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Emergency Medical Services
EMS
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6. Toronto Emergency Medical Services

6.1 Fleet Facts

Toronto Emergency Medical Services (EMS) provides emergency medical response for the City of Toronto, an area of 650 square kilometres with a daytime population of 3.5 million people. This makes Toronto EMS the largest municipal paramedic ambulance service in Canada, and one of the most comprehensive pre-hospital emergency care systems in the world. Currently, EMS operates a fleet of 278 vehicles to meet its operational needs. Primarily, the EMS Fleet consists of Ambulance and Emergency Response Vehicles. Table B below lists all current EMS Fleet vehicles:

Table B: Current Toronto EMS Fleet Vehicles

Vehicle Type	# of Vehicles
Type II & III Ambulance Vehicle	170
Emergency Response Vehicle	66
Emergency Support Bus	2
Emergency Support Truck	3
Logistics Truck	11
Support Vehicle	26
Total	278

6.2 Existing Green Fleet

As of December 31, 2013 the Toronto EMS Fleet consisted of 169 modular type III gasoline ambulance vehicles, 18 emergency response vehicles, 48 vehicles that are currently fitted with anti-idling technology and 6 hybrid sedans which are primarily assigned to vehicle pool and administration deployment.

Anti-Idling Technology

Ambulance and Emergency Response vehicles are equipped with an anti-idling technology, designed to control and monitor engine idling. Primarily, this system allows the vehicle to maintain the interior temperature and battery charge while saving fuel and reducing emissions. If the interior temperature of the emergency response vehicle goes outside the preset values, either too hot or too cold, or if the battery voltage falls below a safe operating level, the engine will start automatically to re-establish these preset parameters. Once the interior temperature and/or battery voltage are back within these preset limits, the vehicle engine will automatically shut off. The cycle will continue as long as the anti-idling system is activated.

While the primary benefit of the anti-idling technology system is fuel savings, there are other benefits from the system as well. By maintaining a consistent temperature in the vehicle, patient comfort is improved, the temperature requirements for medical drugs are maintained, and the vehicle charging system components life is extended.

6.3 Additional Green Fleet Plan 2014-2018 Initiatives

Toronto EMS Green Fleet emergency response vehicle investments are summarized in the vehicle fleet plans developed annually based on the long-term operational requirements forecasts. These forecasts are shown in Table C below:

Table C: Toronto EMS Green Fleet Plan 2014 – 2018 Forecast

	Number of Vehicles			
Vehicle Type	2014	2015	2016	2018
Ambulance Vehicle	27	27	27	TBD
Emergency Response Unit	6	6	6	TBD
Command ERV	3	3	3	TBD
Support Hybrid Sedan			1	TBD

Initiative 1:
Actively participate in the implementation of the Consolidated Plan.

Initiative 2:
Examine the feasibility of purchasing smaller more fuel efficient emergency response vehicles in the Special Service Package Category that meet the current Ontario Provincial Land Ambulance and Response Vehicle standards. The challenge has always been finding a smaller vehicle with enough space to accommodate the equipment mandated by the Province's Land Ambulance Act, as well as the specialized GPS and communication equipment.

6.4 Financial Implications of Green Fleet Plan Initiatives

There are no immediate or direct financial implications arising from the Consolidated Plan. Toronto EMS's investment in fleet vehicle replacement is outlined in the Toronto EMS's Capital Program.

7. Toronto Fire Services

7.1 Fleet Facts

Toronto Fire Services (TFS) is the largest fire service in Canada and the fifth largest in North America. Its mission is to protect life, property and the environment from the effects of fires, illness, accidents, natural disasters and other hazards.

TFS is comprised of 3,144 personnel who are employed in four sections: Operations, Fire Prevention and Public Education, Mechanical and Training, and Staff Services and Communications. Fire Services is a pro-active leader in fire prevention, protection and emergency services to meet the diverse needs of the community.

Table D: Current Toronto Fire Services Fleet Vehicles

Vehicle Type	Number of Vehicles
Aerial Ladders	39
Pumper Trucks	85
Rescue Trucks	28
Heavy Squads	7
Air/Light Trucks	5
Single Purpose Trucks (Haz-Mat, High-Rise, Tanker, De-con)	15
Vans	44
Sedans / Light SUV's / Mini-Vans	45
Small Cars	91
Fire Boats	2
Total	361

7.2 Existing Green Fleet

TFS Pumper trucks are designed small in comparison to most municipal apparatus. The shorter wheelbase is required to negotiate urban streets, but more importantly, it allows the use of smaller format engines and transmissions, which in turn allow the use of smaller axles and wheels. This results in a more fuel-efficient truck that creates less waste in the form of replacement fluids, tires, and maintenance requirements. An automatic lubrication system is installed on all apparatus to extend the life of expensive parts, create less waste, and actually use less grease.

An auxiliary oil filtration system has been installed on all apparatus to extend the service life of engine oil, generating less waste oil and fewer waste filters.

TFS have pioneered the use of hybrid-electric vehicles for emergency response purposes. Changing from conventional "Police pursuit" vehicles to hybrid SUVs has meant a significant increase in fuel mileage and a large reduction in carbon dioxide emissions. To date, TFS has purchased 18 hybrid vehicles.


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7.3 Additional Green Fleet Plan 2014-2018 Initiatives

Initiative 1:
Actively participate in the implementation of the Consolidated Plan.

Initiative 2:
Continue testing hybrid and electric vehicles for short distance regular use applications such as by the Fire Prevention Officer and Training Division Officer.

Initiative 3:
"Right-size" the type of vehicle used by the 16 District Chiefs. The radio repeater equipment and the standard equipment load sizes have changed so dramatically allowing for application of smaller vehicles in this area.

Initiative 4:
Assess the feasibility and benefits of a "Car-Share" program for Fire Prevention Officers in the downtown core by reviewing the outcomes of the pilot program currently being tested by Corporate Fleet.

Initiative 5:
Expand the use of idle reduction technology currently used on aerial apparatus to other fire apparatus wherever possible.

Initiative 6:
Analyze reducing the amount of outsourced labour to reduce the amount of travel time for apparatus in for repair.

7.4 Financial Implications of Green Fleet Plan Initiatives

There are no immediate or direct financial implications arising from the Consolidated Plan. Toronto Fire Services investment in fleet vehicle replacement is outlined in the Toronto Fire Services Capital Program.


POST NO BILLS
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8. Toronto Police Service Fleet

8.1 Fleet Facts

The Toronto Police Service (TPS) has a permanent authorized strength of 5,505 Sworn Officers and 2162 Civilian Members. The Service's fleet inventory consists of 1,713 vehicles, and the majority of these operate on three shifts, 365 days a year. The vehicles, other than boats, are serviced and repaired at three garage locations. The three garages have been strategically located to allow reduced travel time for Officers when attending these sites.

Table E: Current fleet vehicle inventory

Type of Vehicle	Number of Vehicles
Marked	533
Marked Mini Vans/4WD	22
Marked Parking Enforcement	97
Motorcycles	50
Other Marked	127
Plain	813
Plain Parking Enforcement	3
Trailers	44
Boats	24
Total	1713
Bicycles	300

8.2 Additional Green Fleet Plan 2014-2018 Initiatives

The Toronto Police Service is committed to evaluating new initiatives and technology towards implementing a green fleet. The evaluation must take into consideration the TPS's operational requirements, as well as any legal obligations.

In addition to strategies included in the Consolidated Plan, The Toronto Police Service will take the following actions:

1. Additional forty (40) vehicles will be replaced with 4 cylinder units rather than 6 cylinder units within Divisional Policing Command & Specialized Operation Command;
2. L.E.D. emergency lights will continue to be added to all uniform patrol cars;
3. As a result of field testing conducted with the Ford Taurus as a possible replacement patrol vehicle, 450 full size 8 cylinder units will be replaced with 6 cylinder midsize vehicles;
4. A further reduction of ten motorcycles from a total Centralized fleet of forty will be implemented;

8.3 Financial Implications of Green Fleet Plan Initiatives

There are no immediate or direct financial implications arising from this Green Fleet Plan. Toronto Police Service investment in fleet expansion and modernization is addressed in Toronto Police Service Capital Program.

9. Toronto Transit Commission Fleet

9.1 Fleet Facts

The Toronto Transit Commission (TTC) is responsible for operating transit services for the City of Toronto. By providing an environmentally sustainable alternative to private vehicles, TTC is helping to reduce the production of greenhouse gases, air pollution and congestion on our roadways.

The estimated number of cars that a TTC vehicle replaces during a typical morning rush hour is provided in Table F, which helps to illustrate TTC's role in reducing traffic congestion.

Table F: Estimated number of cars TTC vehicles replace during a typical morning rush hour

TTC Vehicle	Number of Cars
Bus (Conventional 40')	45
Bus (Articulated)	75
CLRV Streetcar	65
ALRV Streetcar	95
LFLRV Streetcar	115
SRT Train	195
T1-Train	900
Toronto Rocket (TR) Train	970

Through the encouragement of transit ridership, fleet modernization and expansion, as well as adherence to its Corporate Safety, Health and Environment Policy, TTC is committed to minimizing the impact of its operations on the environment.

Encouraging Transit Ridership

Each work day an average of 1.75 million people ride the transit system which results in 1.2 million fewer trips by private vehicles. In 2012, the TTC provided 514 million passenger rides.

Expanding rapid transit services in the City with the completion of the Toronto-York Spadina Subway Extension (TYSSE), the Eglinton Crosstown LRT, and the Danforth subway extension to Scarborough, will help to maintain the trend of increasing transit ridership in the City.

The major investments the TTC has made, and is continuing to make, in expanding and modernizing its fleet of vehicles is also a key factor in achieving the significant reduction in private auto use. In addition to increased capacity, TTC's newest diesel vehicles incorporate modern emission control technology. All of these improvements help reduce the production of greenhouse gases and air pollution, and are the cornerstones of the TTC Green Fleet Plan.


