



Royal Roads
UNIVERSITY



2021 PSO CLIMATE CHANGE ACCOUNTABILITY REPORT

Royal Roads University

May 2022

LIFE.CHANGING

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CLIMATE CHANGE ACCOUNTABILITY REPORT OVERVIEW

Declaration Statement

This Public Sector Organization (PSO) Climate Change Accountability Report for the period Jan. 1 - Dec. 31, 2021 summarizes our greenhouse gas (GHG) emissions profile, the total offsets to reach net-zero emissions, the actions we have taken in 2021 to reduce our GHG emissions, and our plans to continue reducing emissions in 2022 and beyond. By June 30, 2022 Royal Roads University's final *2021 Climate Change Accountability Report* will be posted to our website at www.royalroads.ca/about/plans-reports.

Overview

Royal Roads University (RRU) is committed to being a climate and sustainability leader in B.C.'s post-secondary sector. The university undertakes projects to reduce GHG emissions in accordance with the *BC Climate Change Accountability Act*, the Carbon Neutral Government Regulation and the university's own reduction targets and climate commitments. This report details RRU's carbon footprint for the 2021 calendar year. It includes a summary of climate and sustainability actions undertaken to reduce the university's emissions, and it outlines our plans for future climate, sustainability and resilience initiatives.

Royal Roads reports 964 tonnes of carbon dioxide equivalent (tCO₂e) in 2021 compared with 977 tCO₂e produced in 2020. This represents a 1 per cent decrease from the previous year. Since 2010, RRU has reduced its overall GHG emissions by 36 per cent. From 2020 to 2021, stationary energy consumption (direct fuel combustion and purchased energy) increased 7 per cent as a result of several factors including weather extremes, higher campus occupancy and use compared to the previous (pandemic) year, and increased ventilation and air-filtration due to COVID-19-related health and safety requirements. Despite increased demands, the completion of upgrades and retrofits to buildings and electrical infrastructure in 2021 is expected to result in emission reductions going forward.

Royal Roads escalated its commitment to climate change mitigation and adaptation through a new [*Climate Action Plan 2022 - 2027*](#). This five-year plan includes ambitious emission reduction targets and puts RRU on a path to climate leadership through three goals and 70 actions that span education, collaboration, partnerships, research, events and more.

2021 Emissions and Offset Summary

Table 1: Royal Roads University 2021 GHG Emissions and Offsets Summary	
GHG Emissions created in Calendar Year 2021	
Total Emissions (tCO ₂ e)	966
Total BioCO ₂	1.61
Total Offsets (tCO ₂ e)	964
Adjustments to Offset Required GHG Emissions Reported in Prior Years¹	
Total 2020 Offsets Adjustment (tCO ₂ e)	0
Total Offsets Adjustment (tCO ₂ e)	0
Grand Total Offsets for the 2020 Reporting Year	
Grand Total Offsets (tCO ₂ e) to be Retired for 2021 Reporting Year	964
Offset Investment (\$25 per tCO ₂ e)	\$24,100

Retirement of Offsets

In accordance with the requirements of the *Climate Change Accountability Act* and Carbon Neutral Government Regulation, Royal Roads University (**the Organization**) is responsible for arranging for the retirement of the offsets obligation reported above for the 2021 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:



May 2, 2022

Signature	Date
Cheryl Eason, MBA, CPA CGA, RPA, DMC	May 2, 2022
Name	Title
Cheryl Eason, MBA, CPA CGA, RPA, DMC	Vice President & Chief Financial Officer Royal Roads University

¹ Emissions reported in previous years are updated as a result of new information becoming available, errors discovered in previously entered data, or consumption data reporting period not aligning with required GHG reporting period.

