carbon neutral kootenays

Local Governments and First Nations Reducing Emissions

Fuel Efficiency for Municipal Fleets

A handbook for achieving efficiency and emission reductions in the municipal fleet

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The Carbon Neutral Kootenays (CNK) Project Team

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Introduction

Local Governments have been tasked with the responsibility to reduce corporate greenhouse gas (GHG) emissions. The emissions from vehicle fleets typically account for a large component of the corporate energy and emissions inventory. In the Kootenays, Local Government corporate fleets account for 37% of total greenhouse gas emissions (about 7000 tonnes of CO2e), and a 25% of total corporate energy costs. Finding ways to reduce fuel consumption will save corporations money and reduce emissions.

Though many fuel efficiency and fleet management resources are available, Kootenay local governments requested a simplified "Carbon Neutral Kootenays" handbook to help departments identify fuel efficient actions. Time constraints, priorities and capacity are common issues among small and medium sized municipalities. This handbook compiles the latest fuel efficiency and fleet management information in a concise fashion, and provides fleet managers and staff with tangible, implementable approaches to fuel and GHG emission reductions.

Local Context

In 2008, the Regional Districts of East Kootenay, Central Kootenay and Kootenay Boundary, in partnership with Columbia Basin Trust, initiated and co-funded a 3-year project called Carbon Neutral Kootenays (CNK). CNK developed GHG inventories for the participating corporations: 28 Local Governments, 3 Regional Districts and 5 First Nations. Significant efficiencies have been achieved through the course of the project individually and with the coordination of joint procurement opportunities.

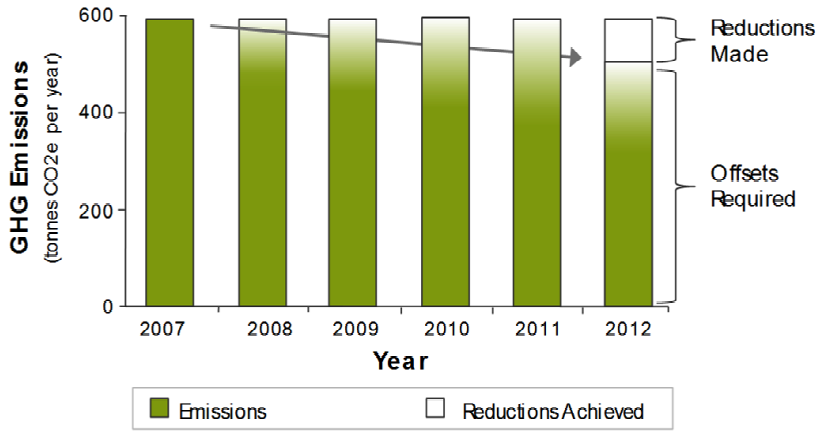
Carbon Neutrality

Carbon neutrality means that the corporate operations of the local government will result in no net greenhouse gas emissions to the atmosphere. Carbon neutrality results from a combination of:

- **Reduction measures:** GHG emissions reduced from operations. Accomplished through retrofits, efficiency initiatives, and behavioural change of staff; and
- **Carbon Offsets:** Reductions made by others, elsewhere in the community or province, through registered and reviewed projects that reduce GHG emissions. Owners of these offset projects may sell these 'reduction credits' to other parties that are working to neutralize their carbon footprint.

Getting to Carbon Neutral:

Efficiency improvements will reduce the emissions from operated facilities. However, there will always be some emissions remaining, and these can be 'neutralized' through the purchase of offsets.



Communication

For optimal buy-in and implementation of any action or policy, staff must have a sense of ownership. This can be achieved through active communication among staff and between employees and managers. Table 1 provides a number of communication ideas.

Table 1: Summary of Communication Approaches

Communication Approach	Details	Ideas
Pre-shift Tailgate Meetings	Opportunity to: • Highlight fuel efficiency techniques • Reminder on policies and actions adopted by the local government	• Focus on one fuel efficiency/vehicle operation theme per month/meeting. • Provide regular opportunity for staff suggestions on fuel efficiency. • Provide regular updates on improvement/successes resulting from fuel consumption reduction initiatives.
Feedback/Input Opportunities	Two-way communication and feedback to ensure • Programs, actions or policies in place are monitored • Measured for success	• A suggestion box placed in a central location to invite staff to put forward ideas/suggestions to improve the efficiency of the fleet. • Offer rotating (i.e. monthly or bi-monthly) themed brainstorming opportunities with accompanying resources. For example, an “idling theme” may invite input around ways to reduce idling.
Lunch & Learns	Lunch break may be an opportunity: • to engage staff on a particular topic • to be more conducive to a brainstorm or discussion	• Arrange for a presentation from a machinery or fuel supplier, or a mechanic (local or in-house with expertise on fleet efficiencies. • Lunch-time workshop is a casual opportunity to present a detailed report on progress, or to delve deeper into tail gate meeting highlights.

Table 1: Summary of Communication Approaches Continued

Communication Approach	Details	Ideas
Signage/ Promotional Information	Extending communication into the community creates accountability for staff, managers and elected officials.	• Signage and stickers on fleet vehicles communicate the commitment to efficiency externally. See "Communication Tools" section for free resources. • Report to Council progress made within the vehicle fleet to recognize success at the political and community level • Post signs and reminders in the lunch room, offices and garages vehicle fleet operators.
Government-wide Engagement	The most significant change in behaviour results when efficiency and conservation become engrained in the culture of an organization.	• Distribute 'fuel efficiency' tips on paystubs and other staff mailouts • Include information in internal newsletters, email updates. • Publish an annual or biannual newsletter dedicated to energy and emissions issues. • Challenge staff to carpool, bike and walk to work, or take public transit whenever possible.