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9.2 Existing Green Fleet

TTC's bus fleet investments are summarized in the vehicle fleet plans developed annually on a long range projection of the number of vehicles required to meet future service requirements. The 2014 bus fleet plan is provided in Table G below.

Table G: TTC Bus Fleet Plan

	Number of Busses									
	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Procurement	142	55	45	65	0	0	0	0	0	292
Mechanical/ Body Rebuild	242	241	240	240	121	120	60	60	6	26
Mechanical Rebuild	0	0	0	62	120	120	180	240	240	240
Hybrid Rebuild	0	0	0	200	245	245	0	0	0	0
18 Year Retirement	185	0	52	50	0	0	0	100	120	262
Total Available (40' Equivalent)	1878	1933	1926	1941	1941	1941	1941	1841	1721	1725

The Subway Fleet Plan as outlined in the TTC's Capital Program 4.12 – Subway Car Purchases. The Streetcar Fleet Plan as outlined in TTC's Capital Program 4.18 – Purchase of Streetcars.

Emission Control Technology

While promoting public transit as an environmentally sustainable alternative to private vehicles, TTC also acknowledges the importance that its vehicles be as "clean" as current proven technology allows. Dependent upon vehicle model, TTC's bus fleet uses one or a combination of three pollution control systems to reduce particulate matter (PM), nitrogen oxides (NO_X), hydrocarbons (HC), carbon monoxide (CO), as well as other air pollutants.

The pollution control systems that TTC's buses are equipped with can be grouped into three categories of technology, Diesel Oxidation Catalysts (DOC), Diesel Particulate Filters (DPF), and Selective Catalytic Reduction (SCR) Systems.

Diesel oxidation catalysts (DOC) have been used for many years. Diesel particulate filters (DPF), which are special filters that physically trap particulate matter (PM) and remove it from the exhaust stream, were introduced to the TTC fleet commencing with bus procurements in 2006. More recently, Selective Catalytic Reduction (SCR) Systems have been introduced. These systems inject diesel exhaust fluid (DEF) into the exhaust stream where it reacts with a catalyst to convert NO_X emissions to nitrogen gas and oxygen. DEF is a solution of ammonia and water.

TTC's oldest buses incorporate only DOC systems, while its newest buses incorporate all three (DOC, DPF and SCR). TTC is transitioning its bus fleet to DPF and SCR technology in the coming years. TTC garages are also being upgraded with DEF dispensing equipment in order to support the new emission control technology.

Emission Monitoring

Since 1999, TTC has been carrying out vehicle emission testing. The TTC owns and operates two mobile heavy duty emission test units that are exclusively licensed for testing the TTC's fleet of diesel buses, as well as a portion of its diesel service vehicles.

Prior to the annual licence plate sticker renewal, each heavy duty diesel vehicle with a Registered Gross Vehicle Weight (RGVW) over 4,500 kg (i.e. bus) is emission tested at one of the TTC's bus garages.

The emission test measures the opacity (ability of light to penetrate the exhaust stream), and is directly proportional to the amount of pollutants released by the engine to the atmosphere. The engine is brought up to operating temperature and a sensor is placed in the exhaust stack. The opacity is measured with the engine operating at a steady state condition, and the light beam and sensor are placed at the exhaust stack exit.

In addition to testing, if a TTC vehicle is observed operating in service and emitting unusual levels of "soot", for example, customers can contact TTC's Customer Service Center and advise staff of the problem they observed. Maintenance personnel are subsequently advised of the problem and the vehicle is recalled to a bus garage for corrective action; however, the scheduled vehicle maintenance program minimizes the occurrence of these types of incidents.

Fuel Selection

B5, a blend of 95 per cent ultra-low sulfur diesel and five per cent biofuel, had been used in the bus and Wheel-Trans fleet since September 2006. During the introduction of this fuel, some additional maintenance costs were incurred to clean bus fuel tanks and replace filters since the bio portion of the fuel acted as a cleaning agent. No other technical obstacles were encountered with the use of B5; however, biofuel was found to be most effective when used to fuel TTC's older fleet with two cycle engines.

With the retirement of the older fleet, TTC switched in 2011 to No. 1 ultra-low sulfur diesel fuel, which contains less than 15 parts per million sulfur and is less expensive than B5. Balanced against the effectiveness of the new emission control technology being introduced to the bus fleet, the continued use of B5 could not be supported within TTC's operating budget. In late 2013, the Ontario Ministry of the Environment introduced a proposal that would require that Ontario's diesel pool contain a minimum per centage of diesel made from renewable sources.

9.3 Additional Green Fleet Plan 2014-2018 Initiatives

Vehicle Idling

Unnecessary vehicle idling wastes fuel and contributes to air pollution. To help reduce unnecessary idling in the City, TTC vehicle operators are reminded that unless it is for the safety of the operator and our customers (i.e. in isolated layover locations at night) they are expected to turn the bus engine off immediately after three minutes.

Diesel engine buses need to provide sufficient time for the diesel engine to cool down so that there is no damage to the turbo-chargers. This requirement is integral to reducing emissions while the engine is operating. The minimum time required for the diesel engine to cool down is at least three minutes.

Electric Passenger Rail Fleet

TTC's fleet of rail vehicles have no local emissions, since they are powered by electricity. Estimates of the emissions from the generating stations used to power the rail system are not included in this report.

TTC's Subway Fleet Plan identifies the retirement timelines for TTC's oldest subway vehicles (H6 cars) and shows the procurement of a new fleet of trains referred to as the Toronto Rockets (TR). By 2015, the subway fleet will be comprised of only two vehicle types - the Toronto Rockets and the older T1 cars.

9.4 Financial Implications of Green Fleet Plan Initiatives

There are no immediate or direct financial implications arising from this Green Fleet Plan. TTC's investment in fleet expansion and modernization is addressed in TTC's Capital Program.


DOWNSVIEW
Downsview
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STAND CLEAR OF DOOR

Appendix A – Definitions

Alternative Fuel – Any fuel other than gasoline, diesel, and other substantially petroleum-based fuels that is less polluting than gasoline or diesel fuel. Alternative Fuel shall include, but is not limited to, natural gas, propane, ethanol, biodiesel (five per cent blend or above), and electricity.

Alternative Fuel Vehicle (AFV) – Any motor vehicle powered in whole or in part by non-petroleum-based fuels.

Battery Electric Vehicle (BEV) – An all-electric vehicle which runs entirely on an electric motor and rechargeable battery.

Bi-Fuel Vehicle – Any motor vehicle designed to operate on two distinct fuels (including flexible fuel vehicles), one of which is an alternative fuel.

Biodiesel – Fuel refined from agriculturally derived oils that is suitable for use in diesel engines. Often blended with traditional petroleum-based diesel in amounts connoted by the letter "B" and a number (e.g. B20 = 20 per cent biodiesel and 80 per cent petroleum diesel).

CAC – Criteria air contaminants or criteria pollutants are a set of air pollutants that cause smog, acid rain, and other health hazards. CACs are typically emitted from many sources in industry, mining, transportation, electricity generation and agriculture. In most cases they are the products of the combustion of fossil fuels or industrial processes.

CO – Carbon Monoxide, a standard component of conventionally powered vehicle emissions.

CO_2 – Carbon Dioxide, a standard component of conventionally powered vehicle emissions and a principal greenhouse gas.

CNG – Compressed Natural Gas

Diesel Particulate Filter (DPF) - A device designed to remove diesel particulate matter or soot from the exhaust gas of a diesel engine.

Electric Vehicle (EV) – An electric vehicle which runs partially or entirely on an electric motor and rechargeable battery.

Greenhouse Gas (GHG) – Greenhouse gases are those gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiation at specific wavelengths within the spectrum of infrared radiation emitted by the Earth's surface, the atmosphere and clouds. This property causes the greenhouse effect. Water vapour (H_2O), carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4) and ozone (O_3) are the primary greenhouse gases in the earth's atmosphere. Moreover, there are a number of entirely human-made greenhouse gases in the atmosphere, such as sulphur hexafluoride (SF_6), hydrofluorocarbons (HFCs), and perfluorocarbons (PFCs).

Green Vehicle – A green vehicle or environmentally preferable vehicle is a motor vehicle with an engine, fuel or device that causes it to produce less impact on the environment than a comparable, conventional, internal combustion engine vehicle running on gasoline or diesel.

Heavy Duty Vehicle – Any motor vehicle, licensed for use on roadways, having a manufacturer's gross vehicle weight rating greater than 9,000 kilograms.

Hybrid Vehicle - A motor vehicle that draws propulsion energy from onboard sources of stored energy that are both an internal combustion / heat engine that runs on combustible fuel, and a rechargeable energy storage system.

Light Duty Vehicle – Any motor vehicle having a manufacturer's gross vehicle weight rating less than 4,500 kilograms. Light duty vehicles include passenger cars, light duty trucks, sport utility vehicles (SUV), minivans, and pick-up trucks.

Medium Duty Vehicle – Any motor vehicle having a manufacturer's gross vehicle weight rating between 4,500 and 9,000 kilograms.

Plug-in Hybrid Electric Vehicle (PHEV) – A type of hybrid vehicle that takes electricity from an outlet to recharge internal batteries. The energy stored in the batteries can be used to drive an electric motor, just as in a BEV. However, a PHEV also has an engine, typically gasoline-fueled, which can power the vehicle when the battery is depleted.

Selective Catalytic Reduction (SCR) – A means of converting nitrogen oxides (NO_x) with the aid of a catalyst into diatomic nitrogen (N_2) and water (H_2O).

VOC – Volatile organic compounds are organic chemicals that have a high vapor pressure at ordinary room temperature, causing them to evaporate easily. They include both human-made and naturally occurring chemical compounds. Some VOCs are dangerous to human health or cause harm to the environment. Anthropogenic VOCs are regulated by law, especially indoors, where concentrations are the highest. Harmful VOCs typically are not acutely toxic, but have compounding long-term health effects. Because the concentrations are usually low and the symptoms slow to develop, research into VOCs and their effects is difficult.

