

Greening the Corporate Fleet Transition Strategy



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Introduction

In 2007, City Council approved the strategic plan, *Future Focus Seven*, which includes a section on Environmental Stewardship with goals and actions to reduce the city's impact on our local environment, including the following:

Burlington will:

- ***Reduce corporate greenhouse gas emissions by 20 per cent on a per capita basis from 1994 levels by 2012.***
- ***Transition to a green corporate fleet of vehicles using low emission vehicles, cleaner fuels and right sizing vehicles for the job.***

Vehicles are a major source of air pollutants and also contribute greenhouse gas emissions. Although new vehicles emit fewer pollutants, there are an increased number of vehicles on the road, increasing overall emissions. With growing public concern over air pollution and climate change, municipalities are taking on leadership roles in energy conservation.

The objectives of this strategy are simple: *to continue greening the corporate fleet by improving efficiency and reducing emissions.*

There are nine sections in the strategy, with a description of the issue including information on the city's current practices. Actions are listed where the City can make further improvements. Some actions entail monitoring market conditions and advancement of technology that may benefit the City in the future. A target for timing and the lead departments are also listed with each action.

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Schedule A

City of Burlington - Assessment to Right Size Fleet Vehicles

1. Right sizing fleet vehicles

Right sizing the fleet refers to ensuring that the right size vehicle is assigned for a specific job function. The fleet manager for the Roads and Parks Maintenance (RPM) Department continues to work with departments to help identify right sized vehicles to meet their needs, while taking into consideration fuel efficiency and emissions reductions using a cost benefit analysis, focussing on capital cost, operating costs (fuel/maintenance) and emissions. For example, an assessment of a full size pick-up may determine that a compact pick-up or a car with a hatchback for storage may be sufficient. A 'needs assessment' form has been developed to assist with this exercise to confirm the function and requirements of the vehicle. This form is found in Schedule A.

Natural Resources Canada (NRCan) publishes an annual *Fuel Consumption Guide* for light duty vehicles available in Canada, including passenger cars, pick-up trucks, minivans, large vans, special purpose vehicles and alternative fuel vehicles. It is a useful resource to compare fuel efficiency and carbon dioxide emissions for individual vehicle models. NRCan also recognizes the most fuel-efficient new light-duty vehicles in their class sold in Canada each model year.¹

Recent examples of corporate right sizing include the replacement of a cube van with a Sprinter van, achieving an improvement in fuel efficiency by 40%. As well, Engineering has replaced a compact pick-up truck with a compact car.

Actions:

- *To assist in right sizing, a needs assessment (Schedule A) must be completed by departments for each new light duty vehicle to confirm job function and demands on the vehicle. Improving fuel efficiency and reducing emissions are key criteria for the assessment.*
TARGET: Immediate
LEAD: All departments requesting new or replacement vehicles must complete the needs assessment. RPM Fleet Manager to evaluate. Director & GM to sign-off.

¹ www.ecoaction.gc.ca/vehicles

- *Departments should target light duty vehicles (that are typically used by single occupants and not used for transporting goods and materials as determined in the needs assessment) with carbon dioxide emissions rated below 3,600 kg per year and fuel efficiency for city driving below 8.5 litres/100 km.²*

TARGET: *Immediate*

LEAD: *All departments*

2. Hybrid Technology

Hybrid vehicles can significantly reduce emissions although there are varying types of hybrid technology which can impact the rate of emissions reduction and fuel efficiency. One technology that is being used by the City is a gas engine that turns off when at idle and propels the vehicle by the electric motor at low speeds. A regenerative braking system charges the vehicles' batteries while the vehicle is braking. Although there is a premium paid for the purchase of hybrid vehicles, this is offset by fuel savings over the life of the vehicle. The provincial government support for hybrids helps to make them more economical (federal support program ends in 2008).

Hybrids are most efficient for high mileage applications with a high proportion of stop and go city traffic. As of 2008, the City has 14 hybrid light duty vehicles in its fleet, including the Toyota Prius, Toyota Camry, Honda Accord, Honda Civic and Ford Escape.

Hybrid technology is most prevalent in light duty vehicles, however, pilot projects are currently underway with manufacturers of heavy duty hybrid trucks, such as forestry vehicles which idle a significant amount of time for equipment to run. Furthermore, a number of transit systems are adding hybrid buses to their fleets, including Halifax, Gatineau, Toronto, Hamilton, Kelowna, Edmonton and Victoria. Some preliminary results show that there are many factors impacting fuel efficiency and overall operating costs, such as the hybrid technology selected, type of battery used, amount of equipment on a bus, and type of driving. Further detailed analysis is required based on the experience of these and other transit authorities.

