Future Transport: a decarbonised transport system?

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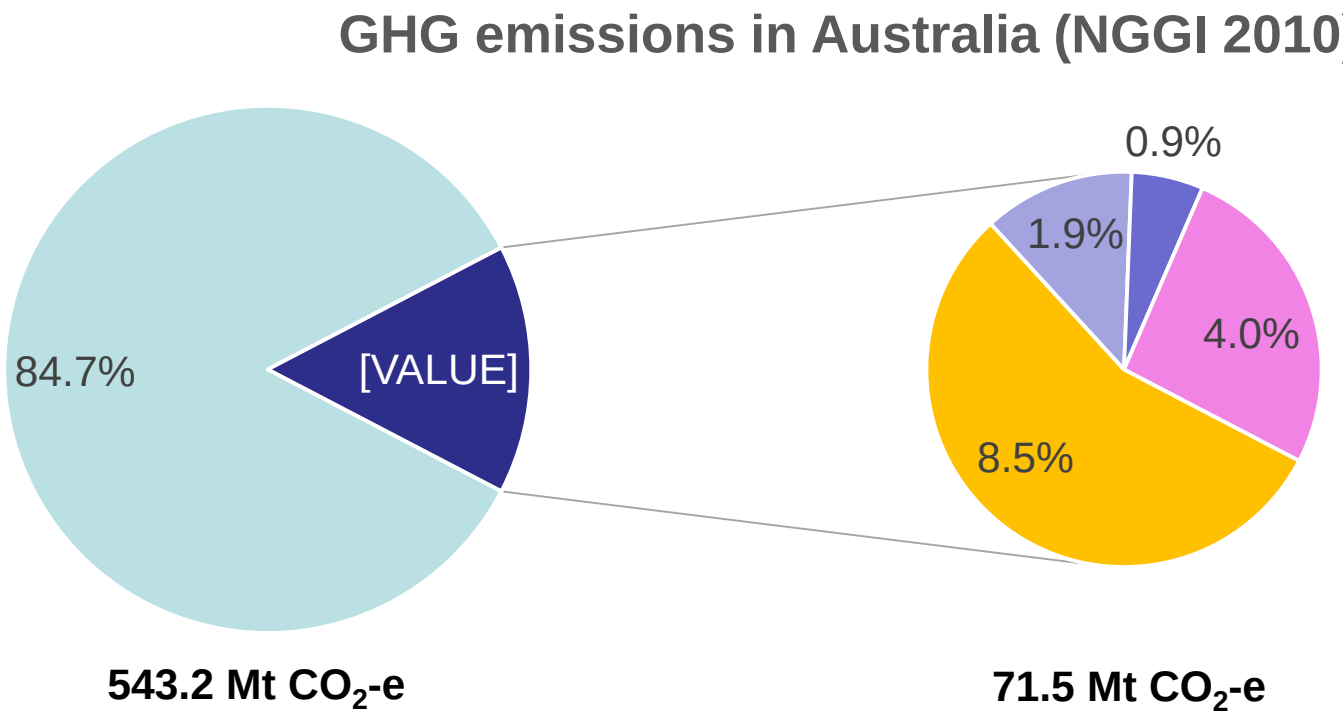
Transport contributions to national GHG emissions



Ehrlich-Ekins equation and sustainability

$$E = PCT$$

E = environmental impact

P = population

C = consumption

T = technology

To halve *E*, if *P* doubles and *C* is constant, *T* must reduce to ¼!

