



## STAFF REPORT ACTION REQUIRED

### City of Toronto Consolidated Green Fleet Plan 2014-2018 – Progress Report Third Quarter 2016

<b>Date:</b>	August 22, 2016
<b>To:</b>	Government Management Committee
<b>From:</b>	General Manager, Fleet Services Division
<b>Wards:</b>	All
<b>Reference Number:</b>	P:\2016\Internal Services\Fleet\Gm16003fleet (AFS # 21960)

#### SUMMARY

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The purpose of this report is to provide a progress update on the City of Toronto Consolidated Green Fleet Plan objectives, strategies and targets.

This progress report includes Consolidated Green Fleet Plan related updates from City of Toronto Divisions: Fleet Services Division (FSD), Toronto Fire Services (TFS), Toronto Paramedic Services and City Agencies: Toronto Transit Commission (TTC) and Toronto Police Service (TPS). This plan is coordinated by FSD with significant contribution from the aforementioned Divisions and Agencies, and the Environment and Energy Division (EED).

In the reporting period 2014-2015 the projected savings expected to be realized from the advancing implementation of the Consolidated Green Fleet Plan, are: \$508,760 in avoided cost, plus over 2 million kilograms in avoided CO<sub>2</sub>e (carbon dioxide equivalent).

#### RECOMMENDATIONS

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**The General Manager, Fleet Services Division recommends that:**

1. The Government Management Committee receive this report for information.

## **Financial Impact**

There is no budgetary impact resulting from the approval of this Staff Report. There is sufficient funding in the current year's operating and capital budgets as previously approved by Council.

Capital expenditures of \$470,000 incurred as a result of the implementation of the Consolidated Green Fleet Plan has resulted in a one-time capital cost avoidance of \$99,000 and an annual operating cost avoidance for fuel of \$96,620, for a total anticipated savings of \$978,760 over the expected asset lifecycle of vehicles. This results in a net savings of \$508,760 in avoided cost. A breakdown of these costs and savings can be found in the table on page 14.

The Deputy City Manager & Chief Financial Officer has reviewed this report and agrees with the financial impact information.

## **DECISION HISTORY**

At its meeting on June 10, 11, 12 and 13, 2014 City Council adopted the City of Toronto Consolidated Green Fleet Plan 2014 – 2018 and directed the Director, FSD to track the progress made in achieving the established targets and report back to Government Management Committee in Q2 2016, Q2 2017, Q2 2018 and provide a final report in Q2 2019. City Council also directed the Chief, Toronto Paramedic Services and the Chief, Toronto Fire Services to actively participate in the implementation of the Consolidated Green Fleet Plan. City Council requested that the Toronto Transit Commission Board and the Toronto Police Service Board adopt and implement the Consolidated Green Fleet plan 2014-2018.

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2014.GM30.12>

At its meeting on June 15, 2015 Government Management Committee requested the General Manager, FSD report to the next Government Management Committee meeting with performance measures related to the Green Fleet Plan.

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2015.GM5.3>

At its meeting on September 17, 2015 Government Management Committee received a report from the Director, FSD outlining the performance measures related to the City of Toronto Consolidated Green Fleet Plan 2014-2018. Government Management Committee also requested that the Director, FSD report in the second quarter of 2016 with data on the current utilization of bicycles in all City divisions and a plan to increase the number of staff using bicycles in each of these divisions.

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2015.GM6.3>

## **ISSUE BACKGROUND**

The overall goal for the City's vehicle fleet is to emit less Green House Gas (GHG) and air pollutants, also known as Criteria Air Contaminants (CAC). City Fleets will contribute toward the City's 2020 targets of GHG reduction of 30 percent compared to the 1990 levels, and CAC reduction of 20 percent compared to 2004 levels. To this end, in 2014, City Council directed the Director, FSD; the Chief, Toronto Fire Services; and

the Chief, Emergency Medical Services (now Toronto Paramedic Services) to implement the following objectives of the Consolidated Green Fleet Plan:

- A. Purchase, lease, or otherwise obtain the most fuel-efficient vehicles where appropriate for City operations, while considering lifecycle cost of the vehicle
- B. Achieve ISO Certification in the area of Environmental Management (ISO 14000) and Quality Management (ISO 9000) for the FSD, and work with other City Fleets to explore the feasibility of their ISO Certification
- C. Develop selection criteria for alternative fuels
- D. Enhance operational efficiency and driver education
- E. Create one new temporary dedicated Green Fleet Coordinator position in FSD for the 2015-2018 period, to be included in FSD's operating budget (subject to Budget Committee approval during the 2015 Budget process), and establish a Green Fleet Team comprised of current staff from each of the participating members of the Fleet Management Steering Committee.

## COMMENTS

The Consolidated Green Fleet Plan 2014-2018 sets realistic objectives that will measure progress toward the established goals, and includes specific, measurable strategies to accomplish these objectives. This Staff Report provides interim progress.

The progress to date of each objective is summarized in the table below.

