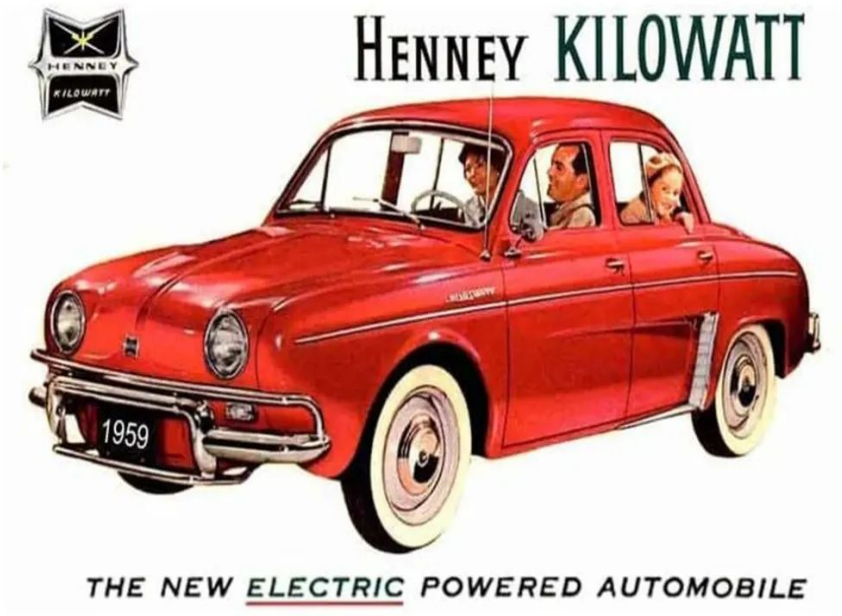
GEELONG SUSTAINABILITY

The

of

Everything Old Is New Again



The first ‘crude’ EV’s appeared around 1832 and by 1912 accounted for more than a third of all cars in the US just as the Model T Ford began to be mass produced.

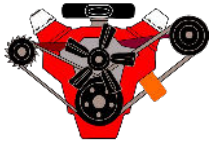
Oh, And Before ICE There Was ECE

External Combustion Engines aka steam powered cars like the Australian made Stanley Steamer were quite popular.

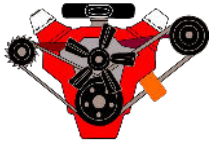
ICE, Hybrid, PHEV and BEV

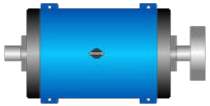
GEELONG SUSTAINABILITY

ICE
Internal Combustion Engine

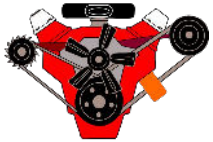


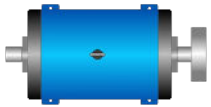
Hybrid
Petrol/Electric

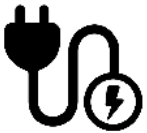




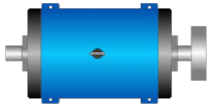
PHEV
Plug in Hybrid/Electric Vehicle

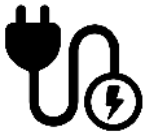






BEV
Battery Electric Vehicle





Home EV Charging (AC Charging)

A regular powerpoint can add around 10 km of range per hour

A single-phase hard-wired EV charger can add ~ 45 km of range per hour

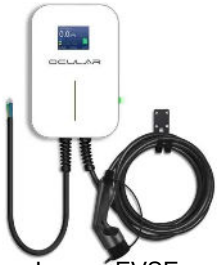


Image: EVSE

Image: Zappi

A three-phase hard-wired EV charger can add ~ 70 km of range per hour (but some can charge at ~140 km per hour).

Source: Solar Quotes

Fast Charging (DC Charging)

Image: Tritium

Image: Tesla

Charger Plug Types

CHAdeMO
25-100 kW DC

This plug type is popular in Japan where the Nissan Leaf and Mitsubishi Outlander PHEV use it. Very few new cars sold in North America or Europe use it.

CCS
50-350 kW DC

CCS plugs are ‘combo’ plugs with the top portion being a Type 2 plug AC plug, and the bottom portion having two ‘DC’ connectors to enable rapid charging.

