



# Environmental assessment of alternative fuels

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## DESCRIPTION

Natural gas, whether produced conventionally or renewably, has several advantages as an alternative fuel, including domestic availability, an established distribution network, low cost, and lower emissions. For use in vehicles, both renewable natural gas and conventional natural gas must be compressed or liquefied. When considering the use of natural gas, there are some factors to consider, as with any alternative fuel (Othman, 2007).

### Green Fuel

Compressed Natural Gas (CNG), also known as the green fuel due to its lack of lead and sulphur, reduces harmful emissions, thereby mitigating the effects of global warming (Kerr, 2007). Because it is non-corrosive, it extends the life of spark plugs. Because CNG contains no lead or benzene, lead fouling of spark plugs and lead or benzene pollution are eliminated. It has no evaporation leaks or fuel spills during refueling or feeding the car. Its combustion produces very little carbon deposits (permits a longer life of lubricant oil, spark plug, piston drum, valves & other components).

### Energy Safety

Although imports of 7.86 million barrels per day remained an important part of balancing supply and demand for domestic and international markets, the United States became a net exporter of petroleum in 2020, with exports exceeding imports. Overall, transportation accounts for approximately 30% of total US energy needs and 70% of US petroleum consumption. Natural gas and other alternative fuels, as well as advanced technologies, are being used to reduce fuel consumption, which helps to strengthen national security while also lowering transportation energy costs for businesses and consumers.

## Vehicle Efficiency

In terms of power, acceleration, and cruising speed, Natural Gas Vehicles (NGVs) are comparable to vehicles fueled by gasoline or diesel. Because natural gas has a lower total energy content that can be stored in a tank of the same size than comparable gasoline and diesel vehicles, NGVs have a shorter driving range than those vehicles. Extra natural gas storage tanks or LNG use can help extend the range of larger vehicles. Dual-fuel, compression-ignited engines are slightly more fuel-efficient in heavy-duty vehicles than dedicated natural gas engines that are spark-ignited (Bell, 1997). A dual-fuel engine, on the other hand, complicates the fuel-storage system by necessitating the storage of both types of fuel as well as the integration of diesel after treatment devices.

## Reduced Emissions

Regardless of fuel type, all new vehicles are equipped with effective emission control systems and must meet the same emissions standards. As a result, natural gas vehicles' tailpipe emissions are comparable to those of gasoline and diesel vehicles when all vehicles are outfitted with modern emissions controls. According to the Argonne National Laboratory's Greenhouse Gases, Regulated Emissions, and Energy Use in Transportation (GREET) model, light-duty vehicles powered by conventional natural gas can reduce Green House Gases (GHG) emissions by a small to moderate amount. 15% reduction in life cycle greenhouse gas emissions (reductions are more substantial for vehicles running on Renewable Natural Gas (RNG). Furthermore, because CNG fuel systems are completely sealed, vehicles emit no evaporative emissions (Nelson, 2008).

Natural gas produced using renewable energy sources has additional advantages. Renewable Natural Gas (RNG) is essentially biogas the gaseous byproduct of organic matter decomposition that has been purified.

Biogas capture from landfills and livestock operations reduces emissions by preventing methane from being released into the atmosphere (Jones, 1993). As a greenhouse gas, methane is 25 times more potent than carbon dioxide. Furthermore, producing biogas through anaerobic digestion reduces while producing nutrient-rich liquid fertilizer.

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