

## **COMMITTEE OF THE WHOLE – OCTOBER 25, 2011**

### **GREEN FLEET STRATEGY AND PURE ELECTRIC VEHICLE FEASIBILITY PROGRAM**

#### **Recommendation**

The Manager of Environmental Sustainability and the Commissioner of Community Services, in consultation with the Director of Building and Facilities recommend:

1. That the report on the Green Fleet Strategy be received and
2. That the City of Vaughan enter into a partnership with other Ontario municipalities in a Pure Electric Vehicle Municipal Feasibility Program, where each municipality would pilot the use of two pure electric vehicles for a 24 month period and collect and share information on best practices. .

#### **Contribution to Sustainability**

Leadership and action are core principles that guide our actions on sustainability. This report is consistent with the priorities previously set by Council in the *Green Directions Vaughan*, Community Sustainability Environmental Master Plan:

Goal 1, Objective 1.1: to reduce greenhouse gas emissions and move towards carbon neutrality for the City of Vaughan's facilities and infrastructure. Action 1.1.6 makes reference to developing a comprehensive green fleet strategy.

#### **Economic Impact**

To be successful, the Green Fleet Strategy must consider both the City of Vaughan's financial constraints and operational need to continue delivering services. As a result, the initial economic impact of implementing the Green Fleet Strategy will be absorbed in existing departmental budgets. Should components of the Strategy require funding above and beyond existing budgets, these components will proceed only when additional external funding resources have been secured. To that end, early estimations for the operational phase of Pure Electric Vehicle Municipal Feasibility Program are \$ 180 K per municipal partner. The project proponents are actively exploring various funding avenues to negate the financial impact on the municipal partners. The project proponents have had positive discussions with the Federation of Canadian Municipalities Green Municipal Fund and the Association of Municipalities of Ontario about accessing funding. Further investigation is ongoing to confirm the costs of the three phase Program. It should be noted that there are no anticipated infrastructure costs for the Pure Electric Vehicle Municipal Feasibility Program as existing infrastructure will be used.

#### **Communications Plan**

A more detailed communications strategy will be developed as we consider partnerships to explore initiatives outlined in the Green Fleet Strategy. Internally, the initiatives within the Strategy will be communicated directly to the operational departments most affected by implementation. The Green Fleet Strategy will also be posted internally on Vaughan On-line. Implementation progress on the Strategy will be tracked and reported on along with other actions specified within *Green Directions Vaughan*, our Community Sustainability and Environmental Master Plan, on an annual basis.

## **Purpose**

The purpose of this report is to update Members of Council of the development of a Green Fleet Strategy and seek approval to investigate the feasibility of partnering with other Ontario municipalities in a Pure Electric Vehicle Municipal Feasibility Program.

## **Background - Analysis and Options**

Transportation is the second largest source of greenhouse gases (GHGs) in Canada (behind energy production), accounting for 27 percent of Canada's emissions growth from 1990 to 2005. Over this timeframe, transportation carbon dioxide emissions increased by 33 percent, from 150 megatonnes (Mt) to 200 Mt. In addition, pollutants from vehicles such as nitrous oxides and carbon monoxide contribute to poor air quality within the community.

Although newer vehicles often emit fewer pollutants, there are an increased number of vehicles on the road, increasing overall emissions. It is estimated that Ontario's municipal fleets, including transit fleets, contribute approximately 0.8 megatonnes (MT) GHG emissions – or about 43 per cent of Canada's estimated 1.74 MT of municipal fleet emissions. With growing public concern over air pollution and climate change, municipalities are at the forefront of taking action on fleet emissions.

