

Vehicle Technologies



Overview

Internal combustion engines (ICEs) have dominated vehicle propulsion in South Australia. While that looks set to continue for some time, electrical propulsion is also establishing itself.

For over a decade, hybrid electric vehicles have combined ICEs with electric motors. More recently, electric vehicles – which may or may not rely on an ICE for backup – have also emerged.

The internal combustion engine has also developed to accept an expanding range of fuels, many of which offer significant emissions reductions.

Improvements in efficiency and emissions control, along with emerging fuels and electrification of the drivetrain, are helping to reduce fuel use and emissions. But there are still further opportunities for improvement.

Propulsion Technologies

Internal combustion engines are available in two main forms: compression ignition (diesel) and spark ignition (petrol). ICEs are a proven and reliable technology and can operate on a wide – and expanding – range of fuels. They have fundamental efficiency

limits, however, and combustion necessarily results in air toxic emissions.

Electric motors offer superior torque characteristics and are very efficient (over 90%). They don't idle – they can be completely stationary and consume no power, as if they were turned off.

Electric motors also double as generators, so they can capture energy that would otherwise be lost, in a process known as regenerative braking, and recharge the battery.

Expanding Fuel Range

In addition to conventional fuels such as petrol and diesel, ICEs can operate on gaseous fuels (LPG and natural gas) and renewable biofuels (ethanol and biodiesel).[□]

Vehicles may be manufactured to use a particular fuel, or converted to use a certain fuel. Some fuels are 'drop-in', in that they are suitable for many existing vehicles without the need for vehicle conversion.[□]

Electric motors are powered by an on-board battery, which is charged from the ICE and regenerative braking and, for plug-in electric vehicles, from an external power supply.

Further information:

Email: DPTI.LowEmissionVehicles@sa.gov.au

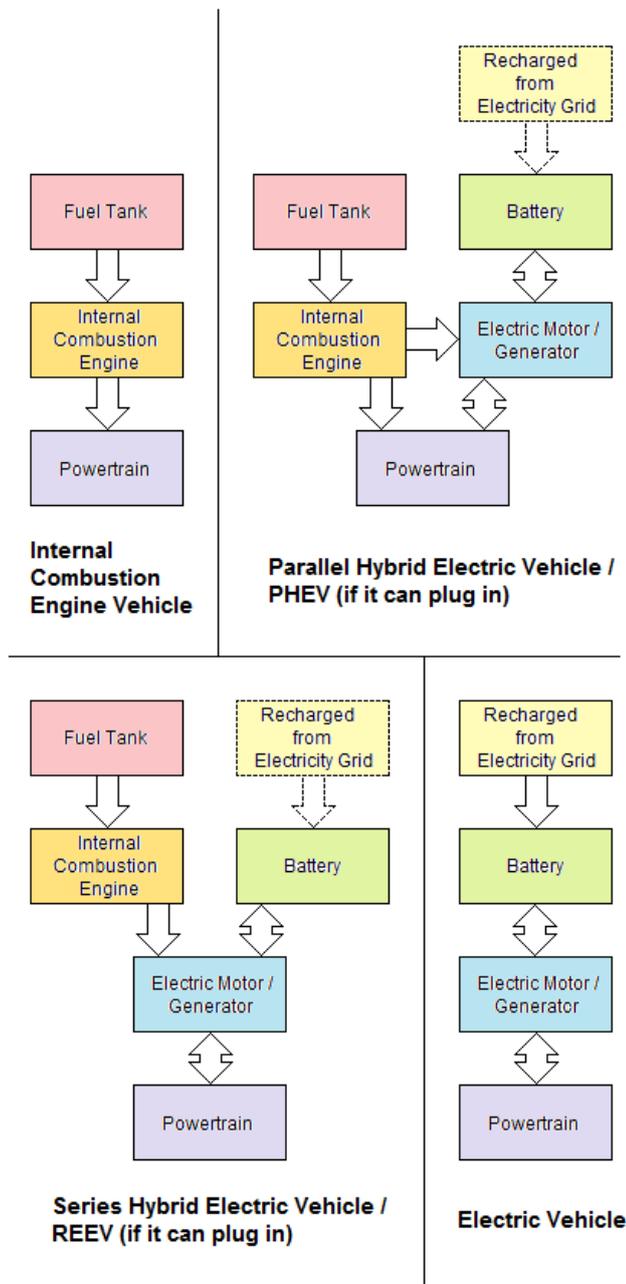
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Figure 1: Electrification of the Drivetrain



PHEV = Plug-in Hybrid Electric Vehicle.

REEV = Range Extended Electric Vehicle.

Electrification of the Drivetrain

Vehicles today can be categorised by the degree to which their drivetrain has been electrified.

Broadly, vehicles may be regarded as conventional vehicles, hybrid electric vehicles or plug-in electric vehicles, though there are numerous configurations which, themselves, comprise subtle variants.

The fact sheets listed below give more details on the various technologies and fuels available.

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See Also:

- [Vehicle Technologies: Conventional Vehicles](#)
- [Vehicle Technologies: Hybrid Electric Vehicles](#)
- [Vehicle Technologies: Plug-in Electric Vehicles](#)
- [Transport Fuels](#)

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