Appendix B – Green Fleet Plan 2008-2011 Centrally-Managed Fleet Outcomes Report

Action 1a:
Reduction target for greenhouse gas emissions from the 1990 levels of six per cent by 2012 (the "Kyoto target").

Outcome 1a:
As reported by Environment and Energy Division (EED) in March 2013 (PE21.5), by the end of 2011 Fleet emissions of eCO_2, including those of EMS and TFS, had decreased by six per cent relative to 1990 levels. In addition to this target, the Green Fleet Plan 2008-2011 for the Centrally Managed Fleet forecasted GHG emissions avoidance of 15,304 tonnes eCO_2, or 11 per cent, compared to the business as usual scenario (Table H). This forecast was based on the Centrally Managed Fleet's composition and size in 2008 (2008 baseline). Emissions avoided as presented here are reductions relative to the business as usual scenario, not absolute reductions from year to year. The business as usual scenario represents the fleet emissions had there been no green fleet initiatives such as alternative fuels or green vehicles.

Over the 2008-2011 period, a total of 11,315 tonnes of GHG emissions were avoided. A combination of green fleet initiatives that were proven to be most effective and sustainable, improvements in environmental standards and regulatory requirements, advancements in conventional vehicle and fuel technologies, and a number of other internal and external factors, contributed to this total. This is based on the actual size and composition of the Centrally Managed Fleet (2011 baseline), and represents an eight per cent reduction relative to the business as usual scenario.

Table H: Forecasted and Actual 2008-2011 Estimated Greenhouse Gas Emissions for the Centrally Managed Fleet*

2008-2011 TOTAL	Business as Usual emissions (without greet fleet initiatives)	Emissions (with green fleet initiatives)	Emissions avoided from Business as Usual	
	(tonnes eCO_2)	(kg eCO_2)	(tonnes e CO_2)	(%)
2008-2011 Estimated Forecast (2008 baseline)	140,992	125,688	15,304	11
2008-2011 Estimated Actual (2011 baseline)	142,966	131,651	11,315	8
Variance	1,974	5,963	(3,989)	(3)

* Based on fuel dispensed at FSD-operated City fuel sites and excludes fuel used by vehicles owned and operated by private companies who contract with the City, mobile fuel, and fuel purchased at commercial sites.

The results also indicate that forecasted emission reductions were not achieved. This was due in part to the reduction of biodiesel fuel purchases in 2011, because of budget constraints, and partly because of challenges experienced with some of the green vehicles, technologies and practices. Caution should be used before comparing the emission forecasts made in 2008 with those made in 2011. It is important to note that between 2008 and 2011 there were major changes in the size and composition of the fleet, and in available information.

The data presented here are tailpipe, rather than fuel lifecycle emissions of greenhouse gases as a group, described as carbon dioxide equivalents (eCO_2).

Action 1b:
A 20 per cent reduction target for locally generated smog causing air pollutants from 2004 levels by 2012.

Outcome 1b:
EED has estimated the 2004 baseline emissions, 2011 actual emissions and 2012 target for Criteria Air Contaminants (smog pollutants) from the Centrally-Managed Fleet (Table I).

Table I: Criteria Air Contaminant (smog pollutant) emission estimates and targets for the Centrally Managed Fleet

	CO (tonnes)	NO_X (tonnes)	$PM_{2.5}$ (tonnes)	PM_{10} (tonnes)	VOC (tonnes)	SO_2 (tonnes)
2004 Baseline Emissions	162.7	106.2	2.1	2.8	13.7	0.4
2011 Estimated Emissions	196.2	145.9	2.9	3.8	16.8	0.6
2012 Target Emissions	130.2	85.0	1.7	2.2	10.9	0.4

CO – carbon monoxide; NO_X – oxides of nitrogen; $PM_{2.5}$ and PM_{10} – particulate matter of aerodynamic diameter less than 2.5 and 10 microns, respectively; VOC – volatile organic compounds; SO_2 – sulphur dioxide

The results, provided by the EED, indicate that emissions of criteria air contaminants (CAC) from the Centrally-Managed Fleet were higher in 2011 than in 2004. This is consistent with the higher fuel consumption reported for the 2011 fleet relative to the 2004 fleet. The Centrally-Managed Fleet's 2012 target reduction of 20 per cent below 2004 levels was unfortunately not met. EED reported in 2013 that the preliminary data available indicate that the Corporation as a whole will also not meet the 2012 target (2013 report PE21.5). It further indicated that the corporate target will remain in effect until it has been met. The outcomes seen here for the Centrally-Managed Fleet indicate that new strategies are required over 2014-2018 to address CAC emissions.

The green fleet initiatives implemented in 2008-2011 were insufficient to meet the CAC target. However, number of different factors lowered criteria air contaminant (CAC) emissions below the levels where they would otherwise have been. Green fleet initiatives that were proven to be most effective and sustainable, advancements in conventional vehicle and fuel technologies, and a number of other internal and external factors were some of the key contributing factors.

The Criteria Air Contaminant (smog pollutant) estimates are for the Centrally-Managed Fleet only. The 2004 baseline emission estimates include the vehicles used by the core Divisions (e.g. Transportation Services, Toronto Water), plus Toronto Public Library. Major fuels included are gasoline containing ethanol, on-road diesel, off-road diesel, biodiesel and natural gas. It is important to note that the fleet size and composition changes over time in response to operational and policy requirements. The emission estimates provided here show the estimated emissions at a snapshot in time, but care should be taken when using these numbers to establish a trend over time. Improved Federal emission factors were also used by the Environment and Energy Division to estimate CAC emissions for all years, and therefore the 2004 baseline differs from that reported previously.

Action 2a:
Contain the size of the City's fleet by working with Divisions to reduce the number of vehicles required and kilometres travelled, use vehicles more efficiently and delete underused vehicles from the fleet or move them to other City operations.

Outcome 2a:
FSD consults extensively with its clients as part of the annual procurement process to discuss vehicle and equipment needs, and requires a business case from Divisions wishing to increase the fleet size. FSD issues reports to its clients identifying underused vehicles. To meet short-term and seasonal needs, FSD operates a pool of short-term rental vehicles rather than purchasing the same vehicles.

Action 2b:
Purchase the right size of vehicle for the job, using small vehicles where they meet operational needs.

Outcome 2b:
FSD continues to work with its clients to optimize light-duty vehicles with a preference for smaller vehicles and hybrids. The business case used to replace a vehicle requires the user to indicate how the vehicle will be used and what cargo will be carried to ensure a vehicle of minimum size possible is purchased.

Action 2c:
Purchase the most fuel-efficient vehicle, or lowest-emitting vehicle, that is commercially available and meets operational needs.

Outcome 2c:
The City purchased hybrid or ultra-fuel-efficient cars as a standard practice. Over 2008-2011, examples of fuel-efficient vehicles purchased include: ultra-compact cars, hybrid cars, hybrid bucket trucks, hybrid cube vans, CNG and hydraulic hybrid waste collection trucks, and all-electric and plug-in electric cars and vans. Over 2008-2011 FSD issued an annual policy to its clients advising what types of proven green vehicles are standard equipment for the City of Toronto.

In 2010, the US EPA mandated clean truck engines came into service and the City now has several hundred of them in the fleet. These trucks include additional pollution control equipment to address particulate matter and NO_x emissions while using low-sulphur diesel fuel. Designed for highway drive cycles, these trucks had to be re-programmed for inner city use and have been a challenge to use. In addition, due to the additional pollution control equipment, these trucks use more fuel than the older models they replace.

Based on the City of Toronto Fleet Services Operational Efficiency Plan conducted by Fleet Challenge Ontario in 2011, the most fuel efficient vehicles in the City's Centrally-Managed Fleet were Toyota Prius and Mercedes Smart car.

Action 3:
Replace the following numbers of City vehicles with green vehicles, giving priority to the cleanest technologies: At a minimum, replace 80 vehicles in 2008, 100 vehicles in 2009, 140 vehicles in 2010 and 200 vehicles in 2011.

Outcome 3:
FSD increased the total number of green vehicles by 196 vehicles in 2008, 69 in 2009, 56 in 2010 and 17 in 2011. These quantities are the net result of purchasing new vehicles and retiring old ones. The green fleet inventory was 612 vehicles as of December 31, 2011.

Table J: Number of green vehicles added to the fleet during 2008-2011 period compared to the original targets

Green Vehicle Additions		
	Target	Actual
2008	80	196
2009	100	69
2010	140	56
2011	200	17
Total	520	338

Action 4a:
Actively seeking, pilot testing and incorporating green vehicles and technologies into the City's fleet.

Outcome 4a:
FSD has undertaken numerous pilot projects and invested in new and emerging green vehicle and fuel technologies. Some of these technologies have been very successful and have been adopted by the City's Centrally-Managed Fleet. Unfortunately, not every green solution tested by the City has been able to adequately reduce emissions and in so doing, justify the investment made.

