



GREEN FLEET PLAN 2008-2011 – ANNUAL UPDATE (2009)

CITY OF TORONTO FLEET SERVICES DIVISION NOVEMBER 2010

SUMMARY

The City's Green Fleet Plan 2008-2011 was unanimously adopted by Council in 2008. The purpose of the Plan is to reduce fuel usage, fuel costs and emissions of greenhouse gases and smog pollutants from the vehicles and fuel used for City operations. This report summarizes the implementation of the Green Fleet Plan in 2009 and provides status details in Appendix A.

In 2009, the City made significant progress in implementing the five areas of the Green Fleet Plan. On **Emission-Reduction Targets**, in 2009 carbon dioxide (CO₂) emissions were reduced by approximately 2,600 tonnes using alternative vehicles and fuels, compared to "business as usual" emissions that would have resulted if there was no Green Fleet Plan. In 2009, baseline emissions and targets were also established for smog-causing pollutants, and it appears that the fleet is on track to meet those targets. On **Vehicles**, in 2009 Fleet Services exceeded its target by adding 117 green vehicles to the fleet including hybrid cars, pick-up trucks, aerial tower trucks and cube vans. On **Fuels**, in 2009 Fleet Services offered many alternative fuels: ethanol, biodiesel, natural gas, electricity and hydrogen. To support its commitment to **Sustainable Choices**, in 2009 Fleet Services continued to promote the Idle-Free policy and started providing maintenance for a pool of City bicycles. Finally, in 2009 the major new **Maintenance and Management Practice** introduced by Fleet Services was the Green Vehicle Evaluation and Selection Tool (GVEST). Using a TAF grant, this Excel-based tool was developed to assist fleet managers in choosing green medium- and heavy-duty vehicles to reduce fuel use and emissions.

At the end of 2009, the total net savings of the Green Fleet Plan 2008-2011 initiatives were approximately \$56,000. The operating savings more than offset the capital costs.

In 2010 and 2011, Green Fleet Plan implementation will focus on introducing electric vehicles and charging infrastructure for City operations, as well as continuing to find green solutions for the City's medium- and heavy-duty vehicles.

BACKGROUND

Fleet Services Division is implementing Toronto's Green Fleet Plan 2008-2011 for the vehicles and fuels used by the City's Divisions: http://www.toronto.ca/fleet/gfp_08_11.htm. The Green Fleet Plan outlines the measures that Toronto is taking to reduce fuel use, fuel costs and emissions of greenhouse gases and smog pollutants from the City's corporate vehicles. Greenhouse gases impact the climate. Smog-causing pollutants affect the health of Toronto's residents. By reducing emissions, Toronto can do its part to protect the climate, reduce smog and protect health. By taking a leadership role in greening the fleet, Toronto is demonstrating to other cities, corporations and individuals how they can reduce emissions from their vehicles. Fleet Services Division is now implementing the plan with our client Divisions and partners.

The City's Green Fleet Plan 2008-2011 (GM12.6) was unanimously adopted by Council at its meeting on March 3 - 5, 2008.

<http://www.toronto.ca/legdocs/mmis/2008/cc/decisions/2008-03-03-cc17-dd.pdf>

The Green Fleet Plan Interim Update 1 (GM18.16) responded to a request on particular issues, and was received by Government Management Committee at its meeting October 21, 2008.

<http://www.toronto.ca/legdocs/mmis/2008/gm/decisions/2008-10-21-gm18-dd.pdf>

The Green Fleet Plans for TTC, Police, Fire and EMS (EX24.2) were adopted/endorsed by City Council at its meeting on October 29 – 30, 2008.

<http://www.toronto.ca/legdocs/mmis/2008/cc/decisions/2008-10-29-cc25-dd.pdf>

The first annual report (GM22.16), was adopted by Council at its meeting April 29-30, 2009.

<http://www.toronto.ca/legdocs/mmis/2009/cc/decisions/2009-04-29-cc35-dd.htm>

This report provides the second annual report on implementation of the Green Fleet Plan 2008-2011.

2009 IMPLEMENTATION

The Green Fleet Plan 2008 - 2011 includes 38 specific actions in five topic areas: emission reduction targets, vehicles, fuels, sustainable choices and maintenance/management practices. This report provides an update of implementation and achievements in 2009. The status of each Green Fleet Plan action is given in Appendix A, and a summary of the five topic areas is given below.

