

2019 CARBON NEUTRAL ACTION REPORT KWANTLEN POLYTECHNIC UNIVERSITY

Prepared by Facilities Services



KPU Wilson School of Design / KPMB & Public Architects / © 2018 Andrew Latreille

May 2020

2019 Carbon Neutral Action Report

Organization:

Kwantlen Polytechnic University.

Declaration statement:

This Carbon Neutral Action Report for the period January 1st, 2019 to December 31st, 2019 summarizes our emissions profile, the total offsets purchased to reach net-zero emissions, the actions we have taken in 2019 to reduce our greenhouse gas emissions, the results of actions taken, and our plans to continue efforts toward reducing emissions in 2020 and beyond.

By June 30, 2020, Kwantlen's final Carbon Neutral Action Report will be posted to our website at the following link: <https://www.kpu.ca/sustainability>.

Overview:

Actions taken in 2019 to minimize emissions

The following actions were taken at KPU Campuses in 2019 to minimize GHG emissions:

Kaizen CopperTree Software - KPU created a pilot project to enhance building automation system control and energy monitoring using Kaizen CopperTree Software. This system provides enhanced equipment operating data as well as energy consumption benchmarking that assists in identifying opportunities to reduce after-hours energy consumption and associated GHG emissions.

Langley Campus – Library Lighting: The lighting in the Library at Langley Campus was retrofitted with more energy-efficient LED lighting to reduce electrical energy consumption and associated GHG emissions.

Plans to continue reducing emissions in 2020 and beyond

Of the 2,422 tCO_{2e} KPU produced, 2,186 tCO_{2e} by burning natural gas. Improving efficiencies in heating systems and exploring alternative energy heating sources is key to achieving substantial GHG emissions reductions to meet statutory targets.

The following actions will be taken in 2020 to minimize greenhouse gas emissions:

Langley – Chiller Replacement: Replace the existing oversized chiller with one of the industry's most efficient magnetic bearing style chiller. The previous chiller could not meet low occupancy demands, and the building operators were required to cool unoccupied zones to keep the chiller from tripping out under low load conditions. This change will reduce energy consumption and emissions.

Heating System Efficiency Improvements – Geo-Exchange Cooling Tower: The feasibility of replacing ageing inefficient boilers with higher efficiency condensing boilers and heat distribution piping will be explored to increase system efficiencies. Geo-exchange systems will be fine-tuned to maximize system operational effectiveness and with opportunities for new geo-exchange fields being explored. Use of heat pumps sourced from geo-exchange fields, and air sourced heat exchangers, create opportunities to fuel switch heating systems from natural gas heating systems.

Cloverdale – BMS Optimization: Analysis of energy consumption indicates an increase in consumption and associated greenhouse gas emissions from the average consumption levels for this campus. This increase has been attributed to the building automation system tuning, which will be evaluated and optimized to correct this increase and reduce GHG emissions.

Langley ISH Research Greenhouse – Geothermal System: When it was constructed, the ISH Research Greenhouse had a geothermal system installed for education. This system will be evaluated to see if it can be modified to heat this building and still be used for education. This greenhouse is currently heated with a non-condensing boiler that is approximately 70% efficient.

Surrey – Optimize Spruce Building: The recently constructed Spruce building was a design-build project due to a very constrained project schedule necessary to receive funding. Unfortunately, this has resulted in the energy performance being affected and increases in the overall energy consumption, most notably natural gas which affects the greenhouse gas emissions at Surrey Campus. This building will be evaluated and modified to reduce the energy consumption and associated greenhouse gas emissions.

Surrey – Geothermal System: The Surrey Campus was constructed in 1990 and is the oldest KPU campus. Some of the newer buildings at Surrey are on geothermal systems for heating and cooling, but despite this, Surrey has the highest average intensity per square meter of greenhouse gas emissions of KPU's academic campuses. This means that older buildings and equipment are less energy-efficient and produce more GHG emissions than the other campuses and that there is significant potential to reduce greenhouse gas emissions. One approach to significantly reduce greenhouse gas emissions would be to expand the existing geothermal system and switch more of the buildings to geothermal heating and cooling. In 2020 a feasibility study will be conducted to determine if this can be achieved, how long it would take, and to determine the estimated costs.

