GREEN FLEET ACTION PLAN

TAKING THE LEAD TOWARDS CLEANER AIR IN RICHMOND

CITY OF RICHMOND:
REDUCING CORPORATE GREENHOUSE GAS EMISSIONS
AND ADVANCING SUSTAINABLE FLEET MANAGEMENT

www.richmond.ca/greenfleet

Richmond

GREEN FLEET ACTION PLAN

RICHMOND'S FLEET GOES GREEN

REDUCING RICHMOND'S CORPORATE GREENHOUSE GAS EMISSIONS THROUGH FLEET VEHICLE MANAGEMENT

Richmond relies on its fleet of vehicles to maintain roads, provide bylaw enforcement, manage water and sewer services, keep parks beautiful and clean and provide many other services in the community. These vehicles are essential; however, the City recognizes that fleet operations generate greenhouse gas (GHG) emissions and to manage the impact of these emissions, the City has been implementing sustainable fleet management initiatives for more than 10 years. Through Richmond's Green Fleet Action Plan, the City has targeted the fleet to expand on this ongoing shift towards "green" operations, which includes applying strategies to purchase vehicles that have lower emissions and explore options to cut fuel consumption.

When Richmond developed the Green Fleet Action Plan as a key opportunity to reduce GHG emissions by making changes to its fleet vehicle program, a few key goals were identified:

1 Reduce GHG emissions

2 Improve fuel efficiency & reduce fuel costs

3 Continue to provide enhanced City services & maintain service excellence

The City is applying multiple solutions to achieve these targets as part of achieving the City's Corporate Energy and GHG Reduction program, and to provide for more sustainable fleet operations. This report includes an overview of actions completed and those underway, and is a summary of the *Richmond Green Fleet Action Plan* technical report. For a copy of the full report, visit www.richmond.ca/greenfleet.

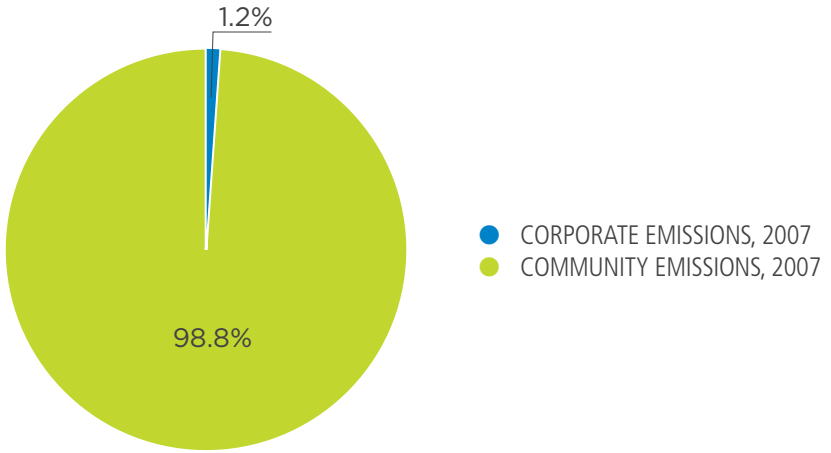
GREENHOUSE GAS REDUCTION TARGET

20% BY 2020

The City has a long history of progressive actions designed to reduce emissions and demonstrate sustainable approaches to fleet management. To track this progress, Richmond first measured the energy use and GHG emissions from its fleet to establish a benchmark. From this, a target to reduce the fleet's GHG emissions by 20% by 2020 was set by Council on October 28, 2013. The Green Fleet Action Plan review also included assessing actions that had already been implemented to reduce GHG emissions along with identifying new opportunities to achieve goals. With changes already underway, Richmond is already seeing improvements in terms of reduced GHG emissions along with some operational cost savings.

Leadership through Fleet Management

Richmond's corporate GHG emissions are just over 1% of the broader community emissions, yet the City's fleet generates about 1/3 of the City's total corporate emissions. With the Green Fleet Action Plan, Richmond is demonstrating leadership in its community and the region by implementing actions that result in measurable improvements that reduce GHG emissions and fuel consumption.



