



Green, Efficient Energy - The Future of Chicago

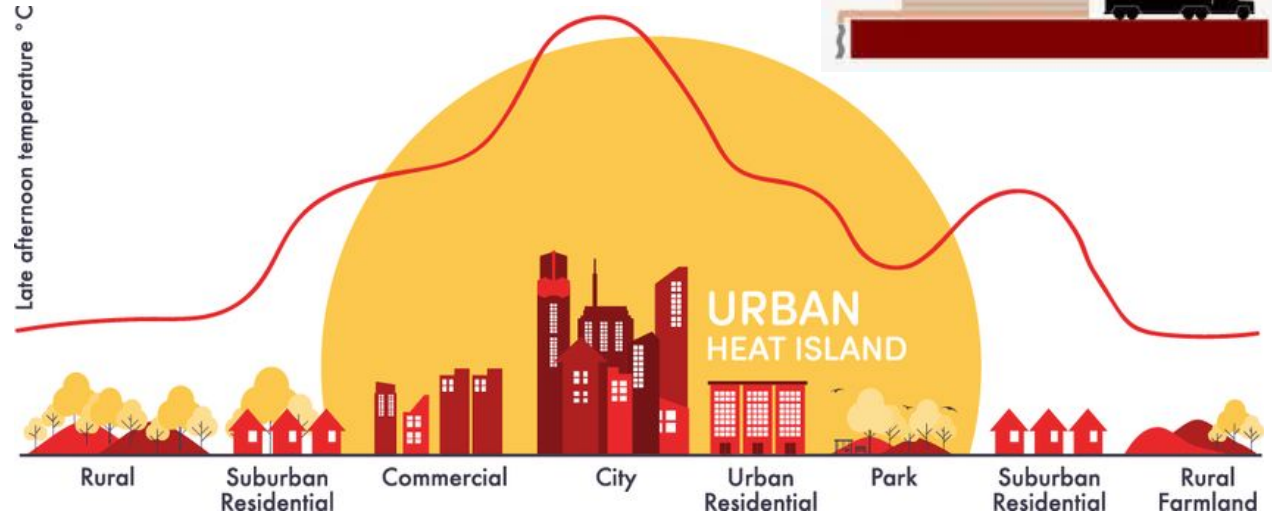
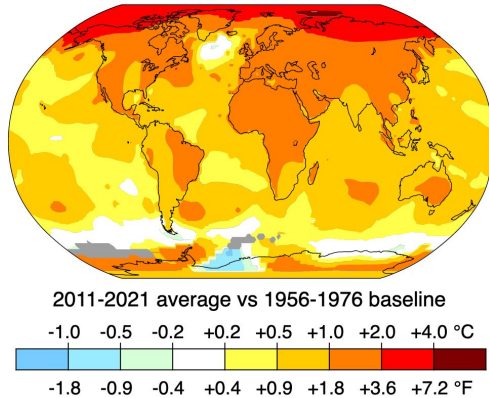
Data Analysis Presentation by Yashas Mattur

