

2016 Carbon Neutral Action Report

This Carbon Neutral Action Report for the period January 1st, 2016 to December 31st, 2016 summarizes our emissions profile, the total offsets to reach net-zero emissions, the actions we have taken in 2016 to reduce our greenhouse gas emissions and our plans to continue reducing emissions in 2017 and beyond.

By June 30, 2017, BC Emergency Health Services' final Carbon Neutral Action Report will be posted to our website at www.bcehs.ca.

BCEHS Environmental Sustainability Policy

BCEHS will act as a leader with respect to environmental stewardship while engaging the healthcare community in a collaborative approach towards sustainability. This will occur through sustainable operations, sustainable facilities and sustainable partnerships.

2016 Actions to Reduce GHG Emissions

- 58 new ambulances received in fiscal year 2016 are equipped with EcoSmart idle reduction technology and feature a redesigned air dam and narrower body to reduce frontal area, resulting in reduced overall air drag on the ambulance and a reduced conversion weight to improve fuel economy. See our 2016 success story below.
- Ambulance RFP included idle-reduction technology as a mandatory requirement and proposed solar panel technology to further reduce idle time. BCEHS plans to install solar panel technology on two prototype vehicles to be received in fiscal year 2017/18.
- BCEHS continues to purchase only 100% recycled paper for office use.

2016 Success Story

Ambulance Idle Reduction and Aerodynamics

BCEHS Fleet Operations strives to ensure the efficiency of the ambulance fleet. Initiatives designed to improve fuel economy include the introduction of idle reduction technology and inclusion aerodynamic considerations in design of the ambulance.

Idle Reduction Technology:

Due to the nature of ambulance work, ambulances need to be left idling to maintain patient compartment condition and electrical power for emergency lighting. BCEHS Fleet Operations recognized that emerging technology presented an opportunity to reduce the impact of this idle time in implementing an automated idle reduction system.

In 2011, BCEHS began introducing a digital multiplexed electrical system in the ambulance conversion. This microprocessor based electrical system allowed for functionality not possible with an older relay-based system. One such application is smart control of idle. The establishment of a new, multiyear ambulance supply contract in 2012 with Demers Ambulances of Beloeil Quebec allowed for the inclusion of the Demers EcoSmart idle reduction system.



Figure 1 EcoSmart decal on ambulance dash

The EcoSmart system works by monitoring the battery condition and patient compartment temperature. When certain conditions are met, the system will shut down an idling engine. If the system detects the battery or interior temperature out of range, the system will restart the vehicle engine until conditions are again met. The system engages automatically when the ambulance is in park and does not require the intervention of the operator.

The EcoSmart ensures critical functions important to paramedic and patient safety remain functioning while keeping idling to a minimum.

Aerodynamic Design:

Aerodynamic considerations have been included in all ambulance procurement RFPs since the late 1990's. The goal of inclusion has been to reduce aerodynamic drag force on the ambulance, thereby reducing the power required to propel the ambulance forward. As aerodynamic drag force can be described by the equation below, two factors, drag coefficient and reference area, can be impacted by the ambulance design.

$$\text{drag force} = \text{drag coefficient} \times \frac{\text{air density} \times \text{velocity squared}}{\text{two}} \times \text{reference area}$$

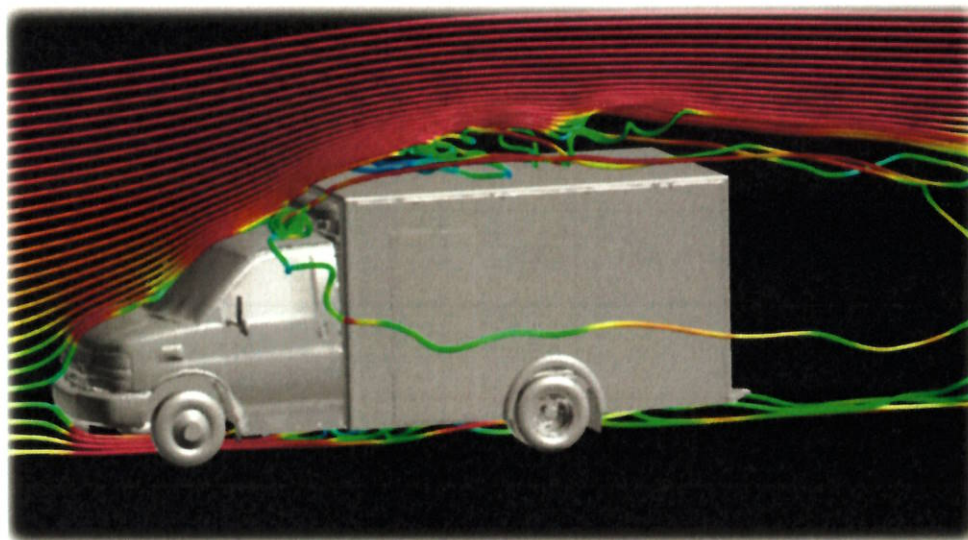


Figure 2 CFD modeling of BCEHS ambulance with Air Deflector

Ambulances produced under contract with BCEHS by Demers Ambulances since 2012 have featured an air deflector design to improve airflow and a 10 centimeter narrower ambulance module to reduce frontal area. Computational Fluid Dynamic (CFD) modeling commissioned by Demers Ambulances shows how the inclusion of the aerodynamic deflector on the front of the

ambulance module decreases the drag coefficient from 0.63 to .542. The reduction in module width represents a 4.3% reduction in reference area of the ambulance.

