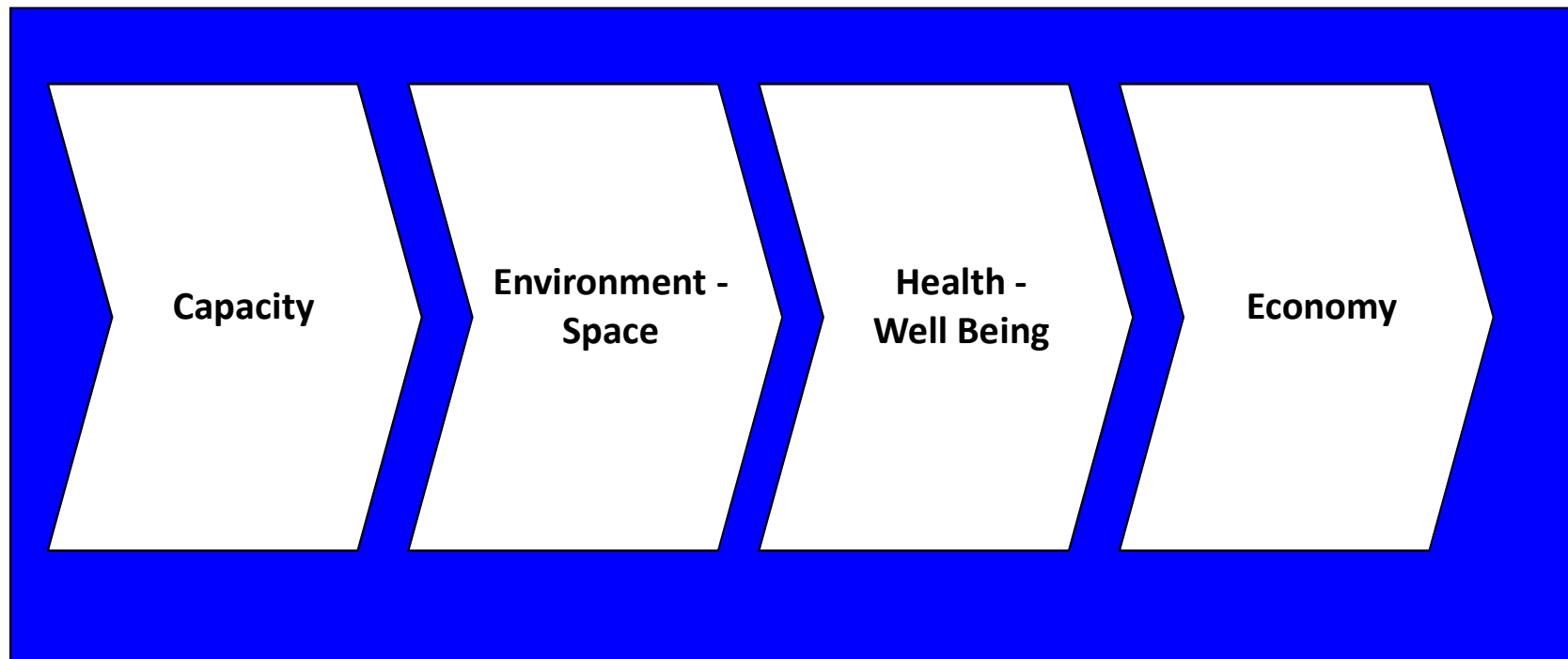
Environment – Space

Health – Well Being

Economy



This presentation outlines how (passenger) rail improves our life





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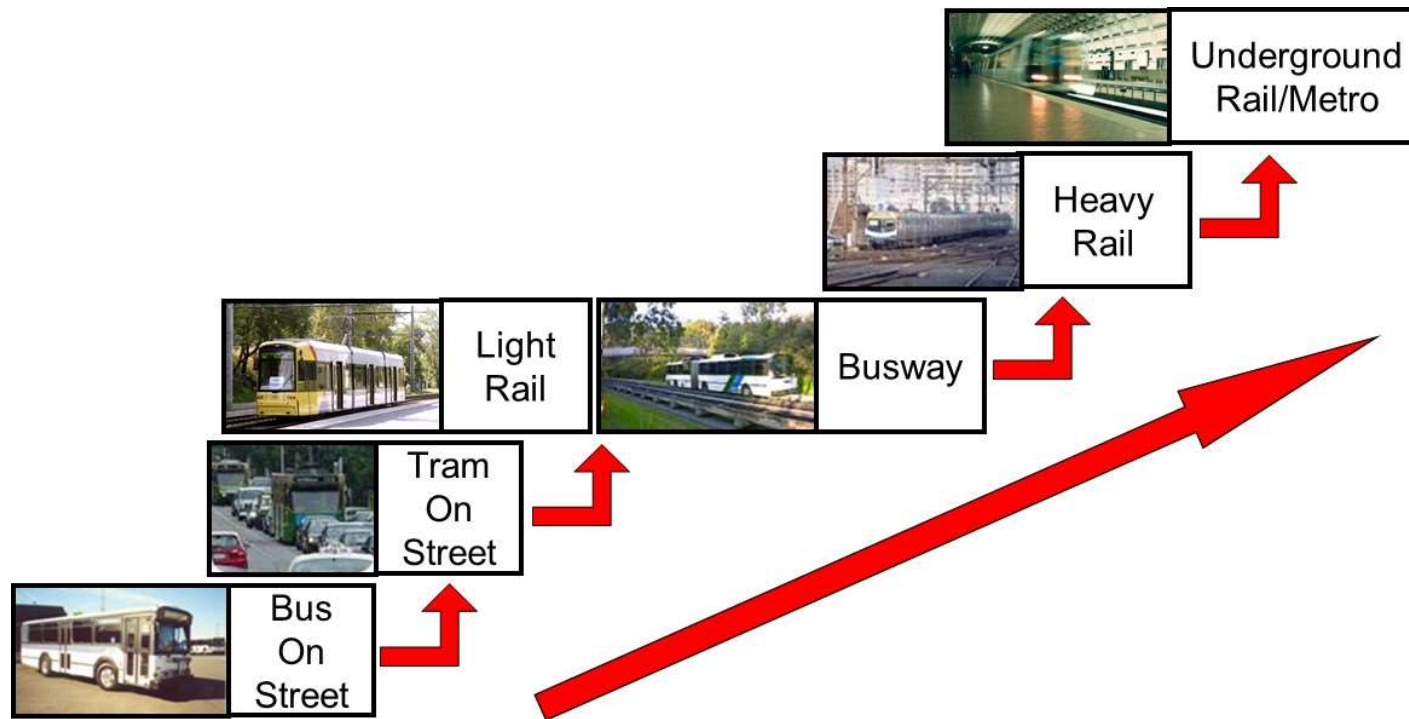
Health – Well Being