The Fleet Department has made some progress on greening the fleet by introducing green vehicle and equipment replacement, green practices in the maintenance shop and staff awareness on driving practices. The department will continue to achieve the objectives of the Green Fleet Strategy by continuing to introduce programs and initiatives that reduce the environmental impact of the fleet. Some of those initiatives further improvements to vehicle replacements, monitoring the advancement of technology and piloting new approaches in green practices

## **Pure Electric Vehicle(PEV) Municipal Feasibility Program**

One of the initiatives within the Green Fleet Strategy involves integrating electric vehicles into the City fleet. The City of Vaughan has been invited to participate in the Pure Electric Vehicle Municipal Feasibility Program with several Ontario municipalities. An Electric vehicle (EV) is a vehicle that is powered by electricity and contains a battery to store energy. There are two main types of EVs: conventional hybrid electric vehicles (HEVs) and grid-connected vehicles that include plug-in hybrid battery electric vehicles (PHEVs) and pure electric vehicles (PEVs). PHEVs and PEVs have larger capacity batteries that can be recharged by plugging into the electricity grid.

The Pure Electric Vehicle Municipal Feasibility Program is being championed by Project EVE which is comprised of a consortium of Canadian companies focussed on designing, developing and deploying next generation pure electric vehicles. Vecture, a Vaughan based battery manufacturer, is a member of the consortium.

As part of the Feasibility Program, the City of Vaughan would have access to two PEVs for a 24 month period in order to better understand key aspects of electric mobility from an operational and economic perspective. The PEV available include a light duty pick-up truck and a subcompact car. There would be an aggregated sharing of data on the use, application and capabilities of electric vehicles between municipal partners to assist with planning for the selection, implementation, maintenance and support for various types of EVs in the future fleet of municipalities. The program is also designed to assist municipalities in generally understanding the impact of having PEV's in their municipality.

## Benefits of Electric Mobility for Municipalities

A number of benefits are associated with this project including:

- Environmental. Reducing the ecological footprint of municipal fleet operations by replacing gas powered internal combustion engines with electric vehicles. Greenhouse gas emissions are dramatically reduced as a result. PEVs are designed for long life cycles with fewer moving parts which results in reduced natural resource use.
- Economic. PEVs powered by electricity from municipally owned power distribution companies keep local transportation spending in the community. PEVs with fewer moving parts have lower operating costs which allows municipalities to devote more money to other areas. The cost to power a PEV is approximately 85% less than a vehicle with an internal combustion engine. PEVs can avoid significant electrical capacity capital expenses for future generations if their design and resulting range allow them to be charged when the grid has excess capacity. Finally, Vecture, a Vaughan based battery manufacturer, is a member of the Project EVE's Canadian consortium and has strong potential for expansion creating new jobs in our local economy should the electric mobility sector grow significantly.
- Social. PEVs can be designed to optimize transportation routes and throughput for a given volume of traffic thereby making better use of existing transportation infrastructure. The potential for new jobs at the local level has obvious social benefits. In addition, municipalities can play a leadership role in influencing people to adopt electric mobility solutions if the infrastructure is available and economically rewarding.

The Pure Electric Vehicle Municipal Feasibility Program enables the municipal partners to leverage spending to create a deeper understanding of the outcomes that will assist with future decisions on electric mobility in communities.

## Relationship to Vaughan Vision 20|20 Strategic Plan

This report is consistent with the Vaughan Vision 20|20 strategic goal of providing service excellence to citizens and the strategic objective to lead and promote environmental sustainability. This report is consistent with the priorities previously set by Council and the necessary resources have been allocated and approved.

## Regional Implications

N/A

## Conclusion

The Green Fleet Strategy will enable the City of Vaughan to continue to make progress on reducing the environmental impact of our corporate fleet while balancing fiscal constraints and operational needs to deliver services. Initiatives within the Green Fleet Strategy build upon existing efforts, involve monitoring the advancement of technology and piloting new approaches. The Green Fleet Strategy is strongly connected to the City's commitment to the Federation of Canadian Municipalities Partners for Climate Protection Program to reduce greenhouse gases. Integration of electric vehicles into the City fleet is one of the initiatives in the Green Fleet Strategy. The Pure Electric Vehicle Municipal Feasibility Program involves partnering with other municipalities to explore the usage of electric vehicles in the municipal fleet in order to a better understand key aspects of electric mobility from an operational and economic perspective. The Pure Electric Vehicle Municipal Feasibility Program has numerous environmental, economic and social benefits.