Emission reduction targets

The first action in the Plan sets out emission reduction targets for the fleet. In the Green Fleet Plan, all targets and activities refer to the fleet managed by the City of Toronto Fleet Services Division and exclude vehicles managed by other Toronto organizations such as the TTC.

Greenhouse gas targets:

The Green Fleet Plan includes the City's reduction targets for greenhouse gases. As reported last year, the fleet is on track to meet the Kyoto target of a six percent reduction in greenhouse gas emissions from a 1990 baseline by 2012.

In 2009, estimated actual CO₂ emissions from the fleet were 38,200 tonnes. In 2008, estimated actual CO₂ emissions from the fleet were 37,500 tonnes. Based on alternative fuels and green vehicles alone, estimated emission reductions were 2,600 tonnes of CO₂ in 2009, compared to business as usual activities that would have occurred if there was no Green Fleet Plan. These reductions are more modest than those predicted in 2008 in the Green Fleet Plan, in part due to the inability to fully implement the biodiesel program because of financial constraints. Estimated CO₂ emission reductions for fuel and vehicles in 2008 were 3,300 tonnes, which met the reduction predicted in the Green Fleet Plan.

When alternative fuels, green vehicles and a variety of idle-reduction and other activities are incorporated, estimated emission reductions were 3,800 tonnes of CO₂ in 2009 and 4,400 tonnes in 2008, compared to business as usual activities. It is important to realize that the reductions reported here are relative to business as usual activities, and are not absolute reductions. In general, total emissions are increasing as a result of increased population and responsibilities.

Smog pollutant targets:

The Green Fleet Plan adopted the City's target to reduce smog-causing pollutant emissions from the Fleet Services-managed fleet by 20 percent below the 2004 baseline by 2012. The Toronto Environment Office has estimated the 2004 baseline emissions, 2009 actual emissions and 2012 target for smog pollutants from the fleet (Table 1). The results indicate that emissions from the fleet are decreasing for several of the smog-causing pollutants, and we are on track or have already met these targets. For other smog-causing pollutants further work is needed to meet the 2012 target.

Table 1. Smog pollutant emission estimates for the Fleet Services-managed fleet.

	HC (tonnes)	CO (tonnes)	NO_x (tonnes)	PM_{2.5} (tonnes)	PM₁₀ (tonnes)	VOC (tonnes)	SO_x (tonnes)
2004 Baseline Emissions	14.2	125.0	176.5	5.1	6.0	1.5	5.0
2009 Estimated Emissions	15.4	118.2	117.3	4.2	5.2	1.5	0.4
2012 Target Emissions	11.3	100.0	141.2	4.1	4.8	1.2	4.0

HC – hydrocarbons; CO – carbon monoxide; NO_x – oxides of nitrogen; PM_{2.5} & PM₁₀ – particulate matter of aerodynamic diameter less than 2.5 and 10 microns, respectively; VOC – volatile organic compounds; SO_x – oxides of sulphur

Scope of emission estimates:

It is important to recall that the greenhouse gas and smog pollutant estimates are for the vehicles and fuels managed by Fleet Services Division only. Fleet Services manages over 4,000 City vehicles and 22 fuel-dispensing sites, and these are covered in the emission estimates. Specifically, the emission estimates include the vehicles used by the core Divisions (e.g. Transportation Services and Toronto Water), plus Toronto Public Library and Toronto Fire Services. Major fuels included are gasoline containing ethanol, on-road diesel, off-road diesel, biodiesel and natural gas.

Fuel and vehicles managed by other organizations are not included in these estimates. Excluded are fuel used by Solid Waste Management Services' off-road machines at transfer stations and landfills, Solid Waste's long-haul trucks and much of Parks, Forestry and Recreation's small equipment. Emergency Medical Services, Toronto Transit Commission, Toronto Police Services, Toronto and Region Conservation Authority, Toronto Zoo and other ABCs that manage their own fuel are also excluded. Fuel purchased by employees for City or personal vehicles for reimbursement or mileage payout is excluded. Finally, some additional fuel that is obtained by core Divisions (e.g. Toronto Water, Facilities or Long-Term Care Homes and Services) at non-Fleet Services managed fuel sites is excluded from these estimates.

Vehicles

In 2009 the City added 117 green vehicles to the fleet, exceeding the Green Fleet Plan target of 100. As of December 31, 2009 the Fleet Services-managed fleet included 527 green vehicles (Table 2). The new green vehicles include cars, hybrid pickups, hybrid aerial towers and hybrid cube vans. In 2009 the City also ordered two cutting-edge technology vehicles that were delivered in 2010: a hydraulic hybrid garbage truck and a compressed natural gas (CNG) garbage truck.