Environment – Space

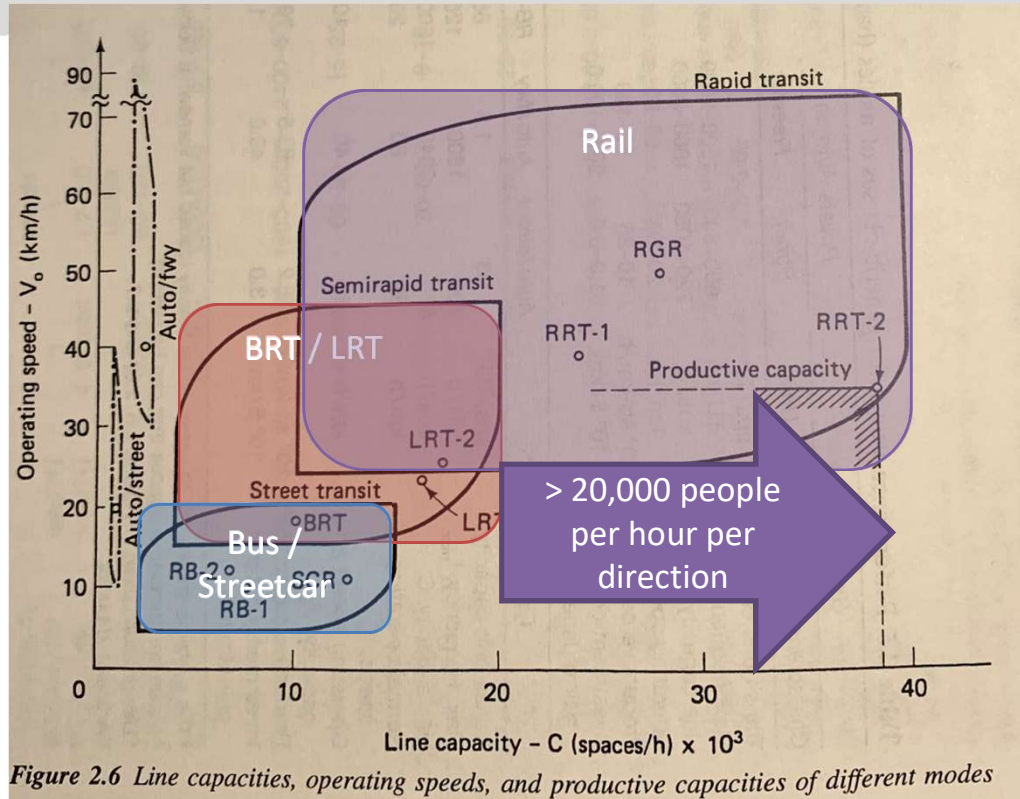
Economy



There is a pecking order in urban transit and rail is at the top



Engineering studies demonstrate significant line capacity and speed advantages of Rail vs other modes – Cities have NO practical choice other than Rail for capacities above 20Kphpd at speed

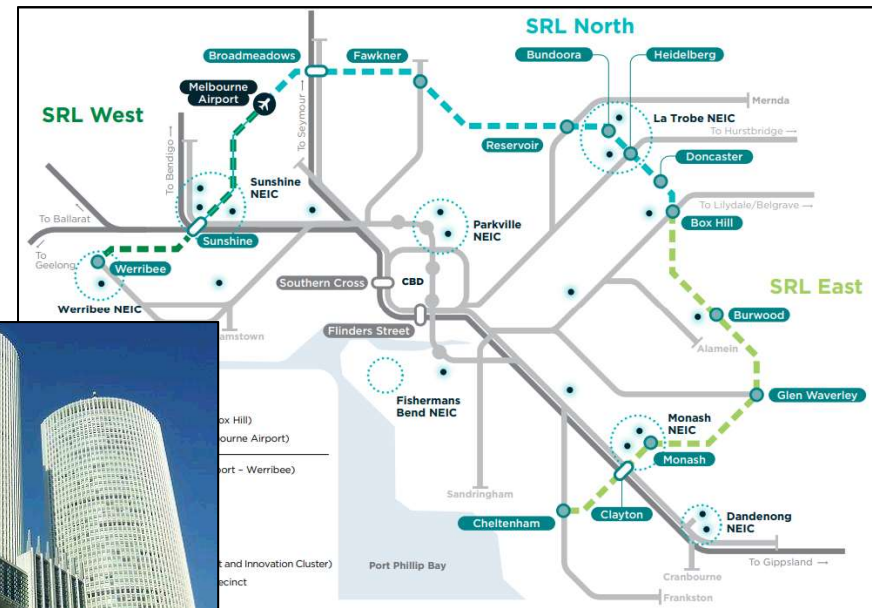
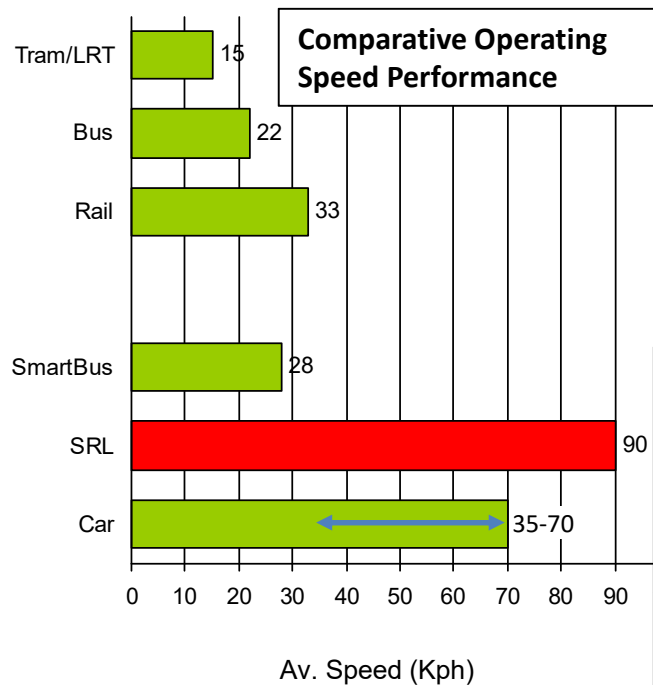