Surrey Cedar – Retrofit Rooftop Units to Condensing Technology: The Cedar building at Surrey Campus has stand-alone heating provided by seven natural gas-fired rooftop RTU HVAC units installed when the building was constructed in 1990. These RTU units have natural gas-fired heat exchangers that are approximately 70% efficient. Replacing these units with new natural gas units that use condensing heat exchanger technology would increase the efficiency of the natural gas usage to 98%. In addition, the air conditioning systems on the new units would use modern refrigerants, which would have a lower environmental impact. The feasibility study for geothermal at Surrey will include an evaluation of the practicality of adding these systems to geothermal or if an upgrade to condensing technology is more feasible.

Kaizen CopperTree Software – The pilot project conducted last year will be expanded to further improve energy efficiency and reduce associated greenhouse gas emissions.

[Additional Information:](#)

In 2000, KPU implemented a major energy conservation project that significantly reduced energy consumption and carbon emissions, and between 2000 and 2007, KPU completed several other energy conservation projects. By 2007 these projects had reduced energy consumption by 11% for electricity and 6% for natural gas even though campus size had increased in area by 10%.

When Bill 44 legislation to reduce greenhouse gas emissions was passed in 2007, and the targets were set as percentage reductions of total emissions based on reducing GHG emission levels from 2007, KPU's emissions had already had significant reductions due to the energy conservation projects, and in 2007 KPU generated 2,710 tCO_{2e} of emissions.

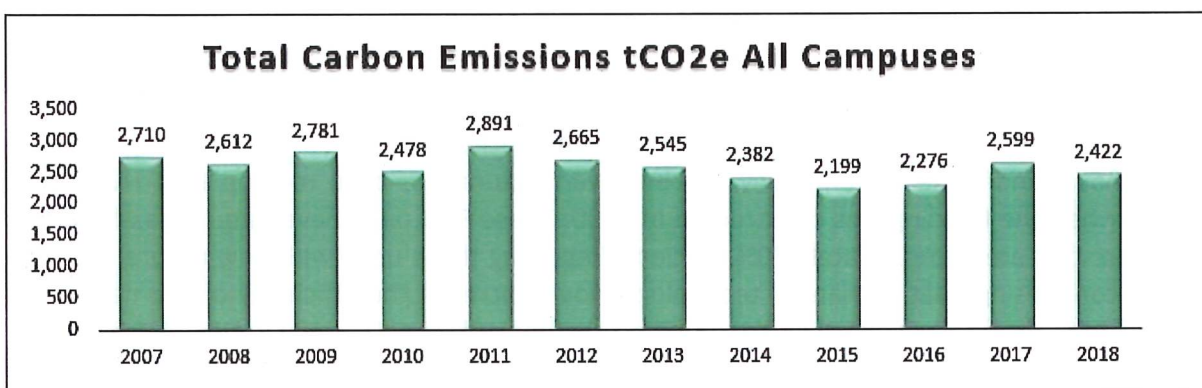
KPU's space utilization has increased in recent years due to increases in student enrollment and longer hours of operation in some areas. There is also increased campus use on weekends, evenings, and during the summer semester.

Growth is another issue affecting KPU's emissions as the university continues to expand and add new campuses and buildings. From the 2007 baseline year to 2018, KPU increased its overall building area by 20.2%. During this same period, KPU was able to decrease carbon emissions by 10.6%.

In terms of overall efficiency, KPU produced 28.6% less emissions in tCO_{2e} per square meter in 2018 than it did in KPU's 2007 base year.

Opportunities supporting efforts to reduce greenhouse gas emissions include the capital renewal and deferred maintenance funding from the Province that has helped to initiate infrastructure renewal and replacement projects that also reduce energy consumption and associated greenhouse gas emissions. KPU is prioritizing these types of projects while funding is available and is focusing staffing and resources on supporting these projects to successful completion. This funding is essential to make the changes and improvements to meet legislated GHG reduction targets.

