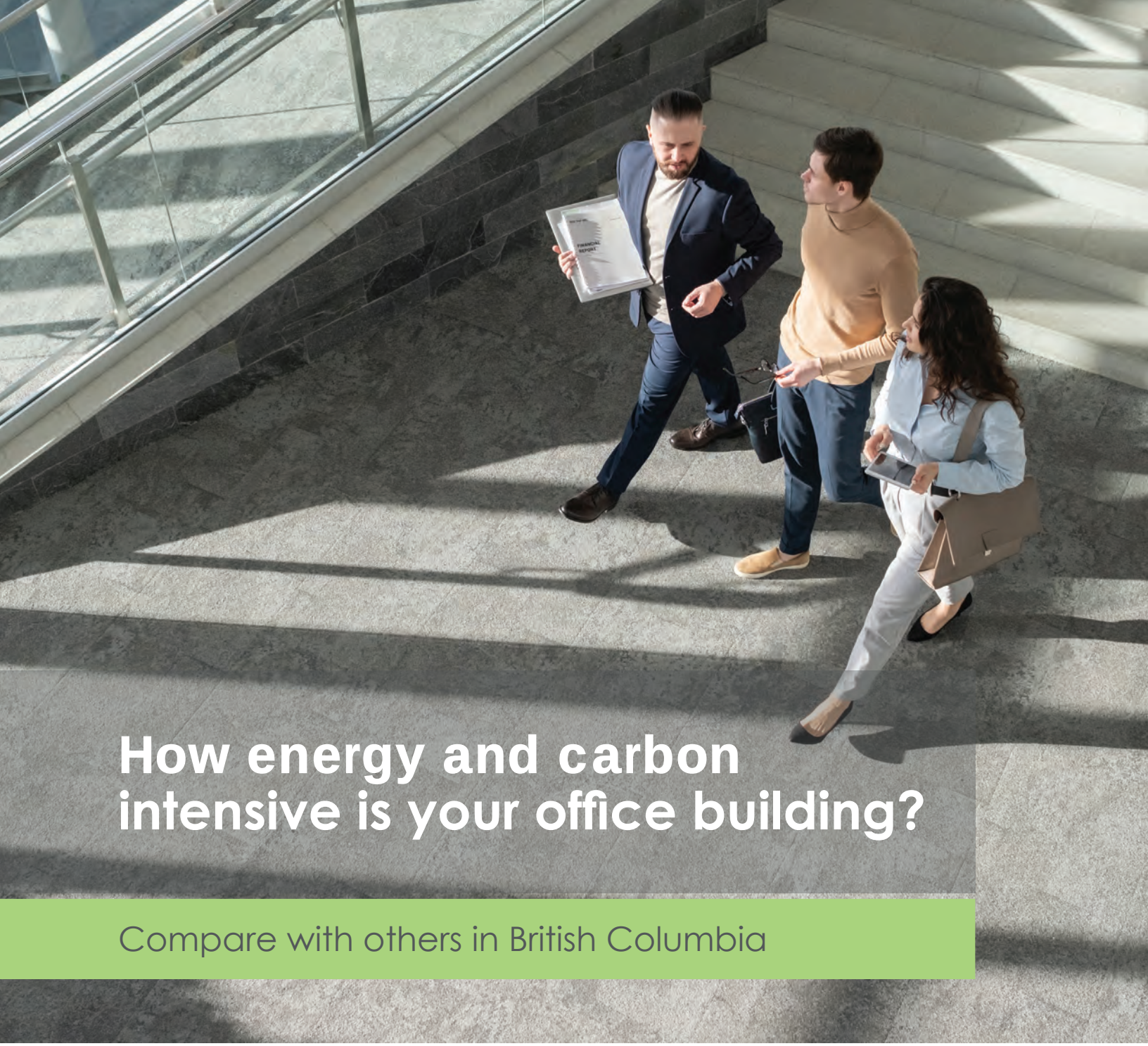


How energy and carbon intensive is your office building?

Compare with others in British Columbia

PUMA **BENCHMARKING SUMMARY**

For BC Office Buildings: 2021 Calendar Year

PUMA™

PUMA Utility Monitoring Inc.

