2022 Greenhouse Gas Emissions Inventory

Gustavson
School of Business
University of Victoria

Gustavson School of Business

January 1 to December 31, 2022

Completed By	Christian Muñoz Mejia & Chloe Shore
Email	christian@synergyenterprises.ca
Completed	27/4/2023

synergy

Executive Summary

The Gustavson School of Business (Gustavson) is an internationally accredited business school at the University of Victoria. The school occupies classrooms, meeting rooms and office space in the Business and Economics and David Strong buildings.

This report measures the carbon footprint associated with Gustavson's operations in 2022. This marks the 13th year that Gustavson has measured and reported its greenhouse gas emissions, with previous reports (2009 - 2014) completed by EcoCentric and ColdStream Consulting. In 2017, Gustavson committed to offsetting all Scope 1, 2 and 3 emissions that are not offset by the University of Victoria (UVic) with the 2016 inventory. 2022 marks the seventh year that Gustavson has operated as a carbon neutral business school.

Total emissions in 2022 were 644 tCO_2e, an increase of 59% over 2021 and 93% over 2020 as Covid-19 restrictions lessened. Since 2010, total emissions are down by 36%. Gustavson has committed to reducing emissions by 20% by 2030 based on 2019 levels. They have exceeded this goal, reducing emissions by 33% in 2022 over the 2019 baseline.

Gustavson's emissions per capita comes to 0.38 tCO_2e. Scope 3 student and employee travel and employee commuting are the largest sources of emissions, followed by Scope 1 natural gas for building heating. Gustavson uses emissions factors for travel from the BC Best Practices Methodology to align with UVic and other BC post secondary institutions. Historically, waste emissions have accounted for less than 1% of Gustavson's total footprint. Emissions from waste are now deminimis and have been removed from the inventory due to the lack of data.

Emissions to be offset by Gustavson result in 474 tCO_2e (excludes emissions already offset by UVic). The projects to be supported include the Nanaimo Landfill to Gas Capture Project and the Composting Facility Project in Abbotsford.

Inventory Information

Company Name	Gustavson School of Business		
Contact Information	Alex Berthin	cssi@uvic.ca	250-853-3721
	Basma Majerbi	majerbi@uvic.ca	250-472-4281
Company Description	Office space, meeting rooms, and classrooms in two UVic buildings.		
Reporting Period	January 1 to December 31, 2022		
Inventory Boundary	**Scope 1 (Direct Emissions)** - Natural Gas		
	Scope 2 (Indirect Emissions from Purchased Electricity) - Purchased Electricity (BC Hydro)		
	Scope 3 (Indirect Emissions from Other Sources) - Stationery, Student & Employee Travel, Employee Commuting & Work from Home		
Consolidation Approach	Operational Control: Accounting for 100% of emissions from operations over which the company has operational control.		
Primary Measurement	Greenhouse gas emissions measured in Carbon Dioxide Equivalent (CO_2e)		
Reporting Guidelines	Aligned with those defined in *The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard, Revised Edition (2015, The GHG Protocol, www.ghgprotocol.org)* . Emissions factors reviewed & approved by Ostrom.		

Summary of Results

Total tCO_2e	644

0.38 tCO_2e per person

Total Footprint Reduction	32.7% Over 2019 Baseline

Carbon Footprint Summary

CSSI on behalf of

Gustavson School of Business
University of Victoria

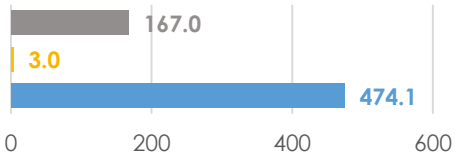
2022 Carbon Footprint Report

tCO_2e	644	tCO_2e offset by Gustavson	474	Offset Cost	$11,839 - $14,207

Total emissions for 2022 are 644 tCO_2e, a 59% increase over 2021. Excluding emissions already offset by UVic (natural gas, electricity and stationery paper), emissions to be offset by the Gustavson School of Business total 474 tCO_2e.

