



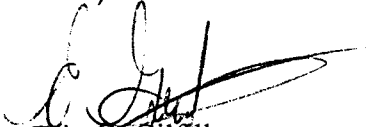
City of Richmond

Report to Committee

To: Public Works and Transportation Committee **Date:** August 3, 2004
From: Eric G. Gilfillan **File:**
Director, Operations
Re: **Alternative Fuel Vehicles**

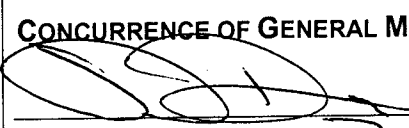


Staff Recommendation

That the "Alternative Fuel Vehicles" report (from the Manager, Fleet Operations, dated June 28, 2004) be received for information.



Eric G. Gilfillan
Director, Operations
(1206)

Att. 1

FOR ORIGINATING DIVISION USE ONLY					
ROUTED TO:	CONCURRENCE		CONCURRENCE OF GENERAL MANAGER		
					
REVIEWED BY TAG	 YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>	REVIEWED BY CAO	 YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>

Staff Report

On January 21, 2004 Public Works and Transportation Committee heard a delegation from Canadian Natural Gas Vehicle Alliance who spoke on the use of Compressed Natural Gas (CNG) as an alternative fuel source, resulting in the following referral motion:

That the possible use of natural gas as fuel in City-owned vehicles be referred to staff for a report on:

- (1) the history of the use of natural gas in the City;*
- (2) the City's current situation;*
- (3) whether staff could foresee natural gas being used for all vehicles in the City's fleet; and*
- (4) whether there were any possible revenue opportunities for the City to pursue, such as allowing public access to the natural gas outlet located at the Works Yard.*

This report deals with the first three referrals, the fourth will be discussed in a separate report.

History

Starting in 1982 the City used Provincial grants for after-market propane conversions. At the time this was an attractive alternative to gasoline. Propane costs were low compared to gasoline and emission testing was fairly broad in determining harmful emissions being emitted from propane-powered vehicles. Propane provided a good alternative to using gasoline.

In 1994 a compressor station to dispense CNG was installed at the City Operations Worksyard to service the growing number of City vehicles operating on CNG. The City had over fifty vehicles operating on a combination of CNG and gasoline known as dual fuel/bi-fuel.

Since 1998 many of the older vehicles with after-market CNG conversions started demonstrating high rates of failures, increased repair costs and were de-converted from CNG back to operate only on gasoline. As these vehicles were replaced, the new vehicles came with gasoline engines that were more efficient with reliable electronic fuel management systems.

Current Situation

The City has 29 vehicles using after-market CNG components and two factory bi-fuel pickup trucks. In addition, our RCMP fleet operates 42 dedicated (single fuel) CNG vehicles that refuel at our on-site refueling station on a daily basis (24/7). Other City equipment relying upon alternative fuels include ice re-surfacers, forklifts and crack sealers all of which are operating on either propane or CNG.

The City most recently has leased four hybrid electric cars as a pilot project. Staff have completed the pilot to evaluate the life cycle implications relative to hybrid vehicles in Richmond. These are considered ultra-low emission vehicles and when placed in specific applications they may prove to be a positive step in achieving the City's sustainable environmental goals.

Furthermore, the City recently concluded a pilot program to evaluate the use of a renewable resource known as Biodiesel. This additive has proven to significantly reduce green-house gases relating to particulate matter (PM), Carbon Monoxide (CO) and Hydro Carbons (HC) emissions being released into the environment. Additional supplementary information is provided in the attached Appendix.

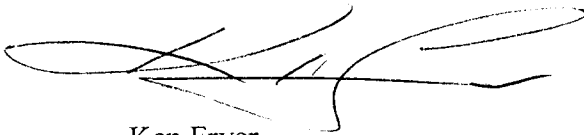
Future of CNG as an alternative fuel

General Motors is currently the only manufacturer producing a CNG factory converted full size van, while Ford Motor Company is discontinuing their production of CNG for all vehicles. Both GM and Ford are producing hybrid electric vehicles and Richmond will continue to take a lead role in evaluating these vehicles using hybrid electric technology. A number of manufacturers are actively pursuing alternative energy sources to meet the growing demand for a cleaner environment.

Local manufacturers such as Azure Dynamics in Burnaby are currently working on prototype hybrid electric chassis's ranging from 5,000 kg to 14,000 kg that could meet some of the City's operational needs. These vehicles are expected to be in production in 2006-2007. Once local warranty representation has been established, the City should consider utilizing this technology. In addition, hydrogen and hythane fuel pilot vehicles are being introduced into the market as test vehicles. Once proven, the City may consider conducting its own pilot.

Conclusion

The City's fleet of vehicles is comprised of a variety of styles and sizes, which currently limits using alternative fuels in many of our applications. As advancement in vehicle technology continues, Fleet Operations will search out what is available and where possible attempt to find the best vehicle to meet operational goals in support of environmental sustainability.



Ken Fryer
Manager, Fleet Operations

:kf

Attached - Appendix

Appendix

Supplemental Information

- Factory converted vehicles offered good driving performance, however, they limited our ability to choose vehicles because of limitations to gross vehicle weight, cab configuration, physical space and engine availability. However, original equipment manufacturers (OEM) vehicles converted to use a dedicated fuel are better suited for unique applications such as the police and taxi industry. Furthermore, the capital cost premium for factory CNG systems compared to gasoline equivalent means that there needs to be significant economic incentive to operate.
- Air Care testing has improved the air quality in our City through continuous testing and analysis of vehicle emissions. Air Care presented a technical paper that was published in a Society of Automotive Engineers publication (SAE), that indicated alternative fuel vehicles (propane and CNG) performed poorly with respect to emissions. Example - failure rate in 2002 was 26.3% for CNG vehicles and 10.9% for gasoline vehicles. Bi-fuel factory conversions had a higher failure rate than gasoline fuel vehicles.
- Our current fuel cost for gasoline and CNG is \$.68/litre and \$.98/ liter respectively. The higher CNG price is based on annual volumes and monthly compressor station costs. This high CNG cost is a deterrent unless our volumes increased.
- CNG vehicles have a limited application primarily as it relates to smaller gross vehicle weight (GVW), payload, horsepower and traveling range. Vehicles using diesel-powered engines have a larger GVW i.e. having the ability to carry more weight with more horsepower and drive a greater distance.

Finally, The Environmental Protection Agency (EPA) and California Air Research Board (CARB) have established strict Federal standards that apply to all vehicles in all classes.

- In 2006 diesel engines will be required to use ultra low sulphur fuel in conjunction with, catalytic converter after treatment or particulate matter traps.
- By year 2008, a two-tier emission standard will require all internal combustion diesel engines to have reduced emissions by 98-99% of 2003 levels.
- The EPA and CARB have identified CNG as having a higher “Mutagenicity” than that of diesel powered engines. This means the particulate matter emitted by CNG engines is “ultra-fine” and more harmful to humans compared to the particulate matter being emitted by diesel engines. The particulate matter in diesels will be reduced significantly when combined with the use of Biodiesel.