Energy Equity Project: Understanding energy affordability within historically redlined areas in Michigan

Chloe Taurel[1], Rahul Agrawal Bejarano[2]

[1] Undergraduate Research Opportunity Program, [2] Energy Equity Project

BACKGROUND

Between 1935 and 1940, the Home Owners' Loan Corporation (HOLC) graded residential neighborhoods (Best, Still Desirable, Definitely Declining, Hazardous), originally meant to indicate the level of security for real estate investments, including mortgages and loans in certain areas. However, the designations were racially motivated and led to the loss of generational wealth, among other inequities.

This research project emphasizes the relationship between energy affordability, particularly energy burden – the percentage of gross household income spent on energy costs, where 6% is considered acceptable – and previous redlining within census tracts. This project focuses primarily on two dimensions of energy equity:

- **Recognition Justice**: Acknowledging the inequities that are already exposing certain people to more environmental harm and a greater energy burden because of identity, economic structures, and historical discrimination of certain groups.

- **Distributive Justice**: Focusing on the societal transition to clean energy, ensuring both individuals and communities are able to benefit from the transition financially and health-wise – as it emphasizes that historically disenfranchised communities, such as those in redlined areas, should be receiving a bulk of the investment benefits first.

METHODS

- We worked with three main datasets for this project:
  a. **Geographic redlining data** from Mapping Inequality
  b. **2018 Census data**, as it was the most recent dataset with the fewest missing census tracts and is one of the highest resolutions at which data is collected and we can evaluate.
  c. **The Low-Income Energy Affordability Data** because it is the only dataset that estimates energy burden at a national scale and can be disaggregated by Federal Poverty Level (FPL) for all U.S. census tracts.

- We focused only on the state of Michigan, specifically cities that were historically redlined including Battle Creek, Bay City, Detroit, Flint, Grand Rapids, Jackson, Kalamazoo, Lansing, Muskegon, Pontiac, and Saginaw.

- We used R to overlay the redlining data onto the census tract data, where assigned each census tract the HOLC category that covered the largest area within it.
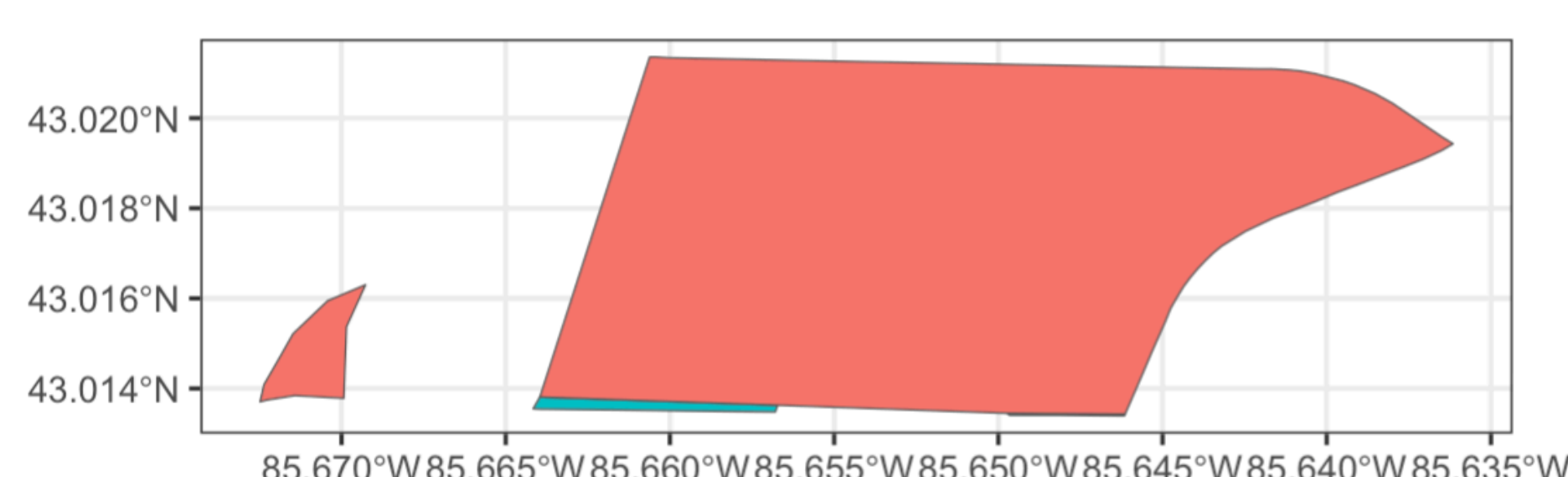

