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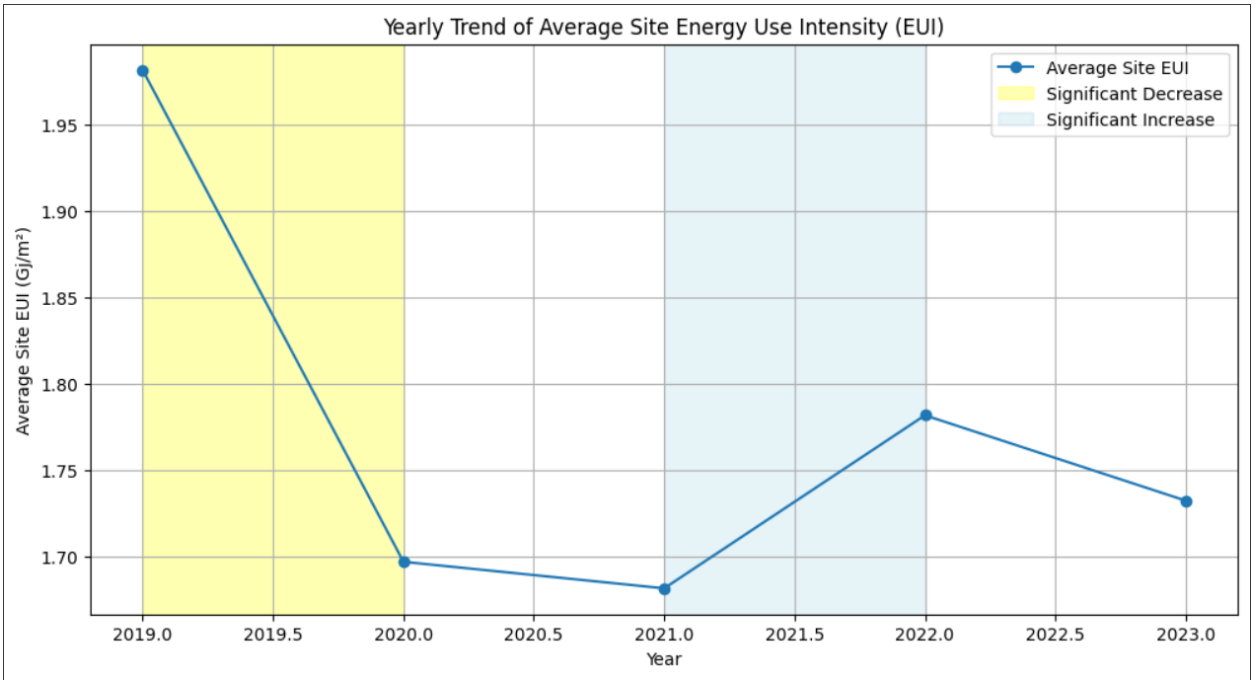
Report Analysis on Building Energy Benchmarking Data

