



KWANTLEN
POLYTECHNIC
UNIVERSITY

STRATEGIC ENERGY MANAGEMENT PLAN

Fiscal Year 2026

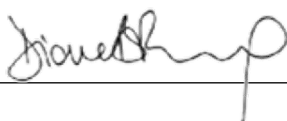
(April 1st 2025 - March 31st 2026)



PREPARED BY
Campus and Community Planning
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KPU SEMP 2025-2026 Approval:

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1. Introduction

1.1 Overview

Kwantlen Polytechnic University (KPU) is committed to being a leader in environmental sustainability in all aspects of its operations. Starting in early 2020, KPU reinitiated its participation in the BC Hydro Commercial Energy Manager Program. Similar to KPU's prior participation in the program, the current iteration still concentrates on energy management. However, in light of the pressures arising out of the global issue of climate change, KPU and BC Hydro have broadened their collective considerations under the program to provide equal focus on the reduction of greenhouse gas (GHG) emissions, as they relate to buildings and associated infrastructure and activities.

KPU's partnership with BC Hydro coincided with the approval on March 31, 2021 of KPU2050 - KPU's first Official Campus Plan. KPU2050 establishes a strategic direction to guide campus development over a thirty-year planning horizon, providing a bold vision, a set of guiding principles, and a series of conceptual plans to shape KPU's campuses and meet the evolving needs of the campus community. KPU2050 also sets forth a Sustainability Framework, which includes a key direction to implement a phased electrification of campus building mechanical systems to support KPU's carbon neutrality goal by 2050.

KPU's energy management and carbon emissions reduction efforts also include a commitment to a continuous improvement process. With constantly changing social, cultural, technological, environmental, and economic landscapes, KPU adapts and continues the ongoing process that is protecting and enhancing our social and natural environment. More specifically, as KPU's buildings take on different functions and as technologies change, new opportunities for energy and GHG emissions reduction become possible. Such a continuous improvement model is a commitment to consistent effort towards maintaining, enhancing, and leveraging previous successes.

1.2 Organizational profile

Established by the government of British Columbia in 1981, KPU has grown to five campuses located in Richmond, Langley, and Surrey (the Surrey campuses include Civic Plaza in Surrey City Centre, the Surrey "Main" campus in Newton, and the Cloverdale campus, which was formerly referred to as KPU's "Tech" campus). KPU offers bachelor's degrees, associate degrees, diplomas, certificates, and citations in more than 140 programs.

P E O P L E	Sector	○ Advanced Education (University)
	Number of Employees	○ More than 1,400 faculty and staff
	Number of Students	○ More than 18,000 students annually ○ Approximately 11,000 FTE students annually
S I T E S	Number of Sites	○ Civic Plaza (air-space parcel) ○ Langley (physical campus) ○ Richmond (physical campus) ○ Surrey (physical campus) ○ Cloverdale [Tech] (physical campus)
O P E R A T I O N S	Energy Management Challenges	○ Availability of funding ○ Shifting enrolment patterns ○ Increased operating hours ○ Expansion of buildings ○ Multiple campuses ○ Occupational use zoning ○ Civic Plaza barriers to operational control ○ Staff capacity
	Core Business Metrics	○ Building Floor Area (m²) ○ Operating Hours ○ Student Full Time Equivalents (FTEs)
	Business Year/ Budget Cycle	○ April 1 to March 31

1.3 Key Executive and Contact Personnel

The BC Hydro Commercial Energy Manager Program key contacts include:

Dr. Diane Purvey	President & Vice Chancellor <i>pro tem</i>
Chani Joseph	Director, Planning, Sustainability & Development, Campus & Community Planning (BC Hydro Commercial Energy Manager)
Rain Kim	Project Support, Campus & Community Planning

1.4 Key Planning Team

Key Planning Team members responsible for energy management and efforts to reduce carbon emissions include:

Brent Elliott	Associate Vice President, Campus & Community Planning
David Stewart	Executive Director, Facilities Services
Iain Hunter	Director, Maintenance & Operations, Facilities Services
Chani Joseph	Director, Planning, Sustainability & Development, Campus & Community Planning
Shawn Cahill	Manager, Maintenance & Capital Renewal, Facilities Services
Dan Brown	Facilities Building and Energy Systems Technical Analyst, Facilities Services
Lucas Ozols-Mongeau	Manager, Planning & Sustainability, Campus & Community Planning
Alexandra Taylor	Sustainability Specialist, Campus & Community Planning
Rain Kim	Project Support, Campus & Community Planning

1.5 Key Stakeholders

As KPU progresses with energy management and towards its goal of carbon neutrality, the following stakeholders will continue to provide ongoing guidance:

Ron Mastromonaco, BC Hydro Senior Key Account Manager	Provides ongoing support and resources through the Commercial Energy Manager Program
Fortis BC	Provides support and resources to help reduce energy use and emissions
Province of BC	Reporting into and receiving ongoing support and resources
Municipalities of Surrey, Langley City, and Richmond	Ensures alignment with local climate change and sustainability policies

2. Commitment to Energy Management and GHG Emissions Reduction

2.1 Alignment with KPU Policies and Goals

KPU's Vision 2026 outlines its strategic Vision, Mission and Goal statements, describing KPU's path forward and view to the future, acknowledging the evolving local, regional and global context that surround our campuses.