**Attachments**

City of Vaughan Green Fleet Strategy

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## CITY OF VAUGHAN GREEN FLEET STRATEGY

### 1.0 Introduction

On April 21, 2009, the City of Vaughan launched *Green Directions Vaughan*, the City's first Community Sustainability and Environmental Master Plan.

*Green Directions Vaughan* establishes sustainability as a guiding principle for the City's growth over the next 25 years.

It influences virtually all aspects of the City's operational and regulatory activities. The plan establishes the principles of sustainability to be used in the development of plans and master plans to achieve a healthy natural environment, vibrant communities and a strong economy. *Green Directions Vaughan* sets the principles of sustainability to guide the City in how it provides services and infrastructure. Objective 1.1 requires the City to reduce greenhouse gas emissions and move towards carbon neutrality for the City of Vaughan's facilities and infrastructure. In particular, Action 1.1.6 states that the City of Vaughan will develop a comprehensive green fleet strategy. This action item is the responsibility of the Community Services department.

### 2.0 Fleet Overview

The City of Vaughan fleet size is 291 (as of Dec 31, 2010), which is comparable in size and function to other Ontario municipalities with similar population size, geographic area and operational responsibility. As expected, those departments with greater operational responsibility such as Parks Operations and Forestry, Fire and Rescue Services and Public Works are the top contributors by department to fleet size.

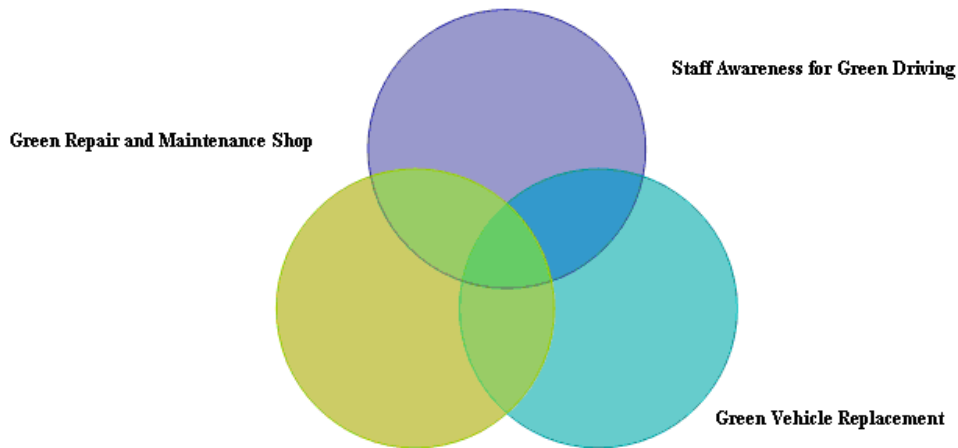
The City of Vaughan vehicle fleet includes cars, trucks, motorcycles, ice resurfacing vehicles, lawn maintenance equipment and snow removal equipment. The current fleet also includes a range of light duty through to heavy duty vehicles with gasoline and diesel engine types. Please refer to Appendix I for further information about the City of Vaughan's vehicle fleet.

### 3.0 Current Green Fleet Initiatives

Over the past several years, Community Services has created and implemented a three-pronged approach to increase environmental sustainability as it relates to the fleet. The approach involves developing programs that impact the operation and maintenance throughout the life cycle of the vehicle. The three components of the approach include vehicle replacement, staff awareness for green training and green repair and maintenance.

To ensure that efficient vehicles and equipment are continually added to the City's fleet, a Green Replacement program has been introduced. Fleet staff have been involved in advising departments on the type of vehicles for various applications.

Staff Awareness for Green Driving initiatives are important as it provides information to staff, both who drive City owned vehicles or personal vehicles, on how to minimize their impact on the environment while undertaking City work. Each area has specific timelines, programs and objectives. Together these three sectors continue to improve the environmental sustainability of the City of Vaughan's green fleet program.



The details of each program implemented to date are outlined below.