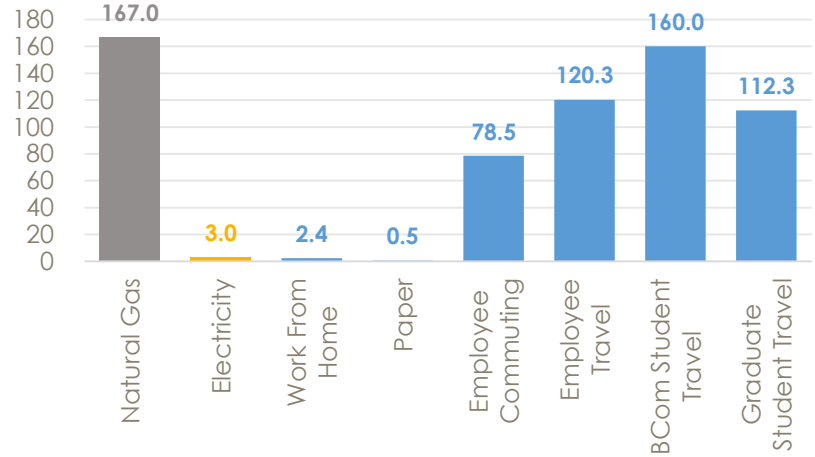
Carbon Footprint by Scope

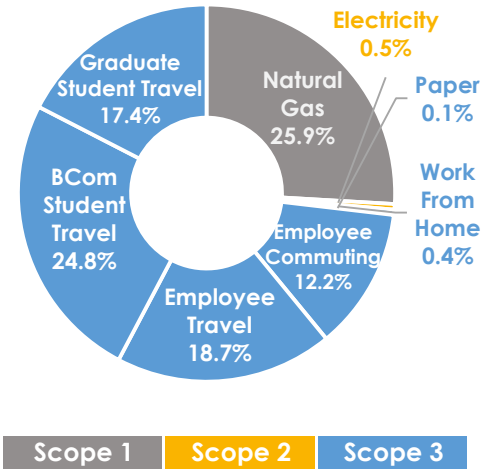
	tCO_2e	
Scope 1 (Direct)	**167.0**	25.9% of total footprint
Scope 2 (Indirect)	**3.05**	0.5% of total footprint
Scope 3 (Indirect)	**474.1**	73.6% of total footprint
TOTAL EMISSIONS	**644.2**	



Carbon Footprint By Activity

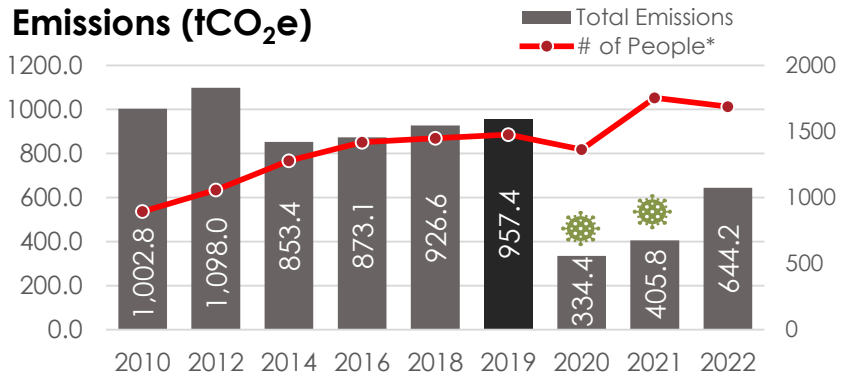
Emissions by Activity (tCO_2e)





Carbon Footprint Year Over Year

Emissions (tCO_2e)



** Note: Number of people includes employees (faculty and staff), undergraduate (BCom), and graduate students (MBA, WMBA, MGB and PhD) at the Gustavson School of Business.*

	tCO_2e Per Year	Change since 2010	
		tCO_2e/person	Percent
2010	**1,002.8**	1.12	
2012	**1,098.0**	1.04	9.5%
2014	**853.4**	0.67	-14.9%
2016	**873.1**	0.61	-12.9%
2018	**926.6**	0.64	-7.6%
2019	**957.4**	0.65	-4.5%
2020	**334.4**	0.25	-66.7%
2021	**405.8**	0.23	-59.5%
2022	**644.2**	0.38	-35.8%
Target	**766.0**	0.51	-20.0%