18%
Light-duty cars

20%
Equipment

37%
Light-duty trucks

23%
Medium and heavy-duty trucks

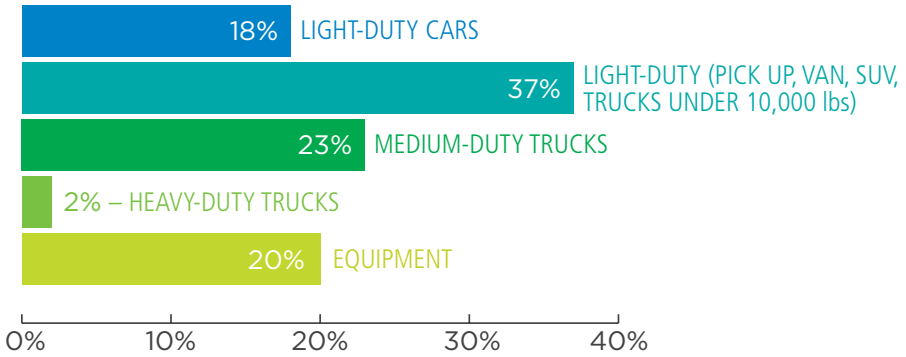
WHAT VEHICLES MAKE UP RICHMOND'S FLEET?

Richmond fleet buys and maintains a wide range of vehicles and equipment, from mowers and snowplows to vans for youth programs and trucks for Parks crews. Many vehicles do more than move people. For example, trucks may have emergency lighting for public safety. Crewcab trucks for operations also act as mobile offices and workshops for crews.

Richmond's Fleet at a Glance

Almost 18% of fleet is made up of light-duty cars and about 37% is light-duty trucks, vans and SUVs. Another 23% of fleet is medium and heavy-duty trucks like big crewcabs, dump trucks and crane trucks. The rest of Fleet's assets are equipment (20%). The Fleet represents 32.7% of the City's total emissions, second only to buildings, offering a tremendous opportunity to achieve the City's targets through green fleet solutions.

PERCENTAGE OF FLEET ASSETS BY MODE (2010)



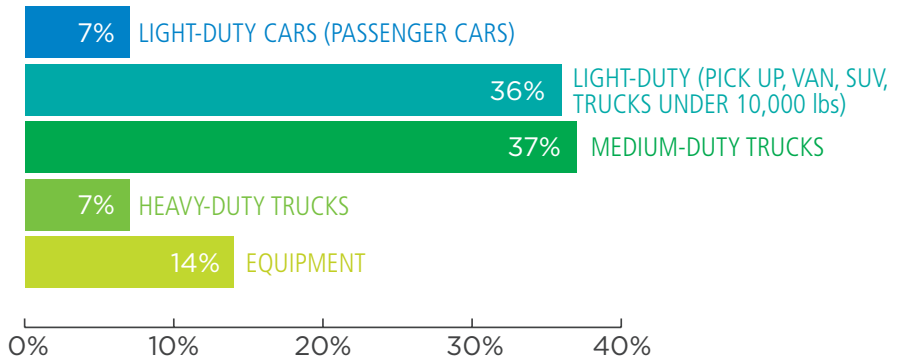
When it comes to a fleet, not all vehicles are alike, and as a result they have different requirements that affect fuel consumption and emissions. For example, cars and light-duty trucks use gasoline, larger fleet vehicles like an excavator use diesel fuel and some specialized equipment like forklifts use propane or electric power. Driver behaviour can also influence fuel use and GHG emissions due to speed, vehicle loads and vehicle maintenance. Richmond's Green Fleet Action Plan includes an inventory of its fleet, fuel consumption and GHG emissions with data from 1995, 2007 and 2010 to help track progress towards its goals.

Where do the Fleet's Green House Gas Emissions Come From?

Passenger cars are responsible for only 7% of Fleet emissions, in part because **by 2010, over 50% of Richmond's passenger cars were already green fleet vehicles (hybrids or Smart Cars)**.

Most of Richmond's fleet are trucks, which have a higher share of emissions, due in part to diesel fuel, fewer green fleet vehicle options in the market, and service requirements that often include idling.

PERCENTAGE OF TOTAL GHG EMISSIONS BY MODE (2010)



"Before we could design a strategy, we first had to get a clear picture of what we had in our fleet. We looked at the City's existing vehicles, including their purpose, fuel use and emissions, and how other factors like driving techniques could affect our targets. Next we were able to create a baseline for fuel costs and GHG emissions for the fleet, and with all of this information, we had a great start to developing models and identifying opportunities for changes that would help us achieve our goals."

