



## 2018 Carbon Neutral Action Report

Plans and actions taken to reduce greenhouse gas emissions at the University of the Fraser Valley



This 2018 Carbon Neutral Action Report contains the University of the Fraser Valley's emissions profile, offsets purchased, the actions we have taken in 2018 to reduce greenhouse gas (GHG) emissions, and our plans to continue reducing emissions in 2019 and beyond.

By June 30<sup>th</sup>, 2019, UFV's final CNAR will be posted to our website at: <http://www.ufv.ca/energy/>.

## Executive Summary:

### Our Mandate - Engaging learners, transforming lives, building community.

It continues to be UFV's vision to provide the best undergraduate education in Canada and to be a leader of the social, cultural, economic and environmentally responsible development in the Fraser Valley. High value is placed on environmental, social, and economic sustainability in all institutional endeavours.

UFV remains committed to, and is actively pursuing the Strategic Direction by assuming a position of environmental stewardship, leadership, and vision, not just in meeting our legislative mandates for GHG reduction targets, but also in the inspiration and enabling of environmental awareness and change in both student learning and campus growth. The University continuously strives to be sustainable wherever economic and feasible, by design and retrofit through campus planning, through awareness and behavioural change within the learning community, and promoting initiatives and leadership inclusive of operations, curriculum, and the engagement of students and employees.

In 2018, approximately 15,000 students attended UFV. The University is expected to experience an average growth rate of -1,000 students per annum as UFV and the City of Abbotsford establish their U-District of the area surrounding the existing campus footprint.

### Campus Expansion Increases Impacts of Actions:

Our 2018 report figures are evidence of the number of sustainability actions completed in the years leading up to, and including the reporting year. Each action contributed significantly to our long-term goal of reducing UFV's energy consumption and carbon footprint. 2018 was characterised by slightly below average spring temperatures, and above average fall and winter temperatures. In 2018, UFV's building footprint changed with the and the addition of CEP Building S (2,397m<sup>2</sup>) in February and Abbotsford Building K (5,376m<sup>2</sup>) in October, and the subtraction of CEP Building N (1,720m<sup>2</sup>) in April and as such the University within the calendar year managed and maintained 100,387m<sup>2</sup> of total core building space with an increasing scrutiny on environmental sustainability throughout all spaces.

The recent addition of campus buildings, retrofits and sales/leases of buildings will require the university to focus increasingly on metrics that normalize energy use based on space to provide a more functional perspective on GHG emissions consumption, reduction and targets. The Sustainable Energy Management Plan (SEMP) has provided the framework required to link together all aspects of energy management at UFV, the changes we have experienced in 2018 require an increased urgency for UFV to invest in de-carbonization by upgrading capital

equipment, supporting electrification, and investing in innovative technologies. The SEMP will continue to provide direction for our actions based on evidence rooted in data.

### Student Engagement in Sustainability:

UFV continues to benefit from a growing culture of sustainability among students and employees, and sustainability issues are increasingly the subject of student and faculty research. UFV values the trust of our communities, not just to educate, but to inspire and foster leadership in environmental awareness. 2018 marked our ninth year with the student sustainability internship position in Facilities Management. This one-year position offers the opportunity for a student near to graduation, demonstrating active engagement in sustainability issues, to develop and implement projects that contribute to a culture of sustainability on campus and within the broader community. Travis Gingerich held this position from mid-2016 until his graduation in early 2018. His contributions to sustainability, energy efficiency and climate change education was substantial. Travis has left a lasting impression on the organization and his efforts have been instrumental in facilitating and inspiring positive change. Sharisse Birk, BBA student, joined the team in the Student Sustainability Coordinator role for the remainder of 2018 and into 2019.

The sustainability legacy of the students' work continues to grow: There is now a general awareness by students to conserve energy on campus (and at home), and growing reliance on both public transit and the intercampus shuttle service to get to UFV campuses. Newly upgraded water fill stations and comprehensive waste stations are heavily used. Sustainability is widely practiced, and indeed, expected by the students and employees at all UFV sites. This year the focus of the sustainability coordinator has been to promote recycling, energy saving, and awareness through various social media outlets. Students have continued to volunteer for events related to sustainability on campus, from simple tabling events to waste audits. It is clear that students are passionate about and willing to commit their time to improving sustainability on campus.