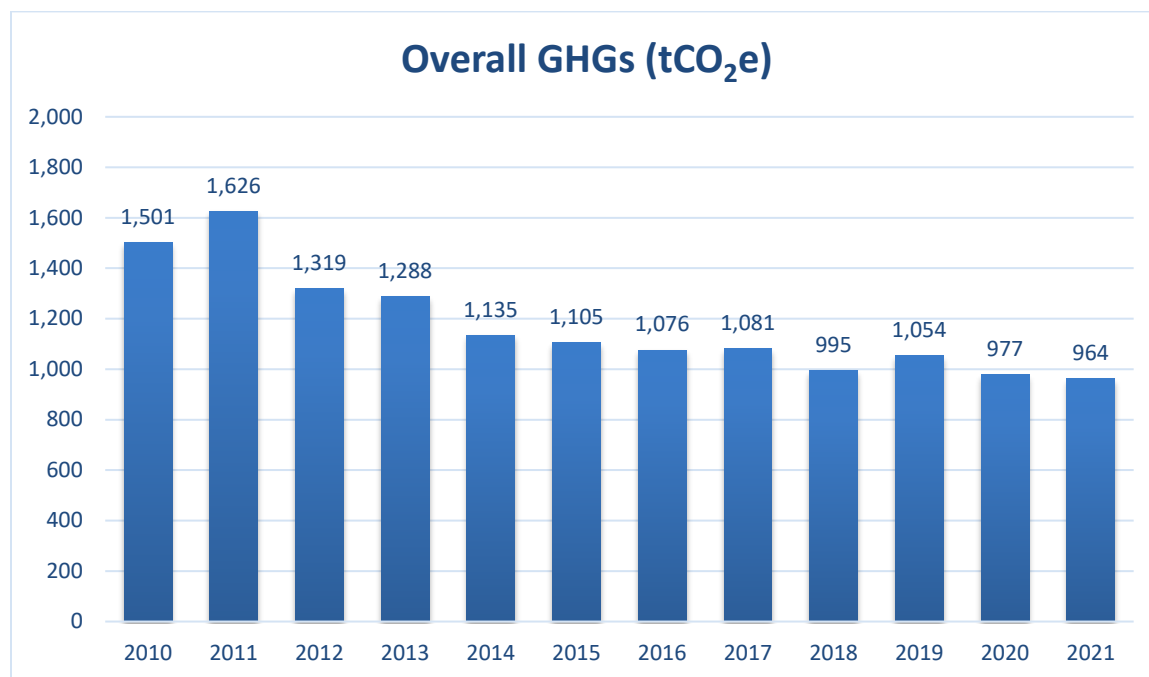
2021 GREENHOUSE GAS EMISSIONS PROFILE

Royal Roads University has committed to reduce GHG emissions associated with its operations as mandated by the BC *Climate Change Accountability Act* and Carbon Neutral Government Regulation. The university is required to measure, reduce and offset carbon emissions from building operations (i.e. direct fuel combustion and electricity), mobile fuel combustion (i.e. fleet and other mobile equipment) and paper. For any GHG emissions produced, the university is required to offset these emissions on an annual basis at a value of \$25 per metric tonne of CO₂e.

2021 Greenhouse Gas Emissions

In 2021, Royal Roads University's GHG emissions totalled 964 tCO₂e, a 36 per cent reduction from 2010 levels (see Figure 1). Of note, historic GHG totals have been updated due to changes in emissions calculation methodology. See Appendix 1 for a review of historic and current (adjusted) GHG totals over time.

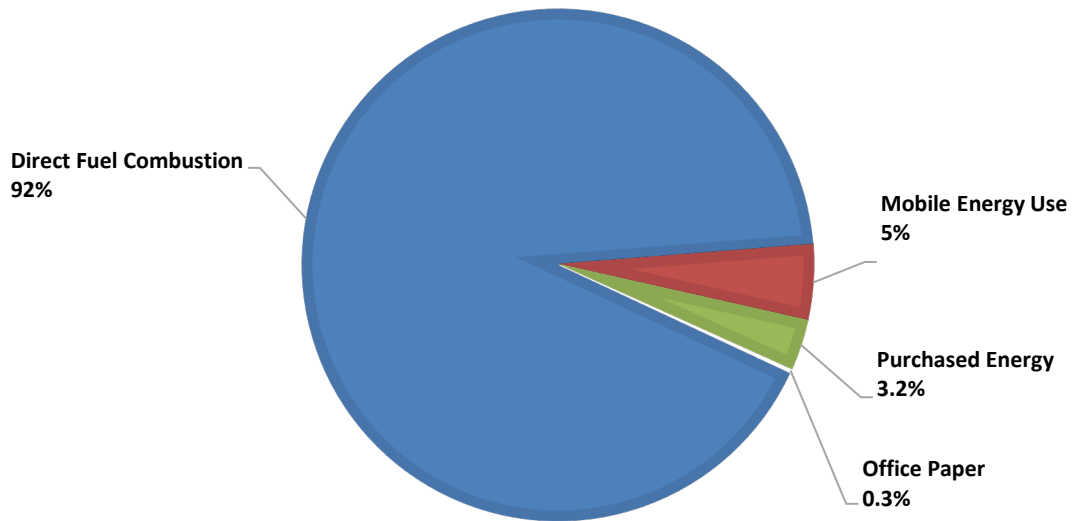
Figure 1: RRU's GHG Emission Trend (tCO₂e), 2010 - 2021