Scope

The sites included in this benchmarking report are from the following clients that subscribed to monthly PUMA utility monitoring software and services during the calendar year 2021 or had energy or low carbon audits carried out by Prism Engineering.

AUSTEVILLE · AVISON YOUNG · Colliers · GWL REALTY ADVISORS · Peterson · TRANSPACIFIC · TRIOVEST · Vancity · wpm WARRINGTON PCI MANAGEMENT · WESGROUP · WEST PENDER Property Group · +6 others

Geography: All buildings included in this report are from Coastal BC regions, including the Lower Mainland, Victoria, and Nanaimo.

About PUMA

PUMA comprises a combination of software and services that track over 23,000 electrical, natural gas, water, and other fuel accounts for government, commercial, and institutional customers. Since launching online in 2009, more and more organizations have enlisted PUMA to help track and analyze building energy use.

PUMA is currently used by over 20 Energy Managers and more than 60 organizations across Canada. Our utility tracking software and services save time and money for owners of multiple properties by turning data into actionable information.

About this Report

Since 2013, the PUMA team has put together a benchmarking report for school districts, advanced education, and local governments based on compiled data from PUMA. Like those reports, this first for office buildings enables the comparison of similar sites across each sector.

www.pumautilitymonitoring.ca

2021 Office Building Benchmarks

This benchmarking report compiles data from sixty-two buildings managed by seventeen property management/owner companies and analyses the reductions needed for compliance to reduce carbon pollution limits.

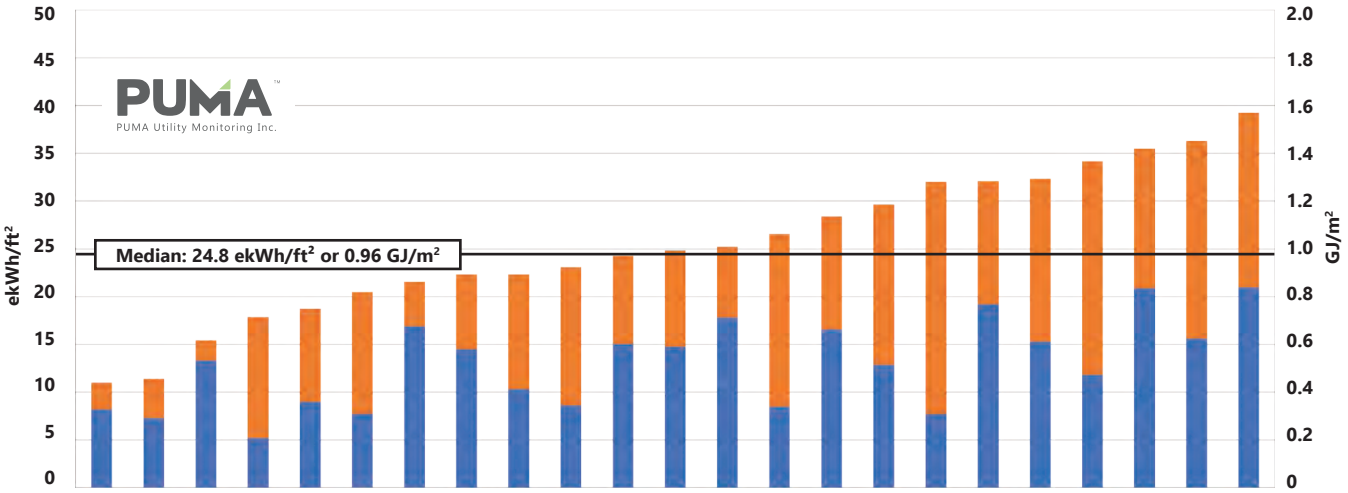
The data set is separated into three categories based on the size of the buildings: small, medium, and large.

Small-sized office buildings	25,000 ft² to 50,000 ft² / 2,322 m² to 4,645 m²
Medium-sized office buildings	50,000 ft² to 100,000 ft² / 4,645 m² to 9,290 m²
Large-sized office buildings	≥100,000 ft² / 9,290 m²

How **energy intensive** is your office building?