Carbon emissions reported on the KPU CNAR report from previous years are as follows:

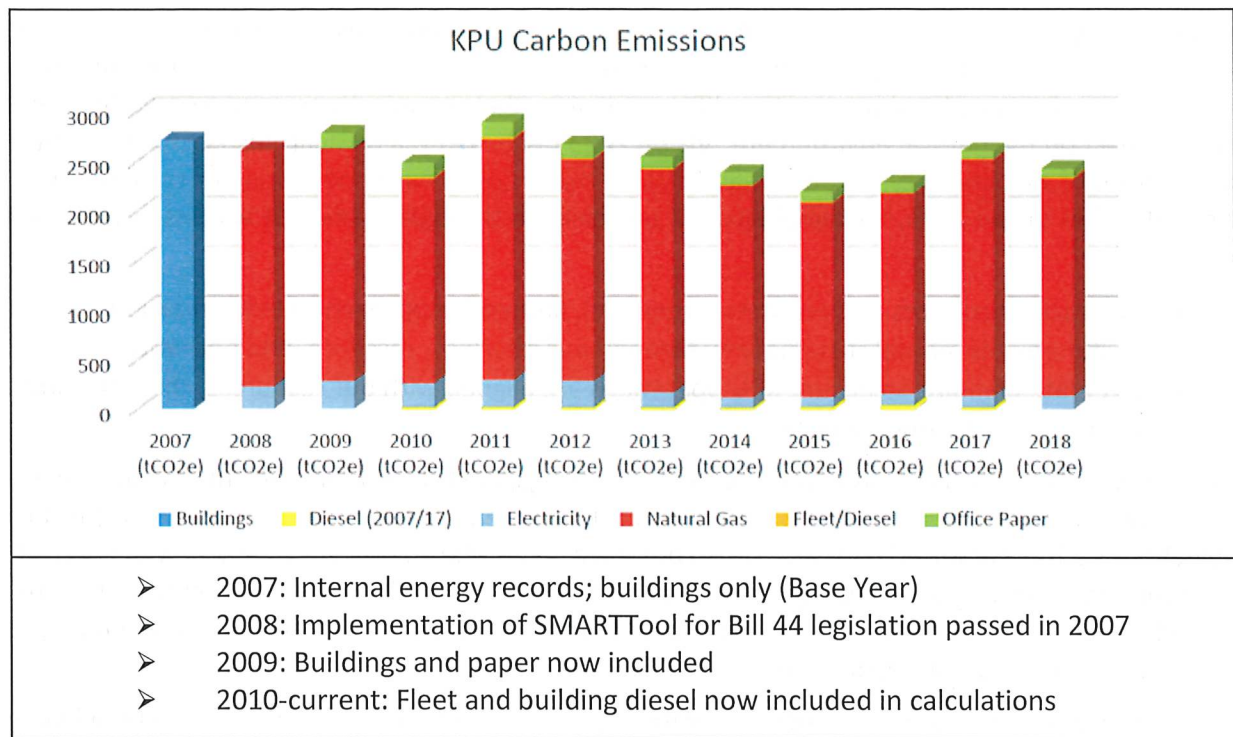


KPU has been carbon neutral since 2010 through annual purchases of carbon offsets to offset greenhouse gas emissions.