Emissions by Source

Building heating (direct fuel combustion) accounts for the largest source of GHG emissions at RRU, followed by fleet (mobile energy use), electricity (purchased energy), and, finally, paper (see Figure 2 below).

Figure 2: Per Cent Total GHG Emissions by Source (tCO₂e), 2021



From 2019 – 2021, campus emissions have been affected by the pandemic response to COVID-19. A trend summary for each source is provided in Table 2 below, and these trends are explained in more detail in the corresponding sections of this report.

Table 2 Comparison of GHG Emissions (tCO₂e) and <i>[Building Energy consumption] (Gigajoules)</i> 2019-2021				
Emission Source	2019	2020	2021	Trend summary
Direct Fuel combustion (methane gas)	885 [17,729]	805 [16,125]	885 [17,722]	Reduced building occupancy (COVID-related) decreased building heating demands, and then rebounded once campus occupation and ventilation needs increased.
Purchased Energy (Electricity)	97.2 [11,700]	123 [11,026]	30.7 [11,396]	Actual consumption (in GJs) has remained relatively consistent over the last three years. GHGs associated with electricity have fluctuated based on changes to the Electricity Emission Factor (EEF) ⁱ .
Mobile Energy Use	59.4	43.4	45.7	COVID-related decrease and then a slight rebound once fleet use levels resumed.
Office Paper	12.8	6.46	2.86	Electronic processes and habits (accelerated by pandemic) have led to continued, steady decrease.
Total Emissions	1054	977	964	Overall COVID-related decrease and then a rebound with resumption of on-campus activities.



STATIONARY SOURCES FUEL AND ENERGY FOR BUILDINGS

The largest source of GHG emissions at RRU is from stationary fuel combustion. This is primarily comprised of direct fuel from heating buildings with methane gas² but also includes purchased energy from electricity. In 2021, direct fuel made up 91.8 per cent of RRU's total emissions (885 tCO₂e) and electricity contributed 3.2 per cent (30.7 tCO₂e). Cumulatively, these two forms of energy contribute 95 per cent of the GHGs in RRU's emission portfolio. Building heating and electricity produced 916 tCO₂e in 2021.

Royal Roads has 26 buildings on campus with a total building area of 45,608 m². The RRU campus has a unique mix of buildings including seven with Federal Heritage Designations and 11 constructed prior to the Second World War. Facility heating and cooling systems vary and present a variety of retrofit and maintenance issues. Fourteen buildings are powered by methane gas from FortisBC while the rest of campus is powered by electricity from BC Hydro.

In keeping with the recommendations of the 2018 energy audit, RRU shifted some buildings from methane gas to electric systems through infrastructure and equipment upgrades. With these projects only recently completed, anticipated reductions from these upgrades have not yet been realized. Since 2010, GHG emissions associated with stationary fuel combustion and electricity combined have declined 36 per cent.