As a core goal, sustainability is an important interconnected theme that spans the Vision 2026 document, and includes a number of broad sustainability goals to pursue:

- 1) Foster environmental sustainability through our offerings, research and operations; and,
- 2) Integrate planning to ensure KPU operations are aligned with our resources, thus sustaining quality and institutional health.
- 3) Ensure financial sustainability for KPU through long-term financial and enrolment planning

Recognising the role institutions have both in terms of globally contributing to climate change and towards taking the proactive steps needed to reduce GHG emissions, KPU signed the Global Universities and Colleges Climate Letter in 2019, committing to achieve carbon neutrality by 2050. Each signatory is responsible for establishing the criteria to achieve net-zero greenhouse gas emissions.

Further, KPU pursues energy management opportunities as a core value incorporated in its business practices, and especially when planning building expansions and renovations, and in daily operations. Just as institutions across the province work to reduce their impact on the natural environment, KPU strives to minimize its environmental impact by reducing consumption

of electricity and natural gas. The university developed an Energy Conservation Policy and Procedure to provide expectations and guidelines to control and reduce energy consumption. KPU is currently undergoing a process of updating and expanding this policy to advance a more holistic approach to sustainability and climate action, including the reduction of GHG emissions.

In sum, KPU's holistic and proactive commitment to energy management and carbon emission reduction aims to:

- Reduce energy consumption and associated greenhouse gas emissions;
- Create a healthy and comfortable learning and work environment;
- Minimize environmental impact and promote environmental sustainability; and,
- Minimize institutional expenditures for utilities.

2.2 Energy Management Targets and Benefits

Energy conservation has been a priority for KPU for over two decades. KPU's ongoing effort to conserve and reduce energy is reflected in the energy savings target established in partnership with BC Hydro of 300,000 kWh for the period of 2025-2026.

Energy management provides the following key benefits:

- Reduces our impact on the environment.
- Awareness and involvement can improve student and KPU community learning opportunities.
- Greater resilience to future price increases.
- Reduces greenhouse gas emissions.
- Reduces energy and maintenance costs.
- Project work creates employment opportunities.
- Projects can modernize buildings, equipment, and systems with newer and more energy efficient technologies. These projects may include co-benefits such as improved accessibility, more comfortable learning and work environments, and healthier campus spaces.
- New lighting technology can improve lighting levels while at the same time reduce energy consumption.
- Actively reducing carbon emissions can foster further research and innovation and support the greater public interest.

2.3 Greenhouse Gas Emissions Reduction Targets and Benefits

In recent years, KPU has been focusing efforts to expand work beyond energy conservation to include reducing GHG emissions through shifting operations to low carbon electrification. As a BC post-secondary institution, KPU is required to meet the requirements of the provincial government's Climate Change Accountability Act (2007) GHG emissions reduction targets, which are as follows:

- By 2030 – 40% below 2007 levels
- By 2040 – 60% below 2007 levels
- By 2050 – 80% below 2007 levels

It is noted that KPU's carbon neutral commitment, as outlined in KPU's Sustainability Framework under its Official Campus Plan, and as a signatory of the Global Universities and Colleges Climate Letter, exceeds the provincial requirements. KPU has therefore prepared an adapted GHG emissions reduction timeline which includes the following further emissions reductions targets:

- By 2030 – 60% below 2007 levels
- By 2035 – 70% below 2007 levels
- By 2040 – 80% below 2007 levels
- By 2045 – 90% below 2007 levels
- By 2050 – 100% below 2007 levels

Reducing GHG emissions provides the following key benefits:

- Directly minimised contributions to climate change and associated societal impacts.
- Awareness and involvement can improve student learning opportunities.
- Less susceptibility to future price increases in carbon tax.
- Builds infrastructure and facilities resilience.
- Support health and wellbeing of the university and surrounding community.
- Project work creates employment.
- Actively reducing carbon emissions can foster further research and innovation and support the greater public interest.
- Maintains KPU's reputation as a leader in sustainability and honours its partnerships and commitments with industry and government.

3. Situational Analysis

This SEMP reflects the most up-to-date information available at the time of preparation.

3.1 KPU Facilities Profile

From 2007 to 2024, KPU increased its total floor area by 17.8% and decreased greenhouse gas (GHG) emissions by 16% from 2007 levels. When considering all campuses, during this timeframe energy intensity was reduced from 253 ekWh/m² in 2007 to 200 ekWh/m² in 2024 which is a reduction in energy intensity of 21%; meaning that KPU's buildings are overall more energy efficient in 2024 than they were in 2007.

Since 2007, improved energy efficiency has been accomplished by more energy efficient construction of new buildings and renovations, as well as updating to more energy efficient equipment and systems through the capital renewal program and energy efficiency upgrade projects.

In the following tables, the Langley Campus is divided into two campus sites, the "Main Site" and the "Horticulture" site due to data collection and operational reasons.

Current Key Metrics – Five Main Campuses

Campus	Year Built	Size (m ²)	Description	2024 Annual Energy Consumption (ekWh)	2024 Energy Intensity (ekWh/m ²)
Civic Plaza	2019	4,392	Air-space parcel including, classrooms, offices, administration	804,261	183
Langley Main Site	1993	17,538	Physical campus, including classrooms, offices, library, brewery, laboratories,	3,689,893	210
Langley Horticulture	1993	3,865	Part of Langley campus, including classroom, office, shop, greenhouses	1,958,491	507
Richmond	1992	34,696	Physical campus, including classrooms, offices, library, design studios, laboratories	5,491,552	158
Surrey	1990	38,518	Physical campus, including classrooms, offices, library, laboratories, administration	8,402,119	218

Cloverdale (Tech)	2007	18,559	Physical campus, including classrooms, offices, library, shops, administration	3,159,459	170
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3.2 Building Energy Performance Index (BEPI)

Understanding and monitoring building energy performance (in units of energy consumption per square meter) is an important tool to identify new energy efficiency project opportunities and issues related to maintaining energy performance. Specifically, building energy performance index (BEPI) data helps highlight the performance of our campuses, which allows KPU to identify the best opportunities for energy efficiency improvements and carbon emissions reductions.

