

Attachment 2

2010, 2021 and 2022 Corporate Energy & Emissions Inventories and 2022 Emissions by Sector

Energy consumption and GHG emissions by sector for baseline year 2010 and years 2021, 2022

Scope 1 and Scope 2 Emissions

		Consumption			Sector Total			Consumption			Sector Total			Overall % Change GHGs
Sector	Energy Type/Unit	tCO ₂ e		tCO ₂ e	tCO ₂ e		tCO ₂ e	tCO ₂ e		tCO ₂ e				
		2010*			2021			2022			2010 - 2022			
Buildings	Elect (kWh)	8,577,852	306	2,412	8,342,677	81	1,509	8,390,060	96	1,535	-36.3%			
	Nat Gas (GJ)	41,849	2,105		28,635	1,428		29,017	1,439					
	Propane (L)	966	1		0	0		0	0					
Outdoor Lighting	Elect (kWh)	3,734,709	133	133	2,548,758	25	25	2,604,321	30	30	-77.5%			
Water & Wastewater	Elect (KWh)	415,121	15	15	473,894	5	5	402,239	5	5	-66.7%			
Vehicle Fleet	Diesel (L)	349,696	955	1667	299,654	778	1472	296,680	764	1409	-15.5%			
	Gasoline (L)	293,878	712		165,403	368		173,888	380					
	Propane (L)	0	0		211,696	326		175,108	265					
Total		4227			3010			3089			-26.9%			

Scope 3 Emissions

Sector		Energy Type/Unit	Consumption		tCO ₂ e	Sector Total	tCO ₂ e	Consumption		tCO ₂ e	Sector Total	tCO ₂ e	Overall % Change GHGs
			2010*					2021					2010 - 2022
Contracted		Diesel (L)						7,139	19	20			
		Gasoline (L)						712	1				
		CNG (L)											
		Renewable Diesel (L)											
Total								20					

*Corporate emissions inventories for this period were not kept. The emissions in 2010 are based on a regression model and actual emissions calculated in 2009 and 2011.

2022 Corporate Emissions by Sector

To calculate the City's annual corporate GHG emissions, energy consumption is tracked for five key sectors: buildings, lighting, fleet, water/wastewater and contracted services. Based on this energy consumption, the resulting GHG emissions are calculated for each sector and aggregated to produce the City's total corporate GHG emissions. Energy consumption and GHG emissions for each sector in 2010 (baseline year), and for 2021 and 2022.

For the 2022 reporting year, the electricity emission intensity factor was slightly higher compared to 2021, resulting in increased GHG emissions in 2022 when comparing the same electricity consumption. The electricity emission intensity factor reflects the emissions created to generate electricity.

Building Sector

GHG emissions produced by the City's buildings and facilities have decreased by 36.4% between 2010 and 2022. Electricity and natural gas consumption was increased in 2022 compared to 2021 but by only a small amount.

While the change in natural gas consumption between 2021 and 2022 was small it is worth noting that there was a significant change in how natural gas was consumed in buildings. In 2022, the closure of the Canada Games Pool resulted in a reduction of 524 tons of greenhouse gas emissions. The Canada Games Pool was the largest natural gas consumer in previous years. In 2022, these emission savings were displaced by the addition of the Massey Theater and an extended season of the two outdoor pools. There was also increased natural gas consumption at many of the City's buildings and facilities, which can be attributed to colder winter daily temperatures.

In 2022, the heating degree days were 4.9% higher compared to 2021.¹ Heating degree days are a way to quantify the heating requirements for a building based on how cold it is in a given time period. This indicates that all being equal, it would require more energy for heating in 2022 compared to 2021. The below graph compares natural gas consumption in city buildings and facilities for 2021 and 2022.

¹ Heating Degree Days, Vancouver International airport weather station. <https://www.degreedays.net/>