Based upon your Energy Use Intensity (EUI)

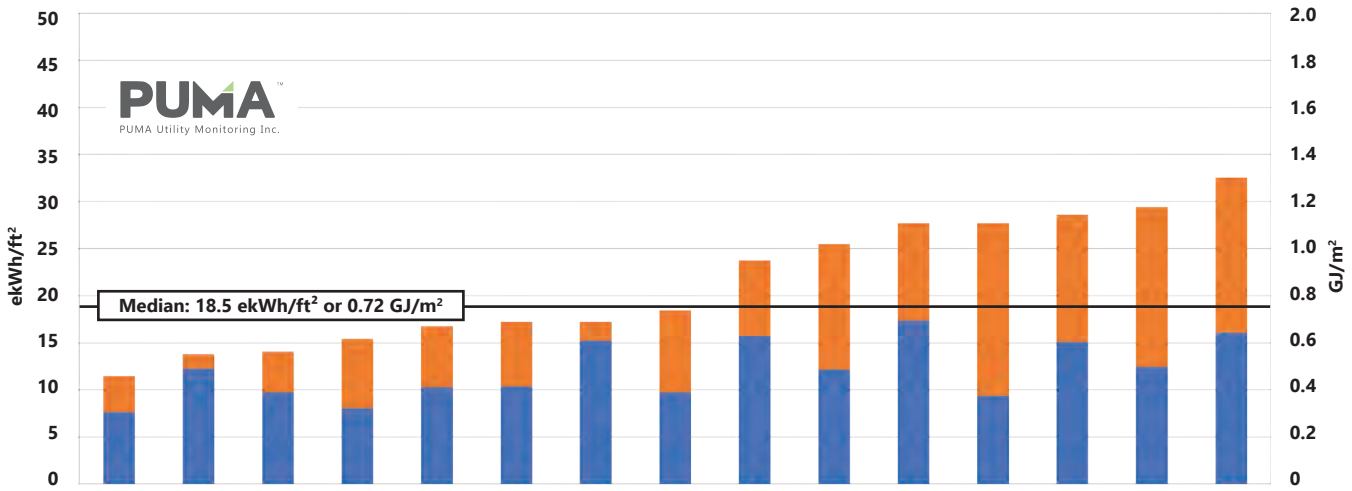
Small-sized office buildings
EUI calendar year 2021



The small building dataset of twenty-three buildings has the highest energy-use intensity (EUI) of the three size groups. The reason might be that the building systems are not as efficient, or there may be less focus on efficiency upgrades for this building set due to not qualifying for utility recommissioning programs.