A base year of 2007 was used in the development of BEPI data to coincide with the base year used for the BC Government Climate Change Accountability Act (2007) for carbon emissions reductions.

Energy Intensity - Total equivalent (e)-kWh/m² for each campus

Campus	2007	2016	2017	2018	2019	2020	2021	2022	2023	2024
Civic Plaza					106	108	249	200	210	183
Langley Main	259	233	287	271	260	229	236	254	230	210
Langley Hort.	437	464	529	451	479	445	455	444	467	507
Richmond	226	164	196	203	170	152	156	179	171	158
Surrey	303	216	228	251	254	220	217	246	228	218
Cloverdale	179	180	196	184	192	178	185	192	177	170

Energy Intensity - Electrical kWh/m² for each campus

Campus	2007	2016	2017	2018	2019	2020	2021	2022	2023	2024
Civic Plaza					106	108	249	200	210	183
Langley Main	94	107	133	132	131	113	117	119	115	109
Langley Hort.	86	65	93	76	81	78	80	104	103	140
Richmond	102	88	92	113	90	72	77	85	90	85
Surrey	151	129	133	144	135	105	101	117	115	113
Cloverdale	82	81	85	87	89	78	80	81	78	78

Energy Intensity – Natural Gas ekWh/m² for each campus

Campus	2007	2016	2017	2018	2019	2020	2021	2022	2023	2024
Civic Plaza					0	0	0	0	0	0
Langley Main	165	126	154	139	129	116	120	135	114	102
Langley Hort.	351	399	436	374	398	367	375	340	364	367
Richmond	124	77	104	91	80	80	79	94	81	73
Surrey	152	87	95	107	119	115	115	129	113	105
Cloverdale	97	99	111	96	103	100	105	112	99	92

When evaluating the BEPI data, it is important to consider the following factors:

- Age of buildings and quality of construction
- Upgrades that have been completed to major mechanical systems and lighting
- Special use buildings and programs located on a campus that use higher energy levels to meet program requirements such as a laboratory that requires 100% fresh air
- Operating hours of the campus and any specialized equipment or systems such as greenhouse lighting or laboratory fume hoods

- Campuses that have more energy efficient buildings added such as the Wilson School of Design at Richmond Campus
- Campuses that have expansions to buildings that are more energy efficient such as the Surrey Main Building and Arbutus building
- Construction that requires significant fine tuning to control energy use such as Spruce building at Surrey Campus
- Passive design strategies, such as building orientation, window-to-wall ratios, and thermal performance
- If an energy model was completed for the building(s), and whether this model was used to inform the expected building performance

3.3 Building Related Greenhouse Gas Emissions

A key issue related to energy performance is GHG emissions and this data is also benchmarked along with energy use.

With a focus on building related GHG emissions, the overwhelming majority of KPU's emissions originate from gas-fueled mechanical equipment, particularly the boilers in our heating plants. In 2024, KPU produced 2,275 tCO₂e in total from its buildings (electrical and natural gas).

Carbon Emissions Totals – tCO₂e for each campus

Campus	2007	2016	2017	2018	2019	2020	2021	2022	2023	2024
Civic Plaza					5	5	11	9	10	8
Langley Main	477	416	509	461	429	386	397	445	380	339
Langley Hort.	202	279	305	262	279	257	263	239	256	259
Richmond	704	419	561	497	527	524	516	615	533	484
Surrey	845	618	60	755	875	837	836	939	827	771
Cloverdale	358	346	385	337	359	347	364	386	344	322

Carbon Emissions Intensity – tCO₂e/m² for each campus

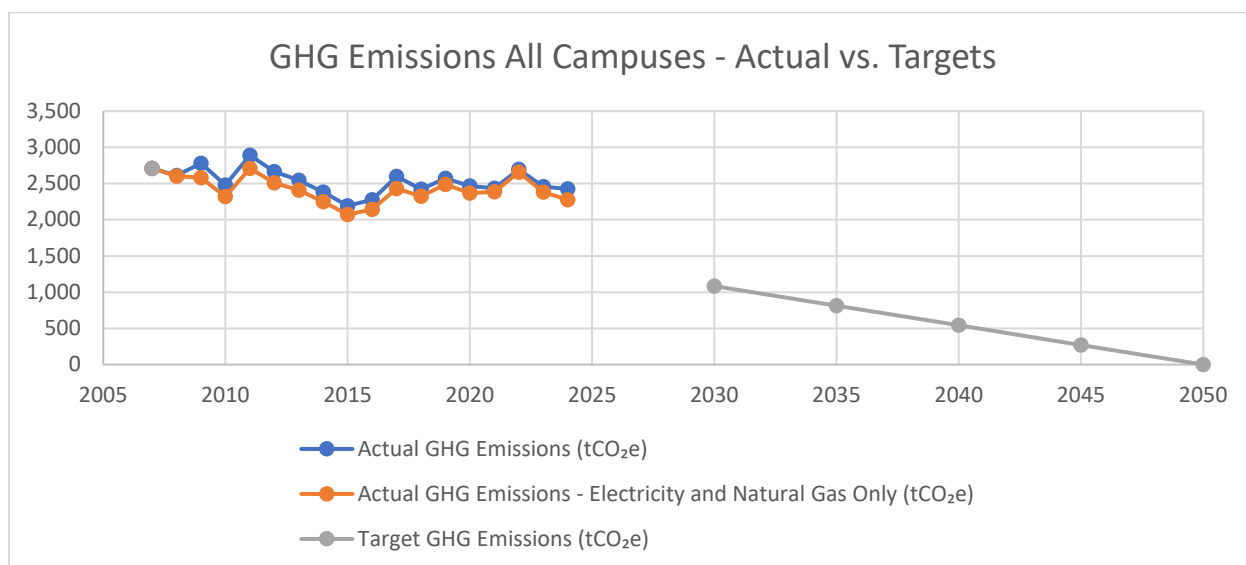
Campus	2007	2016	2017	2018	2019	2020	2021	2022	2023	2024
Civic Plaza					.001	.001	.003	.002	.002	0.002
Langley Main	.032	.024	.029	.026	.024	.022	.023	.025	.022	0.019
Langley Hort.	.065	.072	.079	.068	.072	.067	.068	.062	.066	0.067
Richmond	.025	.015	.020	.017	.015	.015	.015	.018	.015	0.014

