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Australian versus World EV uptake: Why the difference?

What are the EV options?
What are the levels of EV adoption around the world?
Barriers (and drivers) to EV adoption
Approaches to EV policy: the AEVA perspective

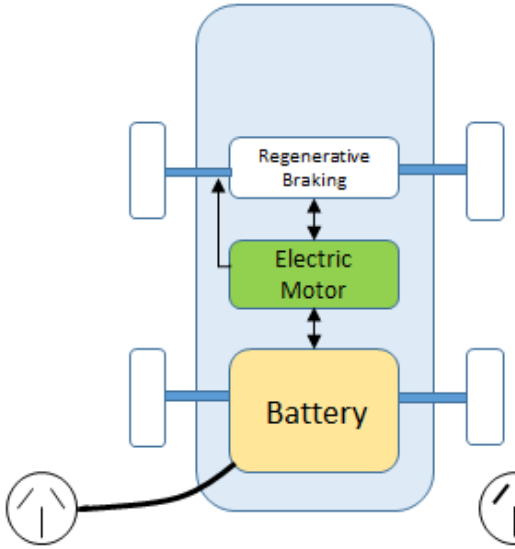
Fleet electrification coming in ALL forms:

- Trucks
- Bicycles
- motorbikes
- Planes
- ‘Flying cars’
- Autonomous forms
- Busses
- Ferries

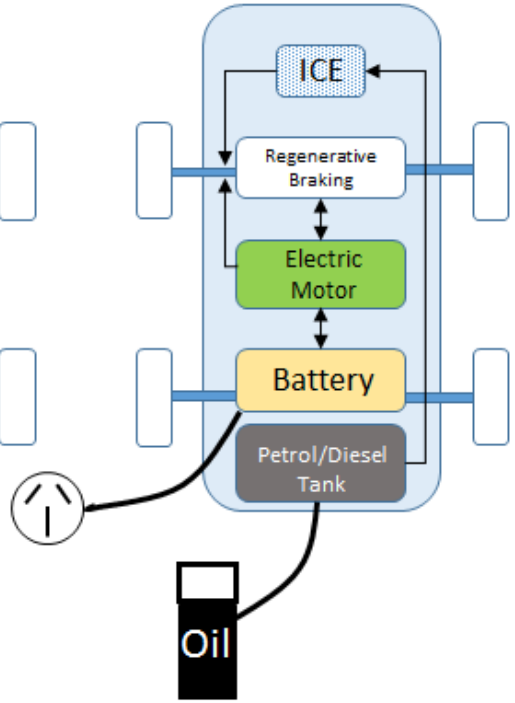
EV terminology reminder:

