

What is CNG?

CNG is compressed natural gas.

ADVANTAGES OF CNG

- Vehicles running on CNG is more efficient than benzene by %70-80, LPG by %40-50
- CNG doesn't damage to motor and oil needs to be changed at 35000-40000
- Engines using natural gas is more durable and last longer than other fuels. Natural gas is a clean burning fuel that reduces vehicle maintenance
- Unlike other liquid fuels, there is no risk to be stolen by pulling out. Especially at large fleets, that prevents the risk of fuel theft.
- Being transferring by natural gas pipeline, unlike LPG, diesel and benzene transferring by track, doesn't cause hazards, environmental pollution and extra cost.
- Ignition temperature of Benzene is 300 °C, LPG is 400 °C and CNG is 650 °C. Because of physical features, ignition of CNG is more difficult
- According to benzene spilling on floor and LPG which is heavier than air, natural gas mixes into air quickly in case of an accident.
- Natural gas which is lighter than air, mixes into air, doesn't accumulate on floor and doesn't cause explosive and flammable environment unlike other fuels (LPG, benzene, etc) in case of accident or leakage. Natural gas has least risk of ignition. It is flammable when mixture of gas/air is between % 5~15
- Lower maintenance cost
- Today, every country that are sensitive to environmental pollution, uses natural gas at their bus, taxi and public transport. Natural gas provides safe, economical and ecological features
- Natural gas produces %90 less nitrogen and %25 less carbon monoxide than other fuels.
- Unlike other alternative fuels, natural gas doesn't involve aldehyde and other air toxins.
- Noise pollution rate is less than 30% compared to engines running on other fuels.
- Level of causing greenhouse effect is very low
- Because of not being toxic and corrosive, natural gas doesn't pollute water.
- Extends the lifetime of methan.
- Today, natural gas is the most reliable, eco-friendly and economic fuel among all other fuel types. Saving is at the maximum level, comparing with benzene, LPG and diesel, natural gas. In other words, natural gas causes more saving than benzene by %62, LPG and diesel by %40.

What is usage of alternative fuel?

Alternative fuel is non-petroleum fuel using with petroleum fuels at the same vehicle as optional. One of them is chosen by user's request.

Is CNG an Alternative Fuel?

In recent years, CNG is accepted as main fuel, but also it is used as an alternative fuel at passenger vehicles. There are many models of vehicles using CNG. Heavy vehicles like buses and trucks are preferred CNG as main fuel. In recent years, CNG engines reached at high technology level.

Reducing reserves of petrol and increasing price make alternative fuels as main fuel. CNG and hydrogen become first choice as the result of petrol's price and effect to the environment. Besides CNG, Hydrogen or HCNG(20% Hydrogen 80% CNG) can be filled by adding equipment at CNG stations.

After natural gas come out from well with basic cleaning process, transferred through pipeline without effects of air conditions. Filling without storing at CNG stations eases natural gas to spread and establishment of system. At the same time, simplicity of processing and transport of natural gas causes lower cost than petrol.

Comparing CNG with Other Fuels

Advantages of CNG by other fuels:

- Safety standards of CNG are higher
- CNG is more environmental fuel with low emissions.
- Higher emission than EURO 5 standards
- CO2 emission is 25% lower at CNG
- Security of supply of natural gas in Turkey is high,
- CNG is cheaper than other fuels
- Octane number is 124 and higher.
- Emission of particles is close to zero,
- Being gas state at engines, CNG provides most effective ignition at engines.
- CNG is the fuel causing least knock at engines,
- CNG engines are silent and vibration-free
- The same performance at cold or hot air conditions.

Service buses in ABD, California use CNG necessarily. Usage of CNG at canal boat has been completed in Holland. In many countries, only vehicles running on CNG are allowed to enter in center of the city. These examples prove superiority of the safety and emissions of CNG

Periodic maintenance time extends, Wearing out caused by vibration reduces, CNG doesn't include contaminants, so oil life extends. Addition of these positive values and very important advantage of its cost makes CNG more economic than other fuels.

Other fuels equals to 1m³ CNG:

1 m ³ CNG	= 1.05 lt Benzin
1 m ³ CNG	= 1.35 lt LPG
1 m ³ CNG	= 1.00 lt Motorin
1 m ³ Benzin	= 1.28 lt LPG

Conversion is according to ABD GGE system. The amount of savings can be calculated according to a bus driving in a city.

Using area of CNG

CNG can be used in two field areas as a compressing of natural gas:

- CNG AUTOGAS can be used at vehicles,
- CNG ENERGY in special transporting container can be transferred to consumers who use it as natural gas and it can be consumed by reducing pressure.

Vehicles using CNG Autogas

- Automobiles
- Local and non-city buses
- Local logistic vehicles and vehicle fleets
- Vehicles like garbage trucks and road cleaner
- Heavy vehicles, military and public service vehicles
- Boats using in canals and seas, ferryboat, sea taxis
- Trains, motorcycles, tripartors
- Airplanes and all kinds of apron tools
- Work machines, earth-moving truck fleets, forklifts

How does CNG use in vehicles?

Basic equipments at CNG vehicles

- Suitable engine for CNG
- CNG cylinders
- Fuel line and regulators

CNG cylinders and Technology

Cylinders that is suitable for being filled CNG are seperated as made of steal and other chemicals. Comparasion between steal and carbon fiber cylinders is below.

	Carbon fiber	Steel
Water Capacity	l	102
Tare Weight	kg	38
Full Weight	kg	56.3
CNG Capacity	m ³	25.8
Pressure	bar	200

Which part of vechiles can be filled with CNG?

CNG is filled with equipments that compress natural gas at high pressure and fill in cylinders. Natural gas with different pressures coming to pipeline, is increased to He 200 or 250 bar pressure by compression system. CNG is filled to vechiles by dispensers. According to filling velocity and dispensers capacity, for example 300 m³ in 4 minutes, CNG is filled in a bus tank.

Transport System of CNG Energy

The most economic way to transport CNG to consumers where natural gas pipelines can not be reached to, is CNG method. Pressure of Natural gas is increased to 200-250 bar by CNG compressor and gas is loaded at special transport vechiles. Widely used CNG energy transporting cantainers are;

- **CNG Battery:** 150 m³ at 200 bar,
- **CNG cylinders trailer:** 4500- 5500 m³ CNG is filled to this vehicle consisted of steel cylinders and moved by tow truck.
- **CNG Cylinder truck:** 14,000 m³ CNG is filled to these trailers consisted of 250 bar carbon fiber cylinders and moved by tow truck.

Different sizes of models of these transporting systems can be made. 200 or 250 bar pressure can be chosen. Different stocking techniques can be used at consumer area.