Surrey	.031	.017	.018	.021	.023	.022	.022	.024	.021	0.020
Cloverdale	.019	.019	.021	.018	.019	.019	.020	.021	.019	0.017

Carbon Emissions – Percentage (%) of total campus building emissions

Campus	2007	2016	2017	2018	2019	2020	2021	2022	2023	2024
Civic Plaza					.2	.2	.5	0.3	0.4	0.3
Langley Main	18	18	20	19	17	16	16	17	15	14
Langley Hort.	7	12	12	11	11	10	11	9	10	11
Richmond	26	18	22	21	21	21	21	23	22	20
Surrey	31	27	26	31	34	34	34	35	34	32
Cloverdale	13	15	15	14	14	14	15	14	14	13

Performance Tracking – GHG Emissions of Total Campus Building Emissions against a 2007 base year.



Note: Total emissions are from CGRT and include: fleet fuel, paper, refrigerant fugitive emissions and in 2024 Fugitive Emissions for Refrigerants was added and they increased emissions by 90.1 tCO₂e.

3.4 Opportunities and Challenges

In following KPU's goals of energy management and GHG emissions reduction, it is important to consider the building age, use, and building systems when evaluating the benchmark data and in

the identification of potential new energy and emissions directions. With such considerations in mind, a list of energy and emissions opportunities and challenges for each of our five campuses has been generated through discussion with our Planning Team and through stakeholder engagement:

LANGLEY MAIN
Profile: Opened in 1993, Langley Main has the second highest energy intensity of all campuses. Most challenges on this campus are difficult to overcome given current available technologies.
Challenges
• Has a research lab which opened in 2012 which uses 100% fresh air ventilation and up to 14 air changes per hour which negatively affects energy consumption • Has a brew lab which opened in 2015 which is similar to an industrial brewery operation which negatively affects energy consumption • Electric vehicle charging stations may need to be added in the future which would increase electrical consumption • KPU Langley has a large central plant with sporadic occupancy and use – scheduling and programming can have the most influence to address this • Piano rooms must be heated and always air-conditioned
Opportunities
• Improve electrical energy efficiency include converting existing T8 and T5 lighting to LED • Reduce carbon emissions by fuel switching the heating system from natural gas to electricity • Reduce energy consumption and GHG emissions through the conversion from a high temperature to a low temperature hydronic system – however, very cost prohibitive • Digital Music Technology program may shift need for pianos and therefore room temperature requirements that currently must be achieved 24x7 can be reduced to normal occupancy times for this area • Electrification of domestic hot water boilers • Potential opportunity to partner with BC Hydro to deliver electric vehicle charging infrastructure, significantly reducing cost to KPU and additional electricity consumption (BC Hydro provides separate electrical connection)

LANGLEY HORTICULTURE
Profile: Opened in 1993, Langley Horticulture has the highest energy intensity of all campuses with only 4% of total floor area. This section of the campus is no longer a part of the Langley Main plant and is therefore now self-supportive for cooling.

Challenges
• Langley Horticulture greenhouses are operated in a “farm-type” manner meaning they are controlled manually to suit operational requirements. This leads system regulation up to the operator and their prioritization of energy reduction. • Electrification of heating systems is challenging due to limited reserve electrical capacity in the main vault for the site and for BC Hydro’s transformer serving the site • Green team for Langley Horticulture campus no longer exists i.e. no known internal group advocating for energy reduction in operation controls • The conversion from a high temperature to a low temperature hydronic system is very cost prohibitive – therefore more suitable for new construction • Funding and capacity limitations to conduct horticulture electrical vault capacity assessment and retrofit
Opportunities
• New Carbon Capture and Storage (CCS) technology opportunity with Fortis BC Beta project which scrubs carbon, captures the flue gas, and consequently reduces the amount of CO2 released into the environment. Potential for significant GHG reductions. • Transferring heating bill to the horticulture program could raise awareness on energy use and reduction. Audits and energy conservation could be embedded in curriculum. • Looking into alternative fuels and greenhouse innovations could catalyze a new academic or research program at KPU • Reduce carbon emissions by fuel switching main heating system from natural gas to electricity • Improve electrical energy efficiency including converting existing greenhouse lighting to LED • Reduce carbon emissions by expanding the research lab geothermal system with sufficient capacity to fully heat the research lab • Natural gas unit heaters in greenhouses could be replaced with electric • Potential to add air source heat pump for hot water generation at Header House Heating Plant

RICHMOND
Profile: Richmond’s main building opened in 1993 while the Wilson School of Design LEED Gold building opened in 2018. The campus is the most energy efficient campus but produces 20% of carbon emissions for KPU which is the second highest of all campuses. Richmond currently has four level two electric vehicle charging locations.
Challenges