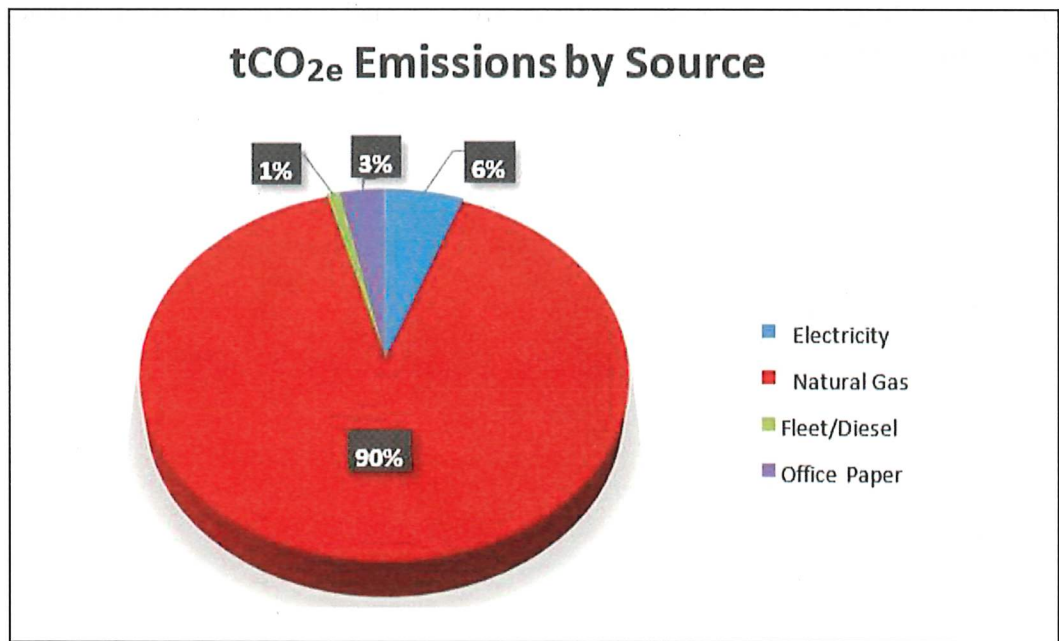
The most recent legislated target KPU faces is the 40% reduction of GHG emissions from the 2007 benchmarking level by the end of 2030. KPU will need to target its natural gas consumption even more to achieve legislated reduction thresholds.

In 2019 carbon emissions for buildings used 2018 emissions levels as instructed by the Provincial Government and which were 2,422 tCO_{2e}, producing a 10.6% reduction in emissions from the comparative 2007 buildings emission level.

The chart below illustrates KPU’s emissions from 2007 base year to 2018:



Of the 2,422 tCO_{2e} KPU produced, **2,186 tCO_{2e}** by burning natural gas. Improving efficiencies in heating systems and exploring alternative energy heating sources is key to achieving substantial GHG emissions reductions to meet statutory targets.



Overall Initiatives which tie in with GHG Emissions Reductions

At KPU Energy Conservation and reducing carbon emissions is a core consideration when completing new expansions, renovating buildings, upgrading ageing infrastructure, and optimizing daily operations. From a global perspective, KPU recognizes that organizations need to greatly reduce their impact on the natural environment. **Vision 2023** defines KPU as a “learning ecosystem rooted in a culture of sustainability, creativity, and quality that inspires our people and our communities.” As outlined in Vision 2023, Sustainability will be achieved through a series of actions in which we will:

- Embrace all cultures and promote a renewed, authentic approach to Indigenization.
- Foster environmental sustainability through our offerings, research, and operations.
- Integrate planning to ensure KPU operations are aligned with our resources, thus sustaining quality and institutional health.

To that end, along with the numerous curricular offerings, KPU strives for efficient and sustainable outcomes in all its service delivery; examples include green procurement practices and product selections such as enhanced recycled paper content; a comprehensive waste management program; technological solutions for meeting rooms and office PC's (the addition of cameras) to reduce the need for travel between campuses; promoting alternative transportation such as an intercampus shuttle, bike lockers, bike repair stations, and showers.

KPU strives to reduce the consumption of water, electricity, and natural gas so that KPU is a leader to others in our sector and the community. Continued partnerships contribute to KPU's energy conservation success. These efforts have been achieved through the support of our many partners, including design professionals, service technicians, building operators, BC Hydro, NRCan, the Province of British Columbia and more. Much of the energy efficiency work we have performed has been funded by either future avoided energy costs, or from financial assistance from NRCan, BCHydro, and, our most valued partner, the Province of British Columbia.