Table 2. City of Toronto's green vehicles, as of December 2009.

Vehicle	Quantity
Honda Insight hybrid	2
Smart Car	24
Honda Civic hybrid	104
Toyota Prius plug-in hybrid – aftermarket conversion	2
Toyota Prius hybrid	7
Ford Fusion hybrid	30
Chevy Malibu hybrid	6
Ford Escape hybrid	72
Saturn Vue hybrid	9
GMC Sierra hybrid pickup	20
Chevy Silverado hybrid pickup	27
Natural gas vehicle	34
Azure/Ford E450 hybrid cube van	5
Vehicle with idle-free space heater – cube van	30
Vehicle with idle-free space heater – garbage truck	84
Vehicle with idle-free space heater – aerial tower	13
Regenerative-air dustless street sweeper	50
Aerial tower bucket truck hybrid	3
Hydraulic hybrid garbage truck	1
Natural gas garbage truck	1
100% Biodiesel garbage truck	1
Ice Cat electric ice resurfacer	2
Total	527

2009 was an exciting year for electric vehicles. In December at the C40 meeting in Copenhagen, Toronto's Mayor, along with 13 other large cities committed to make their cities more electric-vehicle friendly. In 2009, the City of Toronto joined Toronto Atmospheric Fund's EV300 initiative. This project aims to put 300 electric vehicles on the road in the greater Toronto area by 2012 and provides members with procurement assistance and a buyers' club. In 2009 Fleet Services also initiated agreements with several manufacturers of electric vehicles to obtain electric vehicles for the City's fleet.

In 2009 Fleet Services continued to work with its client divisions to transition them to greener technologies. For instance, Fleet Services recommended that Technical Services use hybrid cars and hybrid SUVs for inspectors and supervisors to replace less fuel-efficient pick-up trucks, and use cargo vans with timed heaters that reduce idling.

Fuels

In 2009 alternative fuels included the following:

Participating City fuel sites dispensed B5 (five percent biodiesel in diesel fuel) from January to April and B10 (ten percent biodiesel) from May to December. The planned increase to B20 in

the summer months did not occur due to the high cost of the fuel at that time. In 2009 the City continued to use gasoline containing ten percent ethanol, exceeding regulatory requirements. The City looks forward to the development of biofuels made from more sustainable feed stocks. To encourage manufacturers to offer these fuels, fuel purchasing documents state that the City will consider CO₂-equivalent emissions from fuels, and they were updated in 2009 to allow bids on biofuels from all feedstocks.

In 2009 the City also continued to use CNG and operate two plug-in hybrid electric cars and two all-electric ice resurfacers. A hydrogen dispensing site was set up at a City fuel site (1026 Finch Avenue) in 2009 to support the use of three hydrogen-powered minibuses owned by Ford and being used by the City. This pilot project has since been completed.

Also in 2009, Fleet Services supported Solid Waste's plan to convert the waste collection fleet to trucks running on compressed natural gas (CNG). Solid Waste intends to collect biogas at green bin processing facilities, refine the gas to pipeline-grade CNG and run the garbage trucks on this fuel. In 2009, one CNG waste collection truck was ordered, so that the technology can be tested in Toronto's real-world conditions. This truck was delivered in 2010, making Toronto is the first Canadian government to use this technology for waste collection.

Sustainable choices

Each year the City of Toronto, City of Hamilton and other partners host an educational event to promote more sustainable choices. In 2009 the Green Fleet Expo was held in Hamilton, Ontario. At the event private and public fleet managers learn about green vehicle options available through speakers, displays and test-drives. Given the success of the Green Fleet Expo, in 2009 the City applied for copyright of GFX, Green Fleet Expo & the logo, as directed by City Council.

To encourage more sustainable use of City vehicles, Fleet Services leads an Idle-Free program with five components:

- 1) Driver education including the ten-second Idle-Free policy for staff:
<http://www.toronto.ca/fleet/idle-free.htm>
- 2) Hybrid vehicles that do not idle;
- 3) Idle shut-down devices for light-duty vehicles;
- 4) Idle shut-down settings for heavy-duty vehicles; and
- 5) Other devices including LED lights and air- or coolant-heaters.