PEV
Plug-in Electric Vehicle

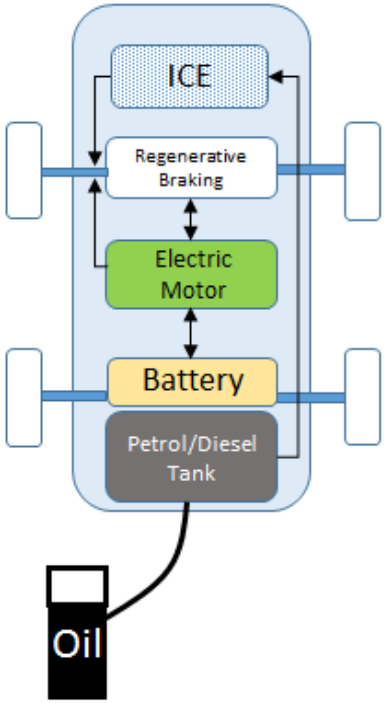
BEV
Battery Electric Vehicle



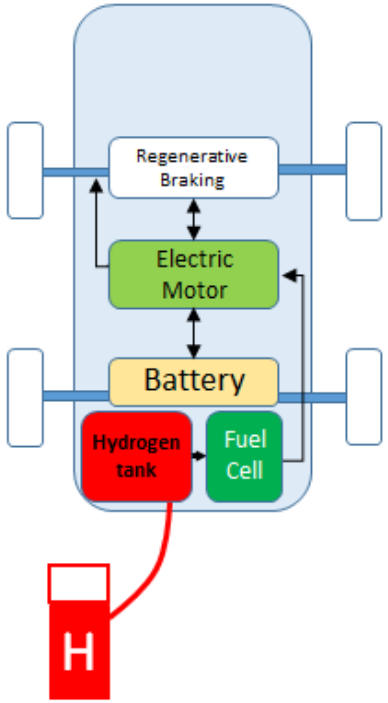
PHEV
Plug-in Hybrid Electric Vehicle



HEV
Hybrid Electric Vehicle

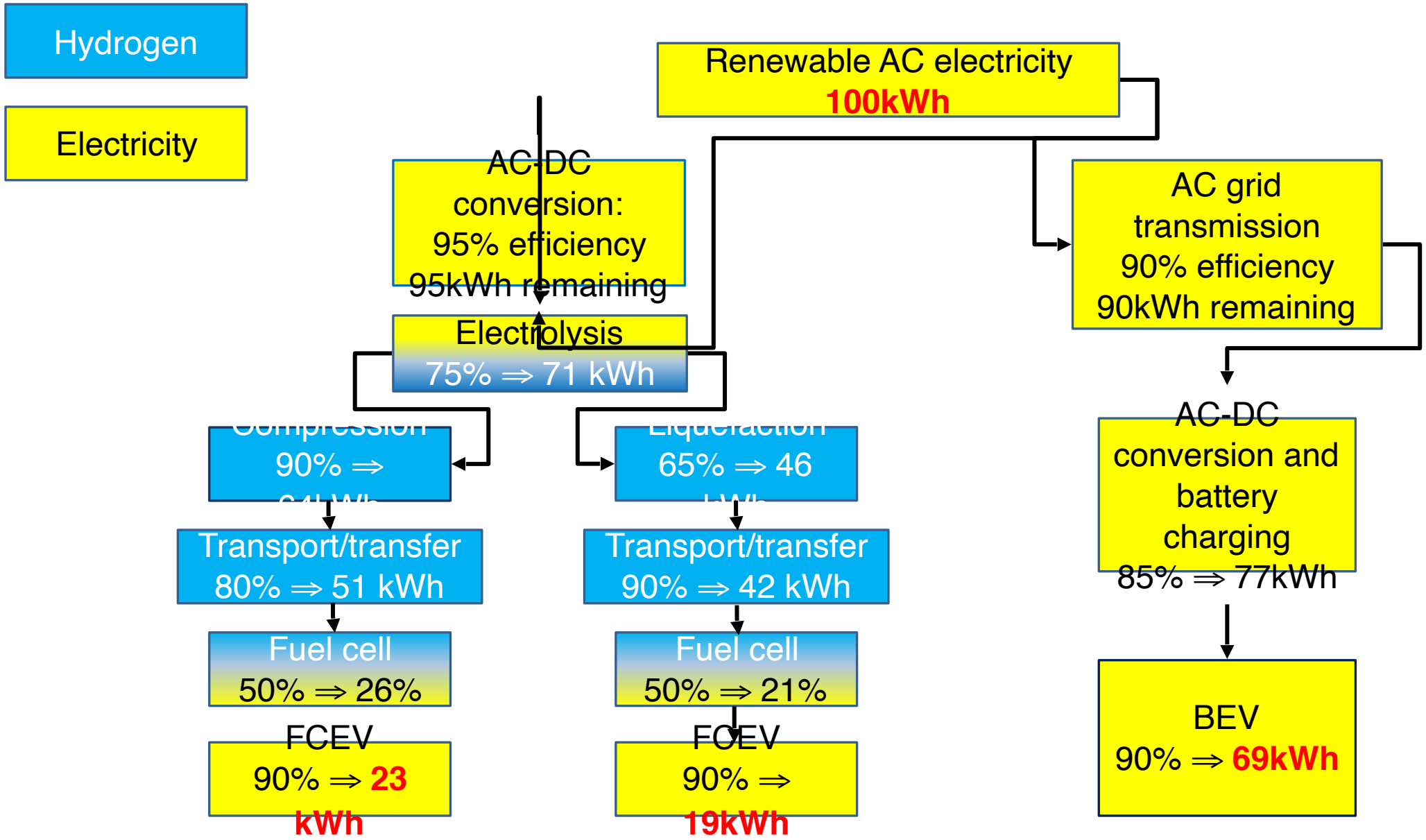


FCEV
Fuel Cell Electric Vehicle



Why BEV, and not FCEV?