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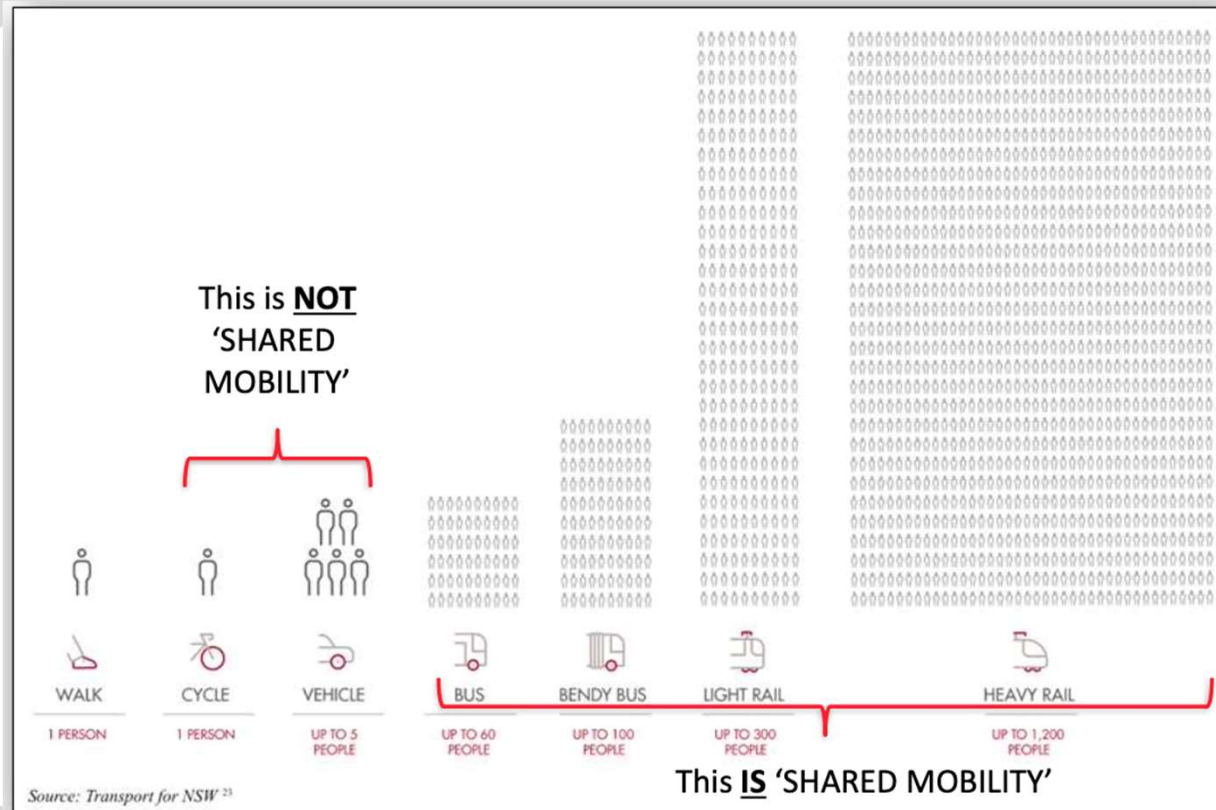
(1) Vuchic V.R., (2007) Urban Transit; Systems and Technology (p.78)



Rail is also very competitive with the car; something bus even SmartBus cannot achieve – it also has significant urban density generation benefits