Communication and Resource Tools

Idle Free BC

Idle Free BC website contains materials developed by local governments across Canada. Bumper stickers, Works Yards signs, pamphlets and street signs can all be downloaded from the Idle Free BC website, and adapted for your community.

http://www.idlefreebc.ca/resources/index.php

Province of BC

Procurement, Supply and Services sector of the Provincial governments has developed an order form for community Idle Free signs. The order sheet can be accessed at the following link:

http://pss.gov.bc.ca/dcv/. Signs are $25 each.

Natural Resources Canada

The Office of Energy Efficiency has idle free and fuel efficiency promotional materials available for download and use by local government or community groups.

http://oee.nrcan.gc.ca/transportation/idling/material/8895

NRCan offers an online tool to compare and rank fuel efficiencies of vehicles sold in Canada. This tool will assist with communication of fuel efficiency and will support the Vehicle Replacement Policy with up-to-date comparisons of vehicle efficiency.

http://oee.nrcan.gc.ca/transportation/tools/compare/compare-search-one.cfm

This Fuel Consumption Calculator is used to track fuel economy and communicate successes in fuel efficiency. A calculator is available for both light duty and heavy duty vehicles.

http://oee.nrcan.gc.ca/transportation/tools/fuel-trip-calculator/fuel-calculator-input.cfm?attr=8

E3 Fleet

The E3 (Energy Environment Excellence) program offers resources and support for members, including Handbooks, technical expertise, fleet review opportunities and a rating program. Some support is also available for non-members.

http://www.e3fleet.com

Actions

The Carbon Neutral Kootenays Team facilitated three learning opportunities for vehicle fleet staff and managers in 2012:

- April 5, 2012 Fleet Management and Fuel Efficiency Webinar: presented by David Lush, a professional driver trainer from DriveWise Management. Discussed opportunities for fuel efficiency, GHG emission reduction and cost savings.
- May 8 2012 Fuel Management 101 Workshop: facilitated by Leith Skinner and Natural Resources Canada. Guided participants through the process of developing a Fleet Management Action Plan.
- June 2012 In-car Driver training: Nicholas Lamm, Green Workplace travelled to the Kootenays and trained over 30 staff from 4 Local Governments in fuel efficient driving techniques.

Feedback from participants indicated a need for a succinct compilation of tangible actions for local governments to reduce fuel consumption, improve fleet efficiency and save money. This handbook has been developed to address this need.

The following section provides one-page summaries of ten possible actions available to reduce vehicle fleet emissions. Information has been compiled and synthesized from a number of referenced sources.

Actions are broken down into:

Benefits of implementing the action.

List of implementable actions, with references and resources note for further information.

MEASURE

How can the action be monitored or measured?
Can the fuel savings be quantified?

ACT

How can the action be implemented? What steps will help ensure successful and meaningful implementation?

LEAD

How will this action demonstrate leadership?
How can the local government inspire action?

This handbook provides the tools and resources for local governments interested in fuel efficiency and effective fleet management. It is the starting point for the conversation. Review the links and resources referenced throughout the actions for more information.

Using the Handbook

The double-page format of each action facilitates easier sharing of information with fleet staff.

- **Share the Handbook** with all existing staff, and ensure it is included in the training package for new staff.
- **Photocopy and post** a different action each month on a central message board. Use ideas from the Communications Table (Table 1) to increase awareness of the action.
- **Make internal targets/commitments** related to each of the Actions. Engage staff in identifying targets, and facilitate ongoing feedback/monitoring of progress.

FUEL CONSUMPTION TRACKING

WHY

Understanding baseline fuel consumption can help to prioritize actions within the fleet

Collecting information about fuel consumption, mileage and maintenance costs allows tracking efficiency of individual vehicles, and fleet overall, to identify opportunities for vehicle replacement

HOW

Most local governments track fleet fuel consumption to some degree. Accounts Payable typically tracks the amount spent and quantity of fuel purchased annually. Public Works likely has an inventory of vehicles in the fleet. There are several ways to manage your inventory, but ideally the following data is collected:

- Fuel consumption is tracked by vehicle
- Odometer readings taken annually by vehicle
- Maintenance costs tracked, ideally by vehicle
- Primary purpose of each vehicle is known and recorded

Understanding the fuel consumption and efficiency of each vehicle (litres/kilometer) helps to prioritize vehicle replacements and right-sizing.

MEASURE

Internal Tracking Programs - adapt what is already in place. If an inventory of fleet vehicles exists, create a simple Excel spreadsheet as an easy way to monitor fuel, mileage, maintenance costs, etc. At minimum, the following headings are useful to compile an annual fleet inventory:

Vehicle ID (if applicable)	Make/ Model	Year	Odometer Reading	Fuel type	Fuel Consumption (L)	Maintenance Cost	Purpose of vehicle

The FLEETWiser Program, a Nova Scotia-based program funded by NRCan, supports fleets to become more efficient in their operations.
See http://fleetwiser.norex.ca/fleet-toolkit/for-fleet-managers/

Join E3 Fleets - a fleet rating program that offers several services to local government and private sector fleets. The program has a fee to join and provides staff support in completing an initial fleet inventory. Based on information provided, E3 recommends fleet efficiency opportunities.

More about the E3 Fleet Program available at:
http://www.e3fleet.com/about.html

Free tools to inform and enhance your tracking:
http://www.e3fleet.com/free_tools.html

ACT

- Set a schedule to report vehicle odometer readings; ensure this task is assigned to a staff person.
- Record all non-scheduled maintenance (cost and nature of repairs).
- Provide a mechanism for staff to communicate concerns or opportunities concerning fuel efficiency.
- Engage staff in updates on fuel consumption progress. Celebrate successes.
- Explore technological options to track fuel consumption (see GPS/Vehicle Monitoring System section)

LEAD

- Use a fleet tracking system to communicate progress not only internally, but to the broader community.
- Demonstrate leadership and commitment by informing the community about Local Government actions.
- Create protocol around fleet management to ensure the tracking program becomes a fully integrated part of fleet operations.

