



GREEN FLEET STRATEGY

MAY 31, 2021



Green Fleet Strategy

BACKGROUND

- April 2020 issued a Request For Quotation (RFQ)for the services of a consultant
- In Response to the Climate Emergency
- Bay Area Climate Change Summit “that all diesel vehicles be decommissioned by 2030 and all vehicles electrified by 2050.” .

Green Fleet Strategy

This presentation will

- Provide overview of the consultants 25 recommendations
- Outline the consultants 3 Groups of summarized solutions
- Fleets recommended Immediate action plan from each of the 3 Groups of summarized solutions. Current to end of 2024.

Green Fleet Strategy

The consultant looked at 1 year of data and provided an overview on some quick facts:

QUICK FACTS		
Fleets Average Age	7.5 years	
Original Purchase Price	\$95,158,752	
Current Day Estimated Replacement Price	\$112,153,100	
Estimated Market/Trade in Value	\$46,193,264	
Kilometers Travelled	11,033,700 km	
Fuel Usage	3,701,629 litres	
Total Repairs/Maintenance, Fuel, Capital & Downtime	\$19,911,820	
Average Fuel Consumption l/100 km	36.1 l/100km	
GHG Emissions	9,371 metric tonnes CO ₂ e	

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Recommendation Tracking & Implementation

Recommendations	Implementation Timelines	Statement	Cost Impacts	GHG
Follow a historical data-driven lifecycle cost assessment, which is completed by modelling repair, maintenance, fuel, and cost of capital over the vehicle's entire lifecycle to determine the optimal replacement age of vehicles.	Previously Implemented/ Immediate	<u>Previously Implemented:</u> Fleet's current process for determining the optimal replacement age of an asset takes into consideration factors such as high maintenance cost, kilometres and replacement year. <u>Immediate:</u> Fleet will utilize the tools provided by Richmond Sustainability to enhance how data is analyzed. Applying this methodology will establish a more accurate approach to determining the optimal replacement cycles for each fleet classification	Costs will be monitored. Impacts to both capital and operating costs are possible	This recommendation may result in shorter or longer replacement cycles. GHG reduction will be impacted by changes in replacement cycles
Consider implementing the green fleet asset management best practices recommended by RSI-FC as illustrated in the process flow chart (Page 25). With these processes the fleet will become green and right-sized.	Previously Implemented/ Immediate	<u>Previously Implemented:</u> Fleet will continue to communicate with the User Groups in determining fit for purpose assets and advise on the availability of BEV assets. <u>Immediate:</u> Fleet will focus on becoming green and right-sizing the fleet by following the recommended best practices identified in the process flow chart (Page 25). Fleet will identify criteria to establish: what the corporate minimum will include, roles and responsibilities and determine what operational justification and level of authorization is required to go outside the corporate minimum	Costs will be monitored. Impacts to both capital and operating costs are possible	GHG reduction will be impacted by determined replacements
1) Employ a total cost of ownership (TCO) approach to optimize the use of capital.	Previously Implemented/ Immediate	<u>Previously Implemented:</u> Currently the driving factor when considering replacement is high maintenance cost <u>Immediate:</u> Fleet will apply the tools provided by RSI to enhance how TCO is calculate and apply a data driven approach to optimize the use of capital	Costs will be analyzed by utilizing the tools provided by RSI. Impacts to both capital and operating costs are possible	GHG reduction will be impacted by determined replacements
2) Consider TCO in competitive bidding proposal structures instead of the lowest compliant bid approach.	Long Term	TCO Procurement- Review in consultation with Procurement and align to the procurement bylaw. This approach provides a narrow view of just the costs associated with the initial purchase of an asset and factors such as planned maintenance. However, there are to many variables with respect to unplanned work to confidently build this concept into the bidding process while remaining fair and transparent	No direct cost impacts associated with the implementation of this recommendation	No direct GHG reduction impacts associated with the implementation of this recommendation
Strictly through a lens of fiscal planning, prioritize replacement of units with BEVs only if they would deliver return-on-investment (ROI).	Additional Analysis	Fleet will review and develop replacement criteria that will consider a return-on-investment strategy along with other impacts such as GHG reductions, manufacturers build schedules and available charging infrastructure.	Costs will be monitored. Impacts to both capital and operating costs are possible	GHG reduction will be impacted by determined replacements
Consider adopting the RSI-FC recommended lifecycle analysis (LCA) approach to extract maximum value from each vehicle.	Immediate	By utilizing the Lifecycle Analysis tools provided by RSI-FC this will provide a component not previously available to Fleet Planning. The tool will provide additional data using the RSI database resulting in more accurate lifecycle structure and the ability to analyze/predict maintenance costs past a vehicles current expected life. Leveraging this tool will allow Fleet to schedule replacements prior to spikes in maintenance and downtime.	Costs will be monitored. Impacts to both capital and operating costs are possible	GHG reduction will be impacted by determined replacements. Affects could be mixed as a result of extending or reducing replacement cycles