Objective	Achieved (Y/N/Ongoing)	Comments
A. Purchase, lease, or otherwise obtain the most fuel-efficient vehicles where appropriate for City operations, while considering lifecycle cost of the vehicle	Y	<ul style="list-style-type: none"> <li>• Vehicle procurement practice updated. The Request for Quotation (RFQ) includes fuel efficiency and fuel cost as part of the total lifecycle cost.</li> <li>• FSD continues monitoring hybrid and electric vehicles for short distance regular use applications. Fuel economy analysis of light duty hybrid vehicle versus conventional vehicle with newer power train technology was completed. This analysis provided evidence that fuel economy for these vehicle types is similar. The purchase of rightsized light duty vehicles instead of the previous vehicle standard resulted in a 30% or \$99,000 savings in capital cost for eleven (11) vehicles.</li> <li>• FSD fuel economy analysis of heavy-duty trucks provided evidence that the hybrid aerial truck is 43% more fuel efficient than the conventional aerial truck. This represents a fuel cost savings of \$3,130/year/truck. In addition to fuel economy, the hybrid aerial truck provides quiet operation, reduced maintenance and reduced emissions.</li> </ul>

Objective	Achieved (Y/N/Ongoing)	Comments
B. Achieve ISO Certification in the area of Environment Management (ISO 14000) and Quality Management (ISO 9000) for the FSD, and work with other City Fleets to explore the feasibility of their ISO Certification	N	<ul style="list-style-type: none"> <li>• FSD Quality and Environment Policy established. <a href="http://www1.toronto.ca/City%20Of%20Toronto/Fleet%20Services/Shared%20Content/Files/Quality%20and%20Environmental%20Policy%20(2016-04-16).pdf">http://www1.toronto.ca/City%20Of%20Toronto/Fleet%20Services/Shared%20Content/Files/Quality%20and%20Environmental%20Policy%20(2016-04-16).pdf</a></li> <li>• ISO Certification for a benchmark location will be reassessed in Q1 2017 in order to better align the timing and content with the City's Excellence Toronto initiative.</li> </ul>
C. Develop selection criteria for alternative fuels	Y and Ongoing	<p>Selection criteria for vehicles include fuel options available in the market place, total cost, operating requirements and utilization, and impact on GHG:</p> <ul style="list-style-type: none"> <li>• FSD currently operates twelve (12) Electric Vehicles (EV) and nineteen (19) Level 2 charging stations. <a href="http://www1.toronto.ca/wps/portal/contentonly?vgnextoid=d3da5c546218f310VgnVCM10000071d60f89RCRD&amp;vgnextchannel=bab82ea35be3f310VgnVCM10000071d60f89RCRD">http://www1.toronto.ca/wps/portal/contentonly?vgnextoid=d3da5c546218f310VgnVCM10000071d60f89RCRD&amp;vgnextchannel=bab82ea35be3f310VgnVCM10000071d60f89RCRD</a></li> <li>• These EVs have limited driving distance range (i.e., typically 100 km on fully charged battery); and the Level 2 charging stations require approximately 8 hours for a full charge.</li> </ul> <p>In 2015, five (5) Compressed Natural Gas units were in service for Solid Waste Management Services (SWMS) and sixty-five (65) CNG units are being purchased and delivered in 2016. Year-to-date FY 2015 fuel savings from five (5) SWMS CNG trucks (versus diesel) is estimated at \$79,000.</p>
D. Enhance operational efficiency and driver education	Y and Ongoing	<ul style="list-style-type: none"> <li>• Eco-driving campaign was developed and implemented in Q4 2015 for G Class and D Class Permit/License upgrade courses. Over 1200 City staff received this training in 2015.</li> <li>• Idling reduction technologies: <ul style="list-style-type: none"> <li>○ FSD has anti-idling systems in 850 vehicles</li> <li>○ FSD will continue to specify anti-idle devices for its vehicles where Original Equipment Manufacturer provides such device</li> <li>○ Toronto Paramedic Services has completed an anti-idling system technology field study</li> </ul> </li> </ul>

Objective	Achieved (Y/N/Ongoing)	Comments
		<p>and estimated that 2,200 L of fuel is saved per year for one (1) ambulance which is a savings of 22% or \$2,400. In 2016 this technology will be installed in twenty-seven (27) ambulances.</p> <ul style="list-style-type: none"> <li>○ TFS has used auxiliary power unit idle reduction technology in nine (9) front line aerial trucks. Annualized fuel reduction is estimated at 22% or 3,300 L at a cost savings of \$3,400 per truck, per year.</li> <li>● Car Share <ul style="list-style-type: none"> <li>○ Car Share Pilot Project was completed in Q1 2015, and approval of Staff Report was received in Q2 2015. <a href="http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2015.GM5.21">http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2015.GM5.21</a></li> <li>○ At its meeting on May 3, 2016 City Council authorized the General Manager, FSD to enter into Acknowledgement Agreement with the Province of Ontario to allow use of their Vendors of Record for Car Share services. <a href="http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2016.GM11.10">http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2016.GM11.10</a></li> <li>○ Agreements with two Car Share companies are now in place and roll-out of the Car Share Plan is scheduled for Q2 to Q4 2016.</li> <li>○ After one full year of implementation, FSD and Financial Planning Division will analyze the costs/ benefits and work with City Divisions and Agencies to capture savings.</li> </ul> </li> <li>● Light duty vehicle under-utilization (i.e., used less than 7,000 km per year) was investigated and feedback from FSD clients indicates that forty (40) out of originally identified two hundred (200) vehicles travelling less than 7,000 km per year require further review and options consideration for low utilization management. The remaining 160 vehicles are used for job specific tasks such as; transportation of tools and crew with long parking times. The forty (40) vehicles requiring further review represent 2% of the 2000 light duty vehicles. The target of no more than 20% for under-utilized passenger vehicles is met.</li> <li>● Currently FSD manages a total of twenty-five (25) active fuel sites. FSD continued with fuel site</li> </ul>