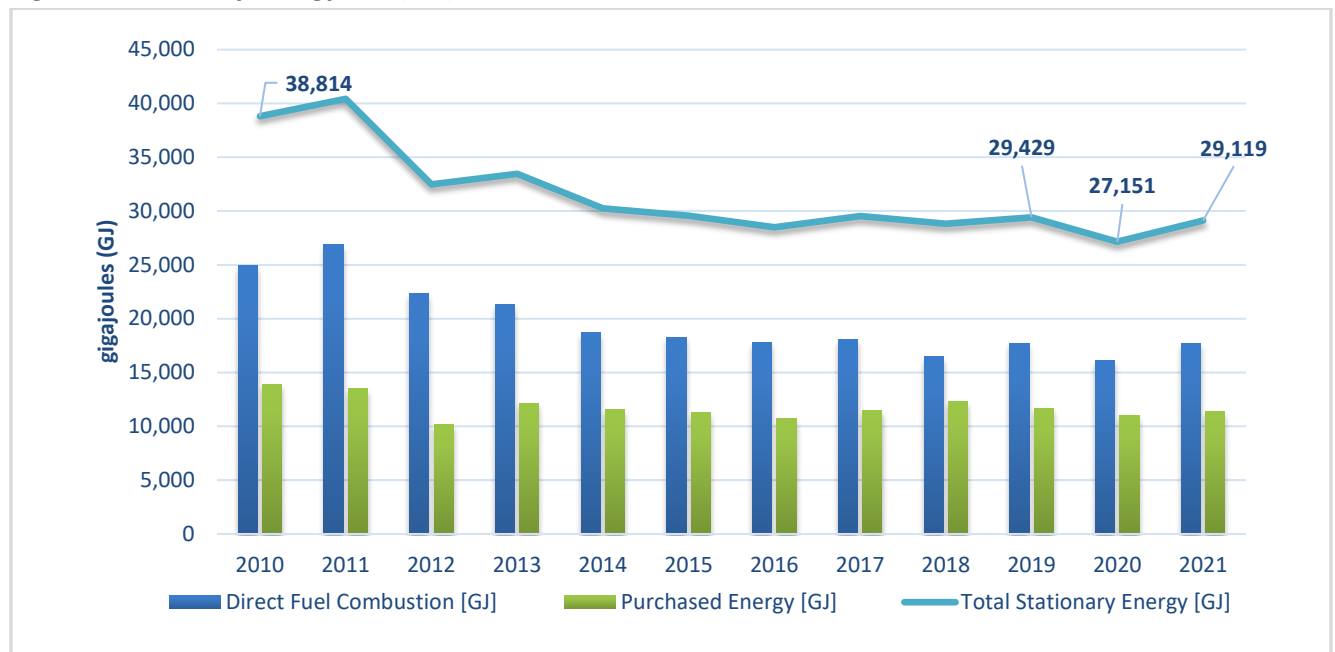
Building Energy Consumption Trends

Building energy consumption data (measured in Gigajoules or GJs) provides a consistent measure that can be compared over time to review progress on energy and GHG reductions. RRU's energy consumption trends from buildings are illustrated in Figure 3 below. Purchased energy (electricity) consumption – comprising 3.2 per cent of RRU's GHG impact – has remained relatively consistent over time, as shown in the green bar below. Direct fuel consumption (methane gas) – comprising the largest

²Methane gas is also known as “natural gas.” RRU's main source for this fuel is FortisBC, which supplies gas that is 95% methane ([FortisBC](#)). Methane has a global warming potential 25 times stronger than CO₂ ([BC Ministry of Environment and Climate Change](#), 2020). Studies have shown that using the terminology of “natural gas” implies a clean source of energy and an undeservedly positive public perception ([Yale](#), 2021). In recognition of these factors, RRU is changing its terminology.

portion of RRU’s GHG footprint at 92 per cent – has also not shown a significant downward trend and has stayed near the 16,000 to 18,000 GJ range since 2014.

Figure 3: Stationary Energy Use (GJs), 2010 – 2021



Although building energy usage saw a dip during the first year of the pandemic and the reduced campus presence in 2020, it rebounded in 2021 due to a few factors. Firstly, there was an increased presence on campus and building energy use followed suit. Another factor causing increased energy consumption was the requirement for increased levels of fresh air intake and the installation of MERV-13 filters due to the emerging health and safety protocols for COVID-19.

Another contributing factor to increased consumption was the extreme weather of 2021. As reported by BC Hydro: “The record-breaking electricity demand that BC Hydro saw in 2021 is tied to B.C. experiencing extreme temperatures in both summer and winter that lasted for extended periods of time.” ([BC Hydro 2021 Demand Report](#), January, 2022). The Crown corporation explained that these extreme temperatures caused spikes in energy consumption and this trend is expected to continue as climate change impacts ramp up.

In October 2021, Royal Roads celebrated the opening of the new Dogwood Auditorium. The auditorium is the culmination of a 2.5-year capital project that involved upgrading and repurposing the former pool building (a federally recognized heritage building, constructed in 1956) into an energy efficient, multi-purpose academic and presentation space that seats up to 500 people. Innovative sustainability features are key aspects of the Dogwood Auditorium. The adjacent open-loop geo-exchange system for heating and cooling is a pilot initiative that is anticipated to result in significant GHG emission reductions for the campus. Optimum functioning of the geo-exchange was affected by silt and debris in the first year of operation. Through regular maintenance and monitoring, it is expected that the system will be fully operational in 2022.



