

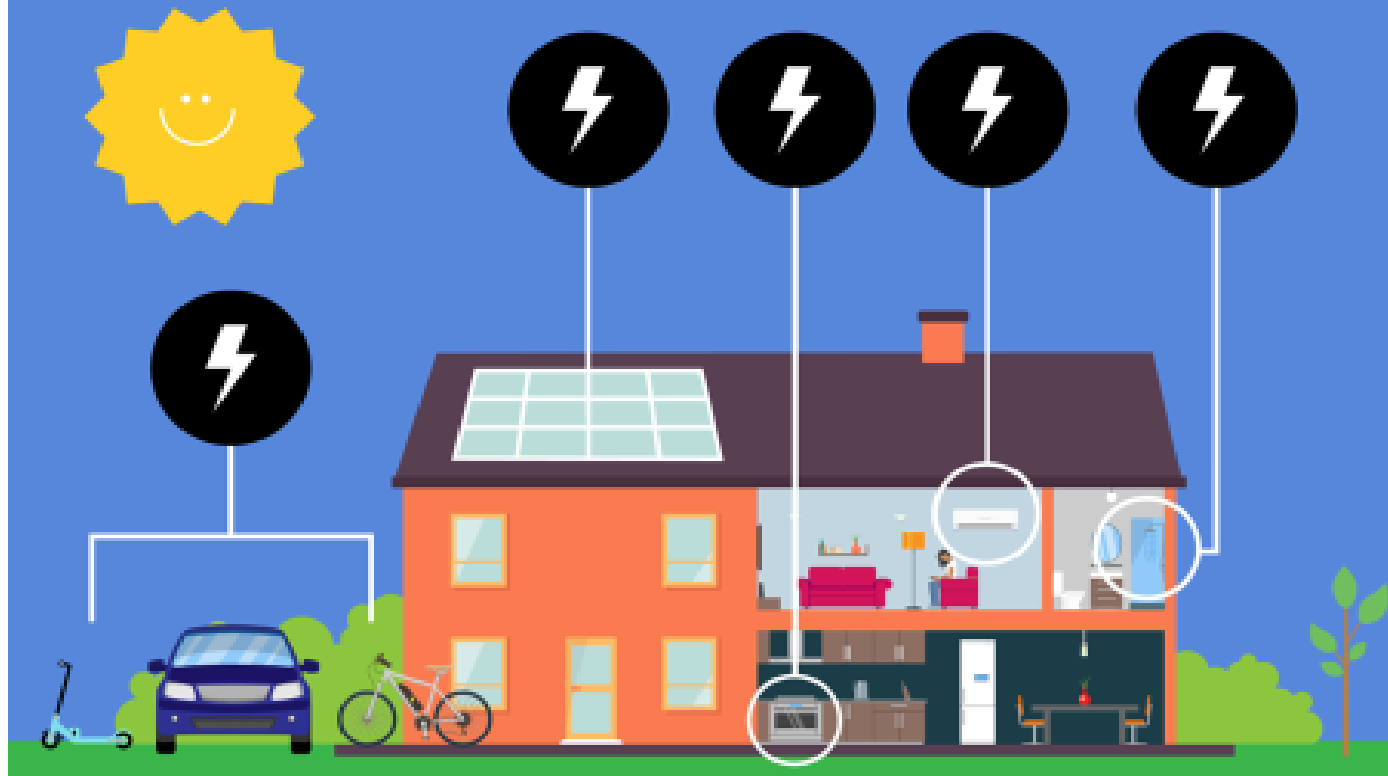
**Repower  
Shoalhaven  
presents...**

# ***Electrify Everything***

Source: Much of the material in this presentation was produced by Saul Griffiths from Rewiring Australia.

See also  
<https://www.rewiringaustralia.org/#Why-Electrify>

**The future  
is here.  
Electrify  
everything!**



# Why Electrify Everything (EE)?

- “...keeping warming to 1.5 (now 2?) degrees C ...requires deep, rapid and sustainable greenhouse gas emissions reductions in all sectors” (IPCC Press Release 2023, emphasis ours).
- Luckily...
- “As we move to renewable energy and rooftop solar, there has never been a better time to transition our households and appliances away from gas and fossil fuels and use the free, clean energy that our homes can generate” Saul Griffiths, *The Big Switch*.