Tesla Type 2
120-250 kW DC

This unique plug looks the same as a Type 2 connector but uses two of the five pins for DC charging. Teslas charge at Type 2 charging stations, but other brands cannot use a Tesla Supercharger

Type 2
43 kW AC

This plug is sometimes also referred to as Mennekes and is now the standard option for most electric vehicles in Australia

Source: Zapmap UK

EV Driving Range Estimates

Most EV's sold in Australia now quote the range under the WLTP (World harmonised Light vehicle Testing Procedure) cycle.

Note :

- Some US cars online use the US EPA standard
- Previously the NEDC standard has also been used

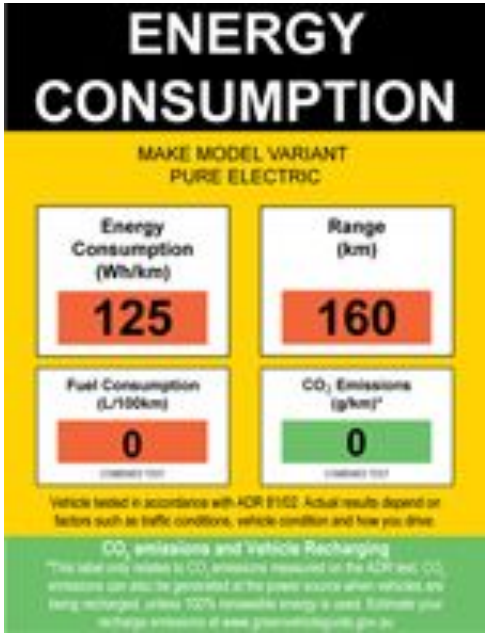
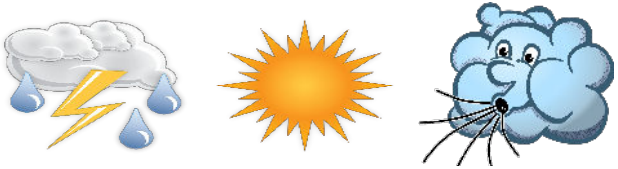


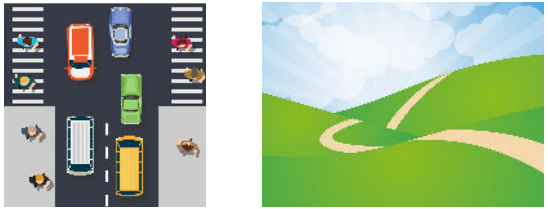
Image: Australian Govt Dept of Infrastructure

Factors Which Can Affect EV Driving Range

Your right foot…..



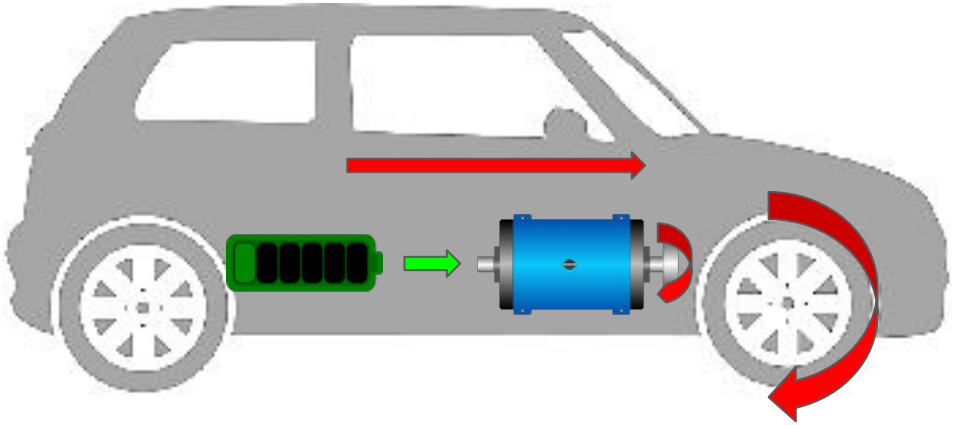
The weather…..



Where you drive…..