IDLING

WHY

Reducing unnecessary and wasteful idling can result in quite significant savings.

Unnecessary idling for just 10 minutes a day uses about 5 percent more fuel over the year.

Idling impacts the starter system, and idling for more than 10 seconds uses more fuel than it takes to restart your vehicle.[1]

HOW

It is important to remember when implementing any action or policy around idling that expectations must be clear regarding when it is acceptable to idle or not (i.e. for health and safety reasons vs. for lunch breaks or perceived need for internal vehicle warmth).

MEASURE

- **TOOL**: E3 Fleet Idling Cost Calculator[2]
    - Simple to use
    - Personalize to vehicles/machinery
    - Enter fuel cost data
    - Immediate summary of idling costs
- **Use existing data** from ECM (electronic control module), GPS or other tracking devices. Alternatively, observe and survey staff to determine the approximate idling time for vehicles.
- **Assess** when the vehicles are left on (i.e. before or after a morning tailgate meeting, during coffee break or lunch?).
- **Tracking programs** for fuel consumption should be established so that the reduction in fuel consumption can be appropriately measured and reported.

ACT

- **Create an Idle Free Policy**[3]. Ensure the policy clearly outlines the 'rules' around idling, and particularly the situations when idling is acceptable (i.e. in cases where health and safety are an issue).
- **Communicate** to staff and the community the commitment to reduce idling. Educate staff about the 'facts and myths' around idling, and the co-benefits of action.

- **Engage** staff through positive messaging, reminders and opportunity for input and feedback on the idle free initiative. Idle Free signs are available through the Province of BC[4], and stickers, etc. are available through Idle Free BC.[5]

LEAD

- **Demonstrate** the commitment of the municipality to reducing GHG emissions associated with vehicle idling by implementing policies that guide efficient vehicle use.
- **Pilot projects** allow municipalities to test different strategies to find the most cost effective approach on a temporary basis. Be sure to implement a tracking plan while pilot testing in order to accurately determine if the strategy achieved the desired benefits.

Cummins Western Canada has presented on the impacts of idling at several conferences and workshops.

The following **facts about idling** have been compiled by Cummins:

- It's a fuel economy penalty = 2.5 – 4.5 litres per/hr of idling.
- It's the most inefficient mode and results in unnecessary emissions.
- Fuel contamination of lube oil is high at idle
- Cylinder wall wear is accelerated by "wash down".
- Short term idling actually "over cools" the engine.
- Engine life can be reduced by up to 20%
- 500 hours of idling = 64,000 miles of wear.

[1] See more driving tips at: http://oee.nrcan.gc.ca/cars-light-trucks/driving/17821
[2] Find the free idling calculation at: http://www.e3fleet.com/idling_calculator.html
[3] The Climate Action Toolkit has some examples of Idle Policies: http://www.toolkit.bc.ca/tool/fleet-idling-reduction
[4] Provincial procurement site, with Idle Free signage: http://pss.gov.bc.ca/dcv/
[5] Idle Free Resources (see Promotional Materials at bottom of page) http://www.idlefreebc.ca/resources/index.php

DRIVER TRAINING

WHY

Fuel efficient driving techniques are not new; most drivers are aware of the behaviours that improve fuel consumption.

Driver training puts common sense behaviours into the context of fuel efficiency, cost savings and reduced wear on vehicles.

Driver training promotes leadership, ownership and encourages participation of staff in the solution.

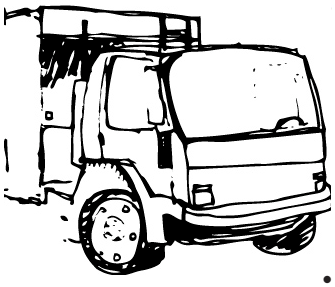
Awareness generated at the workplace around driver training and fuel efficient driving techniques will often be applied in personal vehicles, contributing to fuel efficiency and emission reductions within the community.

HOW

Formal driver training opportunities are important, but to ensure effective implementation and long-term impact, there must be consistent and regular motivation and education. Leadership is critical in successful implementation and ongoing motivation with a driver training program. Managers must be on board and work to create a culture of efficiency among staff.

MEASURE

- **Understanding and communicating** baseline fuel consumption (see Fuel Consumption Tracking) will help staff monitor successes resulting from driver training.
- **Tools** are available to monitor fuel efficiency of a vehicle while in operation.



An engine monitor can be purchased to measure the efficiency of the engine, and to provide instantaneous feedback (if the function is not already available on the dashboard)

  - During driver-training sessions in the Columbia Basin in 2012, a Kiwi MPG was utilized during those training sessions as a visual tool to measure and monitor impacts of driving techniques

- **Tracking** participation of staff in a driver training program, records local government climate actions participation and recognizes drivers that have received training.

ACT

- **Training programs** are available through Natural Resources Canada (NRCan) as part of their FleetSmart programs.
    - **Fuel Management 101**[6] course is geared towards fleet managers.
    - **Smart Driver Training**[7] programs focus on fuel efficient vehicle operation, maintenance and new technologies.
- **In-car training** is an effective way to move from theory to action.
    - **GreenWorkplace** provides a **Fuel Smart Training**[8] program, offering in-car sessions with vehicle fleet operators.
    - **DriveWise**[9] offers 'eco-driver training' programs.
- **Integrate** fuel efficient driving into the training protocol for new staff. Ensure continuous communication regarding the actions and behaviours that are taught in driver training sessions.
- **Use in-car stickers or initial vehicle 'tour'** to ensure all staff know the vehicle's basic components (i.e., where's the parking brake, air conditioning, etc.)

