

Media Briefing

Limitations of Hybrid and Plug in Hybrid Electric Vehicles (PHEV) for decarbonising transport & cutting fuel costs

Spokesperson available	Greenpeace Australia Pacific Senior Campaigner Lindsay Soutar
Media Contact	Geeke van der Sluis - 0447 936 682 geeke.van.der.sluis@greenpeace.org
Subject	Hybrid Electric Vehicles

Summary

Hybrid and plug in hybrid electric vehicles have been heavily promoted as a solution for reducing emissions from the transport sector. But despite their green credentials, life cycle and real world usage analysis has revealed significant limitations of this technology, especially compared to battery electric vehicles. This brief outlines the limitations of hybrid technology, and why it should not receive special treatment under Australian EV policy settings.

What is hybrid technology?

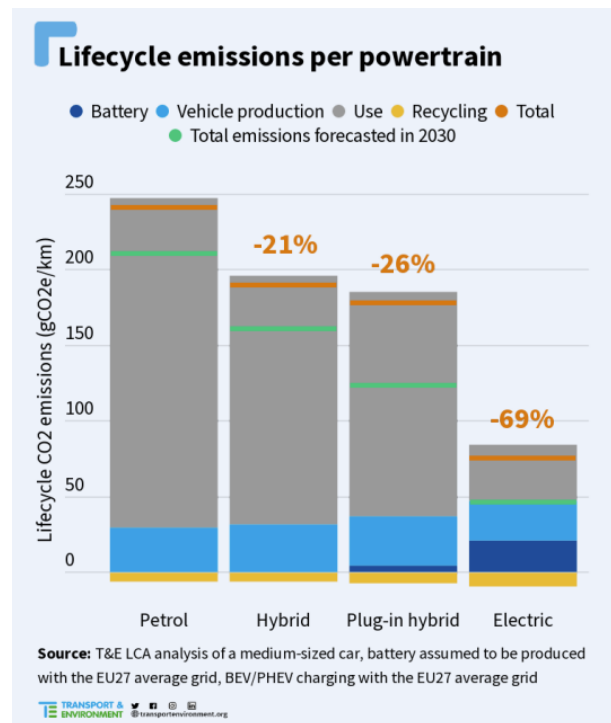
- There are two types of hybrid technology - regular hybrid vehicles (HV) and plug in hybrid electric vehicles (PHEV). Both have a regular petrol fuelled motor and a battery powered electric motor.
- In a hybrid the electricity for the battery motor is generated through acceleration, idling or a regenerative braking system, in a plug-in it comes through being plugged into an external source, usually mains electricity.
- In hybrid cars the petrol motor and battery motor can run at the same time, or independently, often cycling between each motor, while in PHEV technology the idea is that the car will run predominantly on the electric motor, with the petrol motor as back up. (However as we outline below real life testing shows this).
- Both cars are more complex technology than either regular ICE vehicles or battery electric vehicles (BEVS).

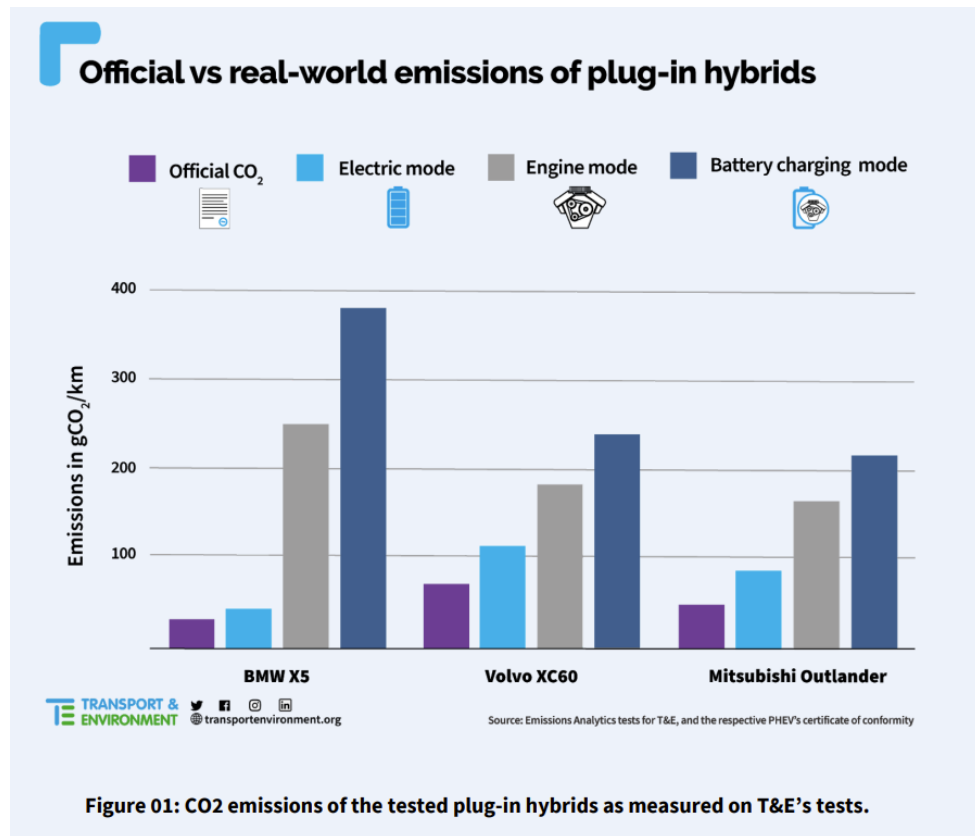
Hybrid market in Australia: current status