Ehrlich-Ekins for (private vehicle) transport

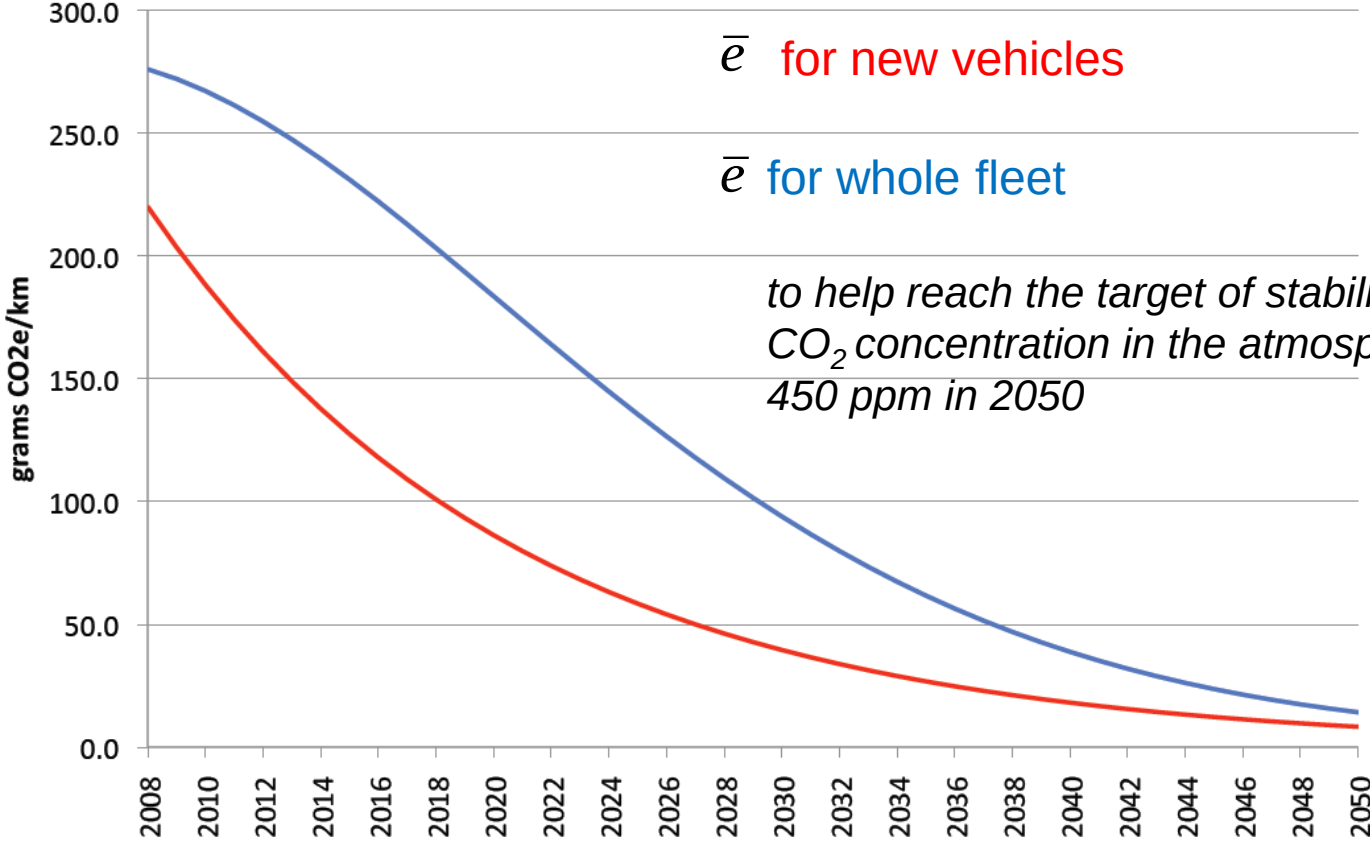
$$E = Pn_T\bar{d}\bar{e}$$

n_T = car trips per person

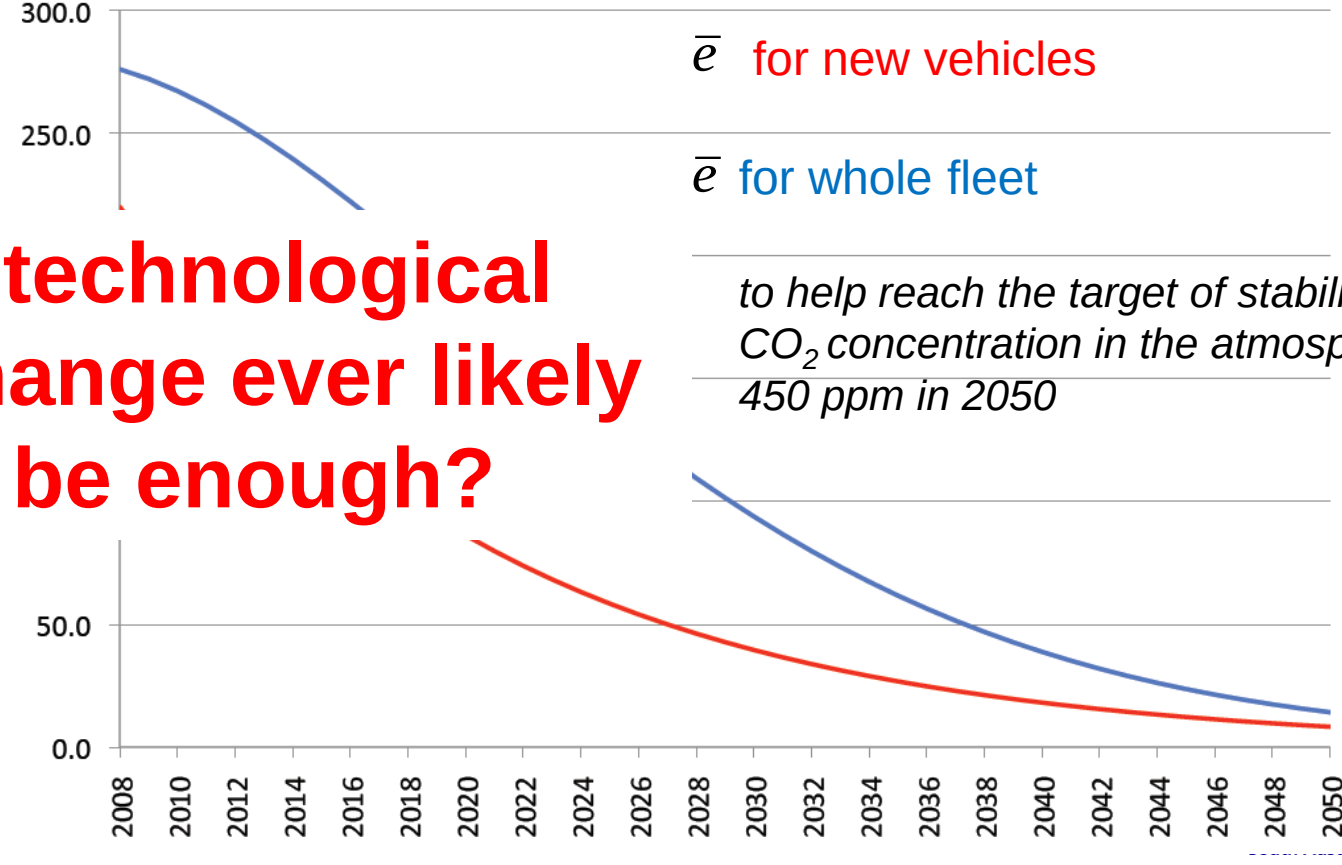
