






To: Public Works and Transportation Committee **Date:** August 19, 2021
From: Suzanne Bycraft
Interim Director, Public Works Operations **File:** 01-0340-03-01/2021-
Vol 01
Re: **Green Fleet Action Plan - 2020 Progress Report**

Staff Recommendation

1. That the staff report titled “Green Fleet Action Plan – 2020 Progress Report”, dated August 19, 2021, from the Interim Director, Public Works Operations, be endorsed.
2. That the City join the West Coast Electric Fleets Diamond Lane pledge, thereby allowing application for additional funding opportunities from the Province of British Columbia’s Go Electric Fleets program.

Suzanne Bycraft
Interim Director, Public Works Operations
(604-233-3338)

Att. 2

REPORT CONCURRENCE		
ROUTED TO: Sustainability & District Energy	CONCURRENCE <input checked="" type="checkbox"/>	CONCURRENCE OF GENERAL MANAGER 
SENIOR STAFF REPORT REVIEW	INITIALS: 	APPROVED BY CAO 

Staff Report

Origin

The City's 2013 Green Fleet Action Plan (GFAP) established a target to reduce greenhouse gas (GHG) emissions from the City's corporate fleet by 20% by 2020. The GFAP outlines 24 action steps in four broad categories of vehicle downsizing and right-sizing, best-in-class replacement, electric vehicle and hybrid vehicle procurement, and maintenance strategies including anti-idling and smart driving techniques. The reduction target of 20% is based on an annual reduction of 2% per year, using 2011 as the baseline year.

This report presents a progress report of actions and results to date; highlighting the City met and exceeded its target by achieving a 28% reduction in fleet GHG related emissions. This is despite an 11% growth in population during 2011-2020. The report provides highlights of the key actions taken to date, as well as outlines next steps to establish a new GHG fleet emissions reduction target.

This report supports Council's Strategic Plan 2018-2022 Strategy #2 A Sustainable and Environmentally Conscious City:

2.1 Continued leadership in addressing climate change and promoting circular economic principles.

2.2 Policies and practices support Richmond's sustainability goals.

Analysis

Background

Corporately, the GFAP is a component of the Corporate Energy and GHG Reduction Program identified in the City's Sustainability Framework. This framework addresses all greenhouse gas emissions and energy use from City operations. Fleet and building related emissions account for the vast majority of corporate GHG emissions, and the reduction of fossil fuel use aligns with broader community targets relating to greenhouse gas reduction, i.e. 33% by 2020 and 80% by 2050, below 2007 levels.

In addition to the GFAP, the City has shown progressive leadership through its Sustainable Green Fleet Policy (Policy 2020). This policy outlines commitments to overall best value vehicle replacement strategies, alternative fuels, high emission standards for equipment and idling reduction alternatives. These plan and policy commitments make the City a leader in its approach to overall corporate fleet management.

The dynamic nature of the City's fleet makes pursuing green technologies challenging given current market limitations on alternative fuel vehicles, particularly of the type needed to support operations. This is due to a large portion of the City's fleet being comprised of non-traditional units such as grass cutting equipment, street sweepers, snow plowing equipment, excavating equipment and trucks with specialized outfitting and supplemental power requirements to meet

operational demands. Reducing GHG emissions, therefore, requires a suite of approaches. The availability of electric vehicle options is expected to expand over time, particularly in light of the BC Zero-Emission Vehicles (ZEV) Act, which mandates automakers meet an escalating percentage of new light-duty ZEV sales and leases, reaching 10% of light-duty vehicle sales by 2025; 30% by 2030 and 100% by 2040. The government of Canada has also announced that it intends to mandate passenger and light duty vehicles sales be 100% ZEV's by 2035, which is an accelerated target from 2040 previously.

Progress on Key Actions

Fleet Size:

The City has reduced its core fleet assets by 2% since 2011, or from 470 units in 2011 to 459 units in 2020. The City also has a complement of non-fuelling assets such as trailers, which has increased from 102 assets in 2011 to 155 in 2020. The City experienced an 11% population growth during 2011 – 2020. Table 1 provides a summary of the City's fleet asset count in relation to its population over the same period.

