

Future of the car

Dr Ian Espada 24 May 2018 Engineers Australia CPD, Melbourne

Cars in Australia

14 million units \rightarrow Asset value \$175 billion

- 570 cars per 1,000 capita
- New car sales of 915,658 in 2016 (PC and SUV) \rightarrow \$22.8 billion per year
- 1,295 road deaths in 2016
- Typical car:
 - Petrol and 9.8 years old
 - 12,800 km per year
 - 10.6 li/km
 - \$25,000 for new car





Unsustainability of the car (+40 years)

Number of cars	Population from 24.7M (2017) to 42.5M (2061) 17 million additional cars (double current numbers)
Environment & energy	Double the fuel consumption
Parking space	1,150 sq km of new parking spaces (30 times the area of Melbourne CBD)
Road space	>2X capacity at bottlenecks
Safety	Likely increase road deaths
Urban footprint	Double the footprint of current cities



Victoria's congestion costs set to soar to \$9b by 2031, infrastructure audit finds

Hy Jean Holwards

Posted 22 May 2015, 544pm

The cost of delays on Melbourne's road network is expected to triple to \$9 billion by 2031 without greater investment to reduce traffic congestion, a national infrastructure audit finds.

Intrastructure Australia's report identities the top 10 roads and freeways in Molbourne where congestion had the toggest impact on economic productivity in 2011

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Autonomy



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Electric

1,369 EV sold in 2016 50% would consider EV *Source: Electric Vehicle Council* (2017)

+40 years: EV share of 10% to 35% Source: Climate Works 2016

GHG emission reductions based on electricity source

Australia's power is coal based \rightarrow benefit is positive but small



Source: Electric Vehicle Council (2017)



arrb.com.au

Ride-sharing services \rightarrow increase VKT

- Erodes transit, walk and cycle use
- Increased discretionary trips
- Deadheading
- No difference in car ownership
- Parking benefits and avoid drink driving

Source: ITS UC Davis (2017)

Are Uber and Lyft helping or hurting the environment?

Berkeley researchers will get unprecedented access to data from both companies and riders to analyze if on-demand ride services are climate friends or foes



▲ Everyone tastan opinion on Uber and Lyfft, but research results can be surprising. Photograph: Anthony

https://www.theguardian.com/



Autonomy

Autonomy promises safety and potentially improved mobility



Updated 2/ Mar 2018, 4:64pm

AV will lead to increase in trip length and total travel time

Source: Davidson and Spinoulas 2015

The best AV disengages every 9,000 km

Automation in the airs drivers reaction to safety critical events Source: Shen and Nevens 2017 (Journal of Safety Research) On the most unsafe rural road type, a human driver experiences a crash every 1 million km

Source: Austroads 2012



Connected



Application	Example	
Safety	Red light violation and ped warning Curve speed warning Weather-related warning	
Mobility and environment	Signal control enhancements Incident management Cooperative platooning	

Source: US DOT 2016

Pilots have identified implementation issues *Queensland pilot: Blogg et al. 2018 New York pilot: TransCore*



Data

A well-informed motorist improves network performance

Optimum penetration rate beyond there is no benefit

Source: Yang and Luk 2001

Parking guidance system reduces travel time and emissions

Potential issue of crowding (multiple motorists heading to the same parking spot)

Source: Moni, Hill and Gruteser 2012









Car of the future depends on us!



Todd Littman blog Image: Shutterstock





Source: www.arch2o.com



Center Transitivar

Access Lanes



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Source: NACTO 2017

