



NC CLEAN ENERGY TECHNOLOGY CENTER

Advancing Clean Energy for a Sustainable Economy

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PROPANE

A clean choice for your vehicle

Propane, or Liquefied Petroleum Gas (LPG), is a simple hydrocarbon byproduct of natural gas processing or crude oil refining. Currently the world's third most common engine fuel source, there were more than 270,000 LPG- fueled vehicles on US roads in 2010. The commercial grade of propane for automotive use is known as HD-5 in North America and is also called Autogas.

The benefits of using LPG in vehicles include:

- **Emission Reductions-** As a low carbon fuel, LPG typically burns cleaner than gasoline.
- **Reduced Costs-** Engines running on HD-5 propane often require less engine maintenance. Fleet fuel and operating costs can be reduced with private fueling stations.
- **Increased Safety-** Propane has greater puncture resistance and lower flammability range than gasoline and diesel.
- **Energy Security-** 92% of LPG used in the U.S. is produced domestically, whereas 21% of the U.S. petroleum demand was imported in 2015.

Vehicles

A variety of new light-, medium-, and heavy- duty propane vehicles are available as conversions or directly from Original Equipment Manufacturers (OEMs). Additionally, some existing fleets can be converted to operate on LPG. Dedicated vehicles are manufactured to run only on LPG, whereas bi-fuel vehicles can use two separate fueling



systems. Dedicated vehicles may perform better and have lower emissions than bi-fuel vehicles because their engines are optimized for a particular fuel. Many vehicles can be up-fitted with few engine modifications to operate on LPG by companies that have received certification by the U.S. EPA. Liquid propane injection fuel systems have recently become available offering more efficiency. To learn more about LPG vehicle conversion systems and regulation visit http://www.afdc.energy.gov/vehicles/propane_conversions.html.

Emissions

For light-duty vehicles, LPG up-fits provide one of the cleanest burning internal combustion engines on the road today. LPG vehicles can be calibrated for pollutant reduction, making it easier for vehicle manufacturers to meet federal

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emission standards and reduction targets. Considering the entire lifecycle of LPG used in up-fitted, light-duty vehicles, Argonne National Laboratory found greenhouse gas (GHG) emissions were reduced by 10% and petroleum use by 99%.

Fueling

LPG is non-toxic, colorless and odorless. To enhance safety, a chemical is added to give LPG a slight odor. LPG can be stored and dispensed similar to gasoline as it turns into a liquid state under moderate pressure (100-200 PSI). There is an extensive network of LPG stations across North Carolina, primarily operated by propane suppliers. LPG fueling stations in NC can be found by visiting http://www.afdc.energy.gov/fuels/propane_locations.html.

Vehicle Emissions	LPG	Gasoline
NO _x	0.2	1.5
VOC	.014	0.34
Carbon Monoxide	0.02	0.02

Source: <http://www.epa.gov/otaq/crttst.htm>

Note: Emissions data and results can vary between vehicle makes and models, the example above may not be representative for all vehicle comparisons.



Cost Savings

LPG used for transportation typically costs less than gasoline and refueling infrastructure can be comparable in price to petroleum. There are also opportunities to negotiate long term fuel contracts for stability and favorable pricing structures. In some cases, infrastructure can be provided at no costs to the fleet, as part of fuel contract arrangements. With air quality a significant concern and potential fuel cost savings, it's an excellent time to consider using this alternative to gasoline and diesel.

www.afdc.energy.gov/afdc/locator/stations/

Learn more about LPG vehicles: www.afdc.energy.gov/afdc/vehicles/propane.html,
www.autogasusa.org/propane-vehicles-and-equipment/, <http://www.transportation.anl.gov/pdfs/AF/633.PDF>



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