

Greening the Fleet

National Trends and Opportunities for the City of Edmonton



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By Allan Bolstad

Greening the Fleet: National Trends and Opportunities for the City of Edmonton

Allan Bolstad

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About the Author

Allan Bolstad is a former Edmonton City Councillor (1992-2004) who now has his own sustainable development consulting practice.

He has authored reports entitled *Smart Growth in Alberta* for the Sierra Club of Canada (Prairie Chapter); *Toward a Provincial Land Use Strategy* for the Alberta Liberal Caucus; *Municipal Sustainability*, also for the Alberta Liberal Caucus; *The Green Energy Plan* for the Alberta NDP Caucus and *The Edmonton Land Trust Business Plan* for the Edmonton Community Foundation.

Prior to serving on City Council, Allan Bolstad spent 13 years as a journalist, working as a columnist and senior business writer for the Edmonton Sun and Editor and city hall reporter for the Edmonton Examiner.

He has a Bachelor of Arts degree from the University of Alberta and teaches both government studies and mass communications in Canada as a sessional lecturer in the journalism program at Grant MacEwan College.

He is a volunteer board member of the Sierra Club of Canada (Prairie Chapter) and Legacy Lands Conservation Society, a group dedicated to preserving some of the agricultural lands in northeast Edmonton.

Executive Summary

Greening the Fleet.

It's a new phrase that is quickly becoming a household term in municipalities across Canada, as they seek ways to reduce fuel consumption and emissions produced by their fleet of vehicles.

The stakes are high.

With fuel prices pushing past \$1/litre and growing concerns about environmental damage produced by global warming, fleet managers are under increasing pressure to find new ways of doing business.

Some cities, like Edmonton, have focused on driver behaviour, in order to find ways to reduce the amount of fuel used on a daily basis.

Other cities, like Toronto, Hamilton and Calgary, have become much more aggressive, investing in alternative vehicles like gas-electric hybrids, diesel-electric hybrids and plug-in hybrids. These vehicles get much better mileage and produce far less emissions, including the greenhouse gas CO₂, which is one of the main culprits contributing to global warming.

These cities are also investing heavily in alternative fuels, such as biodiesel, which also reduces the impact their fleets have on the environment.

On the west coast, an organization called the Fraser Basin Council has gone so far as to develop a program that rates green fleet programs and provides a wealth of advice for fleet managers.

In light of these developments, it is clear that the City of Edmonton could do much more to "green its fleet" of 3,500 vehicles.

With recently-announced federal rebates for fuel efficient vehicles, the time has come for Edmonton to acquire many more gas-electric and diesel-electric cars and light trucks. It's also time to invest in Smart Cars, plug-in hybrids, diesel-electric garbage trucks and idle-free trucks (where the heater runs off a separate motor so the truck doesn't have to be running).

It could also ramp up its investment in diesel-hybrid buses and ensure that it has an order in for the ultra-efficient all-electric vehicles, once they have been approved for general use by Transport Canada.

It also makes sense for the city to get more active in its purchase of alternative fuels, like biodiesel. Other cities are seeing good results with blends of 20% in the summer months and 5% in winter, which work well in the northern Alberta climate. Edmonton could see a significant reduction in its fleet emissions through this change alone.

The city administration in Edmonton hopes to begin work shortly on a green fleet program, so that it has a proposal to present to city council in early 2008.

Its case for political support will be compelling.

Fuel prices are rising dramatically and will consume a growing portion of the city's budget as the size of the municipality continues to increase.

The city is nowhere near its council-approved greenhouse gas reduction targets, a situation that will soon be extremely problematic as Canada, along with the rest of the world, attempts to address global warming.

And citizens are looking for leadership, as they become increasingly uneasy about the growing cost of local government and the impact urban development is having on the environment.

In short, the situation cries out for political leadership, for the will to invest in new technologies that will have a huge impact in the near future.

The time has come for Edmonton's civic leaders to support an aggressive Green Fleet Plan, designed specifically for the City of Edmonton.

Introduction

Municipal fleet managers are under the gun.

They've been told to cut costs.

And they've been charged with reducing vehicle emissions.

So what have they done?

They've focused on reducing fuel consumption – any way they can – along with finding environmentally-friendly fuels.

They've called this effort “greening the fleet” and it's a concept that is sweeping across Canada.

This report examines some of the leading examples of Green Fleet programs in Canadian municipalities.

It documents the steps they have taken and notes the common threads that are emerging between these programs.

It then looks at the situation facing the City of Edmonton, as it begins to meet this challenge.

A series of recommendations are put forward for the city to consider, all designed to reduce costs and improve the environmental performance of its vehicle fleet.

Lower costs.

Fewer emissions.

It's a win-win situation whose time has come.

Why Green The Fleet?