As inclusion of the aerodynamic design has been included in the ambulance design since 1996, it is impossible for BCEHS to measure the extent to which the aerodynamics of the module impacts the fuel economy of the ambulance fleet. It can, however, be presumed that exclusion of aerodynamic considerations in the ambulance design would negatively impact the fuel economy.

Annual GHG reductions:

BCEHS operating data since 2011 shows the cumulative impact of the reduction in frontal area and introduction of EcoSmart idle reduction technology is a reduction in fuel consumption of 0.5 litres per 100 kilometers travelled. From introduction to the end of fiscal year 2016/17, units equipped these technologies have travelled over 36 million kilometers, saving approximately 180,000 litres of gasoline.

Fiscal Year 2016/17 savings

Model	Fuel Economy (L/100km)	GHG (kgCOeq/Km)
<i>Demers MX151 - 92" Wide Ambulance Module</i>	27.4	0.641
<i>Demers MX151 - 88" Wide Ambulance Module with EcoSmart</i>	26.9	0.629
Savings	0.5	0.012

<i>Kilometers Travelled in 2016/17 - 88" Wide Ambulance Module with EcoSmart</i>	11,420,880
<i>Fuel Savings (Liters)</i>	57,104
<i>GHG Reduction (kgCOeq)</i>	133,624

In fiscal year 2016/17, units equipped with EcoSmart idle reduction technology accounted for a little fewer than 50 percent of kilometers driven by the ambulance fleet.

Emissions and Offset Summary Table:

BCEHS GHG Emissions and Offset for 2016 (tCO₂e)	
GHG Emissions created in Calendar Year 2016:	
<i>Total Emissions (tCO₂e)</i>	15,924
<i>Total Offsets (tCO₂e)</i>	15,457
Adjustments to GHG Emissions Reported in Prior Years:	
<i>Total Emissions (tCO₂e)</i>	1875
<i>Total Offsets (tCO₂e)</i>	1806
Grand Total Offsets for the 2016 Reporting Year:	
<i>Grand Total Offsets (tCO₂e)</i>	17263

Retirement of Offsets:

In accordance with the requirements of the Greenhouse Gas Reduction Targets Act and Carbon Neutral Government Regulation, BC Emergency Health Services (**the Organization**) is responsible for arranging for the retirement of the offsets obligation reported above for the 2016 calendar year, together with any adjustments reported for past calendar years. The Organization hereby agrees that, in exchange for the Ministry of Environment ensuring that these offsets are retired on the Organization's behalf, the Organization will pay within 30 days, the associated invoice to be issued by the Ministry in an amount equal to \$25 per tonne of offsets retired on its behalf plus GST.

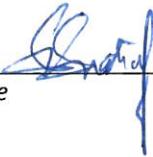
Executive sign-off:

Signature

Date

Name (please print)

Title



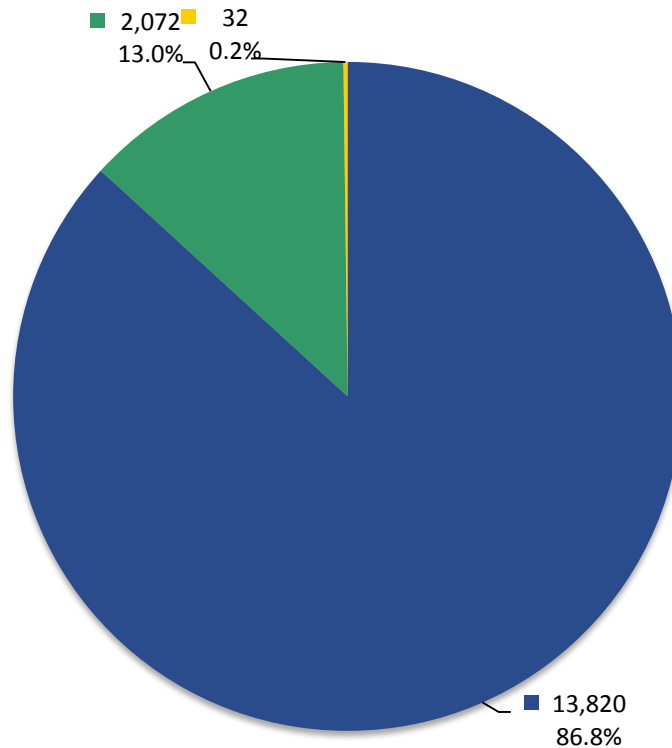
26 May 2017

Sunny Dhalwale

Executive Director

Provincial Programs
BCEHS

BC Emergency Health Services Greenhouse Gas Emissions by Source for the 2016 Calendar Year (tCO₂e*)



