

***COUNTY OF
VERMILION
RIVER GAS
UTILITY***

CNG VEHICLES



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ABOUT CNG VEHICLES

Natural Gas is an excellent alternative fuel option for Light, Medium and Heavy-Duty Fleets wishing to reduce emissions and operating costs without sacrificing power or range in Canada's harsh climate.

Compressed Natural Gas

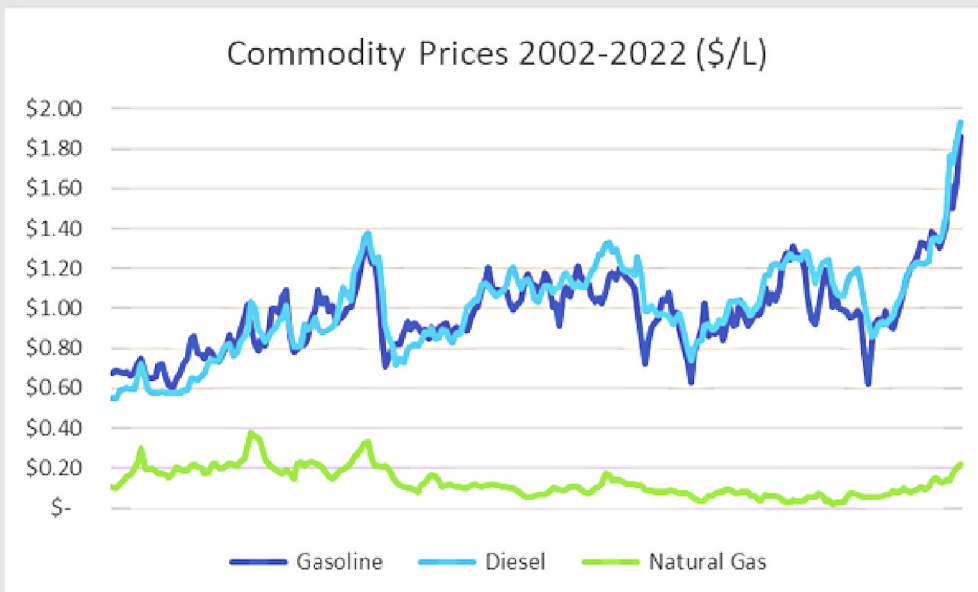
CNG is natural gas compressed to high pressures (~3,000 PSI) and supplied to your vehicle's engine in place of, or in addition to, diesel and gasoline.

Reduce Emissions

Natural gas is the cleanest burning fossil fuel with Well to Wheel emissions up to 22% lower than gasoline and diesel. Harmful NOx emissions can also be significantly reduced by converting to CNG. Excess gas produced in heavy oil recovery and Renewable Natural Gas can further reduce fleet emissions to Near Zero.

Save Money

Gasoline and Diesel commodity prices are volatile and have consistently increased year-over-year, while natural gas prices remain relatively stable.



CNG Vehicle Refueling Station Pricing

Commodity Price	Typically \$0.10 - \$0.20 / GLE
+ Compression Cost	Typically \$0.030 - \$0.60 / GLE
+ Carbon Levy	Currently \$0.10 / GLE
Pump Price	CoVR Station Currently \$0.70 / GLE