MOBILE SOURCES FLEET ENERGY USE

In 2021, the Royal Roads University fleet produced 45.7 tCO₂e (mobile fuel combustion). This accounted for 4.3 per cent of the university's total GHG emissions. From 2020 to 2021, fleet-related emissions increased slightly (up 5 per cent) as fleet use rebounded with the return of on-campus activities.

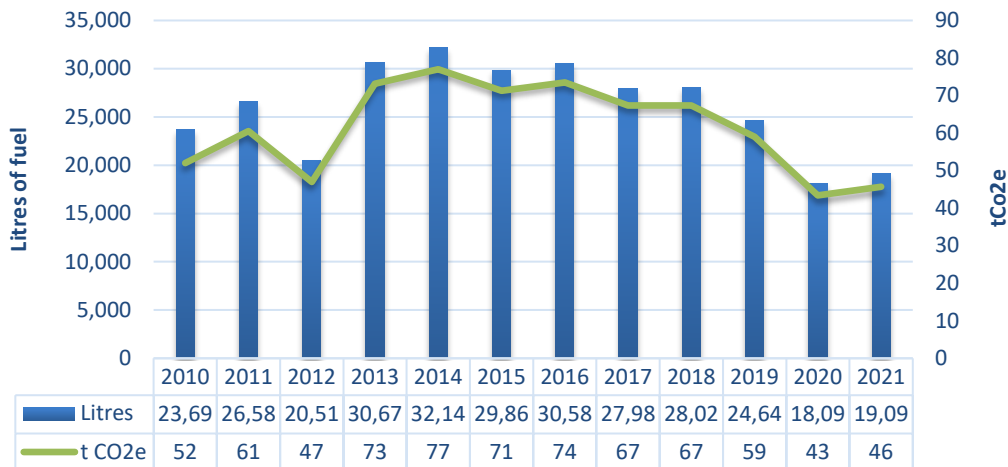
By transitioning to and prioritizing the use of more fuel-efficient vehicles, RRU's fleet emissions have decreased by 12 per cent since 2010.

Through a fleet management plan, Royal Roads continues to phase out inefficient vehicles. RRU has reduced fleet-associated GHGs by 40 per cent since the peak usage year of 2014 (Figure 4). Royal Roads plans to electrify its entire fleet by 2028. To support this transition, electric vehicle (EV) charging infrastructure was installed for the fleet in 2021. Enhancements to EV fleet charging stations will continue into 2022.

Currently, the university has a mixed fleet of 65 on- and off-road vehicles:

- 14 gas-powered vehicles (utility vans, trucks, and minivans)
- 1 diesel-powered heavy-duty vehicle (dump truck)
- 38 electric golf carts
- 12 working vehicles (tractors, mowers, and garden utility vehicles)