- Sales of EVs have overtaken hybrids for the first time in Australia, with [latest sales data from 5 October '22 showing BEV sales \(7,247 vehicles sold\) outstripping HEVs and PHEVs combined \(5,141 vehicles sold\)](#).
- In 2021, [3,372 PHEVs were sold](#) (up 99.4% on 2020, but still only 0.3% of new car market), conventional hybrids had 70,466 buyers (up 20.3 per cent and accounting for seven per cent of all new passenger cars, SUVs, utes and vans sold in Australia) while electric vehicles counted by VFACTS totalled 5149 (up 191.1 per cent) – a figure that excludes Tesla, which is estimated to have sold 10,000-12,000 vehicles in the period
- In the first half of 2022 MG sold more than double the number of PHEVs than anyone else in Australia. [Mercedes-Benz](#), Volvo, Lexus, BMW and Mini also made models in the top 10.
- Toyota was the biggest seller of regular hybrids in 2021, with 65,491 vehicles reported as sold, accounting for 29.3 per cent of the company's sales. RAV4 SUV topped the list with 25,850 sales
- 2.6 million Australian drivers are [considering switching to electric vehicles](#) because of surging petrol prices, as they attempt to avoid a portion of the \$62.5 billion in net fuel excise set to be paid by Australians over the next four years.

Limitations of hybrids for emissions reduction

- Overseas research has shown that PHEVs are not necessarily the environmental solution they are promoted as - through both the lens of lifecycle and real world usage analysis
- The Transport and Environment 'How clean are electric cars' [tool](#) and [report](#) shows that on a lifecycle analysis hybrid electric vehicles only deliver a 21% reduction in emissions, and PHEV technology only a 26% reduction, when compared to internal combustion engines. This makes them much closer to polluting conventional petrol cars than to BEVs.
- Additionally [ICCT research found](#) that PHEVs reduce the life-cycle GHG emissions of a vehicle by only about 20% compared to conventional petrol cars. These findings lead to the ICCT advocating "to align with Paris Agreement targets, the registration of new combustion engine vehicles should be phased out in the 2030–2035 time frame." This includes hybrid and PHEV.





- A separate [analysis](#) showed that real world PHEV co2 emissions are on average over two and a half times those of official test values

Reasons for poor performance of PHEVs

- T&E [attributes](#) the higher emissions of PHEVs to “their poor design; small batteries, underpowered electric motors and no fast charging make it hard for users to drive predominantly in zero emission mode.”
- [Investigations](#) have shown that PHEVs often switch automatically out of electric mode, prompted by for example, cars travelling at a certain speed, or the turning on of heating or a demister.
- Evidence suggest cars are just not being plugged in, including [one claim](#) that consumers bought PHEVs to avoid the tolls in London’s zero emission zone but 90% of vehicles were never plugged in
- ICCT has [found](#) that average real-world electric driving share is about 45%–49% for private cars and about 11%–15% for company cars

Toyota and hybrids

- Toyota is the #1 seller of regular hybrids in Australia, regularly [touting](#) the benefits of the technology. They expect to bring their [first](#) plug in hybrid to the Aust market in 2023

- Recent [quotes from](#) the company seek to oversell the emission benefits of hybrids with respect to BEVs. But Toyota has for years [refused](#) to provide the data it has on the driving and charging behaviour of the drivers of the PHEV vehicles it has sold.
- Toyota has also [threatened](#) to exit manufacturing in the UK, in response to the UK's proposed 2035 hybrid phase out.

PHEVS under review in Europe

- As a result of the above findings on PHEV limitations, [new regulations](#) in Europe require that all new cars sold “[be fitted with an on-board fuel consumption meter](#) (OBFCM), to records real world fuel consumption on the road. The data will be annually collected by the European Commission, starting in April 2022. This means that for the first time comprehensive data on the real world CO₂ emissions of PHEVs will be available, so the assumptions can finally be improved.” And therefore setting up the potential to review and address the compliance of this technology under the Euro CO₂ standards.

Further reading

[UPDATE - T&E's analysis of electric car lifecycle CO₂ emissions](#), T&E, June 2022

[Real world usage of plug in hybrid vehicles in Europe](#), ICCT, June 2022

[PHEV policy brief](#), Cars CO₂ review: Europe's chance to tackle fake electrics, T&E, April 2021

[A global comparison of the life cycle greenhouse gas emissions of combustion engine and electric passenger cars](#), ICCT, July 2021

[How to fix the regulation in the EU](#), Transport and Energy, March 2021

[Plug in hybrids: Is Europe heading for a new dieselgate](#), T&E, November 2020

[Strong Electric Vehicle Sales recorded in September](#), FCAI, October 2022