Objective	Achieved (Y/N/Ongoing)	Comments								
		<p>closures and upgrades to improve operational efficiencies and environmental impact. Upgraded sites have above ground fuel storage tanks that reduce the risk of soil contamination and these sites have technology that allows secure, real-time, centralized fuel and data management.</p> <table border="1" data-bbox="769 554 1399 831"> <thead> <tr> <th data-bbox="769 554 862 590">Year</th> <th data-bbox="862 554 1399 590">Fuel Site Closure/Upgrade</th> </tr> </thead> <tbody> <tr> <td data-bbox="769 590 862 695">2013</td> <td data-bbox="862 590 1399 695">Five (5) sites closed One (1) site upgraded with above ground tanks</td> </tr> <tr> <td data-bbox="769 695 862 762">2014</td> <td data-bbox="862 695 1399 762">Four (4) fuel sites closed Two (2) sites fully upgraded</td> </tr> <tr> <td data-bbox="769 762 862 831">2015</td> <td data-bbox="862 762 1399 831">Twelve (12) fuel sites closed Eleven (11) upgraded</td> </tr> </tbody> </table> <ul data-bbox="769 869 1399 1031" style="list-style-type: none"> <li>Automated fuel authorization and meter reading technology known as VIB is installed in 900 vehicles with a plan in place for installation in the remainder of the fleet, for a total of 4000 vehicles and equipment.</li> </ul> <p data-bbox="769 1037 1399 1100"><a href="http://www.toronto.ca/legdocs/mmis/2013/gm/bgrd/backgroundfile-63523.pdf">http://www.toronto.ca/legdocs/mmis/2013/gm/bgrd/backgroundfile-63523.pdf</a></p>	Year	Fuel Site Closure/Upgrade	2013	Five (5) sites closed One (1) site upgraded with above ground tanks	2014	Four (4) fuel sites closed Two (2) sites fully upgraded	2015	Twelve (12) fuel sites closed Eleven (11) upgraded
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E. Create one new temporary dedicated Green Fleet Coordinator position in FSD for the 2015-2018 period, to be included in the FSD operating budget, and establish a Green Fleet Team comprised of current staff from each of the participating members of the Fleet Management Steering Committee	Y	<ul data-bbox="769 1142 1399 1272" style="list-style-type: none"> <li>Green Fleet Project Manager is in place to coordinate, implement, analyse and report progress.</li> <li>Green Fleet Team is in place to execute the Consolidated Green Fleet Plan.</li> </ul>								

### City of Toronto Fleet Operations Greenhouse Gases and Air Contaminants Data Reporting 2013, 2014, 2015

Greenhouse Gases (GHGs) are the fundamental cause of the greenhouse effect contributing to climate change. Carbon Dioxide (CO<sub>2</sub>) is the primary greenhouse gas

emitted through human activities, including transportation, and the most effective way to reduce CO<sub>2</sub> emissions is to reduce fossil fuel consumption. Criteria Air Contaminants (CAC), are also produced from vehicles emissions, including Sulphur Dioxides (SO<sub>2</sub>), Nitrogen Oxides (NO<sub>x</sub>), Particulate Matter (PM), Volatile Organic Compounds (VOC), Carbon Monoxide (CO).

City Fleets will contribute to the City of Toronto's GHG emissions reduction target of 30% compared to the 1990 levels, and 20% reduction target by 2020, for locally-generated smog causing pollutants compared to the 2004 levels. In reporting periods 2013, 2014, 2015 City Fleets have increased their operations and have implemented strategies for reducing GHG and CAC emissions based on the adoption of anti-idling devices, alternative fuel plans, fleet resizing, and eco-driving programs. It is important to note that some measures which are adopted to reduce GHGs can actually result in an increase in CAC emissions (i.e., higher temperature combustion can increase efficiency but also increase NO<sub>x</sub> emissions).

In an attempt to reduce GHGs emitted by the transportation sector, the Province of Ontario requires fuel companies to provide more environmentally friendly diesel fuels, known as bio-diesel. The Province of Ontario has set minimum targets that the total volume of diesel fuel distributed, used, and/or sold in Ontario be bio-diesel (2014 and 2015: 2%, 2016: 3%, 2017: 4%). (<https://www.ontario.ca/page/greener-diesel-regulation>)

The size, composition and fuel consumption of the City Fleet changes over time in response to operational and policy requirements, and GHGs and CAC from tailpipe emissions are monitored and estimated based on Fleet fuel use and vehicle and equipment specifications.

The City of Toronto's Environment and Energy Division calculates the GHG emissions in equivalent quantity of carbon dioxide (CO<sub>2</sub>e). In order to calculate the CO<sub>2</sub>e and CAC emissions EED implemented Transport Canada's Urban Transportation Emission Calculator (UTECE), using the 2011 Emission Factors. The following tables summarize City Fleets' GHG and CAC emissions for the period of 2013 to 2015. Further details for three fuel types for the period of 2013 to 2015 are provided in Appendix A.

