



# Carbon Neutral Action Report | 2018

# Executive Summary

BC Transit is a significant component of British Columbia's integrated transportation network. Over 1.7 million British Columbians use BC Transit to commute to work or school, to access services and leisure opportunities.

This transit service supports community livability, and contributes to provincial and regional environmental sustainability objectives, helping to reduce traffic congestion, greenhouse gas (GHG) emissions and other pollutants. Under the Provincial Clean BC Plan, cleaner transportation also takes a prominent role to meeting Provincial GHG reduction goals.

GHG emissions reported by BC Transit are primarily from the operation of the bus fleet. Recent investments in compressed natural gas (CNG) and right-sizing fleet options have had noticeable impacts to reduce reportable GHG emissions with a reduction of over three thousand tonnes of CO<sub>2</sub> equivalent (CO<sub>2</sub>e) emissions from the previous year.

These steps included a further expansion of the BC Transit CNG bus fleet in the Resort Municipality of Whistler (joining it with the City of Kamloops and Regional District of Nanaimo as having 100% CNG heavy-duty bus fleets). BC Transit replaced 86 buses with newer more fuel-efficient models and also conducted energy assessments of some of the larger maintenance facilities attributing to actions to reduce facility energy consumption. In partnership with the City of Victoria, BC Transit also completed the construction of the southbound bus lane on Douglas Street in Victoria.

Additionally, a trial of a battery electric bus was conducted in the summer of 2018 in the Victoria Regional Transit System. This trial provided excellent data on how battery electric buses would handle routes in the Capital Regional District and other locations around the Province, and gave a clearer picture on how to implement charging infrastructure if this technology is pursued in BC Transit's fleet program. This trial is an example of how BC Transit is committed to testing low carbon and zero-emission technology alternatives that will meet the expectations of customers while reducing its environmental footprint.

While BC Transit remains committed to lowering its GHG footprint, it is important to recognize that one of the greatest ways to reduce transportation associated GHGs remains in a fundamental shift of mode share from personal vehicles to public transit. BC Transit is excited to work with its government, operating and business partners to further encourage ridership growth and expanding service, all while achieving a high level of customer service in pursuit of a cleaner future.



*Aaron Lamb*  
Vice President,  
Asset Management

## DECLARATION STATEMENT

This is the 2018 Carbon Neutral Action Report for BC Transit. This report contains BC Transit's 2018 emissions profile, the total offsets to reach net-zero emissions, the actions BC Transit has taken in 2018 to reduce greenhouse gas (GHG) emissions and BC Transit's plans to continue reducing emissions in 2019 and beyond.

By June 30, 2019 BC Transit's final Carbon Neutral Action Report will be posted to its website at [www.bctransit.com](http://www.bctransit.com).

## EMISSIONS AND OFFSETS SUMMARY

Most greenhouse gases produced from BC Transit's operations come from the combustion of fossil fuels in the vehicle fleet and the energy used to heat and cool BC Transit-owned or leased buildings.

## BC TRANSIT GHG EMISSIONS AND OFFSETS FOR 2018 (TCO<sub>2</sub>E)

### GHG Emissions created in Calendar Year 2018 (from SMARTTool Reports Page)

Total Emissions (TCO <sub>2</sub> e)	60,650
Total BioCO <sub>2</sub> (TCO <sub>2</sub> e)	1,817
Total Offsets (TCO <sub>2</sub> e)	1,118

### Adjustments to GHG Emissions Reported in Prior Years (from SMARTTool Homepage)

Total Emissions (TCO <sub>2</sub> e)	-6
Total Offsets (TCO <sub>2</sub> e)	-6

### Grand Total Offsets for the 2018 Reporting Year (from SMARTTool Homepage)

Total Offsets (TCO <sub>2</sub> e)	1,112
Total Offset Investment	\$27,800

## RETIREMENT OF OFFSETS

In accordance with the requirements of the Greenhouse Gas Reduction Targets Act and Carbon Neutral Government Regulation, BC Transit (the Organization) is responsible for arranging for the retirement of the offsets obligation reported above for the 2018 calendar year, together with any adjustments reported for past calendar years.

The Organization hereby agrees that, in exchange for the Ministry of Environment and Climate Change Strategy 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.