- Some non-mechanical building systems are near the end of life and are in need of replacement but are in competition for renewal dollars
- Converting from a high temperature to low temperature hydronic system is cost prohibitive but would enable energy consumption and GHG emissions reductions
- Projects including the Richmond BMS project and Richmond Heat Recovery System are complex and the 18 month timeframe for completion can be challenging or not achievable within that timeframe
- Natural gas savings can only be confirmed after completing a full heating season and comparing past and current consumption data
- Electric vehicle charging stations may need to be added in the future which would increase electrical consumption

Opportunities

- Campus had lowest combined energy intensity for natural gas and electricity compared to all other campuses
- Reduce carbon emissions through fuel switching the heating system from natural gas to electricity
- Municipal district energy is nearby and expected to be able to serve this campus in the future
- The current building controls are from 1992 and in need of modernization – opportunity to focus on occupation controls for air handling units
- Opportunity to heat existing RTUs with ASHP technology for heating and cooling.
- Opportunity to partner with BC Hydro to deliver electric vehicle charging infrastructure, significantly reducing cost to KPU and additional electricity consumption (BC Hydro provides separate electrical connection)

SURREY

Profile: Surrey's Main, Birch, Arbutus, Fir and Spruce buildings opened in 1990. There have been significant renovations and building expansions from opening to 2020, including the addition of the Cedar building in 1999, the Arbutus expansion in 2008, the Surrey Main expansion in 2009, and the Spruce building replacement in 2018. This campus produces the highest carbon emissions (32%) for KPU and has the highest intensity per square meter of carbon emissions. Surrey currently has three level one electric vehicle charging locations.

Challenges

- As the oldest campus, many of the building systems are end of life and require replacement in the near future
- The campus offers limited electrical capacity to electrify the building heating systems. Surrey is the largest campus, yet has the smallest electrical service with a 2500 kVA service compared to the typical 3000 kVA service found on other campuses. The main transformers need to be replaced before any significant low carbon electrification of heating systems can be implemented.
- Reducing energy consumption and GHG emissions for the all buildings at Surrey are possible through the conversion from a high temperature to a low temperature hydronic system, however, this is cost prohibitive
- Having the main server room for KPU which is a large electrical load and laboratories which use high volumes of conditioned ventilation air as well as fume hoods, mean high energy consumption
- Natural gas savings can only be confirmed after completing a full heating season and comparing past and current consumption data
- Electric vehicle charging stations may need to be added in the future which would increase electrical consumption

Opportunities

- The blend of old and new buildings allows for a phased approach to decarbonization and electrification
- A new Child Care Center is being built that will increase the overall energy consumption for Surrey Campus, but this presents an opportunity to build an energy efficient building and educate the campus community about energy efficiency and zero carbon building design
- Potential opportunity to reduce carbon emissions include fuel switching the heating system from natural gas to electricity
- Potential opportunity to partner with BC Hydro to deliver electric vehicle charging infrastructure, significantly reducing cost to KPU and additional electricity consumption (BC Hydro provides separate electrical connection)
- A new Student Housing building on Surrey Campus is targeting LEED Gold, and Net Zero Carbon Design, and includes an all-electric dining facility. It will increase the overall energy consumption for Surrey Campus, but presents an opportunity to build an energy efficient building, to reduce carbon emissions associated with commuting by providing the opportunity for students to live on campus, and to educate the campus community about energy efficiency and zero carbon building design.

CLOVERDALE

Profile: The Cloverdale (“Tech”) Main Campus consists of a LEED Gold building that opened in 2007 and a farrier barn. Cloverdale currently has three electric vehicle level one charging locations.

Challenges
• Has sporadic occupancy of classrooms and offices that are determined based on Trades training, which is inherently energy inefficient • Cloverdale's electrical capacity is in good standing, however, it currently has poor distribution • Electric vehicle charging stations may need to be added in the future which would increase electrical consumption • The Farrier Programming requires the use of natural gas. Currently, there are no viable alternative fuel sources that would mimic what is needed for teaching and learning purposes
Opportunities
• Improve electrical energy efficiency by converting existing T8 and T5 lighting to LED • Reduce carbon emissions by fuel switching the heating system from natural gas to electricity • Potential opportunity to partner with BC Hydro to deliver electric vehicle charging infrastructure, significantly reducing cost to KPU and additional electricity consumption (BC Hydro provides separate electrical connection)

CIVIC PLAZA
Profile: Civic Plaza campus was built in 2019 and is located within a mixed-use building that includes a restaurant, café, hotel, and apartment complex. Along with the five campus floors that KPU owns and utilizes as academic and office spaces, a portion of space on the 9th floor KPU leases to generate revenue. This building utilizes geothermal district heating systems.
Challenges
• KPU does not control all operations and maintenance of the building systems for its five floors in this building. KPU only has minor zone controlling.
Opportunities
• Due to the nature of Civic Plaza's HVAC system, KPU can primarily effect change for energy-use and emissions reductions through advocacy rather than operational changes

4. Projects and Actions

The following section outlines current energy management, low-carbon electrification, and greenhouse-gas reduction studies and projects. The first section highlights studies KPU has undertaken which will help inform current and future projects. The following sections highlight the projects that are (1) counted for this fiscal year's savings, (2) active projects that likely won't be counted towards this fiscal year's savings, and (3) potential future projects/studies KPU could consider undertaking in future years.

Funding amounts for the projects listed below are determined to the best of our knowledge as of the current date. Going forward, KPU will continue to track and update actual funding received to ensure accurate reporting and alignment with project implementation.