3 Groups of Solutions

- Group 1: Lifecycle Optimization and Best Management Practices
- Group 2: Low-Carbon Fuel Switching
- Group 3: Transition to Battery Electric Vehicles (BEV)

GROUP ONE SOLUTIONS

Lifecycle Optimization and Best Management Practices

17 Recommendations

Balanced Capital Expenditures and optimized lifecycles

- GHG -17

Best Management Practices (light weighting, lower rolling resistance, driver eco-training, anti-idling policy & technologies, route planning and optimization, trip reduction)

- GHG -2,928

GROUP TWO SOLUTIONS

FUEL-SWITCHING – 6 Recommendations

1. E85 (passenger, pickups, vans) E85 Fuel is made up of 85% ethanol and 15% regular fuel.
2. Biodiesel B10 (annual blend, annualized – all diesel on-road units) B10 is 10% Biodiesel and 90% conventional diesel
3. Compressed Natural Gas (CNG)
 - Light Duty (LD) (pickups)
 - Medium & Heavy Duty(MHD) (Classes 3 to 6)
 - LMHD (Classes 2 to 8)
4. Renewable Natural Gas (RNG) LMHD (Classes 2 to 8)
5. Liquified Petroleum Gas (LPG) AKA Propane
 - LD (passenger, pickups, vans)
 - LMHD (LD & Truck Classes 2 to 8)
6. Hydrogen



GROUP THREE – BATTERY-ELECTRIC VEHICLE

PHASE-IN – 8 recommendations

BEV phase-in (passenger vehicles only 2021)

- GHG -2,943

BEV phase-in (passenger vehicles starting immediately and pickups in 2022)

- GHG -3,789

BEV phase-in (passenger vehicles starting immediately, pickups starting in 2022, and medium- and heavy-duty (MHD) trucks starting in 2024)

- GHG -8,475

Fleets Immediate Action Plan Recommendations

- Enhanced Replacement Schedule
- Light Weighting
- Anti Idling
- Eco-Driver Training
- Alternative Fuels
- Electrification

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Group One Solutions

Lifecycle Optimization and Best Management Practices

Analytics Tool provided by Consultant

- Enhanced replacement schedule
- Alternative fuel analysis

Light weighting – Aluminum trailers, Sanders, dump boxes for crew cabs



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Anti Idling - Compliance section has added an anti-idling segment to the Driver Safety & Compliance Manual Training presentation.

Eco Driver training - Professional Driver Improvement Course content to include a 50 minute eco driving segment.

Deliver 350 – 450 drivers annually



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Anti Idling campaign

- Creation of posters for display in common areas
- Stickers made up for dashboards in vehicles.
- Create communication for display on monitors
- In cab battery power level indicators & driver education
- Implementation of Group One solution could reduce GHG's by as much as 3000 tonnes annually

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Group Two Solutions

Low-Carbon Fuel Switching



- Fleet recommends a trial of 20% blend for the summer and a 5% blend for the winter in two locations for one year
- Average annual GHG reductions expected to be between 10-12%
- No cost increase for up to a 20% blend.



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Other Municipalities

Municipality	B5	B10	B20	B25	R100
Thunder Bay	Oct - May		May - Oct		
Toronto	Dec - Mar	Apr - May, Sept - Nov	June - Aug		
Kitchener	Winter & Summer	Trying a pilot on B-50 in summer			
Kelowna	Used for 15 years	Used for 15 years	Used for 15 years	Used for 15 years	20% total now

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Group Three Solutions

Transition to Battery Electric Vehicles (BEV)

- largest impact in reducing GHG's
- 3 year forecast plus 2021 approved vehicles
- annual reduction of 335 tonnes of GHG's
- 2718 tonne GHG reduction over the expected life

BEV Replacements 2021-2024					
Division/Dept	Replacement Year				Grand Total
	2021	2022	2023	2024	
Healthy and Safe Communities		2	1	1	4
Planning & Economic Development	5	12	3	23	43
Public Works	9	8	9	16	42
Grand Total	14	22	13	40	89






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EV Charging Station Hub Locations 2021 - 2024

Battery Electric Vehicles offer the largest impact in reducing GHG's than any other option that is currently available in the automotive market. Over the next three (3) years approximately 89 vehicles due for replacement may be replaced where fully electric options are available. Therefore, infrastructure planning is a key component to the success of this initiative. The proposed plan has identified the need for approximately 47 - Level 2 and 2 - Level 3 charging stations. Selected locations are based current vehicle parking with consideration of potential location changes in the next three (3) to five (5) years.