In 2011, Fleet Challenge Ontario completed the City of Toronto Fleet Services Operational Efficiency Plan that provided more detailed evaluation of the City's Centrally-Managed Fleet green vehicles. Following are the key findings of that study, FSD internal preliminary findings, and key divisional user experience feedback regarding the use of green vehicles and technologies at the City's Centrally-Managed fleet for the 2008-2011 period:

- Hybrid vehicles and equipment showed the greatest benefit in areas with high operational utilization. Hybrid pickup trucks utilization was higher than for the conventional pickups and as a result they provided expected cost and emissions benefits;
- Hybrid-electric aerial tower trucks were added to Centrally-Managed fleet in 2009. These trucks allow City staff to use the tower and bucket to raise and lower the bucket with the engine off, reducing noise, exhaust and fuel consumption;
- Compressed natural gas (CNG) vehicles were purchased and used by Solid Waste Collections. Overall, our experience with CNG vehicles indicates their benefits in two areas. The cost of CNG is less than half of the cost of regular diesel, and GHG and CAC emissions are much lower. However, CNG vehicles require separate fueling infrastructure which could be costly, and parts and maintenance costs for these vehicles are generally higher as well;

- LED lights, auxiliary batteries, anti-idling devices, inverters, and other technologies for vehicles and equipment that reduce fuel consumption and emissions, have been installed in a large number of vehicles and equipment;
- Most of the plug-in hybrid electric vehicles (PHEV) and battery electric vehicles (BEV) that have been added at Centrally-Managed Fleet, would require higher utilization than they have had, in order to reach their potential for reducing fuel consumption and lowering the total cost of vehicle ownership. In real-world conditions, particularly in a climate with extreme temperatures, adequate range in BEVs is an impediment to high utilization that needs to be managed;
- Hydrogen bus project was too expensive and there was a lack of fuel availability so it was cancelled;
- Purchasing vehicles from small, start-up manufacturers brought the risk of bankruptcy which resulted in having no access to warranty provisions or repairs, as in the case of 5 hybrid and 4 battery electric Azure vehicles;
- Making major modifications to vehicles carries the risk of voiding the vehicle's warranty, as in the case of Toyota Prius plug-in conversions;
- The Solid Waste Collections truck with hydraulic launch assist hybrid technology was costly ($50,000 premium) and was not best suited for the City application;
- Zero-emission ice resurfacers had frequent breakdowns, and no parts supplier.

Fleet Services Division will expand on the current findings and conduct a detailed internal assessment of the current green vehicles and technologies in the City's Centrally-Managed Fleet and will report its findings with the first Consolidated Green Fleet Plan progress report in Q2 2016.

Action 4b:
Pilot testing more plug-in electric vehicles and ensuring that they are recharged at night using off-peak electricity where possible.

Outcome 4b:
FSD incorporated numerous types of plug-in electric vehicles into the fleet. In some cases FSD proactively entered into agreements with manufacturers to acquire these electric vehicles before they were commercially available in Ontario. All plug-in electric vehicles should be plugged in at night, and for operational reasons daytime charging is also necessary in some applications.

In our experience, and according to a number of independent sources and studies, limited electric vehicle range has provided significant challenges. Electric vehicle battery range was significantly reduced depending on the weather and road conditions that required vehicle's battery to be used for other applications, such as climate control, or at higher speed in highway driving conditions. This remains one of the key limitations for broader battery electric vehicle adoption.

Also, in order to achieve significant environmental benefits, and operational cost savings that compensate for higher capital and in some cases higher maintenance costs, these vehicles must have higher utilization.

Action 4c:
Working with Toronto Atmospheric Fund to expand the Toronto Plug-in Hybrid Electric Vehicle Project to a larger consortium of fleet managers, potentially to include GTA municipalities and utilities.

Outcome 4c:
The Plug-in HEV vehicle retrofitting project funded by TAF was concluded without expansion. The City's fleet now includes Toyota and Chevrolet factory-built Plug-in HEVs.

Action 4d:
Pilot testing full-electric vehicles as well as recharging station technologies and options, in partnership with the Toronto Atmospheric Fund and the Toronto Parking Authority.

Outcome 4d:
FSD entered into agreements with manufacturers and acquired battery electric vehicles before they were commercially available in Ontario. Eighteen chargers for City electric vehicles have been installed at City facilities. In 2009, the City established an Electric Vehicle Working Group, led by Toronto Environment Office and Toronto Atmospheric Fund and including the Toronto Parking Authority, to coordinate a public charging strategy. Transportation Services has taken the lead on public EV charging.

Action 4e:
Evaluating electric, low-speed vehicles for City of Toronto operations and pilot testing these vehicles if the evaluation indicates they will be beneficial.

Outcome 4e:
In the past, FSD has requested the Province to expand the permitted uses of low-speed electric vehicles. Given the progress made on full-speed electric vehicles and their versatility, FSD is concentrating on these vehicles at this time.

Action 4f:
Pilot testing green trucks, including light-duty, medium-duty, and heavy-duty vehicles, targeting those that idle excessively such as delivery trucks and garbage packers, and sharing results with municipal and private fleet managers.

Outcome 4f:
FSD acquired green truck technologies across all classes: light, medium and heavy-duty. To reduce idling by light-duty trucks, FSD purchased light-duty trucks with devices that shut the engine off while idling, but where necessary, keep arrow bars and other safety lights operating to protect workers. On later models FSD upgraded to a device that shuts the vehicle off, and automatically restarts it if the battery is getting low. For medium-duty, FSD set trucks' timers to shut them down if idling and piloted five hybrid-electric cube vans. To reduce idling from heavy-duty trucks, including Solid Waste collection trucks, FSD re-programmed the engine control module (ECM) to shut down after one minute of idling. Ultimately, this practice was discontinued due to interference with regeneration of the diesel particulate filter, an emission-control device on 2010 and later diesel engines.

FSD purchased hybrid aerial tower trucks that allow Forestry staff to raise and lower the bucket with the engine off.

SWMS and FSD also acquired natural gas trucks to reduce fuel consumption.

Action 4g:
Developing, in collaboration with the Toronto Atmospheric Fund, a Low-Carbon Truck Pilot Project that pilot tests hybrid, plug-in hybrid, and all-electric truck technologies.

Outcome 4g:
In late 2008, FSD received a grant from TAF to assess green truck technologies and share the results with other fleets. The purpose was to assess the actual performance of the City's green trucks for one year and present the results in an Excel-based tool that other fleets can use to choose the best green trucks for their fleets. FSD completed Phase One of the project, establishing the Excel-based tool and sharing it with approximately fifty private and public fleets for their use. The focus of Phase Two was to monitor and evaluate green Solid Waste collections trucks. In light of changes in Corporate operations, and the contracting out of some solid waste collections, Phase Two of the project was cancelled.

Action 4h:
Pilot testing hydrogen-powered vehicles.

Outcome 4h:
In 2008 and 2009, the City was pilot testing three internal combustion engine hydrogen mini-buses owned by Ford of Canada, and set up a temporary hydrogen fuel site. This pilot project has been cancelled due to substantial cost and lack of fuel availability.

Action 4i:
Adding hybrid-electric aerial tower trucks to the City's fleet.

Outcome 4i:
In 2009, the City received three hybrid-electric aerial tower trucks. These trucks allow Forestry staff to use the tower and bucket to raise and lower the bucket with the engine off, reducing noise, exhaust and fuel consumption.

Action 4j:
Replacing all of the City's old street sweepers with "regenerative-air" dustless sweepers that trap fine particulate matter (PM2.5) pollution and have cleaner diesel engines.

Outcome 4j:
By the end of 2008, the City's street sweeper inventory had been replaced with sweepers that trap fine particulate matter. Transportation Service's experience since that time has shown that the regenerative-air sweepers have made a difference in picking up fine particles; however for maximum effectiveness under various operating conditions more than one sweeper type may be required. According to Transportation Services Division, certain types of sweepers are more effective for certain applications. The City should continue to use sweepers that efficiently pick up and hold fine particles (PM10 and PM2.5) to maintain air and water quality. Responding to recommendations from the Auditor General, in 2013 Transportation, in partnership with Fleet Services and the Environment and Energy Office, committed to initiating comparative testing and evaluation of sweepers in 2014 (AU13.9). In that report Fleet and Transportation also committed to report the results to Council.

Action 4k:
Adding electric, zero-emission ice resurfacers to the City's fleet.

Outcome 4k:
Three electric ice resurfacers were purchased and went into service for the 2008-2009 ice rink season. Unfortunately, they have frequent breakdowns, and no parts supplier.

Action 4l:
Continuing to review the merits and applicability of natural gas vehicles.

Outcome 4l:
Compressed natural gas (CNG) vehicles were purchased and are being used by SWMS Collections. Results were positive, and more are being purchased. The City of Toronto was the first government fleet in Canada to use this type of truck. Efforts are underway to establish a CNG fueling station at a City yard.

Overall, our experience with CNG vehicles indicates their benefits in two areas. The cost of CNG is less than half of the cost of regular diesel, and GHG and CAC emissions are much lower. However, CNG vehicles require separate fueling infrastructure which could be costly, and parts and maintenance costs for these vehicles are higher as well.

Action 5a:

Procure LED lights, batteries, inverters, space heaters or other equipment that reduces the need to idle a vehicle for long periods in order to operate lights, arrow boards and other necessary tools.

Outcome 5a:
FSD has implemented the following idle-reduction initiatives:

Starting in 2009, FSD reduced idling in trucks by purchasing idle shut-down devices for light-duty vehicles, or by setting the existing idle shut-down timer in heavy-duty vehicles. FSD later purchased devices that shut the vehicle down when idling but ensure that arrow bars and other safety lights remain on to protect workers, by restarting the engine when the battery becomes low. On the City's existing heavy-duty trucks, FSD reprogrammed the engine control module (ECM) to shut off the engine when idling. FSD purchases only LED lights for truck arrow bars, safety strobes, etc. since they draw less power and allow battery systems to work. Air or coolant-heaters are now being installed in light and heavy-duty vehicles to warm the vehicles with the engine off and reduce idling. We have experienced problems with some after-market devices, such as automatic vehicle location (AVL), where idle shut-offs are not working on all makes and models, especially newer ones. Evaluation of the effectiveness of these devices and determination of future application is required by FSD.

Action 5b:
Install electric plugs for truck block heaters at all major Solid Waste yards where feasible, and develop a policy to ensure they are used by staff to reduce unnecessary vehicle idling.

Outcome 5b:
In-vehicle space heaters on timers are now being installed instead of block heaters to reduce idling.

Action 6:
Replace the oldest vehicles with cleaner, modern technology by continuing to accelerate the replacement of overdue City vehicles.