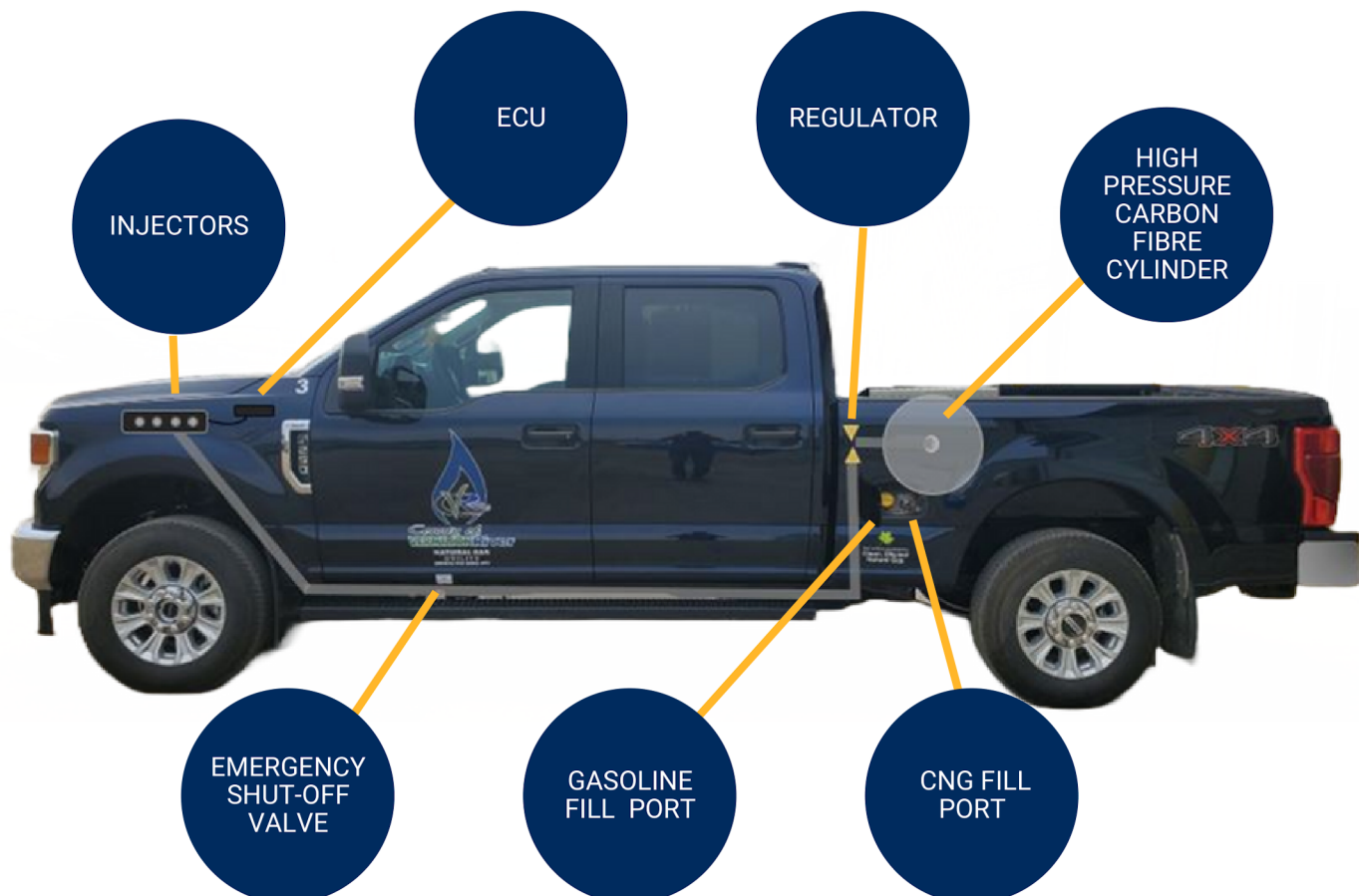
LIGHT DUTY VEHICLES

Light duty vehicle conversions are typically Bi-Fuel meaning that the vehicle will run on either CNG or Gasoline. Conversion of a vehicle generally involves installation of a CNG tank, tubing, pressure regulator, injectors and electronics.

WHILE THERE ARE NO FACTORY CNG PASSENGER VEHICLES AVAILABLE IN CANADA, SEVERAL OPTIONS EXIST FOR CONVERSION OF LIGHT DUTY VEHICLES.

Manufacturer	Vehicles	Nearest Dealer / Installer
Altech ECO	Ford F150, F250, F350, Transit	National Energy Equipment (Calgary)
Landi Renzo	Ford F150-F750, E450	National Energy Equipment (Calgary)
Eco Fuels	Various makes/models	HiTec Fuel Systems (Edmonton)
Prins	Various makes/models	Maxquip (Burnaby) HiTec Fuel Systems (Edmonton)

CNG SYSTEM CONFIGURATION



The Medium and Heavy Duty CNG market is one of the fastest developing areas in the trucking industry. Natural Gas technology will be integral, as the trucking industry looks for ways to reduce carbon footprint and meet emissions targets.