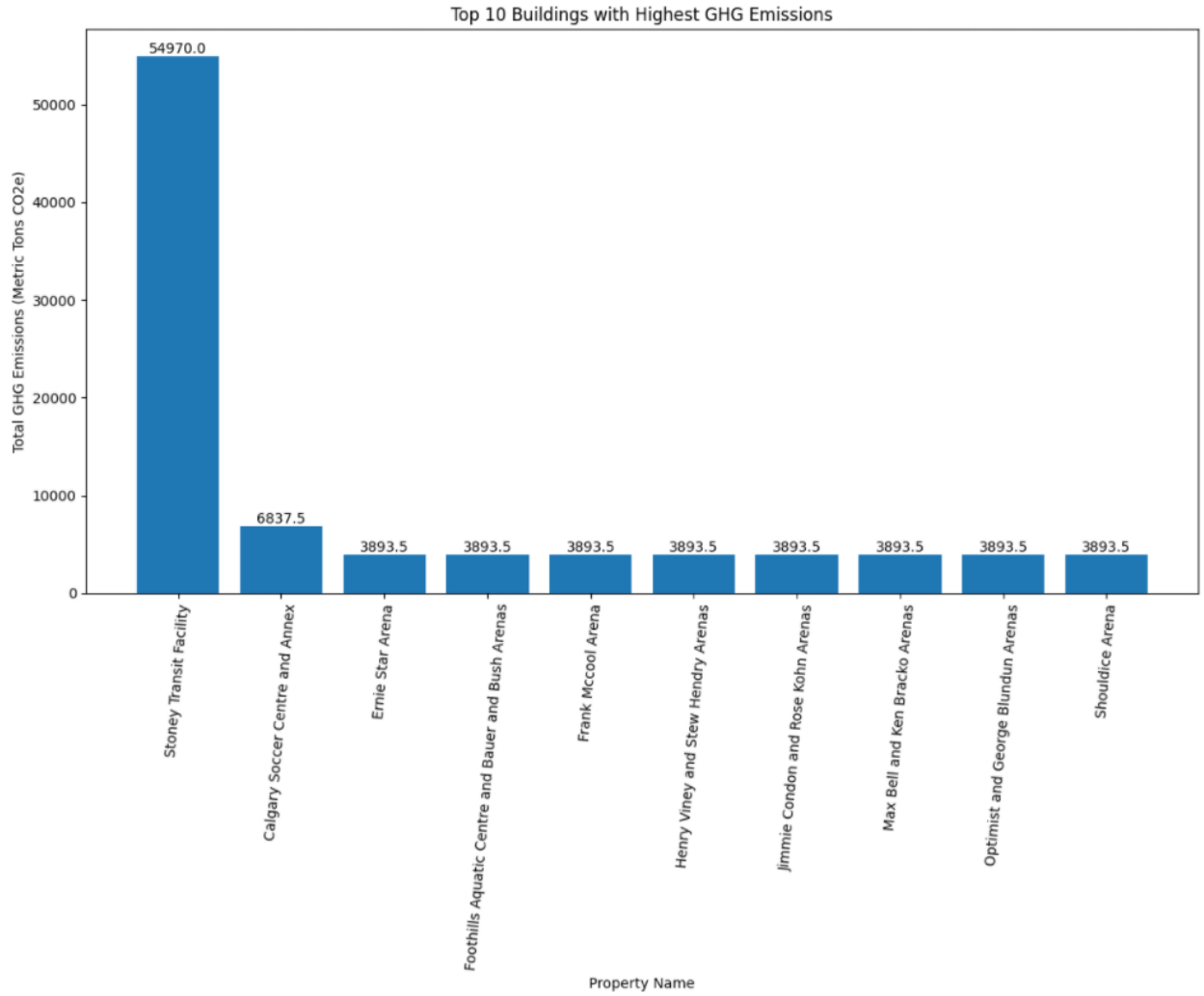
Based on the Building Energy Benchmarking dataset, this report analyzes energy consumption and efficiency trends in Calgary buildings. The following evaluations were based on the Jupyter Notebook in the repository.

The analysis reveals a shifting trend in average Site Energy Use Intensity (EUI) over the years, with a notable decrease between 2019 and 2020, followed by a subsequent increase between 2021 and 2022. This highlights the dynamic nature of energy consumption patterns.



The top 10 buildings with the highest total Greenhouse Gas (GHG) emissions have been identified, indicating areas where emission reduction efforts should be prioritized. It is quite clear that larger buildings tend to consume more energy and generate higher emissions, as evidenced by the strong positive correlation between Site Energy Use, GHG emissions, and Property Gross Floor Area (GFA).