LEAD

- **Integrate a driver training component** into a Fleet Policy to ensure all existing and future staff participates in training that will ensure the fleet is operated at maximum efficiency. If a Fleet Policy does not exist, consider creating a protocol around driver training.
- **Communicate** the dedication of the local government staff within the organization and to the community, and where possible, communicate the results of driver training sessions (i.e. fuel efficiency realized, number of staff trained).
- **Invite other fleet operators** within the community to participate in a driver training workshop to demonstrate leadership and efficiently share resources.

6 Fuel Management Course: http://fleetsmart.nrcan.gc.ca/index.cfm?fuseaction=fleetsmart.workshop
7 Smart Driver Training: http://fleetsmart.nrcan.gc.ca/index.cfm?fuseaction=fleetsmart.smartDriver
8 Fuel Smart Training: http://www.greenworkplace.ca/training-and-education/fuel-smart-driving-save-on-gas/
9 DriveWise: http://www.drivewisesafety.com/professional-driver-training/ecodriving-driver-training

DRIVER BEHAVIOUR

WHY

By adopting a driving behaviour with fuel efficiency in mind, each driver can save up to $500 a year in fuel costs and prevent more than 1,000 kg of CO2 from needlessly entering the atmosphere.[10]

Encouraging and supporting driver training can help achieve success in a fuel management plan.

There is up to 35% difference in fuel consumption between efficient drivers and inefficient drivers.

An investment in fuel-efficient technology will not pay off unless drivers drive efficiently.

HOW

Driver behaviour can influence rates of fuel consumption. Consider the driving behaviour of a cyclist who rides to naturally conserve human energy. Correct tire pressure, proper vehicle maintenance, avoidance of unnecessary heavy loads, coasting to decelerate, efficient route planning, combined trips, anticipated traffic lights and momentum maintenance are natural energy conserving driving techniques. All drivers can make a difference in rates of fuel consumption and vehicle efficiency by personally implementing fuel efficient driving techniques and behaviour.

MEASURE

- **Plan ahead**, considering bad weather, traffic and other obstacles.
- **Combine trips** among departments and staff; cold engines use more fuel than warm ones.
- **Tire pressure** checks once a month.
- **Track fuel consumption** to monitor vehicle performance. Set goals to decrease fuel consumption.
- **Avoid carrying unnecessary weight**, and remove vehicle accessories and heavy tools (roof racks, etc.) when not in use or required.

The Regional District of Centre Kootenay established an initial target to reduce mileage by 10%. Driver behaviour, efficient vehicle use and appropriate planning (carpooling, out-of-town coordinated trips) were implemented. Once the 10% target was achieved, it was increased to 20%. To date, RDCK has achieved 19% annual mileage reduction.

ACT

- **Accelerate gently** and save up to 15% fuel with gradual starts by taking 5 seconds to accelerate to 20 km/hr.
- **Maintaining a steady speed** consumes less fuel, enhances traffic flow, minimizes exhaust emissions and provides safer driving conditions.
- **Anticipate traffic flow** to avoid congestion, maintain vehicle momentum, and make gradual stops.
- **Drive fuel smart** with the 3 second rule, take foot off gas when an obstacle is observed, and keep RPM's under 2000.
- **Coast to decelerate**, braking at the last minute wastes fuel.
- **Avoid high speeds.** Road speed is #1 cause of high fuel consumption, accidents, and shortened tire life. (A 50-km trip takes 30 minutes at 100 km/h and 25 minutes at 120 km/h; 20% more fuel used to save 5 minutes).
- **Avoid unnecessary idling** when safe to do so. 1 hour of idling burns 4 litres of fuel, equivalent to 800 litres wasted fuel/yr.[11]
- **Maintain vehicles** to ensure optimal working condition.
- In winter driving, **remove wet snow from vehicle**; ensure visibility and drive in existing snow ruts.
- **Purchase fuel efficient vehicles** and right-size to suit usual daily needs.

LEAD

- **Demonstrate** the municipality's commit to efficient driving at work and at home.
- **Display** fuel consumption on vehicles.
- **Remember:** fuel conservation of a vehicle as compared to a human powered bicycle. Energy conservation is natural on a bicycle: correct tire pressure, proper vehicle maintenance; avoidance of unnecessary heavy loads, coast to decelerate, routes planned to most efficient, combined trips, anticipated traffic lights and momentum maintenance.

[10] Facts about fuel efficient driving: http://oee.nrcan.gc.ca/cars-light-trucks/driving/fuel-efficient-driving-techniques/17823

[11] Natural Resources Canada, ecoEnergy, Highway Trucking

FLEET ASSESSMENT & REVIEW

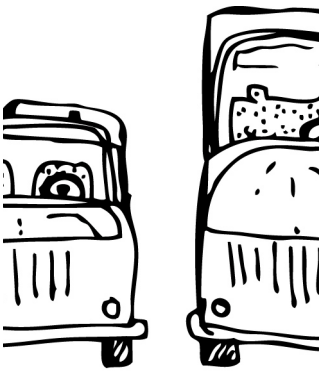
WHY

Using the vehicle that is matched to the job from a fuel efficiency perspective is an achievable way of reducing consumption of non-renewable fossil fuels and cutting down on GHG emissions.[12]

Purchasing new fleet vehicles that are right-sized to the job required is an efficient way to save costs, fuel and GHGs.