2019 baseline shown in darker color

2,032.0 Barrels of Oil

183.3 Cars per Year

0.38 tCO_2e per person

Total tCO_2e **644.2**

Emission Reduction Targets

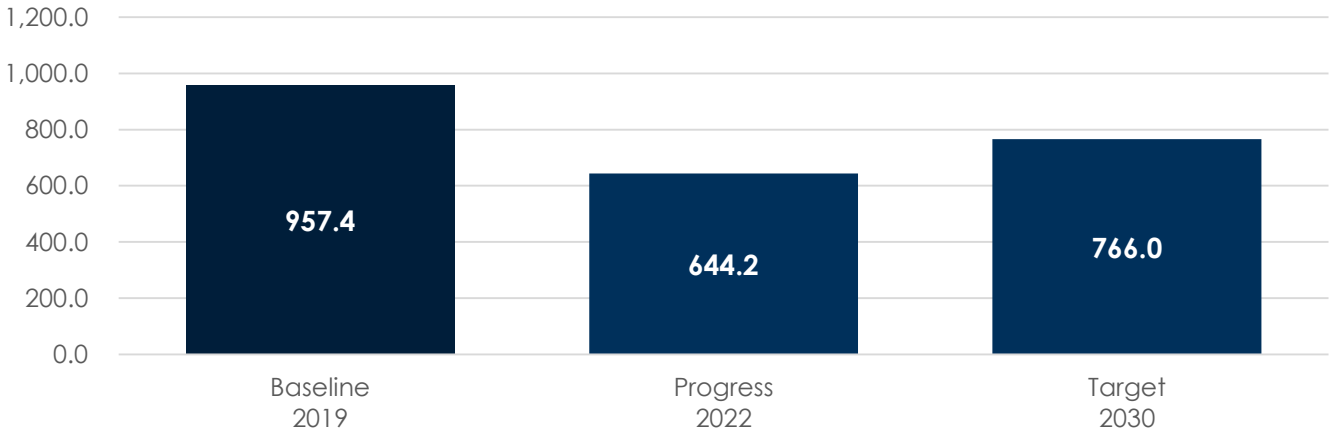
Over 2019 baseline

Reduction Target	**20%** by 2030
% Reduced	**33%** 2022

Gustavson has committed to reducing emissions by 20% by 2030 based on 2019 levels. They have exceeded this goal, reducing emissions by 33% over the 2019 baseline.

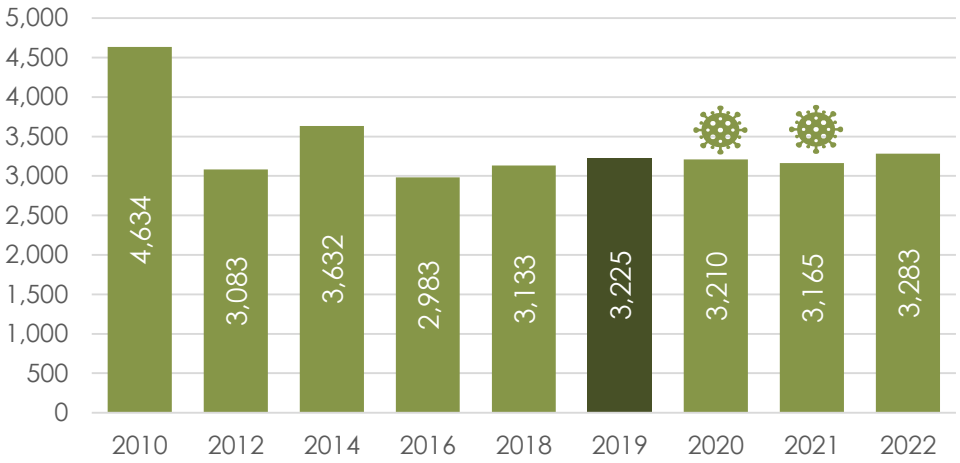
Overall Progress

Emissions (tCO_2e)



Natural Gas

Natural Gas (GJ)



