



Friday 14<sup>th</sup> April 2023  
Queensland Rail  
Rollingstock Engineers

# How can (passenger) rail improve our life?

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TRANSPORT  
STUDIES



## **Introduction**

**Capacity**

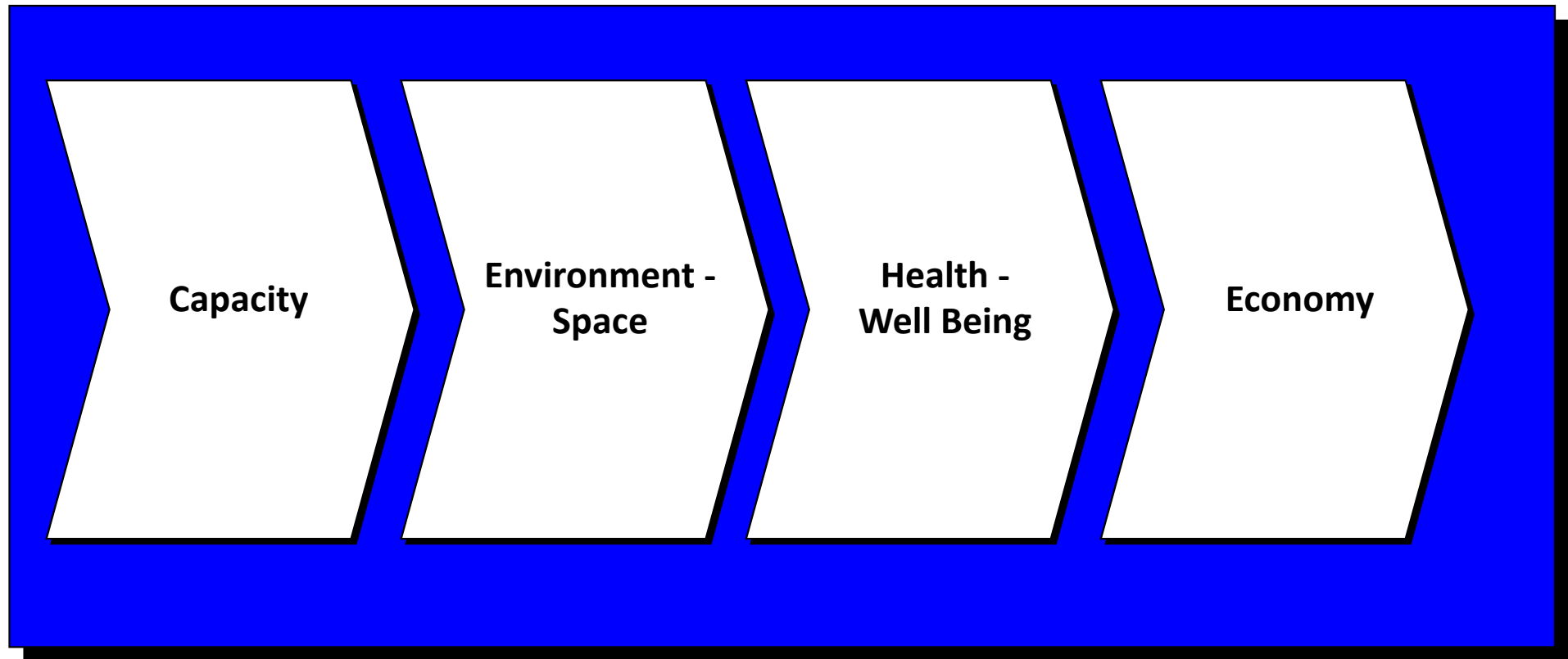
**Environment – Space**

**Health – Well Being**

**Economy**



# This presentation