There are a number of reasons that make efficient fleet management an increasingly important issue among municipalities today.

The first and most obvious factor is cost.

With municipalities like Edmonton using 34 million litres of fuel per year, even a five per cent saving on fuel - which some green fleet programs produce – saves over \$1.5 million.*

This situation is going to become more pronounced, as cities like Edmonton continue to grow in size, forcing vehicles in the municipal fleet to drive increasingly long distances.

The second key issue is vehicle emissions.

This has become increasingly important as cities like Edmonton become more concerned about air quality and their contribution to greenhouse gas production – the chief cause of global warming.

The seriousness of global warming can hardly be overstated, as panels of international experts are warning about prolonged drought, fresh water shortages, the introduction of new diseases and pests (like the pine beetle) to Alberta, along with a sharp rise in severe weather events. Vehicle emissions contain significant amounts of carbon dioxide (CO₂), which is a greenhouse gas that is contributing significantly to global warming.

In the City of Edmonton, vehicle emissions are estimated to account for just over one fifth of the city's greenhouse gas production.**

As emissions from transportation continue to grow, cities like Edmonton are finding it increasingly difficult to reach their greenhouse gas targets. For example, Edmonton's greenhouse gas reduction program (CO₂RE), which was approved by Edmonton City Council in 2002, set a city-wide target of a 6% reduction in 1990 GHG levels by 2010 (13.4 million tonnes). Now five years into its mandate, the program can only point to 3,300 tonnes of GHG reductions that are directly measurable. The current gap is estimated to be over five million tonnes ** and it is expected to hit seven million tonnes by 2010.***

Canada is doing no better.

Despite its commitment to the Kyoto protocol in 1998, where it committed to a reduce greenhouse gas levels to 6% below 1990 emissions by 2012, the country in 2004 had experienced an increase of greenhouse gas by 35% over its target level.****

* Mobile Equipment Services data, City of Edmonton

** City of Edmonton CORE Strategic Review Challenge Paper (March 20, 2007)

*** City of Edmonton's EcoVision Annual Report 2006

**** National Inventory Report, 1990-2004 – Greenhouse Gas Sources and Sinks in Canada, Environment Canada

This leaves both Edmonton and the rest of Canada in a very difficult situation. Unless methods are found to make dramatic reductions in greenhouse gas production, the only option under the Kyoto Accord is to purchase carbon offsets equivalent to the amount by which the country has missed its target.

However, this is shaping up to be a very expensive and difficult proposition.

In Alberta, the provincial government has pegged the cost of carbon offsets at \$15 a tonne. Consequently, if the province were forced to offset its share of emissions in excess of the Kyoto Accord, it would be faced with a charge in excess of \$1 billion in 2004, given the province's heavy reliance on fossil fuel energy.

Canada would have faced a \$3 billion bill in 2004 if it paid a similar charge of \$15 tonne.*

Keeping all of this in mind, municipal green fleet programs would give cities like Edmonton an opportunity to reduce its greenhouse gas production, thereby reducing the need for Alberta or Canada to purchase carbon offset credits. If successful, the program could even attract carbon offset dollars, as other emitters of greenhouse gas look for opportunities to purchase credits.

Toronto is a good example of a city looking at carbon offset trading as a viable means of helping to finance their green fleet operation.

Other Canadian cities, like Edmonton, could easily do likewise.

Finally, it should be noted that municipalities have a leadership role to play when it comes to greening their fleet and improving the environment.

City vehicles, for example, are very visible and can be a positive stimulus for citizens to take steps on their own to purchase vehicles that use less fuel or use fuels that are less harmful to the environment. Cities can play a key role in getting the message out to their citizens and members of the public are always more impressed if the government "walks the walk" as well as "talks the talk."

* Calculated from Environment Canada 2005 Emissions Data

Green Fleet Techniques

The primary goal of any Green Fleet program is to reduce fuel consumption.

The first area that most municipalities consider, that traditionally calls for very little investment, is driver awareness and training techniques that can bring down the consumption of their existing fleet.

For example, fleet managers have instituted an array of programs that impress upon drivers the need to avoid rapid acceleration or sharp braking, unless absolutely necessary. The avoidance of vehicle idling is a significant issue as well, with some cities preparing directives that limit idling time and even track the amount of time each vehicle is sitting idle, in order to find ways to reduce this practice (see Toronto's experience in the next chapter).

Civic fleet managers have also invested a good deal of effort on trip planning, to ensure vehicles go the shortest route and take as few trips as necessary. Right-sizing the vehicle has also become a big topic, as municipalities attempt to make sure they use large, heavy-fuel-consuming vehicles as little as possible.

Fuel Efficient Vehicles

Gas-Electric Hybrids

A hybrid-electric vehicle uses an internal combustion engine and an electric motor, powered by a large, rechargeable battery. The battery is recharged either by the engine or from energy captured when the vehicle is braking.