MEDIUM - HEAVY DUTY VEHICLES

Dedicated CNG

Single fuel CNG trucks are available from all major truck manufacturers in numerous configurations including Medium/Heavy Duty, Day Cab/Sleeper, and all typical axle and transmission options. CNG models can typically be purchased through your local dealer.

The Cummins B6.7N, Cummins-Westport ISL G & ISX12 are the most common dedicated CNG engines on the market and are available in most Makes/Models, including:

Make/Model	Duty Class	Max HP	Max Torque	Engine
Freightliner M2 112	Medium	320	1,000	Cummins Westport ISL G
Freightliner 114SD, Cascadia	Heavy	400	1,450	Cummins Westport ISX12
Peterbilt	Medium	320	1,000	Cummins Westport ISL G
Peterbilt 365, 520, 567, 579	Heavy	400	1,450	Cummins Westport ISX12
Kenworth T180, T280, T380	Medium	240	560	Cummins B6.7N
Kenworth T680, T880	Heavy	400	1,450	Cummins Westport ISX12

An exciting development in Heavy Trucks is the Cummins X15N engine that will be available in 2024. Generating up to 500 HP and 1,850 lb-ft of torque, the X15N provides a large power increase at a lighter weight than the 12L engine.

Dual Fuel Diesel/CNG

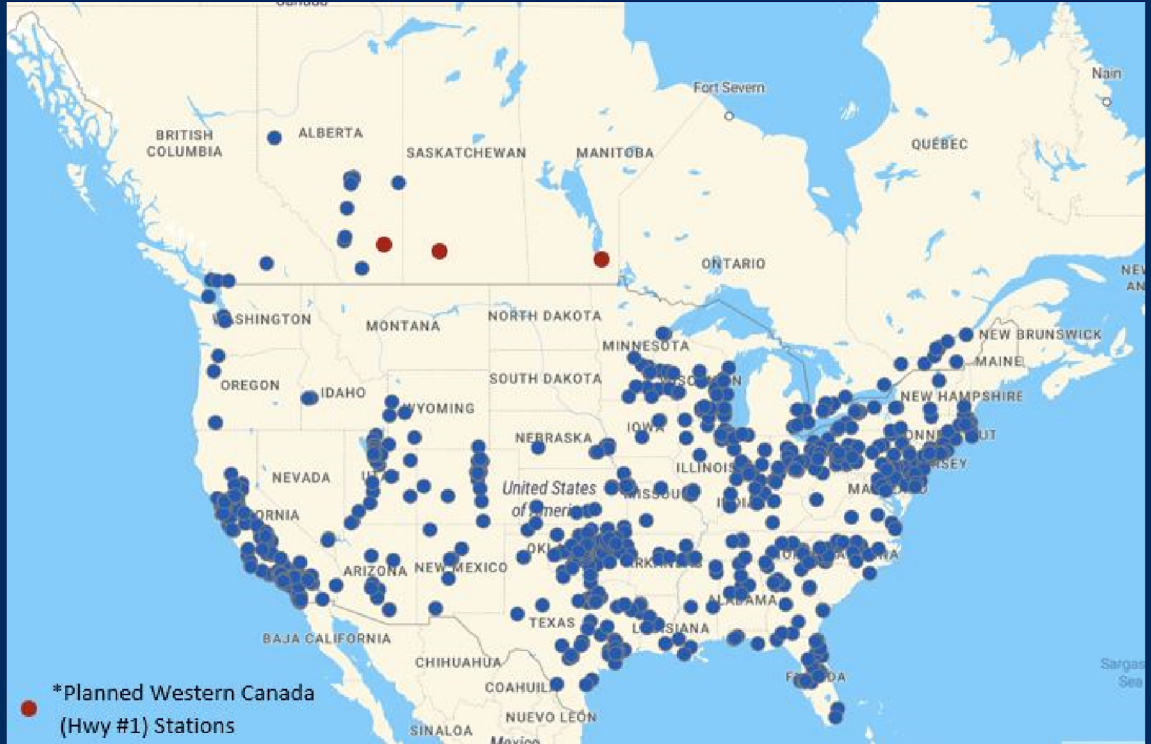
Aftermarket Dual Fuel conversions that utilize CNG to offset a portion of diesel are an excellent option for medium and heavy-duty fleets who wish to access the benefits of CNG, while retaining full power and fueling flexibility of Diesel. Dual Fuel conversions can provide up to 55% substitution of CNG for Diesel fuel, and converted vehicles can operate on 100% diesel when required.