Figure 1

category
- Definitely Declining
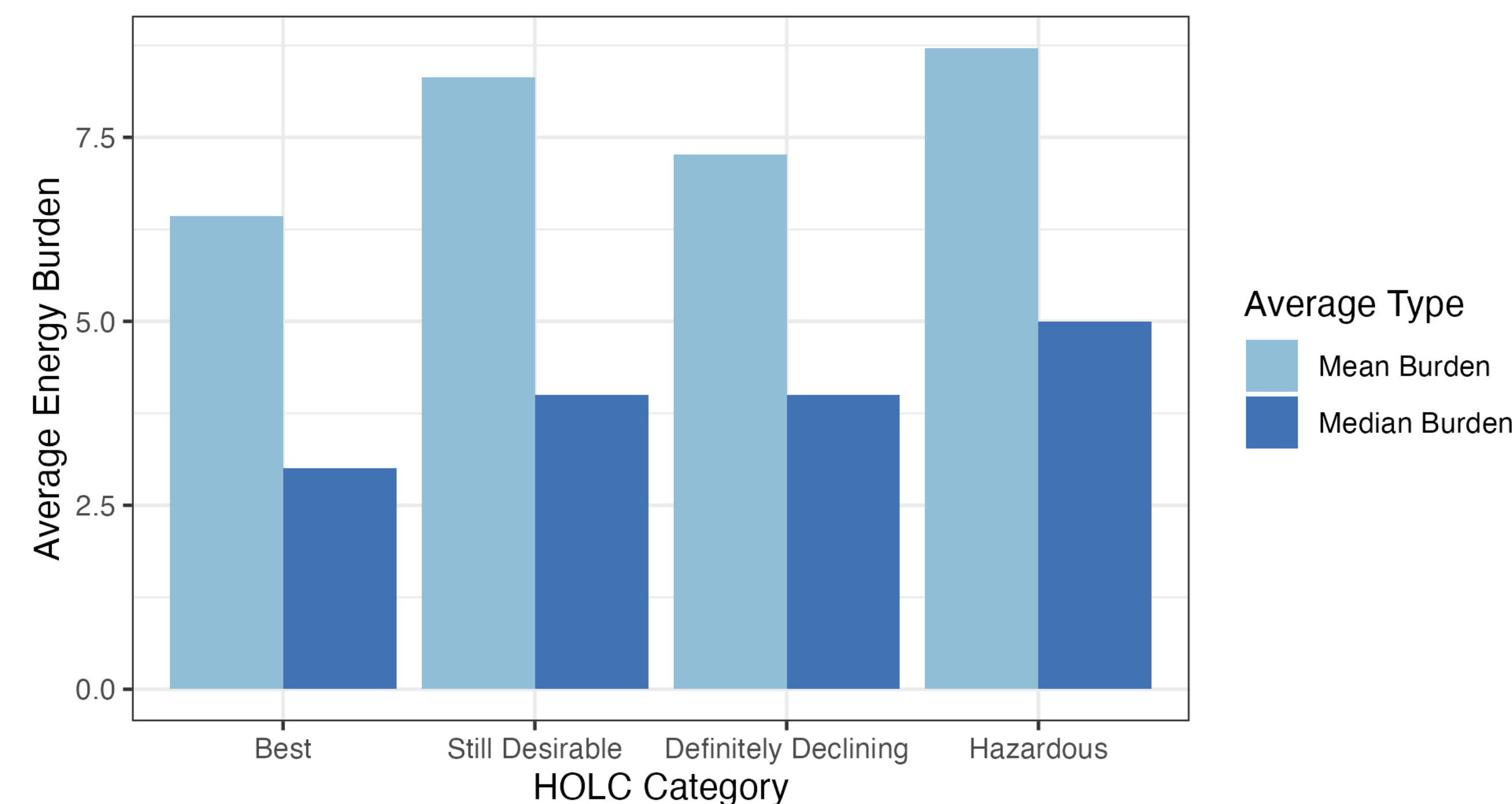- Still Desirable