### Centre for Sustainability:

The Centre for Sustainability maintained its place within the organization which has provided a legacy of championing and supporting environmentally responsible actions and initiatives within the UFV community. The advisory committee is comprised of three facilities personnel, one faculty, and one student. Energy Manager, Blair McFarlane, continued to oversee energy efficiency projects and initiatives, the SCA, and sustainability campaigns. Patrick Harrison, known to many at UFV and throughout the community for his lasting work on sustainability as Chair of the Centre for Sustainability (CFS), maintained an integral voice in all things green at UFV. The Director of Campus Planning and Facilities Management, Mark Goudsblom, and Associate Director of Building Systems Sheldon Marche continued to serve the advisory committee with unique perspectives and a wealth of experience. The changes and shifts in structure of the Centre for Sustainability in 2016 created numerous opportunities for the leadership group to excel, excite and motivate students, staff and faculty to reduce their environmental pact while on campus, as well as in their home communities. In 2018 further progress was made on those fronts.

## Executive Summary (Continued)

### 2018 Greenhouse Gas Emissions

The carbon footprint for the University of the Fraser Valley registered at 2,380 tCO<sub>2</sub>e in 2018; that value was significantly lower than the last year's value of 2,701 tCO<sub>2</sub>e. In relation to the University's activity as measured by on campus full time equivalent (FTE) student enrolment (7,951), the 2018 carbon footprint was reduced to its lowest level since tracking the metric in 2012. Last year's value of 0.359 tCO<sub>2</sub>e/FTE was reduced to 0.299 tCO<sub>2</sub>e/FTE, a decrease of 20% in GHG emissions when factoring a 5.4% increase in student enrolment.

It should be noted that the year started with slightly below average temperatures in the first third, and above average temperatures for the final third of the year which leveled out the heating load energy consumption in the heating seasons. The information provided throughout this report has not been normalized for weather, as we are reporting unaltered data. The 13.5% decrease in stationary combustion (primarily natural gas for heating) resulted from warmer overall temperatures in 2018 and supported by a number of internal and external factors. Mechanical system upgrades, HVAC schedules and increased DDC monitoring, and energy retrofits and behaviour change campaigns. UFV consumed 6,002 less gigajoules in 2018 compared to 2017. This figure represents a significant reduction from the 10 years average.

Fleet emissions identified in 2018 are lower than typical (and significantly lower than last year) due to two key factors: the replacement of a shipping van with an electric vehicle in August which coincided with the re-organizing the logistics department. While fleet emissions account for a small amount of emissions, alternative low-carbon transportation can have a significant impact on the culture of low-carbon economies. Fuel consumption decreased by 2,942 litres in comparison to 2017 and is now lower than the average since 2013 when more vehicles were added to the inventory. With the increasing importance of GHG emissions reduction there will continued efforts to electrify UFV vehicles in 2019 and beyond.

In 2018, UFV decreased its consumption in the use and purchase of paper stock. Paper consumption was down a significant 15.9% compared to 2017, with 1630 less packages purchased compared to last year's totals, resulting in a reduction of additional 9.1 tCO<sub>2</sub>e. These figures speak to the behavioural changes on campus as paper reduction continues to trend downwards resulting in an outstanding 82% decline in paper purchases from 2010 levels: that equates to 8,265 less packages of paper purchased in 2018 alone.

### Offsets Purchased to Become Carbon Neutral

In 2018, the University purchased offsets for 2,380 tCO<sub>2</sub>e valued at \$62,475 (including GST).