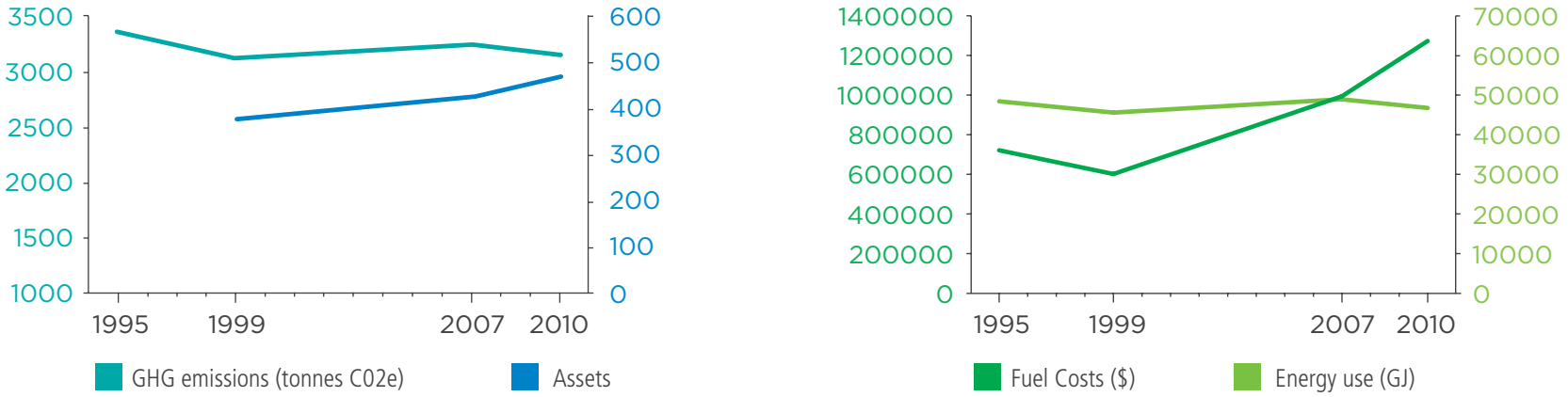
– MALCOLM BRODIE, MAYOR, CITY OF RICHMOND

TRACKING GHG EMISSIONS FOR THE FLEET

Richmond is already making progress on reducing greenhouse gas emissions: 2010 GHG emissions from Fleet were 6% below 1995 emissions and 3% below 2007 levels. It's challenging to reduce fuel consumption and emissions when you're growing, but Richmond is still making progress.

Richmond's population continues to increase, and with this growth there is a corresponding need to expand the fleet to manage the new roads and sewers, respond to a growing number of bylaw calls and meet other service needs. In response, the number of vehicles and equipment in Richmond's fleet increased by 24% between 1999 and 2007. As well, fuel costs have more than doubled in that same time period. Even with the increased number of fleet vehicles and dramatically higher fuel costs, Richmond has made progress in keeping its energy use from rising and reducing fuel costs.

As an example, while fuel costs increased by 28% from 2007 to 2010, thanks to measures such as use of hybrids and Smart Cars, the reduction of litres of fuel used in 2010 over 2007 saved the City $64,650 in fuel costs (based on an average cost price/litre of $1.02 for 2010). In 2010, Richmond's fleet emitted 3,151 tonnes of GHG emissions. In the same year, the fleet used 1,249,957 litres of gasoline and diesel, at a cost of $1.27 million.



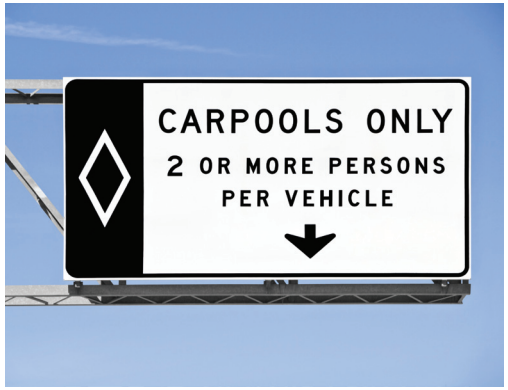
Richmond's fleet has grown while greenhouse gas emissions have shown a slight downward trend; fuel costs have risen steeply while energy use has gone down slightly.