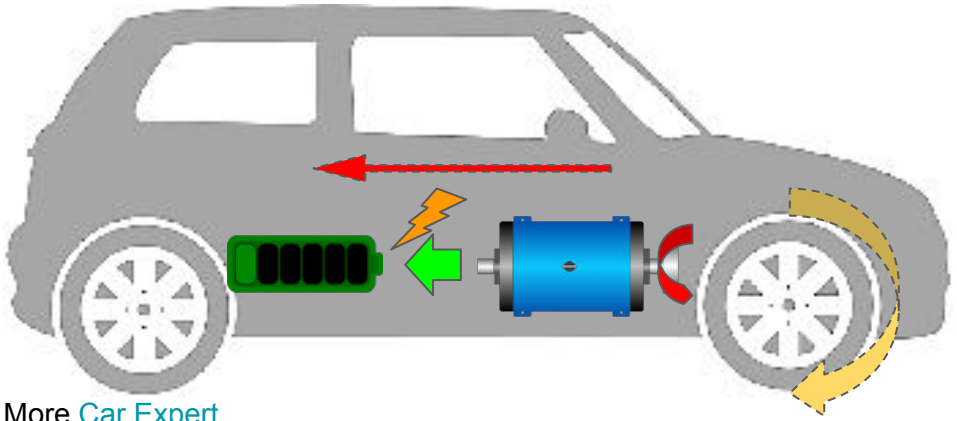
The level of battery charge…..

Regenerative Braking Helps Out Around Town



Depressing the accelerator pedal sends electricity to the motor, which transforms it into kinetic energy that turns the wheels.

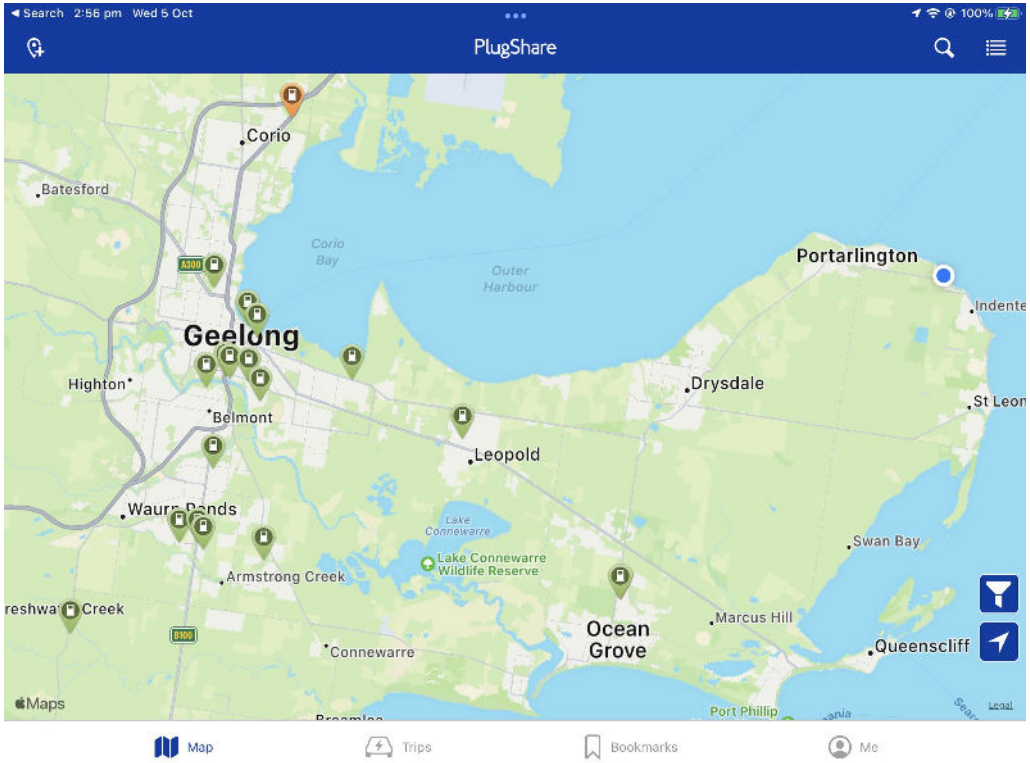
Releasing the accelerator causes the motor to switch direction and act as a generator which recharges the battery.