Emissions and Offsets Summary Table

Kwantlen Polytechnic University GHG Emissions and Offsets for 2019.	
As per the Directive issued March 31, 2020, each PSO will use their 2018 GHG Emissions as a placeholder for the purposes of their 2019 CNAR.	
Total Emissions (tCO ₂ e)	2422.702459
Total BioCO ₂	.702459
Total Offsets (tCO ₂ e)	2422
Offset Investment (\$25 per tCO ₂ e) (Total Offsets: 2422 x \$25/ tCO ₂ e)	\$60,550

Retirement of Offsets:

In accordance with the requirements of the *Climate Change Accountability Act* and Carbon Neutral Government Regulation, Kwantlen Polytechnic University (**the Organization**) is responsible for arranging for the retirement of the offsets obligation reported above for the 2019 calendar year, together with any adjustments reported for past calendar years (if applicable). The Organization hereby agrees that, in exchange for the Ministry of Environment and Climate Change Strategy (**the Ministry**) 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:

<p>Candice C Gartry</p> <p><small>Digitally signed by Candice C Gartry DN: cn=Candice C Gartry, o=Kwantlen Polytechnic University, ou=Financial Services, email=candice.gartry@kpuc.ca, c=CA Date: 2020.05.25 16:12:26 -07'00'</small></p>	<p>May 25, 2020</p>
<p>Signature</p>	<p>Date</p>
<p>Candice Gartry</p> <p>Name (please print)</p>	<p>Executive Director, Financial Services (Interim)</p> <p>Title Chief Financial Officer (Interim)</p>

Confirmation number: 00C3374F

Submitted date: 2020-06-25 12:19:38 Pacific Daylight Time

Carbon Neutral Action Report Survey - 2019

Public sector organizations (PSOs) are required to complete this survey, in addition to a Carbon Neutral Action Report (CNAR) as mandated by BC's [Climate Change Accountability Act](#) and the [Carbon Neutral Government Regulation](#).

Due to the COVID-19 pandemic, the following [Directive](#) was issued on March 31, 2020. Certain deadlines were also extended for the 2019 reporting year (see below).

March 31, 2020 Directive:

Under my authority as the Director for the purposes of the Act, and under the authority delegated to me in Section 6 of the Carbon Neutral Government Regulation, I hereby direct that all ministries and Public Sector Organizations covered by the Carbon Neutral Government requirement shall use their 2018 GHG emissions as a temporary estimate for their actual 2019 GHG emissions, for the purposes of the 2019 Carbon Neutral Action Reports and 2019 Carbon Neutral Government reporting required under the Climate Change Accountability Act.

Neil Dobson, Executive Director, Clean BC Implementation
Climate Action Secretariat

Although 2018 emissions data will be used as a placeholder for 2019, **all other (qualitative) components of the CNAR and CNAR Survey are to be completed with information from 2019 (e.g., actions taken or planned to reduce emissions)**. The only change to the survey is that the deadline was extended by one month to June 30, 2020.

This survey is divided into two parts:

Part 1 - Will be made public on the Climate Action Secretariat (CAS) [website](#) after June 30, 2020; however, it will not be appended directly to each individual PSO CNAR as was done in previous years. This section collects details about actions taken or planned to reduce emissions and is intended to supplement the legislative requirements in your CNAR.

Part 2 - Will NOT be made public. Information you provide in this section is important and will be used internally to help CAS staff with planning for emissions reduction and climate change adaptation initiatives. Although not required, PSOs are highly encouraged to complete Part 2.

Note: Survey progress can be saved at any time by clicking the "Save and continue later" button at the bottom of each page. A new window will open and you will be asked to provide your name and email. An email will be sent to you from Carbon.Neutral@gov.bc.ca with the subject line: "Questionnaire Link", which will include a hyperlink for the "Project: Carbon Neutral Action Report Survey – Broader Public Sector 2019". You can then continue responding at another time or email the hyperlink to a colleague to complete remaining section(s).

May 29, 2020	<ul style="list-style-type: none">The final, signed version of the CNAR (or Small Emitters Form) must be submitted by email to: Carbon.Neutral@gov.bc.ca
June 30, 2020*	<ul style="list-style-type: none">Ministry of Environment and Climate Change Strategy must post a final CNAR for each organization on the BC Government's CNG website and each PSO is encouraged to post the report on their website.The CNAR Survey (optional for Small Emitters) must be completed and submitted online. <p>*Deadline extended from May 29, 2020.</p> <ul style="list-style-type: none"><u>All offset invoice payments must be submitted to CAS.</u>
Sept 30, 2020*	<ul style="list-style-type: none">Clean Government Reporting Tool (CGRT) Data Entry must be completed for the 2019 reporting year.