- ☑ BEVs much more efficient than ICE in energy use per km;
- ☒ FCEVs little better than ICE in overall energy use per km;
- ☑ BEVs better than ICE in GHG emissions even when grid charged;
- ☒ If using current grid – FCEV GHG emissions worse than both ICE & EV;
- ☑ BEVs up to 98% GHG emission reductions if coupled with renewables.



Source: "Does a Hydrogen Economy Make Sense?" *Proceedings of the IEEE*. Vol. 94, No. 10, October 2006.

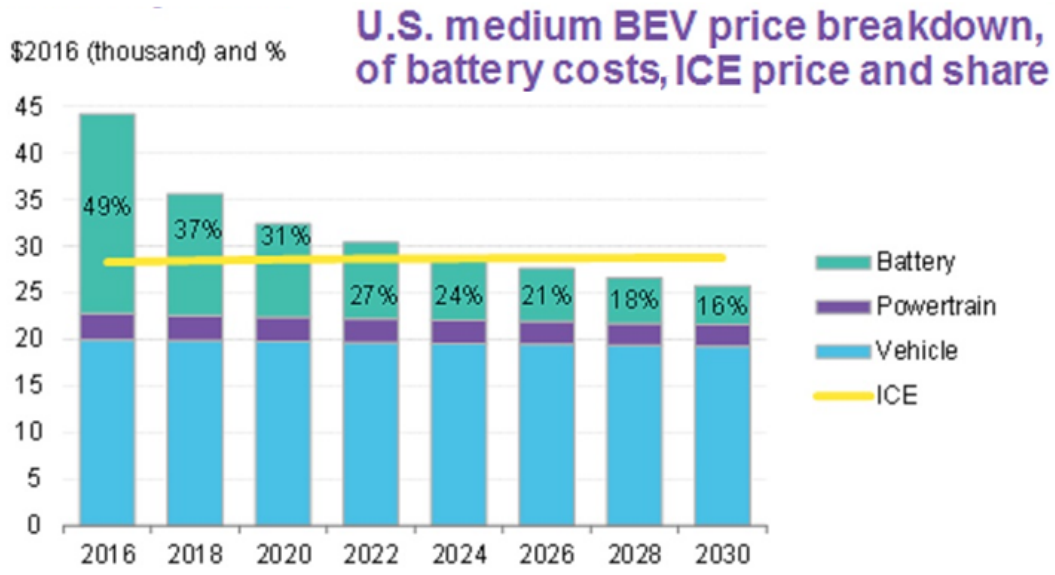
Why BEV, and not shared with HEV & PHEV?

- ☒ HEVs included in coming bans on new ICE sales (more later);
- ☒ PHEVs still use fossil fuels and oils;
- ☑ BEV range and recharging times closing in on ICE;
- ☑ EV battery prices predicted to fall to ICE/BEV price parity beginning in 2024, fall below ICE t

Year of EV up-front price parity with ICE vehicles in selected markets

Segment	US	EU	China	Japan
Small	2027	2028	2030	2040
Medium	2025	2024	2024	2029
Large	2026	2025	2029	2027
SUV	2024	2026	2040	2025

Source: Senate enquiry into Electric Vehicles report, 2019



Source: Bloomberg New Energy Finance, EPA, ICCT, FEV, ONRL, IDL. Note: Estimated pre-tax retail prices