## EMISSIONS REDUCTION ACTIVITIES

<i>University of the Fraser Valley's GHG Emissions and Offset for 2018 (tCO<sub>2</sub>e)</i>	
<b>GHG Emissions created in Calendar Year 2018</b>	
Total Emissions (tCO <sub>2</sub> e)	2381
Total BioCO <sub>2</sub>	1.08
Total Offsets (tCO <sub>2</sub> e)	2380
<b>Adjustments to GHG Emissions Reported in Prior Years</b>	
Total Emissions (tCO <sub>2</sub> e)	2381
Total Offsets (tCO <sub>2</sub> e)	2380
<b>Grand Total Offsets for the 2018 Reporting Year</b>	
Grand Total Offsets Required (tCO <sub>2</sub> e)	2380
Total Offset Investment	\$59,500

Executive sign-off:

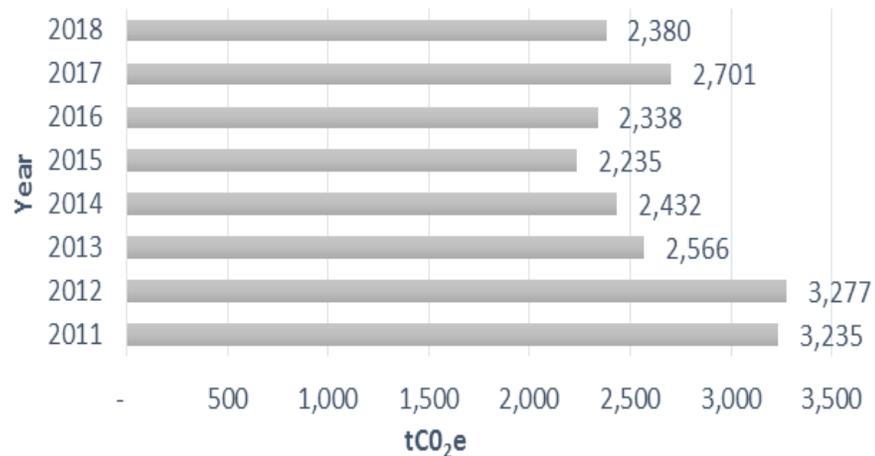
  
Signature

May 24, 2019  
Date

Bethy Bretzcker  
Name (please print)

Acting CFO & VP Administration  
Title

## GHG Emission Comparison

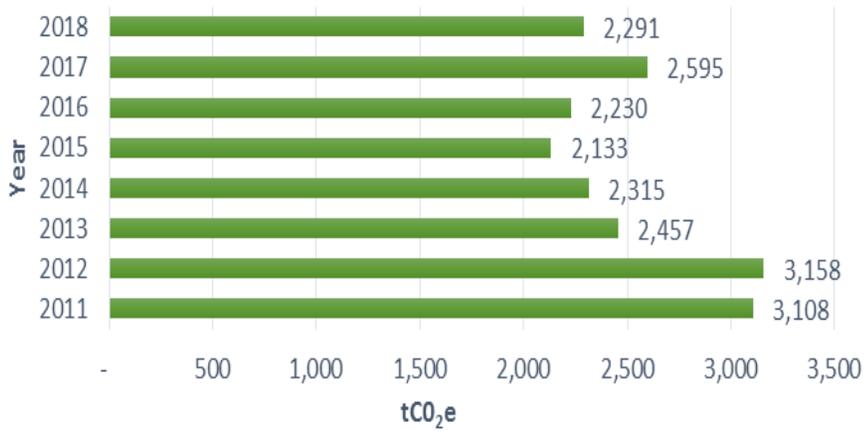


## UFV's GHG Emissions by Source

In 2018, UFV's total GHG emissions were 2,380 tonnes of CO<sub>2</sub> equivalent. The most significant emissions source was from buildings as natural gas is used for heating and space and water, cooking, and to a lesser degree the carbon in the electrical grid which is 98% carbon emission free. Natural gas and electricity used in buildings combined for 96.3% of UFV's total emissions. Paper consumption at 2.5% and mobile (fleet) combustion rounding out a minor 1.3% were the remaining sources of emissions in 2018.