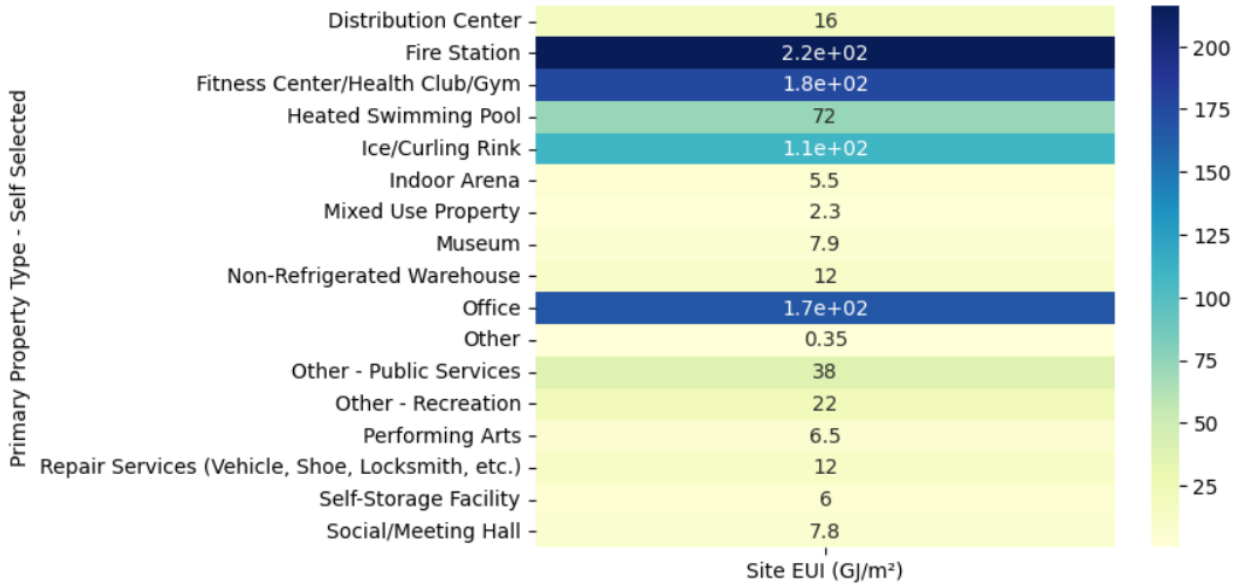
Also, the total GHG emissions show temporal variations, highlighting the importance of considering property characteristics and temporal factors when assessing energy consumption and efficiency trends.



The analysis shows that energy consumption varies significantly across different types of properties. For example, non-refrigerated warehouses tend to have higher energy usage compared to places like hospitals and schools. This is because different buildings have unique energy needs based on how they're used. Recognizing these patterns is key to creating customized strategies for saving energy.

In my opinion, for warehouses, improvements like streamlining logistics and minimizing equipment idle time can make a big difference. On the other hand, schools and hospitals can benefit from encouraging energy-saving habits among occupants. By tailoring efforts to the specific needs of each property type, we can use energy more efficiently and reduce

environmental impact.



Using Regex (Regular Expressions) played a crucial role in ensuring accuracy and consistency. It was used to clean and extract meaningful text from columns like "Property Name" and "Address 1," including removing symbols and correcting abbreviations. Additionally, it was used to format postal codes into a standard format and identify potential data errors in numeric values, improving data quality for the analysis.

In conclusion, to enhance energy efficiency and minimize environmental impact, targeted strategies should be implemented based on property type variations. For energy-intensive buildings like warehouses, prioritizing energy-efficient equipment upgrades, optimizing operational schedules, and improving insulation can significantly reduce energy consumption. In contrast, for buildings like hospitals and schools, focusing on smart lighting systems, HVAC optimization, and occupant behaviour interventions can yield substantial energy savings. Implementing renewable energy sources, such as solar panels, can further reduce reliance on fossil fuels and lower greenhouse gas emissions across all property types. By tailoring strategies to specific building characteristics and operational needs, significant progress can be made toward creating a more sustainable and energy-efficient built environment.