The motor on a hybrid turns off when the vehicle is stopped and is turned back on when the accelerator is pressed. The electric motor propels the vehicle at lower speeds and provides extra power, drawn from the battery, when the vehicle is accelerating quickly.

Hybrids are known for their low fuel consumption, as well as reduced levels of smog-related emissions and CO₂, a greenhouse gas.

For example, the 2007 Toyota Prius Hybrid is rated to travel 100 km on only 4.1 litres of fuel, while the 2007 Honda Civic Hybrid uses only 4.5 litres. This



The two-passenger Honda Insight is the most fuel-efficient vehicle in Canada, with an EnerGuide Rating of 3.9 litres/city and 3.3 litres/ highway per 100 km.

compares with full sized vehicles and vans which typically use 11-16 litres to cover 100 km, or 4x4 SUVs which need closer to 20 litres to travel the same distance.*

Hybrids are equally impressive when it comes to CO2 emissions. As an illustration, a Honda Insight hybrid produces just over 1/3 of the CO2 produced by a Honda Accord, which itself stacks up most favourably against larger cars, vans and SUVs.

While the cost of a hybrid vehicle is generally higher than other similar sized vehicles, purchasing a hybrid has been made easier thanks to the federal government's recently announced rebate program for fuel-efficient vehicles.

For example, new cars that use 6.5 litres or less to travel 100 km and light trucks that use less 8.3 litres or less to travel 100 km are eligible for rebates of \$1,000 - \$2,000, depending on fuel-efficiency. This includes all gas-electric hybrids and some other cars, like the Toyota Corolla or Mini Cooper.

This incentive is augmented by a federal excise tax on fuel inefficient cars, which was also brought into effect last March. Under this program, vehicles that have a weighted average fuel consumption (55% city/45% highway driving) of 13 litres or more per 100 km. are hit with a surtax of \$1,000 - \$4,000, depending on fuel consumption. The tax applies to new automobiles, including vans and SUVs like the Chevy Suburban and Trailblazer (AWD), Ford Explorer 4x4, JEEP Commander 4x4 and Grand Cherokee 4x4 (SRTS). The tax is payable by the manufacturer or importer at the time the vehicle is delivered to a dealer.

Hybrid Plug-Ins

A particularly attractive option now on the table is the use of hybrids that can be plugged into an ordinary wall outlet. Produced in Canada by the Ontario company Hymotion, the cars feature an oversized, lithium ion battery that can propel the car over 50 km. without having to use regular fuel. Plugged in overnight, the vehicle can almost be operated free of the internal combustion motor on board.

These vehicles will become even more attractive from an environmental standpoint as more electricity is produced through renewable energy sources, such as solar and wind power.



The Chevy Volt Plug-In Electric Hybrid Concept Car

* Transport Canada EcoAuto Program Guide

All-Electric Vehicles

A host of vehicles are in the planning and testing stages that rely solely on electric motors and electric energy. For example, Mitsubishi and Subaru announced in 2005 that they would be manufacturing lithium-ion powered cars before 2010.

While tremendous fuel efficiency can be obtained, none of these vehicles has been sanctioned for regular road use for Transport Canada, which makes this option much less attractive for the moment. However, if trends in other nations, including the United States, take hold in Canada, all-electric vehicles could soon become standard components of many municipal fleet operations.



Mitsubishi Prototype Electric Vehicle

Smart Cars

Some municipalities are starting to purchase Daimler/Chrysler's Smart Car for their light-duty operations. With diesel fuel ratings of 4.2 litres per 100 km., these vehicles challenge the most efficient hybrids on the market.* At 2.5 metres in length, the two-seat vehicle is well suited for urban use where parking and turn space is at a premium.



Daimler/Chrysler's Smart Fortwo

Hydrogen Fuel Cells

Vehicles that run on hydrogen fuel cells are being touted in some circles – notably California with its proposed hydrogen highway – as the vehicle of the future. These cars feature on-board fuel cells that generate electricity by electrochemically combining hydrogen and oxygen. Powered by an electric motor, the car can be run with zero or very low emissions.*

However, there are a number of factors that severely restrict, if not prohibit their use in Canada at this time.

One is finding a ready supply of hydrogen. Naturally, if the hydrogen is to be obtained from a fossil fuel source like coal or oil, the environmental benefit of the fuel cell is quickly lost.

* Natural Resources Canada website

It also takes a significant amount of energy to obtain hydrogen, depending on the source.

Other factors include the car battery's aversion to cold weather and the build up of hydrogen – which is very flammable – if the vehicle is stored inside.

One of the only places these vehicles are being tested in Canada is Vancouver. Fleet managers in other locales are adopting a wait-and-see approach.