² Refer to Natural Resources Canada's annual *Fuel Consumption Guide*.

Actions:

- *Staff will continue to evaluate hybrid vehicles as an option during the right sizing assessment process (where one is available in the appropriate class of vehicles for the job function). An analysis of capital and operating costs should be completed, including a comparison of emission reduction abilities (see Right Sizing section).
TARGET: Ongoing
LEAD: All Departments with support from Fleet Manager*
- *Hybrid technologies should be considered for heavy duty vehicle applications where models are available for the necessary job function (pending results of municipal hybrid pilot test results).
TARGET: Ongoing
LEAD: RPM, Transit & Fire*

3. Alternative, Cleaner Fuels

Recently there has been increased media attention on the use of ethanol and biofuels due to the concern that crop utilization to produce fuel is having an impact on world food supply and costs. Although the production of ethanol may be one of the factors causing high prices and shortages for corn and grains, there are other factors at play including high energy prices, increasing demand from developing markets and rising fertilizer costs. The federal government is currently debating a bill that would require 5% ethanol in regular gasoline by 2010 and a 2% renewable content in diesel by 2012. The provincial government already mandates regular gasoline to include 5% ethanol content in regular gasoline. The federal government is also investing in the development of ethanol from crop wastes, such as corn stalks. The issue of using biofuels is a complex one and senior levels of government must provide leadership on the future of biofuels and their viability to reduce emissions and consumption of fossil fuels. Staff will continue to monitor this issue with respect to the use of biofuels for the City's fleet.

Biodiesel

Biodiesel is a non-toxic and biodegradable fuel that is made from vegetable oils, waste cooking oil, animal fats or tall oil (a by-product from pulp and paper processing). Concentrations can range from two percent to 100 percent. Biodiesel reduces the amount of pollutants contributing to smog, including particulate matter, carbon monoxide and hydrocarbons that are emitted from the tailpipe. It has very limited sulphur content and has better lubrication qualities than standard diesel fuel, which can increase horsepower and extend engine life. The production process to develop biofuels also emits less greenhouse gases compared to the production of fossil fuels.

The City has been using various concentrations of biodiesel fuel since 2003 in an effort to reduce air pollutant emissions. In 2003 a B20 mix (20% bio and 80% diesel) was used for off-road vehicles during May, June and September and B50 (50% bio and 50% diesel) was used for July and August. This practice continues every summer. In 2004, the City also began purchasing a B5 mixture for on-road diesel vehicles during May to September, available to those diesel powered vehicles that fuel up at the Roads and Parks Operations Centre. There are limited benefits to using B5 for emission reductions and consideration should be given to eventually expanding the mix to B20 (but taking into consideration manufacturer recommendations and warranty issues).

The use of biodiesel fuel requires very little change to infrastructure if a decision was made in the future to expand the use of biodiesel to other divisions. There are real benefits to using biodiesel, but it is not commonly available to consumers yet and comes with a premium cost of approximately five to 15 cents per litre.

Ethanol

Ethanol is a renewable fuel as it is produced from biomass; in Canada, it is generally made from corn and wheat. Ethanol burns more cleanly and completely than gasoline or diesel fuel.

According to Natural Resources Canada, most gasoline-powered vehicles can run on a blend consisting of gasoline and up to 10 percent ethanol. E-85 is a fuel that is 85% ethyl alcohol or ethanol and 15% gasoline. Certain new vehicles are manufactured to run on any mixture of gasoline and ethanol, usually referred to as flex fuel vehicles. Other fuel injected vehicles could run on E-85 but would have to be re-calibrated to do so and would need a consistent supply of E-85. Switching back to regular gasoline would require re-calibration. Vehicles that run on ethanol use more fuel per kilometre travelled than regular gasoline. Automakers generally equip these vehicles with larger fuel tanks to offset the fuel's lower energy content. A higher ethanol mix also reduces the lubrication characteristics of the fuel.

For the City to begin using E-85 fuel, all gasoline powered vehicles would have to be changed and would require a consistent supply of E-85 (unless it was a newer flex fuel vehicle). Given the limited availability of E-85 at commercial pumps, this could pose a challenge but may improve in time.

Ultra Low Sulphur Diesel

In 2006, federal legislation became effective requiring on-road diesel fuel to be ultra low sulphur diesel (15 parts per million). Sulphur occurs naturally in crude oil and so is found in diesel fuel. It is directly emitted from vehicles as sulphur dioxide and sulphate particles, contributing to the formation of smog. The legislated requirement for the use of ultra-low sulphur diesel for off-road

equipment becomes effective in 2010, however, the City has already instituted the use of this fuel for its off-road equipment.