	*Deadline extended from April 30, 2020.
Oct 15, 2020*	<ul style="list-style-type: none"> • Self-Certification checklist must be completed, signed and submitted by email to: Carbon.Neutral@gov.bc.ca. *Deadline extended from May 15, 2020.

*See the [Carbon Neutral Government – Program Requirements website](#) for more information on program requirements, timelines and templates.

PART 1 - Included as part of your public CNAR report.

Reminder that Part 1 will be made public on the CAS [website](#).

Contact Name:
Shawn Cahill
Contact Email:
shawn.cahill@kpu.ca
Organization Name:
Kwantlen Polytechnic University
Role – Please select the best category for your current role with your organization. If more than one individual completed the survey, multiple categories may be selected:
Facilities/Operations Manager/Coordinator
Please select your sector:
Post Secondary (PS)

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

Actions taken by your organization in 2019 to support emissions reductions from buildings

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

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

Over the medium-term term (1-5 years)
<p>The University is undergoing master planning including an energy model exercise to try and reduce dependency on natural gas.</p> <p>Continued optimized zone and equipment controlling through advanced automated building controls .</p> <p>Capital renewal program is targeting lowest efficiency (highest energy wasters) and highest risk equipment for replacement.</p> <p>Capital builds to include focused energy modelling and building optimization, including alternate fuels to natural gas where viable. Constant monitoring and optimization of building operations: user and building operator awareness and refresher training; infrastructure improvements to enhance energy conservation (eg :upgrades automated building controls/ higher efficiency mechanical equipment): minimum LEED Gold for new capital construction and Silver for Major renovations: same principles for minor renovation.</p> <p>Sustainability embedded in University Mission and Vision (Vision 2023)</p>

Over the long term (6-10 years)

*Continued long term investments in the most optimally designed /redesigned capital improvements.
Explore alternate fuel sources to maintain buildings.
Develop a robust Utility Management Plan with university wide stakeholder engagement.
Develop and recruit sophisticated teams that have the technical competencies to optimize building design and use.*

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

Currently the most effective and reactive auditing is done daily through our automated building controls software, looking at equipment function, set points, occupancy, and time of day schedules .

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

Ongoing motoring of building energy consumption being tracked through our building control systems. Anomalies in energy consumption are investigated to determine if equipment and building systems are operating efficiently. KPU maintains detailed energy records for each building for all campuses as a comparable for yearly historical consumption. 95%

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

*Capital builds to design to the most sustainable and energy efficient modelling possible (minimum LEED Silver or higher) and include focused energy modelling and building optimization, including alternate fuels to natural g as where viable.
Continued long term investments in the most optimally designed /redesigned capital improvements .
Explore alternate fuel sources to maintain buildings.*

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

5%

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.)

3%

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.)

5%

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

*Actively reviewing equipment that currently on natural gas and looking for opportunities for alternate fuels when replacing. Deferred Maintenance program is targeting lowest efficiency (highest energy wasters) and highest risk equipment for replacement with the most efficient and maintenance free equipment.
Equipment replacement must have the design features to be controlled by the DDC system including variable speed drives, dampers, and other features that provide maximum zone controlling.
Built in Return on Investment (ROI) into each equipment evaluation.*

What % on average of your building portfolio do you recommission each year?

2%

Do you keep records of Refrigerant gases¹ category and refilling volumes?

[1] Fugitive emissions from stationary cooling equipment are attributed to the leakage and loss of HFC and PFC based coolants from air conditioning and commercial type refrigeration systems. Coolant loss can occur during the manufacturing, operation, and disposal of such equipment. Gases that may be reported via CGRT include HFC R-134, HFC R-134a, HFC R-404a, HFC R-407c, HFC R-410a.

Yes

If yes, have you quantified and reported the associated emissions? What, if any, mitigation approaches have been considered? Please describe

No.

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

Refrigerant gases are only associated with sealed mechanical cooling equipment and volumes are below the threshold for recording and are not regularly required to be refilled in normal (non-maintenance) operations.

How many newly constructed buildings received at least LEED Gold certification in 2019?