4.1 Studies - Completed in 2025

Continuous Optimization (C.Op) Study – Cloverdale Campus

A C.Op study was started in July 2024 and completed in March 2025. It identified estimated savings of 13,527 kWh/year of electrical savings, 1363 GJ/Year in natural gas savings and carbon emission savings of 68.4 tCO₂e/year. The Energy Conservation Measures (ECMs) for projects identified were in progress in 2025 and will be fully implemented in 2026. The value of this study was \$18,000 and BC Hydro provided incentive funding of \$17,200. All projects with a simple payback of two years or less are being implemented and paid for by KPU.

Continuous Optimization (C.Op) Study – Langley Main Campus

A C.Op study was started in July 2024 and completed in December 2025. It identified estimated savings of 11,300 kWh/year, 479 GJ/Year, and ~25 tCO₂e/year. The post implementation report revised these estimated savings to actual savings of 140,248 kWh/year, 1988 GJ/year and carbon emissions savings of 100.7 tCO₂e/year. The value of this study was \$15,330 and BC Hydro provided incentive funding of \$14,600. All projects with a simple payback of 2 years or less were implemented and paid for by KPU.

Air Source Heat Pump Feasibility Study– Richmond Campus

A feasibility study was started in December 2024 and completed in December 2025. Its purpose is to provide a recommended approach for electrifying the heating system at the Richmond Campus to reduce carbon emissions. The study will inform the design phase. An NRFP for design services was developed and issued in January 2026.

ASHRAE Level 2 Energy Audit – Surrey Campus

An ASHRAE Level 2 Energy Audit was started in 2024 and completed in January 2025. This audit included an analysis of overnight energy consumption to identified possible savings opportunities when the campus is closed. The audit information will be used to develop future energy efficiency projects.

4.2 Energy Efficiency and Decarbonization Projects – Completed in 2025

Replace Natural Gas Domestic Hot Water Tank with Electric Tank – Cloverdale Campus

The natural gas domestic hot water tank was replaced with an electric hot water tank. The purpose of this project is to reduce carbon emissions by an estimated 25 tCO₂e/year. The new electric domestic hot water tank will provide hot water for most of the Cloverdale campus; there are already some locally installed electric hot water instantaneous heaters servicing workshops and the south wing. The project started in January 2025 and was completed in May 2025.

Continuous Optimization (C.Op) Implementation– Langley Campus

This project represents the implementation phase of ECM measures identified through the C.Op study (Section 4.1) that have less than a two-year payback, which KPU was required to complete as part of the incentive agreement with BC Hydro. The project work involved optimizing AHU units and heating pumps to reduce energy consumption and associated carbon emissions. The post implementation M&V report indicated savings of 140,248 kWh/year, 1988 GJ/year and carbon emissions savings of 100.7 tCO₂e/year. The project work was started in May 2025 and was completed in December 2025, once the C.Op post implementation report was completed.

Replace Natural Gas Domestic Hot Water Tank with Electric Tank – Langley Campus

The domestic hot water system at the main Langley Campus was converted from natural gas to electric. The purpose of this project was to reduce carbon emissions (32 tCO₂e/year estimated reduction). The new electric domestic hot water system provides domestic hot water for the Langley south campus. This project was started in May 2025 and was completed in October 2025.

Replace Natural Gas Domestic Hot Water Tank with Electric Tank – Richmond Campus

The domestic seasonal hot water boiler at Richmond Campus was converted from natural gas to electric. The purpose of this project is to reduce carbon emissions (with an estimated carbon reduction similar to the Langley campus project referenced above). The new electric domestic hot water boiler will be used year-round, instead of seasonally which had been past practice, to provide all domestic hot water for the Richmond Main campus. This project started in 2024 and was fully completed and put into service in 2025.

Building Management System Optimization – Surrey Campus

The Building Management System (BMS) Optimization project at the Surrey Campus optimized the control of AHU equipment in the Birch and Fir buildings. The purpose of this project was to reduce energy consumption and associated carbon emissions. The M&V report indicated savings of 207,140 kWh/year. This project started July 2024 and was completed May 2025.

Replace Rooftop Units with Air Source Heat Pump Technology – Surrey Campus

The existing Rooftop RTU equipment on the Cedar building is at the end of life and the technology was changed from natural gas heating with DX cooling to more efficient Air Source Heat Pump (ASHP) technology. The purpose of this project is to increase energy efficiency and to reduce carbon emissions by fuel switching the heating energy from natural gas to electricity. Due to limitations in the available electrical capacity, only five of the seven RTU units were replaced in 2025. The project will achieve natural gas savings of 1766 GJ/year, GHG reductions of 86 tCO₂e/year and increase electrical consumption. Incentive funding of \$157,400 was provided by BC Hydro BC on completion. This project started in December 2021 and was completed in May 2025.

4.3 Energy Efficiency and Decarbonization Projects - In Progress 2026

Convert all Exterior Lighting to LED – All Land-based Campuses

This project is to replace all exterior building, parking lot, and site lighting with LED lighting. The purpose of this project is to increase site lighting levels for safety and reduce energy consumption. The total estimated energy savings are 128,303 kWh/year based on Surrey and Langley campuses and estimated savings at Richmond and Cloverdale campuses are not yet available. This project started in 2023 and is currently in progress as of March 2026.

Heat Recovery System on RTU Units – Langley Main Campus

This project is to add heat recovery equipment to the RTU units for the south side of Langley. The purpose of the project is to reduce energy consumption and associated carbon emissions. An energy study was completed in August 2024 and indicated savings of 1450 GJ/year and 67.8 tCO₂e/year. The energy study was submitted to Fortis BC for review for incentive funding of \$156,000. The NRFP was issued in May 2026. This project started in April 2025 and is currently in progress.