As cities grow; we have no choice but rail for high volume efficient movement





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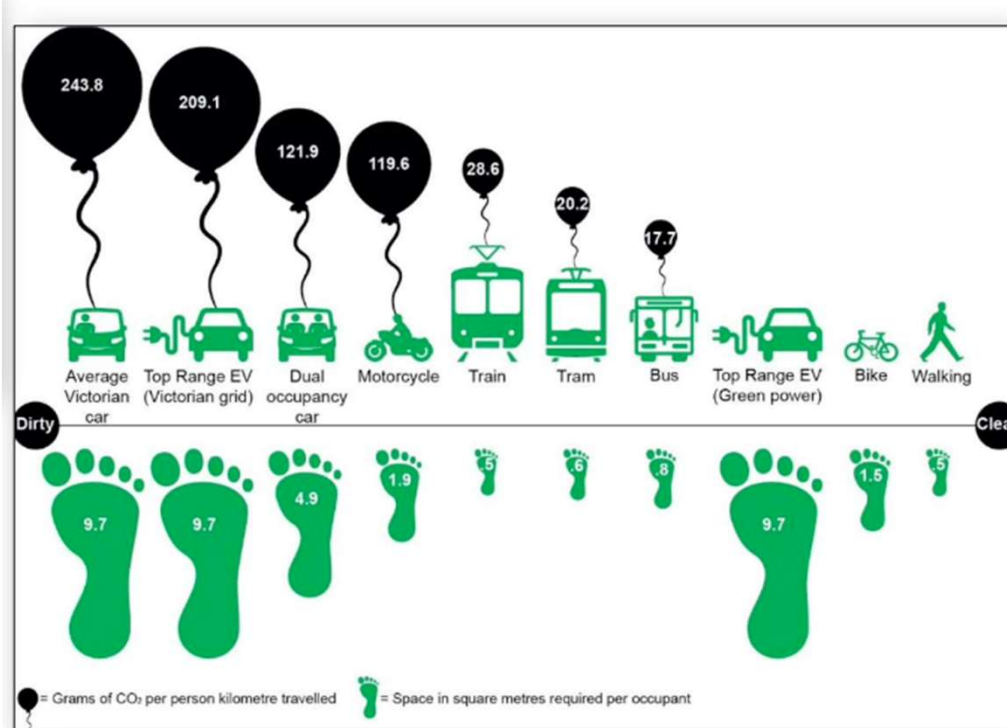
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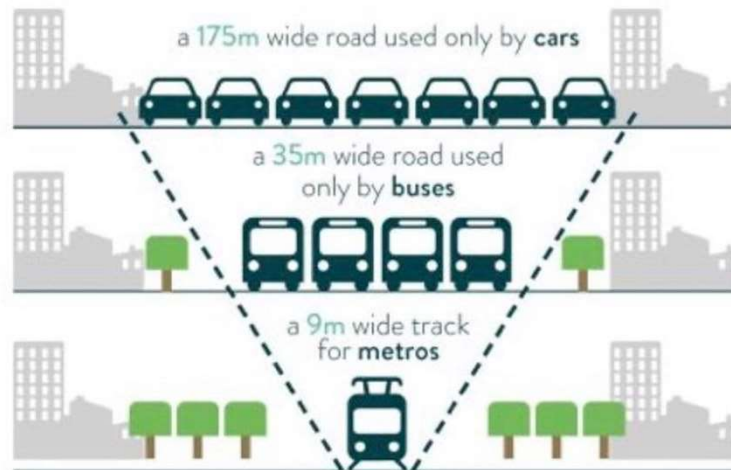
Rail combines the most environmentally efficient mode for longer distance travel with the most space efficient travel



Source: Elliot Fishman - Institute of Sensible Transport (2019)

A 9M rail right of way carries 50,000 pax/hr compared to a 175M wide road

To carry **50,000 people**
per hour per direction,
a city needs...





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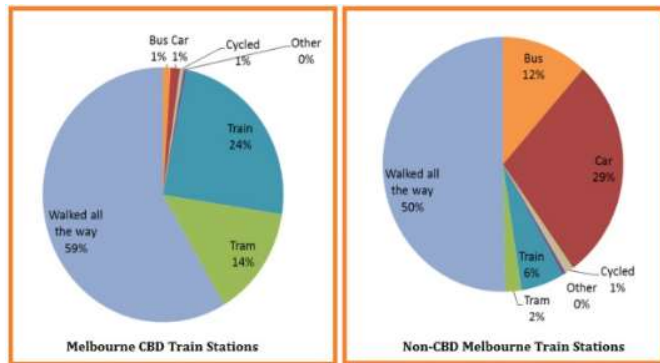
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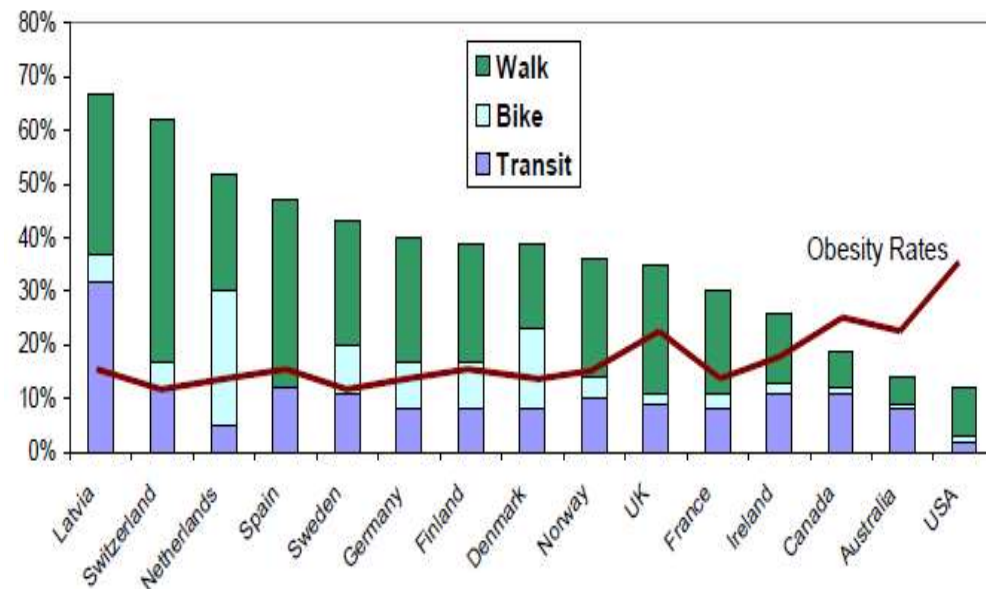
Economy