Analysis

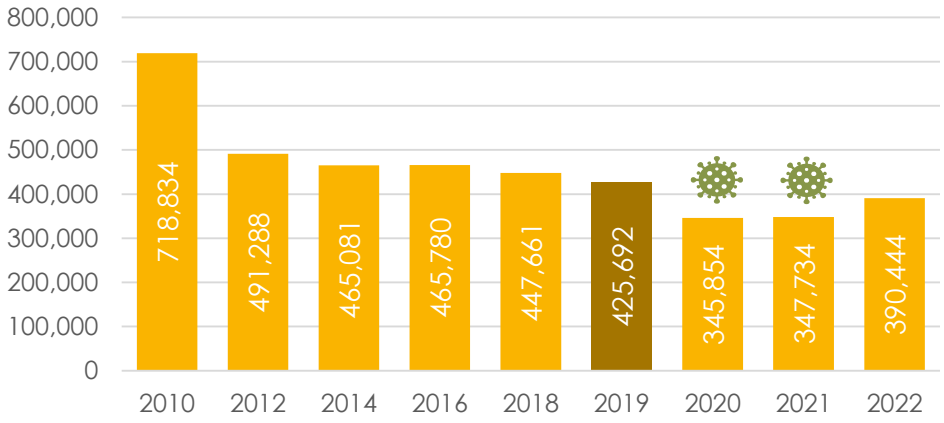
Gustavson's buildings are connected to a natural gas heating loop. Natural gas use and associated emissions have remained fairly consistent over the past ten years, even during the Covid-19 school closures. Natural gas use increased by 3.7% since 2021, but has decreased by 29% since the first year of measurement due to overall improvements to the HVAC systems at UVic.

** Emissions from natural gas are offset by the University of Victoria.*

tCO_2e	167*	% of Total	26%	GJ/ft^2	0.05	% GJ Change	-1.8% Over 2019 Baseline

Electricity

Electricity (kWh)



Analysis

Electricity use increased by 12% since 2021 as more people returned to classrooms following the Covid-19 pandemic. Since 2010, electricity use has decreased by 46% due to lighting upgrades, educational initiatives, and efforts to reduce electricity use in unoccupied offices and classrooms. Emissions from electricity make up less than 1% of Gustavson's total carbon footprint.

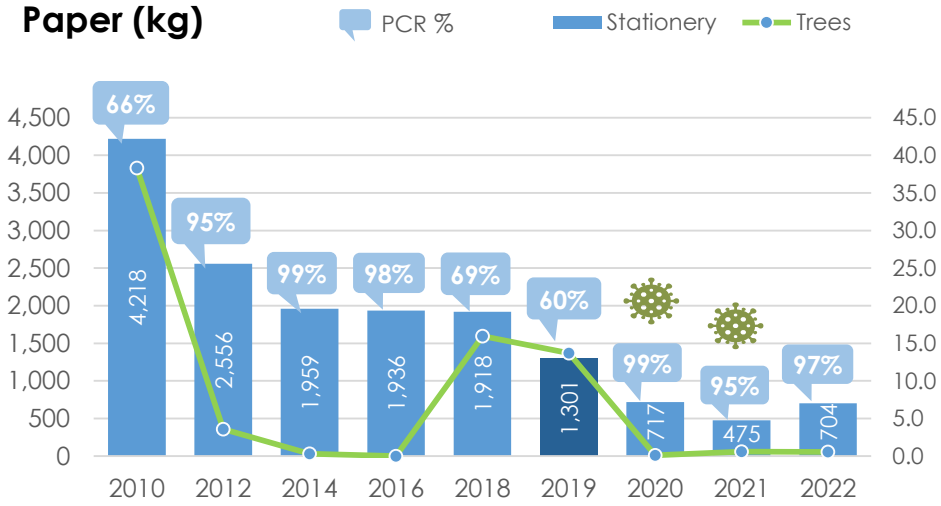
Note: The emissions factor for BC's electricity has decreased by 58% since 2021, decreasing the tCO_2e per kWh as a result of reduced natural gas in BC's grid.