RICHMOND TAKES ACTION

LEADERSHIP FROM WITHIN – EMPLOYEE CARPOOL PROGRAM

Richmond looked at its internal operations and identified staff vehicle usage as a great opportunity to reduce fuel consumption and community GHG emissions through carpooling.

Initiated in 1997, Richmond's employee carpool program has almost 80 participants and more than 70 staff on the waitlist. The program uses 17 vehicles that are based at either City Hall or the Works Yard and travel to Langley, Surrey, White Rock, Delta, Vancouver, and the Tri-Cities. Although the staff carpool does not directly reduce corporate GHG emissions, it does reduce community emissions, demonstrates leadership in transportation, and has been a model for other communities.



80
Carpool Program Participants

70
Staff on the waitlist

PROGRAMS TO REDUCE FUEL CONSUMPTION

Richmond has successfully implemented a number of programs to reduce fuel requirements. Here's a summary of the results.

Reducing Demand	Outcomes
1 Adopted anti-idling programs for fleet since 2004.	Richmond's fleet has had an idle-free program as of September, 2004. Community anti-idling bylaw provides opportunity for education and awareness, introduced July 2012.
2 Implemented driver training for new drivers.	Driver behaviour, including idling, accounts for 5 to 33% of fuel use – smart drivers can help reduce fuel use.
3 Reduced trip length through operational planning.	Bylaw, litter and tree routes have been optimized. Solar compactors at SkyTrain stations reduce number of trips for collection.
4 Initiated pilot IT program to connect Richmond buildings with fibre optic cable for remote meetings to reduce staff driving for meetings.	Fire Halls and City Hall fifth floor connected and using system for remote meetings.
5 Developed a pilot bicycle share program.	The program had low uptake and was discontinued.
6 Implemented Sustainable Commute: the highly successful staff carpool program.	Almost 80 staff participate, with a 70-person wait list. Reduces community GHGs, enhances staff satisfaction and demonstrates leadership. Results in increased wear and tear on City vehicles and the need for accelerated vehicle replacement of carpool units.

"Taking the City's driver training was a great learning experience for work and home because I can use the same driving techniques to improve safety and reduce fuel consumption and emissions when I'm driving my own vehicle as well as when I'm on the job,"

– ROB WILLIAMS, TRUCK DRIVER 3

SAVED 43 TONNES OF GHGs

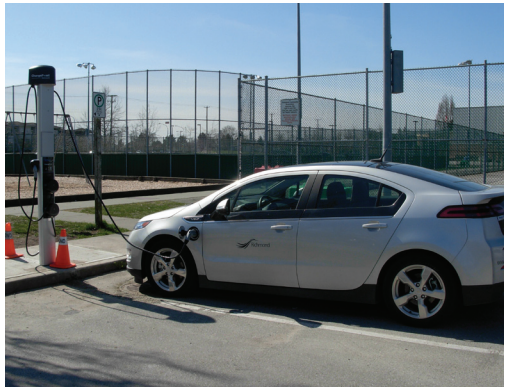
BETWEEN 2007 - 2010 THANKS TO GREEN FLEET CARS

Maintenance & Management Practices	Outcomes
7 Installed an automated fuel management and dispensing system.	Ensures fuel use is monitored and tracked and provides for fuel security.
8 Implented an on-going preventive maintenance program.	Ensures vehicle safety and efficient vehicle performance for worker safety and best vehicle performance.
9 Improved asset management systems.	Financial sustainability of fleet; improved asset management including maintenance schedules and active data use for fuel savings.
Efficient Resource Use	**Outcomes**
10 Purchased hybrids and Smart Cars.	31 hybrids and 10 Smart Cars as of 2010. Saved 43 tonnes of GHGs between 2007 and 2010 thanks to Green Fleet cars.
11 Re-fit trucks with LED lights and auxiliary batteries to reduce idling.	One-third of fleet vehicles have been converted to LED lighting. As of 2012, all new trucks have LED emergency lighting and dedicated auxiliary batteries where possible.
12 Installed solar panels on Parks trailers to run safety/signal lights.	Two message board trailers have been converted to use solar panels for their safety/signal lighting.
13 Replaced lower tier diesel equipment.	Four units replaced.