Figure 4: Mobile Energy Use, 2010-2021



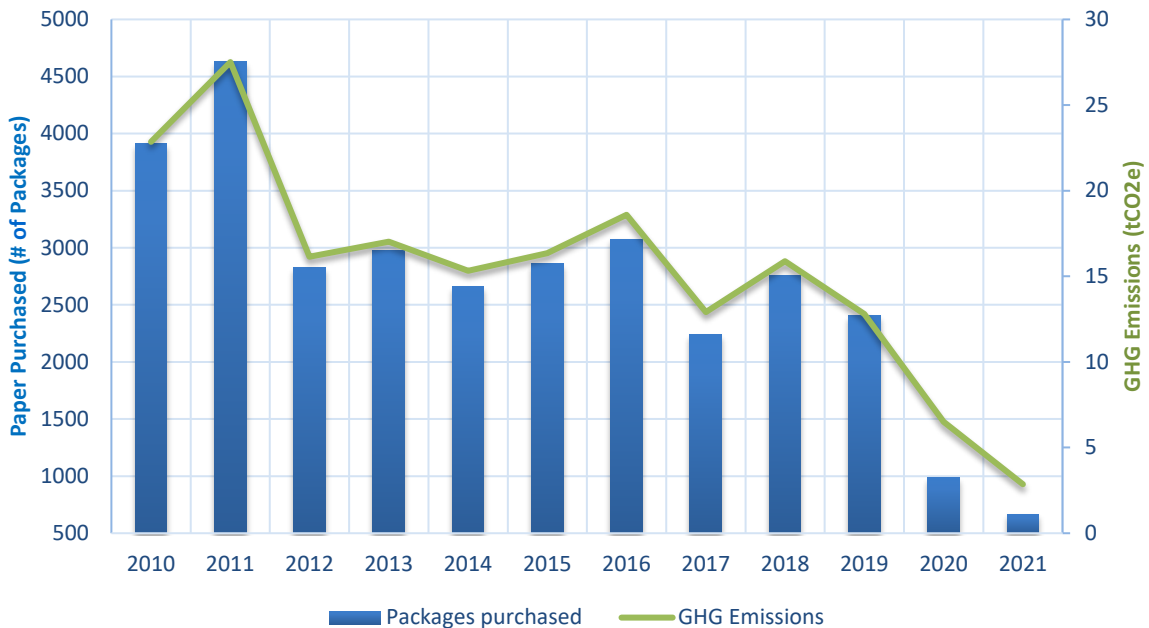


PAPER CONSUMPTION

In 2021, emissions associated with office paper accounted for 2.9 tCO₂e which is less than 1 per cent of the university's total GHG emissions. From 2020 to 2021, GHG emissions associated with paper decreased substantially from an already low total the previous year (3.6 tCO₂e less compared to 2020). The university continued using less paper due to reduced activity levels on the campus and the continued shift to online course delivery and electronic processes.

Since peak paper use in 2011, the university's overall emissions associated with paper have decreased by 90 per cent (Figure 6). Additionally, our general practice is to ensure that all standard-sized paper procured is made of sugar cane to ensure that we reduce our GHG and environmental footprint.

Figure 5: Paper Purchased and Associated GHG Emissions, 2010-2021





OTHER CLIMATE AND SUSTAINABILITY INITIATIVES IN 2021

Fleet Electrification Process Initiated

In addition to the strategic fleet management, RRU is ramping up its focus on fleet electrification.

- Electrical infrastructure was added to the fleet parking area to support EV charger installations.
- Smart EV charging units will replace the existing public units on campus and the old units will be moved to the fleet lot.
- RRU joined the *West Coast Electric Fleets Diamond Lane* with a pledge to purchase zero emission vehicles for 90 per cent of all new fleet vehicle procurement by 2030.

Electrical upgrades and boilers

Energy efficient upgrades and retrofits continued as the university worked to complete the final recommendations of its 2018 Energy Audit. In 2021, electrical infrastructure upgrades were completed and enable key building energy systems to be switched from natural gas to electric. As a result of this work, new boilers are being installed in six buildings which will lead to GHG reductions in the years to come.

Regenerative Sustainability

RRU established a new committee with a mandate to identify ways to advance, model and implement regenerative sustainability, with a focus on research, innovation, teaching and operations.

Climate and Sustainability Education

RRU offers a wide range of programs and courses focused on climate, sustainability or the environment including graduate and undergraduate programs, general studies courses, and several professional and continuing studies courses. New and notable additions include:

- a suite of courses for professionals working in the climate field developed by the Adaptation Learning Network (led by RRU's [ResiliencebyDesign Lab](#))
- the Graduate Certificate in Science and Policy of Climate Change
- the Master of Arts in Climate Action Leadership program
- hosting of a significant number of [free and publicly available webinars and panel discussions](#) related to climate change action and sustainability.

Kitchen Garden @ RRU

As part of its garden revitalization project, RRU is building food production in the 5.26-acre Walled Garden, increasing community food security, creating a living lab for students and community members, and celebrating Indigenous knowledge, culture and edible/medicinal plants.

CLIMATE AND SUSTAINABILITY SUCCESS STORY

RRU's Climate Action Plan Developed and Approved

Throughout 2021, RRU's Climate Action Task Force continued its planning process to develop an action plan for the university. This effort culminated in a strategic five-year plan grounded on ambitious targets that activate the university's influence and impact beyond campus operations into education, research, partnerships and collaboration. RRU's [Climate Action Plan 2022-2027](#) was approved by the Board of Governors in the fall of 2021 and launched in February 2022.

The plan is founded upon three key goals:

GOAL 1

LEAD AND ENABLE

Make urgent climate action core to the university's purpose and business by establishing climate-driven governance, policies and competencies. Be a leading example of mitigation and resilience.