** Emissions from electricity are offset by the University of Victoria.*

tCO_2e	3.0*	% of Total	0.5%	kWh / ft^2	6.1	% kWh Change	-8.3% Over 2019 Baseline

Paper

Paper (kg)



Analysis

Paper use increased by 48% since 2021, but has decreased by 83% since the first year of measurement. In 2022, Gustavson saved 19 trees from being cut down by purchasing paper with high post-consumer recycled content (PCR). The average recycled content of paper purchased increased to 97%, resulting in 0.5 tCO_2e.

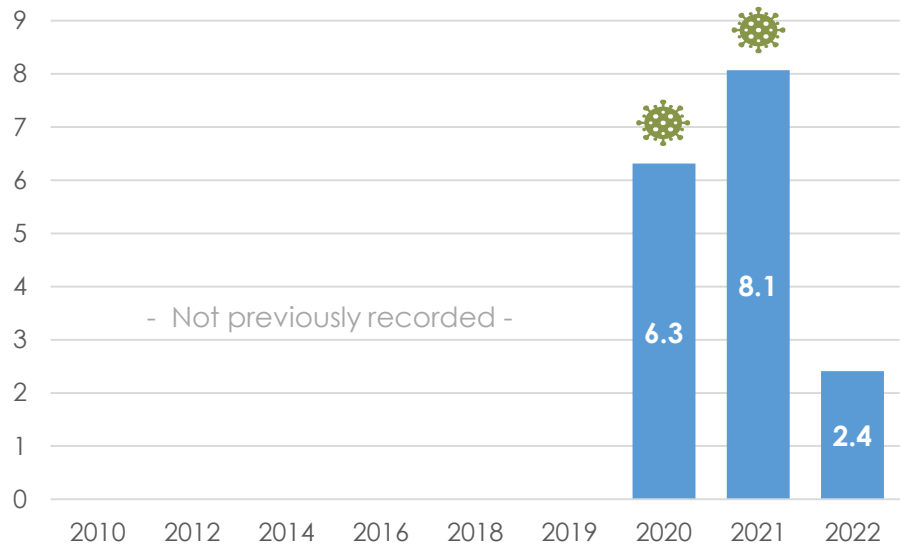
Note: Improved factors have been applied to calculate the emissions from paper. These improved factors have decreased the tCO_2e per kg of paper.

' Emissions from stationery paper are offset by the University of Victoria.*

tCO_2e	0.5*	% of Total	0.1%	Treeless Content	97%	% kg Change	-45.9% Over 2019 Baseline

Work from Home

Emissions (tCO_2e)



Analysis

Work from home emissions were measured for the first time during the Covid-19 pandemic.

As the Covid-19 regulations lifted and more employees returned to in-person work, emissions from work from home decreased by ~6 tCO_2e since 2021.

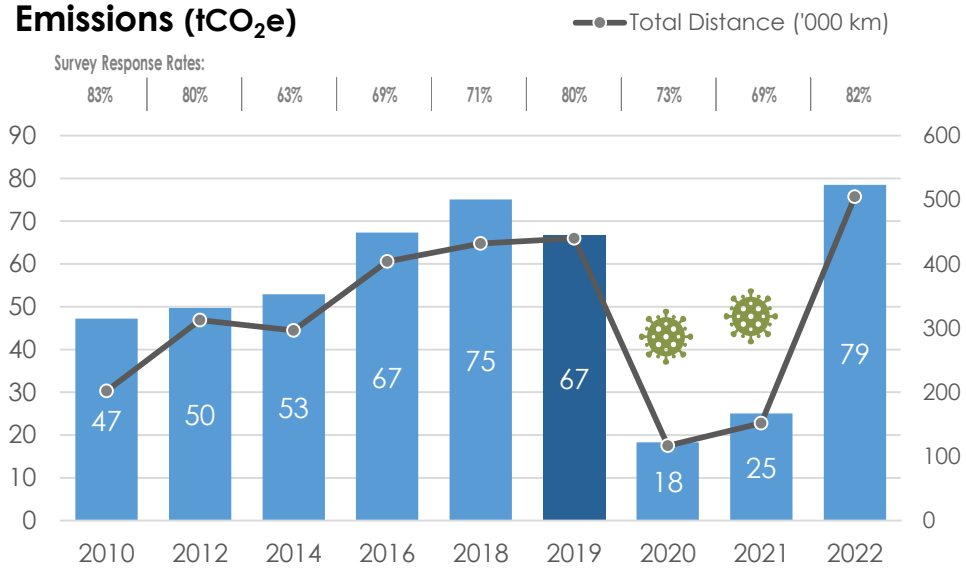
Continuing to offer flexible work from home options will keep staff commuting emissions low.