**Fleet Services Division (FSD) 2013-2015 GHG and CAC Emissions**

Year	Fuel (L)	CO <sub>2</sub> e (kg)	CO (kg)	NO <sub>x</sub> (kg)	PM <sub>10</sub> (kg)	PM <sub>2.5</sub> (kg)	SO <sub>2</sub> (kg)	VOC (kg)
2013	11,947,174	31,327,700	146,542	127,343	3,314	2,540	498	13,328
2014	12,183,752	32,007,889	141,103	131,361	3,417	2,624	510	13,140
2015	11,943,081	31,364,784	135,253	127,751	3,337	2,563	498	12,727

Source: EED GHGs calculation based on FSD data

FSD's 2014 fuel usage increase can be directly attributed to the increase in fleet vehicles and equipment being operated during the 2013/2014 ice storm and a relatively harsh winter with more snowfall.

Sixty five (65) Compressed Natural Gas (CNG) powered garbage collection trucks have been ordered and are expected to be in service starting in 2017 in addition to the five (5) which are already in service. These CNG trucks will replace the old generation diesel garbage trucks.

FSD will continue to explore alternatives to improve fuel economy by including estimated fuel consumption as part of total cost (where available) and by reducing vehicles weight and size, promoting eco-driving, and considering alternative methods of transportation, such as carpooling, bicycles, Car Share and reducing travel. FSD is committed to improving fuel efficiency through the procurement process, and application of advanced engineering, design, materials and technologies to integrate the use of more fuel efficient vehicles and equipment.

**Toronto Paramedic Services 2013-2015 GHG and CAC Emissions**

<b>Year</b>	<b>Total Fuel (L)</b>	<b>CO2e (kg)</b>	<b>CO (kg)</b>	<b>NOx (kg)</b>	<b>PM10 (kg)</b>	<b>PM2.5 (kg)</b>	<b>SO2 (kg)</b>	<b>VOC (kg)</b>
<b>2013</b>	1,952,838	4,599,706	58,813	12,593	275	185	65	4,514
<b>2014</b>	2,044,669	4,814,517	62,359	13,128	287	192	68	4,762
<b>2015</b>	2,057,535	4,844,370	63,429	13,179	288	193	69	4,823

Source: EED GHGs calculation based on FSD and Toronto Paramedic Services data

Toronto Paramedic Services' fuel usage increase in 2014 and 2015 can be directly attributed to the temporary increase in fleet emergency vehicles being operated both in preparation for and during the Toronto 2015 Pan Am/Parapan Am Games. In 2014-2015 Toronto Paramedic Services registered a 6% increase in emergency calls (13% increase since 2013).

Toronto Paramedic Services is committed to evaluating new initiatives and technology towards implementing a green fleet. The evaluation must take into consideration operational requirements, as well as meeting the current Ontario Provincial Land Ambulance & Emergency Response Vehicle Standards, issued by Emergency Health Services Branch, Ministry of Health and Long-Term Care.

In addition to strategies included in the Consolidated Green Fleet Plan 2014-2018, the following actions are planned:

- Continue to identify vehicles that can be replaced with 4 cylinder vehicles rather than 6 cylinder vehicles within Divisional Specialized Operations - six (6) vehicles were replaced in 2015
- Continue to add LED emergency lights to all emergency response vehicles as vehicles are replaced
- Continue to replace full size 8-cylinder senior command emergency response vehicles with midsize 6-cylinder patrol vehicles.
- Continue to add anti-idling modules to each new emergency response vehicle
- Recycle up to twenty (20) modular patient compartments by remounting onto new chassis.



### Toronto Fire Services (TFS) 2013-2015 GHG and CAC Emissions

Year	Total Fuel (L)	CO2e (kg)	CO (kg)	NOx (kg)	PM10 (kg)	PM2.5 (kg)	SO2 (kg)	VOC (kg)
2013	1,671,178	4,413,338	18,013	20,686	506	386	73	1,695
2014	1,691,362	4,464,358	18,630	20,936	512	390	74	1,736
2015	1,719,499	4,535,649	20,040	21,227	519	395	75	1,821

Source: EED GHGs calculation based on FSD data

TFS fuel usage increase in 2014 and 2015 can be directly attributed to the temporary increase in fleet emergency vehicles being operated both in preparation for and during the Toronto 2015 Pan Am/Parapan Am Games. In 2014-2015 TFS registered a 3.5% increase in emergency calls.

TFS has an ongoing program to right size the vehicles used by senior operations staff and Fire Prevention Officers and will have the option to use FSD's Car Share program. Results are the reduction in size of vehicle given the equipment carried, and the actual number of vehicles required. In an effort to keep heavy apparatus off the road and remain in their running area, a mobile face piece fit testing vehicle has been created to go directly to the customer. At the same time, a feasibility study is underway to relocate the Quartermaster and equipment repair facility to a location beside the main heavy fleet repair facility, to further reduce truck movement and increase efficiency.