Natural Gas

Natural gas fuel has lower exhaust emissions of carbon monoxide, particulate matter and sulphur dioxide. However, most manufacturers have ceased building natural gas vehicles for various reasons, but after-market conversion kits are available. The City phased out its natural gas powered transit buses (which were converted after-market) between 2002 and 2005 due to ongoing operational, maintenance, and performance issues. The fuel station has been removed.

It is noted that the City does have natural gas ice resurfacers, however, they operate under very controlled indoor conditions. The vehicles are slowly re-charged with natural gas fuel makers overnight for operation the next day.

Actions:

- *Investigate best municipal practices for using biodiesel year round such as B5 in the winter and B10 in the summer; as well as increasing the mix to B20 for on-road diesel vehicles (manufacturer recommendations including warranty issues must be considered).*
TARGET: 2009
LEAD: RPM Fleet Manager

- *Consider expanding the use of biodiesel to Fire, Transit and Tyandaga fuel stations.*
TARGET: 2009
LEADS: Fire, Transit and Parks & Recreation

4. Clean Diesel

Clean diesel refers to the combination of using Ultra Low Sulphur Diesel fuel (ULSD) with new technologies that make the engine and exhaust cleaner. ULSD fuel (15 parts per million) is an important part of clean diesel. The sulphur in regular diesel can hamper exhaust-control devices in regular engines, similar to how lead used to negatively impact the catalytic controller in gasoline engines. Removing sulphur improves the performance of exhaust-control devices. However, removing sulphur also decreases some of the lubricant qualities of the fuel, so lubricants are added before retail sale.

Diesel engines manufactured for the 2007 model year and later utilize a type of particulate filter and are designed to run solely on ULSD fuel. A high sulphur content would prevent the particulate filter and other emissions controls from working properly.

The technological approach for clean diesel differs between auto makers. Volkswagen refers to its diesel engine technology as 'blue motion' (commonly referred to as TDI in North America), where a nitrous oxide (NO_x) storage catalyst reduces NO_x emissions by up to 90 per cent. The TDI engine is up to 30 per cent more fuel efficient than a comparable gasoline engine and is much cleaner.

Car analysts are predicting that diesel car sales will double by 2012 in North America because of their fuel economy and reduced emissions. The selection of light duty vehicles here is still limited but auto makers have announced plans to start producing light-duty pickup trucks with diesel engines starting in 2009. Staff will continue to monitor the opportunities to add clean diesel light duty vehicles to the City fleet as part of the needs assessment process. This technology should be a viable option for the City as no changes are required to our current infrastructure

5. Electric Plug-in Vehicles

Electric vehicles have zero emissions while operating, although there are emissions from the provincial electricity fossil fuelled generating stations which create the power to charge the vehicles. The benefit is that the vehicles can be recharged overnight after the demand for hydro has peaked. These vehicles are slowly coming onto the market but can still be considered in the development stage. It is noted that plug-in electric utility vehicles are currently in use by the City for park maintenance. The development of this sector will be monitored to consider the feasibility and benefits for the City's fleet.

6. After-market Automotive Products

There are a number of after-market automotive products available to improve fuel efficiency and reduce emissions. The uptake of these products is not consistent among municipalities in the GTA. Some municipalities have undertaken pilots of certain technologies while others have chosen not to utilize after-market products but focus instead on fuel efficiency, reduced emissions and cleaner fuels.

The City is currently piloting a new catalyst technology on four pieces of equipment including an arena ice edger (Mainway Arena) and a greensmower and two push mowers at Tyandaga golf course. The initial results show the technology reduces emissions and noise levels.

Information is continually forthcoming regarding after-market products, however, the efficacy of the product is not always readily apparent. Vendors

are encouraged to apply to Canada's Environmental Technology Verification Program (ETV Canada) who provide the marketplace with the assurance that environmental performance claims are valid, credible and supported by quality independent test data and information.

The effectiveness and availability of after-market products will be monitored for use in the City's fleet to improve fuel efficiency and reduce emissions.

7. Vehicle Maintenance

Vehicle maintenance is an important part of a green fleet strategy to ensure emissions continue to be minimized and fuel efficiency is maximized. Waste reduction is also an important aspect of vehicle maintenance. The Roads and Parks Maintenance (RPM) and Transit Departments use recycled oil and bulk purchases to reduce packaging and containers, such as aerosol cans.

RPM is responsible for maintaining the majority of the City's fleet of light duty vehicles (excluding Transit and Fire vehicles). Corporate systems are in place to ensure vehicles are regularly maintained, following the manufacturer's recommended maintenance schedule. Engine fluid levels are checked regularly to ensure the engine is operating properly and there are no leaks. The City's contracted tire vendor undertakes a weekly inspection of vehicle tires, including pressure checks as properly inflated tires last longer, make the vehicle safer to drive and save fuel. The City is accredited to complete heavy duty vehicle drive-clean tests on its vehicles.

