

NATURAL GAS VEHICLES IN ALBERTA

Introduction

- For nearly twenty years natural gas has been used as a vehicle fuel in Canada. Natural gas can be used without any further refining or chemical processing beyond what is required for heating applications. Engine modifications are necessary to most effectively and efficiently use natural gas as a vehicle fuel.
- Natural gas is composed primarily of methane, with trace amounts of other hydrocarbons not removed during the refining process. It is essentially a no-sulphur fuel. Because of its clean burning properties natural gas has been considered as a vehicle fuel for more widespread usage. Natural gas can have a significant positive impact on air quality. Depending on vehicle type and fuel/engine configuration, the relative benefit of converting to natural gas is variable.
- For use as a vehicle fuel, natural gas is either compressed or liquefied; compression to between 3000 and 5000 psi for compressed natural gas (CNG), or liquefied by cooling to minus 159°C for liquefied natural gas (LNG). Compression or liquefaction of natural gas is necessary in order for natural gas powered vehicles to achieve a range competitive with gasoline vehicles. The range of gasoline vehicles is significantly greater at present. Also, because of the size and nature of the storage systems required for LNG, its use as a fuel is currently restricted to heavy-duty applications.
- CNG has been used longer and more widespread in the United States and some European countries than in Canada, with markets emerging in Asia and South America. In comparison, there has been very limited experience with LNG for vehicles anywhere in the world. The technology for refueling and dispensing both CNG and LNG is improving, and vehicle storage systems are becoming safer and less intrusive on vehicle design.

Natural Gas Vehicles in Alberta

- For 2005 more than 2.4 million vehicles were registered in Alberta. Of these vehicles 4,587 (0.2 per cent) were powered by natural gas (Alberta Registries, Motor Vehicles Division).
- Natural gas vehicles (NGVs) are most numerous in the following municipalities.

Municipality	#NGVs
Calgary	617
Edmonton	331
Grand Prairie	263
Sexsmith	97
Red Deer	87
Medicine Hat	86
Cardston	74
La Crete	66
Peace River	54
Fort McMurray	52
Lethbridge	52
Manning	51

- Twelve natural gas refuelling stations (CNG) with public or limited public access are located in Alberta.

Municipality	Operator	# Stations
Red Deer	ATCO Gas	1
Lethbridge	ATCO Gas	1
Edmonton	Hughes Petroleum	3
	ATCO Gas	3
Calgary	ATCO Gas	3
Banff	ATCO Gas	1

- There are other natural gas refuelling stations (CNG) in the province with no public access, owned and operated by private corporations.
- Currently the only LNG refuelling station/site in Canada is located in British Columbia.

Natural Gas Vehicle Options

- In Alberta, there are currently no natural gas vehicles available for sale from the factory. There is a national incentive program (see below) for conversion to natural gas.
- Transit systems. For more information please see: http://www.nrel.gov/vehiclesandfuels/pdfs/nat_gas_transit_fleets.pdf
- Converting to natural gas for ice resurfacers and fork lifts results in improved indoor air quality and easier refuelling.

Natural Resource Canada Rebate Program

- This pilot project runs from April 1, 2005 to March 13, 2006.
- There is up to \$3000 available for individuals and organizations towards the capital cost for buying or leasing a NGV, or for converting to a NGV using an approved facility
- For eligibility information please see:
<http://www.oeenrcan.gc.ca/transportation/fuels/natural-gas/natural-gas-market.cfm?attr=8>

Other Considerations

- Utilizing natural gas as a vehicle fuel can generate significant operating cost savings on a per vehicle basis and at an aggregate level. Because of its low energy density the GHG emissions reduction potential is not as pronounced. Natural gas compressed to 3000 psi contains approximately 25 per cent of the energy content per gallon compared to gasoline (29,000 Btu per gallon natural gas versus 114,264 Btu per gallon gasoline).
- Existing natural gas refueling infrastructure in Edmonton and Calgary could facilitate government vehicles operating on natural gas (the costs associated with constructing refueling stations are high). Natural gas vehicles are more costly than conventional vehicles.
- Natural gas may be a viable “environmentally-conscious” vehicle fuel source in the short to medium term, until vehicle and equipment manufacturers develop and incorporate more progressive technologies into product design in the medium to longer-term.
- Concerning natural gas for heavy-duty vehicle applications, other competing technologies (i.e. diesel hybrid technology) may offer the same or better performance and environmental attributes when compared to natural gas, without some of the drawbacks.

Lawrence Schmidt
Jason Politylo
Sarah Pinto
Infrastructure Policy and Planning
November 2005