

## 5. Reporting and Insights

### 5.1 Summary Reports

The data presented in this notebook covers some aspects regarding Energy Consumption, Gas Emissions, and other characteristics related to different properties in Alberta.

One important aspect that we did not take into consideration due to the lack of data is the monthly behavior of these metrics since we know that consumption is highly correlated with the temperature - for example, in a cold month, gas consumption is much higher than in a hot month.

Also, the dataset presented a few issues such as the number of outliers in almost every numerical column, which contributed to the skewness (presented in cells 13 and 14). With this imbalance in the data, a proper conclusion or good insights are hard to obtain.

Moreover, we had to use Regular Expressions to reformat some values in the numerical columns, transform the Postal Code to the standard that is the norm in Canada (A1A 1A1), and extract data from other columns such as Address and Property Name.

Nevertheless, the dataset presented some insights such as:

**Emissions (Tons CO<sub>2</sub>):** except Stoney Transit Facility, all other properties seem to be aligned in this metric. From the top 10, for example, Stoney Transit produced 17 MTons of CO<sub>2</sub>, while all other 9 produced between 3 and 6 MTons.

**Electricity Consumption (MWh):** similarly to Emissions, there is one outstanding Property in Electricity Consumption - Municipal Complex. This property consumed over 4 years 27,833 MWh, double what the Top 2 consumed (13,715 MWh). Due to being a complex of the city hall and near buildings, it is expected to have a high consumption, but seeing the Double of the second higher consumption was not expected.

**Energy Use Intensity:** the average of EUI (GJ/m<sup>2</sup>) is, in most cases, stable and flat over the years. The only exception is the Distribution Centers, which grew significantly from 2019 to 2023 - from 1.7 to 5.5.

**Data Correlation:** the correlation between Gas Emissions and Electricity was expected due to the way it is produced. However, it is interesting to see the lack of a direct correlation between the size of the property and electricity consumption. It appears that in the past years were created some good solutions that will save Power without compromising the benefits. A different thing happens with Gas because it is more tangible and its use increases with the size because the majority of venues and houses have a central system that distributes the heat uniformly.

**In conclusion**, with the advance of Solar Energy and electrification, doing the same analysis 10 years in the future, it is likely that the results will be completely different. Energy efficiency will grow and lower the usage, while the emissions will certainly drop due to less Natural Gas being burned to produce heat and/or power. All of these advancements are already under research by the companies and will certainly benefit the consumer - alongside the World.