Rail travellers have to walk so are more physically active – more transit use reduces obesity rates

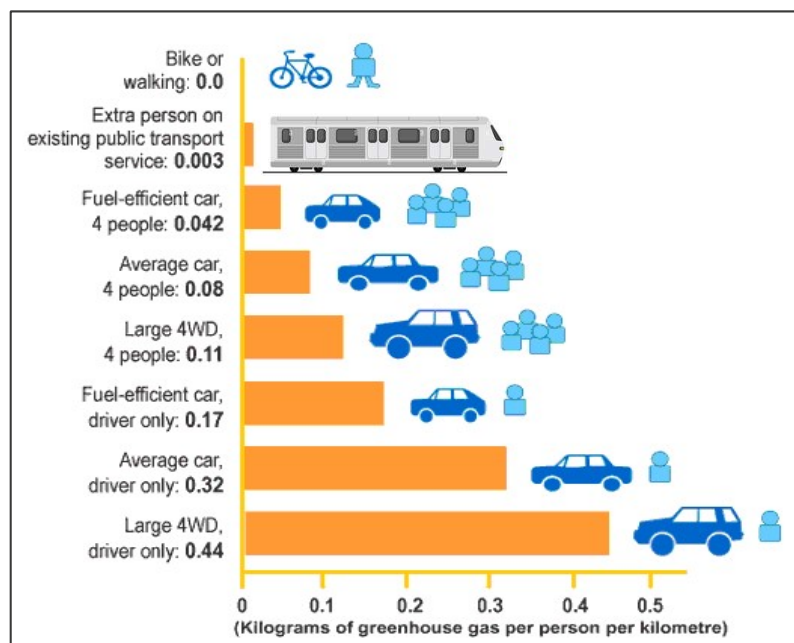


*Access modes to train stations in Melbourne.
(PTV OD Survey, 2011-2012)*



*Mode Split Versus National Obesity Rate
(Bassett, et al 2008)*

Environmental benefits of rail link to health benefits

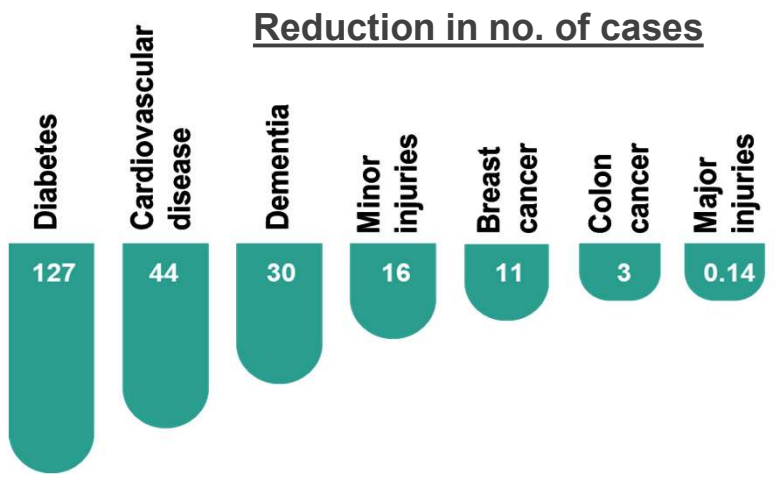
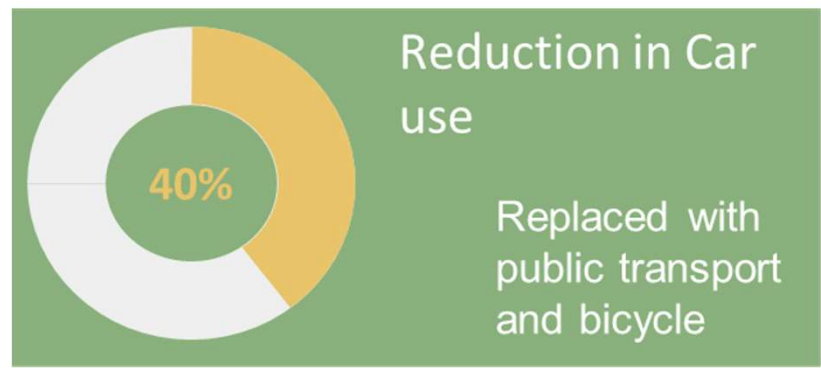


*Greenhouse gas emissions from different transport modes
((Transport State Transit, 2014)*

	Change in disease burden	Change in premature deaths
Cardiovascular Dis.	6-15%	724-1895
Diabetes	6-15%	73-189
Depression	2-6%	<2
Dementia	2-6%	38-132
Breast cancer	2-5%	15-48
Colon Cancer	2-6%	17-53

*Change caused in diseases and premature deaths from forecast reduction in Greenhouse Gas Emissions
(Maizlish 2011)*