Table 1 – Asset Count Corporate Fleet Fuelling & Non-Fuelling



Additionally, temporary rental of assets is applied as a practical option used to meet fleet demands over the short term for project-based work without unnecessarily increasing the size of the core fleet.

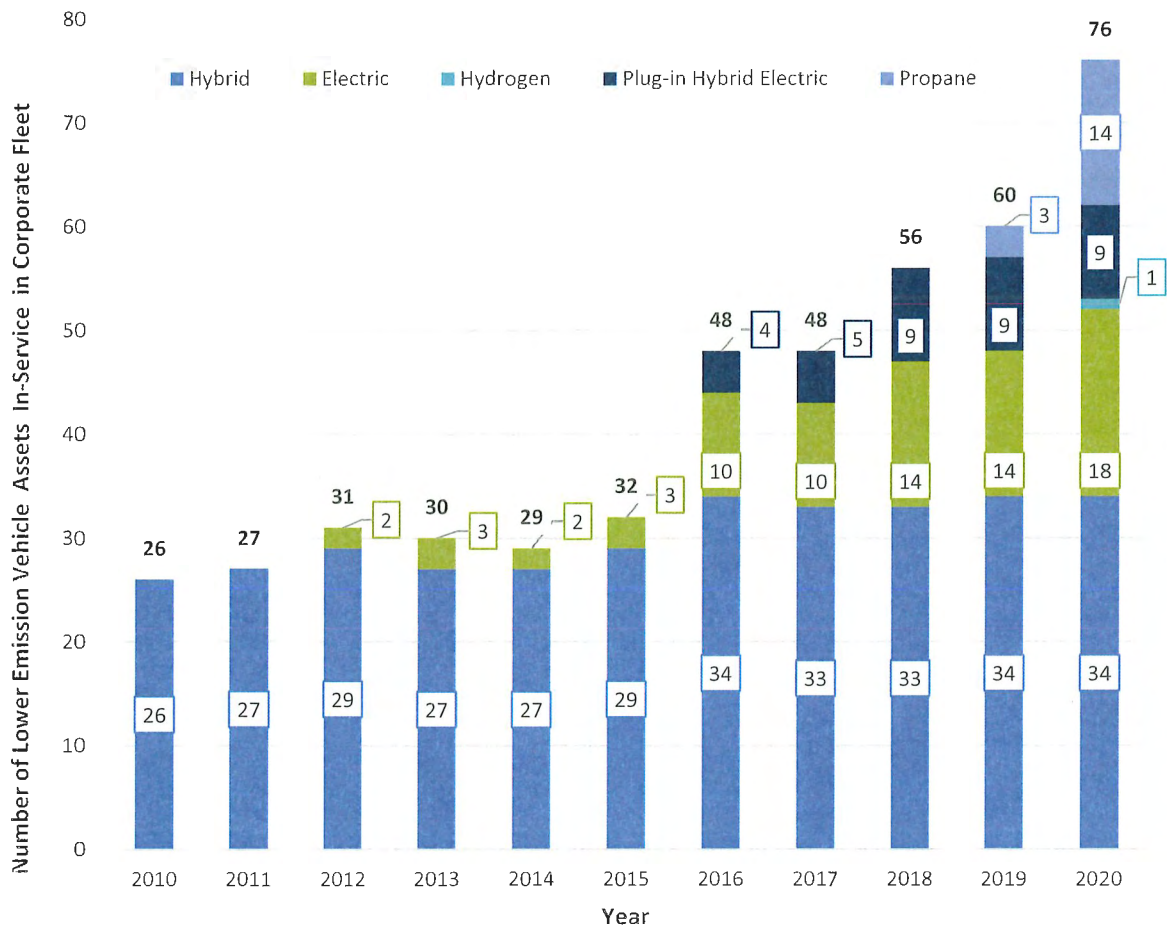
Vehicle Replacements:

At their November 28, 2016 meeting, Council approved a tiered approach to vehicle replacements, as follows:

1. Full electric vehicle
2. Electric vehicle with gasoline backup
3. Hybrid vehicle
4. Most fuel-efficient gasoline vehicle (where electric or hybrid units are not feasible)

Despite marketplace limitations for green technologies, for a large part of the City’s fleet, the number of alternative fuel units in the fleet has grown considerably, or nearly triple that of 2010, as shown in Table 2.

