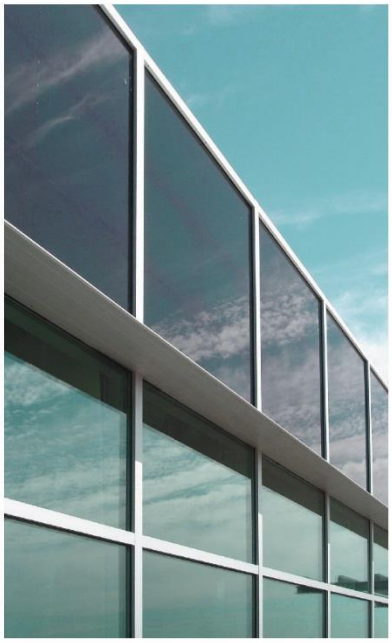



KPU

# 2019 CARBON NEUTRAL ACTION REPORT
# KWANTLEN POLYTECHNIC UNIVERSITY

Prepared by Facilities Services


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.

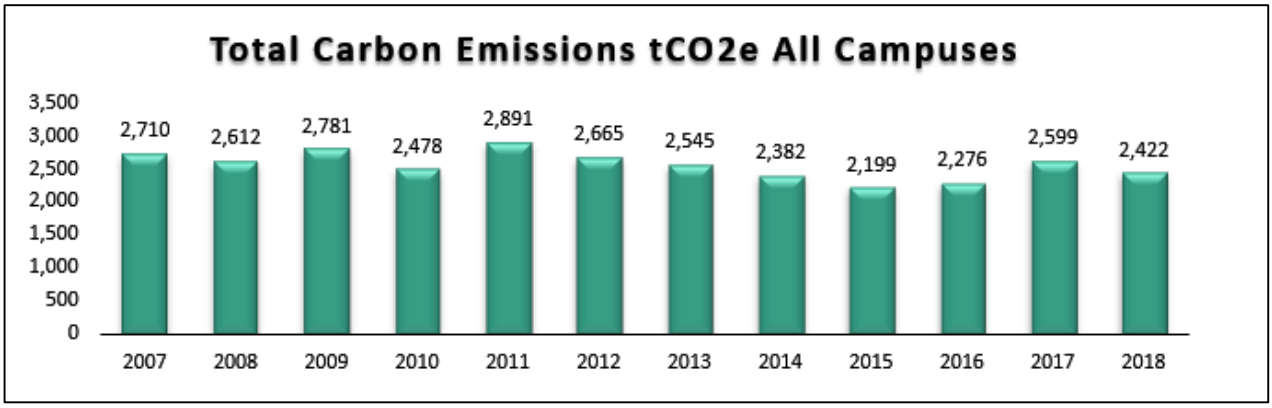
KPU's space utilization has increased in recent years due to increases in student enrollment and longer hours of operation in some areas. There is also increased campus use on weekends, evenings, and during the summer semester.

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:

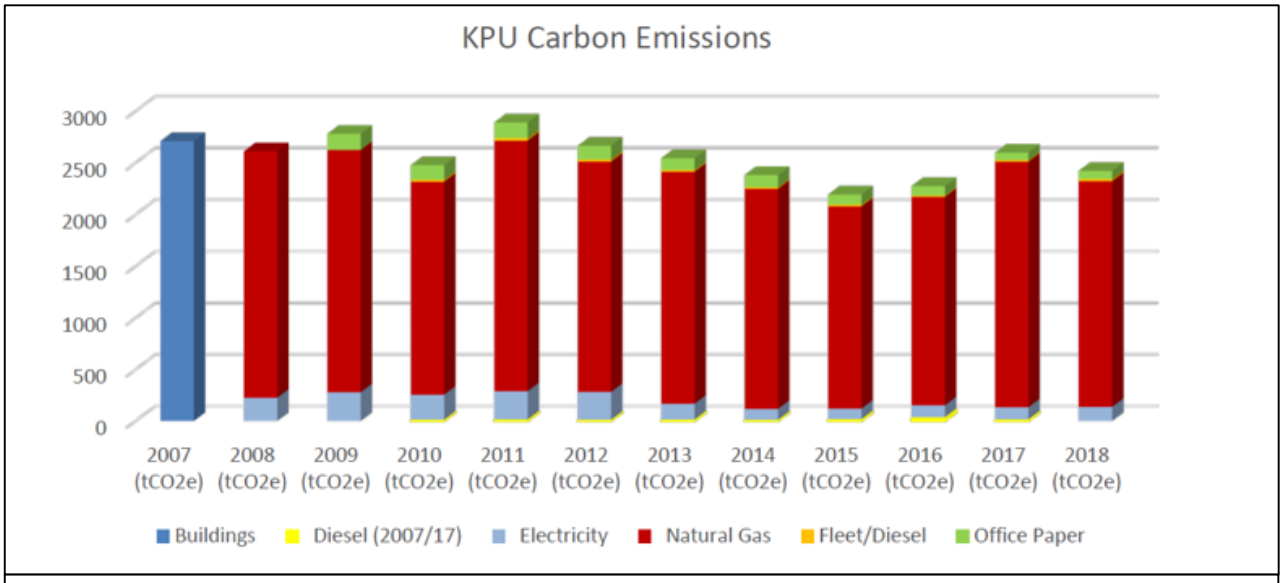



KPU has been carbon neutral since 2010 through annual purchases of carbon offsets to offset greenhouse gas emissions.

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.

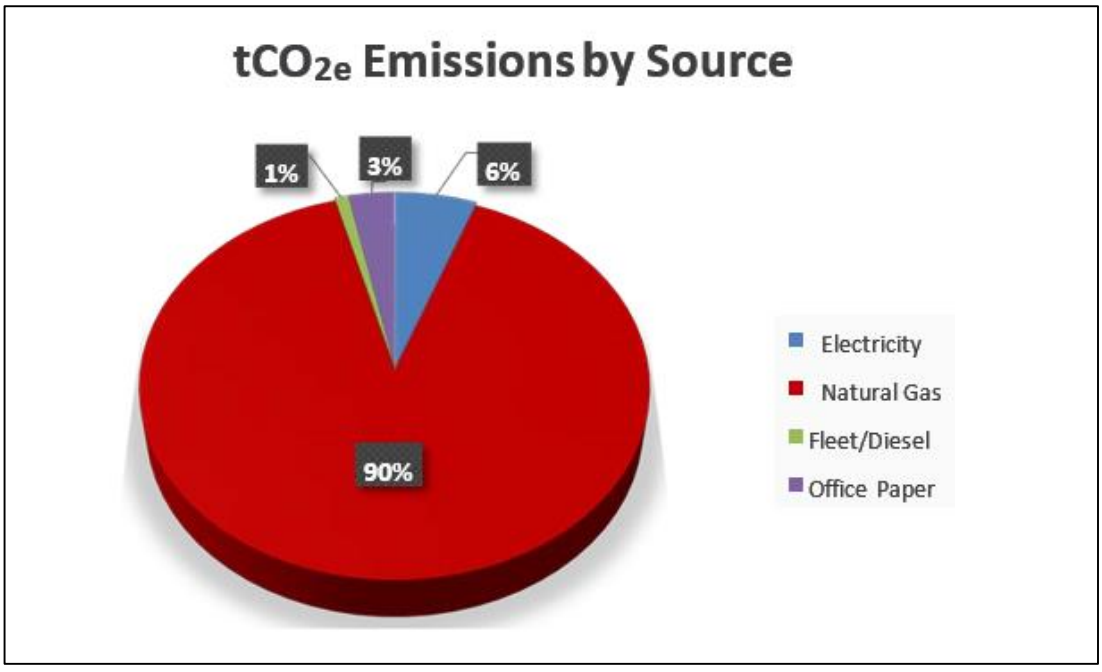
In 2019 carbon emissions for buildings used 2018 emissions levels as instructed by the Provincial Government and which were 2,422 $tCO_{2e}$, producing a 10.6% reduction in emissions from the comparative 2007 buildings emission level.

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




- 2007: Internal energy records; buildings only (Base Year)
- 2008: Implementation of SMARTTool for Bill 44 legislation passed in 2007
- 2009: Buildings and paper now included
- 2010-current: Fleet and building diesel now included in calculations

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 ($tCO_2e$) | 2422.702459 |
| Total $BioCO_2$ | .702459 |
| Total Offsets ($tCO_2e$) | 2422 |
| Offset Investment ($25 per $tCO_2e$)<br><br>(Total Offsets: 2422 x $25/ $tCO_2e$) | $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:

Candice C Gartry

Digitally signed by Candice C Gartry
DN: cn=Candice C Gartry, o=Kwantlen Polytechnic University, ou=Financial Services, email=candice.gartry@kpu.ca, c=CA
Date: 2020.05.25 16:12:26 -07'00'

May 25, 2020

Signature | Date

Candice Gartry | Executive Director, Financial Services (Interim)

Name (please print) | Title Chief Financial Officer (Interim)