Outcome 6:
Each year, FSD identifies for its client Divisions the vehicles that are due for replacement, based on their age and type. All vehicle purchases are done on this basis in an effort to reduce the average age of the fleet. Vehicle lifecycles have been updated, and a new vehicle-assessment process has been introduced, to ensure vehicles are retired at the most cost-effective time.

Action 7:
Include in all vehicle procurement specifications green vehicle attributes, such as fuel efficiency and low emissions, and provide an appropriate weighting for these attributes when selecting a product.

Outcome 7:
FSD actively includes green vehicles in vehicle procurement specifications whenever green options are available. For instance, over 2008-2011 hybrids or electric vehicles were specified when buying cars and where feasible, hybrids were specified when purchasing heavy-duty aerial tower trucks.

Action 8:
Evaluate biofuels to determine which products and feedstock provide the greatest environmental benefits on a life-cycle basis, and the environmental impact of converting forests and food-producing land to growing crops for fuel.

Outcome 8:
A review of biofuels was included in the Green Fleet Plan 2008 - 2011 Interim Update I report and referred to next generation biofuels derived from sustainable feed stocks. In 2009 and 2010, FSD worked with the Clinton Climate Initiative to better understand what sustainable fuels are most promising, and how the City's fleet can transition to lower-carbon fuels over the long term. Finding affordable, environmentally sustainable fuel sources continues to be a challenge.

If chosen carefully, biofuels can be an effective way to reduce emissions across City Fleets, but they come with a price premium. The City's Centrally-Managed Fleet has tested and used a number of different alternative fuels over the years. Many of these were not sustainable due to lack of fueling infrastructure, as in the case of hydrogen, or the actual cost of the fuel, as in the case of biodiesel. Experience by many other fleets across North America shows that use of biodiesel also causes reduced fuel efficiency. Almost 50 per cent of the avoided GHG emissions over 2008-2011 resulted from the use of biodiesel, with an associated cost. Given the incremental cost of biodiesel, and recent Federally and Provincially regulated improvements to conventional fuels, at this time the use of biodiesel over 2014-2018 is not anticipated.

Action 9:
Evaluate the use of biofuels with the federally mandated new diesel engines (2007 US EPA compliant models) and emission control devices to optimize emission reductions achieved by the City.

Outcome 9:
B10 concentrations of biodiesel were approved for use in diesel engines meeting 2007 US EPA emission standards. Currently, some engine manufacturers approve biodiesel concentrations up to B20.

Action 10:
Expand the biofuels program to deliver biofuels to all City Divisions.

Outcome 10:
From 2008 to 2010, the City used biodiesel at many of its large fuel sites. The biodiesel concentration varied, depending on season and cost. In 2008, we used approximately 908,000 litres of pure biodiesel as B5, B10, and B20 concentrations. In 2009 and 2010, we used only B5 and B10 concentrations for the total of 623,000 and 521,000 litres of pure biodiesel for each of those years respectively. The biodiesel pilot program was discontinued at the end of 2010 due to spikes in fuel prices and limited funding.

According to Health Canada and Environment Canada (2014), using B5 and B20 in heavy-duty diesel trucks in Canada will produce only minor air quality and health benefits relative to ultra-low-sulphur diesel (ULSD). The benefits are expected to decline over time. In a study of potential health implications, the authors compared the widespread use of biodiesel in heavy-duty diesel vehicles to the use of ULSD, for 2006 and 2020. They determined that biodiesel lowers emissions of particulate matter, carbon monoxide, hydrocarbons, and volatile organic compounds, though it slightly increases NO_X emissions. They concluded that the potential impacts of biodiesel on air quality would be well below what is detectable by ambient monitoring. The study also concluded that as on-road emissions declined over time, because newer, cleaner vehicles replaced older ones, the effect of biodiesel on exhaust emissions decreased. Specifically, in 2020 anticipated emission reductions from introducing vehicles with better emission controls and fuel efficiency outweighed emission reductions from biodiesel blends lower than B20.

Action 11:
Explore the feasibility of using biodiesel in off-road diesel fuel, and implement a pilot project if feasible.

Outcome 11:
FSD determined that it was not feasible to establish separate fueling delivery to off-road equipment.

Action 12:
Use clean sources of energy for vehicles, including biofuels from sustainable feedstock as they become available, for example ethanol produced from cellulose.

Outcome 12:
During the 2008-2011 period, the City used cleaner fuels including biodiesel, ethanol, hydrogen, electricity, and natural gas. The City's biodiesel usage was discontinued during this time due to fuel price spikes and funding constraints. Today, the Federal Government requires gasoline to contain five per cent renewable fuel and diesel to contain two per cent renewable fuel. In 2009 the City's fuel purchasing process was expanded to allow a greater number of biofuel feed stocks. The City's tender now accommodates cellulosic ethanol and other sustainable feedstocks. However, availability of affordable biofuels from non-food feedstocks remains a barrier. Today, the City has vehicles running on electricity and natural gas.

Action 13:
Advocate for sustainable electricity in Ontario, including conservation, renewable and the timely phase out of coal-fired electricity, to ensure the environmental benefits of plug-in and all-electric vehicles are realized.

Outcome 13:
FSD has supported the City of Toronto's advocacy on phasing out coal-fired electricity in Ontario. Over 2008-11, the City purchased renewable energy from Bullfrog Power. This Corporate contract expired in September, 2011. As more vehicles begin plugging in, there is an increasing need to ensure a clean electricity supply.

Action 14:
Host annual Green Fleet Expo ("GFX") with the City of Hamilton, Fleet Challenge and other partners to provide public and private fleet managers and members of the public with an opportunity to learn about green fleet technologies and practices.

Outcome 14:
The GFX originated in Toronto. The City of Toronto has hosted or partnered in delivering this annual event for eight years. Due to the reputation of the GFX since 2006 as the premier green fleet exposition for fleet managers, the GFX name and logo were adopted as official marks of the City.

Action 15a:
Participating in Fleet Challenge in 2008 by presenting Toronto's green fleet experience to other Ontario municipalities.

Outcome 15a:
FSD participated in Fleet Challenge events in Ottawa, Sudbury, and London in 2008.

Action 15b:
Sharing information with Greater Toronto Area municipal fleet managers through the GTA Clean Air Council.

Outcome 15b:
FSD shares information with GTA municipal fleet managers through the GFX and has provided information to the GTA Clean Air Council and EV300 partners. Toronto's Green Fleet Plan 2008-2011 informed the development of similar plans by Brampton, Hamilton, Markham, Mississauga and Ottawa.

Action 15c:
Sharing information with public and private fleet managers through the Canadian Association of Municipal Fleet Managers (CAMFM), National Association of Fleet Administrators (NAFA Canada) and Municipal Equipment and Operations Association (MEOA).

Outcome 15c:
FSD communicates regularly with CAMFM to share best practices with fleets across Canada, and with other organizations as opportunities arise.

Action 15d:
Working with the Director of the Toronto Environment Office to create a Greening Commercial Fleets Enviro-Action Working Group consisting of representatives of the National Association of Fleet Administrators and operators of large fleets in the areas of phone, cable, utilities, retail and courier providers to work together to identify and implement actions that green these fleets and achieve a reduction in emissions city-wide.

Outcome 15d:
This working group was cancelled by the City. FSD reaches private fleets through the Green Fleet Expo, and utilities are being engaged through the City's Electric Vehicle Working Group.

Action 16a:
Provide technical support to the Toronto Transit Commission, Emergency Medical Services, Toronto Fire Services, Toronto Police Service and other Agencies, Boards and Commissions in developing and implementing their consolidated green fleet plans.

Outcome 16a:
Green Fleet Plans for TTC, EMS, TFS and TPS (EX24.2) were approved/endorsed by Council in October 2008. Fleet Services Division provided extensive technical support.

Action 16b:
Fleet Services Division (FSD), the Energy Efficiency Office and the City's Environment Office assist the Toronto Transit Commission in identifying and reporting on the emissions from the current and proposed streetcars and LRT fleet.

Outcome 16b:
Since the preparation of the City's Green Fleet Plan, TTC completed an emissions inventory for its operations. FSD also meets regularly with TTC on issues related to fuel and operations and staff are available to assist as required.

Action 17:
Provide technical support to Municipal Licensing and Standards, Toronto Atmospheric Fund and other partners in their efforts to green the fleets of vehicles that are licensed by the City (e.g. taxis).

Outcome 17:
FSD supports various green fleet initiatives from other organizations when requested by sharing information such as maintenance costs, warranty issues and driver training strategies. FSD worked closely with TAF over 2008-2011 and provided information wherever possible. FSD provided technical support to Toronto Public Health in its efforts to inform food vendors and mobile workshop owners of the Idle-Free auxiliary power technology currently available.

Action 18:
Support the City's Bike Share program for staff by providing bike procurement assistance, safety training and maintenance for a pool of City bicycles.

Outcome 18:
Initially FSD provided bike safety training and bike maintenance for the City bikes. The Bike Share pilot program, led by EED, wrapped up at the time Bixi was introduced. FSD now provides meeting space for the staff bike training by the City's Bike Safety Working Group and has offered technical support if required.

Action 19:
Provide information and assistance to support establishment of bicycle infrastructure at City facilities by Facilities and Real Estate, including bike parking, bike lockers and other ancillary facilities as appropriate.

Outcome 19:
FSD provided information and assistance as requested. Fleet Safety training courses for City drivers stress the importance of sharing the road with cyclists.

Action 20:
Promote the City's Idle-Free Policy and 10-second idling rule for City staff.

Outcome 20:
FSD's Idle Free program has 5 components: driver education, hybrid vehicles that do not idle, idle shut-off devices in light trucks, engine control module programming in heavy trucks, and other devices such as cab heaters. FSD promotes these technology options to the City's Divisions and undertakes them where possible. Idle-free driver training is provided as part of regular Fleet Safety courses for City drivers. The Idle-Free training has been augmented to include other Ecodriving techniques as well. The Idle-Free message is promoted at the Green Fleet Expo and special events such as the Live Green Toronto Festival. Changing driver behaviour with existing resources continues to be a challenge.

