

2020 PSO Climate Change Accountability Report
KWANTLEN POLYTECHNIC UNIVERSITY

Prepared by Facilities Services



May 2021



2020 PSO Climate Change Accountability Report

Organization Name:

Kwantlen Polytechnic University.

Declaration statement:

This “PSO Climate Change Accountability Report” for the period January 1, 2020, to December 31, 2020, summarizes Kwantlen Polytechnic University’s emissions profile, the total offsets purchased to reach net-zero emissions, the actions taken in 2020 to reduce greenhouse gas emissions, the results of the actions taken, and the university’s plans to continue reducing emissions in 2021 and beyond.

By June 30, 2021, Kwantlen’s final “2020 PSO Climate Change Accountability Report” will be posted to our website at the following link: <https://www.kpu.ca/sustainability>.

Overview:

Actions taken in 2020 to minimize emissions

The following actions were taken at KPU campuses in 2020 to minimize GHG emissions:

Langley – Chiller Replacement: Replaced the existing oversized chiller with one of the industry’s most efficient models, which uses magnetic bearings. The previous chiller could not meet low occupancy demands, and the building operators were required to cool unoccupied zones to keep the chiller from failing under low load conditions. This change will reduce energy consumption and emissions.

Surrey – Optimize Spruce Building: The recently constructed (2017-2019) Spruce building was a design-build project due to a very constrained project schedule necessary to meet funding timelines. This building has now been evaluated and optimized to reduce energy consumption and associated greenhouse gas emissions.

Surrey – AHU Demand Ventilation Upgrades in Cedar and Fir Buildings: Upgraded four main air handling units with motion sensors and CO2 demand ventilation control for larger rooms. This upgrade will adjust ventilation rates to suit occupancy levels, reducing energy consumption and associated greenhouse gas emissions.

Langley – AHU Demand Ventilation Upgrades in Main Building: Upgraded three main air handling units to have motion sensors and CO2 demand ventilation control for larger rooms. This upgrade will adjust ventilation rates to suit occupancy levels, reducing energy consumption and associated greenhouse gas emissions.

Surrey – Geothermal System Study: 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 all KPU’s academic campuses. This means that older buildings are less energy-

efficient and produce more GHG emissions than newer buildings at the university's campuses, and therefore there is significant potential to reduce greenhouse gas emissions at KPU Surrey. One approach to significantly reducing 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 was implemented to determine if this can be achieved, how long it would take, and to determine the estimated costs. This study is informing an ongoing evaluation of a campus infrastructure shift from natural gas dependency on main mechanical infrastructure as it becomes due for renewal in the next immediate (1-3 years for some infrastructure) to medium (5-10 years).

Surrey Cedar – Rooftop Units Evaluation: The Cedar building at Surrey Campus has standalone heating provided by seven natural gas-fired rooftop RTU HVAC units installed when the building was constructed in 1999. These RTU units have natural gas-fired heat exchangers that are approximately 70% efficient. The feasibility study for geothermal at Surrey included evaluating the practicality of adding these systems to geothermal or upgrading to condensing or other technology, which is more feasible. It was determined that replacing these units with rooftop-mounted air source heat pumps would deliver the most reductions in GHG emissions. This project is being evaluated as part of a staged multi-infrastructure improvement plan for all the campuses targeting GHG reductions.

Plans to continue reducing emissions in 2021 and beyond

Of the 2,466 tCO_{2e} KPU produced in 2020, 2,367 tCO_{2e} were produced 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 2021 to minimize greenhouse gas emissions:

All Main Campuses – Asset Condition Assessments & Lifecycle Planning: The condition of all fossil fuel-burning equipment such as boilers, HVAC units, etc., will be formally evaluated by a third party with this expertise to determine end-of-service dates. KPU will use this information to develop a long-term asset replacement plan that is coupled with carbon-neutral goals through the use of electrified replacement equipment. This approach balances the need to replace assets while at the same time continuously reducing GHG emissions in the pursuit of realizing the university's 2050 carbon-neutral goal as well as CleanBC's 2030 emissions reduction targets.

All Main Campuses – Electrical Reserve Capacity Studies: These studies are underway in 2021 to evaluate the reserve electrical capacity left on the main electrical systems to fuel switch heating systems from natural gas to electricity. The study results are being used to plan future projects to fuel switch heating systems from natural gas to electricity to reduce GHG emissions.

All Main Campuses – Fuel Switching Studies: These studies were completed in early 2021 to identify opportunities for fuel switching from Natural Gas to Electricity to reduce GHG emissions that can be completed within the existing reserve electrical capacity of the main electrical systems at each main campus. The study results are being used to plan work as part of a phased infrastructure replacement plan to further reduce GHG emissions.