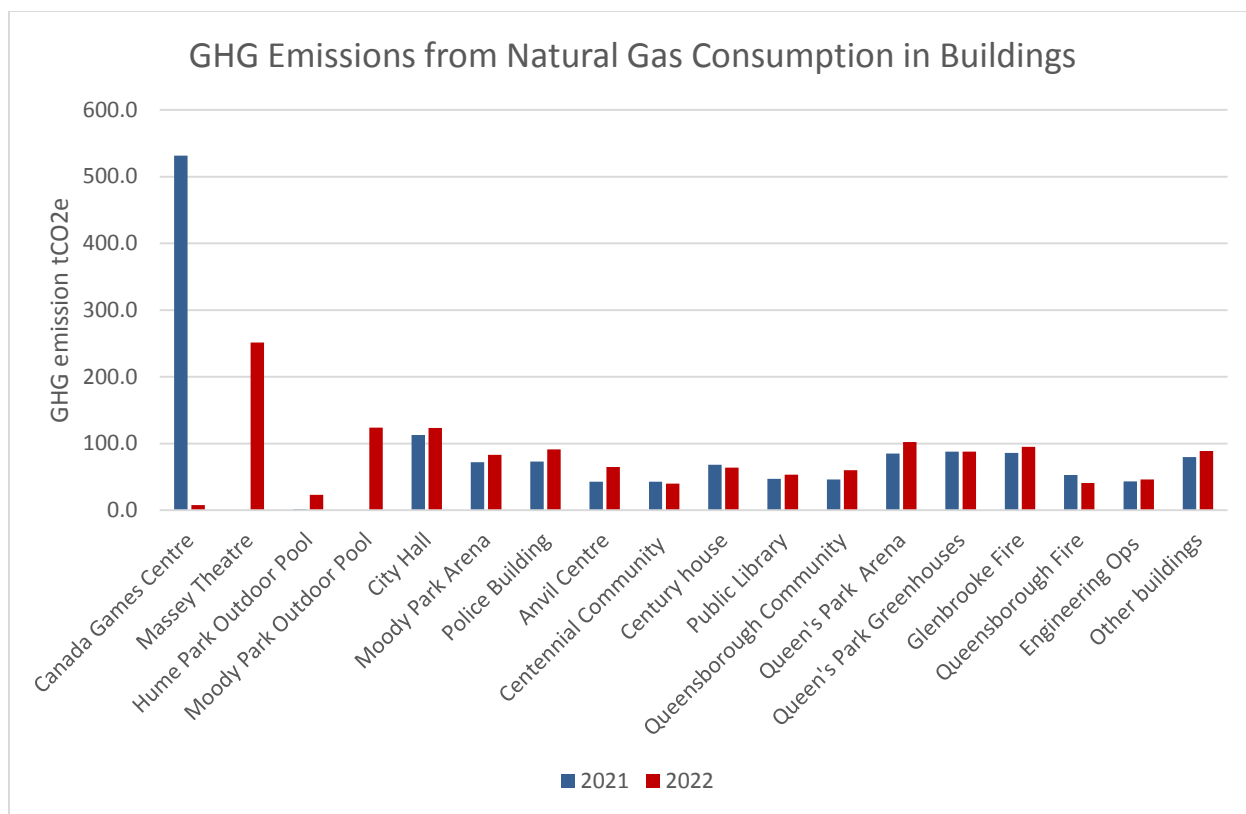


Figure 1: GHG Emissions from Natural Gas Consumption in City Buildings (2021-2022)

Lighting Sector

GHG emission from the lighting sector has decreased by 77% from 2010 to 2022 as a result of the City replacing less efficient lighting systems with LED or highly efficient fixtures. There was an approximately 2% increase in electricity consumption in the lighting sector in 2022 compared to 2021.

Water and Wastewater Sector

This sectors emissions have a minimal effect on total corporate emissions, but worth noting in 2022 there was a reduction in electricity consumption of 71,655 kWh compared with 2021. In 2022, one of the storm water drainage stations was replaced with a new, significantly more efficient station. Also, 2022 was a drier year compared to 2021 resulting in less run time of pump stations compared to the wetter year seen in 2021. The reduction in electricity consumption is not reflected in the emissions due to as previously mentioned the emission intensity of the electricity was higher in 2022 compared to 2021.

Vehicle Fleet Sector

In 2022, emissions produced by the City's fleet decreased by 63 tCO_{2e} from 2021 levels. The City added electric and hybrid vehicles to the fleet which resulted in reduced gas and propane consumption. The emissions from fleet electricity consumption are small compared to that of gas and diesel and while could be tracked using the EV charger software, have not been included in the 2022 inventory. Tracking electricity consumption will be considered in future years as the use of electric vehicles increases and displaces higher GHG emitting fuels.

Contracted Emissions Sector

Contracted emissions are defined as those coming from the vehicles and equipment used to provide a specific municipal services (e.g. tree trimming, line painting) on contracts valued at over \$25,000.

In 2022, contractor emissions contributed 109 to the corporate emissions inventory. This is an increase of 89 tCO_{2e} compared to the emissions reported in 2021. The increase is a result of including additional services in the inventory that were not included in 2021. Fuel consumption from contracted emission can be challenging to obtain and the Province provides guidance on how to estimate emissions from contracted services which was used in calculating these emission in 2022. The addition of the estimated emissions from the Q2Q ferry service was added in 2022, which has significantly changed the overall emissions for this sector. Had the emissions been included in 2021 they would have been similar to those reported in 2022.

Although reducing contracted emissions cannot be directly controlled, the City is considering the sustainability of the contractor's operations during the vendor selection process as a means to influence these emission. In 2022, contractors reporting replacing the use of diesel in their operations with the less carbon intense fuels of Compressed Natural Gas (CNG) and renewable diesel.