GOAL 2

BUILD KNOWLEDGE AND CAPACITY

Increase climate change awareness and action through education, research and engagement. Advance learning that is responsive to place, people and nature.

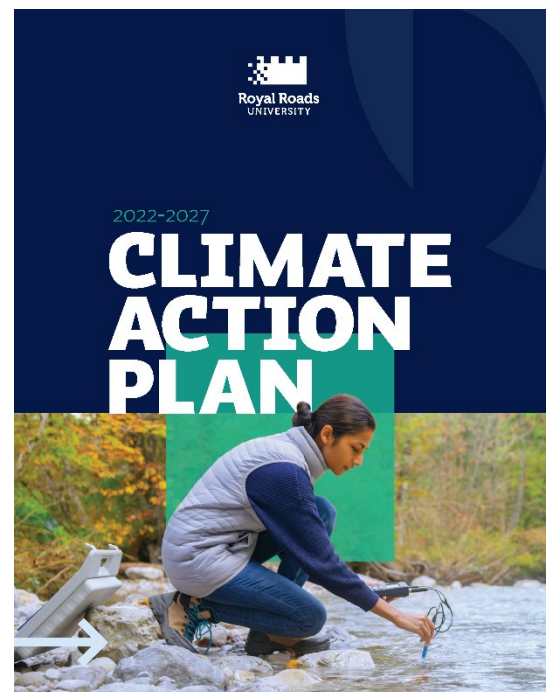
GOAL 3

COLLABORATE FOR SOLUTIONS

Co-create climate action solutions, leverage resources and amplify positive impact through relationships, partnerships and dialogue.

Key actions and targets in the Climate Action Plan include:

- GHG emission reduction targets of 65 per cent by 2025, 80 percent by 2030 and net zero by 2050
- expanding efforts to include a Scope 3 emission reduction strategy with initial baseline-setting
- developing a climate preparedness and adaptation strategy by 2025
- establishing a Climate Action Hub as a support system, connector and amplifier of education, research, collaboration and partnerships
- making climate change and climate action and leadership a core part of learning, teaching and research
- integrating Indigenous collaboration, climate justice, equity, diversity and inclusion throughout the work
- advancing innovative projects, Living Labs programs and nature-based solutions
- committing to climate action with a public declaration and the [Race to Zero](#) pledge.



CLIMATE AND SUSTAINABILITY INITIATIVES PLANNED FOR 2022

In 2022, Royal Roads will focus on implementing Year One initiatives of the *Climate Action Plan*. Operational and sustainability actions will be integrated with the goals of this plan. We are committed to making an impact beyond our institutional emission reductions.

Implementing the Climate Action Plan

In 2022, RRU will strive to implement early [Climate Action Plan](#) actions and initiatives such as:

- establishing governance and administration structures such as the Climate Leadership Committee, advisory circles and working groups for strategic guidance and oversight
- setting up a Climate Action Hub as a connector to support climate action leadership, education, research, and collaboration
- determining our 2019 baseline and a methodology for reducing and offsetting scope 3 emissions with a 50 per cent target by 2030
- integrating climate risk and resilience into operations, service, development and RRU's Enterprise Risk Management framework
- advancing and promoting climate education, training, engagement and research, with a focus on living labs and nature-based solutions
- developing climate-related events, programs and outreach to amplify action through collaboration, relationships, partnerships, and dialogue.

Smart chargers and EV fleet vehicles

In 2022, we will begin the installation of smart EV chargers in our public parking areas. Four chargers will be added to the P3 parking lot, with a longer-term plan of adding more across campus. We will also purchase up to five electric vehicles, enroute to our target of a zero-emission fleet by 2028.

Updated energy audit

The 2022 heating season will see new boiler systems in six buildings that were selected for upgrades to electric in the 2018 energy audit. With this and other key energy upgrades and retrofits completed, the 2018 audit recommendations have all been met. In 2022, an expanded energy audit will be undertaken to

identify new opportunities to shift RRU away from fossil fuels and begin linking climate resilience and adaptive capacity to our GHG reduction efforts.

Rapid energy reductions

An important focus of the audit will be our next GHG target – a 65 per cent reduction by 2025, for which we will need to cut our current emissions to 525 tCO₂e. Meeting this ambitious target in just three years will require significant and sustained efforts across the institution – specifically focused on building energy use. Further, we have committed to improving our climate resilience and an ambitious target of reaching 300 tCO₂e by 2030 (an 80 per cent reduction from 2010).