Surrey Cedar – Rooftop Units Replacement: The feasibility study for geothermal at Surrey Campus explored other options in addition to expanding the geothermal system. While it had originally been anticipated to retrofit these units to condensing technology to reduce GHG emissions, the study indicated that rooftop mounted air source heat pumps would be a more practical solution to further reduce GHG emissions. An RFP to replace these units with roof-mounted air source heat pumps has been developed and may be issued to start the design work in 2021, subject to the findings from the asset condition assessment.

Richmond – Replace Heating Boiler with an Electric Boiler and add ASHP to the Heating System: The Fuel Switching Studies to Reduce GHG Emissions completed in early 2021 identified this opportunity. The study provided an analysis of work that could be performed to electrify the heating system to reduce GHG emissions to the maximum extent possible within the capacity of the existing electrical service. The study recommended replacing one main existing natural gas boiler with an electric boiler and adding an air source heat pump (ASHP) to the heating system as one approach to minimizing the GHG emissions within the existing electrical capacity. An RFP to perform this work has been developed and may be issued, subject to the findings from the asset condition assessment.

Surrey – Convert Parking Lot Lights to LED: This change in lighting system technology from high-pressure sodium (HPS) to LED will significantly reduce electrical consumption and improve the quality of light in the parking lot. The scope of work is being finalized, and this project will be implemented in 2021. The reduction in electrical consumption will reduce GHG emissions.

Langley – Convert Greenhouse Lights to LED: This change in lighting system technology from high-pressure sodium (HPS) to LED will significantly reduce electrical consumption and improve the quality of light in the parking lot. The scope of work is being finalized, and this project will be implemented in 2021. The reduction in electrical consumption will reduce GHG emissions.

Additional Information:

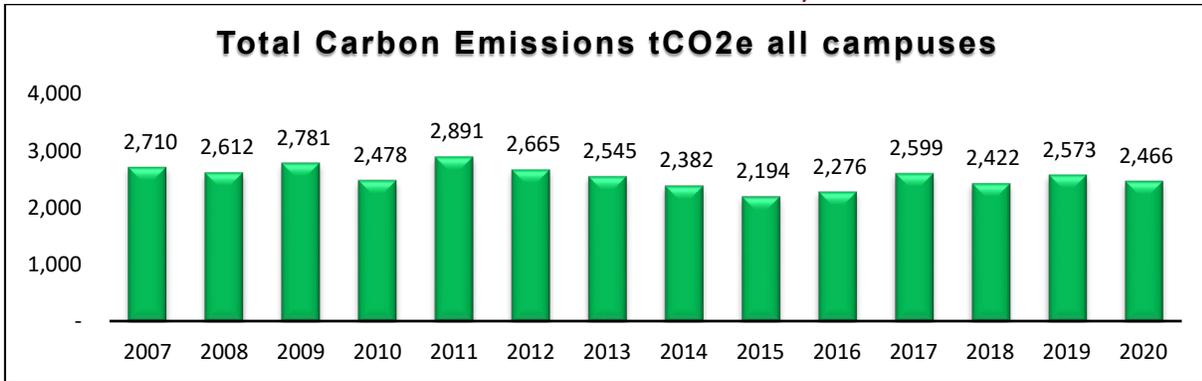
Overview

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 sizes had increased in area by 10%.

When Bill 44 legislation to reduce greenhouse gas emissions was passed in 2007, the targets were set as percentage reductions of total emissions based on reducing GHG emission levels from 2007. In 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.

Other factors that affect KPU's emissions include space utilization which has increased since 2007 due to increases in student enrollment and longer hours of operation at some campus locations and growth as the university added new campuses and buildings. From the 2007 baseline year to 2020, KPU increased the overall building area by 18%. During this same period, KPU was able to decrease carbon emissions by 9%.

The chart below illustrates KPU’s total emissions from the 2007 base year to 2020



Reference: KPU Energy Accounting Records – 2020

Emissions by Source

The total GHG emissions are from three sources: stationary energy, which is electricity and natural gas, mobile energy, which is for gasoline, diesel fuel and propane and office paper use. The primary source of the emissions is from heating the buildings using natural gas.

The chart below illustrates emissions by source from 2020

Annual Comparison by Site - All Sources

	t CO ₂ e, GHG, All	
	2019	2020
Kwantlen Polytechnic University		
Stationary Energy Use	2487	2367
Mobile Energy Use	29.3	91.5
Office Paper	56.0	7.45