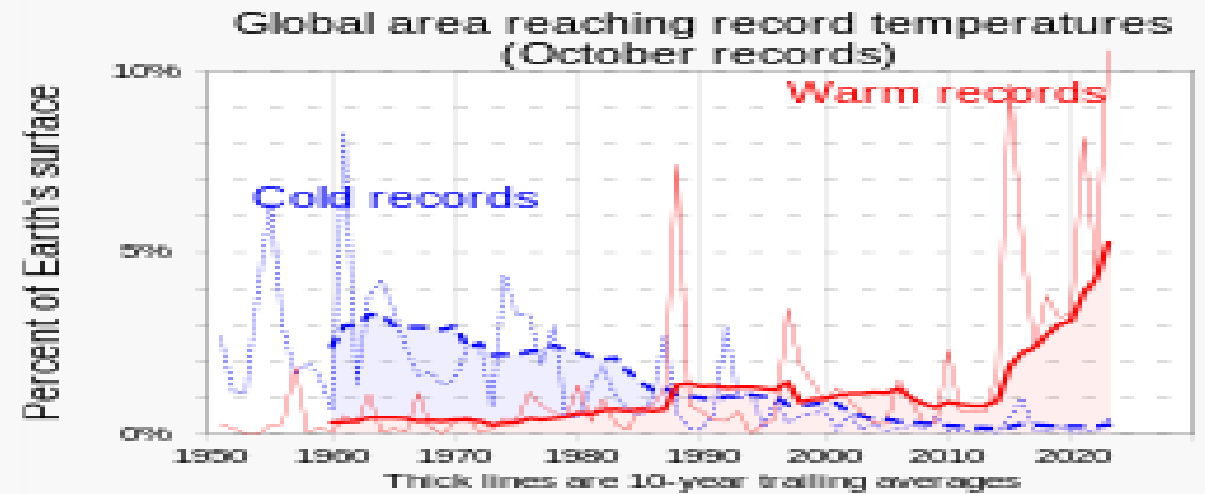
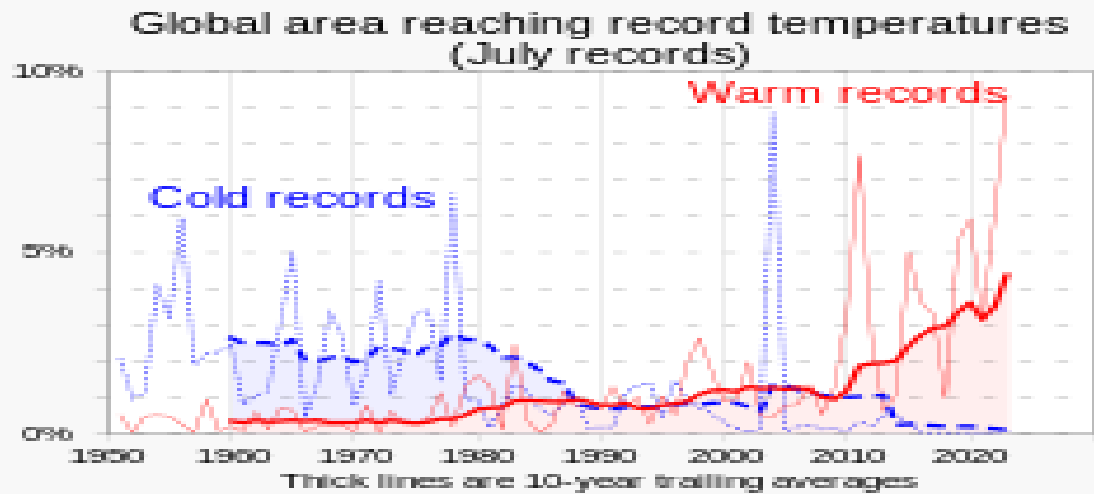
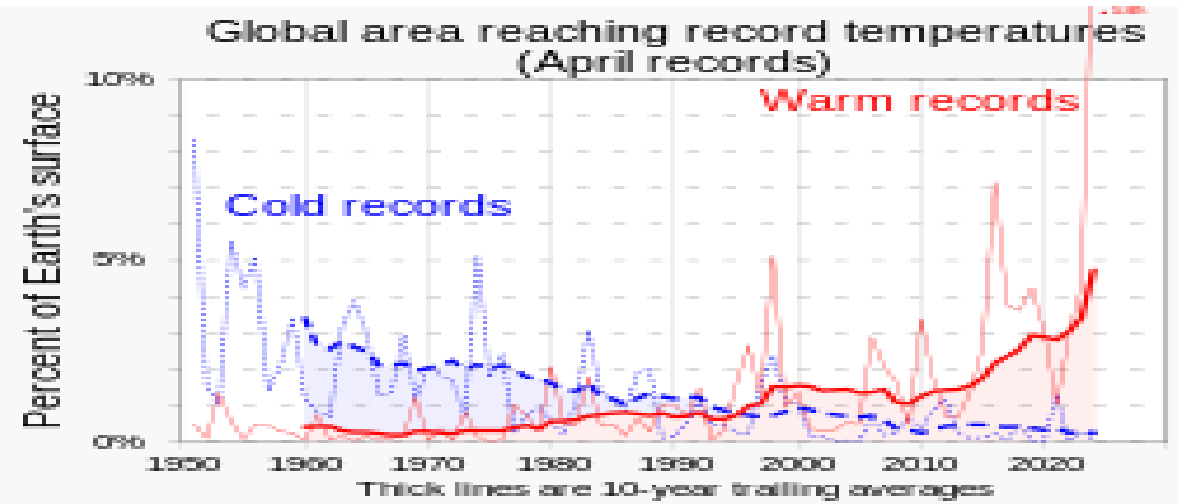
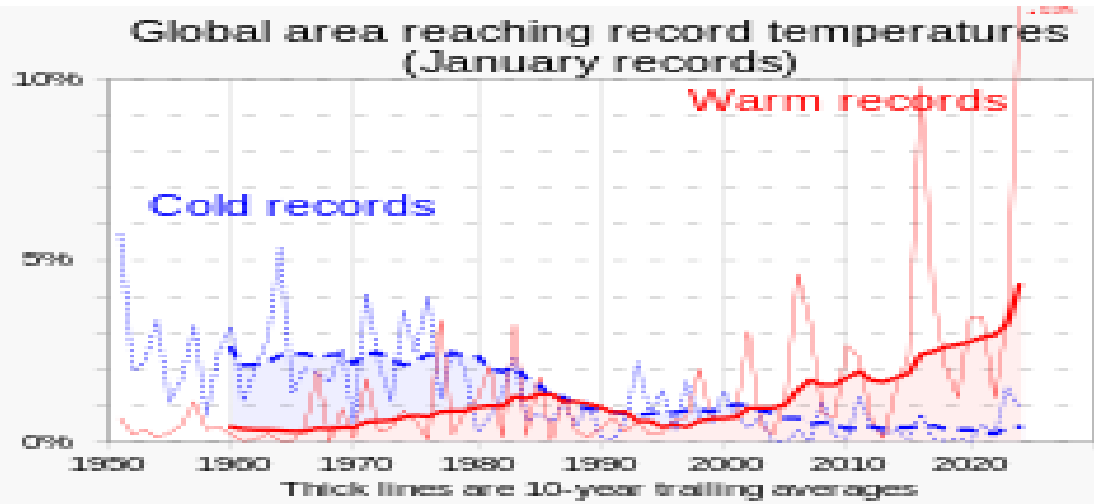




# Lismore (Composite: Jason O'Brien/Google Maps/AAP)



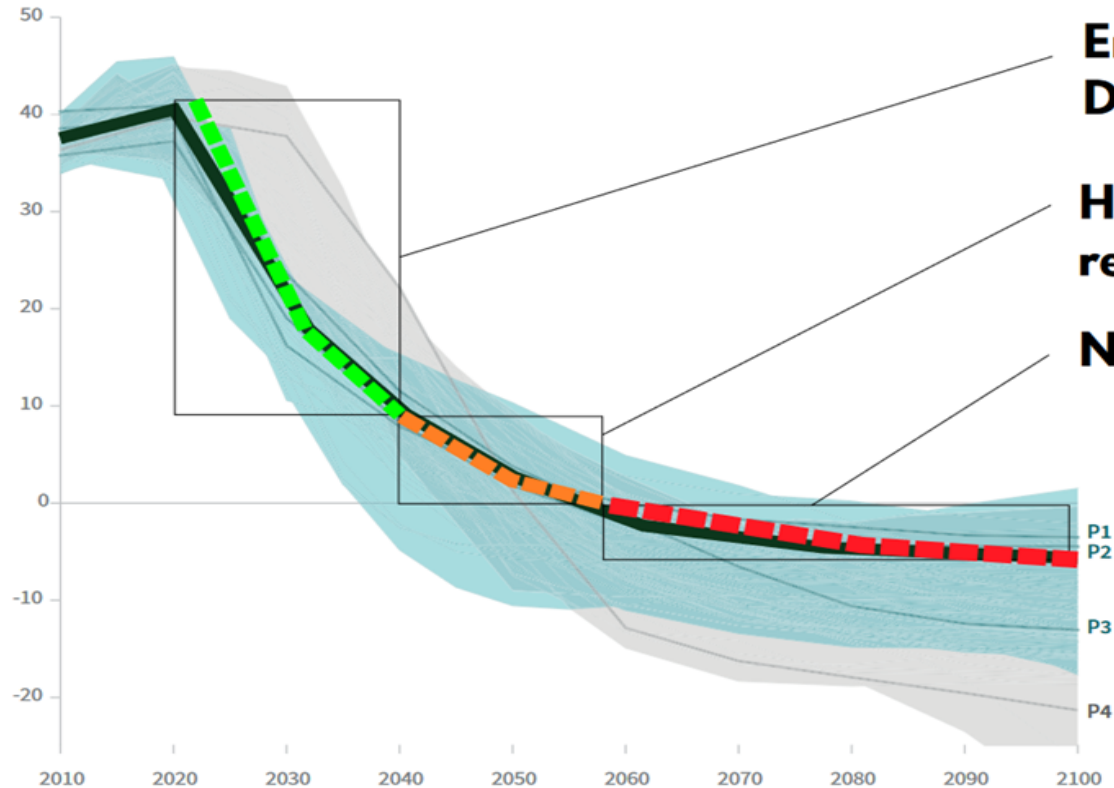
In last two decades, new high temperature records have substantially outpaced new low temperature records on a growing portion of Earth's surface.