Alternative Fuels

Alternative fuels represent the other significant frontier through which municipal fleet managers can reduce the emissions produced by their stable of vehicles.

The fuel generating the most interest at this time is biodiesel. Made from sources such as animal fats, cooking oil and agricultural crops like soy, blends of 5% biodiesel and 20% biodiesel are actively used in Canada and have produced good results.

Although tailpipe GHG emissions are only slightly lower using biodiesel over petrodiesel, the life-cycle difference between growing oil seeds or collecting rendering waste versus petroleum diesel production is dramatic. For example, pure biodiesel produces 60% - 100% less greenhouse gas than petroleum diesel, depending on what oil or fat is used to make it. A 20% blend produces 12-18 per cent fewer GHG emissions and a 5% blend produces two-four per cent fewer emissions.*

Pure biodiesel also produces 67% fewer unburned hydrocarbons (smog), 48% fewer particulates (causing respiratory diseases) and 48% less carbon monoxide **

While biodiesel tends to gel at low temperatures, Toronto Transit has had good results with using a B20 blend in summer and B5 blend in winter.

It should also be noted that producing biodiesel from animal fats and restaurant grease has the benefit of keeping these materials out of landfill sites. Conversely, producing biodiesel from food sources like soy or canola oil will soon find the transportation sector competing for a perfectly good food product, which has many ramifications from the perspective of world food supply and food pricing.

* Natural Resources Canada website

** Fraser Basin Council website video



Blends of B5, B10 and B20 biodiesel are now available at the pump in British Columbia.

Ethanol

Ethanol is a renewable fuel because it is produced from biomass, like corn or various grains. It reduces greenhouse gas because the feedstock absorbs carbon dioxide as it grows. For example E10 from grain produces about 3-4 per cent fewer greenhouse gas emissions than gasoline. E10 made from wood will produce six to eight per cent fewer emissions than gasoline.*

However, as noted above, the use of products like wheat or corn raises significant food production and food pricing issues that warrant careful scrutiny.

Clean Natural Gas

Some Canadian municipalities, like Toronto, are using natural gas powered vehicles as a way to reduce the amount of greenhouse gas and other emissions associated with regular fuels. A clean-burning fuel, natural gas produces 30-40% less greenhouse gas than regular fuel. In addition, smog-producing gases, such as carbon monoxide and nitrogen oxides, are reduced by more than 90% and 60%, respectively. **

However, as the name implies, fleets using this technology require a ready supply of natural gas. As a non-renewable resource, this will soon become a significant issue for Albertans, in that the provincial natural gas reserves are dropping by two-to-three per cent per year.*** This decline will have a significant impact on the provincial budget (natural gas royalties pumped \$8.388 million into the provincial treasury 2005/2006),**** and many sectors of society, such as residential and commercial building operations, are entirely dependent on natural gas for heat. All of these concerns would be accentuated if the transportation sector began to use large amounts of Alberta's dwindling supply of natural gas.

Carbon Credits

While the trading of carbon credits as offsets to greenhouse gas emissions is still in its infancy, corporations, governments and stock exchanges are gearing up for the day when this practise will be commonplace.

A good illustration is the recent announcement from the Province of Alberta that large industrial emitters will face a penalty of \$15 for every tonne of CO₂ they produce beyond the government's carbon intensity guideline.

* Natural Resources Canada, <http://oe.nrcan.gc.ca/transportation/tools/afvGuide/allSuppliers.cfm?attr=16>

** U.S. Department of Energy

*** Canadian Association of Petroleum Producers

**** Government of Alberta, Department of Energy, www.energy.gov.ab.ca/447.asp

Neither Alberta nor Canada has developed or joined a carbon-trading program, but once this happens greenhouse gas reduction programs like green fleetings would be in line for funding.

With global warming and Canada's Kyoto commitment deadline looming (2012) municipalities should be in a position to receive significant financial assistance for their green fleet programs in the next five years.

Green Municipal Fund Assistance

On May 23 the federal government issued a request for proposals from municipalities interested in acquiring or retrofitting and operating energy-efficient and emission-reducing vehicles.

Administered by the Federation of Canadian Municipalities, the program has \$10 million in low-interest loans and \$1.6 million in matching grant moneys that it can make available.

While Intent to Apply forms had to be in by June 20, a government representative noted the plan will undoubtedly return next year, structured to address environmental issues faced by municipalities.

Experience of Other Canadian Municipalities

City of Toronto

One of the first cities through the green fleet gate was the City of Toronto, which is nearly finished the first phase of its program (Green Fleet Transition Plan 2004-2007).*

An aggressive and multi-faceted plan, it called for a reduction of 10-15 million kilograms of carbon dioxide equivalent (eCO₂) – representing a 23 per cent reduction in fleet emissions from the business-as-usual scenario - along with significant reductions in other forms of air pollution.