Horticulture Electrical System Upgrade – Langley Horticulture

This project will replace existing transformer and electrical equipment. The purpose of the project is to support future heating system electrification to reduce carbon emissions and EV charging. The project started in June 2025 and the NRFP to hire a consultant for the design work was issued in January 2026.

Heat Recovery System – Richmond Campus

KPU is working with Dialog to evaluate the original main building at Richmond Campus and identify suitable Heat Recovery Ventilation (HRV) equipment and systems to reduce energy consumption and associated carbon emissions (56 tCO₂e/year estimated reduction). HRVs also enhance air circulation by replacing stale indoor air with fresh outdoor air, and reducing air pollutants in the process. The project began in June 2024 and is anticipated to be completed during the summer of 2026. The preliminary system design report has been reviewed and updated to reflect project requirements, and a revised Class D cost estimate has been provided to address earlier inconsistencies. Design was completed in January 2026 and the project was issued for tender. Once implemented, the system is expected to generate annual savings of

13,567 kWh of electricity and 1,040 GJ of natural gas. The estimated project cost is \$130,841, with anticipated incentive funding from Fortis BC to be confirmed.

Phase One of Exterior Glazing – Richmond Campus

Phase one of this project began in November 2025 and is currently in progress. An ASHRAE level 2 audit was completed as part of the project work to identify energy savings, which were provided to BC Hydro and Fortis. However, the estimated energy savings were too low to qualify for incentive funding.

Replace Remaining two Rooftop Units with Air Source Heat Pump Technology – Surrey Campus

Due to limitations in the available electrical capacity only five of the seven RTU units were replaced in 2025. The next phase involves replacing the remaining two rooftop units at the Cedar Building with Air Source Heat Pump technology. The design phase for this phase began in April 2026. Work for the five units was completed in 2025 and resulted in an electrical energy savings of 154,110 kWh and a reduction in natural gas consumption of 1,766 GJ. These energy savings contributed to an estimated decrease of 86 tCO₂e in greenhouse gas emissions, tracked through the Energy Star Portfolio Manager (ESPM) for Monitoring and Verification (M&V). A CleanBC incentive agreement providing \$77,400 in project incentive funding has been approved by BC Hydro.

Transformer Replacement – Surrey Campus

This project involved completing a design review to replace the existing transformer to facilitate ongoing low carbon electrification at the Surrey Campus. The previous transformer could not accommodate the fuel switching of the heating systems from natural gas to electric or accommodate increased electric vehicle charging stations. The proposed size change was from 2500 kVA to 7000k VA. Additionally, a more efficient transformer will require less power to operate, leading to lower emissions. This project was a multi-year project, completed in 2026.

4.4 Fiscal Year 2026 Target

KPU has an annual energy savings target of 300,000 kWh for Fiscal Year 2026 (April 1st 2025 March 31st 2026). Based on the known estimated annual energy savings from completed projects in 2025 (see section 4.2), KPU has the *potential* to save 347,388 kWh. Accounting for annual energy savings from projects currently in progress, KPU has the *potential* to save an additional 194,752kWh in Fiscal Year 2027. KPU does not have an annual greenhouse gas reduction target through the BC Hydro Energy Management program, however, KPU has its own set of GHG emissions targets set out in its Sustainability Framework as seen in Section 2.3 above.

4.5 Actions for Fiscal Year 2026 and Future Targets

At this time, the following active projects are those that the planning team anticipates will directly achieve BC Hydro's targets for KPU's energy management and greenhouse gas emissions

reduction program for *future years'* submissions. See Appendix #1 for a record of completed projects as of December 2024.

Convert Interior Lighting to LED – All Land-Based Campuses: Surrey, Langley, Richmond, and Cloverdale

This project is to replace all interior lighting to LED. This is a multi-year multi-campus project with Surrey campus completed and Richmond Campus partly completed in previous years. The purpose of this project is to increase energy efficiency and to reduce associated carbon emissions. The estimated energy savings will be determined as the project progresses. The initial project work started in Jan 2023. Construction is scheduled to start in July 2026 with anticipated completion in March 2027. Final energy savings will be confirmed as implementation progresses.

Continuous Optimization Implementation (C.Op) – Cloverdale Campus

This project represents the implementation phase of ECM measures identified through the C.Op study (Section 4.1) that have less than a two-year payback, which KPU was required to complete as part of the incentive agreement with BC Hydro. Measures include optimization of boiler sequencing and installation of time-of-day controls for the welding shop air compressor system. Implementation began in May 2025 and is expected to be completed in summer 2026. Verified savings will be reported following post-implementation M&V. The C.Op study identified estimated savings of 13,527 kWh/year of electrical savings, 1363 GJ/Year in natural gas savings and carbon emission savings of 68.4 tCO₂e/year.

Heat Recovery System – Cloverdale

Energy modelling has been conducted to identify the most practical technical approach and quantify energy savings potential. This project began in May 2025. Funding is being pursued for the heat recovery coils and system for AHU units at the Cloverdale Campus. An incentive application was submitted to FortisBC's Custom Efficiency Program on November 10, with an estimated \$18,000 in funding.

Building Management System Replacement – Richmond Campus

The purpose of the project is to replace the existing obsolete Building Management System (BMS) at Richmond Campus with a new system. This will include replacing the entire existing BMS system and enhancing it by installing additional zone occupancy and CO₂ sensors, and optimizing controls strategies where possible and practical. It also includes expanding the system to control some areas of the building with stand-alone controls, such as stairwells and main entrances, and enhancing and optimizing the Atrium ventilation control to increase free cooling in the summer and reduce energy consumption. The upgrade is expected to achieve electrical savings of 137,125 kWh/year, natural gas savings of 1112 GJ/year and GHG reductions of 55 tCO₂e/year. Incentive funding of \$157,400 will be provided by Fortis BC on completion. This project started in 2022 and the target completion date is summer 2026. The electrical savings derived from this project are to be counted towards Fiscal Year 2027.

