Relationship Between Median Income(€) & Average Energy Consumption

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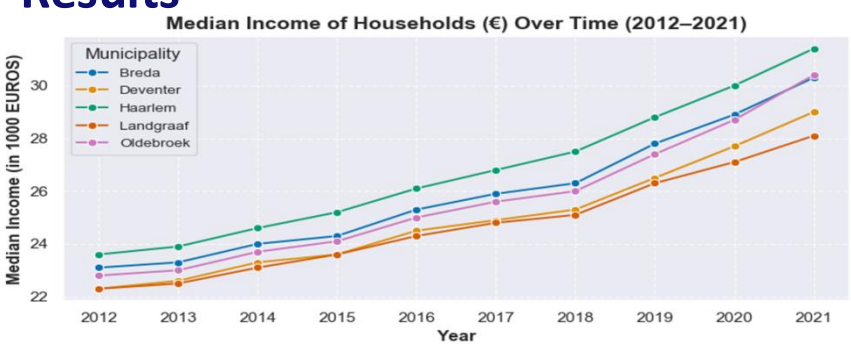
Introduction

Understanding the factors that influence energy (natural gas and electricity) consumption is crucial for energy management. One potential factor is median income, as the wealth of households impacts the energy demand. In ***"general",*** studies show that wealthier households tend to consume more energy. However, as the Netherlands has a low Gini coefficient (a measure of income inequality), of 0.285, I wanted to investigate if that ***"general"*** relationship also corresponds to the Netherlands. Hence, I chose the research question to investigate: "To What Extent Does Median Income (€) Influence Average Energy (Natural Gas – m^3 & Electricity - kWh) Consumption in Breda, Deventer, Haarlem, Landgraaf, Oldebroek?

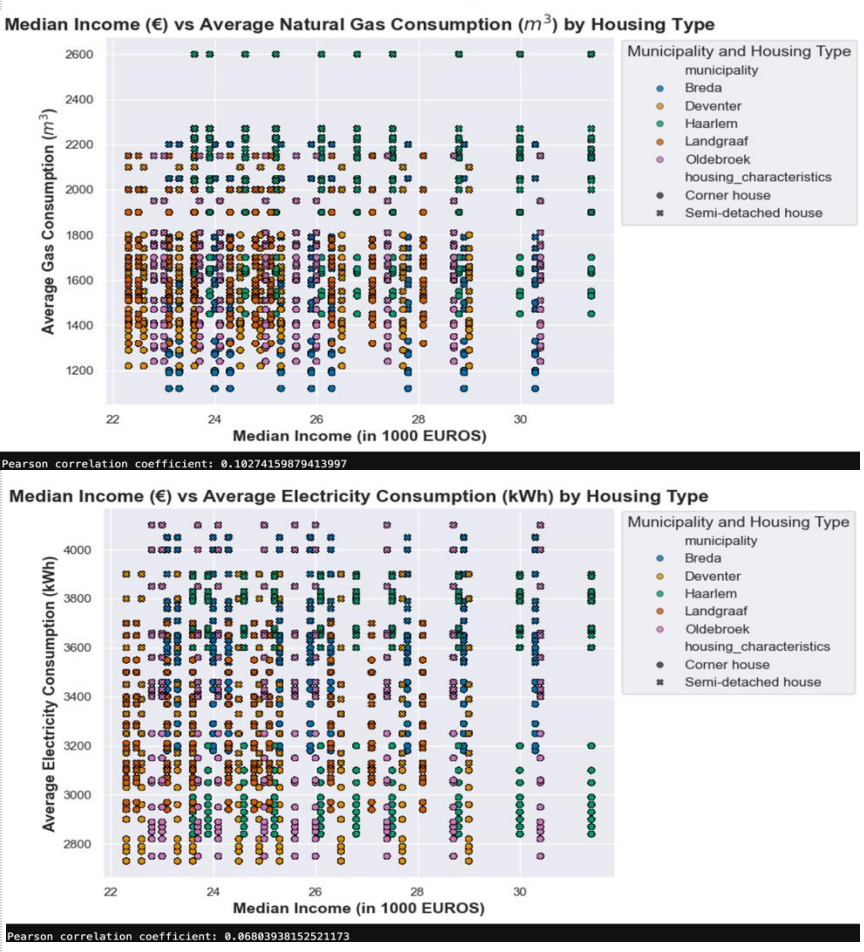
Methods

A line graph was used to visualize the trend in median income from 2012 to 2021. This method helps track income changes over time and sets the context for energy consumption trends. A scatter plot was used to examine the relationship between median income and average gas and electricity consumption. This allows us to visually assess any correlation between income levels and energy use. Also, to quantify the relationship between median income and energy consumption, the Pearson correlation was applied. This statistical measure determines the strength and direction of the relationship between the variables. These methods were chosen for their ability to clearly visualize trends and quantify the correlation between income and energy consumption.