### **Green Vehicle and Equipment Replacement**

- Purchased fuel efficient vehicles that provide the best available reduction in vehicle fleet emissions, including, but not limited to, the purchase of alternative fueled and hybrid vehicles.
- Biofuel usage has been piloted Off-road vehicles have successfully operated with varying degrees of biofuel mixtures.

### **Green Repair and Maintenance Shop**

- **Non-toxic products for spill clean-up-** Ecosorb® products use natural ingredients to eliminate industrial smells without the need for harsh chemicals or masking fragrances.
- **Green Rust Inhibitor** - The City of Vaughan uses a natural rust inhibitor to protect City vehicles against rust to ensure maximum durability.
- **Greening Cleaning products-** Vehicle fleet and component parts are washed regularly with an eco-friendly cleaner
- **Scheduled maintenance-** Car maintenance improves the efficiency of vehicles and reduces emissions.

### **Staff Awareness for Green Driving**

- **Anti-Idling Awareness.** Educated staff on the existing City of Vaughan by-law, which bans excessive idling which reduces fuel use and emissions
- **Proper Driving Techniques.** Staff that drive City vehicles have been trained on how proper driving techniques to reduce fuel consumption which reduces fuel use and emissions
- **Participate in the InterFleet program.** InterFleet is an internet-based GPS/AVL fleet management solution focused on public sector fleet tracking Provides cost-effective solutions to manage mobile assets through live map display of entire fleets and through providing status reports of each vehicle.

#### 4.0 Work Plan: Moving Forward

In an effort to build on the early successes of vehicle replacement, green repair and maintenance and staff awareness, a series of initiatives are proposed. The new initiatives incorporate the latest thinking on options for greening of a fleet which will in turn help to reduce greenhouse gas emissions and move towards carbon neutrality for the City of Vaughan.

The City of Vaughan Fleet department will continue to work with all Departments to reduce the environmental impact of our fleet. In addition to working to continually improve the City of Vaughan’s Green Fleet Strategy, the Fleet Department and the Environmental Sustainability Office will undertake specific initiatives with timelines and measurable goals to reduce the impact of the City’s fleet on the environment.

Initiative	Key aspects	Action	Lead (Partner)
Right size fleet vehicles	Right sizing involves ensuring the right size vehicle is assigned for a specific job function. Considerations include fuel efficiency, capital costs, operating costs (fuel/maintenance)	Continue to work with departments to identify right-sized vehicles ,	Fleet Department (All Departments)
Hybrid vehicles	A hybrid vehicle uses two or more sources of power to move the vehicle. Hybrid technology can have a positive impact on emissions reduction and fuel efficiency. The most prominent hybrid technology is a gas engine that turns off at low speeds enabling the vehicle to be propelled by electric motor. A regenerative braking system charges the vehicles’ batteries while the vehicle is braking. Fuel savings can be significant over the life of the vehicle.	Replace specific fleet vehicles with hybrid vehicles based on rightsizing and within budgetary constraints.	Fleet Department (All Departments)
Integration of electric vehicles into the City fleet	An Electric vehicle (EV) is a vehicle that is powered by electricity and contains a battery to store energy. There are two main types of EVs: conventional hybrid electric vehicles (HEVs) and grid-connected vehicles that include plug-in hybrid battery electric vehicles (PHEVs) and battery electric vehicles (BEVs) PHEVs and BEVs have larger capacity batteries that can be recharged by plugging into the electricity grid. These vehicles are slowly coming into the market and will continue to become	Conduct an impact analysis on the reduction of fuel usage and greenhouse gas emissions’ from the purchase of hybrids.	Environmental Sustainability Office (Fleet Department)
Integration of electric vehicles into the City fleet	An Electric vehicle (EV) is a vehicle that is powered by electricity and contains a battery to store energy. There are two main types of EVs: conventional hybrid electric vehicles (HEVs) and grid-connected vehicles that include plug-in hybrid battery electric vehicles (PHEVs) and battery electric vehicles (BEVs) PHEVs and BEVs have larger capacity batteries that can be recharged by plugging into the electricity grid. These vehicles are slowly coming into the market and will continue to become	Continue to monitor the development of electric vehicles and consider piloting with departments that demonstrate the greatest benefit for this type of vehicle.	Fleet Department (All Departments)