Note: Work from home emissions were calculated by surveying Gustavson faculty and staff to assess the incremental energy incurred over and above normal home energy use, as a result of homeworking.

tCO_2e	2.4	% of Total	0.4%	tCO_2e / FTE	0.019	% tCO_2e Change	-61.9% Since 2020

Commuting

Emissions (tCO_2e)

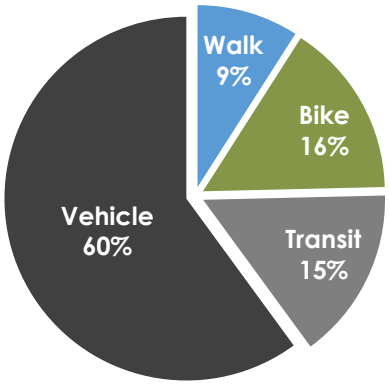


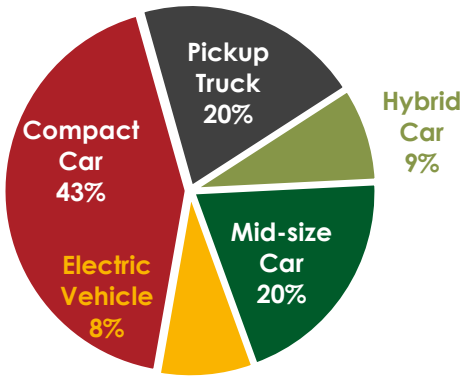
Analysis

Commuting emissions increased by 216% since 2021 as the Covid-19 regulations lifted and more employees returned to in-person work. In 2022, employees commuted longer distances, resulting in a cumulative total distance traveled of ~500,000 km.

The survey had a response rate of 82%, the highest since 2010.

Commuting Percentages by Method





Current (2022)

Average $kgCO_2e/km$	0.156
Low-Emission Commuting %	40%

Vehicle Types

Distance Traveled (km)	372,407
Low-Emission Vehicles	17%

Analysis (Breakdown)

The portion of employees commuting by low-emissions means (biking, busing, or walking) increased from 32% in 2021 to 40% in 2022.

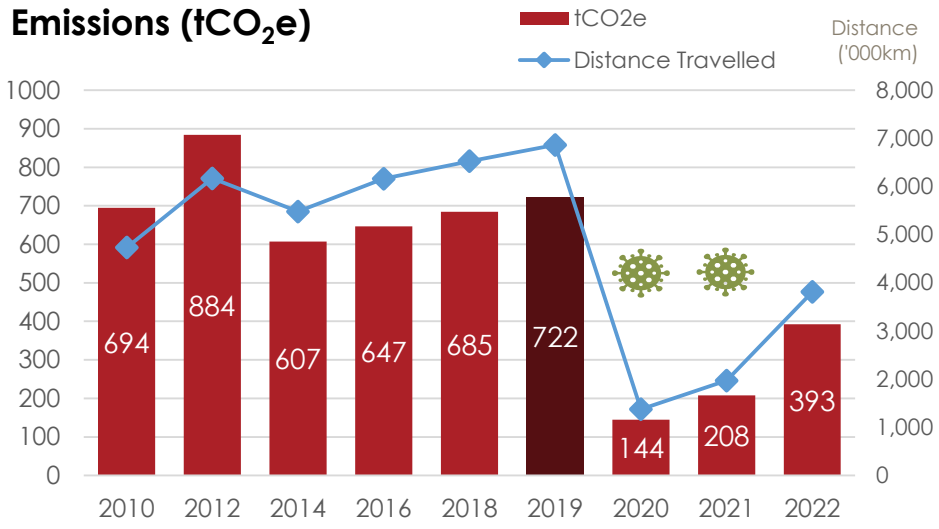
Only 17% of vehicles used by employees for commuting purposes are low emissions vehicles (electric, hybrid).