Read More Car Expert

Public Chargers, (aka there's an app for that)

PlugShare



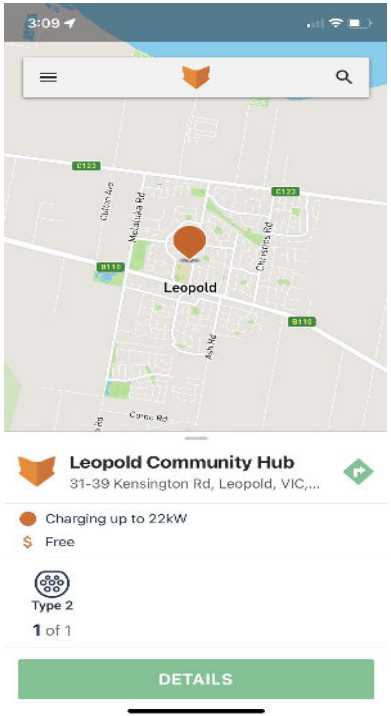
PlugShare is a free EV driver's app for iOS, Android, and web, allowing users to find charging stations, leave reviews, and connect with other plug-in vehicle owners.

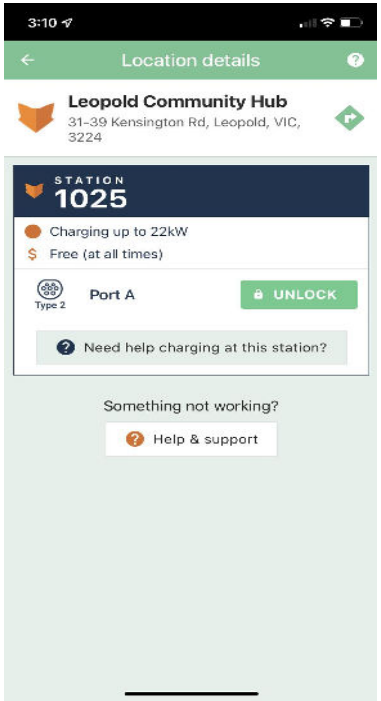
- Get turn-by-turn navigation straight to the stations you're looking for.
- Set up filters that let you see only the stations appropriate to your needs..
- Check ahead to see if the station you want is open for use (where available).

Source: Plugshare

Charger Specific Apps

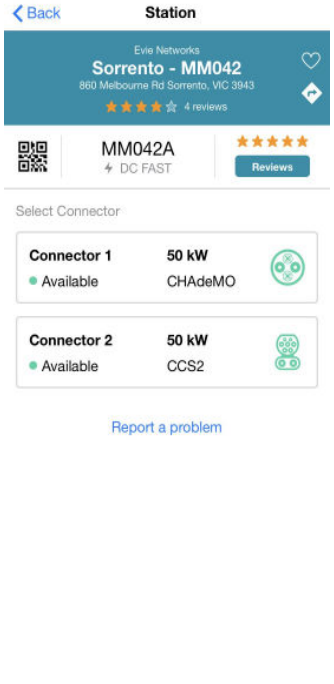
Chargefox





[Chargefox](#) is the predominant charging provider around Geelong. It has recently been acquired by Australian Motoring Services including RACV.

Evie

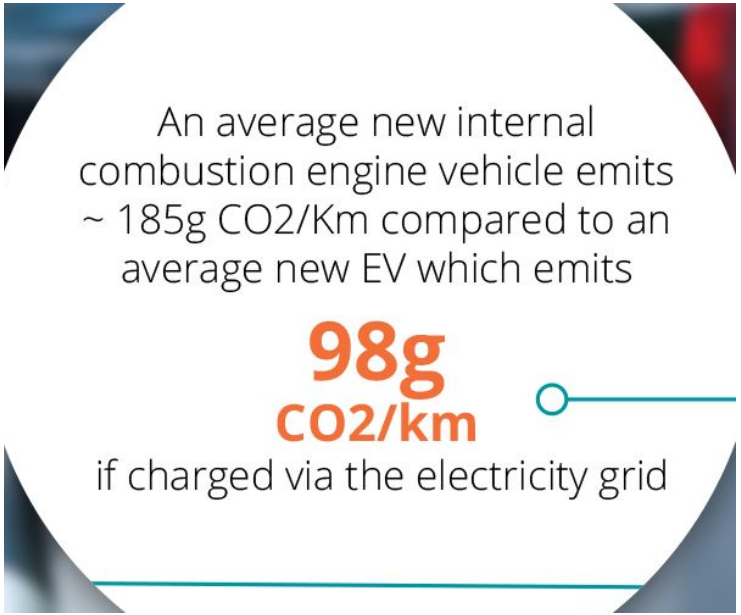


[Evie](#) is an Australian company with big ambitions. It is the predominant charging provider in Bendigo and some other Victorian centres.