Legend:

- 2021 
- 2022 
- 2023 
- 2024 
- Level 3 Charger 

2021 Charging Station Locations



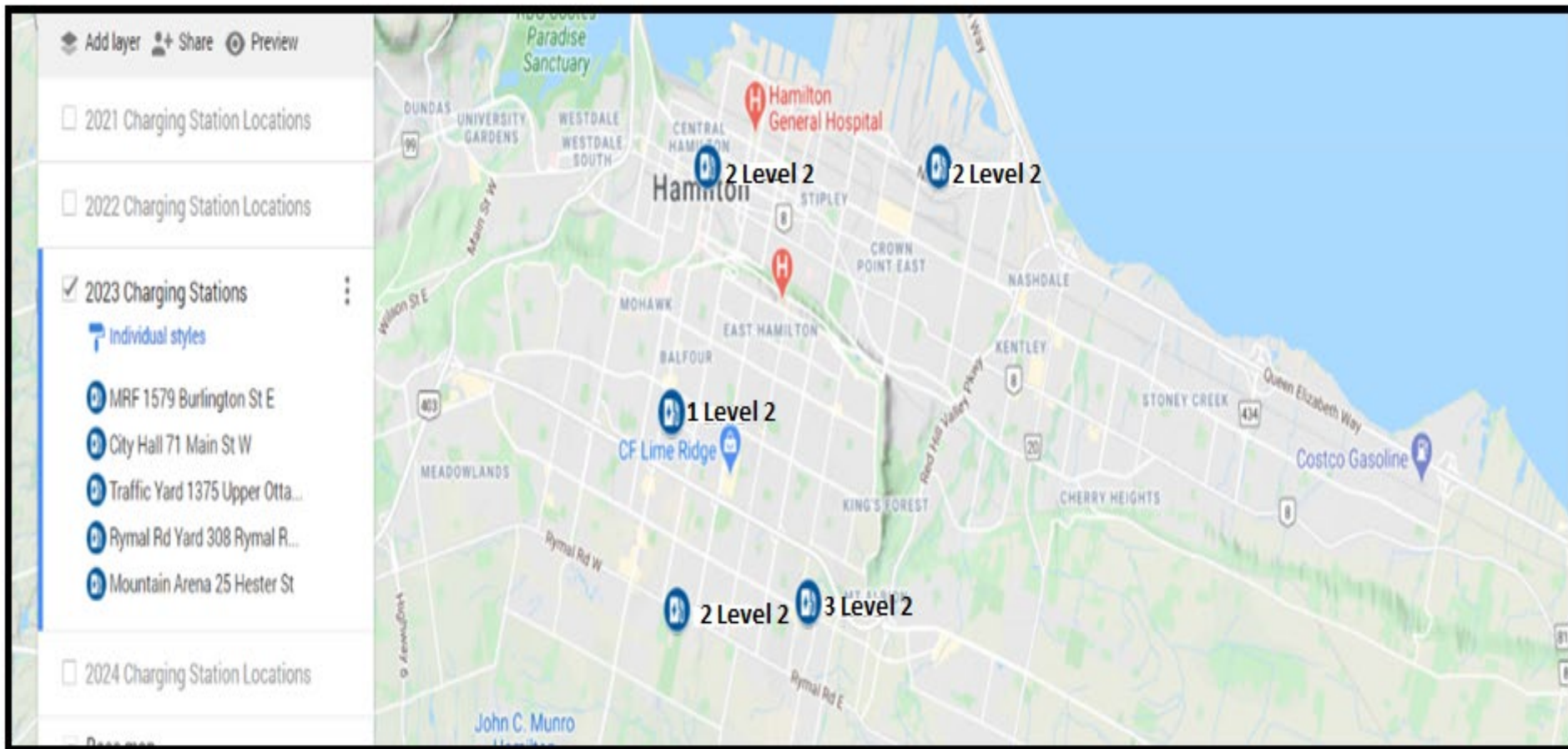
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2022 Charging Station Locations



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2023 Charging Station Locations



2024 Charging Station Locations



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Financing model

The preliminary action plan will result in additional annual capital fund requests for the additional BEV cost and charging equipment costs.

BEV Capital

- BEV additional cost will be funded from Unallocated Capital Reserve through annual Capital requests.
- initial purchase of a BEV from gasoline only.
- Subsequent BEV replacements will be made through the Vehicle and Equipment reserve

Charging Equipment Capital

- New charging equipment and infrastructure funded from the Unallocated Capital Reserve through annual Capital requests.
- Periodic requests to additionally fund the reserve will be made to provide redundancy and install or enhance supply lines and back up generator systems.
- Grant Funding
- A new reserve fund will be established to fund charging equipment scheduled replacement.
- This reserve will be funded through usage charges.

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Summary of Costs

2021 – 2024

- Vehicle Premium for Electric Total \$1.7 - \$2.2 million
- Charging Infrastructure – Grant Approved \$300,000
- Lifetime Fuel Savings (gas – kwh) \$895,000
- Lifetime Maintenance Cost Savings (50%) \$250,000

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Summary of GHG Reductions

2021-2024

- Electric Vehicles 870t
- Anti idling/eco driving 1500t
- Biodiesel 2657t
- Total 5027t
- By 2024 1725t annually = 18.4% reduction



QUESTIONS?



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THANK YOU