Total Emissions: 15,924

- Mobile Fuel Combustion (Fleet and other mobile equipment)
- Stationary Fuel Combustion (Building Heating and Generators) and Electricity
- Supplies (Paper)

Offsets Applied to Become Carbon Neutral in 2016 (Generated May 16, 2017 9:38 AM)

Total offsets required: **15,457**. Total offset investment: **\$386,425**. Emissions which do not require offsets: **467** **

*Tonnes of carbon dioxide equivalent (tCO₂e) is a standard unit of measure in which all types of greenhouse gases are expressed based on their global warming potential relative to carbon dioxide.

** Under the *Carbon Neutral Government Regulation of the Greenhouse Gas Reduction Targets Act*, all emissions from the sources listed above must be reported. As outlined in the regulation, some emissions do not require offsets.

2016 Carbon Neutral Action Report Survey

Part One (external)

Contact Name(s):

Molly Carlow, Manraj Chohan, Sunny Dhaliwal

Organization Name:

BC Emergency Health Services

Please select your sector:

- Health Authority or Affiliate

1) Stationary Sources (Buildings, Power Generators): Fuel Combustion, Electricity use, Fugitive Emissions.

During 2016, did your organization take any of the following actions to support emissions reductions from buildings?

Select all that apply

- Performed energy retrofits of the organization's buildings.: Yes

Briefly describe your organization's plans to continue reducing emissions from its stationary sources in future years.

Brookfield Global Integrated Solutions, our contracted building maintenance firm, provides the following services:

- Recycling (paper/cardboard) programs are in place where the services are available. In some buildings, expanded recycling programs are being looked at.
- Energy usage in BCEHS buildings is reviewed to identify any spikes in usage. These spikes are investigated to ensure there isn't energy loss from equipment issues or other factors. We also look at buildings where usage has decreased to identify energy saving successes that could be extended to other buildings.
- To aid in decision making, energy reports are available for review whenever an issue is identified.
- Projects are identified that could offer energy reduction outcomes (i.e. T8 upgrades)

Where new projects are undertaken, professional engineers evaluate energy consumption projections and look to find ways to decrease demand. These include both electrical lighting systems and mechanical systems.

During 2016, did your organization participate in utility-sponsored energy demand management program(s) (e.g. BC Hydro's Energy Management (Manager))?

No

If yes, please describe briefly:

(No response)

2) Mobile Sources (Vehicles, Off-road/Portable Equipment): Fuel Combustion.

During 2016, did your organization take any of the following actions to support emission reductions from its mobile sources?

Select all that apply

-
- Replaced existing vehicles with more fuel efficient vehicles (gas/diesel).: Yes
-
- Took steps to drive less than previous years.
-

Briefly describe your organization's plans to continue reducing emissions from its mobile sources in future years.

Idle Reduction - 58 new ambulance units received in FY 16/17 are equipped with ECOSmart idle reduction technology. The ECOSmart system monitors battery condition and patient compartment, shutting down an idling ambulance when the engine is not required. The anticipated reduction in fuel consumption is 1,500 litres over a 300,000 km vehicle life.

Aerodynamic Design – These 58 new units feature a redesigned air dam and narrower body to reduce frontal area, resulting in reduced overall air drag on the ambulance and a reduced conversion weight to improve fuel economy.

Ambulance RFP - Idle Reduction a mandatory requirement for new units. Solar panel technology was proposed to reduce idle time. BCEHS is planning to install this technology on two prototype vehicles to be received in FY 17/18.

3) Supplies (Paper):

During 2016, did your organization take any of the following actions to support emissions reductions from paper supplies?

Select all that apply

-
- Policy requiring the purchase of recycled content paper.: Yes
-

Briefly describe your organization's plans to continue reducing emissions associated with its office paper use in future years.

BCEHS will continue to purchase only 100% recycled paper for office use.

4) Other Sustainability Actions:

Business Travel:

During 2016, did your organization take any of the following actions to support emissions reductions from business travel?

Select all that apply

-
- Encouraged alternative travel for business (e.g. bicycles, public transit, walking)
-
- Encouraged or allowed teleworking or working from home

Education Awareness:

During 2016, did your organization have any of the following programs or initiatives to support sustainability education and awareness?

Select all that apply

(No response)

Other Sustainability Actions:

During 2016, did your organization have any of the following programs or initiatives to support sustainability?

Select all that apply

-
- A water conservation strategy which may include a plan or policy for replacing water fixtures with efficient models
-
- An operations policy or program to facilitate the reduction and diversion of building occupant waste (e.g., composting, collection of plastics, batteries) from landfills or incineration facilities
-
- Lifecycle costing of new construction or renovations