Table 2 – Number of Lower Emissions Vehicle Assets



Staff note that the initial purchase cost of electric vehicles remains higher than their gasoline counterparts, however, the total cost of ownership over the vehicle lifecycle is comparable. Attachment 1 provides a lifecycle comparison of six fleet units with details of purchase price, fuel economy, costs and emissions profile data. Total cost of ownership for electric vehicles is expected to improve over time as these vehicles become more mainstream and cost-comparable in the vehicle market.

Alternative Fuels:

The City actively evaluates and pursues alternative fuel options where feasible pending development of the electric vehicle market and as part of fuel diversification:

- Propane Pilot - A propane pilot program was initiated in 2020, where fourteen high use light duty pick up trucks were outfitted with propane systems, running 90% on propane and 10% on gasoline. A propane filling station was also installed at the Works Yard. This initiative resulted in an average 12% reduction in GHG emissions per kilometre travelled, and saved an estimated 50 tonnes of CO₂e. Staff will continue to look for opportunities to expand the program for high use vehicles where the return on investment and savings in GHG are advantageous.
- Hydrogen – Supported by grant funding through the Clean BC Heavy-Duty Vehicle Efficiency Program, the City outfitted three heavy-duty diesel-fueled units with hydrogen fuel cell enhancements. The system works by converting distilled water to hydrogen. No currently observable improvements in fuel efficiency or a reduction in GHG emissions has been noted to date. Staff will, however, continue to evaluate hydrogen for broader application in the City's medium and heavy duty fleet in alignment with provincial and federal actions in this regard where there are demonstrated emissions and/or fuel efficiency gains.

In 2021, the City purchased its first Hydrogen Fuel Cell Vehicle, a 2020 Toyota Mirai. The vehicle fuel cell converts compressed liquid hydrogen to electricity to power the vehicle. The by-product is water or H₂O, therefore is zero emissions. The lack of fuelling infrastructure remains a barrier to expansion of hydrogen fuel options at this time.

- Biodiesel – diesel fuel purchased by the City contains 5% biodiesel content. While renewable fuels and compressed natural gas are also evaluated periodically, neither are being considered further at this time due to a lack of cost benefit and/or lack of alignment with circular economy principles. Instead, other emerging fuel technologies including electric and hydrogen are being evaluated.

Maintenance/Management Strategies:

The City incorporates a number of strategies to manage and maintain its fleet in an effective manner. Proper vehicle maintenance, fleet training/education programs and robust systems are used to track information as part of effective fleet management. Driving and optimum maintenance

practices have been shown to save up to 25%¹ of emissions. Example key programs, initiatives and systems currently in place and actively applied include:

- Vehicle asset management system
- Fleet training program
- Idle reduction and awareness programs (includes retrofits/anti-idling technology)
- Automatic vehicle location units (GPS) on 72 units
- Robust fuel management system (fuel security and consumption/idling data)
- Continuous improvement, including actively reviewing emerging technologies

The City's progressive approach to management of its fleet and policy/plan commitments led to the City obtaining a platinum rating in 2016 from E3 Fleet (Energy, Environment and Excellence). This program, operated by the Fraser Basin Council, monitors and measures fleet efficiency against best practise criteria, including policy commitments. Richmond was the first City in Canada to achieve platinum rating, noting it as the "highest mark of achievement for fleet management in Canada".