Reduction strategies include exploring financial incentives for electric vehicle adoption, encouraging low-emission vehicles and transportation options, and implementing a voluntary carpooling or ride-sharing program to reduce overall commuting emissions.

tCO_2e	78.5	% of Total	12%	tCO_2e / FTE	0.633	% tCO_2e Change	+15.1% Over 2019 Baseline

Travel

Emissions (tCO_2e)



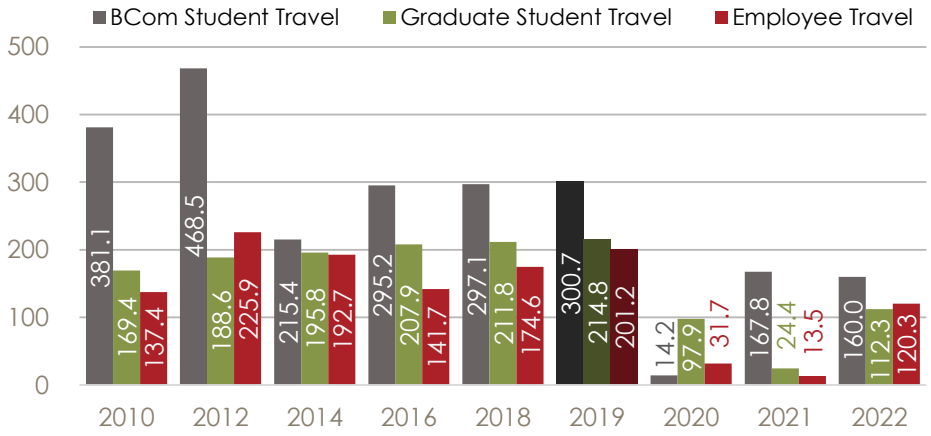
Analysis

The gradual return of employee and student travel in 2022 resulted in 393 tCO_2e, an increase of 89% over 2021.

Emissions from BCom Student travel were the highest at 160 tCO_2e, followed by Employee travel at 120 tCO_2e, and Graduate Student travel at 112 tCO_2e. The majority of flights taken by employees were short distance trips to-and-from Vancouver.

Note: Flight emission factors are pulled from the 2021 B.C. Best Practices Methodology for Quantifying Greenhouse Gas Emissions. These factors have not changed since 2016 and are an average of 42% lower than the current DEFRA factors used by Synergy.

Travel Emissions by Dept. (tCO_2e)



		Distance ('000 km)	# of Flights
2019	Employee	1,921	739
	BCom	2,869	330
	Graduate	2,050	232
2022	Employee	1,101	405
	BCom	1,567	194
	Graduate	1,100	196
Total 2022		**3,769**	**795**

Travel emissions account for 61% of total emissions. In 202, there was a 45% reduction in overall travel emissions, or 329 tCO_2e fewer than the 2019 baseline.

Emissions from Graduate student travel decreased by 48%, followed by BCom student travel at 47%, and Employee travel by 40%.

2019 Baseline

Average $kgCO_2e/km$	0.1052
Average Distance per Flight (km)	5,258

2022

Average $kgCO_2e/km$	0.1031
Average Distance per Flight (km)	4,741

tCO_2e / Employee	3.17
tCO_2e / BCom Student	0.28
tCO_2e / Graduate Student	2.57
tCO_2e	393

Carbon Reduction Strategy

The Gustavson School of Business (Gustavson) has measured and reported its greenhouse gas emissions since 2009, and has operated as a carbon neutral business school since 2016. Total emissions in 2022 were 644 tCO_2e, an increase of 59% over 2021 and 93% over 2020 as Covid-19 restrictions lessened. Emissions to be offset by Gustavson result in 474 tCO_2e (excludes emissions already offset by UVic).