Rooftop Unit & Air Source Heat Pump – Richmond Campus

This project is to add ASHP equipment to the older main buildings heating system to provide the majority of the heating requirements. The purpose of this project is to reduce carbon emissions by fuel switching the heating energy from natural gas to electricity. A study completed in December 2025 indicates that this project will reduce carbon emissions from 297 tCO₂e/year to 17 tCO₂e/year while keeping the existing natural gas boilers for heating. The project started in December 2024 with the Feasibility Study and the NRFP for design work was issued in March 2026. Once the design is finalized and before going to tender, we will explore available incentive funding from BC Hydro and other sources such as NRCAN. This is a complex project with an anticipated year 2029 completion date and a Class D estimated project cost of \$7.9 Million.

Variable Frequency Drives – Langley Horticulture

This project started in September 2025 and is anticipated to end in spring 2026. This project installs VFD drive equipment on some AHU equipment and will save an estimated 44,100 kWh/year. BC Hydro will provide \$16,349 in incentive funding which represents 41% of the project cost. This project is expected to count towards Fiscal Year 2027.

4.6 Future Potential Projects

Looking forward to the next project cycle, Fiscal Year 2027 (April 1st 2026 – March 31st 2027), a number of projects are outlined below that are anticipated to be undertaken to advance KPU's energy and greenhouse gas emissions reduction efforts. KPU's [Carbon Reduction Plan](#) identifies a series of emissions reduction measures to the year 2032, that will reduce institutional building GHG emissions to align with Provincial climate targets.

Legend:

LCE: Low carbon electrification
GHG-R: Greenhouse gas reductions
EE: Energy efficiency
CA: Climate adaptation
EER: Electrical energy reductions

Project	Campus(es)	Project Type	Status	Start Date	End Date	Funding Incentives (\$)		
						BC Hydro	Fortis BC (estimates)	Other
Heat Recovery System (Project work)	Langley	LCE, GHG-R	Energy Modelling in Progress		2027		\$100,000	
Heat Recovery System (Project work)	Cloverdale	LCE, GHG-R	Energy Modelling in Progress		2026-2028		\$100,000	

Heating plant – Install electric ASHP for first stage of heating	Cloverdale, Langley – Main	LCE, GHG-R	Potential for further investigation					
Domestic hot water tank replacement	Surrey	GHG-R						
Header House Heating Plant – Add e-ASHP for hot water generation	Langley - Horticulture	EE, GHG-R						
Replace natural gas heaters with radiant tube electric alternatives	Langley – Horticulture (Header Polyhouse)	GHG-R						

5. APPENDIX 1 – History of Energy Conservation, Low Carbon Electrification, and Greenhouse Gas Emissions Reductions Projects (to Dec 2024)

Since inception, KPU has been active in advancing change to support sustainability and efficient resource management. The energy management projects implemented have resulted in significant and ongoing cost avoidance for energy expenses and reductions in greenhouse gas emissions.

Description (Record of Improvements)	Project Type	Estimated Savings	Campus	Completion Year
T8 to LED (hallways and common areas)	EER	32,000 kWh	Richmond	2024
Controls Optimization	Langley	102,600 kWh 454 GJ 23.9 tCO ₂ e	Langley	2024
Hort. Garage Heating Conversion	LCE		Langley	2023
Rooftop Chiller Replacement	EE		Langley	2023
Building Management System Optimization	EER	79,000 kWh	Langley	2022
Electrical Vault Capacity Assessment & Retrofit (Horticulture)	LCE		Langley	2022
Domestic Hot Water Boiler	LCE		Richmond	2022
Brew Lab Electrification	LCE		Langley	2022
Interior T8 to LED Lighting Project	EER	178,186 kWh	Surrey	2022
Controls Optimization	EER	188,000 kWh	Surrey	2021
Optimize BMS systems in 2 buildings	EER	1300 GJ and 188,000 kWh; 74.5 tCO ₂ e	Surrey	2021
Greenhouse #6 Lighting	EER		Langley	2021
Halogen to LED (Design Wing)	EER	5720 kWh	Richmond	2015
T8 dual lamp lighting fixtures to T5 high output single lamp fixtures	EER		KPU Tech	2015
Washroom sink area lighting to LED fixtures.	EER		KPU Tech	2015

Description (Record of Improvements)	Project Type	Estimated Savings	Campus	Completion Year
DDC Controls upgrades (from 1990's) -building controls systems replaced			Langley	2015
Conversion of hot water to instantaneous heaters (for remaining of Langley campus)		39,222 kWh 12 tCO ₂ e \$5,434	Langley	2015
Replacement of large single Horticulture boiler with 5 smaller condensing boilers			Langley	2014
Converted last portion of Birch and Surrey Main from pneumatic controls to DDC (direct digital control) and removed obsolete air compressors in each building			Surrey	2014

6. APPENDIX 2 – Awards

Award Description	Awarded By	Year
LEED Gold achieved for the Wilson School of Design at Richmond Campus	Canada Green Building Council (CaGBC)	2018
KPU was one of the winners of Canada's Greenest Employers award	Canada's Greenest Employers	2015
LEED Silver achieved for the Langley West Wing renovation	CaGBC	2014
BC Hydro Power Smart Excellence Award - Leadership Excellence	BC Hydro	2014
LEED Gold achieved for Institute for Sustainable Horticulture Lab (ISH)	CaGBC	2014

Note: Past awards and project descriptions from before 2014 can be found in previous SEMP's.