TFS has thirty (30) frontline aerial trucks of which nine (9) are equipped with idle reduction systems and there are four (4) more on order. The system is designed to leave most functions of the unit operational with the main engine off. At the same time, the next four aerials have been ordered without fire pumps and water tanks to reduce weight, maintenance requirements and fuel use. In an attempt to further reduce fuel use and GHG emissions, TFS is changing a significant quantity of gas powered small equipment to battery operated units. This includes auto-extrication tools, ground lighting, power saws and smoke ejection fans.

### Toronto Police Services (TPS) 2013-2015 GHG and CAC Emissions

Year	Total Fuel (L)	CO2e (kg)	CO (kg)	NOx (kg)	PM10 (kg)	PM2.5 (kg)	SO2 (kg)	VOC (kg)
2013	6,873,023	16,374,179	524,134	26,612	1,001	486	232	26,893
2014	6,674,017	15,900,358	508,890	25,847	972	472	226	26,111
2015	7,028,935	16,746,092	536,159	27,219	1,026	498	238	27,510

Source: EED GHGs calculation based on Police of Toronto fleet data

Beginning in the early 1990's, the TPS took a lead role in identifying and taking appropriate action toward environmental responsibility (e.g., down-sizing, right-sizing, standardizing, introduction of more diesel vehicles, etc.). In 2004, TPS adopted a green fleet plan which was incorporated into the City's Fleet Transition Plan (2004-2007). Subsequently, in 2008, this plan was revised based on results to date and was endorsed by and incorporated into the City's Green Fleet Plan (2008-2011). The TPS has played an active role in monitoring and evaluating evolving technologies and initiatives for over ten (10) years and has consistently met or exceeded goals.

It should be noted that the TPS's 2015 fuel usage increase can be directly attributed to the temporary increase in fleet vehicles being operated both in preparation for and during the Toronto 2015 Pan Am / Parapan Am Games. 180,947 liters of unleaded fuel was used for Police Pan Am vehicles.

TPS 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 Green Fleet Plan, the TPS in an effort to reduce idling time has and will take the following actions:

- Auxiliary batteries have been added to all Patrol Vehicles which have Mobile Work Station and In-Car Camera systems (450 vehicles)
- LED emergency lights will continue to be added to all uniform patrol cars - being done through vehicle lifecycle replacement (over 600 vehicles)
- Auxiliary heaters, generators and power inverter have been added to all command posts, communities stations, forensic vehicles and support vehicles

TPS anticipates a reduction of vehicle mounted equipment and the subsequent reliance of on-board vehicle power for future years. At this point in time, it is too early to give specifics with the exception that newer technologies will be evaluated.

**Toronto Transit Commission (TTC) 2013-2015 GHG and CAC Emissions**

Year	Total Fuel (L)	CO2e (kg)	CO (kg)	NOx (kg)	PM10 (kg)	PM2.5 (kg)	SO2 (kg)	VOC (kg)
2013	90,833,264	244,030,940	337,332	1,265,039	42,933	37,978	4,670	45,358
2014	95,144,104	255,618,838	352,816	1,326,442	45,020	39,831	4,894	47,449
2015	94,234,084	253,155,868	351,902	1,314,398	44,612	39,474	4,849	47,104

Source: EED GHGs calculation based on TTC fleet data

In keeping with City and Provincial initiatives focused on low carbon mobility, public transit plays a vital role in improving Toronto's air quality and reducing GHG emissions. Absolute emissions from public transit (vehicles and supporting infrastructure) need to increase if wider emissions from transportation (personal automobiles) in the city are to be reduced. Efforts to reduce pollution from the TTC bus fleet have been wide-ranging, including annual emission testing, retirement of inefficient engines, and the application of technologies such as diesel oxidation catalysts, diesel particulate filters, and selective catalytic reduction systems. These technologies and processes are aimed at reducing emissions of: particulate matter, nitrogen oxides, hydrocarbons, carbon monoxide and other air pollutants.

Generally, fuel use increases as ridership grows and since ridership is expected to grow TTC is not anticipating that the overall carbon dioxide emissions from its bus fleet will reduce in spite of using minimum content bio-diesel fuel as required by provincial regulation. TTC's total bus fleet fuel consumption per total km travelled has remained relatively consistent over the past few years. As of January 2016, TTC commenced the use of a seasonally blended fuel instead of the #1 diesel fuels used in the past. The increased energy density of this fuel is expected to impact positively on TTC fuel consumption per km. Future Consolidated Green Fleet Plan updates will report further on this change in fuel type. The TTC is also reviewing performance data collected by other agencies who are currently piloting CNG and electric propulsion technologies.

As older buses are retired, they are replaced with the best available technology related to the efficient use of energy and further reductions in engine exhaust emissions. Additionally, new buses are designed to include features to attract new riders to public transit that includes passenger information systems, such as Wi-Fi, electronic fare collection, route destination announcements, improved LED interior and exterior lighting, and generally a more user friendly environment for TTC customers. TTC plans to purchase approximately 100 to 120 new buses each year to take advantage of the continuing evolution of City bus technology for customer comfort and the efficient use of energy.

### **City of Toronto Bike Share Program**

At the meeting on September 17, 2015 the Government Management Committee requested data on the current utilization of bicycles in all City divisions; a plan to increase the number of staff using bicycles in each of these divisions; an assessment of possible areas to expand the use of bicycles by City staff in other divisions; an internal bicycle use marketing plan and other proposals to encourage expanded use of bicycles by City staff to meet transportation for City operations.

