

# NATURAL GAS VEHICLES IN LOUISIANA

by  
Bryan Crouch, P.E.

## Natural Gas Vehicle Basics

Natural gas is a clean-burning, economical alternative to gasoline and diesel that can be utilized in almost any type of vehicle. Natural gas vehicles (NGVs) reduce greenhouse gas emissions by 20% – 30%, reduce ozone forming nitrogen oxide emissions by 35% – 60%, and produce little or no particulate emissions when compared to gasoline and diesel powered vehicles. Natural gas is currently about 40% – 45% less expensive than gasoline and diesel. Natural gas is also an abundant and domestically produced fuel with Louisiana being the second largest producer in the U.S.

Natural gas can be stored onboard a vehicle as either compressed natural gas (CNG) or liquefied natural gas (LNG). CNG is typically utilized in light, medium, and some heavy-duty applications, and LNG is typically utilized in heavy-duty long-haul trucks. Natural gas vehicles are available directly from manufacturers (OEM), by modifying an engine in a new or existing vehicle to operate on natural gas (referred to as “conversion”), or by replacing the gasoline or diesel engine in an existing vehicle with an engine that operates on natural gas (referred to as “repowering”). In addition, vehicles converted to CNG can be dedicated or bi-fuel. A dedicated CNG vehicle can only operate on CNG, whereas a bi-fuel CNG vehicle can operate on CNG or gasoline, but not simultaneously. Bi-fuel CNG conversions have the advantage of being able to use gasoline when CNG is not available, but are not optimized for CNG, and therefore, are not as efficient as a dedicated NGV.

Natural gas vehicle availability is limited, but expanding. The only OEM CNG passenger car available is the Honda Civic GX. General Motors has a CNG cargo van available and a CNG wheel chair accessible van is available through Ford. Both GM and Ford are planning to offer CNG pick up trucks very soon. Choices for OEM NGVs in the mid- and heavy-duty market are greater with several manufacturers offering school busses, transit busses, refuse trucks, and more. The conversion and repower markets are fairly extensive with several manufacturers offering bi-fuel and dedicated natural gas conversion “kits” and engines for vehicles ranging from small passenger vehicles to long-haul trucks. A guide to available NGVs is available from the Natural Gas Vehicles for America website: <http://www.ngvc.org/pdfs/marketplace/MP.Analyses.NGVs-a.pdf>.

NGVs cost more than their conventionally fueled counterparts. The Honda Civic GX has a premium of approximately \$6,500 and a CNG refuse truck has a premium of approximately \$45,000. Conversion costs for light duty cars and trucks range from \$12,000 - \$18,000, and repower costs for heavy-duty trucks can top \$50,000.

In addition to the increased up-front costs of NGVs, the other main impediment to their widespread usage is the lack of refueling infrastructure. L/CNG refueling stations range from small private access only stations for a particular fleet to large publicly accessible stations similar to and/or in conjunction with conventional refueling stations. Currently, there are only a handful of refueling stations in Louisiana for NGVs, but several more are either under construction or in the planning stages. By late 2012, there will be about 20 public access CNG stations in Louisiana, including locations in and around Shreveport, Alexandria, Lafayette, Baton Rouge, and New Orleans.

## Louisiana Incentives and Initiatives

Louisiana has a state tax credit for individuals and businesses who invest in alternative fuel vehicles and refueling equipment. In the case of L/CNG, the credit is for 50% of either the cost to convert or repower a vehicle to L/CNG, 50% of the incremental cost of an OEM L/CNG vehicle, and 50% of the cost of refueling equipment.

The Louisiana Department of Natural Resources administers the EmPower Louisiana Transportation Efficiency and Alternative Fuels Grant Program. Funding for this program came through the American Recovery and Reinvestment Act of 2009 and has already been completely allocated. Eighteen grants totaling \$8.4 million were awarded for 119 CNG vehicle purchases/conversions and 8 publicly accessible refueling stations.

## Economics

Payback times and life-cycle cost savings are dependent on a number of variables that are specific to each situation. In general, payback times are long and life-cycle cost savings are relatively small for the average consumer light-duty vehicle, whereas, high-mileage heavy-duty fleet vehicles can pay back in less than 2 years and result in life-cycle savings of \$80,000 or more. Here are several examples based on a fuel cost savings of \$1.40 per GGE:

- Private commuter vehicle – Honda Civic GX
  - 15,000 miles driven per year, 26 mpg average, 10 years service life
  - \$6,500 incremental cost
  - \$3,250 Louisiana income tax credit
  - **Simple payback = 4 years**
  - **Life-cycle cost savings = \$4,827**
  
- Contractor – Chevy/GMC 3500 cargo van
  - 35,000 miles driven per year, 13 mpg average, 5 years service life
  - \$15,500 incremental cost
  - \$7,750 Louisiana income tax credit
  - **Simple payback = 2.1 years**
  - **Life-cycle cost savings = \$11,096**
  
- Uniform service – Ford/GM step van
  - 28,000 miles driven per year, 6.2 mpg average, 10 years service life
  - \$30,000 incremental cost
  - \$15,000 Louisiana income tax credit
  - **Simple payback = 2.4 years**
  - **Life-cycle cost savings = \$48,226**
  
- School bus – Blue Bird/Thomas Built
  - 18,000 miles driven per year, 6.8 mpg average, 13 years service life
  - \$43,000 incremental cost
  - \$21,500 Louisiana income tax credit
  - **Simple payback = 5.8 years**
  - **Life-cycle cost savings = \$26,677**
  
- Garbage truck – Crane Carrier/Peterbilt/Mack
  - 25,000 miles driven per year, 2.7 mpg average, 8 years service life
  - \$45,000 incremental cost
  - \$22,500 Louisiana income tax credit
  - **Simple payback = 1.7 years**
  - **Life-cycle cost savings = \$81,204**