1

How many newly constructed buildings did not receive LEED Gold certification?

0

Please explain why LEED Gold certification was not obtained for those new buildings.

N/A

Other actions? Please describe briefly:

None

Mobile Sources (Fleet Vehicles, Off-road/portable Equipment): Fuel Combustion:

Actions taken by your organization in 2019 to support emissions reductions from mobile sources?

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

Yes

Whether you have a strategy or not, briefly describe your organization's plans to continue reducing emissions from mobile sources:

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

Continue to source fuel efficient vehicles (gas/diesel/electric) for KPU fleet.

Over the long term (6-10 years)

KPU fleet will be comprised of the maximum number of electric vehicles possible.

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

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

0

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

0

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

0

Hydrogen fuel cell vehicle

0

Natural gas/propane

0

Gas/diesel vehicle

4

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

We purchased 3 in 2019 and 1 in 2020.

Decision was based on market conditions for the need; cargo vans and dump trucks do not have electric options at this time.

Actions taken by your organization in 2019 to support emissions reductions from mobile sources? (Continued)

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

Level 2?

6

Level 3?

0

How many level 2 stations (if any) are specifically for your fleet vehicles?
As defined as Level 2 stations only your organization's fleet vehicles may use

0

How many level 3 stations (if any) are specifically for your fleet vehicles?
As defined as Level 3 stations only your organization's fleet vehicles may use

0

How many EV charging station(s) did you install in 2019 in each category:

Level 2?

0

Level 3?

0

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

As defined in the previous section

0

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

As defined in the previous section

0

Please briefly describe any other related actions, (e.g. charging station feasibility studies, electrical panel upgrades, etc.)

We have 7 level 1 EV charging stations.

At the KPU Tech campus (Trades campus) existing 120 V charging stations are being explored as an upgrade to Level 2 as part of an exterior lighting improvement project this coming year.

Budget requested for FY20/21 for feasibility and installation of adding level 2 stations

Please indicate the total number of the vehicles in the following vehicle classes that are in your current fleet

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)

Light duty vehicles (LDVs)

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

0

“Plug In” Electric Vehicle – PHEV -- (e.g., plug-in Prius, Chevy Volt)

0

Hybrid vehicles – HEV – (e.g., non “Plug In”- older Toyota Prius, Toyota Camry hybrid)

1

Hydrogen fuel cell vehicles

0

Natural gas/propane

0

Gas/diesel

0

Light duty trucks (LDTs)

Electric Vehicles – EV

0

"Plug In" Electric Vehicle – PHEV

0

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

0

Hydrogen fuel cell vehicles

0

Natural Gas/propane

0

Gas/diesel

13

Heavy duty vehicles (HDV)

Electric Vehicles – EV

0

"Plug In" Electric Vehicle – PHEV

0

Hybrid vehicles – HEV – (e.g., non "Plug In")

0

Hydrogen fuel cell vehicles

0

Natural Gas/propane

0

Gas/diesel

0

Actions taken by your organization in 2019 to support emissions reductions from paper supplies.

Briefly describe your organization's plans to continue reducing emissions from paper use:

Over the medium-term (1-5 years)

Currently have a Print management software (Papercut) that allows for pay for print/card access release/and cancellation of print jobs. Introduction of this software saw significant paper use reductions in its first year. Consulting with BC Net to test sugar paper and other alternate sustainable products. Working with Spicers (paper supplier) to source alternate paper products where possible. Looking into FSC Certification.

Over the long term (6-10 years)

Work with key stakeholders to use social media and other online internal and external marketing tools rather than poster campaigns.

Watch for trends in teaching that use online teaching and assignments and develop campaigns that highlight the cost savings and carbon footprint reductions for this academic use.

Do you have an awareness campaign focused on reducing office paper use?

Yes

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

No

Other 2019 actions, please specify

Reducing paper waste by reusing paper where reasonable.

Reducing paper usage by being smart about what we print and the layouts used in multiple copies.

Ongoing use of Papercut software that also generates individual reporting on personal use in the organization; tied to this strategy is the centralization of copiers (less personal copiers has also reduced paper use)