outlines how (passenger) rail improves our life



## **Introduction**

### **Capacity**

### **Health – Well Being**

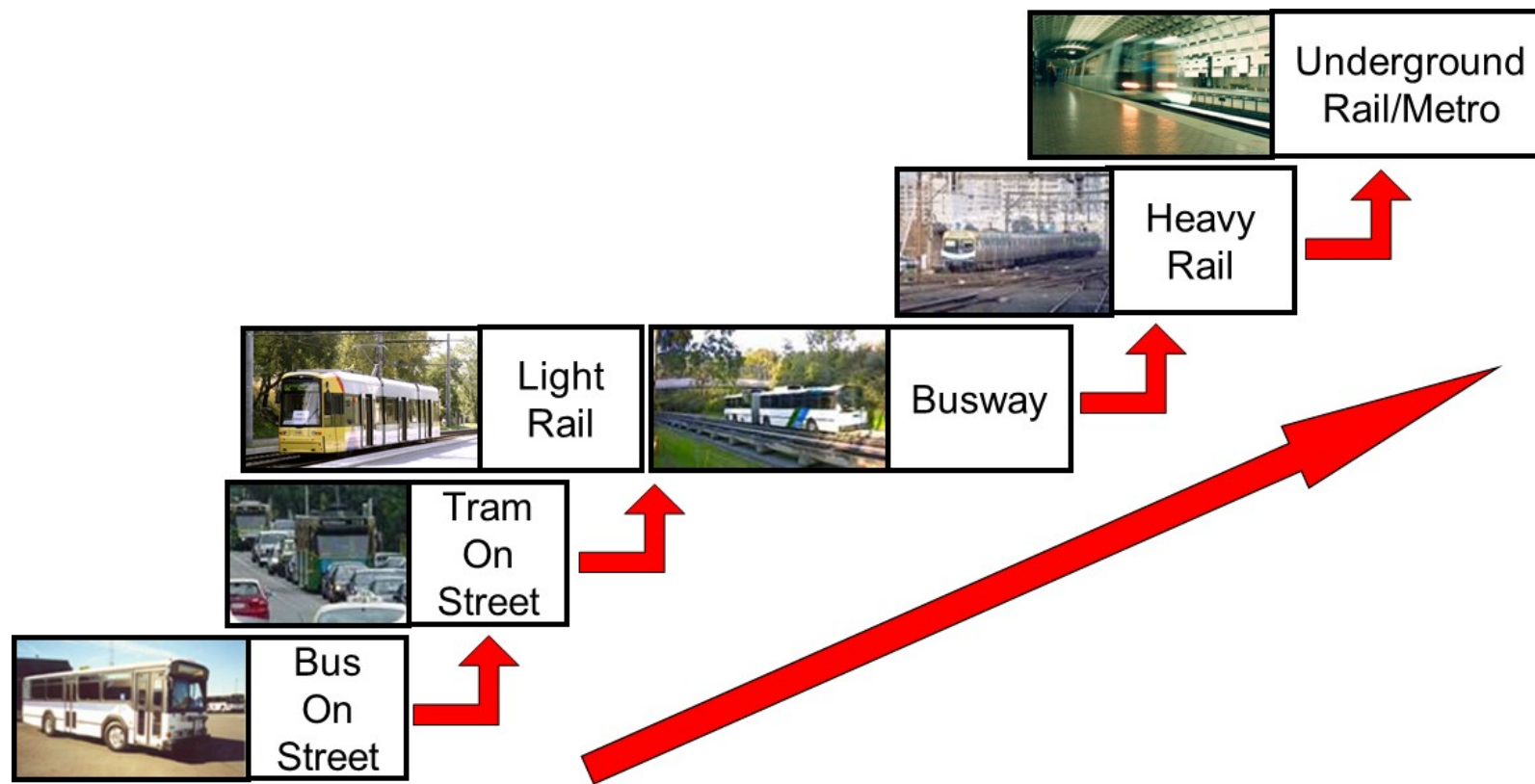
### **Environment – Space**

### **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

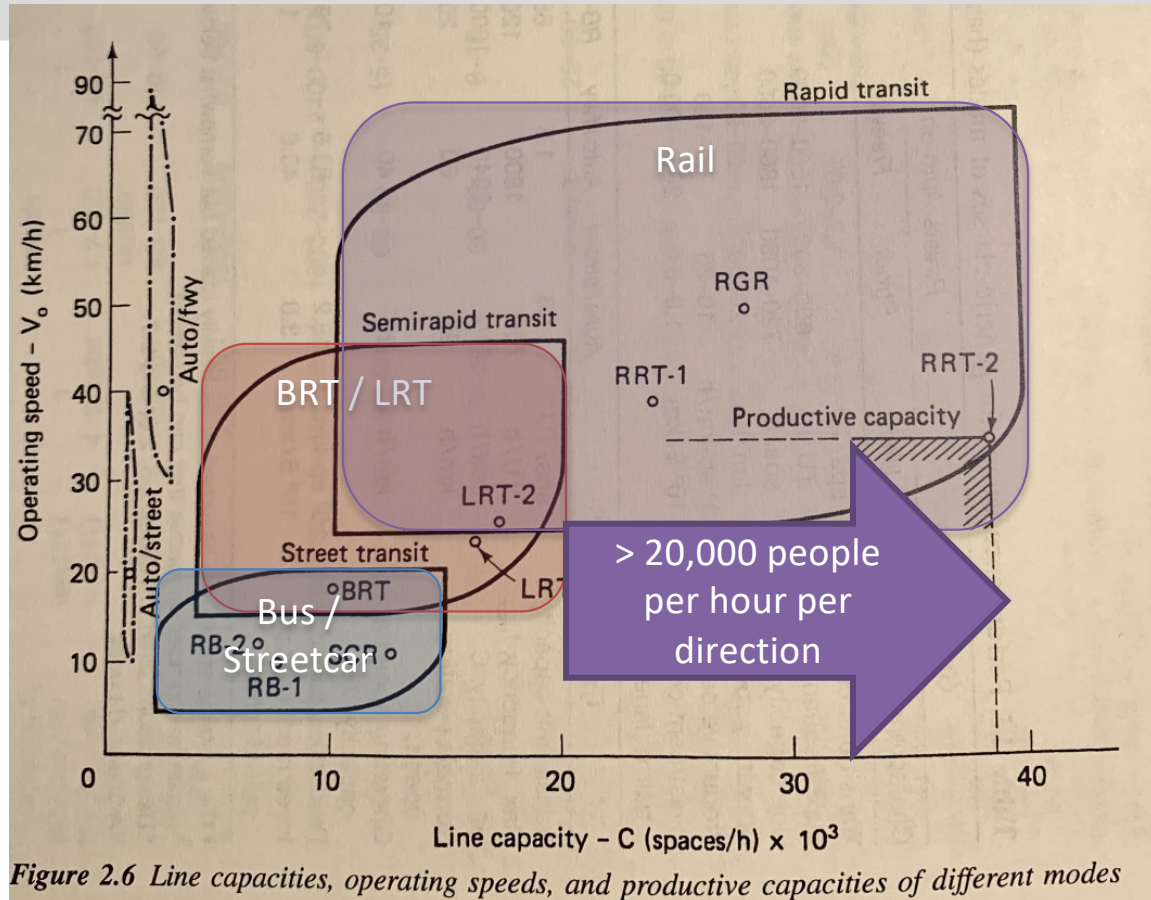


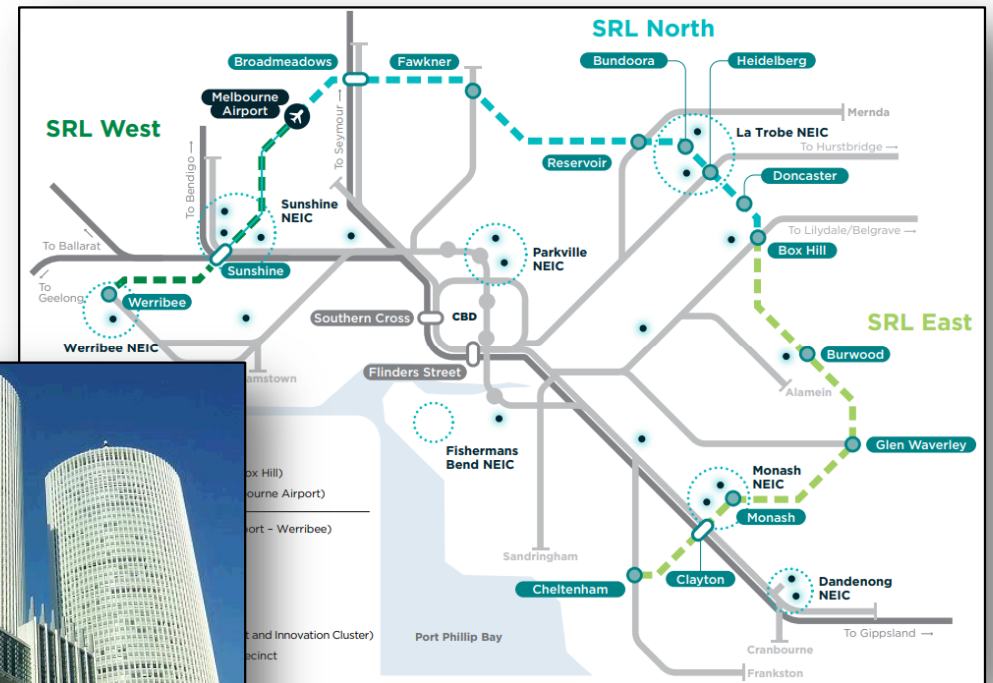
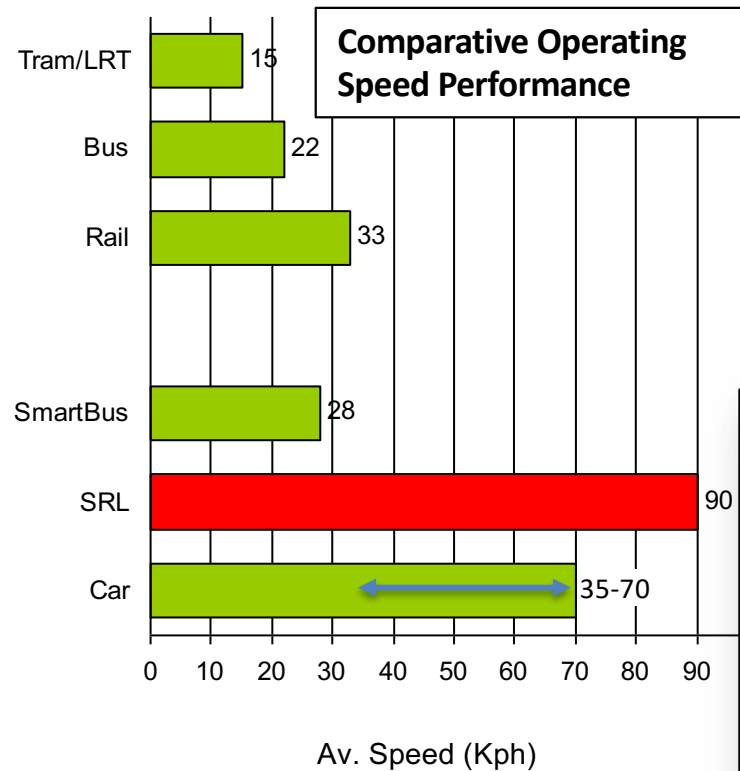