CONTEXT

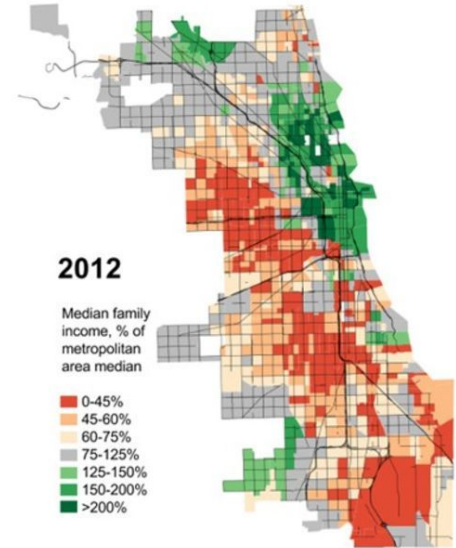
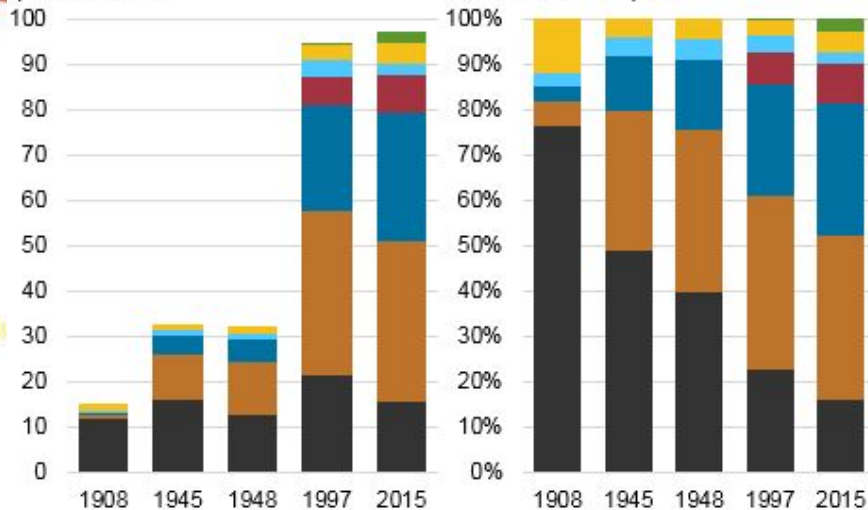
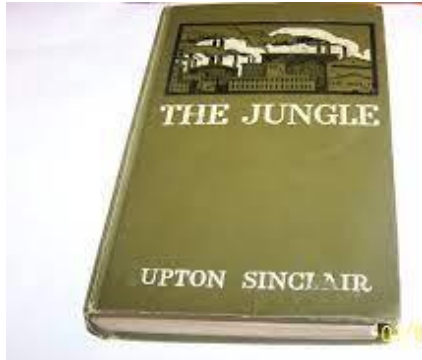


