

# Transport Fuels: Natural Gas (CNG and LNG)



## Overview

Natural gas is predominantly used in heavy vehicles, in the form of compressed natural gas (CNG) or liquefied natural gas (LNG).

It is typically used for depot-based refuelling, where compression or liquefaction facilities can connect to the existing gas distribution network. The savings can be significant for vehicles covering large distances each year.

Commercial heavy vehicles designed to operate on CNG can be purchased in Australia. Alternatively, a vehicle may be converted.

Light petrol vehicles may also be converted to operate on CNG, however LPG conversions are more common.

## What is Natural Gas?

Natural gas is predominantly methane (CH<sub>4</sub>). Natural gas is used extensively in the stationary energy sector, from industry to electricity generation to household heating.

At standard pressures, natural gas has a very low energy density. To be suitable for transport applications, natural gas must be compressed or liquefied to increase its energy density.

Australia has abundant reserves of natural gas and we are becoming a major global exporter of LNG.

## Compressed Natural Gas (CNG)

CNG is natural gas compressed to around 25 MPa (0.4% volume). Even at such high pressure, CNG has around a quarter of the energy density of a conventional fuel.

Using CNG, therefore, involves a trade-off between fuel tank size and vehicle range.

## Liquefied Natural Gas (LNG)

LNG is natural gas liquefied under high pressure and low temperature. LNG has an energy density of about 60% of conventional fuels, making it more suitable for long-haul transport applications.

Storage and handling of LNG requires special equipment and procedures.

## Can my Vehicle Run on Natural Gas?

CNG may be used in place of petrol in spark ignition engines. Like LPG, vehicles may be dedicated CNG or dual-fuel.

Alternatively, CNG is used to supplement diesel in compression ignition engines, with 5% to 15% diesel used to ignite the mixture.

## Further information:

Email: [DPTI.LowEmissionVehicles@sa.gov.au](mailto:DPTI.LowEmissionVehicles@sa.gov.au)

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



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LNG is most often used in compression ignition engines, with a small amount of diesel to ignite the mixture.

LNG tends to find application with large, long-haul vehicles, where the complexity and expense of LNG storage and handling can be offset by much more significant savings.

A range of CNG heavy vehicles are available in Australia (4.5 tonnes to 14 tonnes GVM). CNG light vehicles are not available.

Many Adelaide Metro buses use CNG.

There aren't any LNG vehicles available in Australia at the moment. Vehicle conversion is the only option.

### Cost Effectiveness of Natural Gas

Natural gas is not a drop in fuel. The cost effectiveness should be subject to a business case, underpinned by a financial analysis specific to your organisation.

As a *rough guide*, the cost of energy from CNG is about half of the cost of energy from diesel – though this will be subject to a range of factors specific to your organisation.

These savings will need to be balanced against investment costs.

### Where do I Buy CNG or LNG?

Natural gas is broadly available, through the distribution networks in the metropolitan area and some regional centres.

You'll need facilities on site to compress or liquefy the natural gas, and store and handle the final product.

### Why consider Natural Gas?

- Even when the energy needed to compress or liquefy is considered, natural gas is cheaper than conventional fuels.

- Greenhouse gas emissions are 20% to 25% lower using CNG or LNG, when compared to petrol or diesel.
- Natural gas reduces particulate matter, nitrous oxides and complex hydrocarbon emissions.
- It is domestically sourced, reducing Australia's dependence on oil imports.

### What issues are there?

- Natural gas use requires significant commitment of effort and resources to install depot-based equipment and, potentially, convert vehicles.
- Natural gas is non-lubricating and requires engines with hardened valves and valve seats.
- There is range and fuel tank size trade-offs to be made.
- Refuelling must be done at depot – CNG and LNG aren't yet available at service stations.

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### See Also:

- [Transport Fuels](#)
- [Transport Fuels: Conventional Fuels](#)
- [Transport Fuels: Liquefied Petroleum Gas \(LPG\)](#)
- [Transport Fuels: Ethanol \(E10 and E85\)](#)
- [Transport Fuels: Biodiesel \(B5, B20 and B100\)](#)
- [Transport Fuels: Electricity](#)
- [Transport Fuels: Emerging and Future Fuels](#)

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