Figure 2.6 Line capacities, operating speeds, and productive capacities of different modes

Note:

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

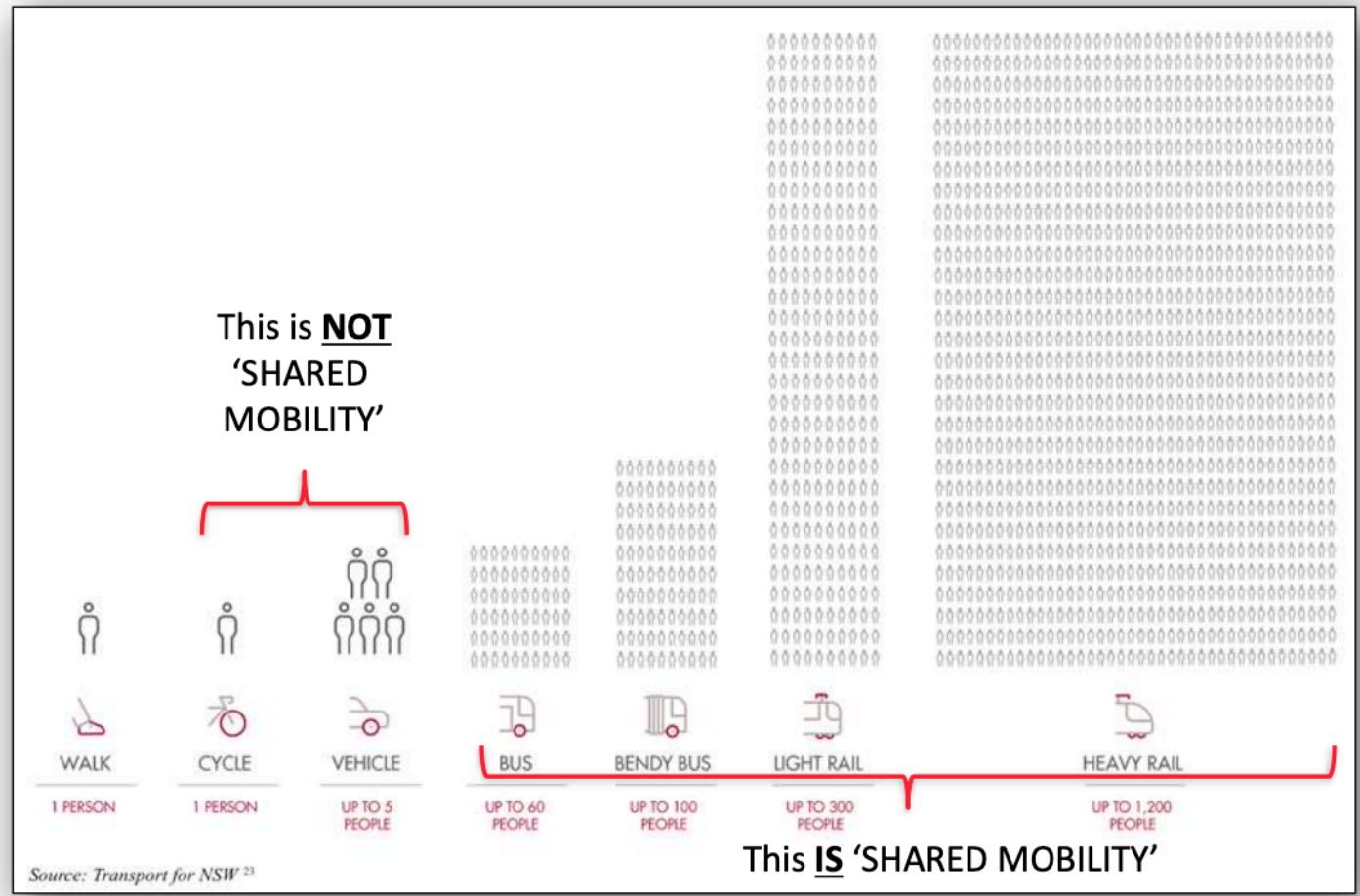


Rail is also very competitive with the car; something bus even SmartBus cannot achieve – it also has significant urban density generation benefits