Action 21:
Continue to provide Idle-Free training in staff driver training courses, to monitor staff compliance with the 10-second idling rule, and to follow up with staff found to be idling.

Outcome 21:
As noted above, Idle-Free training is offered as part of regular driver training courses, such as the Commercial Vehicle Operator Registration (CVOR) refresher courses for City staff. Idle-Free training has been expanded to include other Ecodriving techniques. Fleet Safety staff perform on-road spot checks on vehicles to ensure compliance with the Fleet Safety Policy, Highway Traffic Act and Idle-Free Policy. To further enforce the Policy, public idling complaints are relayed by 311 directly to the driver's supervisor for follow-up action.

Action 22:
Determine the feasibility of establishing a policy prohibiting City vehicles from drive-throughs, and establish the policy if feasible.

Outcome 22:
Through training, promotion of the Idle-Free Policy and spot checks, FSD encourages City drivers to eliminate idling wherever possible, and this would include limiting the use of drive-throughs. It was determined that a specific policy on drive-throughs, with associated promotion and enforcement, is not the most productive strategy at this time.

Action 23:
Encourage other orders of government to support policies and incentives that encourage the use of sustainable vehicles, fuels and practices.

Outcome 23:
FSD has worked with the Government of Ontario and other stakeholders to encourage the introduction of low-speed electric vehicles and financial incentives for fuel-efficient and electric vehicles. Through its participation in Electric Mobility Canada, FSD has encouraged the Federal government to establish other supportive programs for electric vehicles.

Action 24:
Work with Divisions to explore the feasibility of making green pool vehicles available to staff who require their vehicle for work.

Outcome 24:
FSD has worked with City pool-vehicle managers to increase the proportion of green vehicles. Of the five passenger cars in the City Hall pool managed by Facilities and Real Estate, four of them are hybrids or ultra-fuel-efficient cars and one is a plug-in hybrid electric vehicle. All four pool vehicles managed by Toronto Water at Metro Hall are hybrids. The pool operated by FSD at 843 Eastern Avenue is largely made up of hybrids and electric vehicles. FSD has set up a pilot project giving City staff access to a car-share company's vehicles across the City.

Action 25:
Investigate and implement ways to reduce the number of work-related vehicle trips taken by Fleet Services staff, such as increasing the use of conference calls and scanners to share information between work sites.

Outcome 25:
In addition to conference calls and webinars, employees were encouraged to use touch-down stations at City offices to reduce travel time. A new teleconferencing phone was added at FSD's main office.

Action 26:
Work with other Divisions to encourage City of Toronto employees to make sustainable transportation choices on their commute and at home, including by providing information on green vehicles and commuting alternatives to City staff.

Outcome 26:
Over 2008-11, FSD's website provided information and links on the green vehicles and financial incentives available. The Green Fleet Expo, an annual event that FSD helps host is an opportunity to learn about green vehicles that individuals can purchase for personal use. A commuter ride-sharing program for City staff led by EED was promoted to FSD staff.

Action 27:
Support the Smart Commute program by providing data and information and promoting the program as it is rolled out to all City employees.

Outcome 27:
FSD provides information as requested. FSD also supported Smart Commute's Employee Bike Share program by providing technical support.

Action 28:
Provide information to the public on green vehicles and funding incentives on Fleet Services' website.

Outcome 28:
FSD provides information on green vehicles and links to financial incentives on our website. FSD staff also provide information directly to members of the public and media in response to specific enquiries.

Action 29:
Promote green vehicles at public events such as the Green Living Show, Canadian National Exhibition and Green Toronto Festival.

Outcome 29:
During the 2008-2011 period, FSD participated in Earth Day events, the Green Living Show and the Live Green Toronto Festival as opportunities arose. At these public events, FSD has provided vehicles, staff and Idle-Free materials. In June 2009, Toronto hosted the ecoCAR Challenge with support from FSD.

Action 30:
Investigate the feasibility and benefit of adopting additional green practices at Fleet maintenance facilities, such as using synthetic oils and extending the time between oil changes.

Outcome 30:
FSD is using synthetic transmission oil to extend the time interval between oil changes. Used engine oil from city vehicles is recycled, as was reported on in 2007. FSD garages continue to test and use alternative products such as Ecologo-certified hydraulic oil.

Action 31:
Continue to reduce the number of fuel sites operated by the City of Toronto by consolidating, upgrading or closing fuel sites, in consultation with client Divisions.

Outcome 31:
In 2003, the City owned and operated 105 fuel sites. To reduce environmental risk and cost, FSD has worked with its client Divisions to close some fuel sites and upgrade others. As of January 2014, the City has 40 fuel sites, 20 managed by Fleet Services Division and 20 by City Divisions. Fleet Services has responsibility for oversight of fuel sites managed by Divisions. As part of consolidating fuel sites, underground tanks are removed and replaced with aboveground tanks with leak detection monitoring.

Action 32:
Have the City's fleet reviewed and rated under the E3 Fleet Rating System to identify opportunities to reduce fuel use and pollutant emissions and measure Toronto's fleet against available environmental benchmarks.

Outcome 32:
An E3 review of FSD's maintenance, fuel and inventory data was completed in 2008. An E3 rating was not undertaken due to funding constraints and an analysis of alternatives.

Action 33:
Examine the practices used by international municipal green fleet leaders such as New York City and Los Angeles, and incorporate successful practices into Toronto's fleet operations where feasible.

Outcome 33:
With the assistance of the Clinton Climate Initiative, FSD has studied the experience of US cities with natural gas garbage trucks. These trucks have low emissions and are reliable. FSD learned from US cities' experience with electric vehicles and charging infrastructure, as part of Toronto's EV Working Group. The US models for green fleet planning informed FSD's planning process.

Action 34:
Undertake a study to confirm that the actions Fleet Services is taking will meet the emission reduction targets for greenhouse gases and smog air pollutants.

Outcome 34:
FSD undertakes periodic review of specific Green Fleet Plan implementation. Due to funding constraints, a separate study was not undertaken. FSD works with a variety of organizations and manufacturers on an ongoing basis to fill any gaps in implementation and identify new means of reducing emissions. Analysis is provided in this report.

Action 35:
Request funding in 2009 and later years to provide an operating budget for emission reduction assessment studies and green fuel premiums.

Outcome 35:
A modest operating budget has been set up for green fleet activities including promotion. Further operating funds were not available due to funding constraints. In 2009, FSD successfully sought a TAF grant for a green fleet project.

Action 36:
Seek funding opportunities to enable the City to accelerate greening of its fleet.

Outcome 36:
In 2009, FSD was awarded a TAF grant over three years. These funds were used for Phase One: development and distribution of the Green Vehicle Evaluation and Selection Tool (GVEST). Phase Two of the project was cancelled due to evolving operational needs. This was a result of the contracting out of a portion of Solid Waste collections. Before contracting out occurred in SWMS, FSD sought a federal grant to further green the Solid Waste fleet, but was unsuccessful. The City benefits from Provincial and Federal hybrid and EV procurement incentives.

Action 37:
Include green fleet practices in tenders for work done by private contractors, such as a requirement to use fuel-efficient vehicles for City business and to prevent idling, and consider this information in the selection process.

Outcome 37:
PMMD is the project lead, working with FSD and EED to include green fleet practices in tenders. FSD provided a presentation on green vehicles, technologies and practices to the City's Linear Infrastructure Environmental Initiative working group, which was addressing green practices in tenders done by contractors.

Action 38:
Provide annual updates on progress achieved in meeting the commitments and targets of the Green Fleet Plan 2008-2011 on Fleet Services' website.

Outcome 38:
Updates were provided on FSD website when resources permitted.

In 2008, implementation of the Green Fleet Plan for the Centrally Managed Fleet was forecasted over 2008-2011 period to have a capital cost of $2.0 million and operating net savings of $4.032 million, resulting in total net savings of $2.032 million. Actual values were lower, with a capital cost of $1.277 million and operating net savings of $1.620 million, resulting in total net savings of $343,000 (Table K).

Table K: Financial implications of the Green Fleet Plan 2008-2011

2008-2011	Forecast	Actual	Variance
Capital Cost	$2,000,000	$1,277,000	($723,000)
Operating Net Savings	$4,032,000	$1,620,000	$2,412,000
Total Net Savings	$2,032,000	$343,000	($1,689,000)

As part of the 2008-2011 forecasted capital spending, Centrally-Managed Fleet established specific targets for the number of green vehicles forecasted to be acquired during this period. One of the lessons learned from the implementation of the 2008-2011 Plan, however, is that establishing specific green vehicle acquisition targets is unrealistic as it does not address the City's operational requirements. This will be addressed as part of the Consolidated Plan. A key objective, therefore, of the Consolidated Plan is to apply a more strategic and realistic approach when purchasing, leasing, or otherwise obtaining the most fuel-efficient vehicles where appropriate for the City operations, while considering the lifecycle cost of the vehicle.

Actual operating net savings were lower than anticipated because the forecasted fuel savings estimated to result from reduced idling were not achievable. On the operating side, $3.456 million, or 86 per cent, of the $4.032 million in forecasted savings to result from the implementation of the Green Fleet Plan 2008-2011 for the Centrally-Managed Fleet, was attributed and expected to come from ten per cent in fuel savings across the board, as a result of the Idle-Free initiatives. The highly optimistic forecast made at the time was not achievable in real-world conditions, and as a result, the actual outcomes have come well short of that.

Appendix C – Green Fleet Plan 2008-2011 Emergency Medical Services Outcomes Report

Action 1:
Work with the Province of Ontario, Toronto Fleet Services Division and industry in an effort to identify and pilot test hybrid (electric and hydraulic), full electric, hydrogen/fuel cell and fuel-conserving ambulances and equipment as they become available provided they meet operational needs and regulation.