## Buildings

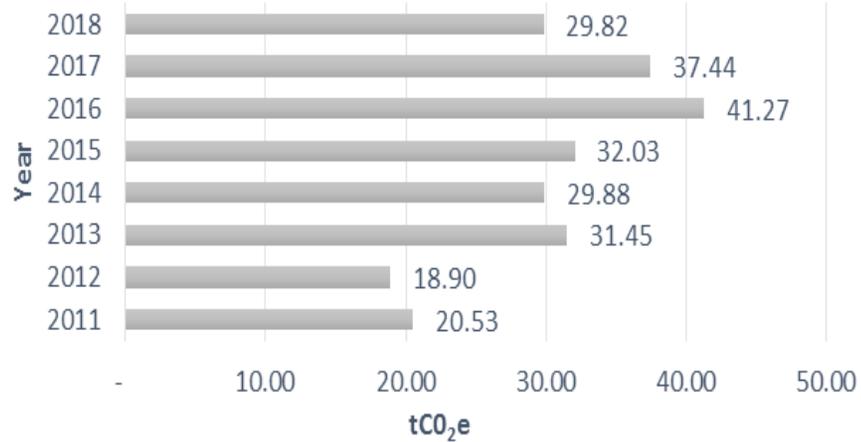


## Buildings

A number of mechanical system upgrades, building energy retrofits, and behaviour change campaigns reduced carbon emissions in the built environment which resulted in a 14.1% decrease in natural gas use. When accounting for the changes in building portfolios and the amount of space needing heating, the efficiency (tCO<sub>2</sub>e/HDD/m<sup>2</sup>) of carbon emitting systems at 6.2% lower than the previous year. It took 6,002 less gigajoules in 2018 compared to 2017 to heat spaces and domestic water at UFV.



## Fleet

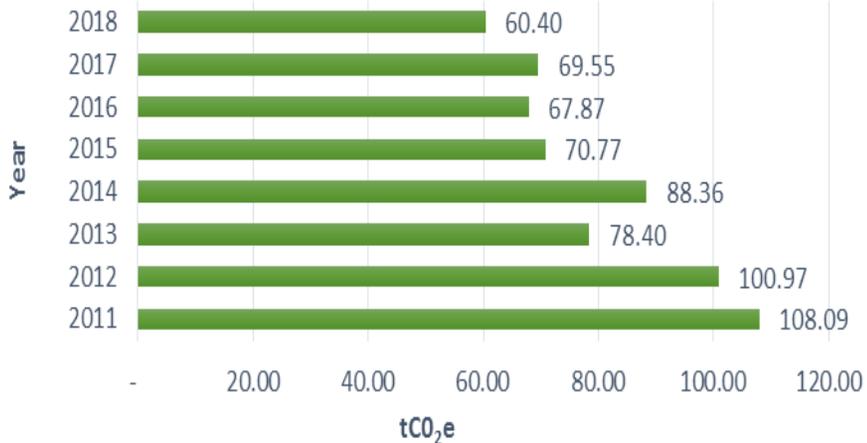


## Fleet

After identifying missing fleet vehicles from our inventory in 2013 and again in 2017, a further reduction in fuel consumption in 2018 data. Overall, there was a 2,942L reduction in fuel consumption in 2018 from the previous year. The driving force behind these significant reductions is due to an old shipping van being replaced with a zero-emission electric vehicle. Additionally, the restructuring of logistics operations in August 2018 significantly reduced fuel purchases for UFV vehicles.