# WE FOCUS ON HOW HOUSEHOLDS CAN EE NOW.

## Global total net CO<sub>2</sub> emissions

Billion tonnes of CO<sub>2</sub>/yr



**End-use ELECTRIFICATION**  
Deploy renewables - wind, solar, hydro

**Harder - air travel, beef, agriculture, refrigerants, steel, aluminium, cement**

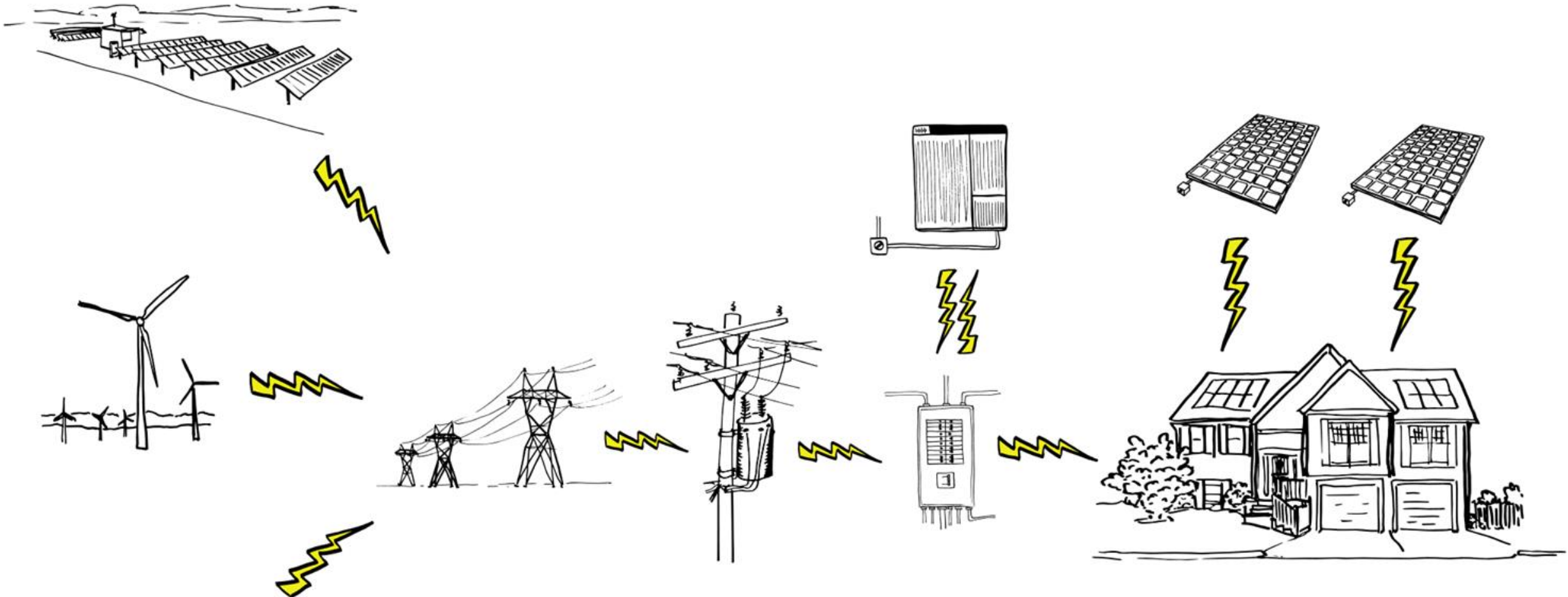
**Negative emissions technology at scale.**

P1

P2

P3

P4



**Supply clean electricity**



# Rooftop Solar Installations Shoalhaven City



## Shoalhaven (C) PV Installations

Last update: 2023-06-30

Figures are estimated based on available data.

See footnotes for details of data sources, terminology and analysis.

### Total solar installations

# 19,489

Residential installations: 17,609

Commercial installations: 1,874

Power stations: 6

Number of houses in LGA: 57,154

Installed residential capacity: 82,459 kW

Total installed capacity: 118,959 kW

Average annual kWh generated per kW installed: 1,310 kWh/kW

### LGA residential PV density benchmarking (Proportion of houses with PV)

<b>Shoalhaven (C)</b>	<b>~30.8%</b>
New South Wales	~30.6%
Eurobodalla (A)	~32.1%
Wingecarribee (A)	~31.7%
Wollongong (C)	~28.0%

### Estimated annual savings



For all households with solar PV:

# ~\$16,947,000

For a typical new solar PV system (7 kW), conservatively:

# ~\$1,200

### Annual CO<sub>2</sub> offset

All solar installations:

# 115,000 tonnes

Residential: 80,000 tonnes

Commercial: 30,200 tonnes

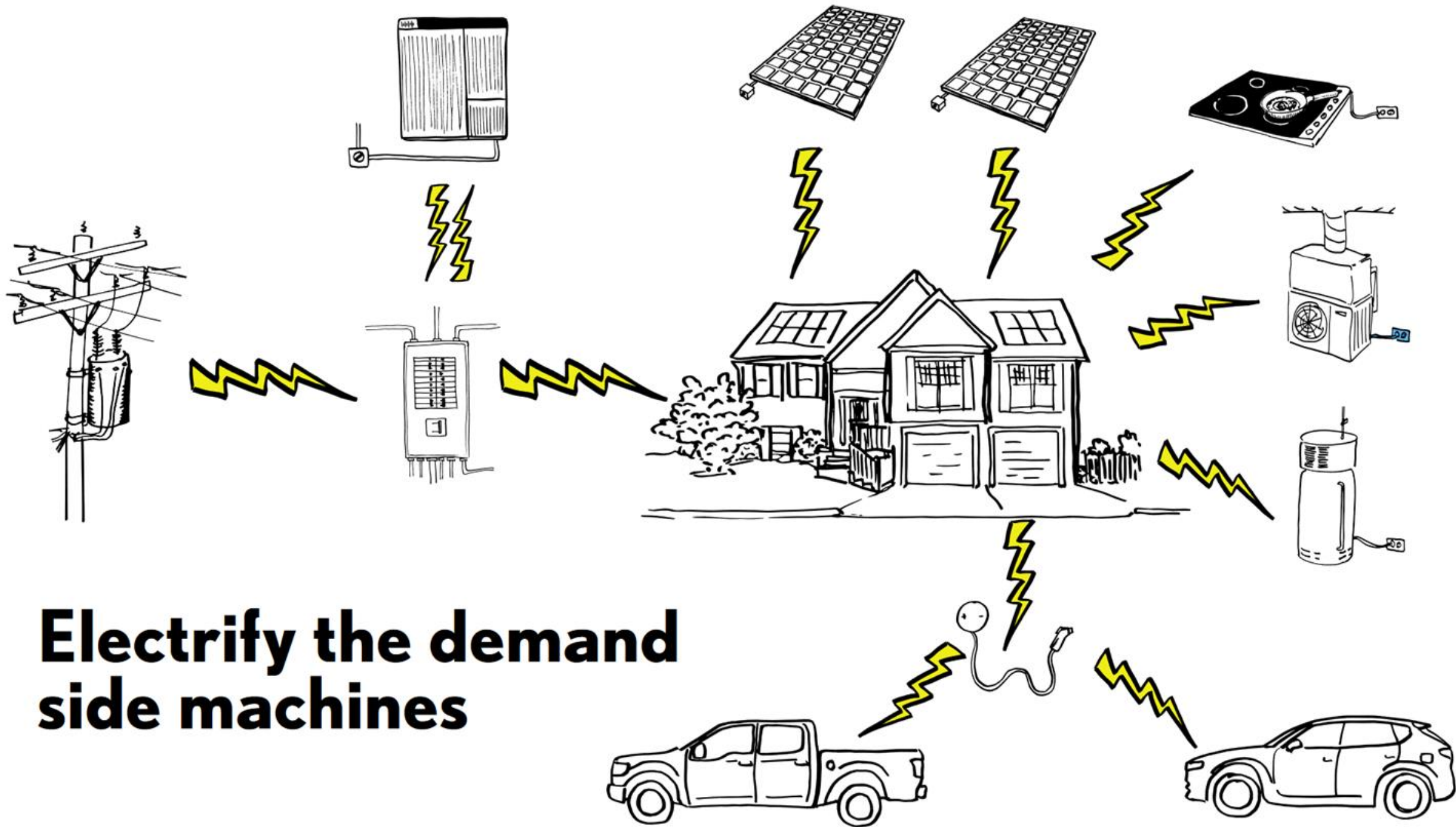
Power stations: 5,190 tonnes

Based on estimated annual output of 155,984 MWh and 0.74 tonnes of CO<sub>2</sub> produced by the energy network per MWh.

Equivalent to over 35,000 cars taken off the road per year [based on these calculations](#)

**RS latest supply project: Shoalhaven solar farm: BTU Road Nowra Hill. 3 MwAC (8000 panels).**



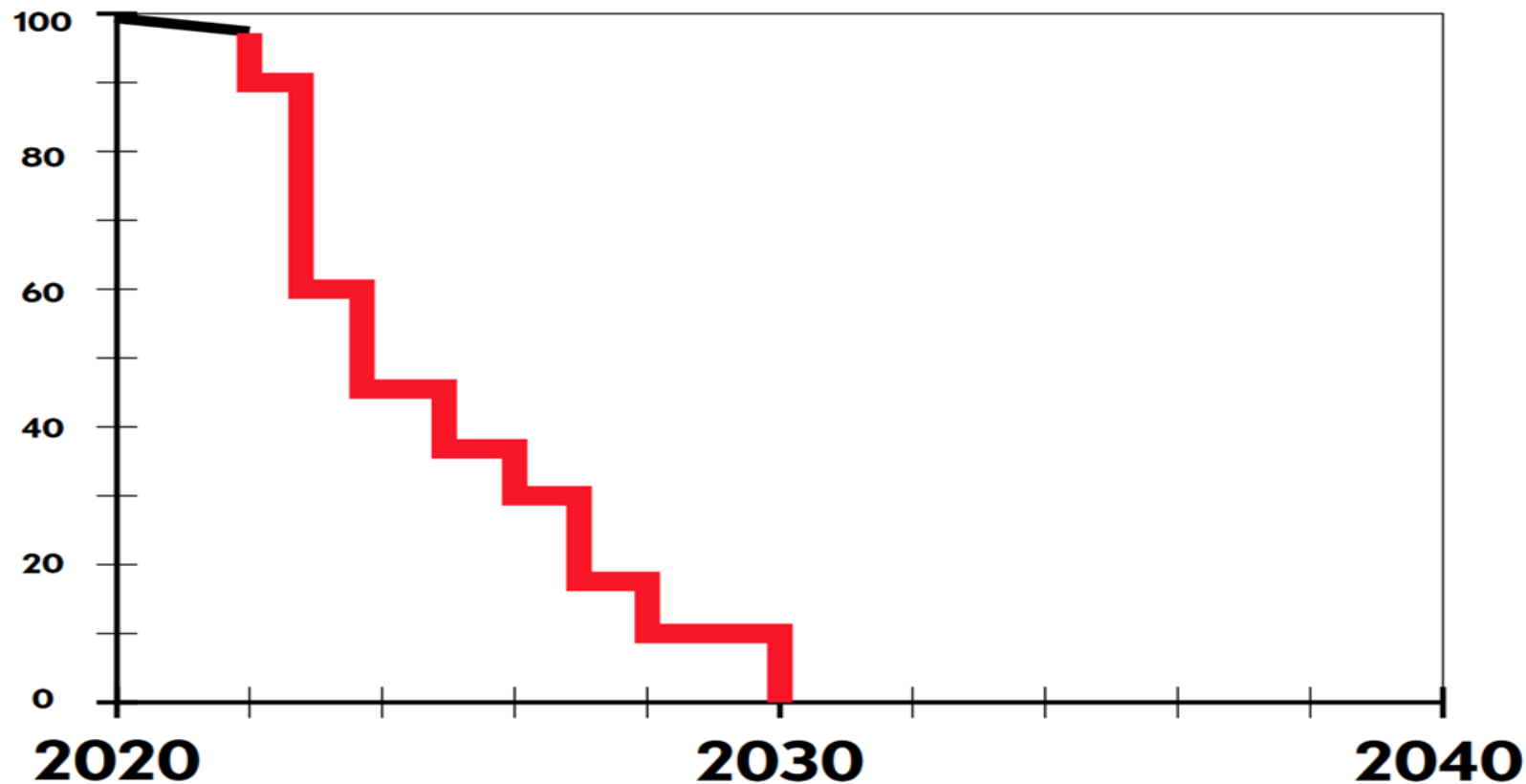


**Electrify the demand  
side machines**



# A TIMELINE FOR YOUR HOUSEHOLD TO EE BY 2030? (see <https://energytips.org.au/>, produced in Victoria but advice is also relevant to NSW)