Climate Change vs Chicago

Temperature change in the last 50 years



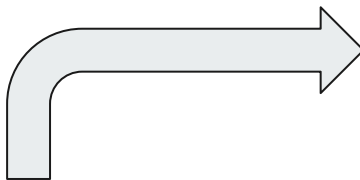
Chicago's History of Renewables



other renewables
biomass
hydroelectric
nuclear
natural gas
petroleum
coal



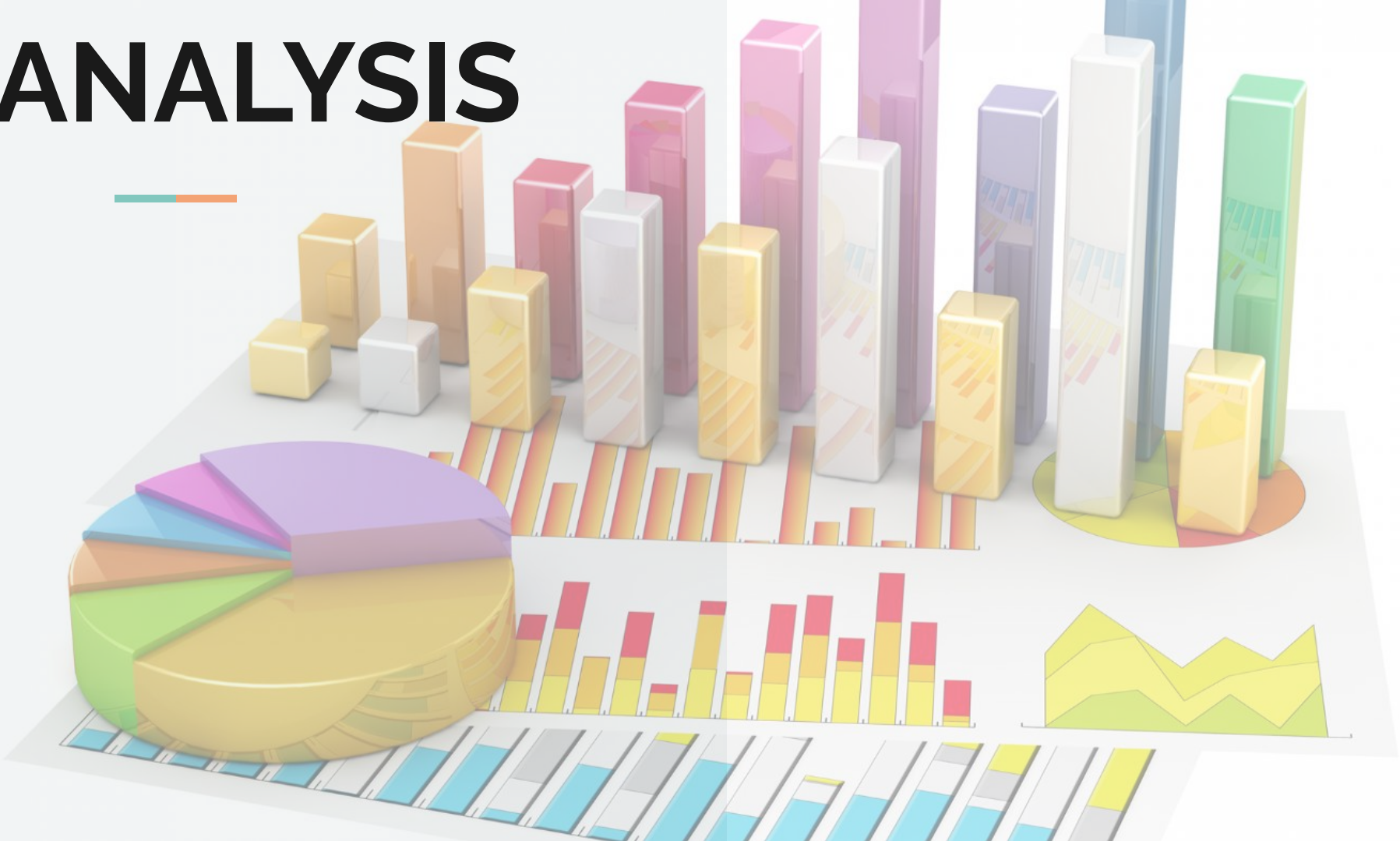
Why This is Important to ME



Yes, this is a REAL photo of Chicagoan smog that I took last Friday. It can get a lot worse than you'd think!



ANALYSIS



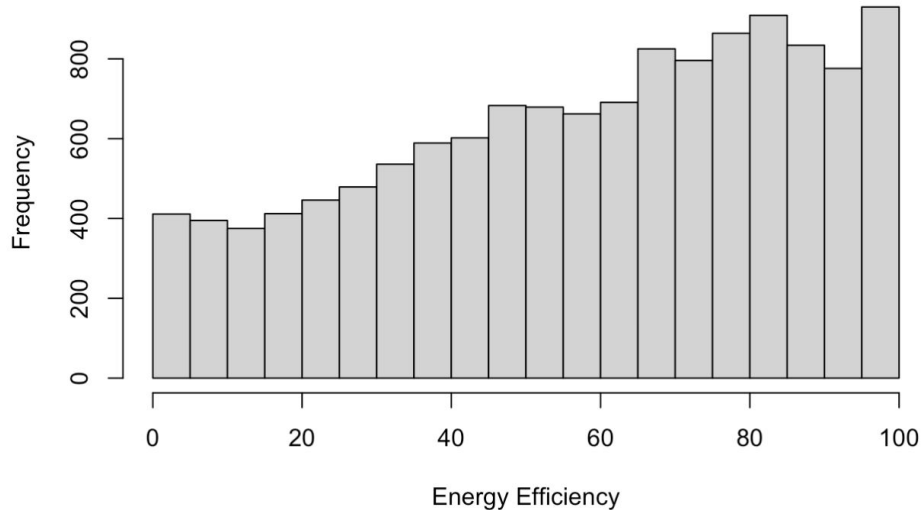


My Methods

- Creating Graphs
 - Histograms
 - Scatter Plots
 - Geographical Maps
 - ANIMATIONS!
- Statistical Tests
 - Confidence Intervals
 - Hypothesis Test (for means)
 - Chi-Square Test (for Independence)

Energy Efficiency in Chicago

Histogram of Energy Efficiency in Chicago



95% Confidence Interval for Average Chicagoan Energy Efficiency Level:

57.76856 - 58.72360

Above average, but not by much.