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





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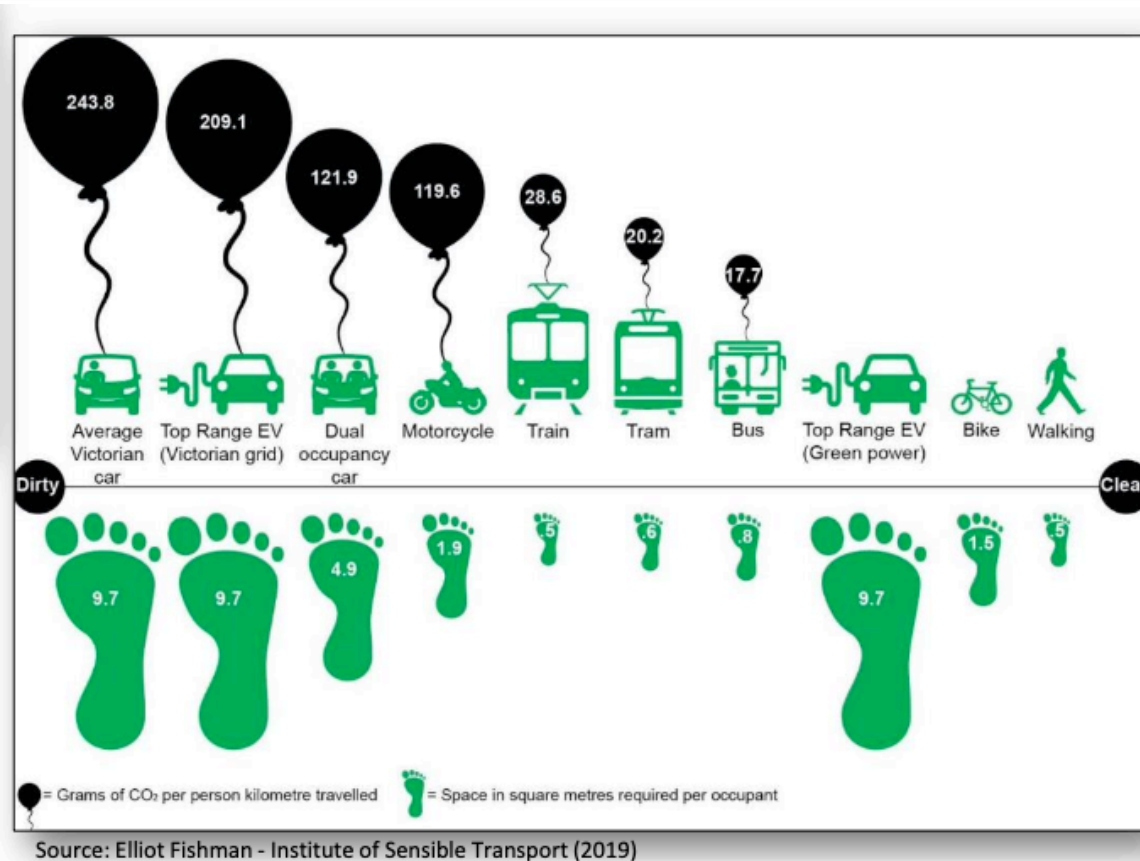
**Environment – Space**

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**Economy**



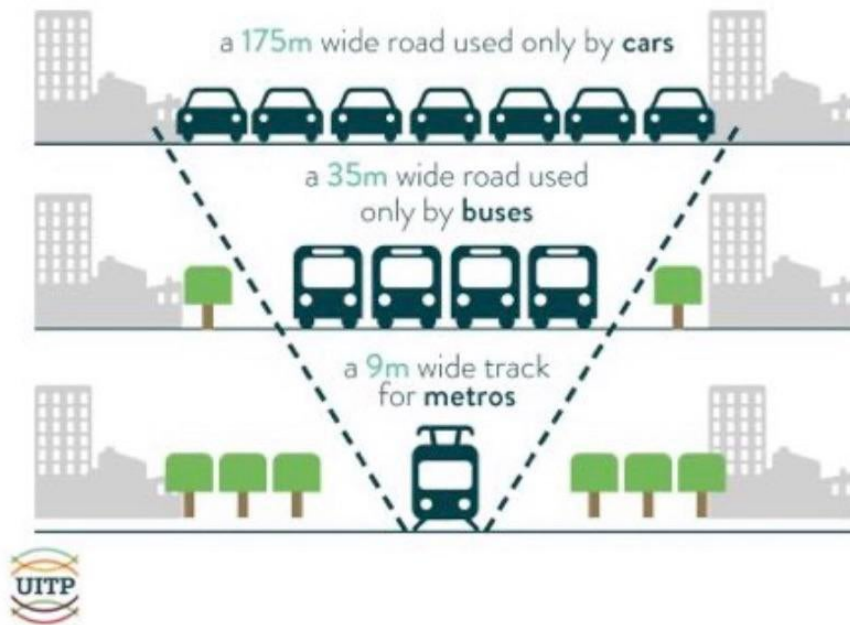
Rail combines the most environmentally efficient mode for longer distance travel with the most space efficient travel





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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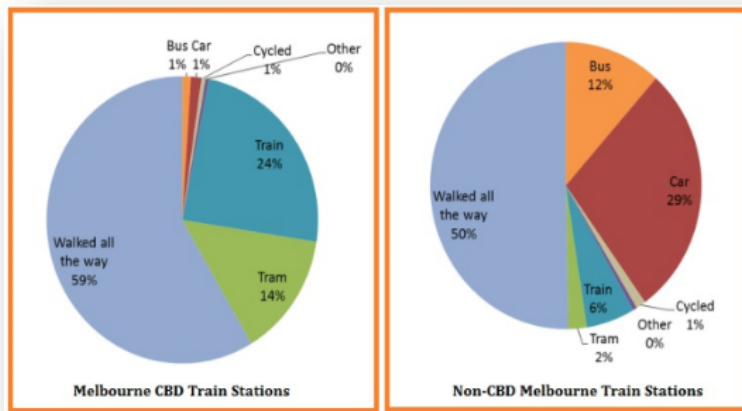
**Environment – Space**