$\bar{d}$ = average trip length (km)

$\bar{e}$ = emissions rate (g/km)

Required technology change (Aus)



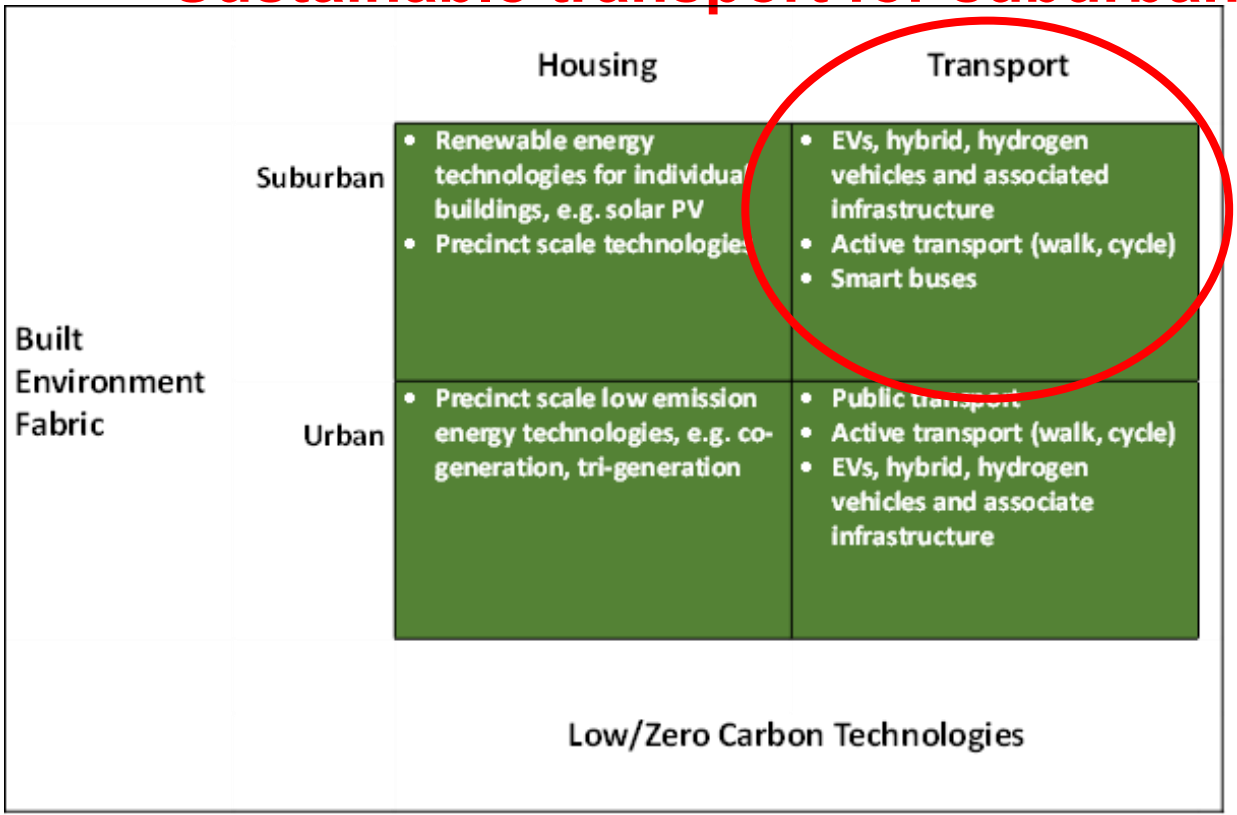
Required technology change (Aus)