Outcome 1:
After a successful trial in 2011, EMS completed the installation of anti-idling technology on all of its Emergency Response Vehicles (ERV). All new 2013 EMS frontline vehicles now have this technology installed. This technology reduces engine idling by monitoring vehicle battery voltages and interior temperatures and starts and stops the engine as required to meet the set parameters.

Action 2:
In 2008, complete the replacement of diesel, transport ambulances with gasoline vehicles running on ethanol-enriched gas.

Outcome 2:
EMS has converted all but one of its frontline ambulances with those capable of being fuelled with E-85 ethanol fuel. There is one diesel-powered ambulance remaining in EMS fleet that is used to respond to emergencies on the Toronto islands. This is a low-mileage vehicle and remains in service as it can be safely accommodated on the islands' bridges due to its narrower dimensions. In 2013 EMS took delivery of a newly designed vehicle that runs on ethanol-enriched gasoline. This will allow for safe replacement of the diesel powered vehicle.

Action 3a:
Reduce the number of kilometres travelled where possible, use vehicles more efficiently and rotate underused vehicles through the fleet.

Outcome 3a:
EMS regularly monitors vehicle kilometres travelled and, whenever possible, deploys underutilized resources to areas of higher usage.

Action 3b:
Purchase the right size of vehicle for the job, using small vehicles where they meet operational needs and applicable regulation.

Outcome 3b:
EMS has converted its pool car fleet to hybrid sedans and is currently reviewing options to replace some of its SUV-based vehicles with a more fuel-efficient model.

Action 3c:
Purchase the most fuel-efficient vehicle, or lowest-emitting vehicle, that is commercially available and meets operational needs and applicable regulation.

Outcome 3c:
Through the competitive tender process, EMS continues to seek greener and more fuel-efficient alternatives to suit its fleet needs.

Action 4:
Attempt to replace (where appropriate vehicles are available) the following numbers of vehicles with green vehicles, giving priority to the cleanest technologies: Planned vehicle replacements are as follows provided they meet operational needs and applicable regulations: 4 vehicles in 2008, 11 vehicles in 2009, 11 vehicles in 2010 and 11 vehicles in 2011.

Outcome 4:
Vehicle replacement has occurred as follows:

- 2008: 2 low-emission hybrid sedans where purchased to replace less efficient vehicles;
- 2009: 2 low-emission hybrid sedans where purchased to replace less efficient vehicles, 11 E85 compliant vehicles were purchased;
- 2010: 2 low-emission hybrid sedans where purchased to replace less efficient vehicles, all gasoline vehicles purchased were E85 compliant including the addition of 30 new ambulances, and 13 ERVs;
- 2011: 6 E85 compliant ERVs.

In addition to that, in 2012, 6 E85 compliant ERVs. EMS projects that by year end 2014 all front-line gasoline vehicles will be E85 compliant.

Action 5a:
Actively seeking, pilot testing and incorporating green vehicles into the fleet provided they meet operational needs and applicable regulations.

Outcome 5a:
In 2011, EMS completed the installation of anti-idling technology on all of its new ERVs, and Ambulances. All new 2013 EMS frontline vehicles now have this technology installed.

Action 5b:
Continuing to review the merits and applicability of alternative-fuel vehicles such as but not limited to natural gas.

Outcome 5b:
EMS continues to explore and evaluate emerging alternative fuel products that have the potential to be implemented safely and economically

Action 6:
Identify and incorporate devices, equipment and practices that reduce fuel consumption, pollutant emissions and idling by vehicles, such as procure LED lights, batteries, inverters, space heaters or other equipment that reduces the need to idle a vehicle for long periods in order to operate lights and other necessary tools and equipment provided they meet regulation and can be certified.

Outcome 6:
In 2009, EMS began the installation LED lighting and has added higher capacity batteries and invertors to reduce the need for unnecessary engine idling. EMS has also installed 110-volt heaters and shore line with auto eject plugs in all of its ambulances to maintain patient compartment and drug storage temperatures while vehicles are not in service. This reduces the need for engine idling.

Action 7:
Include in all vehicle procurement specifications green vehicle attributes, such as fuel efficiency and low emissions, and provide an appropriate weighting for these attributes when selecting a product, provided they meet regulation and can be certified for use in emergency vehicles.

Outcome 7:
Through the competitive tender process, EMS continues to seek greener and more fuel-efficient low-emissions emergency vehicles.

Action 8:
Use clean sources of energy for vehicles, including biofuels from sustainable feedstock as they become available, for example ethanol produced from cellulose.

Outcome 8:
EMS purchases the bulk of its fuel, gasoline and diesel, with the Toronto Police Service and Toronto Fleet Services, and uses E85 ethanol fuel with a 10 per cent ethanol blend in all its gasoline-fuelled vehicles. EMS projects that by year end 2014 all front-line gasoline vehicles will be E85 compliant.

Action 9:
Encourage other municipal and private fleets to green their vehicles by promoting and sharing Toronto's green fleet experience on the organization's website and through government/industry associations and groups.

Outcome 9:
EMS has been an active participant at the Green Fleet Expositions and is actively sharing greening solutions and experiences with other EMS fleet providers.

Action 10
Support the City's cycling initiative by incorporating the use of paramedics on bicycles where operationally feasible.

Outcome 10:
EMS currently uses 23 bicycles in its bike paramedic program.

Action 11:
Promote the City's Idle-Free Policy and 10-second idling rule for staff (noting exceptions from the policy such as emergency vehicles).

Outcome 11:
In 2011, EMS completed the installation of anti-idling technology on all of its new ERVs, and Ambulances. All future new EMS frontline vehicles will also have this device installed.

Action 12:
Explore the feasibility of making green pool vehicles available to staff who require their vehicle for work.

Outcome 12:
EMS has converted its pool car fleet to hybrid sedans and continues to participate in City of Toronto Fleet Services Division hybrid vehicle initiative.

Action 13:
Investigate and implement ways to reduce the number of work-related vehicle trips taken by staff, such as using transit and increasing the use of conference calls and scanners to share information between work sites.

Outcome 13:
EMS strives to reduce the use of vehicles by encouraging car pooling and, where possible, teleconferencing instead of driving to meetings.

Action 14:
Encourage staff to make sustainable transportation choices on their commute and at home, including by providing information on green vehicles and commuting alternatives to staff.

Outcome 14:
All City of Toronto environmental initiatives are conveyed to all staff.

Action 15:
Promote the organization's green vehicles and fuel efficiency efforts at public events.

Outcome 15:
EMS has been an active participant at the Green Fleet Expositions and continuously shares greening solutions and experiences with other EMS fleet providers.

Action 16:
Investigate the feasibility and benefit of adopting additional green practices at maintenance facilities such as recycling.

Outcome 16:
EMS continues to recycle batteries, automotive fluids, oil filters, tires, scrap metals and packaging. EMS participates in joint contracts with other city divisions to insure all opportunities for cost recovery are maximized, such as the recycling of used automotive fluids.

Action 17:
Investigate the practices used by local, Canadian and international municipal green fleet leaders and incorporate successful practices into the organization's fleet operations where feasible.

Outcome 17:
EMS meets with other EMS fleet providers to exchange and share information on practices and new technologies. EMS also attends and has demonstrated its vehicles at the Green Fleet Expositions.

Action 18:
Provide annual updates on progress in implementing the Green Fleet Plan for EMS to the Community Development and Recreation Committee.

Outcome 18:
EMS updates were provided in conjunction with City of Toronto Fleet Services.

Appendix D – Green Fleet Plan 2008-2011 Fire Services Outcomes Report

Action 1:
Purchase all future Senior Officer vehicles and Fire Prevention Officer cars as hybrids or ultra low emission vehicles.

Outcome 1:
TFS currently use 22 Hybrid SUV's and Sedans in place of larger conventional Sedans.

Action 2:
Test an eco-friendly auto parts washing machine that uses a warm water-based formula charged with enzymes.

Outcome 2:
The systems did not work to a reasonable standard, however TFS has increased the use of hot water pressure washing to reduce the dependency of solvent based parts washers.

Action 3:
Contain fleet size and purchase fuel-efficient, right-sized vehicles as a standard practice, if they are commercially available and meet operational needs.

Outcome 3:
The fleet has remained the same size throughout this period. Vehicles are purchased to their size requirement, specifically Pumper trucks that are the smallest within the GTA. The most recent six 105' rear mounted aerial trucks were designed and purchased with APU generators to allow the truck to function as a "hybrid", shutting the main engine down when not required.

Action 4:
Replace the following numbers of vehicles with green vehicles, giving priority to the cleanest technologies: At a minimum, replace 13 vehicles in 2008, 8 vehicles in 2009, 8 vehicles in 2010 and 13 vehicles in 2011.

Outcome 4:
All vehicles replaced as planned.

Action 5:
Work with Fleet Services Division to identify and pilot test promising green vehicles and work with industry to accelerate development and large-scale adoption in Canada.

Outcome 5:
TFS tested a number of small vehicles and either purchased hybrid units or specified vehicles that provided exceptional mileage.

Action 6a:
Procure LED lights, batteries, inverters, space heaters or other equipment that reduces the need to idle a vehicle for long periods in order to operate lights and other necessary tools and equipment.

Outcome 6a:
All emergency lighting is now LED to reduce idling requirements. TFS use only AGM batteries that do not emit gasses.

Action 6b:
Investigate the potential to use auxiliary heating systems to protect the fire truck pump and tank from freezing when the main engine is shut down.

Outcome 6b:
The APU system noted above does provide for auxiliary heating and water pump flow to reduce idling requirements.

Action 7:
Replace the oldest vehicles with cleaner, modern technology by accelerating the replacement of overdue vehicles.

Outcome 7:
Being done as quickly as funding permits.

Action 8:
Include in all vehicle procurement specifications green vehicle attributes, such as fuel efficiency and low emissions, and provide an appropriate weighting for these attributes when selecting a product.

Outcome 8:
All vehicles purchased with 2007 then 2010 emission compliant engines.