EV Myth No. 1

Electric vehicles are ‘dirty’, producing as many carbon dioxide emissions as a petrol or diesel vehicle

BUSTED



Source NRMA

EV Myth No. 2

EV batteries don’t last, just look at phone batteries

Smartphone batteries do degrade over time, but they’re typically charged daily.
Most EV’s are charged a few times a month.
They also charge in a smarter fashion.

BUSTED

Source Forbes

EV Myth No. 3

The grid can't support all these EV's

If all the EV's in the world tried to charge at the same time then the grid might collapse BUT the chances of this happening is infinitesimally small.
In fact EV battery storage can support the grid.

BUSTED

Source Forbes

EV Myth No. 4

EV's can't tow

The instant torque of EVs should make perfect tow cars though the extra effort of towing can significanly reduce the range of an EV, (as it does with an ICE). Towing can also impact an EV's regenerative braking system.

BUSTED
(SORT OF)

- Hyundai Ioniq 5: 1,600kg
- Kia EV6: 1,600kg
- Polestar 2: 1,500kg
- Tesla Model 3: 1,000kg
- Volkswagen ID 4: 998kg

Source Car Wow UK

Source The Driven

EV Myth No. 5

EV's batteries can't be recycled

EV batteries have long lives and can be repurposed several times before finally being recycled. When recycled, around 95 – 98% of the materials can be extracted and reused.