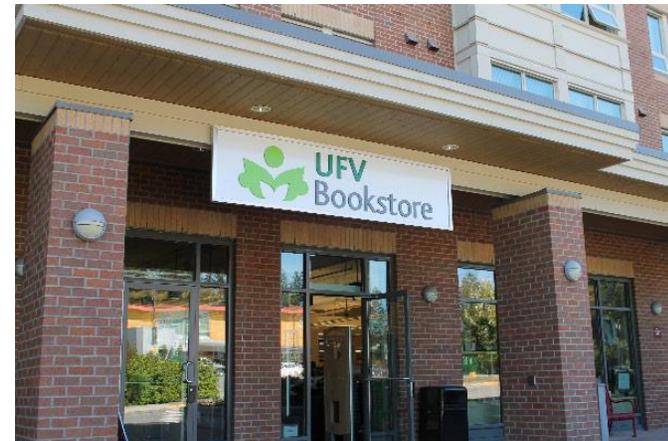


## Paper



## Paper

In 2018, UFV drastically reduced the purchase and use of recycled paper stock at UFV. Paper consumption was nearly 16% less than the previous year, which resulted in avoiding 1630 packages of paper (9.1tCO<sub>2</sub>e). Overall, six of the previous eight years have had year-over-year reductions in paper purchases. UFV is on the right path and will continue to identify opportunities to digitize paperwork. Paper purchases have decreased by 80.4% from the peak in 2010, and related emissions have dropped by 82.7% over that same period.



## OPERATIONAL CHANGES IN 2018

2018 presented a few significant challenges, and many successes as we progress to a more carbon-responsible organization.

UFV engaged with FortisBC and CleanO2 to participate in a pilot project in which a micro-carbon capture unit was installed in the Abbotsford B building for the purpose of measuring and verifying the functionality of the technology. This carbon capture unit is expected to scrub 15% of carbon from the flue stack that would otherwise be exhausted into atmosphere, pulling waste heat from the flue and put through a heat exchanger preheating domestic hot water, reducing natural gas use. A chemical reaction in the chamber produces a carbon byproduct that can be sold on the open market.

UFV partnered with another innovative product from Pace Chemicals. EndoTherm is a solution that is added into hydronic heating systems to reduce surface tension and promote the transfer of heat, in turn increasing system efficiencies and reducing natural gas use. EndoTherm was installed in 9 buildings at two campuses. Preliminary results have shown 10-15% savings in weather corrected natural gas use.

October 10, 2018, the Enbridge Pipeline explosion near Prince George, BC significantly impacted operations at UFV through the fall and winter of 2018/2019. FortisBC notified UFV that gas use under Rate 25 agreements must be curtailed as part of the Force Majeure. The Abbotsford campus, rate 25, was impacted by the Force Majeure and resulted in the significant reduction of indoor air temperatures for 6 weeks. The temperatures during this 6 week curtailment were significantly above average reducing natural gas savings that would otherwise have been realized.

The focus continues to be on increasing efficiency on existing systems, and experimenting with minor innovative technologies. It's expected that more impactful changes in processes and technology will be introduced into the operations of UFV.

## ACTIONS TO REDUCE PROVINCIAL EMISSIONS & IMPROVE SUSTAINABILITY

In addition to reducing our reportable emissions, below are examples of our commitment to sustainability and innovation:

### Mechanical Upgrades

- Abbotsford Bldgs ABCDGS EndoTherm Installations
- Abbotsford Bldg B FortisBC Carbon Capture Pilot
- Abbotsford Bldg H Residence faucets and showerheads upgrade
- Abbotsford Bldg E Solar Air Collector Energy Study
- Abbotsford Bldg G High Efficiency Boiler Purchases
- Abbotsford Electric Vehicle purchase
- Abbotsford Electric Vehicle Level 2 Charging Stations installations: Lot 10, 10b
- Abbotsford & CEP grounds electrification of landscaping hand tools
- CEP Electric Vehicle Level 2 Charging Stations installation: Lot 5
- CEP Bldgs AHT EndoTherm Installations
- CEP Bldg T interior LED lighting upgrade

### Energy Wise Network & Sustainability

The BC Hydro & FortisBC Energy Wise Network is a collaborative network made up of Advanced Education, Government, Schools (K-12), Hospitality, Municipalities, Property Management, and Retail sectors. This network supplanted the Workplace Conservation Awareness program and was initiated by BC Hydro and Fortis BC. The network provides campaign tool kits, professional coaching hours, networking opportunities, training webinars, and two summits per year providing the framework for many of the energy efficiency focused initiatives throughout 17/18.

