CNG and Propane Vehicle Conversion Guidelines

Green Drive$
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Ted Barnes
Gas Technology Institute
Gas Technology Institute (GTI) Overview

Established in 1941
Staff of ~300
350 active projects
1,200 patents; 500 products
Gas Technology Institute (GTI) Barrier Reduction Grant – US Dept. of Energy

GTI and Lake Michigan Consortium created webinars on important alternative fuel topics:

• Inspection Guidelines for CNG/LPG Vehicle Conversions
• Considerations for Garage & Maintenance Shops When Using CNG/LPG
• Station Installation Guidelines for CNG
• Station Installation Guidelines for LPG
• Best Practices for End Users for CNG, LPG & Electric Vehicles

Presentations are available on Clean Cities websites
Compressed Natural Gas (CNG) Vehicle Purchases

Natural Gas Vehicles (NGVs) are purchased from:
- OEMs at the dealership
- Small or Qualified Vehicle Manufacturers (SVMs/QVMs)
- Local conversion companies

NGVs are available for all needs:
- Light duty (sedan, pickup, van)
- Medium duty (school bus, box truck, work truck)
- Heavy duty (regional/long haul, waste hauler, cement mixer)
Light Duty CNG Vehicles Available from OEMs

- **Honda Natural Gas Civic Sedan** (dedicated)
- **GM Express/Savana Cargo & Passenger Vans** (dedicated)
- **GM Silverado/Sierra pick-up** (bi-fuel)
- **Ram 2500 dual-cab pick-up** (bi-fuel)
- **Bi-fuel GM Impala** (bi-fuel)
Light and Medium Duty NGVs Available Through SVMs and Conversions
Heavy Duty Trucks with OEM Engine
Selection of NGVs from OEMs, SVMs, Local Converters

**Light Duty OEMs**
- Honda
- General Motors
- Chrysler Ram Trucks
- Ford*

**Local Converters**
- Advanced VTech
- Autotrick
- Dual Fuel Systems
- World CNG
- Others?

**Light Duty/Medium Duty Retrofits**
- Altech-Eco
- Landi Renzo/Baytech
- IMPCO Automotive
- Westport/BAF Technologies
- Stag USA
- NGV Motori USA
- NatGasCar
- AGA Systems
- Greenkraft
- PowerFuel Conversions
- World CNG
  - Retrofits of GM, Ford, Dodge, VW, Mazda, Mitsubishi, Workhorse, Isuzu, JAC, Freightliner
  - Custom Chassis platforms
# Selection of NGVs from OEMs, SVMs

## HD Truck OEMs
- Freightliner Truck
- Volvo
- International
- Kenworth
- Peterbilt
- Mack

## HD Bus OEMs
- Thomas Built Bus
- Blue Bird Bus
- Optima/NABI
- El Dorado
- New Flyer
- Motor Coach Ind.
- Gillig
- DesignLine

## HD Vocational OEMs
- Mack
- Peterbilt
- Crane Carrier
- Autocar Truck
- ALF Condor
- Elgin
- Johnston
- Schwarze
- Tymco

## HD Retrofit/Repowers
- American Power Group
- Clean Air Power
- Fyda Energy Solutions
- NGV Motori
- Omnitek Engineering
- Diesel 2 Gas
  - Dual fuel retrofits and SING repowers of Cummins, Daimler, Navistar, Detroit Diesel, Mack, Volvo, Caterpillar
Conversion of CNG Vehicles

Guidance: Select approved kits and converters:

1. US EPA and CARB certified conversion kits and engine platforms are allowable under current federal regulation.
   - NGVAmerica List: https://www.ngvamerica.org/vehicles/vehicle-availability/
   - EPA Website: http://www.epa.gov/otaq/consumer/fuels/altfuels/documents/certified-conversions.xls

2. Converters need to be approved by kit manufacturer. It is preferred to confirm converter has ASE/CSA qualified technicians installing conversion kits.
3. Expand knowledge base. Use the following resources to educate yourself in the basics.

- “Have Your Vehicle Converted to Compressed Natural Gas- Safety”, Clean Vehicle Education Foundation

- US DOE Alt Fuel Data Center – Vehicle Conversion Regulations and Info
  http://www.afdc.energy.gov/vehicles/conversions.html
Inspection of CNG Vehicles

> What are the rules?
Tanks/Fuel systems must be inspected every 3 years, 36,000 miles, after an accident or fire, and before it is reinstalled on a vehicle.

> Who can inspect?
The CGA defines a qualified inspector as any of the below:

- 2 years experience conducting inspections
- Supervision by person with 2 years experience conducting inspections
- Approved by fuel cylinder manufacturer
- Certification from OEM through training center
- Certification from nationally recognized organization e.g. CSA
- Certification as inspector by Authority Having Jurisdiction
Inspection of CNG Vehicles

> How do you find a certified inspector?
  • CSA provides certification for CNG fuel system inspection which includes all major components and tanks.
  • CSA offers a list of qualified and certified fuel system inspectors on their website:


> How do you become an inspector?
  • Take a course / pass the CSA test
  • US DOE Alt Fuel Data Center has info:

http://www.afdc.energy.gov/vehicles/technician_training.html
Propane / LPG / Autogas Vehicle Purchases

> Propane vehicles are purchased from:
  — OEMs at the dealership
  — Small or Qualified Vehicle Manufacturers (SVMs/QVMs)
  — Local conversion companies

> Propane vehicles are available for:
  — Light duty (sedan, pickup, van)
  — Medium duty (school bus, box truck, work truck)
Propane / LPG / Autogas Vehicle Purchases

> Several options for OEM/conversions:
  - Ford*
  - GM
  - American Alternative Fuel
  - Blossman Services
  - CleanFuel USA
  - Greenkraft Inc.
  - ICOM
  - IMPCO
  - Landi Renzo
  - Roush
LPG Vehicle Conversion

Conversion guidance:

1. US EPA and CARB certified conversion kits and engine platforms are allowable under current federal regulation.
   - **EPA Website**: Certified Clean Alternative Fuel Conversion Systems
   - **PERC List**: [http://www.propane.com/uploadedFiles/Propane/On_Road_Fleets/Propane_Conversions/January2015OTRManufacturerListingPublicView.pdf](http://www.propane.com/uploadedFiles/Propane/On_Road_Fleets/Propane_Conversions/January2015OTRManufacturerListingPublicView.pdf)
2. Confirm converter has trained technicians installing conversion kits. (NFPA 58)
   - Propane autogas technician course and training (PERC partnership with NAFTC)
   - OEM approved/trained installations

3. Expand knowledge base using existing resources: Propane Education and Research Council (PERC) and Alt Fuel Data Center websites are useful:
   - [www.autogasusa.org](http://www.autogasusa.org)
   - [http://www.afdc.energy.gov/vehicles/propane_conversions.html](http://www.afdc.energy.gov/vehicles/propane_conversions.html)
LPG Vehicle Inspection

Inspection guidance: Know the facts.

1. Propane containers are certified by ASME or DOT
   - DOT cylinders are mainly used for industrial and off-road applications such as forklifts, mowers, etc.

2. NFPA 58 states fuel containers have to be requalified per Compressed Gas Association inspection criteria. Good practice to include vehicles involved in fire and/or auto accidents.

3. Follow OEM specifications for inspections/training.

4. NFPA 58 requires vehicle fuel system to be leak free prior to garage storage or service.
Questions?

Thank you for your time.