"The first time I drove one of the new electric vehicles, I was expecting it to feel different than a regular car. It wasn't. With a few changes to how the car is started, it drives like any other vehicle, and you feel good about the zero emissions as you travel – something to brag about to your colleagues and friends,"

– MARTIN YOUNIS, SENIOR PROJECT MANAGER

Alternative Fuels	Outcomes
14 Adopted a biodiesel 5 blend in diesel fuel prior to 2008.	104 tonnes of Richmond's fleet emissions in 2010 were from renewable resources: biodiesel and ethanol.
15 Switched to low-carbon B.C. grid electricity as a fuel:	
A. Richmond's ice resurfacers	Acquired five electric ice resurfacers in 2012.
B. Electric vehicle passenger cars	Purchased four electric cars in 2012.
C. Electric vehicle charging stations	Installed 11 electric vehicle charging stations in 2013.



9

Electric fleet vehicles procured in 2012

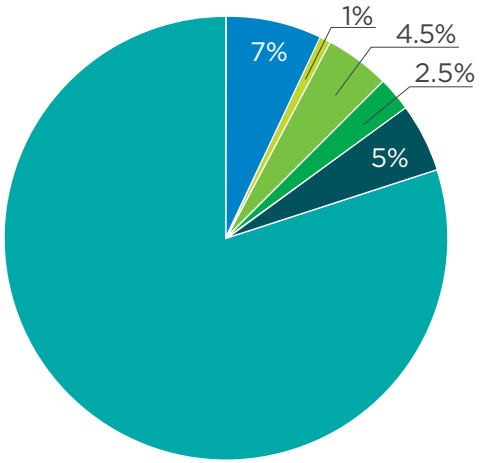
11

Electric vehicle charging stations installed in 2013

REALISTIC TARGETS FOR FUTURE REDUCTIONS

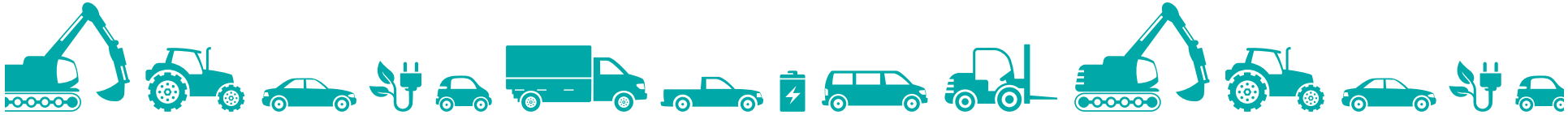
While setting high targets for GHG emission reduction sounds like a good idea in theory, it's not realistic or achievable in the context of a growing City. Richmond, like many communities in the region, will continue to grow in the coming years and the fleet will need to expand to provide services. More vehicles means more emissions and more fuel consumption. But with Green Fleet initiatives, the rate of those increases can be reduced.

Without continued Green Fleet actions, emissions from Richmond's fleet are projected to rise 3% by 2020. Instead, Richmond is aiming to reduce its emissions by 20% from 2010 to 2020. This is based on an annual reduction of 2% per year starting in 2010. This pragmatic approach takes into account growth requirements, costs for purchasing new best-in-class vehicles for trucks and other equipment, as well as purchase of additional electric and hybrid vehicles.



PRAGMATIC 2020 FLEET TARGET: 20%

- REDUCE GROWTH AND DOWNSIZE
- RIGHT-SIZE EXISTING AND NEW ASSETS
- BEST-IN-CLASS REPLACEMENT
- EV AND HYBRID PROCUREMENT
- MAINTENANCE/ANTI-IDLE/SMARTER DRIVING
- REMAINING GHGS



TACTICS TO ACHIEVE 20% REDUCTION TARGET

Richmond has looked at its progress in recent years and is focused on the tactics that have proven successful in reducing GHG emissions. Key actions include: ensuring the right fleet vehicle is assigned to the right tasks. This is sometimes called "down-sizing and right-sizing vehicles" and ensures that a vehicle that uses more fuel and has more emissions is not used when a smaller, more energy-efficient vehicle can do the same job.