<b>Initiative</b>	<b>Key aspects</b>	<b>Action</b>	<b>Lead (Partner)</b>
Alternative cleaner fuels	<p>more mainstream in the years to come.</p> <p>Biodiesel is a fuel produced from vegetable oils, waste cooking oil and animal fats. This is a highly desirable fuel as it needs little to no engine modification to be used successfully. Biodiesel can be blended with petroleum diesel in varying percentages. Barriers to using biodiesel include issues with weather, temperature, water/humidity, short shelf life, and voiding manufacturer's warranties.</p>	<p>Work with the Purchasing Services department to procure sustainable biofuels including biodiesel, to increase amount of sustainable fuels used in the fleet fuel mix.</p>	<p>Fleet Department. Public Works, Parks (Purchasing)</p>
Greening of non-vehicle equipment	<p>Although non-vehicle equipment is not a high fuel user and subsequent emissions are lower, there is a benefit to addressing this area. The impact on health of employees who operate non-vehicle equipment is significant. In addition, the optics of emissions from small, non-vehicle equipment can be detrimental to the public.</p>	<p>Work to replace non-vehicle equipment, including lawn maintenance equipment and snow removal equipment as replacement schedule and available technology permits</p>	<p>Fleet Department (Parks, Public Works, Building &amp; Facilities)</p>
Green Repair and Maintenance	<p>Regular preventive maintenance inspections and follow-up repairs are necessary to maintain a green fleet. Green management practices include the proper environmental disposal of vehicle fluids, recycling of tires, waste oils and waste oil filters, limiting the use where possible of aerosols, water use, auto body refinishing, filters and particulates</p>	<p>Investigate the feasibility of implementing additional green practices within the Repair and Maintenance shop</p>	<p>Fleet Department</p>
Evolving emission reduction technology	<p>Emission reduction technologies are continuing to evolve and becoming more available for municipal fleets. Technologies verified by Canada's Environmental Technology Verification Program (ETV Canada) help to provide the marketplace with assurances that the environmental performance claims are valid and credible.</p>	<p>Continue to investigate emerging emission reduction technologies. Implement pilot projects where suitable and funds are available in the annual budget.</p>	<p>Fleet Department (Environmental Sustainability)</p>



<b>Initiative</b>	<b>Key aspects</b>	<b>Action</b>	<b>Lead (Partner)</b>
Driver training on fuel efficiency	Altering driving habits of vehicle operators can help reduce fuel consumption and emissions. Providing training on driving techniques, such as braking, acceleration and idling, can improve fuel efficiency.	Determine the next phase of the driver education to address fuel efficiency. Implement into driver training programs.	Fleet Department
Bike Sharing Pilot Program	Biking is a sustainable transportation mode that has the ability to replace single use vehicle trips of a short distance. Employees are most likely to use this transportation mode for lunch errands or trips to City facilities located nearby, particularly in the Spring through Fall period.	Investigate the feasibility of piloting a bike sharing pilot program. Identify areas where bike availability would be preferred by staff.	Environmental Sustainability Office

**APPENDIX I – CITY OF VAUGHAN VEHICLE FLEET – BY DEPARTMENT (2010)**

<b>Department</b>	<b>Gas</b>	<b>Diesel</b>
Building & Facilities	17	0
Building Standards	8	0
Enforcement Services	20	2
Engineering	14	0
Fire & Rescue Services	26	25
Fleet	13	1
Parks Ops & Forestry	65	14
Public Works	50	23
Miscellaneous	7	0
Clerks	2	0
Licensing	1	0
Information Technology Management	1	0
Recreation	1	0
Purchasing	1	0
<b>Total</b>	<b>226</b>	<b>65</b>
<b>Combined Total</b>	<b>291</b>	