Action 9:
Design and purchase fire trucks and other apparatus that are sized to the purpose of the job, and conform to all standards and regulations governing their use.

Outcome 9:
Vehicles are purchased to surpass regulatory standards, and designed for the specific purpose.

Action 10
Use clean sources of energy for vehicles, including biofuels from sustainable feedstock as they become available, for example ethanol produced from cellulose.

Outcome 10:
Corporate fuel sites where most Fire apparatus fill up, are supplied with bio-diesel.

Action 11:
Encourage other municipal and private fleets to green their vehicles by promoting and sharing Toronto's green fleet experience on the organization's website and through government/industry associations and groups.

Outcome 11:
As a member of the Emergency Vehicle Technician's Association, emerging ideas are regularly shared.

Action 12:
Promote and enforce the City of Toronto Idle-Free Policy and 10-second idling rule for staff and the Toronto Fire Services Standard Operating Policy for idling emergency vehicles.

Outcome 12:
Due to the use of emergency lighting and water pumping (freeze concerns) this isn't always possible, however the new aerial apparatus do use idle reduction technology as noted.

Action 13:
Explore the feasibility of making green pool vehicles available to staff who require their vehicle for work.

Outcome 13:
Three hybrid pool cars are provided for staff at headquarters.

Action 14:
Investigate and implement ways to reduce the number of work-related vehicle trips taken by staff, such as increasing the use of conference calls and scanners to share information between work sites.

Outcome 14:
Phone calls and e-mail are preferred over travel to save time as much as fuel.

Action 15:
Encourage staff to make sustainable transportation choices on their commute and at home, including by providing information on green vehicles and commuting alternatives to staff.

Outcome 15:
As a great number of TFS staff live outside the city, most of them car-pool to work with other staff members.

Action 16:
Promote the organization's green vehicles and fuel efficiency efforts at public events.

Outcome 16:

Hybrid vehicles have been showcased at a number of media events. The new aerials mentioned will be presented in a public forum once fuel and emission savings are quantified.

Action 17:
Investigate the feasibility and benefit of adopting additional green practices at maintenance facilities.

Outcome 17:
All paper products, scrap metal, tires, batteries, and used fluids are recycled. Mobile truck hoists were selected over in-ground units for their mobility and less chance of oil leakage.

Action 18:
Investigate the practices used by local, Canadian and international municipal green fleet leaders and incorporate successful practices into the organization's fleet operations where feasible.

Outcome 18:
The concepts to change to an unpainted stainless steel body, and use an Alternate Power Source generator to allow the main truck engine to shut down both came from interaction and communication with other agencies in the fire services and fleet industries.

Action 19:
Provide annual updates on progress achieved in meeting the commitments and targets of this Green Fleet Plan for Toronto Fire Services to Community Development and Recreation Committee.

Outcome 19:
Updates provided as requested.

Appendix E – Green Fleet Plan 2008-2011
Police Service Outcomes Report

Action 1:
In 2008 use eight hybrid vehicles to replace existing unmarked vehicles and evaluate them in a similar manner to the parking enforcement pilot.

Outcome 1:
Eight (8) hybrid vehicles replaced existing unmarked vehicles.

Action 2a:
Contain the size of the fleet by reducing the number of vehicles required and kilometres travelled, use vehicles more efficiently and delete underused vehicles from the fleet or move them to other operations.

Outcome 2a:
Conducted audits in both Divisional Policing Command & Specialized Operation to identify possible reduction and utilization.

Restricted Police vehicles from leaving City boundaries unless approved by D/Chiefs & then only for surveillance or on call units.

Marine vessels operations reviewed and a re-visit of the Federal agreement on areas of responsibility, resulting in reduced patrols while increasing response time from base.

Centralizing all motorcycle to Specialized Operation Command (TSV) resulting in a further reduction of 34 motorcycles, current fleet (50).

A reduction of 580,000 km traveled has been realized from 2008 to current.

Action 2b:
Purchase the right size of vehicle for the job, using small vehicles where they meet operational needs.

Outcome 2b:
Within Divisional Policing Command & Specialized Operation Command forty (40) vehicles were replaced with 4 cylinder units rather than 6 cylinder units.

Action 2c:
Purchase the most fuel-efficient vehicle, or lowest-emitting vehicle, that is commercially available and meets operational needs.

Outcome 2c:
52 Hybrid Malibu's were purchased for use as Senior Officer and administrative vehicles.

Action 3:
Identify and incorporate devices, equipment and practices (as long as these do not impact operational or legislated requirements) that reduce fuel consumption, pollutant emissions and idling by vehicles, such as procure LED lights, batteries, inverters, space heaters or other equipment that reduces the need to idle a vehicle for long periods in order to operate lights and other necessary tools and equipment.

Outcome 3:
L.E.D emergency lights have been added to all uniform patrol cars, replacing old halogen lighting systems (reducing amp draw in full emergency mode from 53amps to 19amps).

Action 4:
Replace the oldest vehicles with cleaner, modern technology by accelerating the replacement of overdue vehicles.

Outcome 4:
A committee was formed to review the possibility of a downsized front line patrol vehicle being field tested as a possible replacement patrol vehicle. This resulted in a recommendation to replace 450 full-sized, 8-cylinder units with mid-sized, 6-cylinder vehicles.

Action 5:
Include in all vehicle procurement specifications green vehicle attributes, such as fuel efficiency and low emissions, and provide an appropriate weighting for these attributes when selecting a product.

Outcome 5:
Green vehicle attributes were considered when purchases of new vehicles were made. See Outcomes 1 and 2.

Action 6:
Share information with Greater Toronto Area municipal and Police fleet managers through the Police Cooperative Purchasing Committee.

Outcome 6:
While participating in the Police Cooperative Purchasing Group Fleet sub-committee (best practices), initiatives were undertaken and shared, such as, an auxiliary battery has been added to all front line patrol vehicles (500) to power all in trunk electronics such as in car camera, mobile work station, automatic vehicle location system, etc., eliminating the need to idle vehicles at the end of each shift for the purpose of uploading video and file data – 30 minutes each shift; 90 minutes total per vehicle per shift.

Action 7:
Use clean sources of energy for vehicles, including biofuels from sustainable feedstock as they become available, for example ethanol produced from cellulose.

Outcome 7:

All Marine vessels with outboard engines have been converted to 4-stroke gas from 2-stroke gas; (6 250hp 2-stroke to 6 300hp 4-stroke) each engine operates approx. 1,000hrs per year) (6 74hp 2-stroke to 4-stroke).

Action 8:
Continue the long-standing practice of incorporating bicycles into the Toronto Police Service's fleet.

Outcome 8:
A review of bicycle utilization resulted in the increase of 56 bicycles (currently 300).

Action 9:
Investigate and implement ways to reduce the number of work-related vehicle trips taken by staff, such as increasing the use of conference calls and scanners to share information between work sites.

Outcome 9:
TPS continued to explore more cost efficient ways of conducting its business including new technologies and business practices. See outcome 2a above: A reduction of 580,000 km traveled has been realized from 2008 to current.

Action 10
Promote the organization's green vehicles and fuel efficiency efforts at public events.

Outcome 10:
Participated in the City's Green Fleet initiative.

Action 11:
Investigate the feasibility and benefit of adopting additional green practices at maintenance facilities.

Outcome 11:
New Green initiatives were adopted, such as recycling of waste oil, engine antifreeze, oil jugs and windshield washer jugs. Environmentally friendly disposal of used oil filters.

Action 12:
Investigate the practices used by local, Canadian and international municipal green fleet leaders and incorporate successful practices into the organization's fleet operations where feasible.

Outcome 12:
A Pilot Project to examine the benefits of new technology available with regard to motorcycles used by the service, i.e. Harley Davison – replaced by BMW is being conducted.

Appendix F – Green Fleet Plan 2008-2011 TTC Outcomes Report

Action 1:
Request that Council note and endorse the current environmental benefits of public transit, noting that the 2,500 revenue vehicles servicing 460 million passengers in the GTA and traveling over 198 million miles in 2007 result in significant existing environmental benefits over the alternative potential impacts of car trips and the environmental impact of these trip decisions.

Outcome 1:
Completed.

Action 2:
Purchase portable powered equipment with four-stroke engines instead of two-stroke engines wherever possible.

Outcome 2:
This is an ongoing action.

Action 3:
Purchase a regenerative-air street sweeper to reduce air-borne dust during street sweeping operations in stations.

Outcome 3:
A regenerative-air street sweeper has been purchased and is in service.

Action 4:

Incorporate regenerative braking into all subway trains by 2010.

Outcome 4:
Completed.

Action 5a:
Contain fleet size and purchase fuel-efficient, right-sized non-revenue service vehicles as a standard practice, if they are commercially available and meet operational needs, specifically.

Outcome 5a:
This action will be ongoing.

Action 5b:
Purchase the right size of vehicle for the job, using small vehicles where they meet operational needs.

Outcome 5b:
This action will be ongoing.

Action 5c:
Purchase the most fuel-efficient vehicle, or lowest-emitting vehicle, that is commercially available, financially viable and meets operational needs.

Outcome 5c:
This action will be ongoing.

Action 6:
Identify and incorporate devices, equipment and practices that reduce fuel consumption, pollutant emissions and idling by vehicles, such as LED lights, batteries, inverters or other equipment that reduces the need to idle a vehicle for long periods in order to operate lights and other necessary tools and equipment.

Outcome 6:

This action will be ongoing. TTC will continue to monitor the evolution of green technology and introduce green technologies to its fleets as appropriate.

Action 7:
Include in all vehicle procurement specifications green vehicle attributes, such as fuel efficiency and low emissions.

Outcome 7:
This action will be ongoing and evolving to reflect industry technology improvements.

Action 8:
Use clean sources of energy for vehicles.

Outcome 8:
This action will be ongoing.

Action 9:
Maintain and expand its existing transit service with the goal of removing passengers from private vehicles and onto the public transit system.

Outcome 9:
This action will be ongoing.

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