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2015.GM6.3>

FSD has gathered information on the use of bicycles and expansion thereof within City divisions. A comprehensive Toronto Bike Plan exists.  
[https://www1.toronto.ca/City%20Of%20Toronto/Transportation%20Services/Cycling/Files/pdf/B/bike\\_plan\\_full.pdf](https://www1.toronto.ca/City%20Of%20Toronto/Transportation%20Services/Cycling/Files/pdf/B/bike_plan_full.pdf)

Moreover, a comprehensive City of Toronto Bicycle Safety Policy exists.  
<https://wx.toronto.ca/intra/hr/policies.nsf/a8170e9c63677876852577d7004ff7f8/08623a2a545f496185257b1700554ecb?OpenDocument>

It is required that the Divisions that expect or encourage employees to use bicycles ensure that employees complete a Can-Bike II or equivalent training program, that they wear helmet and reflective clothing, and that the Division has a preventative maintenance program in place for their bike fleet. The Can-Bike II training is created by Cycling Canada. This training is recognized by the Ministry of Transportation and requires 3 days of in-person attendance. FSD is currently investigating other recognized training options with the goal to reduce the training time with the City's Occupational Health, Safety and Worker's Compensation section of Human Resources.

### **Data on City's fleet bicycles**

The following table provides the major users of City's fleet bicycles.

<b>Organization</b>	<b>Quantity of Bicycles</b>
Toronto Police Service	376
Toronto Paramedic Services	33
Municipal Licensing and Standards	12
Parks, Forestry and Recreation – Waterfront District	9

### **Expansion of bicycle use**

Use of bicycles for work trips may be expanded to other City employees who are willing to use bicycles as an alternate method of transportation. One alternative is to purchase bicycles at a cost of \$750 to \$1,500 per bicycle and an annual maintenance and repair cost of \$100 to \$150 per bicycle.

FSD's suggestion for expanding the use of bicycles is to leverage the partnership between Transportation Services and Toronto Parking Authority (TPA) for Bike Share Toronto. TPA recently awarded a tender to PBSC Urban Solutions as the supplier of Bike Share Toronto's new bicycles and bicycle stations. Bike Share Toronto is offering the City an annual membership rate of \$90/FOB. The FOB allows an employee to obtain a bicycle from its parking station. The FOB can be shared by members of an organization to use a bicycle as often as required at no additional cost. The City supervisors or managers will need to manage the use of the bicycle FOB. Moreover, they will be responsible for adhering to the City's Health and Safety policy including training, use of proper protective gear, etc.

FSD's internal marketing plan for promoting the use of Bike Share is described below.

<b>Marketing Item</b>	<b>Description</b>	<b>Target Date</b>
Price	Details of the pricing and its inclusions with the appropriate links will be posted on the FSD website	Q4 2016
Product	Appropriate links or documentation on Bike Share program and the associated facts about FOB management and Health and Safety requirements as well as the process to sign-up for Bike Share will be communicated at FSD client meetings and posted on the FSD website.	Q4 2016
Promotion	Relevant Bike Share information for FSD client groups will be provided on FSD website and at client meetings. The FSD clients are responsible for implementation.	Q1 2017
Place	Current nearest Bike Share bicycle station locations and on station expansion plan are underway between the Transportation Services Division and the TPA and the link will be available on FSD website.	Q2 2017

FSD will work with Transportation Services to gather and report the metrics to measure the usage and expansion of bicycles. Additional resources and cost may be involved if FSD is required to play a more active role.

### **Savings realized and costs incurred**

At the meeting on September 17, 2015 the Government Management Committee requested that future progress reports presented to Government Management Committee also include savings realized and costs incurred:

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2015.GM6.3>

In the reporting period 2014-2015 for the implementation of the Consolidated Green Fleet Plan, the table below contains the annualized per unit cost and savings as well as projected savings over the expected life of the vehicles.

Savings Description	Number of units	Vehicle Cost (\$)	One-time Savings (\$)	Annual Fuel Savings (\$)	Useful Life (years)	Fuel Savings Projected over life of vehicle (\$)	GHG - CO2e Reduction (kg) Projected over life of vehicle
Reduction of light duty vehicles weight and size and purchase Toyota Yaris (\$20,000 average cost per unit) versus the previous vehicle standard (\$29,000 average cost per unit)	11	None	\$99,000 (\$9,000 per unit)	\$4,730 (\$430 per unit)	8	\$37,840	86,000 or 30%
Purchase hybrid aerial heavy-duty (\$254,000 average cost per unit) versus diesel heavy-duty trucks (\$196,000 average cost per unit)	3	\$174,000 (\$58,000 per unit)		\$9,390 (\$3,130 per unit)	8	\$75,120	195,000 or 43%
SWMS CNG refuse collection trucks (\$290,000 average cost per unit) in service versus diesel refuse collection trucks (\$260,000 average cost per unit)	5	\$150,000 (\$30,000 per unit)		\$49,500 (\$9,900 per unit)	6	\$297,000	540,000 or 23%
Installation of anti-idling technology devices on TFS front line aerial trucks	9	\$144,000 (\$16,000 per unit)		\$30,600 (\$3,400 per unit)	15	\$459,000	1,203,000 or 22%
Installation of anti-idling technology device on Toronto Paramedics ambulance	1	\$2,000 for one unit		\$2,400 for one unit	4.5	\$10,800	24,000 or 22%
<b>Totals</b>		\$470,000	\$99,000	\$96,620		\$879,760	2,048,000