For example, the plan proposed to replace 84 per cent of the city's planned vehicle replacements of light duty vehicles (cars and light trucks) with hybrid-electric vehicles. Through optimizing fleet specifications (right-sizing) and other measures, the plan was also designed to meet city council's directive of reducing Toronto's 4,000-unit fleet by five per cent.

The city has followed through with the purchase of a wide-array of hybrid and other high-efficiency, low-emission vehicles. For example it has bought 27 GMC Sierra Hybrid Pickup Trucks, 24 Honda Civic Hybrids, 10 Toyota Highlander Hybrids, 13 Smart Cars and a Hybrid Garbage Packer. It has also invested in 138 Natural Gas Vehicles and 29 Idle-Free Trucks,

* City of Toronto, Fleet Services, http://www.toronto.ca/fleet/green_fleet_transition_qa.htm where the space heater inside the vehicle runs off a separate motor so the main engine doesn't have to be running – a significant energy-saving measure in low temperatures.

Toronto Mayor David Miller made headlines on May 24 when he announced the city's plan to convert 10 of its hybrid cars to plug-in models that can be charged by any wall socket. The vehicles are equipped with batteries that are able to propel the car in an urban setting for 50 kilometres, meaning that they are essentially all-electric vehicles if recharged regularly. The vehicles can also serve as mobile backup power stations, able to provide emergency electricity to homes during a blackout or be plugged into the grid en masse during the day to supply peak power and prevent blackouts.

The Toronto Atmospheric Fund, a city agency providing funding for the project, estimates the retrofitted vehicles will see a 40 per cent drop in their carbon dioxide emissions, growing to 60 per cent once all Ontario's coal facilities are closed. Emissions at that point will be 85% below those of the current average Canadian car.

The plan is to expand the use of plug-in hybrids to as many as 200 vehicles in 2008, contingent on funding.

To date, Toronto is taking a wait-and-see approach with hydrogen fuel cell vehicles.

However, it has ventured heavily into use of alternative fuels, featuring E10 gasoline, B10 Biodiesel and S15 coloured diesel. The city has also reported positive results on some early testing of B50 Biodiesel.

Toronto has concluded that biodiesel is well suited to Toronto's needs and represents an affordable, renewable and sustainable solution for reducing CO₂ emissions.

Toronto has also been a leader in implementing an array of fuel saving measures in the operation of its fleet. As one of the first cities to adopt an anti-idling bylaw (motorists are prohibited from idling their vehicles for more than three minutes in all but extremely hot and cold temperatures), the city has instructed its staff not to idle their vehicle for longer than 10 seconds, unless stuck in traffic. Under the belief that its vehicles are left idling somewhere between 20% and 60% of their total running time, the city has developed a Global Positioning Monitoring (GPS) system that is able to accurately measure the idling time of each vehicle. It is also able to gauge vehicle speed and the incidents of hard-braking, all of which will be used to educate employees about smart driving techniques.

Cost of the four-year Green Fleet Transition Plan is expected to be about \$1.8 million, which is less than three per cent of the forecast \$68.3 million planned for vehicle replacement over the next four years. The city believes a variety of factors, ranging from greater fuel savings to reduced capital costs of new vehicles (complete with federal rebates) to the sale of emission-reduction credits to the federal government should reduce the cost of the program in future years. The city is in the midst of evaluating the success the plan and is beginning work on a 2008-2010 version that will prominently feature the use of hybrids, along with alternative fuels.

It also wants to send a compelling message to the automotive industry, other governments and the public that the city's fleet operations are at the forefront of major actions to be taken that improve the environment in a sustainable and cost-effective way.

Toronto hosted the first-ever Green Fleet Expo in 2006 and joined with the City of Hamilton to host the second event on May 24, 2007. The exposition provided an opportunity for participants to see, test-drive and learn about green fleet technologies. It also showcased the progress by Ontario municipalities in reducing fuel and emission levels.

City of Hamilton

The City of Hamilton recently received a silver rating for excellence in “greening” its fleet from the Fraser Basin Council’s E3 Fleet Rating System.

Between 2005 and 2006, the city’s fleet of over 700 vehicles increased fuel efficiency by 5% for every kilometre traveled and decreased greenhouse gas emissions by 2% per kilometre. These improvements were almost entirely due to the replacement of conventional gasoline-powered vehicles with gas-electric hybrids. The city’s 56 hybrid cars are using approximately 22% less fuel than the vehicles they replaced. The city also has 12 hybrid buses in its fleet.*

Other key accomplishments that lead to the silver rating included:

- Developing a comprehensive Green Fleet Plan, with endorsement from city council.
- Engaging employees in an idling-reduction program
- Developing a right-sized vehicle program
- Developing and maintaining a fuel-data tracking system, using weekly and monthly exception reports to resolve problems quickly.
- Route and trip planning to minimize the number and length of trips.
- Eliminating older, fuel inefficient vehicles

The city has also just begun to use a 5% blend of biodiesel in its main yard in downtown Hamilton, which is provided by Alberta-based Suncor.