Zero Carbon Design Standards

Expanding its approach to infrastructure design and renovations, the university will aim to meet its climate and sustainability objectives through a commitment to Zero Carbon Building (ZCB) Design Standards objectives in both the development of new initiatives and the upgrading of the Rose Garden Cottage. This approach positions RRU as a leader in the sector.

R22 Phase out and Roof Replacements

RRU is completing its phase-out of R22 (a hydrochlorofluorocarbon also known as HCFC-22) in 2022. We are replacing the 32 remaining HVAC units that use this refrigerant, which is both ozone depleting and has a Global Warming Potential significantly higher than CO₂ (1760 more than CO₂ over 100 years, according to International [Greenhouse Gas Protocols](#)). Since most of the HVAC units are on rooftops, RRU will optimize replacement efforts and simultaneously replace or upgrade roofs whenever feasible to improve building envelope performance.

CLIMATE RISK MANAGEMENT

Addressing climate risk and resilience have been escalated as organizational priorities through the approval of the *Climate Action Plan*.

Some of RRU's plans over the next two years to manage risk and build resilience related to a changing climate include:

- climate resilience considerations in an updated and expanded energy audit
- conducting a Climate Risk and Vulnerability Assessment to determine priority risks and impacts under a range of climate scenarios
- developing and resourcing a Climate Adaptation Plan (informed by the risk assessment, above) to integrate climate risk and resilience into university governance, administration, operations, business development and service delivery models
- integrating disaster risk reduction and climate adaptation considerations and targets into university emergency plans with annual updates to reflect new regional climate risk projections and business continuity plans. As a first step in this, developing an emergency response procedure for extreme heat in 2022
- assessing, monitoring, reporting on and managing institutional climate risks
- ensuring new buildings and major renovations integrate climate risk and adaptation considerations
- developing a water management plan that includes climate risks (e.g. extreme weather, stormwater surge) and regional factors
- developing a roster of student research projects and volunteer opportunities that integrate with campus mitigation, climate risk and resilience goals. For example, a business case modelling "case study" by the Master of Arts in Climate Action Leadership students focused on an adaptation plan to address the needs of vulnerable populations during extreme heat events.

Appendix: Royal Roads University GHG totals, 2010 – 2021 (pre-adjusted and current)

In 2021, the BC Carbon Neutral Government program adopted the Electricity Emissions Factor (EEF)ⁱ methodology for quantifying emission factors for electricity, a methodology already used by industry reporting under the *Greenhouse Gas Industrial Reporting and Control Act*. The EEF methodology was applied to historical data in the Clean Government Reporting Tool (dating back to 2010). This adjusted the GHG totals for electricity as well as overall emission totals. Table 2 includes previous overall emission totals compared to adjusted totals (in blue). The differences in historic totals are not subject to offset adjustment payments.

Year	Previous totals		New totals after EEF update in 2021	
	Previous Emission totals (tCO ₂ e)	Total with Biogenic emissions (tCO ₂ e)	New Emissions totals (tCO ₂ e) after 2021 EEF update	Total with Biogenic emissions (tCO ₂ e) after 2021 EEF update
2010	1,460	1,462	1,501	1,503
2011	1,564	1,566	1,626	1,629
2012	1,276	1,278	1,319	1,321
2013	1,219	1,221	1,288	1,290
2014	1,066	1,069	1,135	1,138
2015	1,030	1,032	1,105	1,108
2016	1,010	1,013	1,076	1,079
2017	1,014	1,016	1,081	1,083
2018	945	948	995	998
2019	992	994	1,054	1,056
2020	888	889	977	979
2021	---	---	964	966

ⁱ **Electricity Emission Factor (EEF):** the BC Hydro (electricity) emission factor is based on the reported GHG intensity for the utility’s total domestic supply. In previous years, the EEF was calculated as an average of BC Hydro’s GHG intensities, and a three-year rolling average was used to smooth out the annual fluctuations due to changing water conditions and accompanying reliance on thermal generation. Starting in the 2021 reporting year, the EEF was changed to align with *Greenhouse Gas Industrial Reporting and Control Act* (GGIRCA) intensities using a grid-based, instead of provider-based, approach. Source: <https://www2.gov.bc.ca/assets/gov/environment/climate-change/cng/methodology/2020-pso-methodology.pdf>