**Health – Well Being**

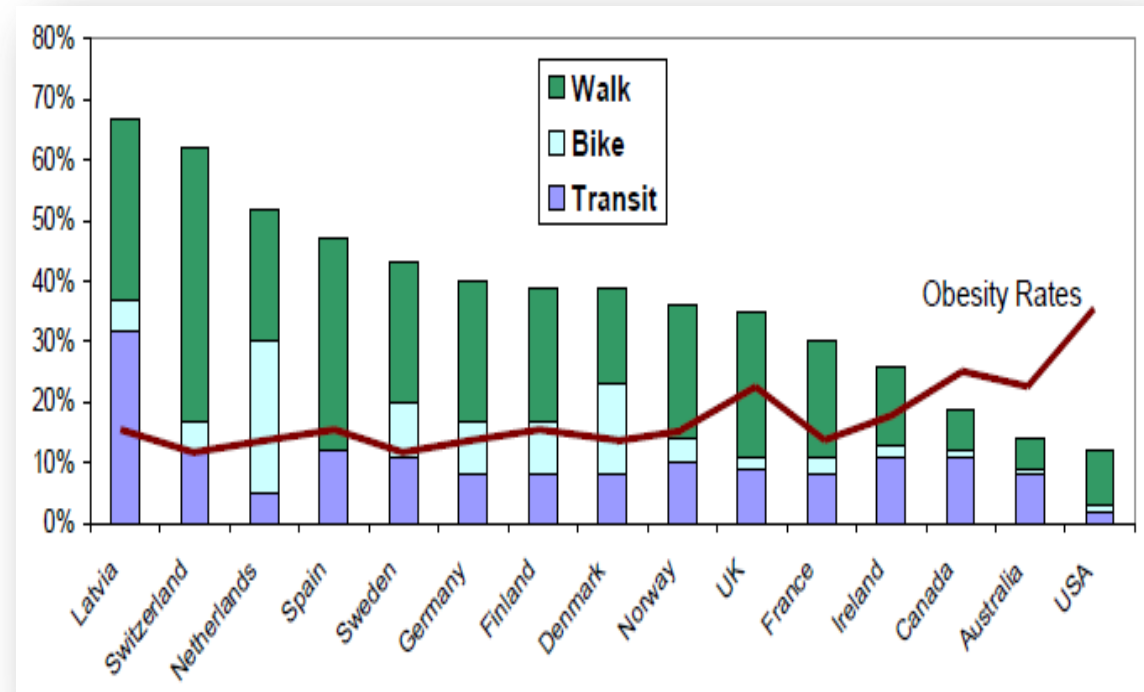
**Economy**



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

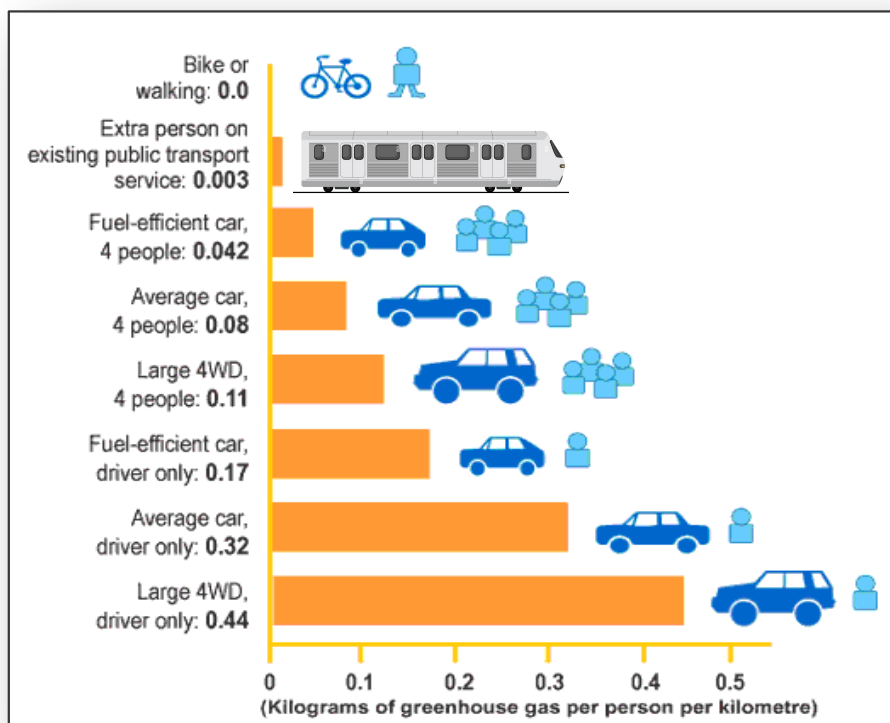


*Access modes to train stations in Melbourne.  
(PTV OD Survey, 2011-2012)*



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

# Environmental benefits of rail link to health benefits

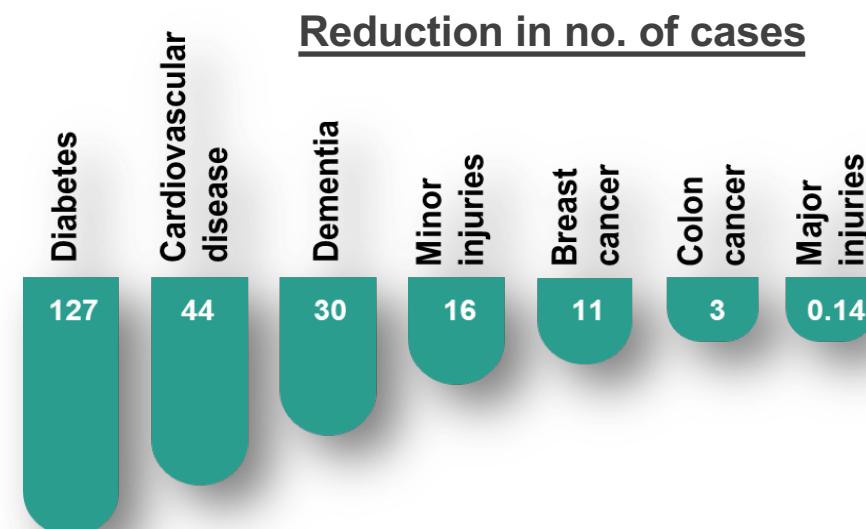


*Greenhouse gas emissions from different transport modes  
((Transport State Transit, 2014)*

	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



Morbidity results (cases/year)