The City will also continue to buy best-in-class vehicles, with a focus on light-duty trucks that come with improved emission and fuel consumption ratings. The City also plans to continue to buy and make best use of electric vehicles and hybrids. Purchasing and using the right vehicles for each service is important, but so is looking at how to reduce demand for vehicle use overall, and this requires cooperation from all City departments.

1. Down-sizing & right-sizing vehicles
2. Buy best-in-class vehicles with improved emission & fuel consumption ratings
3. Make best use of electric & hybrid vehicles
4. Reduce demand for vehicle use overall

The following is an overview of tactics identified for reducing GHG emissions and fuel consumption, including priority status and anticipated outcomes.

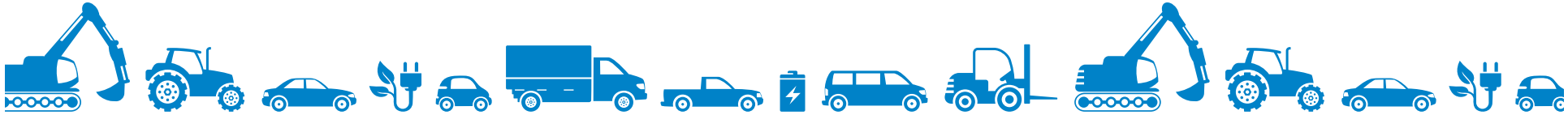
	Actions that support slowing growth of Fleet	Status	Impact Assessments
1	Reduce new growth in assets.	Priority	Eliminating new growth in assets could provide up to 16% reductions in fleet emissions, 2010 to 2020. Potential to reduce overall number of assets in some areas such as passenger cars. Targeted overall GHG reduction of 7%, supported by other actions to reduce demand.
2	Consolidate and eliminate trips through information technology and route optimization. Report all route optimization programs in order to share learning.	Priority	Reduces vehicle kilometres traveled (VKT).
3	Increase employee public transit use for off-site meetings, or pay for taxis or use personal staff vehicle (with mileage reimbursement) when a passenger car with low VKT has been downsized out of fleet.	Priority	Supportive action for downsizing low use passenger vehicles.
4	Extend the Works Yard anti-idling program to City Hall.	Priority	Supports Richmond's community-wide anti-idling initiative, demonstrating leadership.
5	Expand driver training to include anti-idling and smarter driver reminders.	Consider	Up to a 10% reduction in emissions from driving when combined with anti-idling and maintenance.
6	Develop a corporate car share program, e.g. with Modo.	Consider	Reduces the need for passenger cars in fleet, enabling downsizing and freeing resources for other service provisions.
7	Expand Sustainable Commute: offer staff transit passes as an employee benefit.	Consider	Demonstrates leadership, reduces community GHG emissions, and enhances employee satisfaction.

Maintenance and Management Monitoring and Reporting	Status	Impact Assessments
8 Right-size vehicles for best use on an annual basis.	Priority	Fuel cost savings are maximized when higher capital green fleet vehicles are assigned to users with the highest VKT. Passenger car fuel savings of up to 18% may be possible, with a targeted overall GHG reduction of 1%.
9 Systematize preventive vehicle maintenance with the new Faster Asset management software.	Priority	Regularly scheduled vehicle maintenance saves fuel, ensures worker safety and prolongs vehicle life. Use of the Faster Asset software will ensure reduced vehicle downtime and ensure continued service excellence. Targeted GHG reduction of 5%, including anti-idling and smarter driving.
Monitor and report on: 10 VKT annually 11 Sustainable Green Fleet Actions 12 Joining the E3 Fleet Program	Priority	Supports right-sizing and downsizing of existing assets. Mandatory requirement for E3 Fleet review and rating.
13 Provide a monthly fuel use report to all departments using fleet vehicles.	Consider	Supports departments in managing their use of fleet assets.
14 Integrate GHG measurement tools with asset management software.	In process	Assures monitoring and reporting on Fleet emissions performance.
15 Make fuel costs transparent to departments in their leasing rates.	Consider	Provides an incentive for departments to reduce fuel use.
16 Provide additional human resources to Fleet during current critical renewal period.	Consider	Ensure implementation of sustainable actions during current renewal cycle.