## YOUR HOUSEHOLD CO<sub>2</sub> ZERO PLAN

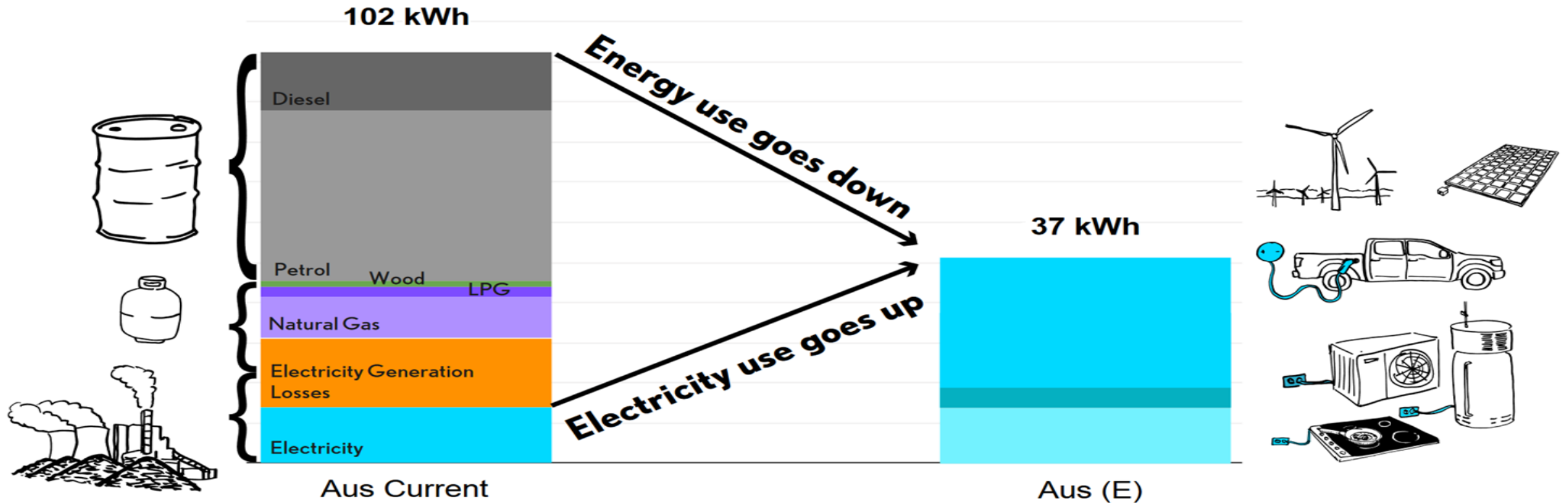


<b>E-bike</b>	<b>2022</b>
<b>Car 1</b>	<b>2023</b>
<b>Main Panel</b>	<b>2023</b>
<b>Rooftop Solar</b>	<b>2024</b>
<b>Green Electricity</b>	<b>2025</b>
<b>Water Heater</b>	<b>2026</b>
<b>Electric Cooking</b>	<b>2027</b>
<b>House Battery</b>	<b>2027</b>
<b>Car 2</b>	<b>2028</b>
<b>Space Heater</b>	<b>2030</b>

EE will lower energy use (near zero wasted energy) for the same level of comfort.

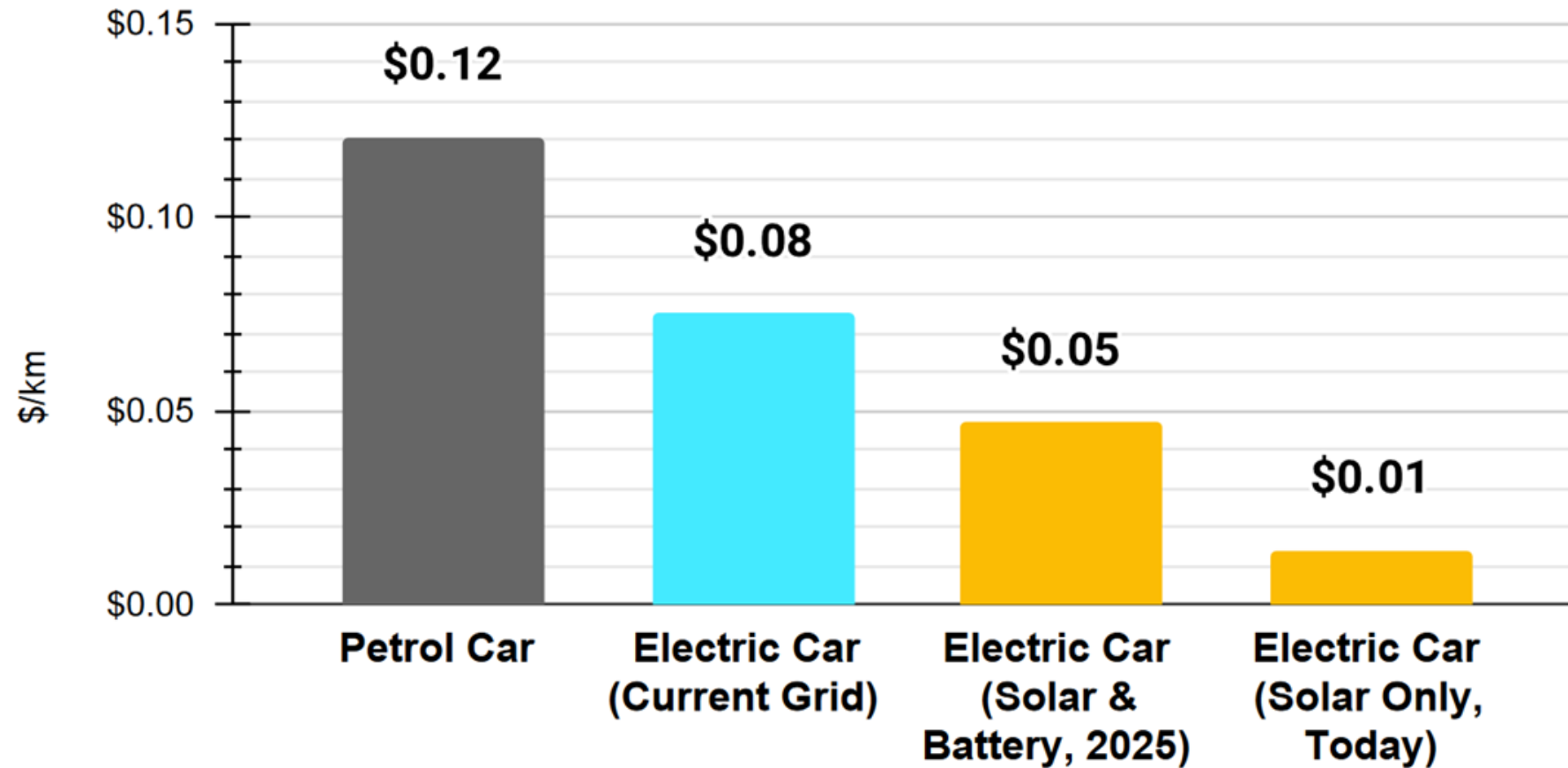
Additionally, **SAVE, LOCALISE** and **MAKE** money! How?