Electricity Use vs Emissions, 2014 - 2020

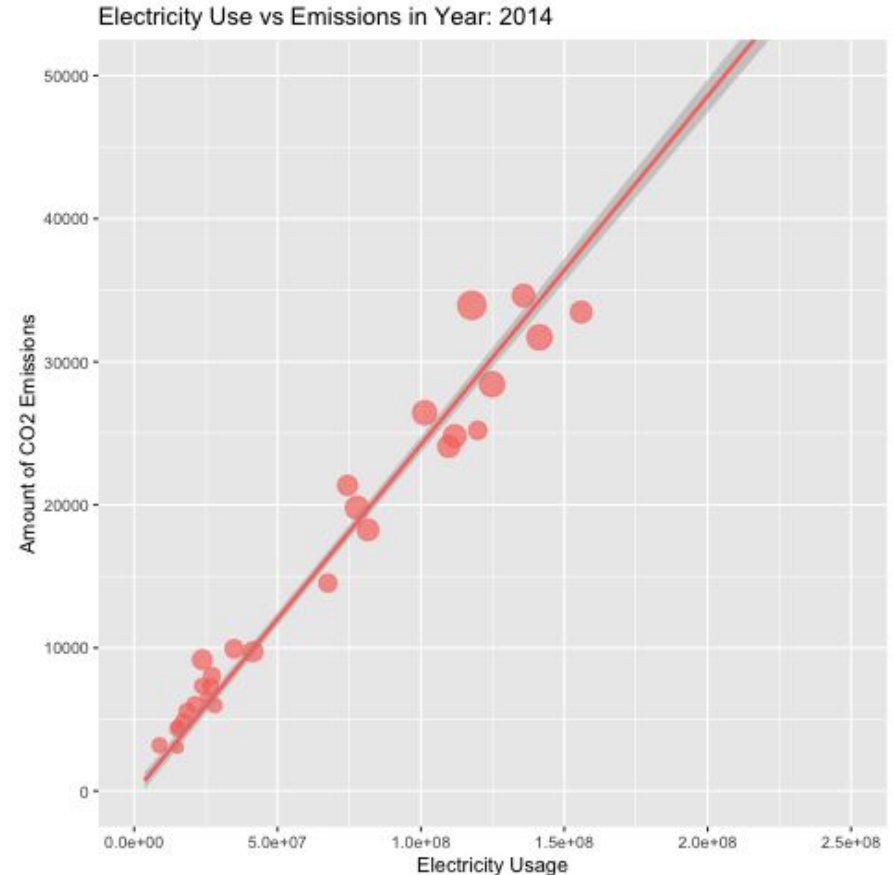
Chi-Squared Test:

H₀: Electricity Usage and Emissions are Independent

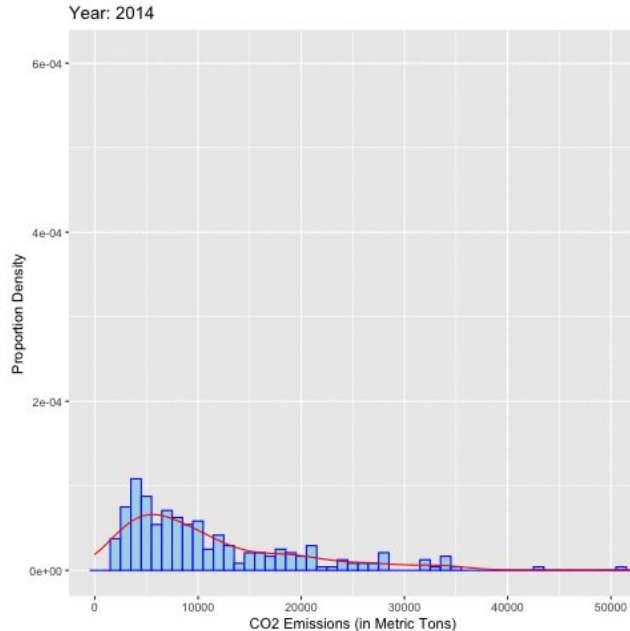
H_A: Electricity Usage and Emissions are Dependent