Rail mode shift creates health benefits



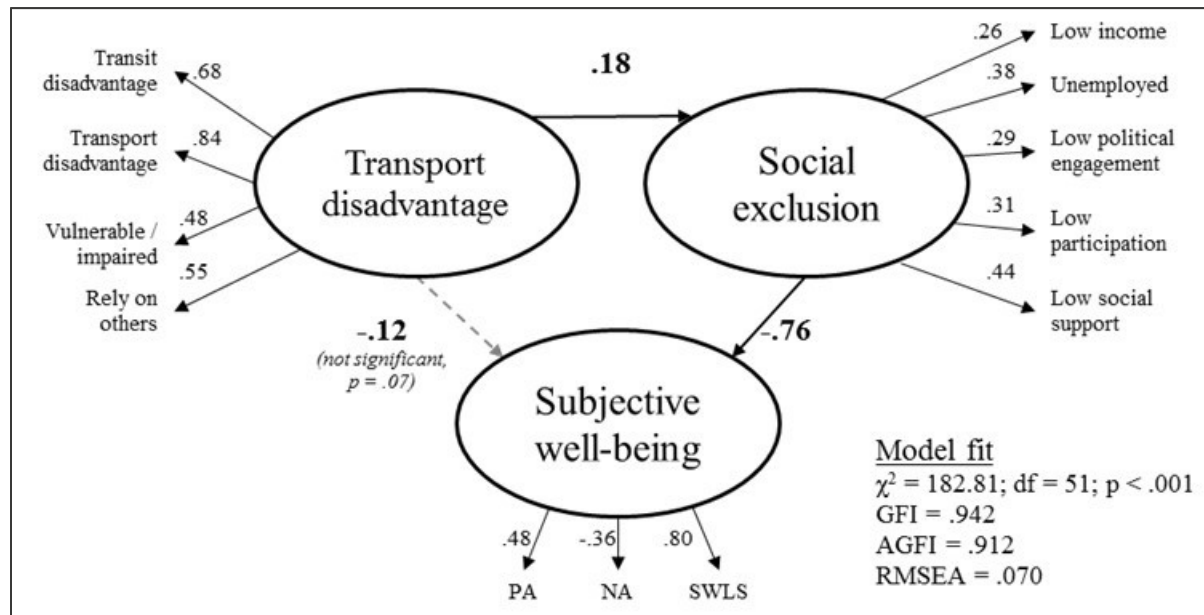
This change has reduced PM_{2.5} exposure and resulted in annual reductions of

- 7 cases of low birth weight
- 6 of preterm birth
- 1 of cardiovascular disease
- 1 of lower respiratory tract infection

Morbidity results (cases/year)

This study is based on the data from the 2009 traffic conditions reported by Barcelona City Council. 8 scenarios were developed to compare the reduction of car uses with the 'business as usual' scenarios. (*Rueda et al., 2013*)

Rail improves mobility for the disadvantaged; this links indirectly to psychological well being



Transport Disadvantage, Social Exclusion and Well Being
 (Currie and Delbosc, 2010)



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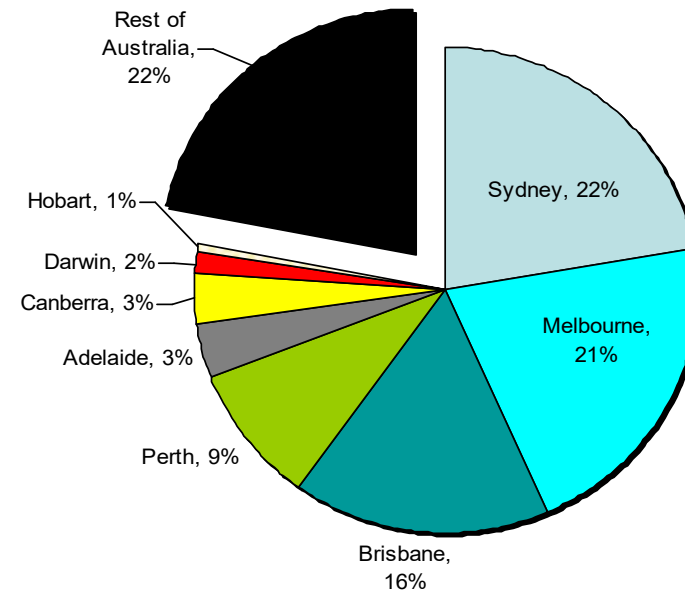
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Australian cities dominate national economic growth

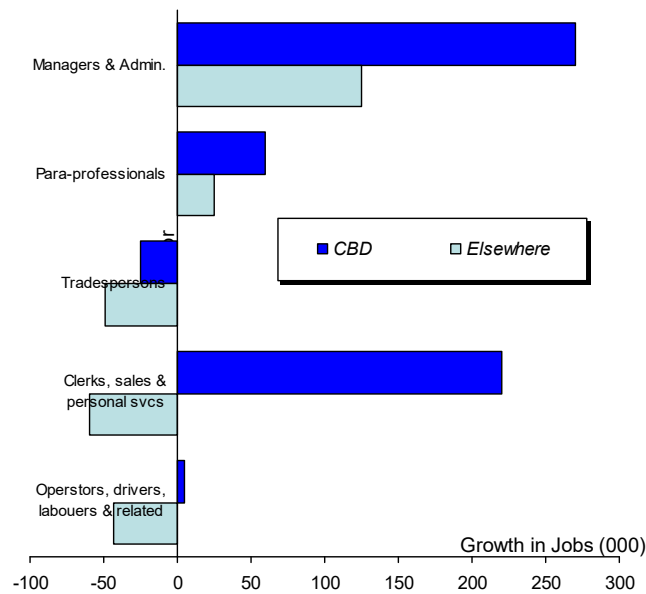
- Australia's national economic well-being is increasingly dependent on its capital cities –
- 61% of Australia's economic activity in 2006 took place in Sydney, Melbourne, Brisbane and Perth
- and these cities contributed 78% of Australia's economic growth during the last five years



Source: Australian National Accounts, Australian Bureau of Statistics
Council of Capital City Lord Mayors, 2007