*Aaron Lamb*

Vice President,  
Asset Management  
May 31, 2019

# 2018 Greenhouse Gas Emissions

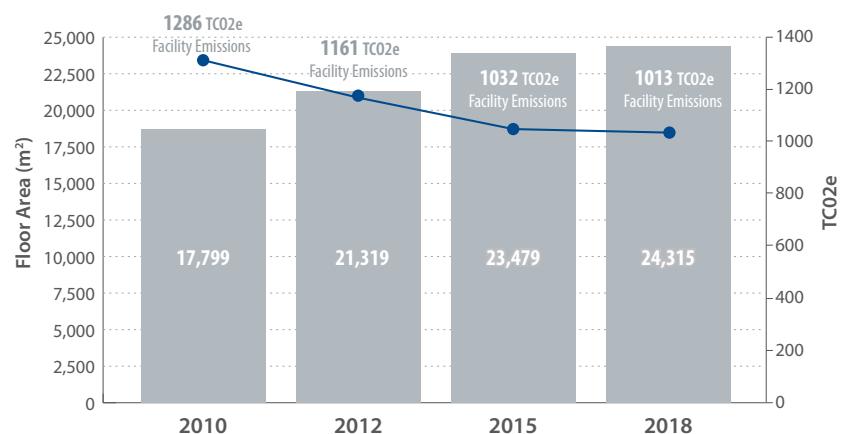
## FROM THE GHG EMISSIONS SOURCE DETAIL REPORT

Emission Source		Greenhouse Gases in Tonnes
<b>Mobile Fuel Combustion (Fleet and other mobile equipment)</b>		
Offset Required	Fuel Combustion **	93.14
	<b>Offset Required Subtotal</b>	<b>93.14</b>
Offset Exempt	Public Transit	57,714.69
	CO <sub>2</sub> from Biogenic Fuel Combustion	1,817.06
	<b>Offset Exempt Subtotal</b>	<b>59,531.76</b>
	<b>TOTAL MOBILE EMISSIONS</b>	<b>59,625</b>
<b>Stationary Fuel Combustion (Building Heating and Generators) and Electricity</b>		
Offset Required	Fuel Combustion **	947.06
	Purchased Energy	66.02
	<b>Offset Required Subtotal</b>	<b>1,013.08</b>
Offset Exempt	CO <sub>2</sub> from Biogenic Fuel Combustion	0.27
	<b>Offset Exempt Subtotal</b>	<b>0.27</b>
	<b>TOTAL STATIONARY EMISSIONS</b>	<b>1,013</b>
<b>Supplies (Paper)</b>		
Offset Required	Recycled Content Copy Paper	11.75
	<b>Offset Required Subtotal</b>	<b>11.75</b>
	<b>TOTAL SUPPLIES EMISSIONS</b>	<b>12</b>
<b>TOTALS</b>		
	Total Offset Exempt	59,532
	Total Offset Required	1,118
	<b>TOTAL EMISSIONS</b>	<b>60,650</b>

\*\* Includes Fossil Fuels and CH<sub>4</sub> and N<sub>2</sub>O from Biogenic Fuels

Fugitive emissions from vehicle fleet air conditioning are estimated to not comprise more than 1% of BC Transit's total emissions. An ongoing effort to collect or estimate emissions from this source would not be materially effective. For this reason, emissions from this source have been deemed out of scope and have not been included in BC Transit's total greenhouse gas emissions profile.

### Facility emissions reductions from 2010 Building Areas vs. Carbon Intensity



# Offsets Applied to Become Carbon Neutral in 2018

BC Transit measures and is accountable for its environmental results. BC Transit measures and reports its greenhouse gas emissions under carbon accounting protocols consistent with the Carbon Neutral Government Regulation, using the web-based application known as SMARTTool. BC Transit offsets those regulated greenhouse gas emissions it cannot avoid through payments to the Minister of Finance.

In 2018, BC Transit offset 1,118 tonnes of regulated emissions. This includes subtracting six (6) tonnes that were miscalculated in the 2017 reporting year.

As required by section 5 of the Carbon Neutral Government Regulation, 59,532 tonnes of CO<sub>2</sub>e resulting from the operation of transit buses were reported in as part of BC Transit's GHG emissions profile in 2018. However, they were not offset as they are out of scope under section 4(2)(c) of the Carbon Neutral Government Regulation.

Battery Electric Bus Trial



# Emission Reduction Activities

## A. MOBILE FUEL COMBUSTION

Greenhouse gas (GHG) emissions per service hour (a Key Performance Indicator) were 27.5kg CO<sub>2</sub>e per service hour in the 2018/19 fiscal year. Service hour emissions have shown modest but steady declines since 2010, even with significant service hour increases.