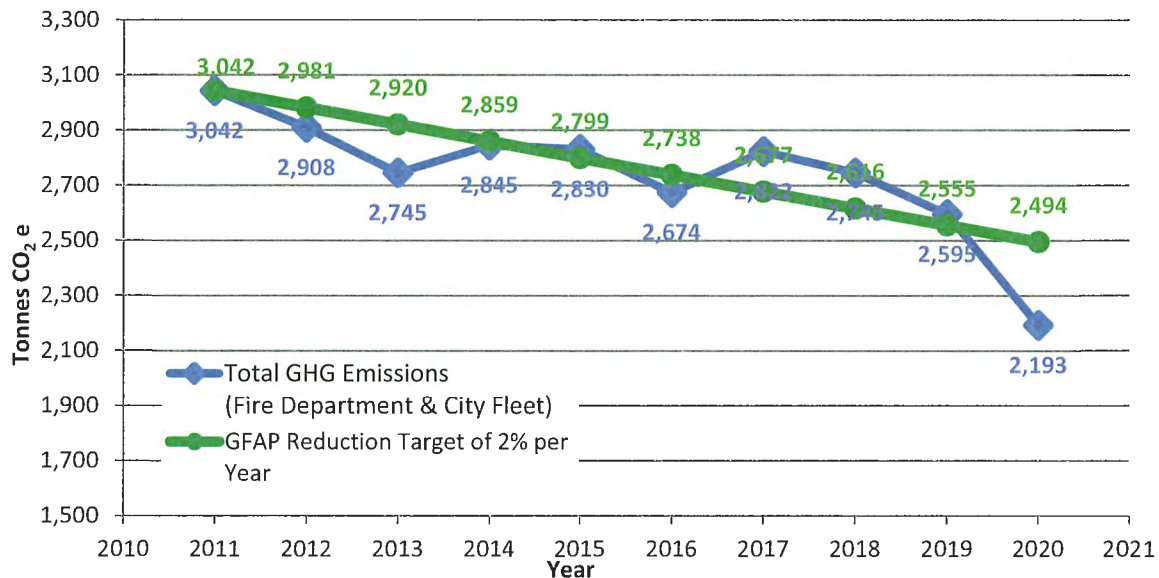
Results to Date

These actions have led to the City meeting and exceeding its GHG emissions reduction target by achieving a 28% reduction in emissions as shown in Figure 2 below. Staff note that to achieve consistency in GHG inventories under the Climate Action Rebate Incentive Program, only maintenance-related emissions are considered.

The decline in emissions, particularly in the 2020 year, was likely impacted by COVID-19. While in some cases there was less driving of the corporate fleet due to staff working from home and attending meetings virtually, there were other circumstances leading to greater use of fleet assets, such as the launch of the community ambassador program and policies limiting staff to two people per vehicle. These impacts are not directly quantifiable, however, the overall outcome was a reduction in fuel consumption and emissions output from the City's Fleet.

¹Source: Natural Resources Canada Fuel Efficient Driving Techniques: <https://www.nrcan.gc.ca/energy-efficiency/transportation-alternative-fuels/personal-vehicles/fuel-efficient-driving-techniques/21038>

Figure 2: City of Richmond GHGs Percentage from 2011 Baseline Year



Funding Opportunities via BC Clean Energy Go Electric Program for EV Infrastructure

The City has invested in installing electric vehicle infrastructure for both the community and corporate fleet. The number of public and corporate charging ports has grown to 36 in 2020 (18 for each). A detailed list of the current and planned public and corporate stations is shown in Attachment 2.

Continued investment in both public and corporate charging infrastructure will be needed to meet future charging needs. The City will continue to take advantage of funding opportunities through provincial and federal grants, where feasible to increase the EV charging network overall. To date, the City has received funding commitments totalling \$860,000 from Natural Resources Canada (NRCan) to support public and corporate electric vehicle infrastructure installation projects.

To qualify for additional funding opportunities for zero emission vehicles and charging infrastructure, the BC Clean Energy Go Electric Program requires organizations to participate in the West Coast Electric Fleets pledge. There are four levels to this program:

1. On-Ramp (commitment to evaluate zero emission vehicles).
2. Highway (commitment to 3% zero emission vehicles annually).
3. Express Lane (commitment to 10% zero emission vehicles annually).
4. Diamond Lane (commitment to above 10% zero emissions vehicles annually).