Is technological change ever likely to be enough?

The current dilemma

- **Sustainable transport for suburban areas…**



See:
Newton, P W and Newman, P (2013). The geography of solar photovoltaics (PV) and a new low carbon urban transition theory. *Sustainability 5*, pp.2537-2556
and
Philp, M and Taylor, M A P (2014). *Research synthesis report: a research agenda for low carbon mobility.* Research Report, CRC for Low Carbon Living, www.lowcarbonlivingcrc.com.au

5 big issues for this morning

- Integrating Low Carbon Mobility and infrastructure
- Integrating Low Carbon Mobility and travel behaviour
- Integrating Low Carbon Mobility with policy making
- Evaluation
  - better accounting for low carbon options in project economic evaluation
- Technology
  - necessary but not sufficient?

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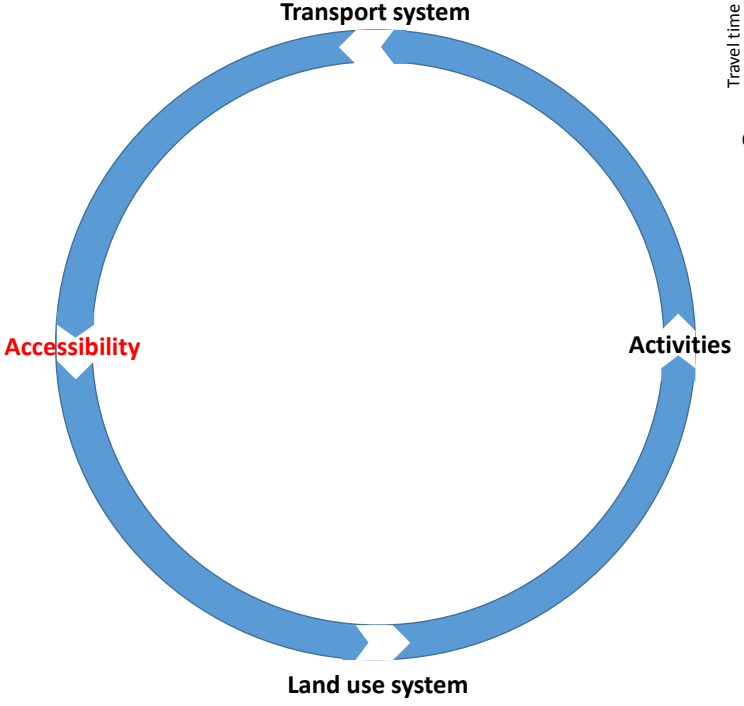
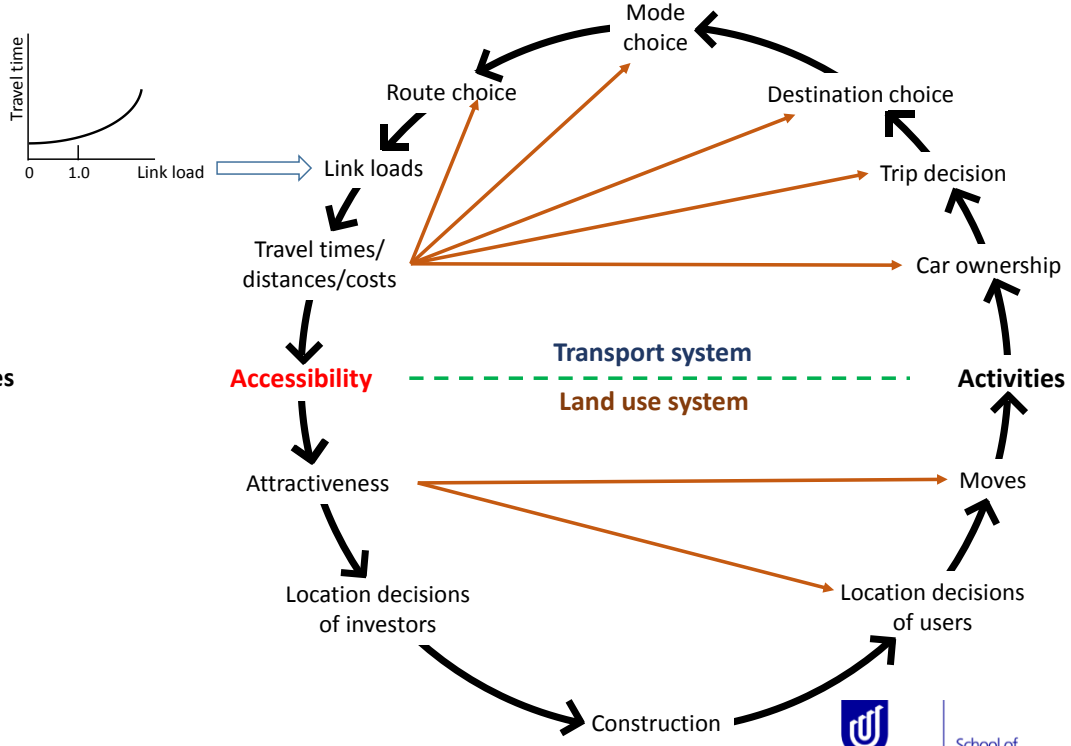
Land use & transport

- Integration of land use planning & transport planning
- Basic idea = concept of accessibility
  - ‘the ease for people to participate in activities from specific locations to a destination using a mode of transport at a specific time’ (Primerano & Taylor 2005)
  - ‘the quantification of an individual’s freedom to participate in activities in the environment’ (Chen et al 2007)
- How does this help?

‘Wegener’s Wagon Wheel’ conceptual model