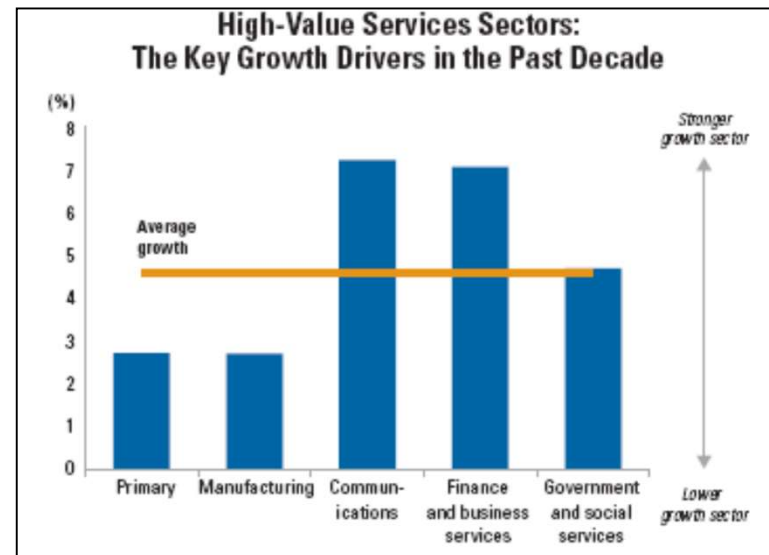
CBDs and CBD businesses dominate this growth

**Growth in Jobs by Sector -
Melbourne CBD/Non CBD (1981-1991)**



Source: Brottchie et al. (1995)

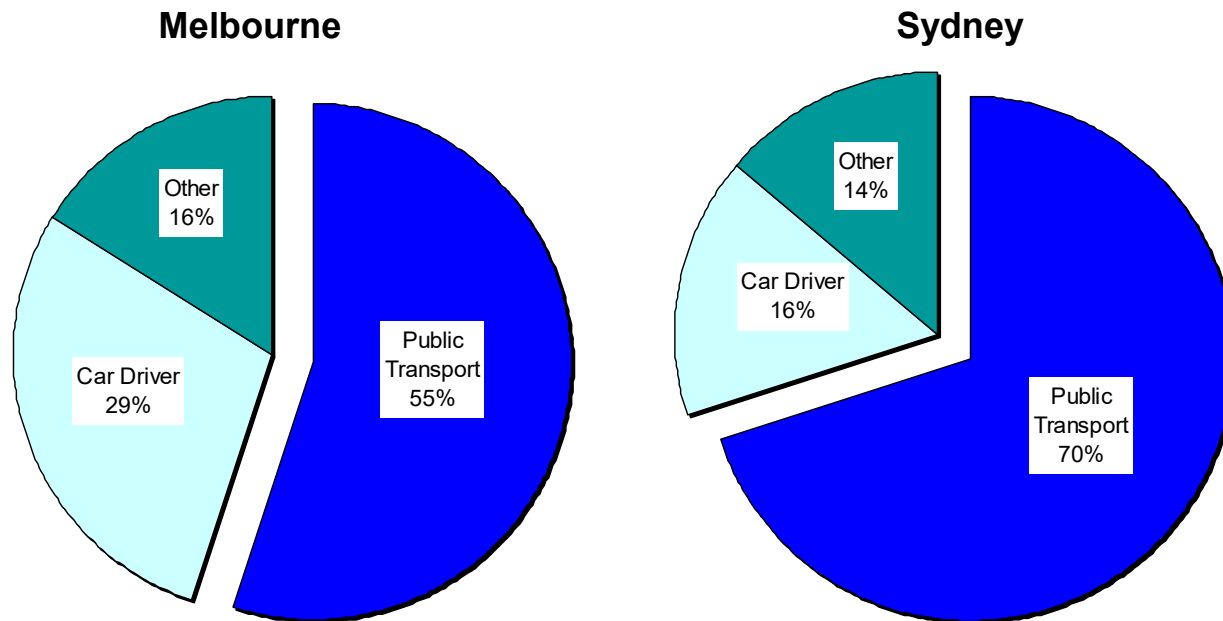
Growth Drivers – Melbourne (Decade)



Source: Standard and Poors (2003)

Australian rail dominates CBD access

Access Mode Share to Work



Source: ABS Census 2006

Economic productivity grows as employment density increases in cities

Agglomeration Benefits – Increase Employment Density in CBDs

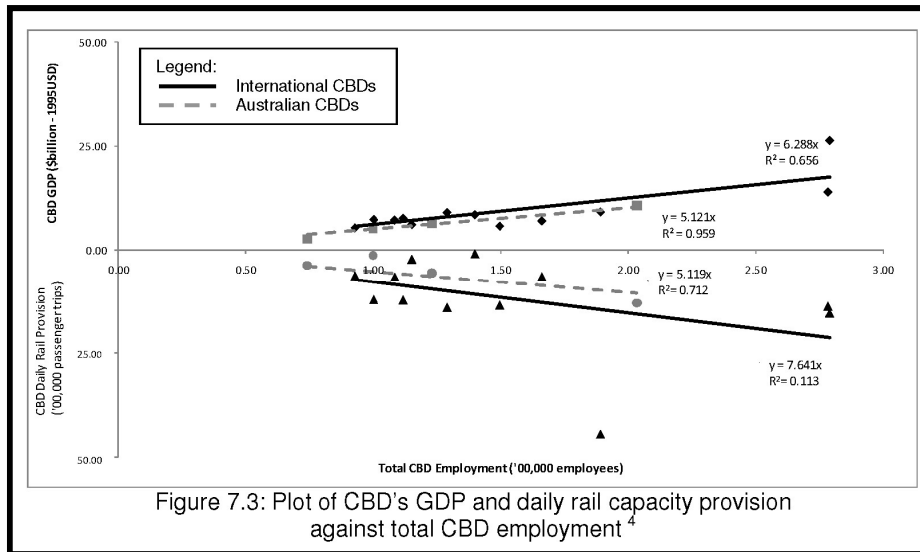


Figure 7.3: Plot of CBD's GDP and daily rail capacity provision against total CBD employment⁴