**Electrifying the Australian household leads to enormous efficiency wins.**



# Everyday Savings : Electric cars

AUS driving cost per km - petrol car versus electric car - mid-size





# Localise money?

- According to Saul Griffiths, the average household in postcode 2515 (around Thirroul) spends \$5000/annum on energy (fuel, gas, electricity), **70% of which goes offshore.**
- “Our community could easily generate one-third, one-half or, very ambitiously, two-thirds of all the energy it needs. We could be using our own sunshine to power our vehicles.... to power our water heaters, space heaters and cooktops. We could be keeping the majority of the \$20m a year that currently leaves the community (2515) and spending a lot of it locally instead.
- Win-win-win (household, community, environment).

## • Make money?

- Energy efficient homes attract higher asset values and lower operating costs. Research (Geelong Sustainability) shows energy efficient homes attracting a potential increase in sale price of about \$40,000 to \$70,000.

# Helping you get started...

- Big picture for NSW

<https://www.energy.nsw.gov.au/nsw-plans-and-progress/major-state-projects/shift-renewables/renewable-energy-nsw>

- Solar for Households:

<https://www.energy.nsw.gov.au/households/ways-get-started-households>

- EV charging for Strata:

<https://www.energy.nsw.gov.au/business-and-industry/programs-grants-and-schemes/electric-vehicles/electric-vehicle-ready/strata>

- Household battery boost (see more below)

<https://www.nsw.gov.au/media-releases/incentives-to-boost-rollout-of-household-batteries-nsw>

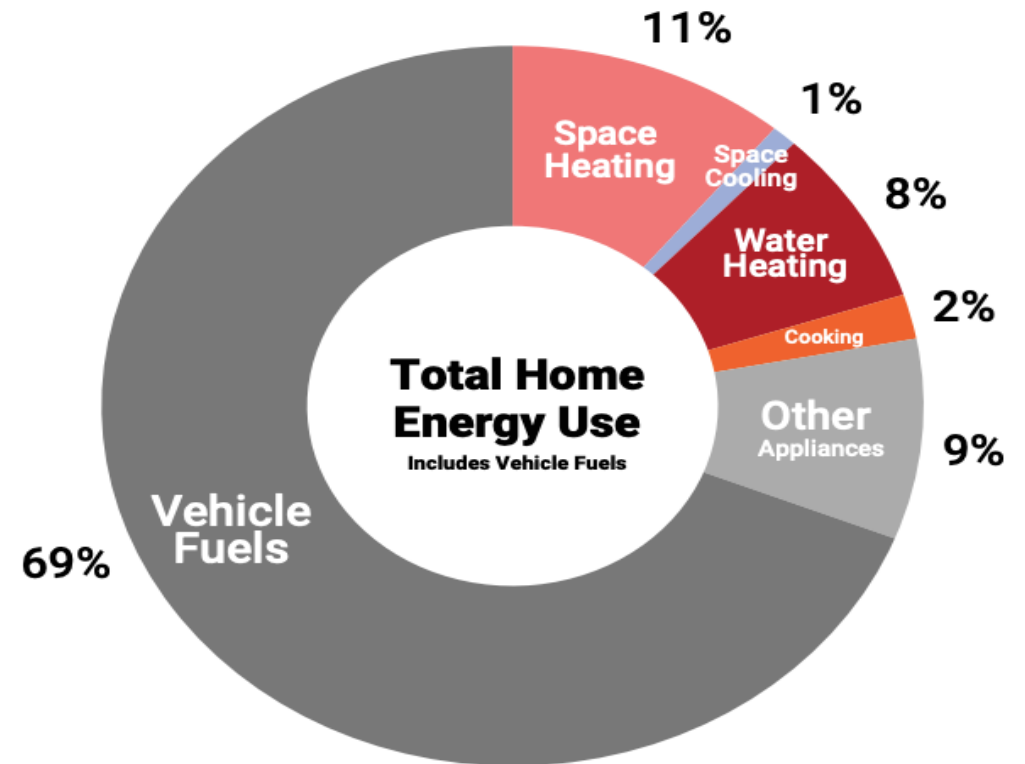
# Helping you get started continued...

- Buy 100% Green power from renewable energy retailers e.g. Energy Locals, Diamond Energy, Red Energy, Indigo Power, and others.
- <https://maketheswitch.org.au/> for information on switching to electricity (website produced in ACT but much is applicable to NSW).
- My Efficient Electric Home (MEEH): Facebook group dedicated to improving the energy performance of Australian homes.
- See <https://www.repower.net.au/> for additional information.

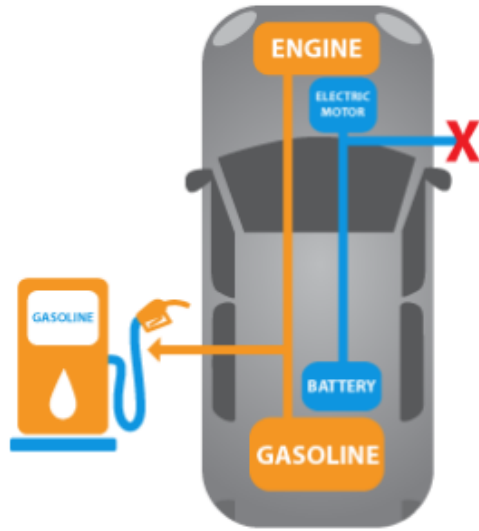


# The single most impactful change most of us can make is to replace a fossil fuel car with an EV.

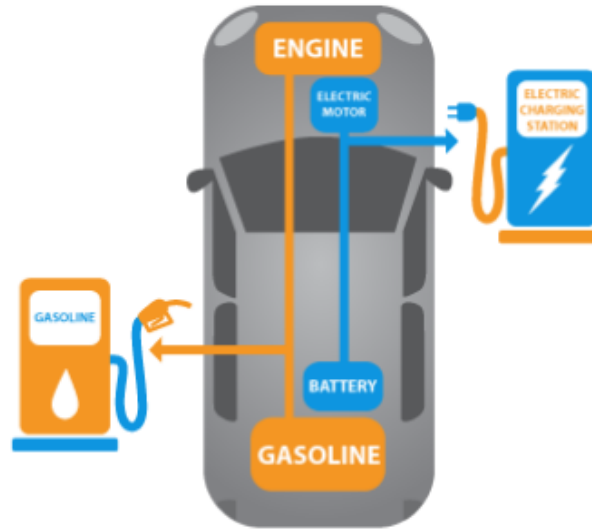
- For a discussion of EV's, see <https://evcentral.com.au/electric-car-advice-and-faq/>.
- Check out RS Facebook page and future EV expos around the Shoalhaven region.
- There are three common types of EV's: hybrid EV (HEV), plug-in hybrid EV (PHEV), battery EV (BEV): what is the difference?