HOW

A corporate review of the existing fleet to determine that all vehicles are necessary and in their best working condition will ensure an efficient vehicle pool. Vehicles should be matched to the job they are required to perform. Consider adding shared vehicles and alternate fuel/ human powered vehicles to the fleet for overall fuel reduction and to support healthy transportation alternatives. Adopt a Green Vehicle Policy with a ''right-sizing'' clause so new vehicles are purchased according to their usual anticipated use.



MEASURE

- **Fleet review** to determine if all fleet vehicles are required.
- **Assess vehicle function** and match vehicle sizing and ability to its usual use.[13]
- **Combine vehicles** by collaborating with departments; some vehicles could be multi-use.
- **Consider alternative vehicles**, including electric or human powered options.
- **Measure fuel and GHG's.**

Fleet and Vehicle Right-Sizing

Vehicles should be the right size for the tasks they perform 90% of the time, considering passengers, storage capacity and work related supplies. Vehicles that are too large or over powered for their tasks will burn more fuel and produce more emissions. (Fleetwiser.ca)

ACT

- **Adopt a Green Vehicle Policy** to direct vehicle purchases based on right-sizing according to the average or usual anticipated use of the vehicle.

- **Right-size** by purchasing vehicles based on intended purpose. Consider engine size; vehicle weight; average carrying capacity; average passenger capacity; and average terrain. See Appendix A for a sample Rightsizing Checklist.
- **Consider alternate fuels** and when operational requirements allow; purchase hybrid vehicles or alternate fuel vehicles.
- **Assess fuel consumption** and purchase vehicles with an acceptable fuel consumption mileage for anticipated use. See NRCan's *Fuel Consumption Guide.*[14]
- **Rent or share** vehicles when there is a need for irregular tasks, or when needs exceed capacity of daily fleet vehicles.
- **Smart fuel choices** means using the lowest GHG emission fuel for the fleet (i.e., natural gas, electricity, low-sulphur gasoline, biodiesel).
- **Install charging infrastructure** for community and corporate electric vehicles.
- **Consider alternate vehicles** or human powered/electric bicycles and/or golf carts for short haul/on-site transportation.
- **Walk:** access local meetings quickly on foot.
- **Car-pool** and coordinate departments and staff to travel together to meetings.
- **Join a car-share** and consider corporate membership in the car-share program and use the vehicles as occasional vehicles in the corporate fleet. Larger Kootenay communities have Car-Share Co-op programs.

LEAD

- **Demonstrate:** commitment of an efficient fleet and use of vehicles appropriate for its job.
- **Display:** educate on right-sizing of vehicles. Use alternate 'vehicles' such as bikes and electric vehicles. Install charging stations for public use.
- **Remember:** not all 'fleet' is a 'vehicle'. Electric/manual bikes and golf carts can be important and healthy additions to the fleet. Walking to local meetings is a viable transportation option. Use Car-share Co-ops or rental vehicles to support fleet operations.

[12] Natural Resources Canada, ecoEnergy, "Lean and Clean, Best Practices for Fuel-efficient Driving"
[13] More tips and information at http://fleetwiser.ca/fleet-toolkit/for-fleet-managers/
[14] NRCAN's fuel rating guide: http://oee.nrcan.gc.ca/transportation/tools/fuelratings/ratings-search.cfm

VEHICLE MAINTENANCE

WHY

Most fleet vehicles have a regular maintenance schedule; minor enhancements can improve fuel efficiency.

Maintenance measures contribute to improved fuel economy, optimization of vehicle performance, and reduced costs associated with 'reactive' fixes.

HOW

If a standard maintenance protocol exists, review the protocol to ensure vehicles are monitored for simple yet effective maintenance opportunities. If vehicle maintenance protocol does not exist, starting from scratch is a great opportunity to integrate maintenance checks and procedures that will optimize fuel economy and vehicle efficiency.

MEASURE

- **Track maintenance costs** by vehicle. This allows informed decisions regarding vehicle changeover, appropriate right-sizing, and adjustment of maintenance procedures as necessary.
- **See Fuel Consumption Tracking** section for more information about measuring and tracking maintenance costs.

ACT

- **Develop a preventative maintenance program** [15]
  - ID the vehicle type/class and function;
  - Consult staff for input and expertise;
  - Identify regular maintenance and inspection criteria and tasks accordingly that ensure engine is operating at optimum efficiency;
  - Identify and integrate vehicle manufacturers;
  - Maintenance/warranty standards;
  - More tips available through Canadian Automobile Association, CAA. [16]
- **Keep maintenance vs repair costs** separate to understand and compare trends and costs per vehicle.

Tips from NRCan's Office of Energy Efficiency

• Measure your tire pressure at least once a month: Properly inflated tires last longer, make your vehicle safer to drive and save fuel. Inflate cold tires to the recommended pressure.

• Service your vehicle regularly: Consult your owner's manual to learn about the proper care and maintenance of your vehicle. Follow the service recommendations and change the air filter, spark plugs, engine oil and other fluids accordingly to ensure optimum performance and fuel efficiency. A poorly maintained vehicle uses more fuel and creates more emissions

• Check fluid levels at least once a month: Check and change the engine oil, engine coolant, transmission fluid (automatic) and power-steering fluid according to the manufacturer's recommendations in your owner's manual.

Tips from E3 Fleets

• Out of alignment wheels and axles may increase fuel consumption up to 6% and under inflated tires can increase fuel consumption by 10% or more

• Out of tune engines can burn excessive amounts of fuel – sometimes as much as 10% more

- **Implement** a daily vehicle circle check (see Appendix B for an example from the Town of Oakville).
- **Communicate** the benefits of preventative maintenance and simple ways to optimize vehicle efficiency to staff.
- **Report** regularly on improvements, cost savings and fuel efficiency that results from your vehicle maintenance program.