It also reports that it has yet to see a practical or affordable all-electric or hydrogen fuel-cell vehicle on the market. It noted that some of the low-speed electric vehicles (like the Zenn electric car) does not have Transport Canada approval, which presents health and safety issues for employees. It also noted that it doesn’t have a campus-like area with roads closed to normal traffic where an electric low-speed vehicle could be operated safely.

Air Liquide has a plant in Hamilton that produces hydrogen (along with oxygen for the Stelco blast furnaces), but the city noted how cold temperatures were a barrier, as the water in the fuel cells will freeze.

* Fraser Basin Council, May, 2007 Newsletter

City of Calgary

One of the first cities to develop a comprehensive Green Fleet program was the City of Calgary, which began work on an aggressive fuel-saving and emission-reduction program in 2003. The program's short term goal was to stabilize the city fleet's fuel consumption at the 'year 2000 level' and its long term goal was to stabilize fleet GHG emissions at the 'year 2000' level by 2012.

The city has moved on a number of fronts in its attempt to reach these targets. Perhaps most notable is its use of biodiesel – two million litres in 2007 – mostly by the city's waste collection trucks, along with an assortment of parks vehicles and equipment. Using blends of B20 in the summer and B5 in the winter, the new fuel reportedly cut the fleet's GHG emissions by 190 tonnes in 2006.

The city has also begun to introduce hybrid vehicles into the fleet. Nineteen gas-electric vehicles have been purchased – including five pick-up trucks – for use by various departments. Calgary is also keeping an eye on the success other cities, like Toronto, are having with plug-in hybrids and are waiting to see how the City of Vancouver makes out with its hydrogen fuel-cell vehicles.

Calgary's Green Fleet program also calls for a variety of other changes. The following list offers a sampling:

- automatic engine shut-off devices for heavy-duty diesel vehicles
- engine pre-heat systems to reduce idling
- incorporation of Transport Canada's fuel consumption ratings into the vehicle tendering process
- vehicle idling driver education and policies
- right-sizing vehicle needs
- new maintenance protocols
- route planning efficiencies
- employee transit ticket sign-out program for work travel

With a fleet of about 4,100 vehicles (2,200 general use vehicles, 800 Police Service vehicles, 950 transit vehicles and buses and 170 fire department vehicles), the city's fleet was the source of 95.2 kt of GHG emissions in 2004. This represented 21.4% of the corporation's total GHG emissions and was the corporation's fastest-growing source of emissions since 1990, increasing by about 5.3%.

The city's fleet management branch notes that the biggest obstacle to meeting the city's Green Fleet objectives is the "astronomical growth the city is experiencing." This forces city vehicles to cover many more kilometres each year while fighting increasing amounts of traffic congestion.

The city also noted that it has yet to receive any financial help from the provincial or federal government for its Green Fleet program.

Fraser Basin Council

The Fraser Basin Council, a charitable organization focused on sustainability issues in central and southern B.C. (see appendix), has launched two programs that are particularly helpful to fleet managers across Canada. They are the E3 Fleet Program and Fleet Challenge B.C.

E3 Fleet Program (Energy, Environment, Excellence)

Launched in November, 2006, E3 Fleet has 16 charter members, including the cities of Vancouver, North Vancouver, Coquitlam, Kelowna and Hamilton, along with BC Hydro, the University of B.C, Enbridge and Novex Courier. Collectively they manage over 15,000 vehicles.

Through E3 Fleet membership, managers gain access to a new data analysis tool – Fleet Review – which generates reports for reducing fuel, operating and capital costs as well as emissions for each fleet.

The program also offers *the first green rating system for vehicle fleets in North America*.

Undertaken by an independent third party, the rating of fleets is a points-based system that takes the following into account: fleet action plan, training and awareness, idling reduction, vehicle purchasing, fuel data management, operations and maintenance, trip and route planning, utilization management, fuel efficiency and greenhouse gas performance.

Designed by fleet managers for fleet managers, E3 Fleet is a new program to provide services and resources to help Canadian public and private sector fleets increase fuel efficiency, reduce emissions, manage expenses, incorporate new technologies and use alternative fuels.

With funding from Western Economic Diversification Canada and BC Ministry of Environment, E3 Fleet also offers its members software-based services that will provide comprehensive reports on emissions and fuel performance, vehicle utilization and availability, capital asset profile, operational profile, exception reports identifying vehicles that have below average fuel economy, excessive emissions, excessive downtime or underutilization, average age of fleet and an analysis of vehicle replacement with “best in class vehicles.”