Medium-sized office buildings

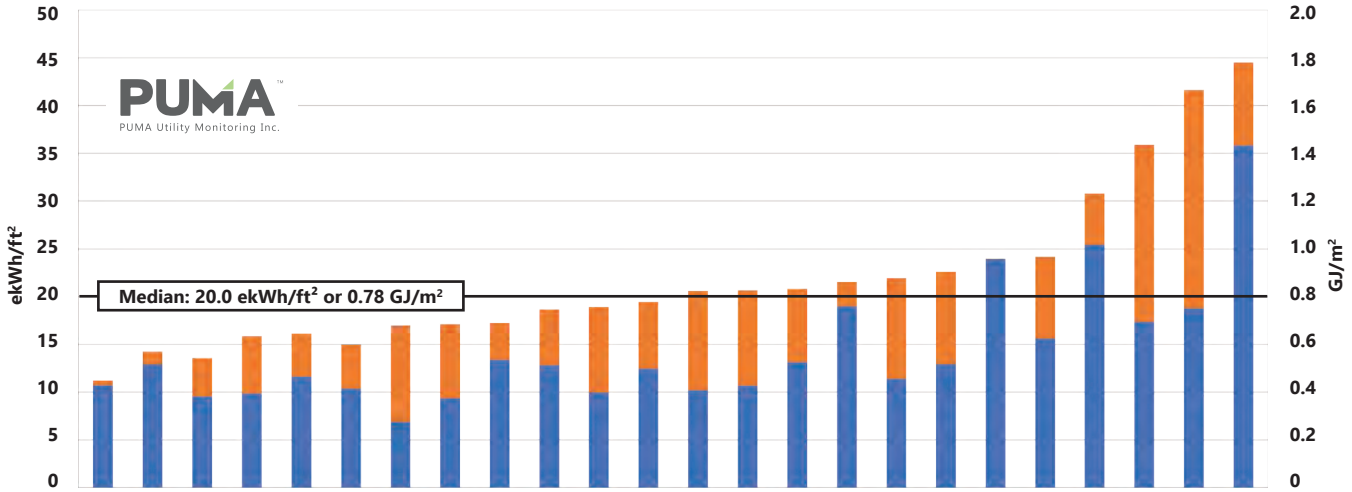
EUI calendar year 2021



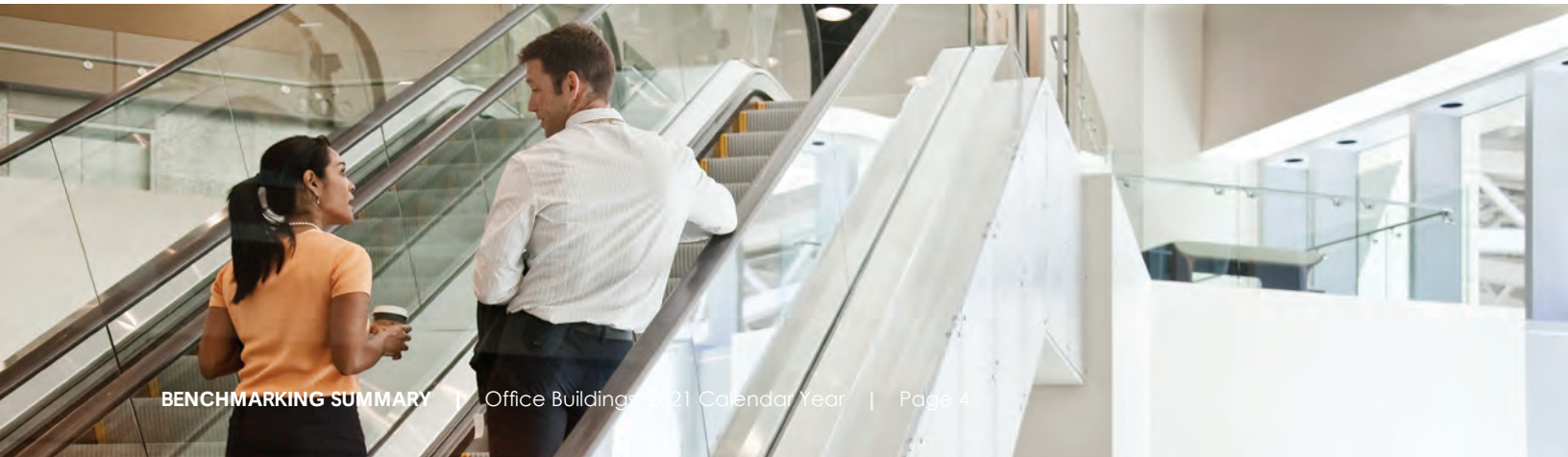
This data set compares fifteen medium-sized buildings. Like other categories, the highest energy use building uses approximately three times the energy of the lowest building.

Large-sized office buildings

EUI calendar year 2021



Note that the highest energy use building has a large data centre causing the highest intensity in this group, and the all-electric building, the one with only a blue bar, has energy use above the median but with minimal GHG emissions.



How **carbon intensive** is your office building?

In April 2022 Vancouver City Council approved **Annual Carbon Pollution Limits and Reporting for Existing Large Commercial and Multi-family Buildings** to advance the Climate Emergency Action Plan.

The Council report introduces reduction limits on the largest office and retail buildings in Vancouver. This will limit the amount of GHG emissions (GHGi) and heating energy for these building types and require "building owners and energy utilities to plan for deep emission retrofits and investments in renewable energy, including renewable gas and low carbon district energy."

Other regions and cities, like Metro Vancouver, are considering GHGi and heating energy limits for their regions.

Read the regulations here:

Carbon pollution limits and reporting for existing large commercial and multi-family buildings

vancouver.ca/green-vancouver/green-large-commercial-and-multi-family-buildings.aspx

City of Vancouver Pollution Reduction Requirements

GHGi: The intensity of total GHG emissions per unit area from energy use in the building.