Calculated: 22.04.2021 08:29, Cache: 22.04.2021 02:02

Reference: CGRT Website

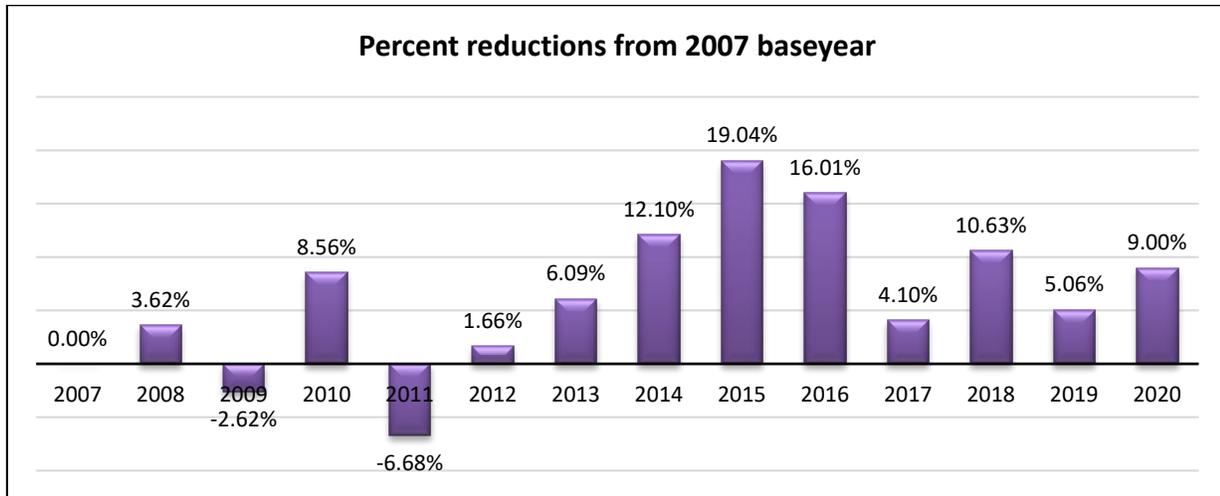
GHG Emissions Targets

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 also has its own 50% internal reduction of GHG emissions from the 2007 benchmarking level by the end of 2025.

Progress Reducing GHG Emissions

Progress towards achieving carbon emissions targets has varied from year to year, but the total GHG emissions are steadily declining. In terms of overall efficiency, KPU produced 28% fewer emissions in tCO₂e per square meter from natural gas and electricity in 2020 than in 2007.

The chart below illustrates KPU's reductions from the 2007 base year to 2020



Reference: KPU Energy Accounting Records – 2020

Opportunities to Reduce GHG Emissions

Opportunities supporting efforts to reduce greenhouse gas emissions include the capital renewal and deferred maintenance funding from the Ministry of Advanced Education, and Skills Training (AEST) has helped 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 to support these projects to successful completion. This funding is essential to the changes and improvements to meet legislated GHG reduction targets.

Of the 2,466 tCO_{2e} KPU produced in 2020, 2,367 tCO_{2e} were produced by burning natural gas, and fuel switching from natural gas to electricity is key to achieving substantial GHG emissions reductions to meet statutory targets.

Covid 19- Pandemic Impacts: it is important to note that despite relative campus low student and employee occupancies during the pandemic crisis in 2020, KPU did not realize significant energy reductions as may have been expected. While emissions from paper use were significantly reduced, energy consumption remained moderate as campuses still had experiential learning or essential service delivery in a majority of buildings at most campuses. This means the building systems and HVAC continued to run for occupied spaces as well as needing to run to maintain safe minimum set points during unoccupied periods.

Overall Initiatives which tie in with GHG Emissions Reductions

At KPU, energy conservation and reducing carbon emissions are core considerations when completing new expansions, renovating buildings, upgrading ageing infrastructure, and optimizing daily operations. KPU recognizes that organizations need to greatly reduce their impact on the natural environment. From a global perspective, KPU signed the **Global Universities and Colleges Climate Letter** in 2019, committing to achieve carbon neutrality no later than 2050. KPU's strategic plan – **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 computers (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 water, electricity, and natural gas consumption 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 financial assistance from BC Hydro and the Province of British Columbia.

KPU has developed the **KPU2050 Official Campus Plan**, which includes the actions needed to formalize a holistically sustainable KPU. In the interest of reducing campus GHG emissions, the plan outlines directions to pursue phased electrification of existing building systems and establishes a zero-emissions commitment for new buildings. The plan builds upon an existing foundation of employee and student-led sustainability commitments and initiatives that already positively shape KPU’s campus culture, identity, and impacts.

Emissions and Offsets Summary Table

GHG Emissions created in Calendar Year 2020	
Total Emissions (tCO ₂ e)	2,470
Total BioCO ₂	3.10
Total Offsets (tCO ₂ e)	2,466
Adjustments to Offsets Required Reported in Prior Years	
Total Offsets Adjustment (tCO ₂ e)	151
Grand Total Offsets for 2020 Reporting Year	
Grand Total Offsets (tCO ₂ e) to be retired for 2020 Reporting Year	2,617
Offset Investment (\$25 per tCO ₂ e) <i>(Grand Total Offsets to be retired x \$25 per tCO₂e)</i>	\$65,425

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 2020 calendar year, together with any adjustments reported for the 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:

Signature	Date
	June 3, 2021
Name (please print)	Title
Tara Clowes	Vice President, Finance & Administration