More detail on these Idle-Free initiatives is provided in Appendix A under actions number 5A, 20 and 21.

To support employees' other sustainable choices, in 2009 Fleet Services started maintaining the pool of bicycles operated by the City's Smart Commute program.

Maintenance and management practices

Green management practices for 2009 included closing four City-operated fuel sites to reduce environmental risk. Staff training was also initiated to show staff how to properly operate a

diesel particulate filter. This equipment is an integral part of the emissions-control technology now required on new trucks in order to meet more stringent Canadian emission standards.

In late 2008, Fleet Services Division received a generous 2009-2011 grant from the Toronto Atmospheric Fund for a project called the Green Vehicle Evaluation and Selection Tool (GVEST). The GVEST is an Excel-based tool that compares green vehicle technologies based on emissions of greenhouse gases and smog-causing pollutants, and approximate lifetime cost. The purpose of the tool is to help fleet managers choose green medium- and heavy-duty vehicles for their fleets so that fleets can collectively reduce fuel consumption and emissions.

In 2009, ENVIRON EC (Canada), Inc. was retained and developed the first phase of the GVEST model for Fleet Services. The tool can be used for garbage trucks, cube vans and aerial towers. It compares a variety of conventional and green technologies based on lifecycle emissions (for Ontario fleets only) and tailpipe emissions. The tool can be easily customized by fleet managers to identify the best green technologies for their fleet's operations.

Since that time, the GVEST model and User Guide have been completed and distributed free-of-charge to interested governments and companies. The final stage of the project will be to install dataloggers on Toronto's medium- and heavy-duty green vehicles to collect real-world data for input into the GVEST model.

Financial impact

A summary of actual costs and savings for the first two years of the Green Fleet Plan is provided in Table 3. 2008 financial information was provided in the 2008 annual update report. It is important to keep in mind that these costs and savings are those that resulted from green fleet activities, relative to the costs that would have been incurred if there was no Green Fleet Plan.

Table 3. Summary of actual costs and savings for Green Fleet Plan activities.

	Capital cost ('000s)	Operating cost ('000s)	Total net cost ('000s)
2008	\$134	-\$586	-\$452
2009	\$653	-\$257	\$396
Plan to end of 2009	\$787	-\$843	-\$56

Capital costs for the Green Fleet Plan result from the price premium paid for new types of green vehicles, over the cost of conventional vehicles. In 2009, capital costs were greater than those for the previous year because Fleet Services took delivery in 2009 of more green vehicles, and invested in a temporary hydrogen fuelling station.

Net operating costs for the Plan result from the price premium paid for alternative fuels, minus fuel savings from fuel-efficient vehicles and Idle-Free initiatives. In both 2008 and 2009 there were net operating savings, relative to the costs that would have been incurred if there was no Green Fleet Plan. Estimated operating savings for 2009 were lower than the previous year largely because of the high cost of biodiesel. In 2008 using biodiesel provided a cost savings compared to regular diesel fuel, but in 2009 biodiesel cost more than diesel fuel. Costs incurred

for a pilot hydrogen fuelling program also reduced the net operating savings for 2009 compared to the previous year.

At the end of 2009, the total net savings of the Green Fleet Plan 2008-2011 initiatives were approximately \$56,000. The operating savings more than offset the capital costs.

2010 HIGHLIGHTS

The following are highlights of Fleet Services' planned/completed 2010 green fleet activities:

- Develop Green Fleet Fund 2010 Allocation Policy to help client divisions utilize green funds;
- Provide staff education on operating emission-control technology required to meet 2010 Canadian emission standards;
- Host two-day, fifth-annual Green Fleet Expo in Toronto;
- Start new recycling for containers in maintenance garages; and
- Complete GVEST model and User Guide, promote it and release it to fleet managers.

CONCLUSION

Implementation of the Green Fleet Plan in 2009 involved many successes. These included surpassing the target for adding new, green vehicles to the fleet and developing a Green Vehicle Evaluation and Selection Tool for fleet managers. The status of each of the specific Green Fleet Plan actions can be found in more detail in Appendix A.

In 2010 and 2011, Green Fleet Plan implementation will focus on introducing electric vehicles and charging, as well as continuing to find green solutions for the City's medium- and heavy-duty vehicles. A new Green Fleet Plan will be developed for 2012 and beyond, incorporating new innovations and lessons learned from the City's current green fleet activities.

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Appendix A: Status of actions in the Green Fleet Plan 2008 – 2011.