LEAD

- **Provide opportunities** for fleet staff to provide feedback and input on maintenance procedures and protocols.
- **Demonstrate** leadership by committing to review and refinement of maintenance procedures.
- **Commit** to ensuring fleet staff and management are trained in the latest vehicle technologies.
- **Ensure** proper maintenance specifications are communicated for each new or used vehicle acquired to the fleet.
- **Communicate** lessons learned and strategies implemented to the broader community. Sharing this knowledge will provide tangible ways for the general public to contribute to fuel efficiency.

[15] Preventative maintenance tips adapted from the E3 Fleet program. www.E3Fleet.com
[16] CAA's tips for efficient driving: http://www.caa.ca/working-for-you/eco-driving/

ROUTING REVIEW

WHY

Fleet vehicles are used on regular routes to complete the same tasks repeatedly. A formal review of vehicle routes may find opportunities to get tasks done while driving a shorter total distance.

By reducing the number of kilometers driven by the fleet, costs and GHG emissions can be saved. Every 1000 km reduction in kilometers driven for a diesel heavy vehicle represents a saving of approximately 1.8 tonnes of GHG's.[17]

HOW

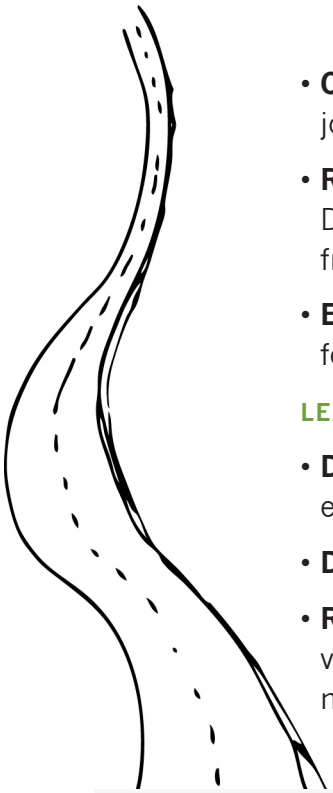
Although citizens expect and appreciate the regular service of such things as waste pickup and snow removal in their community, the services come at cost. A critical review of municipal service routing helps to ensure that the schedule, the route used, and the regularity are as efficient as possible. Routing changes may lead to a reduction in kilometers travelled and fuel consumed. Though perceived lessening of service is never easy; measuring and communicating the results (financial and time savings) to the citizens will be understood.

MEASURE

- **Review routes** to minimize number of trips.
- **Review scheduling** to optimize time of use.
- **Minimize unproductive trips** by maximizing loads per trip.
- **Maximize vehicle use** to ensure vehicles match their task.
- **Reduce the number of kilometers** driven by reducing unnecessary trips, reduce unauthorized personal use.

ACT

- **Route optimization:** purchase and use software package [18] designed to optimize regular municipal routing.
- **Minimize back tracking** - reduce number of trips to yard, perform job on one sweep, reduce section repeats.



- **Combine activities** and consider other department needs, rethink two jobs at once.
- **Reduce number of trips** to increase capacity and decrease frequency. Determine if weekly tasks (i.e., waste pickup) can be performed less frequently (i.e., bi-weekly) at some times of the year.
- **Educate** through newsletters, websites and vehicle stickers reasons for efficient routing; encourage others.

LEAD

- **Demonstrate** commitment to perform tasks and route vehicles as efficiently as possible.
- **Display** fuel consumption on vehicles.
- **Remember:** Fewer kilometers travelled reduce wear and tear on fleet vehicles and components and less fuel consumed means less engine maintenance.

FleetRouteTM Route Optimization Software

- ✔ Decrease labour costs
- ✔ Decrease costs for fuel and tires
- ✔ Decrease mileage
- ✔ Reduce overtime
- ✔ Maintain customer service times and information
- ✔ Improve quality control and management
- ✔ Price services more accurately
- ✔ Reduce the time and cost of rerouting
- ✔ Integrate new customers more easily
- ✔ Facilitate rapid expansion of service and business
- ✔ Balance/equalize routes
- ✔ Route/crew accountability
- ✔ Reduce operating expenses by 10-25%

[17] Natural Resources Canada, ecoEnergy for Fleets, Fuel Management 101

[18] FleetRouteTM Route Optimization Software is one route planning software package available. Advantages noted by FleetRouteTM are shown in the box. http://www.gbbinc.com/products/FleetRoute/index.shtml

IDLE FREE TECHNOLOGIES

WHY

While there are occasions when vehicle idling is required, there are certain technologies that can be installed to reduce the amount of idling a vehicle must do, while still achieving the required function.

Initial costs of technologies such as auxiliary power units (APUs) and cab heaters should be weighed against the longer term costs of continued idling (both from an economic and environmental perspective, known as Life Cycle Costing).

HOW

Several levels of investment in technologies are available to support anti-idling. Pilot projects can be used to test a technology, and to ensure staff understanding of the technology function. Provide ample opportunity for feedback. Communication around idling is important – set clear boundaries and commitments regarding when idling is/is not appropriate.

MEASURE

- **Fuel tracking program** allows a local government to track the impact of idling technologies over time.
- **Implement a pilot** to track fuel consumption on individual vehicles as a way to determine the impact of the technology
- **Measure** the impacts of idle-free technologies by monitoring the impact on air quality.

ACT

The Federation of Canadian Municipalities (FCM) Best Practices Guide for Heavy Duty Vehicles [19] provides further details on the idle-free technologies listed in Table 2. These technologies can also be applied to trucks and other light-duty municipal fleet vehicles.

LEAD

- **Involve** municipal vehicle operators in the selection and implementation of new technologies.
- **Communicate** emission reduction targets, and demonstrate successes with staff, as well as the broader community.
- **Integrate** idling technology applications into vehicle fleet policies.