PHASE 1 — 25 kg CO_2e/m^2 in 2026 for large-sized buildings and in 2030 for medium-sized buildings

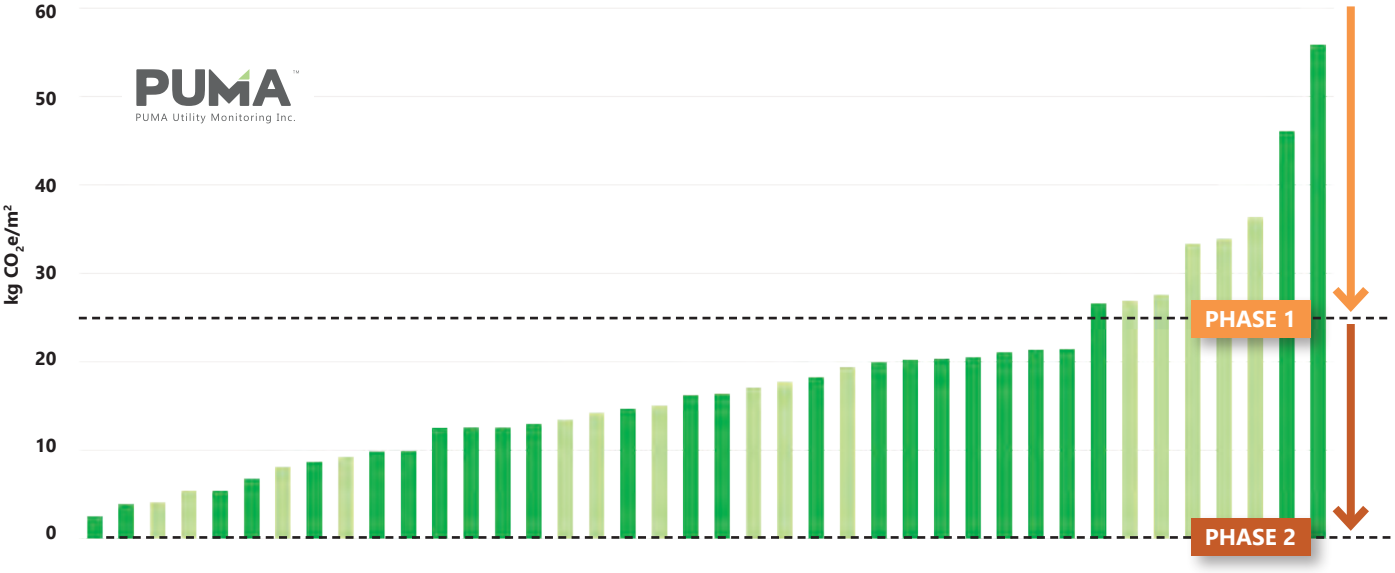
PHASE 2 — 0 kg CO_2e/m^2 in 2040 for large-sized buildings, and between 2040 and 2050 (tbd) for medium-sized buildings

Heating energy-use: The natural gas and district energy use per unit area in the building regardless of the carbon intensity.

By 2040, both building sizes must reduce their fuel consumption to 0.09 GJ/m^2.

The following charts show how buildings across the lower mainland measure in relation to the City of Vancouver Pollution Reduction Limits.