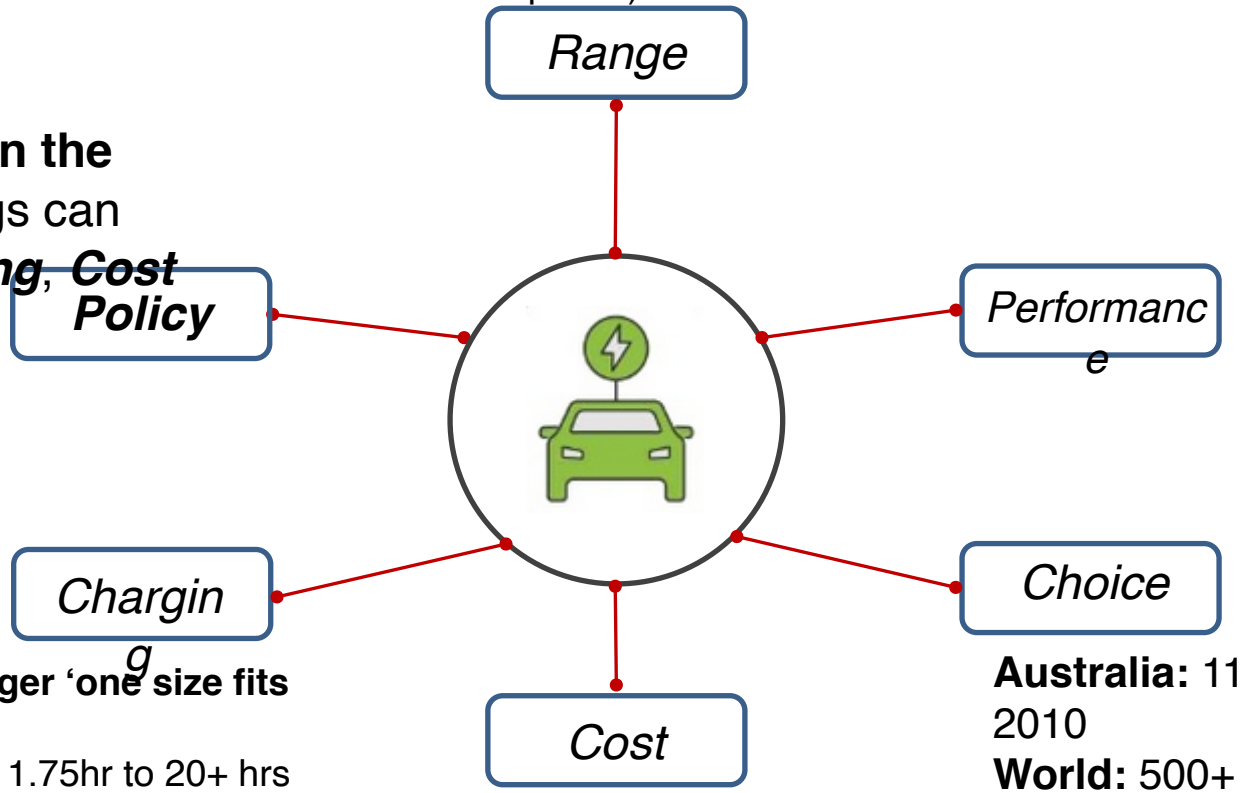
World new BEV sales: 2019

Country	BEV sales % in 2019
World	2.5% (BEV and PHEV)
Norway	42%
Iceland	24.5%
Europe	3.8%
China	4.7%
UK	3.2%
Australia	0.6% (= 3 x 2018, ICE fell 7.8% in same period)

Are there barriers to BEV adoption in Australia?

Renault Zoe: 300km
Jaguar I-Pace: 377km
Hyundai Kona electric: 420km
Tesla: 320 – 539km (battery options)

The elephant in the room… Settings can impact ***Charging***, ***Cost*** and ***Choice***.



Vehicle	0 – 100kmh (in s)
ICE Corolla:	9.5
Zoe:	8.2
2018 Leaf:	8
I-Pace:	4.5
Tesla S:	2.28

No longer 'one size fits all':
Home: 1.75hr to 20+ hrs
Public: 15min to 20+ hrs

Australia: 11 now, 17? by end 2010
World: 500+ BEV and PHEV now

Second-hand: $10k up
New: $46k up
ICE price parity: beginning 20242

Adapted from: '5-barriers-to-electric-vehicle-adoption' by Erik Fairburn, CEO PodPoint

Why such low Australian EV uptake?