Table 2: Idle Free Technologies [20]

Technology	Details	Benefits
Auxiliary Power Unit (APU)	• Small engine powered by a diesel or gasoline engine, or by deep-cycle batteries recharged during vehicle operation • Can be used to power auxiliary systems, heat the engine and charge the start battery.	• Particularly applicable for heavy duty vehicles/ machines • Higher upfront costs.
Direct fired heater	• Provides heat to the cab (diesel only) or engine • Not used to power accessories or to provide cooling • Heat is supplied from a combustion flame to a small heat exchanger • Circulation fan distributes heat.	• Inexpensive • Cab heating applicable only to diesel vehicles/ machine • Does not power accessories.
Block heater/ engine pre-heater	• Uses power from electrical outlets to heat the engine block • Reduces need for warm-up idling • If electricity is not available, diesel-fired engine preheaters provide a similar function • Timers can be used to start both heaters automatically.	• Very low cost where electricity is available at parking spaces. • Diesel-fired heaters are more costly • Reduces warm-up idling only.
Parking lot controllert	• A 'smart' power receptacle, like a standard outdoor electrical outlet • Regulates electricity flow based on outside temp and wind chill • Automatically regulates optimum power flow and delivers power to block heater only when warranted. [21]	• BC Hydro product incentive program • Easy to install • Reduces electrical consumption by 65%. [22]

[19] Best Practices Guide for Heavy Duty Vehicles developed by Federation of Canadian Municipalities is available online: http://www.fcm.ca/Documents/reports/Reducing_municipal_heavy_duty_vehicle_emissions_EN.pdf

[20] Table 2 is an adaptation of the FCM Best Practice guide with information included from Transport Canada: http://www.tc.gc.ca/eng/programs/environment-ecofreight-road-anti-idling-technologies-2514.htm

[21] Parking lot controllers: http://www.saskpower.com/save_power/business/programs_offers/parking_lot_controller.shtml

[22] Intelligent Parking Lot Controller information brochure: http://www.iplc.com/files/IPLC2006a.pdf

VEHICLE REPLACEMENT POLICY

WHY

To formalize and clarify fleet replacement policies and practices.

To support climate action policies to reduce GHG emissions by acquiring the most appropriate vehicle and equipment, minimizing fuel consumption, improving driver satisfaction and equipment life, and reducing operating costs.

Replacing vehicles on a set schedule does not ensure optimal financial and environmental performance for all vehicles. If vehicles are replaced too soon, increased capital expenses are incurred. If replacement is too late, maintenance, repair costs and emissions are higher.

Lifecycle analysis compares the capital and operating costs of a vehicle, along with its environmental impact, for the whole of its use within an organization. The analysis also provides optimal timing for replacement, based on anticipated use.

HOW

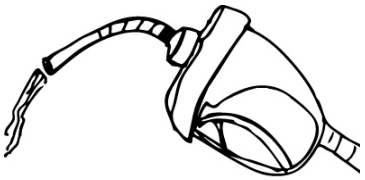
Vehicle replacement policy using a set schedule does not provide opportunity to evaluate all factors of capital and vehicle operating costs. Lifecycle analysis spreadsheets compare all costs, including environmental impact, and determine optimal timing for vehicle replacement. Analysis will simplify ‘‘how to choose’’ a vehicle based on both economic and environmental factors. Vehicle emissions control information is found with the vehicle serial number.

MEASURE

- Adopt a vehicle purchase policy.
- Accelerate retirement of inefficient vehicles.
- Lifecycle analysis tool to analyse replacement of vehicles. [23]

ACT

- Adopt a Vehicle Purchasing Policy based on lifecycle costing.
- Join E3 Fleet to learn how to consider energy, environment and excellence in all vehicle purchases. Following or registration in the National green fleet rating system provides a structure for evaluating performance of the fleet by monitoring and reporting and continuously improving.
- Maintain vehicles, and keep them in optimal mechanical condition.
- Inspect vehicles at regular intervals.
- Monitor fuel consumption, fuel costs, mileage and maintenance cost to identify vehicles not performing optimally.



- Preventative maintenance will maximize the efficiency of all vehicle operations.
- Replace vehicles with excessive maintenance, carbon emissions or operating costs.

LEAD

- Demonstrate commitment to reduce GHGs from fleet vehicles.
- Retain/replace vehicles based on lifecycle costs and GHG emissions.
- Educate staff with methods and reasons for vehicle replacement.
- Remember: rule of thumb vehicle replacement policy at approximately 5 years of service and 150,000 kilometers must be considered in conjunction with lifecycle costing. Consider vehicle working condition, operating costs, carbon emissions and corporation requirements in the timing of vehicle replacement.

[23] E3 Fleets, Lifecycle Analysis tool available for download at http://www.e3fleet.com/cost_analysis.html

GPS/VEHICLE MONITORING SYSTEM

WHY

Collect data and information that allows for more informed decision making.

Optimize routing.

Monitor and minimize idling times by identifying locations and times of increased idling.

Precise tracking and monitoring ensures optimal fleet efficiency.

Monitoring tool measures and communicates improvements and fuel efficiency successes.

FleetWiser[24] provides a summary of 'why' a GPS system is useful for a vehicle fleet.

HOW

GPS systems can be a useful tool in measuring and monitoring fleet efficiency. Communication with fleet staff is critical to the implementation of new technology. Implementation should involve consultation and input from staff to ensure understanding and compliance. A pilot project may be the best way to introduce the vehicle monitoring concept. Communicate the benefits and advantages of the technology and dispel myths.