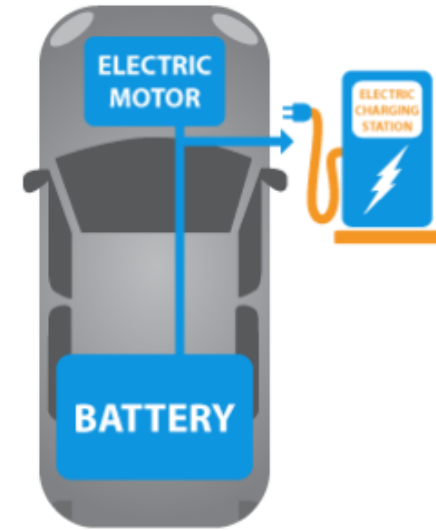
# The Main Types of EV's



**HEV**  
(Hybrid Electric Vehicle)



**PHEV**  
(Plug-In Hybrid Electric Vehicle)



**BEV**  
(Battery Electric Vehicle)

# Frequently asked EV questions.

## • 1. Can I charge at home and how long will it take?

- **Yes**, this is the most common and cost effective way. Most EV's come with a 10 amp charger. A 40kwh EV will take 18 hours to charge from empty to full. Electricity used for the average daily trip (40 kms) will take about four hours to replace.

## 2. How far can an EV travel on a single charge?

- Early model EV's about 150kms. Current models about 400-600 kms, depending on model and city/highway (city driving is more efficient due to regenerative braking).

## 3. Can I tow with an EV?

- **Yes**. Some current models can tow up to 1600kg. EV's with more towing capacity are available in USA and may soon become available locally.

#### 4. How much does it cost to charge an EV?

- If charging at home from solar, you forgo the FIT (assume 6c per kwh), so about 1 cent per km (assuming 6 km per kwh). If charging at a fast charger, about 10 cents per km.

#### 5. How quickly does the battery degrade? (see slide below)

- Newer cars are looking at 1% degradation per year, if charged properly. So the battery will outlast the car. Range also reduces in winter. Regardless, the battery and car warranties in EVs are aligned or even longer than non-EVs, with several guaranteeing state of charge levels (SoC).

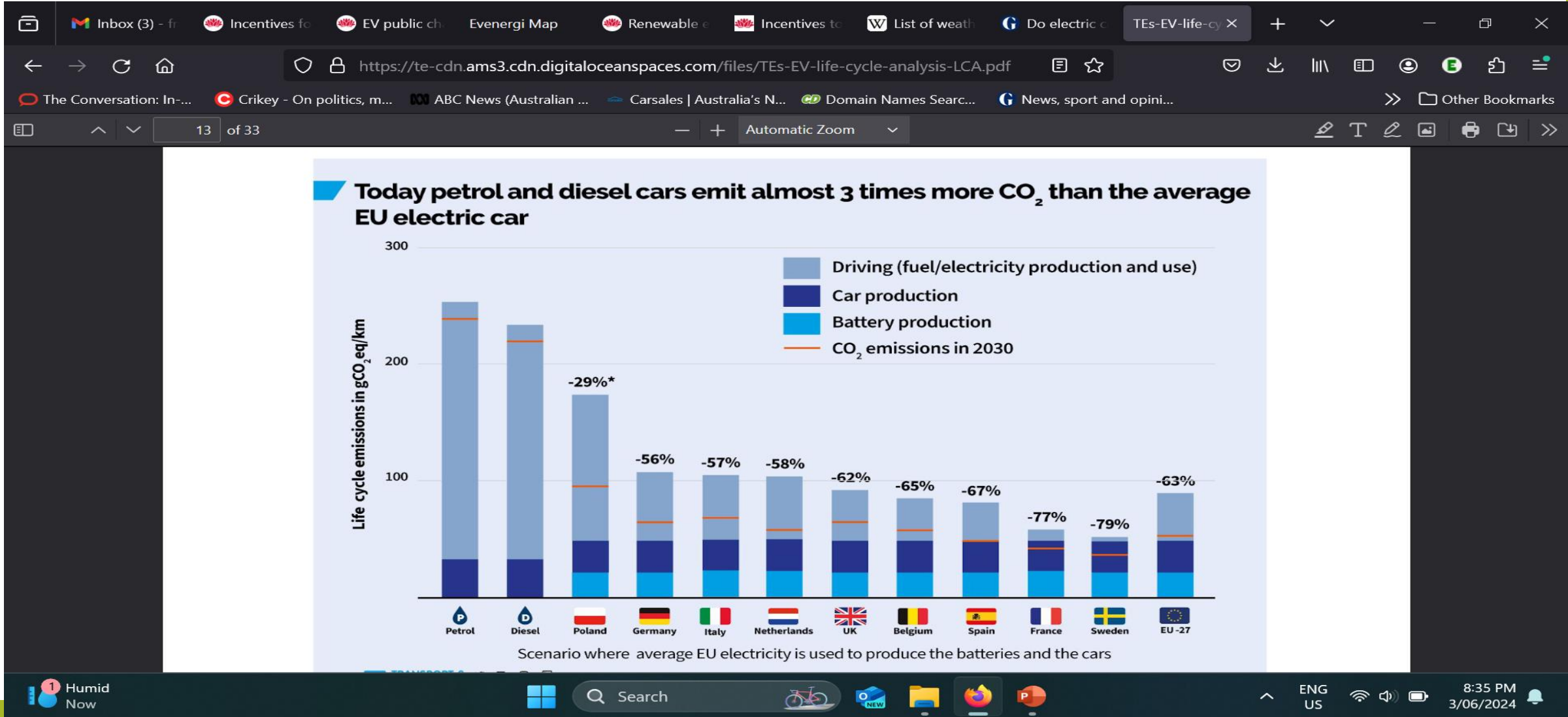
#### 6. What happens to EV batteries (and solar panels) at end of life?

- There are a few battery (and solar panel) recyclers in Australia, and the number will increase as early systems are replaced and EV's become more popular. There is also the potential for a second life for EV batteries as storage (home) batteries.



# 7. Are EV's really better for the environment? YES!

Source: Transport and Environment. Carbon intensity of electricity grids based on ENTSO 2022 forecast of energy mix and emissions factors for different sources derived from the 2021 UNECE report.



- EV battery production produces lots of emissions. However with zero emissions on-road, they become net CO<sub>2</sub> negative after approx. 20-30,000km depending on your vehicle and how you charge. Polestar are working on a carbon neutral car by 2030. Tesla are reducing their use of cobalt. Most manufacturers are moving as quickly as they can to reduce embedded emissions.