P-Value: $0.01817 < 0.05 \Rightarrow$ Reject H₀

Therefore, Electricity Usage and Emissions are NOT Independent



Carbon Dioxide Emissions, 2014 - 2020



Hypothesis P-Test:

H0: The true average amount of emissions is greater than or equal to the 2014 amount

HA: The true average amount of emissions is less than or equal to the 2014 amount

P-Value: $\approx 0 < 0.05 \Rightarrow$ Reject H0

Therefore, emissions have decreased since 2014, meaning that on average, Chicago is improving!

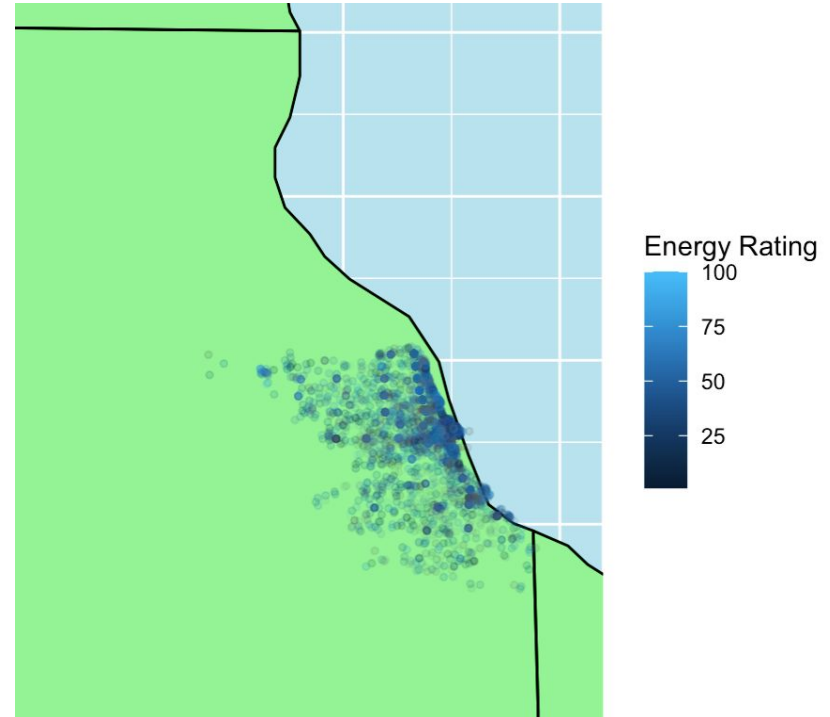
Energy Regional Disparities in Urban Chicago

Most energy-efficient “green” buildings are concentrated on:

- Lakefront
- Riverside
- “Heart” of Chicago

Least energy-efficient “green” buildings are concentrated in:

- South Chicago
- Western Chicago



CONCLUSIONS





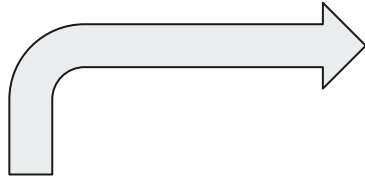
THE GOOD

- Renewables are increasing buildings' efficiency
- As corporations realize this, more renewables are implemented
- Emissions, as a whole, are decreasing throughout Chicago

THE BAD

- Chicago is above average in energy efficiency, but not by enough
- Chicago's efficient, green energy is focused only on the center, and economically burdened areas are missing out

The Purpose Behind This Analysis



A Green Roof on the Chicago
City Hall, Installed to Mitigate
Urban Heat Island Effect!



QUESTIONS