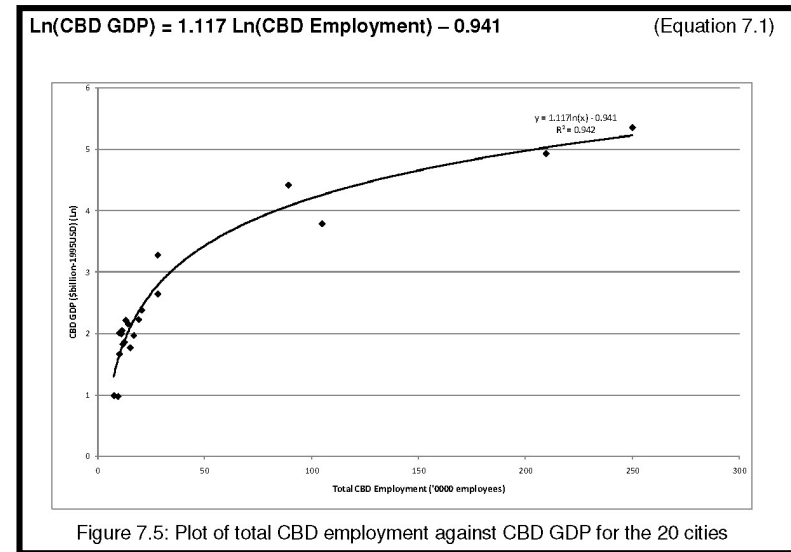
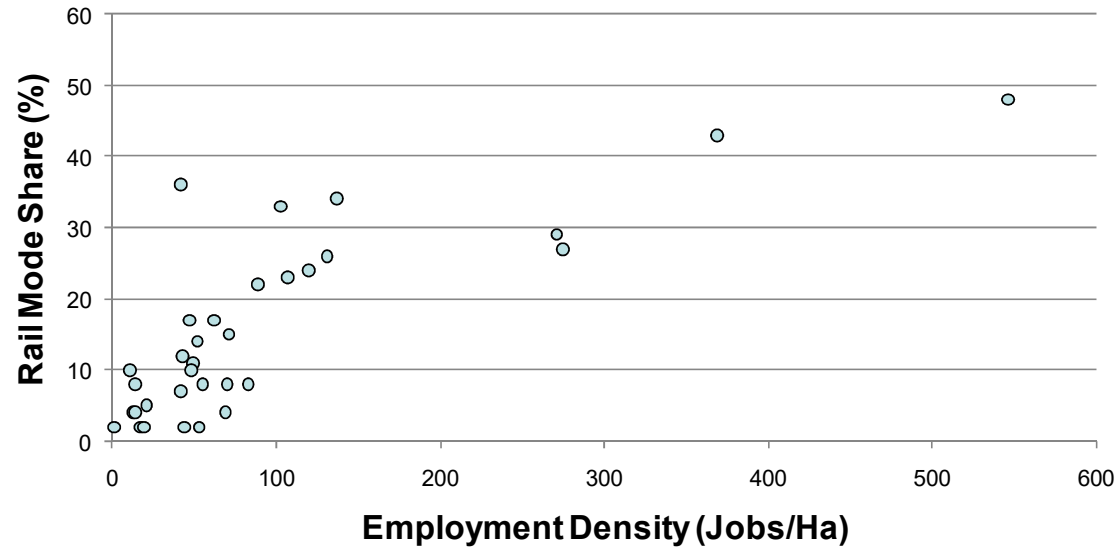


Figure 7.5: Plot of total CBD employment against CBD GDP for the 20 cities

Source: Gwee TM (2010) 'Exploring the Economic Impacts of Agglomeration Economies in Urban Rail Projects' Monash University PhD Thesis

Rail dominates high employment density in Australian cities



Source: TransFigures - Employment and Commuting in Sydney's Centres, 1996 - 2006 NSW Transport Data Centre Dec 2008



Please reach out for more information

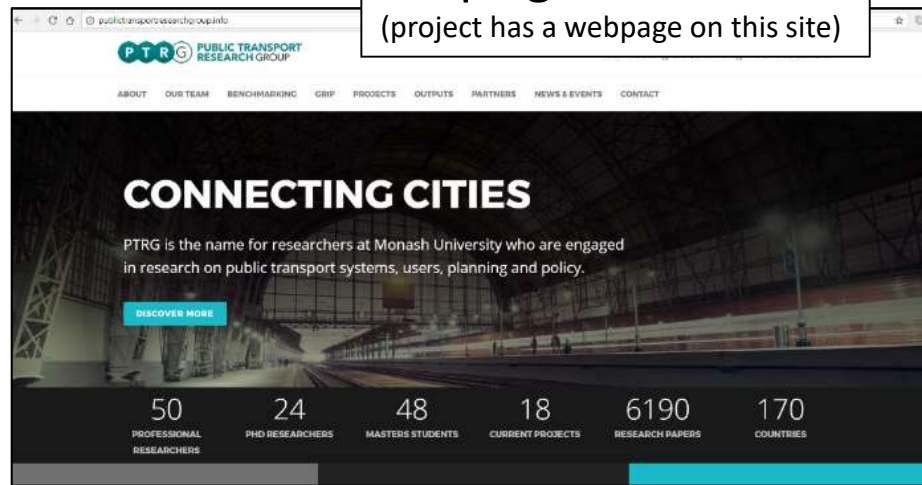


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