Total Savings over life of vehicles	\$978,760
Total Costs	\$470,000
<b>Net Savings</b>	<b>\$508,760</b>

Reference for the CNG fuel savings:

<http://www.toronto.ca/legdocs/mmis/2015/pw/bgrd/backgroundfile-84980.pdf>

FSD will continue with right sizing the vehicles, right sizing the fleet, use of alternative fuels, use of OEM anti-idling technology and monitoring vehicle utilization as best practices to reduce environmental impact.

The Green Fleet Team will continue with the Consolidated Green Fleet Plan implementation and updated data and information will be provided in Q2 2017.

## **CONTACT**

Lloyd Brierley  
General Manager, Fleet Services Division  
Phone: 416-392-1034  
Email: [lbrierl@toronto.ca](mailto:lbrierl@toronto.ca)

## **SIGNATURE**

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Lloyd Brierley  
General Manager, Fleet Services Division

## **ATTACHMENTS**

City of Toronto Consolidated Green Fleet Plan 2014-2018  
[http://www1.toronto.ca/city\\_of\\_toronto/fleet\\_services/files/pdf/gfp.pdf](http://www1.toronto.ca/city_of_toronto/fleet_services/files/pdf/gfp.pdf)

Appendix A - City of Toronto Fleets Operations Greenhouse Gases and Air Contaminants Data Reporting 2013, 2014, and 2015 – Details

## Appendix A - City of Toronto Fleets Operations Greenhouse Gases and Air Contaminants Data Reporting 2013, 2014, and 2015 – Details

### FSD 2013-2015 GHG and CAC Emissions

Year	FSD Fuel data		GHG (kg)	CAC (kg)					
	Fuel Typology	Fuel (L)	CO2e	CO	NOx	PM10	PM2.5	SO2	VOC
2013	<b>DIESEL</b>	8,492,670	22,854,017	20,832	101,489	2,685	2,105	372	4,997
	<b>DYED</b>	974,285	2,621,828	2,473	12,230	314	245	43	581
	<b>UNLEADED</b>	2,480,219	5,851,855	123,237	13,624	315	190	82	7,750
<b>Tot</b>		<b>11,947,174</b>	<b>31,327,700</b>	<b>146,542</b>	<b>127,343</b>	<b>3,314</b>	<b>2,540</b>	<b>498</b>	<b>13,328</b>
2014	<b>DIESEL</b>	8,789,797	23,653,504	21,585	105,290	2,781	2,180	385	5,173
	<b>DYED</b>	1,045,774	2,814,224	2,664	13,187	338	264	46	625
	<b>UNLEADED</b>	2,348,181	5,540,161	116,855	12,884	299	180	78	7,342
<b>Tot</b>		<b>12,183,752</b>	<b>32,007,889</b>	<b>141,103</b>	<b>131,361</b>	<b>3,417</b>	<b>2,624</b>	<b>510</b>	<b>13,140</b>
2015	<b>DIESEL</b>	8,612,557	23,176,450	21,087	102,825	2,721	2,133	377	5,062
	<b>DYED</b>	1,004,826	2,703,999	2,469	12,056	318	249	44	592
	<b>UNLEADED</b>	2,325,697	5,484,335	111,698	12,869	298	180	77	7,073
<b>Tot</b>		<b>11,943,081</b>	<b>31,364,784</b>	<b>135,253</b>	<b>127,751</b>	<b>3,337</b>	<b>2,563</b>	<b>498</b>	<b>12,727</b>

Year	FSD Fuel data		GHG (kg)	CAC (kg)					
	Fuel Typology	Fuel (m3)	CO2e	CO	NOx	PM10	PM2.5	SO2	VOC
2015	<b>CNG</b>	56,064	95,925	13	199	7	5	7	14

Source: EED GHGs calculation based on FSD data



### PS 2013-2015 GHG and CAC Emissions

Year	Fuel data		GHG (kg)	CAC (kg)					
	Fuel Typology	Fuel (L)	CO2e	CO	NOx	PM10	PM2.5	SO2	VOC
2013	DIESEL	59,851	161,059	144	697	19	15	3	35
	UNLEADED	1,892,987	4,438,647	58,669	11,896	256	170	63	4,479
<b>Tot</b>		<b>1,952,838</b>	<b>4,599,706</b>	<b>58,813</b>	<b>12,593</b>	<b>275</b>	<b>185</b>	<b>65</b>	<b>4,514</b>
2014	DIESEL	56,973	153,315	137	661	18	14	2	33
	UNLEADED	1,987,695	4,661,202	62,222	12,467	269	178	66	4,729
<b>Tot</b>		<b>2,044,669</b>	<b>4,814,517</b>	<b>62,359</b>	<b>13,128</b>	<b>287</b>	<b>192</b>	<b>68</b>	<b>4,762</b>
2015	DIESEL	55,551	149,487	133	646	17	14	2	32
	UNLEADED	2,001,984	4,694,883	63,296	12,533	271	179	66	4,791
<b>Tot</b>		<b>2,057,535</b>	<b>4,844,370</b>	<b>63,429</b>	<b>13,179</b>	<b>288</b>	<b>193</b>	<b>69</b>	<b>4,823</b>