In 2018, BC Transit, with support from FortisBC's Natural Gas for Transportation Incentive Program and the Resort Municipality of Whistler, replaced 25 diesel buses with 25 Compressed Natural Gas (CNG) buses in regular service. This makes the Whistler fleet 100% CNG operating. Compared to diesel, the primary benefits of CNG buses are lower and more stable fuel prices, quieter engines and simplified emission systems.

BC Transit initiated discussions with FortisBC to purchase and use Renewable Natural Gas (RNG) in place of CNG for its bus fleet. The use of RNG would significantly drop the GHG emissions of the natural gas bus fleet.

Fleet expansion and replacement of older diesel buses continued in 2018. BC Transit purchased 45 new medium-duty diesel buses and 41 new light-duty diesel or gasoline buses to replace older vehicle models.



Vicinity Bus

### ***Non-revenue fleet***

Building from the research of Plugin BC, BC Transit has been investigating options for procurement within the Non-Revenue Vehicle Replacement Project. In 2018, BC Transit replaced the Transit Supervisor fleet with seven Toyota Highlander hybrids, which have improved fuel efficiency over the vehicles that they replaced.

### ***BC Scrap-it Program***

The Victoria Regional Transit System offers a monthly pass incentive for vehicle owners to scrap their older, heavier-polluting vehicles and adopt transit. Twenty-five of these eco-passes were issued in 2018. Implementation of this program removed 317 tonnes of CO<sub>2</sub>e that would otherwise have been emitted in 2018.

**Nissan Leaf** – BC Transit's all-battery electric pool car



BC Transit also expanded its non-revenue staff vehicle fleet with two more Nissan Leaf-battery electric cars. The non-revenue staff pool cars travels on average 4-6000 kilometres per year. This will equate to avoiding between 1.5 -2 tonnes of CO<sub>2</sub>e (compared to an incumbent hybrid vehicle).



## B. STATIONARY FUEL COMBUSTION – FACILITIES

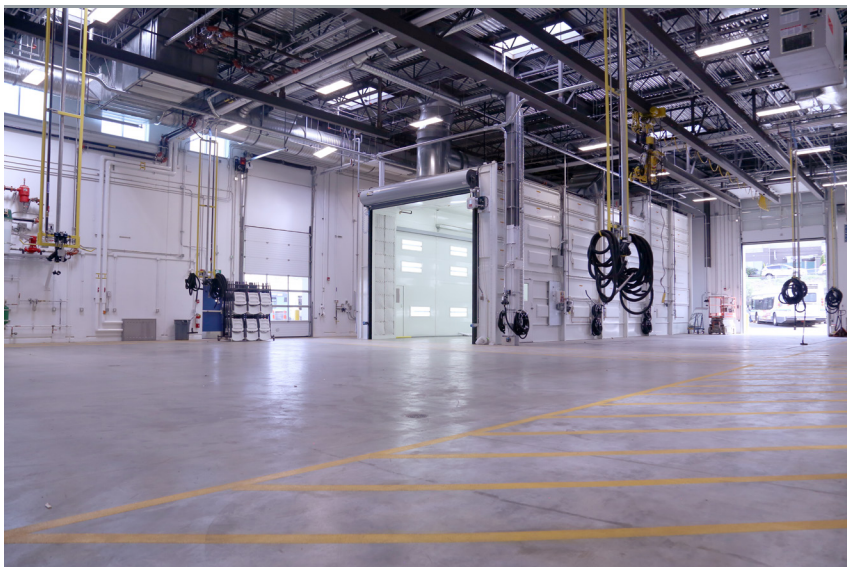
In partnership with FortisBC, BC Transit created a Senior Energy Specialist position to assess building energy usage and develop retrofit strategies to replace older, less-efficient building systems and assist in the design of new builds. Energy audits of Victoria Transit Centre (VTC) garage, Kelowna Transit Centre (KTC), Trail Transit Centre (KOB), and Whistler Transit Centre (WTC) were subsequently completed. Input including lighting control, single line modification, building envelope sealing, domestic hot water and HVAC system efficiencies were incorporated into new facility design for Abbotsford, Cowichan Valley and Campbell River locations.

At the WTC, BC Transit installed tankless water heating systems as per analysis from energy audits, and compressed air system leak corrections were completed at all assessed sites. It is the expectation that further emissions reduction projects informed by these reports will be completed in the coming years.