Staff recommend adopting the Diamond Lane pledge, with the commitment to replace above 10% zero emission vehicles for all new corporate passenger fleet vehicle procurements. This is considered achievable with new ZEV’s being introduced into the marketplace in the passenger vehicle category. In 2020, three passenger vehicles were replaced, with one ZEV unit (or 33%). In 2021, one of eight passenger fleet vehicle replacements will be ZEV (or 12.5%). This pledge can be revisited annually to consider a higher ZEV procurement goal and potential expansion

into other vehicle categories (e.g. light duty pickups) as the ZEV market expands. The pledge is non-binding but demonstrates the City's commitment to emissions reduction. Through this program, the City can continue to leverage further grant opportunities that are not available to those that do not take the pledge.

Next Steps

To align with the City's Community Energy and Emissions Plan, staff will begin work on preparing an updated GFAP to achieve the 2030 target of reducing emissions by 50% from 2007 levels. This will include continuation of existing green fleet actions (i.e. idle reduction strategies, fleet training program, expanding GPS on additional units, vehicle procurement strategies, alternative fuel vehicles, etc.) as well as new actions designed to help ensure the City remains a leader in overall greening of its corporate vehicle fleet.

Staff will report to Council for appropriate approvals on a new, proposed Green Fleet Action Plan once prepared.

Financial Impact

None

Conclusion

This report presents a progress report on the City's 2013 Green Fleet Action Plan, which set a target to reduce its corporate fleet greenhouse gas emissions by 20% by 2020. Through the implementation of numerous strategies outlined in the GFAP, the City achieved a 28% decrease in total fleet emissions. While COVID-19 impacts may have contributed to the more significant emissions reduction in 2020, the City's actions have nonetheless had a positive impact on fleet vehicle emissions reduction, leading to achieving and exceeding the City's 2020 target.

Installation of electric vehicle charging infrastructure, for both public and corporate vehicle charging, is underway and will continue in accordance with Council funding approvals, with funding opportunities pursued from senior levels of government, where available. To maximize the City's ability to apply for these funding opportunities, it is recommended that the City join the West Coast Electric Fleets Diamond Lane pledge. This is a non-binding commitment for the City to replace above 10% zero emission vehicles for all new corporate passenger fleet vehicle procurements annually.

Staff will begin work on an updated Green Fleet Action Plan with the goal of achieving the 2030 target of reducing emissions by 50% from 2007 levels in alignment with the City's Community Energy and Emissions Plan. This updated plan will be presented to Council for consideration and approvals upon completion.



Dinos Ramos
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August 19, 2021

- 9 -

DR:dr

Att. 1: Gasoline vs. Electric Vehicle Total Cost of Ownership Comparison

Att. 2: Current and Planned Public and Corporate EV Charging Station Locations Owned and Operated by the City

Gasoline vs. Electric Vehicle Total Cost of Ownership Comparison

	2002 Chevrolet Cavalier	2004 Dodge Neon	2008 Honda Civic Hybrid	2012 Chrysler 200	2018 Chevrolet Bolt BEV ¹	2018 Chevrolet Volt PHEV ¹
Purchase Price	\$17,647	\$18,094	\$27,296	\$19,529	\$44,919	\$37,559
Actual Fuel Economy	11.05 L/ 100 km	11.85 L/ 100 km	8.17 L/ 100 km	11.44 L/ 100 km	20.1 kWh/ 100 km	1.71 L/ 100 km
Fuel/Energy Used Per Year based on 15,000 km Driven	1,675.5 L	1,777.5 L	1,225.5 L	1,716 L	3,015 kWh	256 L
GHG Emissions/Year	4.77 T CO ₂ e	5.06 T CO ₂ e	3.49 T CO ₂ e	4.88 T CO ₂ e	0.0901 T CO ₂ e	0.73 T CO ₂ e
GHG Emissions for 10 Years	47.73 T CO ₂ e	50.63 T CO ₂ e	34.91 T CO ₂ e	48.88 T CO ₂ e	0.901 T CO ₂ e	7.3 T CO ₂ e
Fuel Cost²	\$21,548	\$23,108	\$19,463	\$22,308	\$3,015	\$3,334
Cost of Maintenance for 10 Years	\$15,031	\$16,638	\$15,931	\$16,150	\$7,492	\$13,456
Total Cost of Ownership for 10 Years	\$54,226	\$57,840	\$62,690	\$58,078	\$55,426	\$51,015