Manufacturer	Nearest Installer
Innovative Fuel Systems	Innovative Fuel Systems (Edmonton)
ICOM Alternative Fuel Systems	HiTec Fuel Systems (Edmonton)

REFUELING

COMMERCIAL REFUELING STATIONS

Due to the growth of Natural Gas Vehicles in Canada, CNG fleets have increasing options for publicly accessible refueling. In support of this growth, Natural Resources and private alternative fuel providers are constructing new stations in Prawn, Manitoba, Swift Current, Saskatchewan, Redcliff, Alberta, Edmonton, Alberta, Calgary, Alberta and numerous other locations in British Columbia, Ontario and Quebec.



Public refueling is a strategic option for new and established CNG fleets and is often utilized as either a standalone fueling option for specific routes or in conjunction with onsite refueling.



REFUELING CONT'D



ONSITE REFUELING

Options for Onsite CNG Refueling are endless and can be surprisingly easy to setup at your homebase. County of Vermilion River, Clean Energy Fuels, FortisBC, consulting firms (Jenmar), and CNG refueling equipment suppliers are able to work with firms to determine your fleet refueling requirements and size equipment accordingly. In some cases, options are available for capital cost sharing of onsite refueling equipment.

Vehicle Type	Number of Vehicles	Capital Cost (CAD)	Maintenance Cost (CAD/year)	Electricity Cost (CAD/year)	Total Operating Cost (CAD/year)
Light Duty	5	\$ 320,453.00	\$ 17,330.00	\$ 9,921.10	\$ 27,251.10
	15	\$ 450,943.00	\$ 38,992.50	\$ 20,220.03	\$ 59,212.53
	50	\$ 1,103,993.09	\$ 65,740.13	\$ 28,802.46	\$ 94,542.59
Heavy Duty	3	\$ 313,154.00	\$ 33,698.02	\$ 9,921.10	\$ 43,619.12
	10	\$ 679,160.00	\$ 56,812.11	\$ 20,220.03	\$ 77,032.14
	50	\$ 1,141,594.25	\$ 80,684.23	\$ 37,384.90	\$ 118,069.13
Heavy Equipment	1	\$ 202,941.00	\$ 5,850.35	\$ 4,657.17	\$ 10,507.52
	5	\$ 320,453.00	\$ 23,401.40	\$ 9,921.10	\$ 33,322.50

2022 costs based on typical fleet requirements. Less and more expensive options are available depending on fuel quantity and timing requirements.

BY THE NUMBERS

Natural Gas is a unique alternative for fleets given that it can reduce both emissions and costs without major operational sacrifices in our Canadian climate. Numerous studies have shown the CO₂ and NO_x emissions reductions. And the County of Vermilion River is currently saving over 45% on fuel costs versus gasoline vehicles and projecting over \$7,000/vehicle in net savings.



Light Duty Vehicle

- + 40% Fuel Cost Savings
- + 18% CO₂e emissions reduction*



Heavy Duty Vehicle – Dedicated CNG

- + 50% Fuel Cost Savings
- + 22% CO₂e emissions reduction
- + 25% NO_x emissions reduction*



Heavy Duty Vehicle – Dual Fuel CNG

- + 25% Fuel Cost Savings
- + 11.5% CO₂e emissions reduction
- + 45% NO_x emissions reduction*

GREET Model for greenhouse gas emissions – CO₂ Emissions Calculator University of California, Riverside – Real-World NO_x Emissions from Heavy-Duty Diesel, Natural Gas, and Diesel Hybrid Electric Vehicles of Different Vocations on California Roadways



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