MEASURE

- Establish a system to organize and interpret the data from the GPS systems. The data is only useful if there is a way to use it effectively.
- Report on the data collected (idling time, fuel efficiency, etc.) so that fleet staff are aware of technology outcomes.
- Link the data to the fuel tracking system so there is a record of fuel consumption, idling time, distance travelled, etc. The information collected through a GPS system is invaluable to interpreting changes in fuel consumption. A set of indicators could be established, against which fuel consumption is analyzed.

ACT

- Consult with fleet staff to discuss the option of GPS. Determine and address staff concerns.
- Implement a pilot project with one or two fleet vehicles.
- Demonstrate the output from the system, sharing the data collected and how data is used to interpret changes in fuel consumption, or route planning.
- Measure and report to staff, Council and community the improvement to fuel efficiency or reduced idling time as a result of the GPS system.

LEAD

- Set targets for idling reduction and fuel consumption reduction.
- Communicate successes to the community.
- Mentor other local governments investigating the opportunity for GPS. As a newer technology for local government fleets, 'lessons learned' will be useful in determining the suitability of the technology for other fleets.

[24] GPS information summarized by FleetWiser:
http://fleetwiser.ca/2011/03/14/5-ways-gps-can-improve-fleet-efficiency/

Appendix A: Right Sizing Checklist

Town of Oakville Sustainable Green Fleet Guide – template for a vehicle fleet rightsizing checklist.

Town of Oakville - Vehicle Fleet Rightsizing Checklist

Employee/Department Requirements

Department Name: _____

Employee Name and Title: _____

1. Does the employee currently use a Town fleet vehicle? Y or N
If No, Continue on to question 2.
If Yes, What make and model does the employee currently use?

_____

2. What are the main job functions you need to perform with your vehicle? (Inspections, parking enforcement, surveying, deliveries/moving, transport equipment etc.)

_____

3. Does the vehicle require towing capacity? Y or N

4. Are there any specific features you require for the vehicle? (Size, type, mechanical equipment etc)

_____

Fleet Manager Recommended Vehicle Selection and Comments

Recommended Size/Type: _____

Is the vehicle size/type available in a hybrid, low emission or alternative fuel vehicle? Y or N

Recommended Make/Model and Comments:

_____

What is the NRCAN Fuel Consumption Guide Rating of the recommended vehicle:

Published: _____ MPG City/Highway _____
L/100 Km City/Highway _____ CO2 Emissions (kg)/Year: _____

Fleet Manager: _____ Director: _____
Signature Signature

Appendix B: Circle Check Example

Circle Check inspection implemented by City of Oakville to improve vehicle efficiency.

Vehicle Inspection Reports

Truck/Trailer Make		Truck Unit #	Date: mm/dd/year
Truck License Plate #	Trailer License Plate #	Trailer Unit #	Odometer Finish
☐ Pre-trip	Inspection Location:	Time: AM PM	Odometer Start
☐ Post-trip	Inspection Location:	Time: AM PM	Total Km's Driven

Driver (D) use X if item is not satisfactory — Mechanic (M) use + your initials when defect corrected

Truck	D	M	Truck	D	M	Truck	D	M	Trailor/Towed Vehicle	D	M
Air Brake Adjustments + Connections			Wheels, Rims + Fasteners			Defroster/Heaters, Fans + Controls			Air Brake Adjustment/Brake Components		
Air Compressor			Condition of Tires + Proper inflation			Steering Wheel			Parking Brake		
Air Lines - Supply + Service			Fire Extinguisher			Air/Electric Horn			Electric/Hydraulic Brakes		
Air Brake Pressure			First Aid Kit			Doors, Locks, Handles			Ownership/Valid Insurance		
Parking Brake			Reflective Triangles			Body Damage			Annual Inspection Sticker/ Certificate		
Low Air Warning Signals			Stop/Brake + Tail Lights			Cleanliness of Cab			Valid License Plate		
Brake Pedal			Clearance Lights/Reflectors			Mirrors			Lights + Reflectors		
Air Tanks			Turn/Hazard Signals			Load Security			Ramps/Tailgates		
Hydraulic Brakes			Auxilary Lighting			Mud Flaps			Wheel, Rims, Fasteners		
Electric Brake/Controls			Exhaust Systems			Plow Assemblies			Condition of Tires + Proper Inflation		
Chassis, Frames + Cross Members			Radiator + Fluid Level			Body Damage			Suspension, Springs, Air Bags + Controlling Attachments		
Clutch + Adjustment			Fuel Systems			Valid License Plate			Jack/Landing Gear		
Transmission			Engine			Ownership/CVOR			King Pin/Plate		
Rear End/Axles			Battery(ies)			Valid Insurance			Pintle Hook/Ball Hitch		
Suspension, Springs, Air Bags + Controlling attachments			Oil Pressure + Level			Annual Inspection Sticker/Certificate			Load Security		
Drive Line			Windshield + Windows			Seat Belt			Body Damage		
5th Wheel/Pintle/Ball			Windshield Wipers + Washers			Other Attachments			Other		

Driver's Comments:

Mechanic's Comments:

☐ Conditions of above vehicle satisfactory. ☐ Above defects corrected.

☐ Above defects need not to be corrected for safe operation of vehicle. Repair Order#:

Driver's Name: (print and sign)	Time: AM PM	Date: mm/dd/year
Mechanic's Name: (print and sign)	Time: AM PM	Date: mm/dd/year

carbon neutral **kootenays**

Local Governments and First Nations Reducing Emissions

This document was produced by the Carbon Neutral Kootenays project, funded by the Regional District of East Kootenay, Regional District of Central Kootenay, Regional District of Kootenay Boundary, and the Columbia Basin Trust.

Regional District of East Kootenay

Central Kootenay Regional District

Regional District of Kootenay Boundary

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