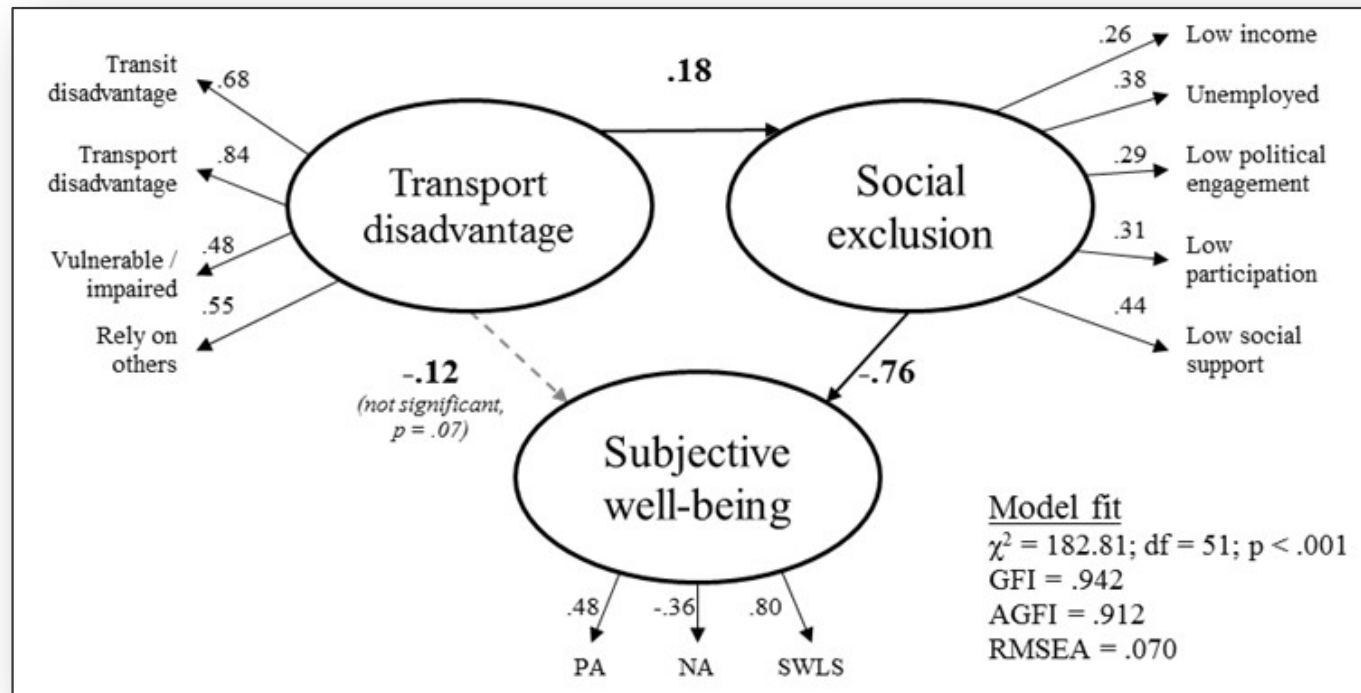
This change has reduced PM<sub>2.5</sub> exposure and resulted in annual reductions of

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

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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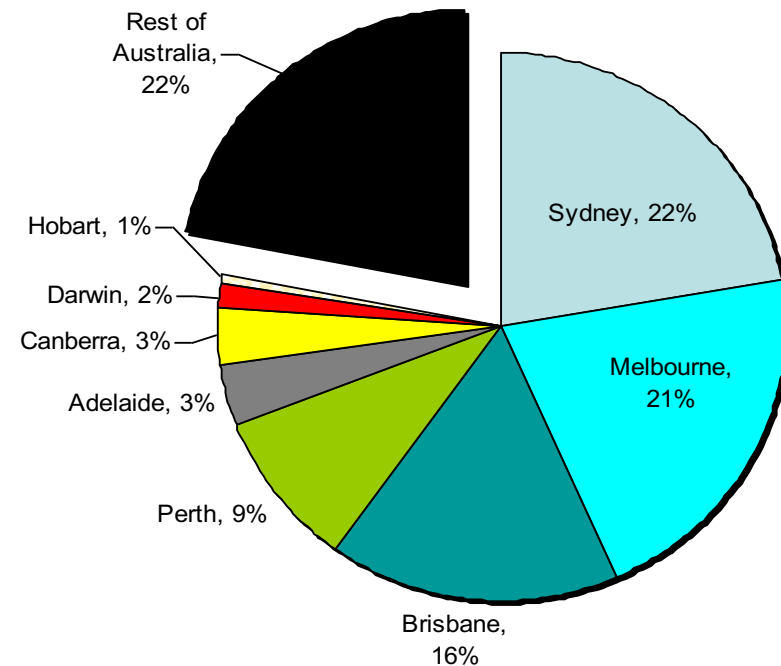
**Health – Well Being**

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# Australian cities dominate national economic growth

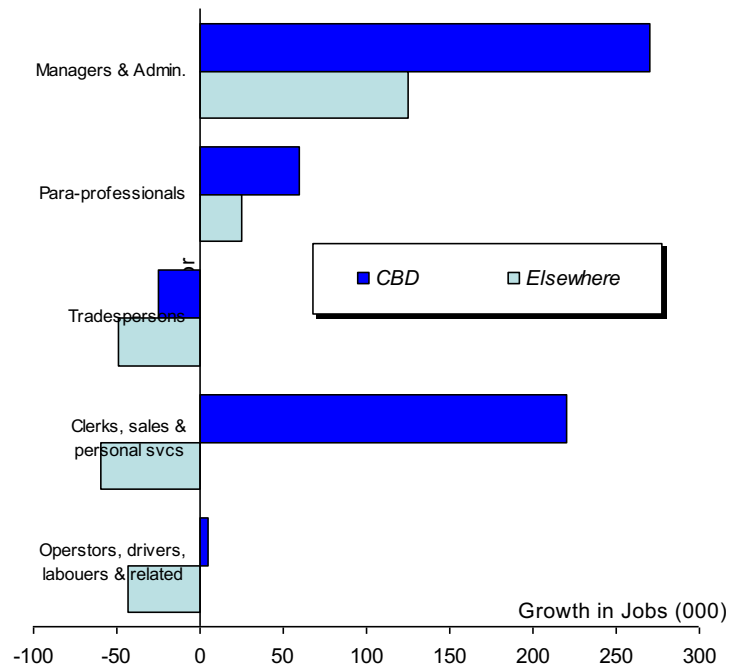
- Australia's national economic well-being is increasingly dependent on its capital cities –
- 61% of Australia's economic activity in 2006 took place in Sydney, Melbourne, Brisbane and Perth
- and these cities contributed 78% of Australia's economic growth during the last five years