In Australia, the adoption of electric vehicles is being held back by the lack of policy support or incentives, higher upfront cost, lack of choice of available electric vehicles for sale in Australia, and the availability of public vehicle charging infrastructure.*

*Climate Council report: Waiting for the green light: transport solutions to climate change, 2018

WAITING FOR
THE GREEN LIGHT:
TRANSPORT SOLUTIONS
TO CLIMATE CHANGE

Promoting EV uptake

Carrots: examples from around the world

New Zealand: tax exemptions until EVs reach 2% of fleet.

Comparison of one-off subsidies to encourage EV purchases

Country	Subsidy	Comments
Belgium	€4000	
France	€2500–€4000	
United Kingdom	£2500–£8000	Limited to total car price of £60 000
Portugal	€1125–€2250	Trading in used ICE
Germany	€3000–€4000	Vehicles under €60 000
Denmark	$AUD1470–$AUD3675	Subsidy for businesses and local councils

Source: Senate enquiry into Electric Vehicles report, 2019

UK:

- Workplace Charging Scheme and the Electric Vehicle Homecharge Scheme.
- £80 million investment to develop the “next generation of electric vehicles”.

Carrots:

- Registration and stamp duty concessions;
- tax concessions;
- reduced import duties for EVs;
- grant funding for EV R&D and charging infrastructure;
- subsidies to buyers;
- EV access to bus lanes;
- Reduced registration fees;

Sticks from around the world:

July 2016:

Paris bans ICE vehicles built before 1997 from city streets.

September 2017:

C40 Fossil-Fuel-Free Streets Declaration: pledges from 12 major cities to ***"ensure that a major area of their city is zero emission by 2030".***

February 2018:

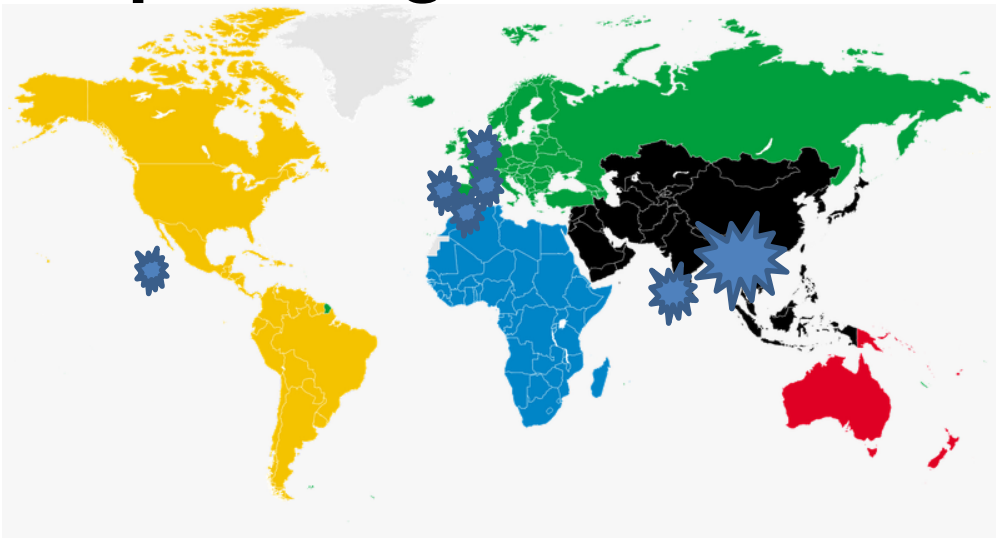
German court decides individual cities in Germany may ban diesel engine vehicles to reduce air pollution. "***The decision could affect the value of up to 15 million vehicles now on the roads in Europe's largest car market".***

Currently:

Rome, Copenhagen and other European cities looking at similar bans.