Fleet Challenge B.C.

With funding from Natural Resources Canada, the Fraser Basin Council has launched Fleet Challenge B.C., a program that focuses on the use of biofuel and hybrid vehicles.

For example, its program **BC Biofleet** promotes the use of biodiesel through branding, website resources, training workshops, outreach and incentives. Thanks to this initiative, over 50 fleets in B.C. are now using biodiesel.

The council's **Hybrid Experience Report*** documents the real-life experiences and fuel efficiency results of fleets that use hybrids.

The City of Edmonton's Experience

Edmonton has yet to formally develop a Green Fleet program.

However, it has launched some initiatives that would certainly qualify for inclusion.

For example, it has a 'fuel sense program' that encourages efficient driving behaviour for city vehicle drivers. Over 800 municipal drivers and over 200 transit bus drivers have been trained on this program.

Edmonton Transit has a bus-idling initiative, in effect during summer daylight hours, that encourages drivers to shut down their vehicles at layover points where the bus has a dwell time of five minutes or more, without compromising the comfort and safety of passengers.

Edmonton Transit is also testing two diesel-hybrid buses which are expected to save anywhere from 20 to 50 per cent of the fuel needed to power a regular diesel bus. Although the hybrid will also save on brake life, the purchase price of about \$700,000, compared to \$400,000 for a regular diesel bus, is a major drawback.

By the end of summer, 2008, the city will launch 216 clean diesel buses, which burn fuel that has significantly less sulphur content, which leads to the production of acid rain.

The city's fleet management branch has also spent a good deal of time looking at vehicle maintenance and replacement schedules, to ensure that the capital cost of each of its 3,500 vehicles is optimized.

To date, the city has done little in the way of investing in fuel-efficient vehicles or alternative fuels.

However, the city is a long-standing member of ISO 14001, an internationally-recognized environmental monitoring and rating service. And just this month the fleet management branch applied to the federal government's Green Municipal Fund for \$100,000 to develop a \$200,000 Green Fleet Plan. If funded, the administration hopes to have the plan in place by early in 2008.

* www.hybridexperience.ca

Recommendations for the City of Edmonton

Given the positive experience of many other Canadian municipalities, it is time for the City of Edmonton to enhance its green fleet program.

The following are three key recommendations that could be enacted upon immediately.

ONE

The first recommendation is to join the E3 Fleet Program offered by the Fraser Basin Council. With an annual membership fee of only \$2,500, the city would gain access to a wealth of information and contacts that would be most helpful to Edmonton in this stage of the game. This program goes well beyond the city's existing ISO 14001 Certification, as it is specific to fleet operations and targeted to the fleet challenges faced by municipalities, particularly those in western Canada.

Membership in the E3 Fleet program would help the city administration in its effort to develop a comprehensive Green Fleet program, which ultimately needs city council's support.

TWO

The second recommendation is for the city to get much more active in the purchase and use of fuel-efficient vehicles. With the federal government now leading the way with cash incentives, there is little reason why Edmonton wouldn't jump at the opportunity to buy gas-electric or diesel-electric hybrids when replacing vehicles, particularly in light of the distances its vehicles are being forced to drive in an ever-growing land base.

The city should explore opportunities to link with other municipalities and place bulk-order purchases of fuel-efficient vehicles. Canadian municipalities, such as Edmonton, have commonly used this approach for their purchase of standard vehicles, like diesel-powered buses and fire trucks. There is every reason to believe this could be an effective part of the city's Green Fleet strategy, particularly as the manufacturers of new technology vehicles scramble to attract market share. Buying in bulk is one more reason why Edmonton should join the E3 Fleet program – mentioned above – so it has a ready-made group of partners to pursue this type of initiative.

While all-electric vehicles are intriguing, Edmonton would make little use of them at this time as they have yet to be sanctioned for public roads. However, given their significant fuel savings, city should monitor this situation closely and begin to build these vehicles into its medium-and-long-term planning.

Vehicles propelled by hydrogen-fuel cells remain a work in progress that the city should also keep an eye on. However, cost and technical issues suggest that this technology is still a number of years away from being commercially useful.

THREE

The final recommendation is for the city to get much more active in the use of alternative fuels. Biodiesel in particular has proven to be most effective by a number of municipalities. It's time the city took steps to secure significant contracts at both the B5 (winter) and B20 (summer) levels for city vehicles.

Ethanol is also worth investigation. In particular, the city should look into obtaining ethanol from waste plant material (grain stalks), which presents fewer food supply issues than using commercial products like corn or canola oil.

