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YORK REGION TRANSIT
PILOT PROGRAM ON BIO-DIESEL FUEL - UPDATE

The Transit Committee recommends the adoption of the recommendation contained in the following report, October 23, 2007, from the General Manager, Transit:

1. RECOMMENDATION

It is recommended that bio-diesel fuel be utilized in all 90 buses operated for the Viva bus rapid transit service commencing in 2008, subject to continued satisfactory operations and exhaust emission test results, and approval of the 2008 Draft Business Plan and Budget.

2. PURPOSE

This report updates Transit Committee and Regional Council on the status of current testing activities on the use of bio-diesel fuel and recommends the expansion of its use subject to continued successful operating and testing results as outlined in this report.

3. BACKGROUND

Regional Council, at its May 24, 2007 meeting, endorsed the use of bio-diesel fuel in the Viva bus fleet, subject to York Region Transit (YRT) staff reporting back on the results of ongoing tests on five buses in co-operation with Veolia Transportation, and approval of the program as part of the 2008 Business Plan and Budget.

3.1 Bio-Diesel Fuel

Bio-diesel is a clean-burning alternative fuel produced from vegetable oils and/or animal fats. Bio-diesel contains no petroleum, but it can be blended at any level with petroleum diesel to create a bio-diesel blend. It can be used in diesel engines with no major modifications.

The use of bio-diesel in conventional diesel engines results in reductions of unburned hydrocarbons, carbon monoxide and particulate matter compared to emissions from diesel fuel. In addition, the exhaust emissions of sulphur oxides and sulphates (major components of acid rain) from bio-diesel are essentially eliminated compared to diesel. Although some increases in nitrogen oxide (NOX) emissions have been experienced with some types of bio-diesel, these can be mitigated by selecting bio-diesel with a high cetane number. Regardless, research has confirmed that bio-diesel exhaust has a less harmful

impact on human health than petroleum diesel fuel. Bio-diesel emissions have decreased levels of polycyclic aromatic hydrocarbons (PAH) and nitrated PAH compounds that have been identified as potentially cancer-causing. Other advantages include the reduction of our dependence on non-renewable fuel sources, prolonging the life of the bus engine and contributing to the overall health benefit of our community.

Bio-diesel blends of up to 20% bio fuel and 80% diesel (B20) have been tested and are in use by some transit systems in Ontario including the Toronto Transit Commission and Brampton Transit. Typically, B20 is used from mid-spring to mid-fall and 5% bio fuel and 95% diesel (B5) during colder weather conditions. Both transit systems had some fuel "jellying" issues with the use of B20 during winter conditions.

4. ANALYSIS AND OPTIONS

4.1 York Region Transit Bio-Diesel Pilot Program

YRT staff have partnered with Veolia Transportation, which is under contract to the Region to operate the Viva bus rapid transit service, on the pilot program. Five Viva buses were tested starting in May 2007 with the use of B5 and later with B20 bio-diesel fuel. As with all YRT service contractors, Veolia is responsible for supplying all the necessary fuel to operate the service. The study included before and after emission tests, review of fuel handling techniques, and an examination of maintenance and operational impacts. YRT and Veolia are sharing the cost of this pilot program.

Emission tests were conducted on three separate dates on the same five buses. The test results indicate that carbon monoxide emissions were reduced by an average of approximately 22%. The carbon monoxide test result is consistent with a detailed test on transit buses conducted by the National Renewable Energy Laboratory for the U.S. Department of Energy. This test also measured particulate matter and hydrocarbon emissions. Table 1 below provides a summary of the emission test results.

Table 1
Transit Bus Emission Test Results - U.S. Department of Energy

	Carbon Monoxide grams/mile	Particulate Matter grams/mile	Hydrocarbons grams/mile
Low Sulphur Grade A Diesel	3.36	.301	.830
Bio-Diesel (B20)	2.61	.229	.596
Percentage Difference	**-22.3%**	**-23.9%**	**-28.1%**

The U.S. test results also identified a slight reduction in fuel economy of up to two percent with B20 bio-diesel. The fuel economy on the five Viva buses experienced no changes with B5 bio-diesel and a marginal reduction with the use of B20 bio-diesel.

From an operations and maintenance perspective, there were no concerns identified with respect to maintenance or bus performance. During the pilot program, there was the need for additional handling of fuel as two separate fuel types had to be transported and only bio-fuel was pumped into the test bus units. The additional fuel handling requirements will not be necessary if bio-diesel is used fleet wide. Continued testing is required as YRT staff have not tested B5 in cold conditions. Although this test has already been conducted successfully on other transit buses in Ontario, the YRT/Viva fleet is unique as the majority of buses are stored outside.

This pilot project utilized the Viva fleet as all the buses and fuel storage tanks are relatively new. If the bio-diesel program is expanded in subsequent years for use on older YRT buses and older fuel storage tanks, there will be a need to clean the fuel tanks and pumping equipment due to the cleansing properties of this fuel.

4.2 Relationship to Vision 2026

The implementation of this initiative will contribute to a reduction in greenhouse gas emissions and other air pollutants, and could lead to its more widespread use. This complements the Vision 2026 goal of “Enhanced Environment, Heritage and Culture”.

5. FINANCIAL IMPLICATIONS

YRT and Veolia staff have partnered to share the cost of a bio-diesel pilot program on five Viva buses. The cost of the pilot program is calculated to be approximately $1,000 per month which includes the testing program and added cost for the bio-diesel fuel.

YRT shares in the cost of the pilot program by paying the $0.05 per litre difference from the Ultra Low Sulphur Diesel (ULSD) currently used. If the program is extended to the entire Viva fleet, it has been determined that the cost per litre for the B5 or B20 blend will range between $0.025 and $0.04 per litre more than the ULSD. The cost per litre will be determined by the current market, volume purchased and the delivery system.

The cost to extend the program to the entire Viva fleet is estimated at $200,000. These funds would allow the Viva operating contractor to purchase approximately 5 million litres of bio-diesel fuel to operate approximately 250,000 hour of revenue service.

Funding is included in the draft 2008 Business Plan and Budget for the proposed expansion of the bio-diesel program.

6. LOCAL MUNICIPAL IMPACT

The use of bio-diesel fuel by one YRT contractor would reduce greenhouse gas emissions and specific air pollutants that affect local air quality in the community while providing the opportunity to assess the merits of expanding its use to the remainder of the YRT fleet.

7. CONCLUSION

Staff recommends the introduction of bio-diesel fuel for the Viva fleet in 2008 subject to continued successful test results and approval of the program as part of the 2008 Business Plan and Budget.

For more information on this report, contact Rick Takagi, Manager, Operations (Ext. 5624) of the Transit Branch in the Transportation and Works Department.

The Senior Management Group has reviewed this report.