Gustavson has committed to reducing emissions by 20% by 2030 based on 2019 levels. They have exceeded this goal, reducing emissions by 33% in 2022 over the 2019 baseline. Gustavson now has the opportunity to set a new and ambitious goal moving forwards. To achieve further emission reductions, Gustavson should prioritize its two highest emission sources, travel (393 tCO_2e) and natural gas (167 tCO_2e). Gustavson should implement a travel policy/program to limit non-essential travel and work with UVic to decarbonize the heating loop by switching to renewable natural gas.

Achievements

> Measured and reported carbon emissions for 13 years.

> Carbon neutral for seven years.

> Formed the Carbon Neutrality Plus committee, comprising students, faculty and staff representatives, meant to provide information and long-term leadership in shortlisting carbon offset projects and integrating carbon neutrality education with students moving forward.

> Exceeded 2030 carbon reduction target.

Moving Forward

> Work with UVic to decarbonize the natural gas heating loop.

> Develop and implement a travel reduction strategy.

> Continue to provide flexible work from home options to minimize staff commuting.

> Create an annual student engagement project to measure Gustavson's waste.

Information on Inventory Uncertainty

* The inventories for years 2010 to 2014 were completed by EcoCentric and ColdStream Consulting, and restated with the methodology and emissions factors of Synergy Enterprises.

* Flight emission factors are pulled from the 2021 B.C. Best Practices Methodology for Quantifying Greenhouse Gas Emissions. These factors have not changed since 2016 and are an average of 42% lower than the current DEFRA factors used by Synergy.

* Natural gas use in buildings was estimated using floor area share on the natural gas loop.

Emissions References

1. 2021 B.C. Best Practices Methodology for Quantifying Greenhouse Gas Emissions
https://www2.gov.bc.ca/assets/gov/environment/climate-change/cng/methodology/2021-best-practices-methodology.pdf
2. Environment Canada's National Inventory Report (1990-2019); Part 2 & 3.
https://www.canada.ca/en/environment-climate-change/services/climate-change/greenhouse-gas-emissions/inventory.html
3. Department for Environment, Food & Rural Affairs (UK) Carbon Factors 2021
https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-
4. Intergovernmental Panel on Climate Change (Global Warming Potentials)
http://www.ipcc.ch/publications_and_data/ar4/wg1/en/ch2s2-10-2.html

All emissions factors are reviewed and approved by Ostrom Climate Solutions (https://ostromclimate.com/) on an annual basis.

Policy for Base Year Recalculation:
Base year emissions, and other previous emissions, shall be retroactively recalculated if a change in organizational structure or data quality is expected to exceed a significance threshold of 10% of base year emissions. These changes may arise from structural changes such as mergers, acquisitions, divestments, outsourcing or insourcing, changes in calculation methodology and improvements in accuracy, or discovery of significant errors.

Glossary of Terms

Term	Description
Carbon Neutral	Companies are carbon neutral when they remove GHG emissions equivalent to all their scope 1, 2 and material (>5%) scope 3 emissions, usually by purchasing carbon offsets.
Biogenic	Carbon emissions generated from sources naturally occurring in the carbon cycle (i.e. organic matter), rather than the result of fossil fuel combustion.
Emissions Factor	The volume of emissions created by an emissions producing activity (i.e. fuel combustion), calculated based on the amount of the activity (volume, distance, etc.).
GHG	**Greenhouse Gas (emissions):** Atmospheric gasses contributing to the greenhouse effect, including Carbon Dioxide (CO_2), Methane (CH_4), Nitrous Oxide (N_2O), etc.
GJ	**Gigajoule**: Unit of natural gas equal to 26.137 m^3 or 0.947 MMBtu
kWh	**Kilowatt-Hour**: Common unit for measuring electrical consumption
m^3	**Cubic Meter**: Unit of measurement equal to 1,000 Litres
Net-Zero	Companies with a zero-emission carbon footprint, usually achieved by minimizing outputs and negating the remaining emissions through carbon removal activities.
PCR%	**Post-Consumer Recycled Content** (as a percentage)
psg-km	**Passenger-Kilometer**: Unit separating total emissions between passengers per km
tCO_2e	**Tonnes of Carbon Dioxide Equivalent**: a combined term capturing the emissions from various GHGs.
t-km	**Tonne-kilometer**: A unit of measurement used in shipping

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synergy