An electrical submeter was installed at WTC to isolate electrical impacts of CNG compression from facility usage, allowing for more effective carbon reporting and decision making for both mobile and stationary fuel consumption.

HVAC rebalancing was initiated at Victoria Regional Transit System locations to optimize systems, reduce energy consumption and assess potential for larger digital data control (DDC) system roll-out to existing facilities and new structures.

The costs and emissions impacts of renewable natural gas adoption in facilities was assessed to inform longer-term strategic emissions reduction planning.



Victoria Transit Centre Garage

# Actions Planned for 2019

- Policy recommendation being explored that will have LEED Gold New Building standard certification or equivalency for future Operations and Maintenance facility projects being pursued. If adopted, training will be provided to educate staff on benefits and impacts of the new standard.
- The Transit facility at Trail is expected to undergo a LED lighting retrofit in addition to upgrades to HVAC control systems, reducing both electric and natural gas consumption on site as well as upgrades recommended during energy audits performed in 2018 will be further assessed, planned for, and executed.
- The wastewater treatment system at VTC will be commissioned in spring 2019, allowing for more effective water treatment. This may lead to options to further conserve water use and thus reduce associated energy demands.
- An energy conservation day will be executed at all five Victoria Regional Transit facilities, with temporary heating set-point reduction, energy conservation pledges, and educational information distribution to staff in order to facilitate a culture of energy awareness.
- Planned energy audits at the following facilities throughout the province: Kamloops, Vernon, Victoria handyDART, Fort St. John and Dawson Creek.
- Innovative natural gas technologies will be explored for the potential to reduce facility gas consumption and associated emissions.
- Commissioning of CNG fueling infrastructure at the Langford Transit Centre in late 2019, allows for the introduction of CNG bus fleet to the Victoria Regional Transit System.
- An additional eight (8) CNG buses will be added to service in the Whistler and Kamloops transit systems. These buses will continue to provide service while producing less GHGs than incumbent diesel buses.
- BC Transit will pursue a supply of Renewable Natural Gas (RNG) with FortisBC for use in the CNG bus fleet. Using RNG versus CNG will reduce GHG emissions by over 70%.
- The BC Transit Green Team will focus on participating in regional green initiatives like Bike to Work Week, Help Fill a Dream, Garden Planting Day and Shoreline Clean-up.
- BC Transit will continue to develop the framework for a Climate Resiliency and Adaptation Action Plan based on consultation with the Climate Action Secretariat.
- BC Transit will continue to support Provincial initiatives in the Climate Leadership Plan, Clean BC and the Pan-Canadian Framework on Clean Growth and Climate Change through the establishment of a Low Carbon Fleet Program.

# Links to Other BC Transit Information Relevant to Sustainability

## **Government Mandate Letter – 2017/2018**

<https://www.bctransit.com/documents/1507213433558>

## **BC Transit Service Plan 2017– 2020**

<https://www.bctransit.com/documents/1507213433571>

## **BC Transit 2017 – 18 Annual Report**

<https://www.bctransit.com/documents/1529700865472>

## **BC Transit Sustainability**

<https://bctransit.com/about/sustainability>

## **BC Transit Strategic Planning**

<https://www.bctransit.com/transforming-your-journey>

## **BC Transit is a member of the Community Energy Association**

<http://communityenergy.bc.ca/>

## **BC Transit Victoria Regional Transit System is member of BC Scrap It Program**

<https://scrapit.ca/incentivechoices/>

## **BC Transit is a member of the Canadian Urban Transit Research & Innovation Consortium (CUTRIC)**

<http://cutric-crituc.org/>



520 Gorge Road East, Victoria, BC V8W 9T5  
[www.bctransit.com](http://www.bctransit.com)

# Part 1: CNAR Survey

## 1. General Information

**Name:** Geoffrey Huber

**Contact Email:** geoff\_huber@bctransit.com

**Organization Name:** BC Transit

**Sector:** Crown

**Role** - Please select your role(s) below.

*If more than one individual completed the survey, multiple categories may be selected:*

Energy Manager: No

Sustainability Coordinator: No

Administrative Assistant: No

Facilities/Operations Manager/Coordinator: Yes

CEO/President/Exec Director: No

Treasurer/Accounting: No

Superintendent: No

Other - Please Specify: Supervisor Environmental Services

### A. Stationary Sources (e.g. Buildings, Power Generators): Fuel Combustion, Electricity use, Fugitive Emissions.

#### 1. Actions taken by your organization in 2018 to support emissions reductions from buildings.

a) Do you have a strategy to reduce emissions from stationary sources?