Results



<- Figure 1. A Line Graph That Shows Median Income (€) of Households During 2012-2021



<- Figure 2. A Scatter Plot That Shows How Different Median Income Groups Consume Average Natural Gas (m^3). Pearson Correlation Coefficient: 0.103 (3 significant figures)

<- Figure 3. A Scatter Plot That Shows How Different Median Income Groups Consume Average Electricity (kWh) Pearson Correlation Coefficient: 0.0680 (3 significant figures)

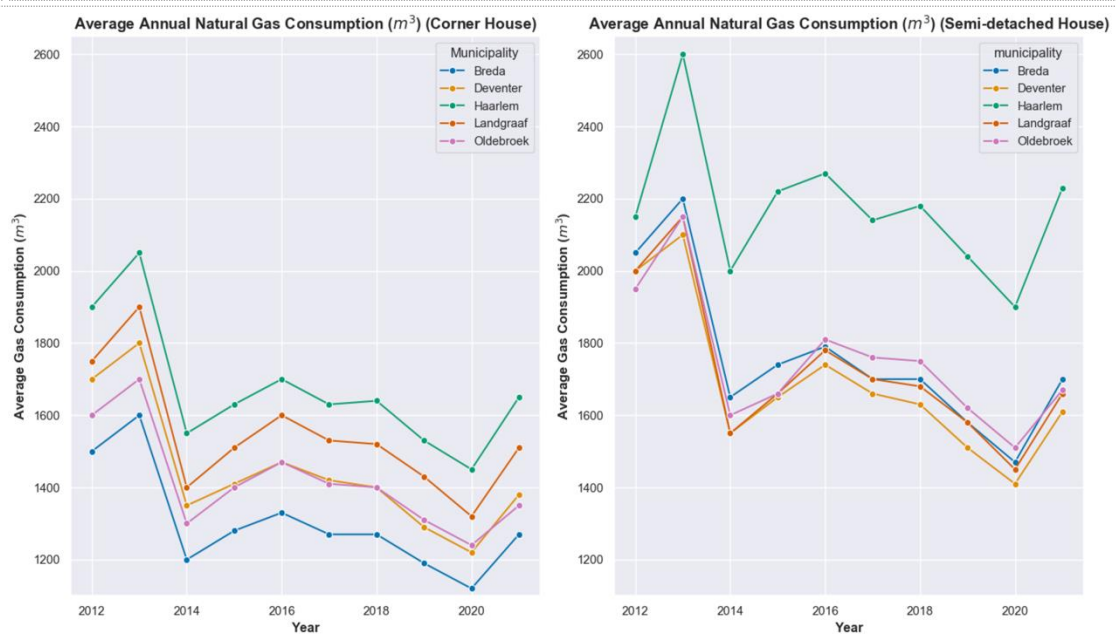


Figure 4. A Line Graph That Shows Average Annual (2012-2021) Natural Gas Consumption (m^3)

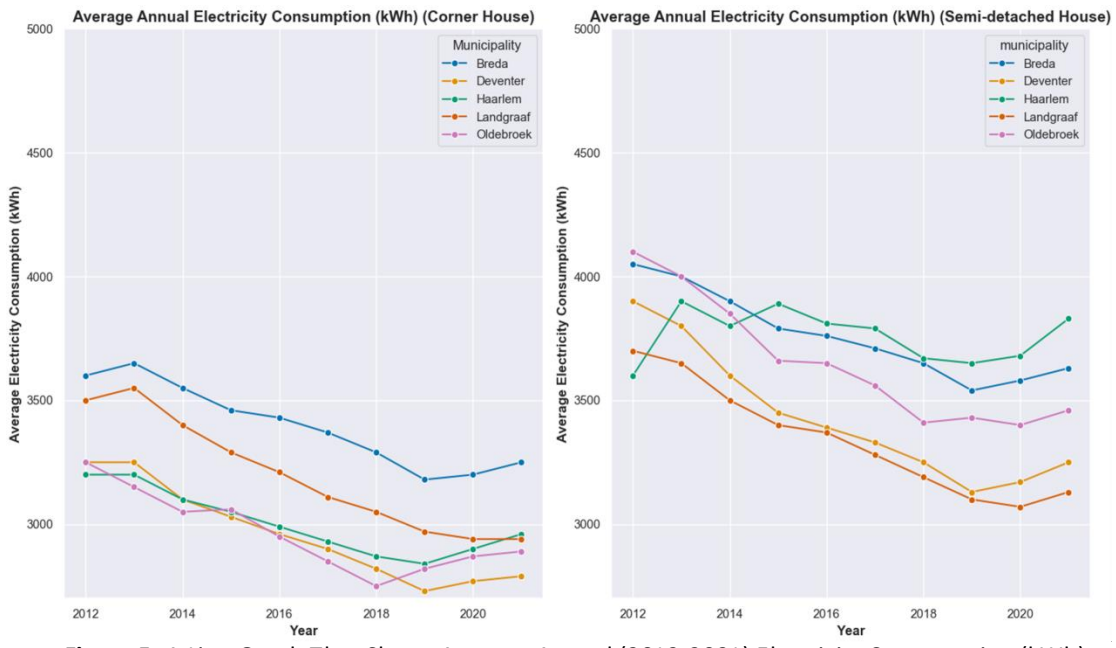


Figure 5. A Line Graph That Shows Average Annual (2012-2021) Electricity Consumption (kWh)

Discussion

While median income has increased over time, there is no strong relationship with average energy consumption, as indicated by the weak Pearson correlation coefficient (0.103, 0.068). This approach has limitations, particularly the lack of consideration for median income for housing characteristics. Future improvements could include analyzing the influence of education levels and geographical factors, such as climate, on energy usage. For example, warmer regions may use less energy compared to colder ones. Including these factors could offer a deeper understanding of energy consumption patterns across different income groups.

Conclusion

The hypothesis was, "The wealthier people are, the more they consume energy such as natural gas and electricity." However, the investigation reveals this is not the case. Median income has little to no effect on average energy consumption across the five municipalities. **Figures 1, 4, and 5** illustrate that, despite an increase in median income over time, energy consumption did not rise accordingly but instead fluctuated. Also, it was interesting to see that although the Netherlands is considered to be a wealthy country, the usage of energy did not increase. Future research could explore whether energy prices affect usage among different income groups.

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