Source: EED GHGs calculation based on FSD and PS data

### TFS 2013-2015 GHG and CAC Emissions

Year	TFS Fuel data		GHG (kg)	CAC (kg)					
	Fuel Typology	Total Fuel (L)	CO2e	CO	NOx	PM10	PM2.5	SO2	VOC
2013	DIESEL	1,415,944	3,810,307	3,826	19,400	472	367	64	866
	DYED	1,042	2,805	3	13	0	0	0	1
	UNLEADED	254,191	600,227	14,184	1,273	33	19	8	829
<b>Tot</b>		<b>1,671,178</b>	<b>4,413,338</b>	<b>18,013</b>	<b>20,686</b>	<b>506</b>	<b>386</b>	<b>73</b>	<b>1,695</b>
2014	DIESEL	1,424,962	3,834,645	3,870	19,588	476	370	65	874
	DYED	1,803	4,852	5	24	1	0	0	1
	UNLEADED	264,598	624,861	14,756	1,324	35	20	9	861
<b>Tot</b>		<b>1,691,362</b>	<b>4,464,358</b>	<b>18,630</b>	<b>20,936</b>	<b>512</b>	<b>390</b>	<b>74</b>	<b>1,736</b>
2015	DIESEL	1,438,442	3,870,974	3,920	19,818	482	374	66	884
	DYED	1,663	4,475	5	23	1	0	0	1
	UNLEADED	279,393	660,200	16,115	1,385	36	20	9	936
<b>Tot</b>		<b>1,719,499</b>	<b>4,535,649</b>	<b>20,040</b>	<b>21,227</b>	<b>519</b>	<b>395</b>	<b>75</b>	<b>1,821</b>

Source: EED GHGs calculation based on FSD data

### TPS 2013-2015 GHG and CAC Emissions

Year	TPS Fuel data		GHG (kg)	CAC (kg)					
	Fuel Typology	Total Fuel (L)	CO2e	CO	NOx	PM10	PM2.5	SO2	VOC
2013	DIESEL	263,550	709,740	619	2,459	80	63	11	157
	UNLEADED	6,609,473	15,664,438	523,516	24,153	921	422	222	26,735
<b>Tot</b>		<b>6,873,023</b>	<b>16,374,179</b>	<b>524,134</b>	<b>26,612</b>	<b>1,001</b>	<b>486</b>	<b>232</b>	<b>26,893</b>
2014	DIESEL	256,810	691,589	603	2,396	78	62	11	153
	UNLEADED	6,417,207	15,208,768	508,287	23,450	894	410	215	25,958
<b>Tot</b>		<b>6,674,017</b>	<b>15,900,358</b>	<b>508,890</b>	<b>25,847</b>	<b>972</b>	<b>472</b>	<b>226</b>	<b>26,111</b>
2015	DIESEL	273,446	736,390	642	2,552	83	66	11	163
	UNLEADED	6,755,489	16,009,702	535,517	24,667	942	432	226	27,347
<b>Tot</b>		<b>7,028,935</b>	<b>16,746,092</b>	<b>536,159</b>	<b>27,219</b>	<b>1,026</b>	<b>498</b>	<b>238</b>	<b>27,510</b>

Source: EED GHGs calculation based on TPS data

### TTC 2013-2015 GHG and CAC Emissions

Year	TTC Fuel data		GHG (kg)	CAC (kg)					
	Fuel Typology	Total Fuel (L)	CO2e	CO	NOx	PM10	PM2.5	SO2	VOC
2013	DIESEL	89,647,921	241,242,554	284,452	1,258,517	42,771	37,881	4,631	42,018
	DYED	1,185,344	2,788,386	52,880	6,521	162	97	39	3,340
<b>Tot</b>		<b>90,833,264</b>	<b>244,030,940</b>	<b>337,332</b>	<b>1,265,039</b>	<b>42,933</b>	<b>37,978</b>	<b>4,670</b>	<b>45,358</b>
2014	DIESEL	93,921,638	252,743,128	298,280	1,319,716	44,853	39,730	4,854	44,005
	DYED	1,222,466	2,875,711	54,536	6,726	167	100	41	3,444
<b>Tot</b>		<b>95,144,104</b>	<b>255,618,838</b>	<b>352,816</b>	<b>1,326,442</b>	<b>45,020</b>	<b>39,831</b>	<b>4,894</b>	<b>47,449</b>
2015	DIESEL	92,969,955	250,182,149	295,508	1,307,443	44,440	39,370	4,807	43,542
	DYED	1,264,129	2,973,719	56,394	6,955	172	104	42	3,561
<b>Tot</b>		<b>94,234,084</b>	<b>253,155,868</b>	<b>351,902</b>	<b>1,314,398</b>	<b>44,612</b>	<b>39,474</b>	<b>4,849</b>	<b>47,104</b>

Source: EED GHGs calculation based on TTC data