No

b) Whether you have a strategy or not (1.a), briefly describe your organization's plans to continue reducing emissions from stationary sources:

I. Over the medium-term term (1-5 years)

Pursue LEED Gold certification or equivalency for future transit operations and maintenance facilities to be constructed.

Senior Energy Specialist position created in 2018 to perform energy audits at all BC Transit owned facilities throughout the province of British Columbia, and assist in implementing energy efficiency upgrades through our Major Facilities Equipment and Maintenance programs.

## II. Over the long term (6-10 years)

Continue to look towards emerging energy efficient heating, ventilation and air conditioning systems. Whenever possible incorporate green technology and when appropriate green design to reduce all emissions, this includes replacing outdated systems with more energy conscious substitutes. As smarter systems emerge, aggregate systems will have scheduled and monitored heating and cooling to reduce the waste of energy while optimizing employee comfort.

Continue to pursue LEED Gold certification or equivalency for future transit operations and maintenance facilities to be constructed (and or incorporate future sustainable building design opportunities as they emerge through industry).

### c) Please describe your strategy's goals (if any) related to [energy audits](#).

Senior Energy Specialist position created in 2018 to perform energy audits at all BC Transit owned facilities throughout the province, and assist in implementing energy efficiency upgrades.

I. What % on average of your building portfolio has an energy audit completed each year (if any)? : 30

### d) Please describe your strategy's goals (if any) related to building retrofits.

Along with energy audits, recommend retrofit measures found to be cost effective as budgeting allows.

I. What % on average of your building portfolio is retrofitted each year in the following categories (if any) - click [here](#) for further information:

Minor retrofits (e.g., low cost, easy to implement measures including caulking, lighting, adding roof insulation, etc.) (%): 10

Major retrofits (e.g., replacing windows and doors, equipment replacement such as boilers, etc.) (%): 10

Deep retrofits (e.g., replacing roof, replacing the heating, ventilation and air-conditioning system with a renewable technology like a ground-source heat pump, etc.) (%): 0

### e) Please describe your strategy's [re/retro-commissioning](#) goals (if any)?

N/A

I. What % on average of your building portfolio do you recommission each year?: 0

### f) Do you keep records of Refrigerant gases category and refilling volumes?

No

## II. What, if any, mitigation approaches have been considered? Please describe.

Fugitive emissions from vehicle fleet air conditioning are estimated to not comprise more than 1% of BC Transit's total emissions. An ongoing effort to collect or estimate emissions from this source would not be materially effective. For this reason, emissions from this source have been deemed out of scope and have not been included in BC Transit's total greenhouse gas emissions profile.

### g) How many newly constructed buildings received at least LEED Gold certification in 2018 : 0

I. How many newly constructed buildings did not receive LEED Gold certification?: 0

## II. Please explain why LEED Gold certification was not obtained.

No new buildings completed in 2018. LEED Gold standard is planned for future new transit operations and maintenance facilities approved in 2019 onwards.

## B. Mobile Sources (Vehicles, Off-road/portable Equipment): Fuel Combustion:

### 3. Actions taken by your organization in 2018 to support emissions reductions from mobile sources.

#### a) Do you have a strategy to reduce emissions from mobile sources?

No

#### b) Whether you have a strategy or not (3.a), briefly describe your organization's plans to continue reducing emissions from mobile sources:

##### I. Over the medium-term term (1-5 years)

All BC Transit employees have bus passes. Pool cars (battery-electric) are available when meeting logistics prevents transit use. The BC Transit non-revenue pool car fleet was tripled from a single Nissan Leaf to three Nissan Leafs in 2018. The pool cars travel on average 4-6000 kilometers per year. This will equate to avoiding between 1.5 -2 tonnes of CO<sub>2</sub>e (compared to our previous incumbent hybrid pool car vehicle).

In 2018, BC Transit replaced the Transit Supervisor fleet with seven Toyota Highlander hybrids, which have improved fuel efficiency over the vehicles that they are replacing.

It is expected there will be an expansion in capacity of CNG bus fleet in existing locations as well as the installation of CNG fueling facilities to convert fleet in Central Fraser Valley and Victoria Regional Transit Systems.

##### II. Over the long term (6-10 years)

Continue to distribute bus passes to employees. When appropriate invest in hybrid and electrical pool cars and encourage telecommunications in lieu of in-person meetings to reduce travel. Replace existing fleet with newer lower carbon technology and if technology and finances permit, zero-emission technology buses.