¹Cost net of \$5,000 rebate from the BC Clean Energy Vehicles (CEV) Point of Sale Incentive Program

²Cost of Fuel/Electricity for 10 years based on \$1.30/L for gasoline and \$0.10/kWh for electricity

Current and Planned Public and Corporate EV Charging Station Locations Owned and Operated by the City

Public Stations:

Station Location	Address	No. of Ports (Parking Stalls)	Type of Station	
			Level 2	Level 3
Existing Public EV Charging Stations				
City Hall	6911 No. 3 Rd	2	✓	
City Works Yard	5599 Lynas Ln	2	✓	
Firehall 1	6960 Gilbert Rd	2	✓	
Firehall 3	9660 Cambie Rd	2	✓	
Thompson Community Centre	5151 Granville Ave	2	✓	
Steveston Community Centre	4111 Moncton St	2	✓	
Cambie Community Centre	12800 Cambie Rd	2	✓	
Minoru Centre for Active Living	7191 Granville Ave	4	✓	
SUBTOTAL		18		
Planned Public EV Charging Stations				
City Hall	6911 No. 3 Rd	1		✓
City Hall	6911 No. 3 Rd	2	✓	
Richmond Oval	6111 River Rd	1		✓
Richmond Oval	6111 River Rd	2	✓	
King George Park	4100 No. 5 Rd	1		✓
King George Park	4100 No. 5 Rd	2	✓	
Richmond Ice Centre	14140 Triangle Rd	1		✓
Richmond Ice Centre	14140 Triangle Rd	2	✓	
Steveston Tennis Courts	4151 Chatham St	2	✓	
West Richmond Community Centre	9180 No. 1 Rd	4	✓	
Britannia Heritage Ship Yards	5180 Westwater Dr	2	✓	
Garden City Park	6620 Garden City Rd	2	✓	
Minoru Park (Arenas)	7551 Minoru Gate	4	✓	
South Arm Community Centre	8880 Williams Rd	2	✓	
Blundell Park	6468 Blundell Rd	2	✓	
Hamilton Community Centre	5140 Smith Dr	2	✓	
RCMP City Centre Community Police Office	6931 Granville Ave	2	✓	
SUBTOTAL		34		
TOTAL CURRENT & PLANNED		52		

Corporate Stations:

Station Location	Address	No. of Ports (Parking Stalls)	Type of Station	
			Level 2	Level 3
Existing Corporate EV Charging Stations				
City Hall	6911 No. 3 Rd	2	✓	
City Works Yard	5599 Lynas Ln	6	✓	
City Hall Annex	6900 Minoru Blvd	8	✓	
RCMP Headquarters	11411 No. 5 Rd	2	✓	
SUBTOTAL		18		
Planned Corporate EV Charging Stations				
City Hall	6911 No. 3 Rd	1		✓
City Works Yard	5599 Lynas Ln	2		✓
City Works Yard	5599 Lynas Ln	20	✓	
City Hall Annex	6900 Minoru Blvd	22	✓	
Firehall 1	6960 Gilbert Rd	2	✓	
Firehall 2	11011 No. 2 Rd	4	✓	
Firehall 3	9660 Cambie Rd	4	✓	
RCMP Headquarters	11411 No. 5 Rd	2	✓	
RCMP City Centre Community Police Office	6931 Granville Ave	2	✓	
SUBTOTAL		59		
TOTAL CURRENT & PLANNED		77		