BUSTED

Source Engineering.com

EV Pluses

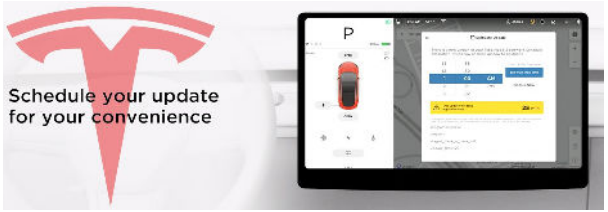
The Frunk

Source Electrek

V2L

Source InsideEVs

Software updates



Source Electrek

Annual Tesla Fuel Savings

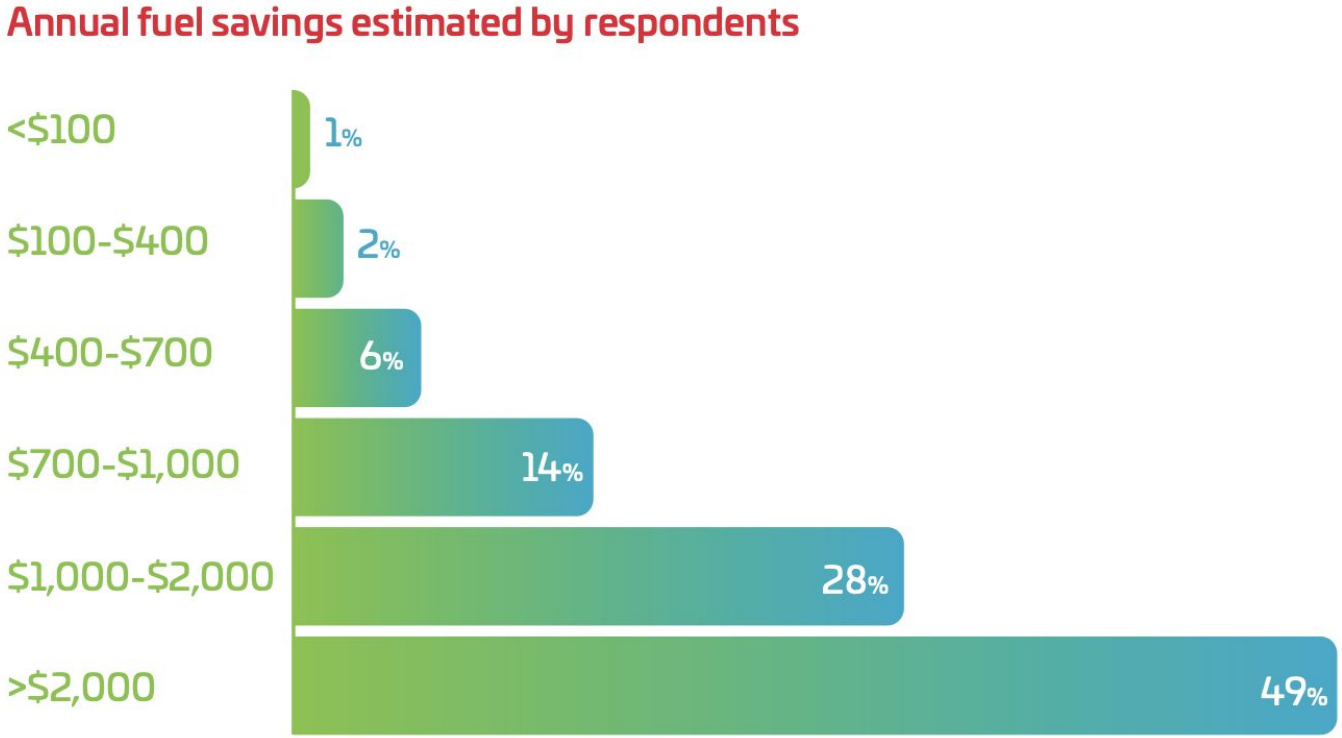


Figure 15
Respondents reported annual fuel savings

Source: Electric Vehicle Council

EV vs ICE Vehicles Cost of Running

GEELONG SUSTAINABILITY

KM/YR travelled	MG ZS EV	Mazda CX-5	Annual difference in running cost	Difference over life of car
10,000	$253.00	$1374.00	$1121.00	$1790.00 (cheaper to buy Mazda)
12,000	$303.60	$1648.80	$1345.20	$452.00 (cheaper to buy MG)
14,000	$354.20	$1923.60	$1569.40	-$2,694.00
16,000	$404.80	$2198.40	$1793.60	-$4936.00
20,000	$506.00	$2748.00	$2242.00	-$9420.00

Source: Herald Sun

EVs can also save owners about $400 a year on maintenance

Vehicle Emission Standards

(aka why EV's are so hard to buy in Australia)

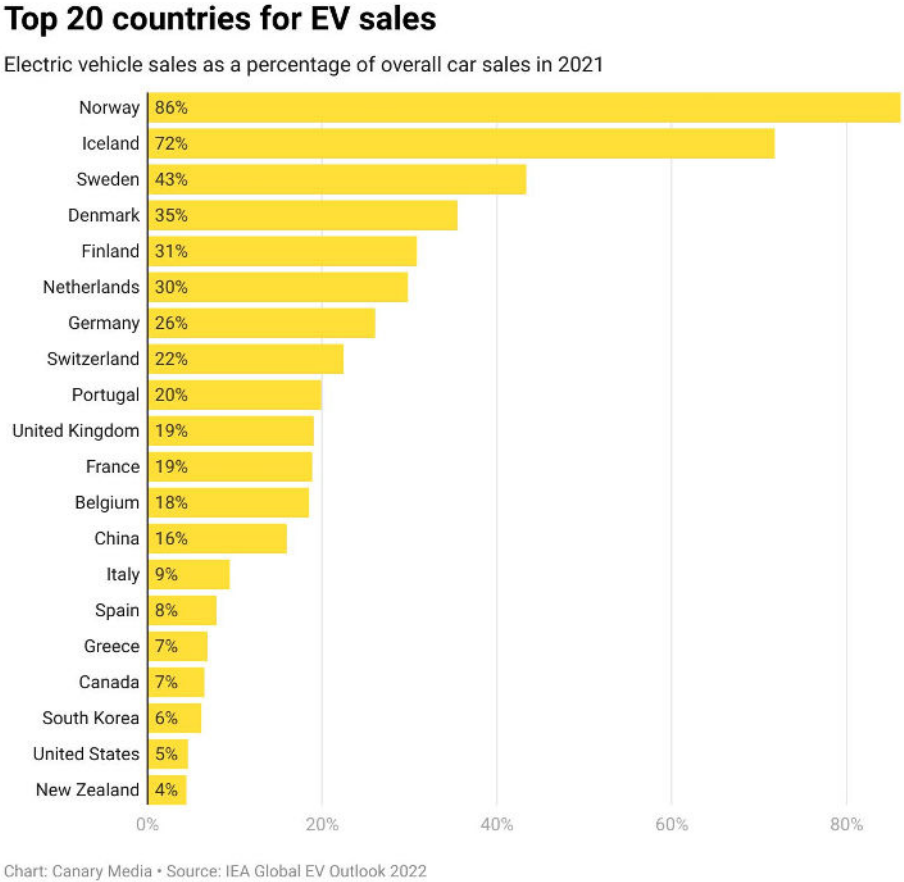
- 18% of Australia's Co2 emissions come from transport and cars are the largest contributor. National Transport Commission
- 80% of the global car market have fuel emission standards. Australia, Russia, Indonesia and Turkey are the only industrial nations that don't. Climate Council
- The Australian Light Vehicles Report 2021 shows Australia falling further behind other countries. In Australia last year, 45 per cent had an emissions intensity of 160 g/km or less, compared with 90 per cent of all new cars sold in Europe. National Transport Commission
- Fuel efficiency standards provide a maximum average level of carbon emissions across a manufacturer's overall car sales. They provide incentives for car makers to supply low and zero emissions vehicles to a country – and penalise them for failing to do so. Climate Council