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

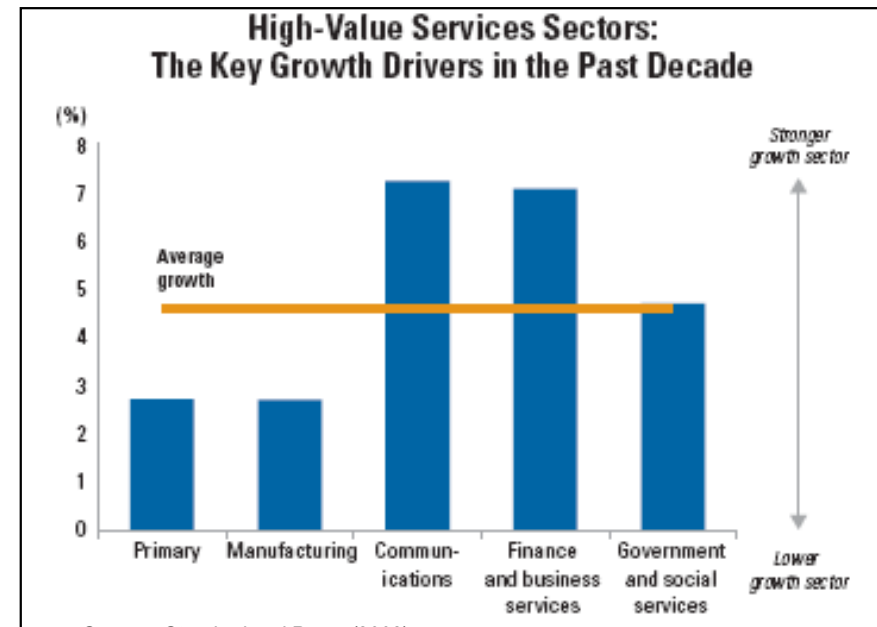
# CBDs and CBD businesses dominate this growth

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



Source: Brottchie et al. (1995)

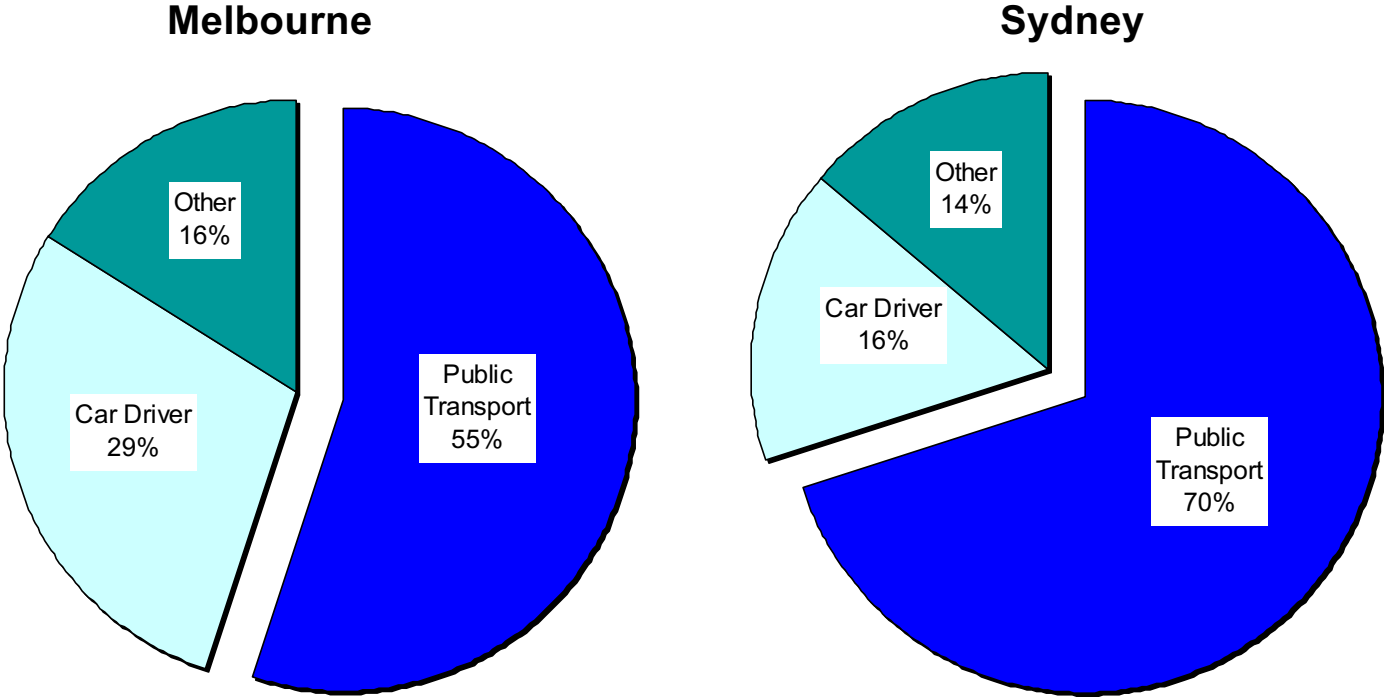
**Growth Drivers – Melbourne (Decade)**



Source: Standard and Poors (2003)

# Australian rail dominates CBD access

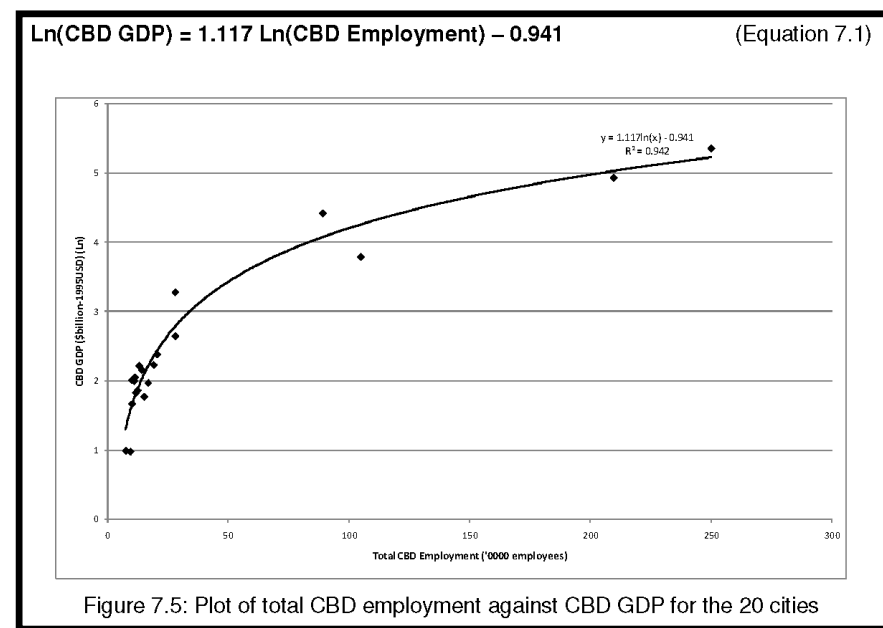
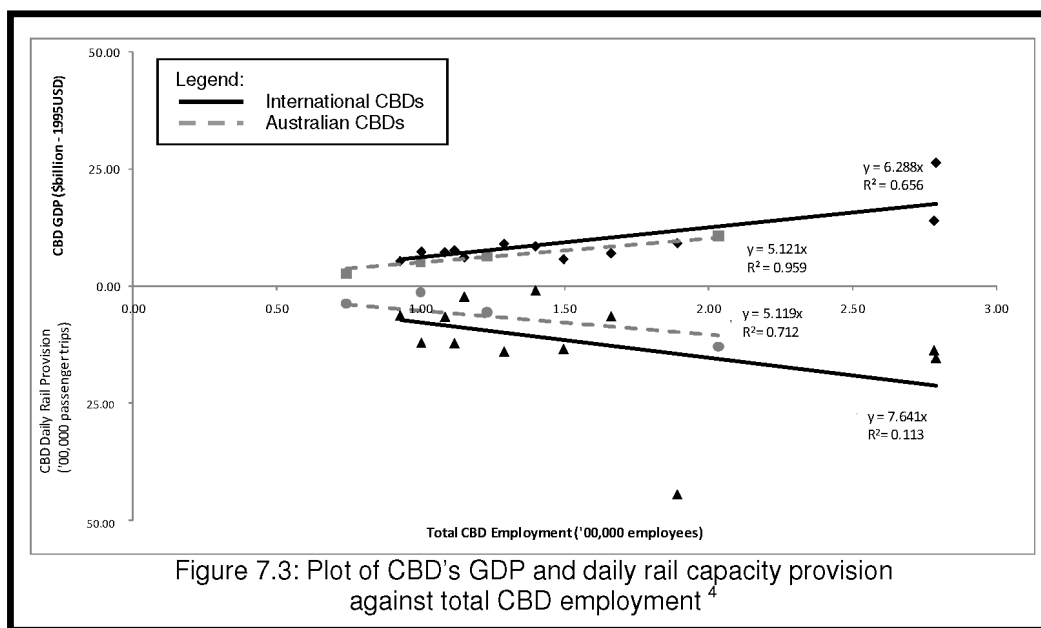
Access Mode Share to Work