#### c) How many fleet vehicles did you purchase from the following categories:

Electric Vehicle – EV - (e.g., Nissan Leaf, Chevy Bolt): 2

"Plug In" Electric Vehicle – PHEV (e.g., plug-in Prius, Chevy Volt): 0

Hybrid vehicle – HEV – non "Plug In"- (e.g., Toyota Highlander Hybrid): 7

Hydrogen fuel cell vehicle : 0

Natural gas/propane: 33

Gas/diesel vehicle: 86

#### I. If you purchased new gas/diesel vehicles, can you briefly explain why vehicles from the other categories were not chosen?

Lower carbon options for our bus fleet (Hydrogen and Battery Electric) are currently not feasible. As the market for these technologies progresses, BC Transit will be investigating it's options to expand into these markets.

CNG fueling infrastructure and fleet transition costs are prohibitively expensive and thus is only expanded or utilized in a well planned and calculated format.

#### d) How many existing EV charging stations does your organization have in each category:

level 2: 2

level 3: 0

How many level 2 stations (if any) are specifically for your fleet vehicles: 2

How many level 3 stations (if any) are specifically for your fleet vehicles: 0

**e) How many EV charging station(s) did you install in 2018 in each category:**

level 2: 2

level 3: 2

How many level 2 stations (if any) were installed specifically for your fleet vehicles: 2

How many level 3 stations (if any) were installed specifically for your fleet vehicles: 2

**f) Other actions, please describe briefly (e.g. charging station feasibility studies, electrical panel upgrades, etc.)**

Underwent a trial of two types of battery electric bus (BEB) to investigate potential for using BEB's in the fleet. Upgrades necessary for the Level 3 charging infrastructure provided very useful information for planning for any future BEB utilization.

**4. Please indicate the number of the vehicles in the following vehicle classes that are in your current fleet (including any purchased in 2018):**

Definitions:

- Light duty vehicles (LDVs) are designated primarily for transport of passengers <13 and GVWR<3900kg
- Light duty trucks (LDTs) are designated primarily for transport of light-weight cargo or that are equipped with special features such as four-wheel drive for off-road operation (include SUVs, vans, trucks with a GVWR<3,900kg )
- Heavy duty vehicles (HDV) includes vehicles with a GVWR>3,900 kg (e.g. ¾ tonne pick-up truck, transport trucks)

**a) Light duty vehicles (LDVs)**

Electric Vehicles – EV - (e.g., Nissan Leaf, Chevy Bolt): 3

Hybrid vehicles – HEV – (e.g., non "Plug In"- older Toyota Prius, Toyota Camry hybrid): 5

**b) Light duty trucks (LDTs)**

Hybrid vehicles – HEV – (e.g., non "Plug In"- older Ford Escape Hybrid, older Chevrolet Silverado pickup hybrid etc): 7

Natural Gas/propane: 2

Gas/diesel: 9

**c) Heavy duty vehicles (HDV)**

Natural Gas/propane: 128

Gas/diesel: 1025

**5. Please indicate the number of the vehicles you plan to replace in your fleet:**

How much do you budget per LDV?: 50000

How many LDVs do you plan to procure annually over the next 5 years?: 1

How much do you budget per LDT?: 130000

How many LDTs do you plan to replace annually over the next 5 years?: 3

How many HDVs do you plan to replace annually over the next 5 years?: 537



**C. Office Paper: Indicate which actions your PSO took in 2018:****6. Actions taken by your organization in 2018 to support emissions reductions from paper supplies.****a) Do you have an Office Paper strategy?**

No

**b) Whether you have a strategy or not (6.a), briefly describe your organization's plans to continue reducing emissions from paper use:****I. Over the medium-term (1-5 years)**

Over 99% of all paper purchased under reporting guidelines is between 30 to 40% recycled content. We continued to review opportunities to further increase our post-consumer content in purchased paper.

Using laptops and smart devices are encouraged reducing paper consumption and double sided printing is encouraged whenever possible and all software has been defaulted to print double sided.

**II. Over the long term (6-10 years)**

Transition towards electronic communication with the NextRide technology to reduce the number of printed riders guides. Electronic forms of payment are being investigated that will reduce the number of paper tickets and passes being printed. Other forms of electronic communication will be investigated as available to reduce administration paper use.

**c) Have an awareness campaign focused on reducing office paper use**

No

**d) Purchased alternate source paper (bamboo, hemp, wheat, etc.)**

No