Availability Of EV's In Australia

• Audi e-tron	• Hyundai Ioniq 5	• Porsche Taycan
• Audi e-tron GT	• Hyundai Kona	• Mercedes-Benz EQC
• BMW i4	• Jaguar I-Pace	• Mercedes-Benz EQS
• BMW i7	• Kia EV6	• Mini Cooper SE
• BMW iX	• Kia Niro	• Nissan Leaf
• BMW iX3	• Lexus UX300e	• Polestar 2
• BYD Atto 3	• Mazda MX-30	• Tesla Model 3
• Genesis GV60	• MG ZS EV	• Tesla Model Y
• Genesis Electrified G80	• Mercedes-Benz EQA	• Volvo C40
• Hyundai Ioniq	• Mercedes-Benz EQB	• Volvo XC40 Recharge

This list from Car Expert shows all EV's currently available in Australia. The same page has a list of the 35 EVs slated to arrive before the end of 2023. Each vehicle name links to a short blurb on that vehicle.

The Rest of the World



- The European Parliament has voted to set a 2035 deadline for zero-emissions cars and vans
- The United Kingdom will ban the sale of new petrol and diesel cars and vans from 2030
- Singapore won't allow new diesel-powered car and taxi registrations from 2025
- In Canada, all new light-duty cars and passenger trucks must be zero-emission by 2035.

Source: SBS News

Hydrogen??

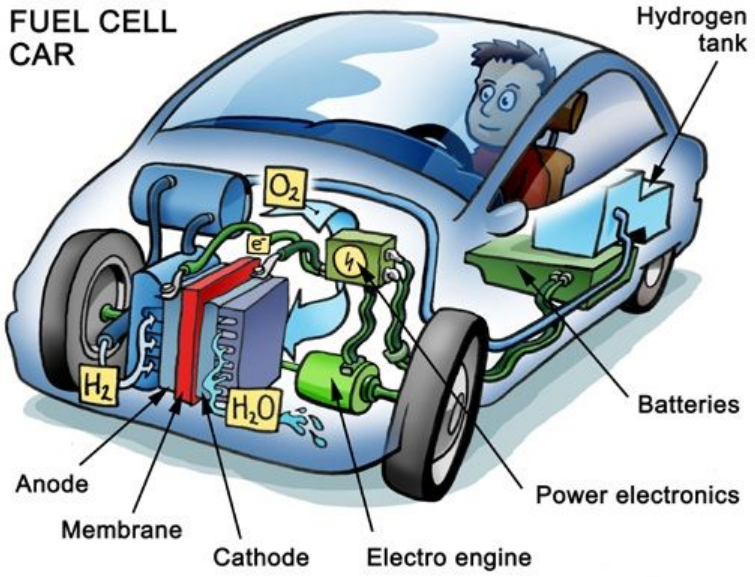


Image:Wikipedia

Hydrogen Fuel Cell vehicles have some advantages over EV's:

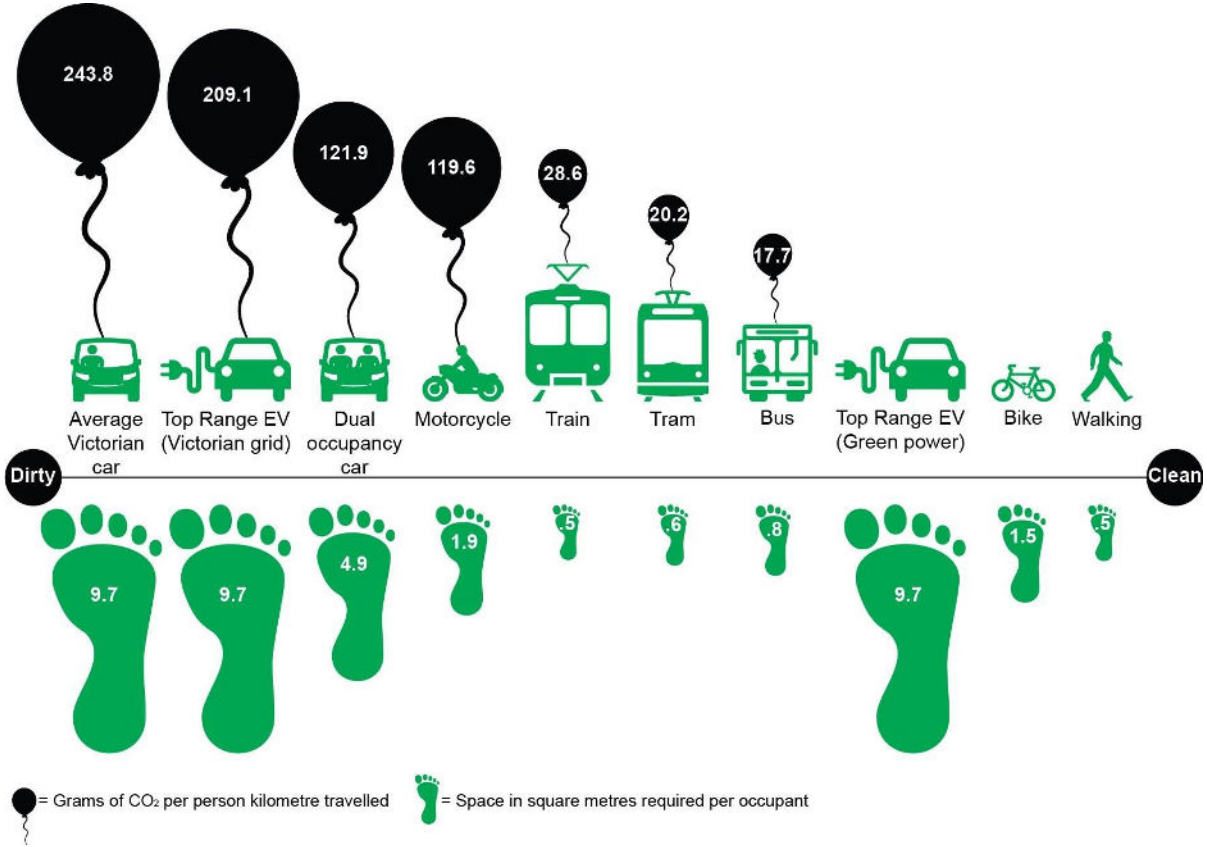
- Fuel cell vehicles weigh less
- Refueling of fuel cells is quicker
- Fuel cells have a longer range, (though this is changing)

The disadvantages are large though:

- Hydrogen development is behind EV's
- The infrastructure is not here yet
- Fuel cells need to run on true green hydrogen to be 'clean' technology

Read More at Reuters

Transport Carbon Emissions and More



Source: [Institute for Sensible Transport]

The GS Notes

tinyurl.com/GS-EV-Notes