Source: ABS Census 2006

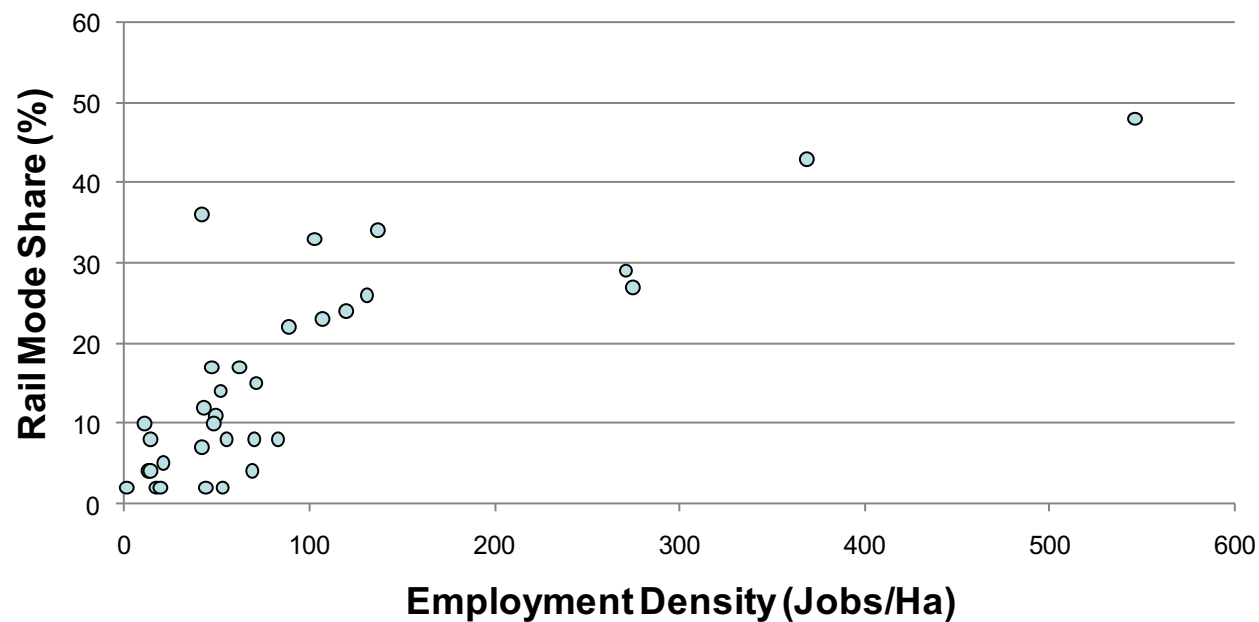
# Economic productivity grows as employment density increases in cities

## Agglomeration Benefits – Increase Employment Density in CBDs



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

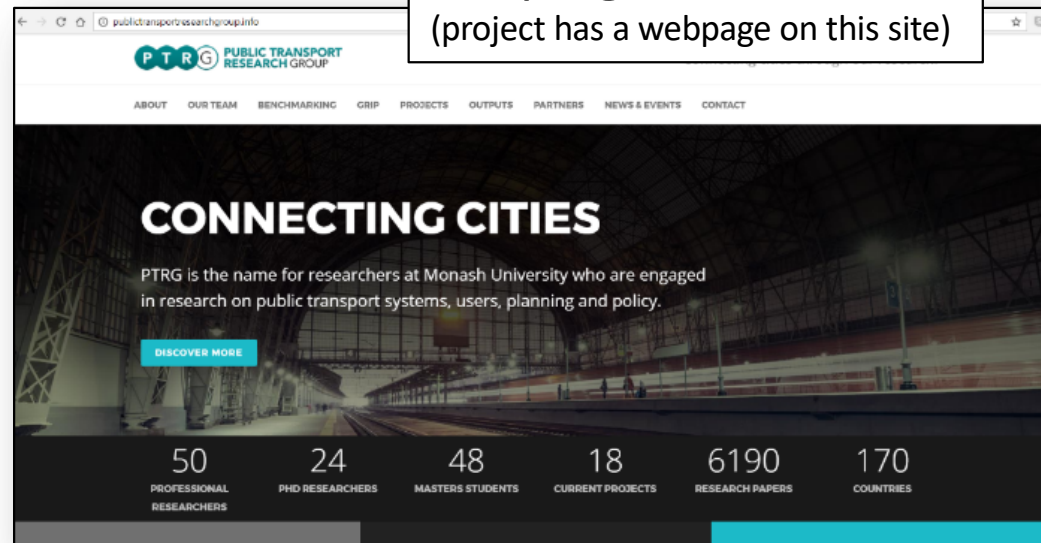


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Connect with us on



**W: ptrg.info**  
(project has a webpage on this site)



Researching Transit



**RT5 – Long term  
impact of COVID-  
19 on Travel  
Behaviour**