## **8. Will charging an EV at home lead to a fire?**

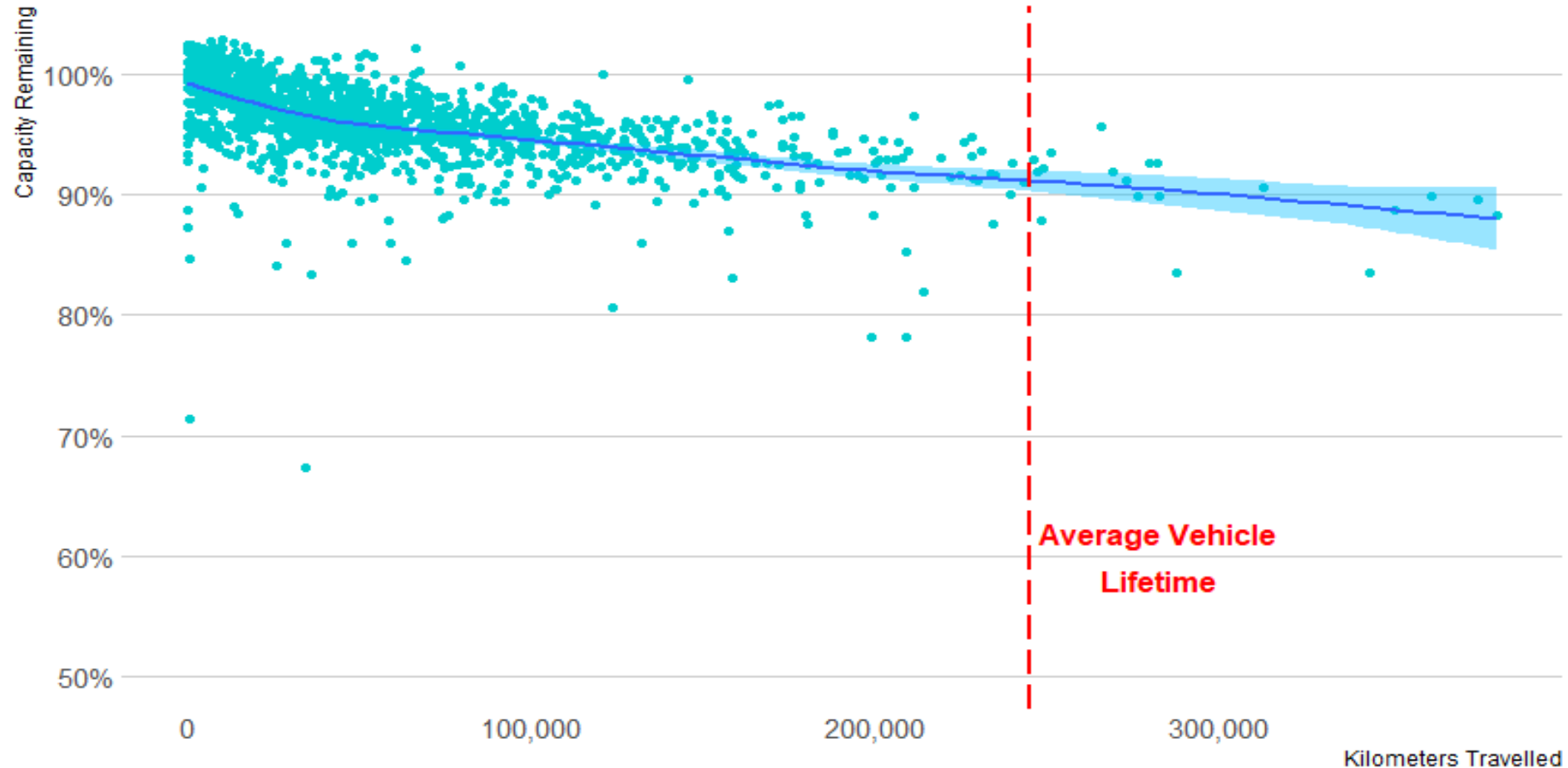
- Very unlikely. Fires from petrol/diesel cars and EV's are rare. "Our latest research indicates that the risk of a fire for all types of EV remains less likely than for ICE vehicles...but the usable data only goes back five years and even now the number of EVs on the roads still represents a very small sample size."
- **9: Are there sufficient fast chargers for EV road trips? (see below)**
- Charging infrastructure is not great but getting better quickly.

## Disadvantages of an EV?

- Up front EV cost is higher than for comparable fossil fueled vehicles, however these EV costs are currently falling fast.
- Rapid technological change: today's EV may soon seem 'obsolete'.
- Not all residences are suited to home charging, e.g. apartment blocks. But see earlier reference to NSW Govt Strata Plan.
- For long trips, charging infrastructure is still somewhat rudimentary.

# Battery life

## Battery Degradation In Tesla Electric Vehicles





# EV's and Public charging Infrastructure



- Lots happening within the four Illawarra/Shoalhaven Councils and NSW Net Zero Transport team.
- Check out <https://nswmaps.evenergi.com/>
- 1033 new fast charging bays planned for NSW over next 7 years: 119 in our broader region: BBay (6 bays >250Kw), Cooma (4>175), Dapto (4>175), Figtree (6>250), Goulburn (6>175), Gundagai (12>250), Jindabyne (6>250), Kiama (10>350), Marulan (15>250), Mittagong (8>150), Moss Vale (4>175), Naroma (4>175), Nowra (4>150), Q'beyan (4>175), Ulladulla (4>175), UOW (6>180), W'wong (4>150), Yass (12>250).
- RS aims to support local community groups looking to secure suitable EV charging infrastructure by engaging with councils as site owners.
- RS will also conduct EV Expos to inform, educate and show a range of Ev's to public. We will work co-operatively with Illawarra and Eurobodalla organisations that seek to expand EV uptake.

# Residential batteries.

- NSW residential battery incentives will be available from 1 November 2024.
- \$1600 - \$2400 (depending on battery size) off battery installation cost for eligible homes/businesses with existing solar. \$250 - \$400 for connecting your battery to a Virtual Power Plant (VPP).
- <https://www.energy.nsw.gov.au/households/rebates-grants-and-schemes/household-energy-saving-upgrades/incentives-residential>
- May not make financial sense currently. In future, house may be powered by your EV (currently allowed in SA), OR neighbourhood battery.





# Neighbourhood Batteries.



- Management and maintenance is complex.
- Likely owned/leased by retailers or network owners (e.g. Endeavour). NOT a community of households.
- Large numbers will be installed to optimise substantial capacity of (and private investment in) roof top solar.
- Charged when renewable electricity is plentiful (cheap), drawn down when it is scarce (expensive).
- How and to what extent communities can participate is not yet clear.



# Repower Shoalhaven Current Community Projects

## **Increase Public EV Chargers**

- RS aims to support local community groups looking to secure suitable EV charging infrastructure by engaging with councils as site owners.
- RS will also conduct EV Expos to inform, educate and show a range of EV's to public. We will work co-operatively with Illawarra and Eurobodalla organisations that seek to expand EV uptake.

## **Increase awareness and access to residential and community batteries**

- RS is supporting community energy retailers to increase community access and awareness around energy, solar and storage.
- RS is working with community groups on potential community battery opportunities.
- END.