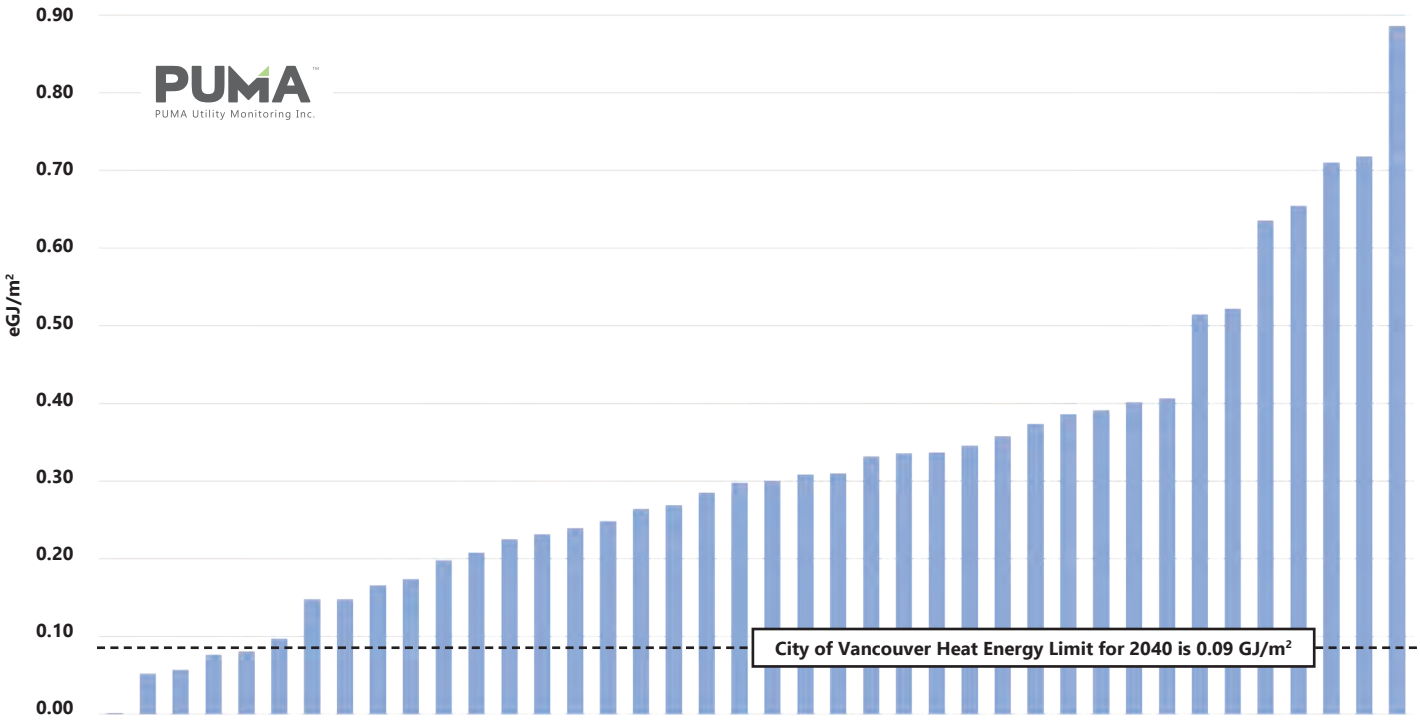
Emissions intensity based upon total energy-use
GHGi calendar year 2021



80% of the buildings in the dataset of buildings over 50,000 ft^2 currently meet **PHASE 1** of the City of Vancouver's GHGi limits set for 2026 and 2030. However, at this time, none of them meet the **PHASE 2** requirement of 0 kg CO_2e/m^2 for 2040.

Medium-sized buildings
Large-sized buildings

Heating energy-use fuel consumption for medium and large-sized buildings



Unlike the previous chart, more than 80% of the buildings in this dataset of large and medium buildings do not currently meet the Heat Energy limits. **As the report states:** "This limit will ensure buildings start planning, investing in, and implementing energy conserving practices and significant energy efficiency retrofits as cost effective opportunities arise prior to 2040."

A note about COVID-19 and the 2021 benchmarks

Though Vancouver's heating and cooling degree days were both slightly higher in 2021, energy use was 5.7% lower than in 2019 for the overall group of 62 buildings. Although there may be some impact due to COVID-19, the data shows that using the 2021 results for benchmarking is relatively similar to 2019 pre-COVID-19.

Average energy intensity by building size (3 year trend)

Building Size (Quantity)	2019	2020	2021
Large (24)	**23.7 ekWh/ft²**	**21.8 ekWh/ft²**	**21.9 ekWh/ft²**
Medium (15)	**22.5 ekWh/ft²**	**21.0 ekWh/ft²**	**21.3 ekWh/ft²**
Small (23)	**26.6 ekWh/ft²**	**24.7 ekWh/ft²**	**25.4 ekWh/ft²**
Total (62)	**24.5 ekWh/ft²**	**22.7 ekWh/ft²**	**23.1 ekWh/ft²**