Action:

- *Continue with vehicle maintenance best practices, including staff training for new technologies such as hybrid vehicles.*
TARGET: Ongoing
LEAD: Fleet Maintenance Supervisors

8. Driver Training

Vehicle operators can reduce emissions and conserve fuel by adopting proper driving habits, such as driving less, smarter, reducing unnecessary idling and minimizing cargo loads where possible. Vehicle operators are provided driver training upon hiring with an emphasis on safety and re-training is provided when necessary. Additional training of smart driver techniques should be considered to improve fuel efficiency.

Vehicles idling unnecessarily get zero kilometres to a litre of fuel, waste fuel, cause increased wear on an engine and contribute to air pollution. The City

of Burlington has had an idling control by-law in place since 2004 (By-law 71-2004), which applies to the public and staff. Awareness raising activities directed at staff have included posters, information cards, electro-magnetic stickers for vehicles and articles in the staff newsletter. There are some exemptions in the by-law covering certain actions where idling is permitted, such as when outside temperature is above or below a certain degree point (but the vehicle must be occupied), use of emergency vehicles and while a vehicle is being prepared for service. For further details, refer to the actual by-law on the City's website (www.burlington.ca).

Actions:

- *Implement a smart driver education program for fleet vehicle operators.*
TARGET: 2009
LEAD: RPM, Fire & Transit

9. Transportation Demand Management

In 2007, a corporate Transportation Demand Management Team was created under the Halton Smart Commute program to reduce single occupied vehicles for commuting to and from work. Currently the program is focussed on downtown employees at City Hall and Sims Square. Although the program deals with commuting, some of the actions can benefit the green fleet program by reducing vehicle usage by teleconferencing and car pooling where possible. Efficient planning of trips can also reduce mileage. Each year employees are also encouraged to participate in a contest in June (e.g. Clean Air Commute or Commuter Challenge programs), to reduce the use of single occupied vehicles, again reinforcing smart commute messages.

10. Monitoring

In order to confirm the efficiencies of the fleet vehicles, information such as vehicle type, fuel consumption and kilometres travelled is required. Most of this data is currently tracked through the City's computerized fleet system but additional analysis of the data may be required.

Actions:

- *All vehicles should be monitored to track fuel consumption, fuel costs, mileage, and maintenance costs to ensure the corporate objective to improve fuel efficiency is met.*
TARGET: Ongoing
LEAD: RPM, Fire & Transit

- *This fleet strategy should be reviewed annually.*
TARGET: Annually
LEAD: Fleet Manager & Sr. Environmental Coordinator

**SCHEDULE A:
City of Burlington - Assessment to Right Size Fleet Vehicles**

Department: _____

Operator's Name/Position: _____

Main Purpose of Vehicle: _____

Is this a new vehicle or replacement? Replace____ New____
If replacement, what vehicle (unit number, model & year) is being replaced? _____

Driving Frequency:
Average # of trips per day: _____
Average # of trips per week: _____
Total km per year: _____

Typical Destinations:

Between City Hall & other City facilities:	Yes	No
Between Operations Centre & work sites:	Yes	No
Property/Building inspections:	Yes	No
Other Enforcement activities:	Yes	No
Travel to meetings/conferences, etc.	Yes	No

Types of Driving:

Continual driving to destination	Yes	No
Stop & Go driving (inspections, etc.)	Yes	No
Stopping along roadways/boulevards	Yes	No
Number of times enter & exit vehicle/day	_____	

Driving Conditions:

Along roadways (%age)	_____
Off road – construction inspections (%age)	_____

Does it need to provide emergency services? Yes No
If yes, describe duties: _____

Office on wheels?	Yes	No
Will it have a computer, etc?	Yes	No
Will the vehicle be used to transport equipment or material?	Yes	No

If yes, what and amount?

Will the vehicle be used for transporting staff and how often?

Does vehicle require towing capability? Yes No

If yes, describe type of equipment being towed, approximate weight and how often.

Identify equipment that is permanently stored in or attached to vehicle:

Identify special requirements/considerations for vehicle (eg. size, class & type) and reasons:

Department Comments:

Fleet Manager Comments:

Vehicle Selected:

Will there be emission reductions with vehicle replacement? Yes No

Will vehicle be a low or ultra low emission vehicle? Low Ultra Low

CO₂ emissions as rated by NRCAN for current vehicle: _____

CO₂ emissions as rated by NRCAN for new vehicle: _____

Director Sign-off

GM Sign-off