REPLACE OLDER LOW-USAGE CARS WITH BEST-IN CLASS COMPACT VEHICLES

Efficient Resource Use	Status	Impact Assessments
17 Continue best-in-class fuel-efficient vehicle procurement, with a focus on light-duty trucks. Replace older, low-usage passenger cars with best-in-class compact vehicles.	Priority	Targeted overall GHG reduction of 4.5%.
18 Reduce idling through better vehicle technology: continue the replacement of truck, van and SUV emergency lights with LEDs and auxiliary batteries; use solar panels where possible to run safety lights.	Priority	Supports anti-idling program. By 2020, 100% of vehicles that idle to run emergency lights should be outfitted with LED lights and auxiliary batteries. Older trucks that cannot convert to auxiliary batteries will be retired.
19 Add GPS units to vehicles to aid in route optimization, best use of vehicles and data collection.	Priority	GPS units support improved fleet management and demand side management ensuring fuel and GHG reductions from other actions.

Alternative Fuels	Status	Impact Assessments
20 Purchase electric vehicles for high use cars. Procure hybrid light-duty trucks when possible.	Priority	Fully electric vehicles have zero tailpipe emissions. Up to 5% additional modeled reductions in fleet emissions with high rates of electric vehicle and hybrid adoption in light-duty vehicles including trucks. Targeted overall GHG reduction of 2.5%.
21 Monitor emerging technologies in plug-in hybrid trucks, and adopt plug-in hybrid purchasing policies for light duty trucks as soon as the technology is market-ready.	Consider	Aim to have 10% of light-duty truck procurements plug-in hybrid or electric vehicles by 2017.
22 Pursue procurement of diesel-electric hybrids for medium and heavy-duty trucks and buses as the technology matures and becomes market-ready.	Consider	No cost to monitor and assess.
23 Monitor and assess emerging technologies, particularly compressed natural gas vehicles. Depending on trends, pursue a feasibility study for establishing an alternative vehicles program that would shift medium and heavy-duty vehicles to compressed natural gas.	Consider	GHG reductions from natural gas vehicles may be as high as 25%, but depend on vehicle type and driving cycle. Full life cycle emissions are also impacted by upstream production and distribution emissions.
24 Monitor the advances in biodiesel fuels and consider switching to a higher biodiesel blend when full lifecycle emissions reductions are assured.	Consider	The GHG benefit of biodiesel is in the full lifecycle of the fuel, with estimated savings of 18% for biodiesel20.



MEASURING PERFORMANCE

Richmond will monitor its fuel use and emissions on an annual basis, and report out on Green Fleet actions like the numbers of hybrid vehicle purchases. Trends in emissions will be tracked on a three-year to five-year basis to allow for updated or new actions to be adopted. Fleet may also provide fuel use data to departments to support their efforts to reduce fuel use, greenhouse gas pollution and costs. Richmond will obtain E3 rating from Fraser River Basin Council, which monitors and measures fleet efficiency.

Taking the Lead Towards Cleaner Air in Richmond

The City of Richmond recognizes that efficient fleet operations are essential to delivering City services and that there are opportunities to improve the sustainability of these operations. The City is proud of its fleet operation track record to date – including reducing GHG emissions by 43 tonnes between 2007 and 2010 thanks to Green Fleet cars – but remains focused on continuous improvement by applying progressive, practical measures to reduce GHG emissions and lower fuel consumption. With the Green Fleet Action Plan, Richmond has set a target to reduce its GHG emissions by 20% by 2020, and it has a clearly-defined strategy and framework to achieve this target by implementing measures based on research, best practices and past successes.

Through its broad range of existing and planned programs, Richmond continues to demonstrate its leadership and commitment to its reduction targets. By reducing demand overall through programs like car pools and prviding driver training, and applying maintenance programs to support safety and efficiency, Richmond is improving efficiencies within its operations. As well, by applying efficient use of resources such as purchasing vehicles with considerably greater fuel efficiency and exploring options for alternate fuel vehicles, Richmond is shifting its fleet operations towards a more sustainable model with reduced emissions.

Together, these actions will help the City achieve its targets in a responsible manner while taking into account the continued growth in the community and continued need to expand its fleet to meet service demand.

Fleet & Environmental Programs

For a copy of this summary report or the full Richmond Green Fleet Action Plan online, please visit www.richmond.ca/greenfleet.

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