Systematic approach towards sustainable transport

- Comparative Urban Transport and Environment (CUTE)
- Based on 3 action areas
  - *Avoid*
  - *Shift*
  - *Improve*
- and 4 instruments:
  - technology
  - regulation
  - information
  - economy

Reference:
Nakamura, Hayashi & May (2004). *Urban Transport and The Environment*, Elsevier

CUTE matrix: policy & technology interventions

Strategies / Means	AVOID	SHIFT	IMPROVE
Technologies	• Transport oriented development (TOD) • Poly-centric development • Efficient freight distribution	• Railways and BRT development • Interchange improvement among railway, BRT, bus and para-transit modes • Facilities for personal mobility and pedestrians	• Development of electric vehicles • Development of biomass fuel • "Smart grid“ development
Regulations	• Land-use control	• Separation of bus/para-transit trunk and feeder routes • Local circulating service • Control on driving and parking	• Emissions standards • “Top-runner" approach
Information	• Telecommuting • Online shopping • Lifestyle change	• ITS public transport operation	• "Eco-driving" • ITS traffic-flow management • Vehicle performance labeling
Economy	• Subsidies and taxation to location	• Park & ride • Cooperative fare systems among modes	• Fuel tax/carbon tax • Subsidies and taxation to low-emissions vehicles

Source: Nakamura, Hayashi & May (2004