The REALLY big stick:

Countries with legislated or planning sales bans of new ICEs:



- **Norway:** 2025
- **Holland:** 2025
- **India:** 2030
- **England:** 2035
- **France:** 2040
- **California:** legislation for 2040 introduced
- **China: (Now world's biggest new vehicle market)**
  - targets include 20% EV by 2025;
  - date for total end to be announced.

Policy:

- national EV fleet targets;
- government fleet purchasing procurement targets;
- funding for education and familiarisation campaigns;
- Tenancy laws and building codes for new dwellings;
- Public charging infrastructure;
- industry plans;

Policy: Emissions standards.

Europe:

➢Euro 6d emissions standards currently coming into effect.

USA:

➢EPA are/were more stringent than European (Trump not helping).

Australia:

➢Euro 5 standards still in place.

➢Recommendations for adoption of standards similar to latest European standards still on table after over 3 years.

Greenhouse gas emissions:

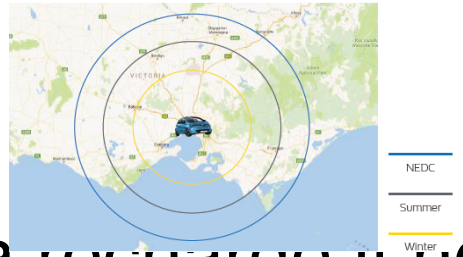
➢BOTH US and Europe have mandated CO_2 limits for vehicles. (Aust. does not).

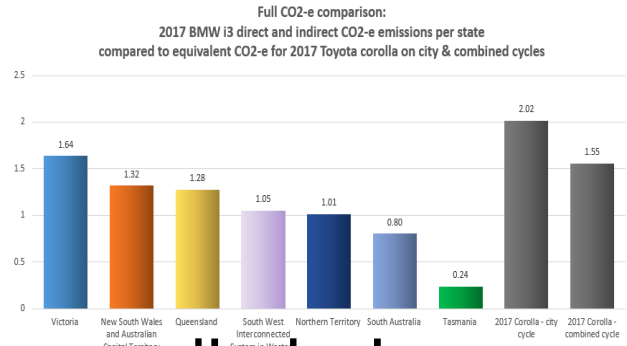
The 7th barrier in Australia?

Public familiarity with EVs!

Currently, lack of public EV knowledge tends to be shown by:

- Range anxiety
- Confusion about plug types
- Fear of not being able to get a recharge if needed
- Lack of understanding of the environmental benefits





Result: Skewed (or simply wrong) EV information in the media being all too easily believed as the depth of knowledge on EVs is not there (yet)

Threat to grid from electric cars

EXCLUSIVE

GRAHAM LLOYD
SIMONE FOX KOOB

not sufficient. Modelling by electric vehicle consultancy Energeia showed flat tariffs caused a spike in electricity demand when drivers arrived at work and returned home to plug in to recharge.

dedicated centres. It said that with bigger batteries and faster charging, the electric vehicle would become the single largest electricity load in a home within five years.