It is difficult to recommend the use of natural gas, particularly in the Alberta context. Alberta's natural gas is steadily running out, which has major ramifications on the availability of feedstock for heating buildings, as well as huge economic implications. Royalties from natural gas comprise approximately one-quarter of the province's annual revenue stream. This doesn't include the impact natural gas production has on corporate and individual taxation, which the province also depends upon. Hence, it is extremely difficult to suggest that another sector, particularly one as large as transportation, begin to look at natural gas as a significant fuel source.

Appendix: Fraser Basin Council

Formed in 1997, the Fraser Basin Council (FBC) is a charitable organization designed to promote the economic, environmental and social sustainability of the region drained by the Fraser River in the province of British Columbia.

Extending from Mount Robson in central B.C. to the Fraser River Delta near Vancouver, this region accounts for over one quarter of the province' land base, four/fifths of the province's gross domestic product and is home to 2.7 million people.

With most of its funding from federal, provincial and local governments, the council is managed by a 36-member board of directors, including 14 representatives from the three orders of government, eight from First Nations and the rest from the private and non-profit sectors.

FBC was founded on the belief that the major river management priorities for the region cannot be effectively addressed by any one jurisdiction. To achieve its goals the FBC acts as a impartial facilitator, as a catalyst for solving inter-jurisdictional issues, as a conflict-resolution agent and as a sustainability educator.

In its ten-year history the council has tackled a wide variety of subjects, including flood hazard management, air quality control, energy and climate-change issues, invasive plant management, river debris entrapment, strengthening communities and building aboriginal partnerships.

Its mandate to improve air quality in the basin's air shed and to conserve energy lead to the creation of its ground-breaking E3 Fleet Program.

E3 Fleet Program

E3 Fleet rating uses a comprehensive, point-based Rating System Checklist for rating fleet performance, with points for fleet management practices and energy/emissions performance.

Each fleet is rated on the following topics (R or O denotes required or optional; 1, 3 or 5 is the point value assigned).

- 1) Green Fleet Action Plan
 - Fuel and GHG Emissions Baseline (R3)
 - Green Fleet Action Plan (R5)
 - Senior Management/Council/Ownership Formal Approval (R1)
 - Fleet Action Communications/Communications Program (R1)

- 2) Training and Awareness
 - Corporate Fuel Efficiency Policy Orientation Training (R1)
 - Driver Awareness Program/Fuel Efficient Driving Techniques (R3)
 - Driver Training Program/Fuel Efficient Driving Techniques (O5)

- Fleet Management Training Program (O3)
 - On-Going Driver Training Program (O1)
 - Driver Incentive/Reward Program (O1)
 - Innovation in Training and Awareness (O1)
- 3) Idling Reduction
- Idling Cost Evaluation (R1)
 - Corporate Idling Reduction Strategy (R3)
 - Idling Awareness Program (R3)
 - Idling Training Program (O3)
 - Corporate Idling Reporting (O3)
 - Innovation in Idling Reduction (O1)
- 4) Vehicle Purchasing
- Energy Efficient Vehicle and/or Component Purchasing Strategy (R5)
 - Functional and Operational Analysis (O3)
 - Vehicle Usage and Replacement Criteria (O1)
 - Standard Vehicle and Component Purchasing List (O1)
- 5) Fuel Data Management
- Fuel Consumption Data Management System (R3)
 - Fuel Consumption Monitoring and Reporting (R3)
 - Internal and/or External Benchmarking Program (R1)
- 6) Operations and Maintenance
- Preventive Maintenance Program (R3)
 - Vehicle Fuel Efficiency Operating Procedures (O1)
 - On-Board Vehicle Data Analysis and Reporting (O1)
 - Vehicle Emissions Testing (O1)
 - Predictive Maintenance Program (O1)
 - Recycle, Reduce, Recover, Reduce Program (R1)
 - Innovation in Equipment Operations or Maintenance (O1)
- 7) Trip Route Planning
- Route Planning (O3)
 - Load Optimization (O3)
 - Minimize Empty Trips (O1)
 - Logistics/Dispatch (O1)
 - Innovation in Trip and Route Planning (O1)
- 8) Utilization Management
- Utilization Benchmark and Exception Reporting (R1)
 - Vehicle Utilization Targets (O1)
 - Utilization Monitoring Program (O3)
 - Innovation in Utilization Management (O1)

9) Fuel Efficiency

- Demonstrated improvements in fuel efficiency (R5)

10) GHG Reductions

- Demonstrated Net Reductions in GHG Emissions (O5)
- Net Reductions in GHG Emissions/Carbon Credits (O3)
- Carbon Neutral Fleet/Carbon Credits (O5)

Points Summary

- A) Bronze Level: 55-66 points
- B) Silver Level: 67-78 points
- C) Gold Level: 79-90 points
- D) Platinum Level: 91-100 points