Events & Campaigns:

- Energy & Sustainability Contest: Engaging with students and staff, encouraging them to participate in simple changes in their behaviours to reduce their environmental impact.
- Sweater Week: Lowering building temperatures and encouraging students, staff, faculty to wear layers - and sweaters, in an effort to lower GHG emissions and raise awareness of the effects of climate change.
- Energy Efficient Residence: Encouraging on-campus residents to discuss their energy-efficient habits and providing education on how to reduce their use of resources while living on campus.
- Waste Audit: 4<sup>th</sup> annual waste audit data outlined an increase in compliance. Landfill diversion projects were implemented.
- Experimenting with the using goats to remove invasive plant species in place of gas powered tools.

### Plans to Continue Reduction of Greenhouse Gas Emissions

In the upcoming year, we anticipate numerous energy audits, mechanical equipment upgrades, impactful LED upgrades, continued DDC optimization and a stronger sustainability culture throughout all levels of the UFV community.

### Links to Other Information Relevant to Sustainability

<http://www.ufv.ca/operations/cnar/>

<http://www.ufv.ca/energy/>

<http://www.ufv.ca/sustainability/>



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# Part 1: CNAR Survey

## 1. General Information

**Name:** Blair McFarlane

**Contact Email:** blair.mcfarlane@ufv.ca

**Organization Name:** University of the Fraser Valley

**Sector:** Post Secondary

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

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

Energy Manager: Yes

Sustainability Coordinator: No

Administrative Assistant: No

Facilities/Operations Manager/Coordinator: No

CEO/President/Exec Director: No

Treasurer/Accounting: No

Superintendent: No

## 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?

Yes

If yes above, what are the main goals?: Aligned with provincial goals:

40% reduction by 2030

60% reduction by 2040

80% reduction by 2050

#### 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)

UFV is committed to increasing energy efficiency in all core buildings through system and equipment retrofits, efficient scheduling and use of equipment and systems, and changing behaviours to increase efficiency.

UFV will develop a carbon emissions strategy in the summer of 2019 to create a path forward to decarbonizing operations.

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

Once buildings are optimized (energy efficient) the remaining emissions are much more approachable for new technologies to transition in place of older carbon intense systems.

On the strengths of the step code for new construction, and EfficiencyBC, FortisBC and BC Hydro incentive programs, UFV buildings will continue to see a reduction in carbon emissions and intensity.

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

Energy audits provide valuable information on energy use, costs and potential cost avoidance through system and equipment upgrades. Energy audits can be useful pathways to low-carbon lower cost operations.

I. What % on average of your building portfolio has an energy audit completed each year (if any)?: 5

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

UFV is committed to increasing energy efficiency in all core buildings through system and equipment retrofits, efficient scheduling and use of equipment and systems, and changing behaviours to increase efficiency. UFV will utilize innovative technologies wherever possible to reduce emissions and energy costs.

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.) (%): 5

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.) (%): 1

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

UFV has a lengthy history of participating in BC Hydro's Continuous Optimization retro-commissioning programs. UFV will continue to participate in similar programs as they become available.

I. What % on average of your building portfolio do you recommission each year?: 15

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

No

**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)

UFV is supportive of the transition from traditional internal combustion engines to electric and plug-in hybrid electric vehicles.

UFV in 2018 purchased its first electric vehicle, removing an old shipping van from the fleet. UFV installed two level 2 charging stations and one level 3 station in 2018/2019. More infrastructure and vehicle upgrades are planned in the coming years.

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

A comprehensive low-carbon transportation plan should be completed and enacted to ensure there are complimentary modes of active and zero-carbon transportation options for students and employees to utilize when commuting to and from UFV's regional campuses.

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

Electric Vehicle – EV - (e.g., Nissan Leaf, Chevy Bolt): 1

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

level 2: 5

level 3: 1

How many level 2 stations (if any) are specifically for your fleet vehicles: 0

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: 1

How many level 2 stations (if any) were installed specifically for your fleet vehicles: 0

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

**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): 1

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

Gas/diesel: 5

**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)

In 2019/2020 all multi-function devices are to be replaced. This will provide an opportunity to refresh the standard of double-sided printing.

There is a continued move towards digitization of standard documents.

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

No

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

No