Bryce Gaton, from Brighton

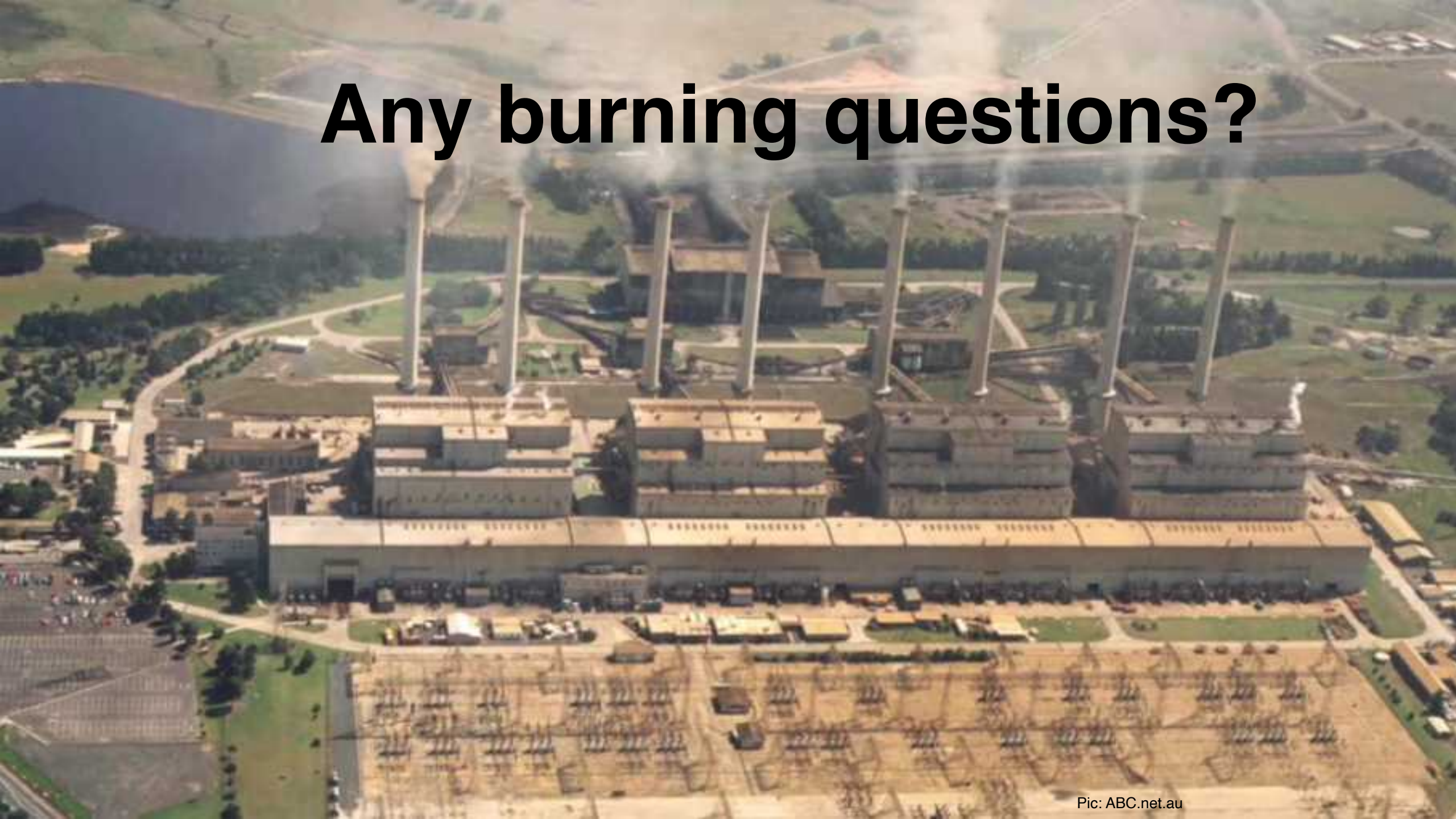
Electric cars won't lower emissions on the mainland: Kelly

10min

Why is Australia misleading consumers on electric vehicle emissions? 140

By Giles Parkinson on 25 January 2018

Any burning questions?

