

# Vehicle Technologies: Conventional Vehicles



## Overview

Conventional vehicles are those that use an internal combustion engine (ICE) for propulsion, without assistance from an electric motor or other mechanism.

Therefore, the vast majority of South Australian vehicles – across all classes – are conventional vehicles. However, they operate on a variety of fuels, use a variety of supporting technologies and, as a result, vary in efficiency and emissions levels.

### Internal Combustion Engines

Basically, an internal combustion engine harnesses repeated combustion (explosion) of a fuel/air mix to drive a set of pistons down a corresponding set of cylinders. These, in turn, deliver rotating mechanical power through an attached crankshaft.

The two most common types of internal combustion engines used in road transport are *compression ignition engines* and *spark ignition engines*.

### Compression Ignition Engines

Compression ignition engines use fuels such as mineral diesel and biodiesel. Gaseous fuels are sometimes used in a mixture with a diesel product.

Compression ignition engines draw in air, compress it (thereby heating it), then draw in the fuel. The hot, compressed air mixes with the fuel and the mixture ignites.

A glow plug (electrical resistance heating) may be used to ensure sufficient temperatures for ignition are reached.

### Spark Ignition Engines

Spark ignition engines are fuelled by petrol, ethanol blends, LPG or natural gas.

These engines use a spark plug to ignite the premixed fuel and air at the right time.

In spark ignition engines that have high compression ratios, and require premium (ignition resistant) fuel, the use of regular fuel can induce early combustion under similar principles as diesel combustion. This is not good for efficiency or engine wear.

### Engine Efficiency and Emissions

For the most part, engine efficiencies are now about refinements to the basic process. Smart engine management systems and components have helped optimise the cycle.

More complete combustion and exhaust treatments have reduced air toxic emissions

#### Further information:

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Web: [www.lowemissionvehicles.sa.gov.au](http://www.lowemissionvehicles.sa.gov.au)



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markedly (by orders of magnitude, in some cases) and, with incremental efficiency improvements, greenhouse gas emissions are trending downwards as well.

Turbochargers are an important addition, packing more fuel and air into the cylinders, increasing ICE power and efficiency.

Still, internal combustion engines face fundamental efficiency limits.

### Vehicle Efficiency

A range of approaches are being used to improve vehicle efficiency, beyond improving the engine's efficiency, such as:

- Vehicle light-weighting;
- Improved aerodynamics;
- Anti-idle technologies and electric motors (see *Vehicle Technologies*);<sup>□</sup>
- Efficient accessories and lights, and innovative electrical systems; and
- Low rolling resistance tyres.

### ICE Vehicles: What to Consider

Conventional vehicles are well accepted, deliver good utility and, for many fuels, the refuelling network is comprehensive.

- Specify the right type of vehicle.<sup>□</sup>
- Consider which fuel(s) you will use. Some fuels are cheaper and/or cleaner than others. Vehicles capable of operating on multiple fuel types offer a hedge against fuel price increases and may offer low-cost emission abatement opportunities.<sup>□</sup>
- Research efficiency and emissions with the *Green Vehicle Guide* or *Fuel Consumption Guide Database* (light vehicles), or the *Truck Buyer's Guide* (heavy vehicles).<sup>∞</sup>

- You can get more from your vehicle and fuel by ecodriving.<sup>□</sup>

### What issues are there?

- ICE vehicles may have significant air toxic emissions and greenhouse gas emissions – consider fuel and vehicle options to minimise these.
- Conventional fuel prices are likely to rise in real terms, and may be subject to carbon pricing.

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### See Also:

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

### External Links:

- [FCAI Ethanol Compatibility List](#)
- [Green Vehicle Guide](#)
- [Fuel Consumption Guide Database](#)
- [Truck Buyer's Guide](#)

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