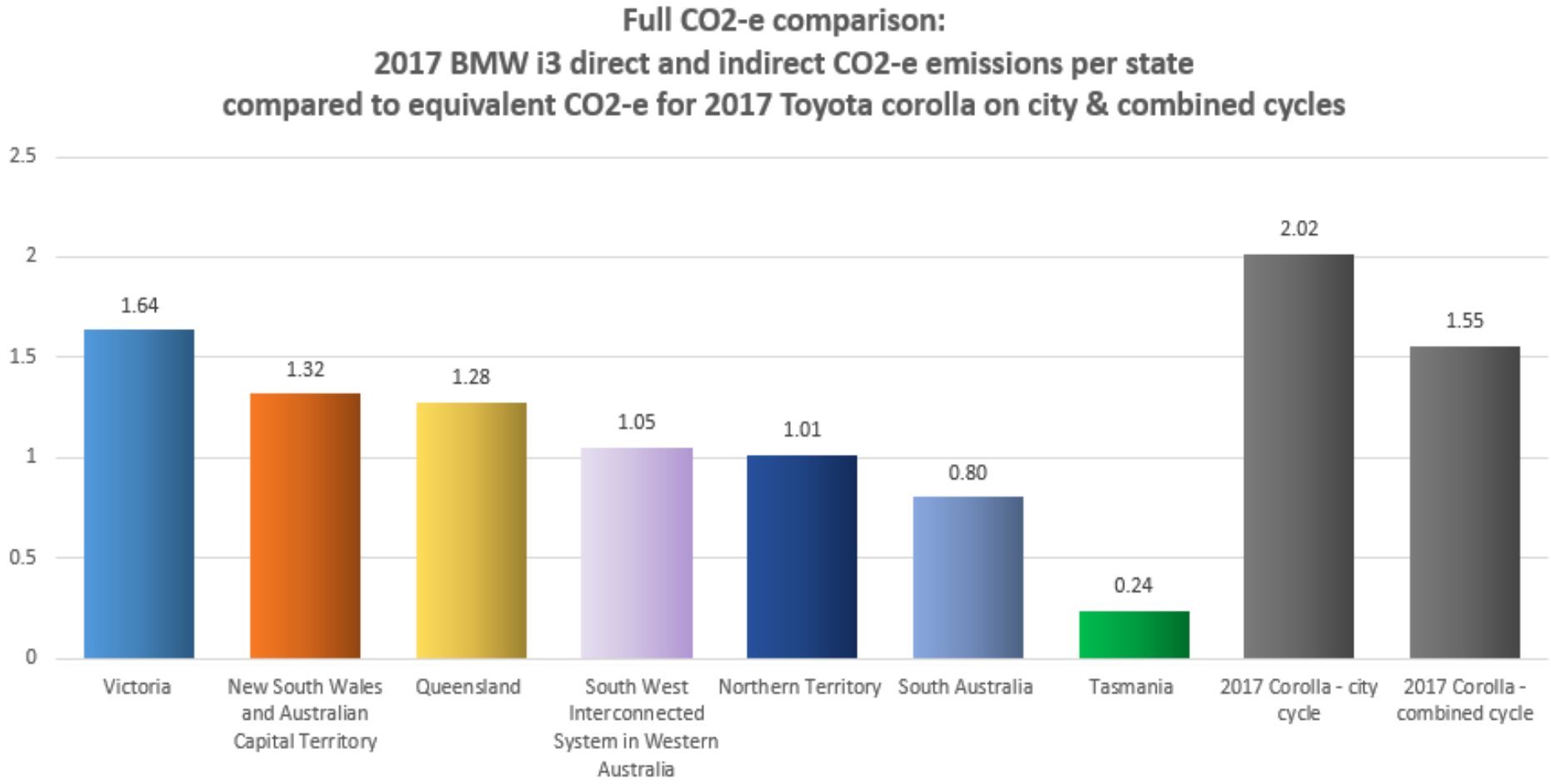


Pic: ABC.net.au

Further reading:

- European air quality standards:
  https://ec.europa.eu/environment/air/quality/standards.htm
- EV Council report (Australia): State of Electric Vehicles, August 2019. https://electricvehiclecouncil.com.au/wp-content/uploads/2019/09/State-of-EVs-in-Australia-2019.pdf
- Smit, Whitehead and Washington, 2018. Where are we heading with electric vehicles, *Air Quality and Climate Change, V52, No.3, September 2018, 18 – 27.*
- Climate Council report: Waiting for the Green Light: Transport Solutions to Climate Change. 2018. https://www.climatecouncil.org.au/resources/transport-climate-change/
- Australian Vehicle Emission Standards: https://www.infrastructure.gov.au/vehicles/environment/emission/index.aspx
- Senate Select Committee on Electric Vehicles:
  https://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Electric_Vehicles

Addendum:
2017 ‘well to wheel’ EV vs ICE emissions for 10000 km



*Calculations done to Department of the Environment and Energy National Greenhouse Accounting methodology, using latest (2017) NGA factors data. For full article: see ReNew 143, April-June 2018).