RESULTS

Figure 2: Average Energy Burden

Average Type
- Mean Burden
- Median Burden

Figure 3: FPL Distribution of HOLC Categories

FPL
- 0-100
- 100-150
- 150-200
- 200-400
- 400+
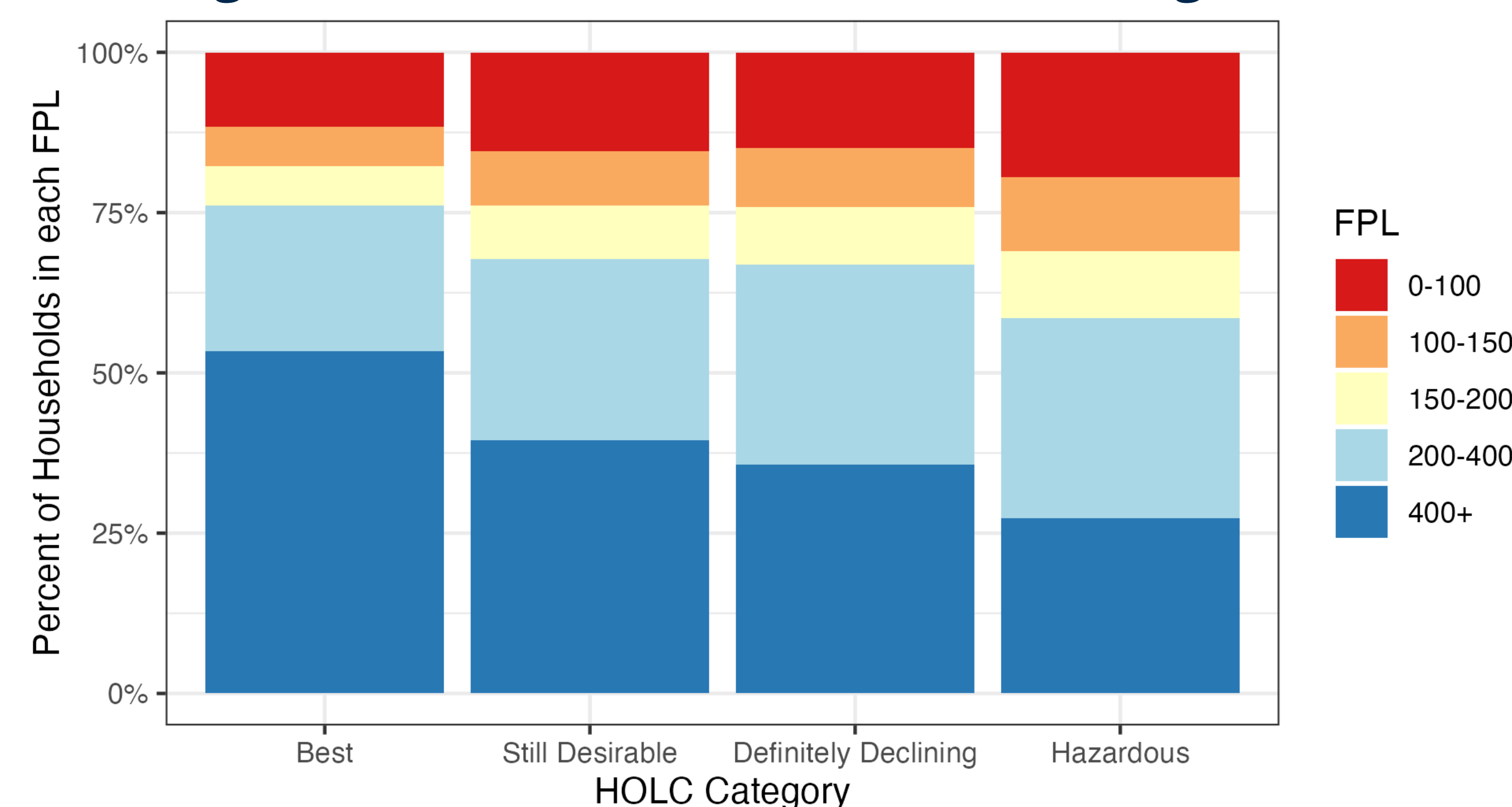
Figure 4: Energy Burden by HOLC Category & FPL

FPL
- 0-100
- 100-150
- 150-200
- 200-400
- 400+
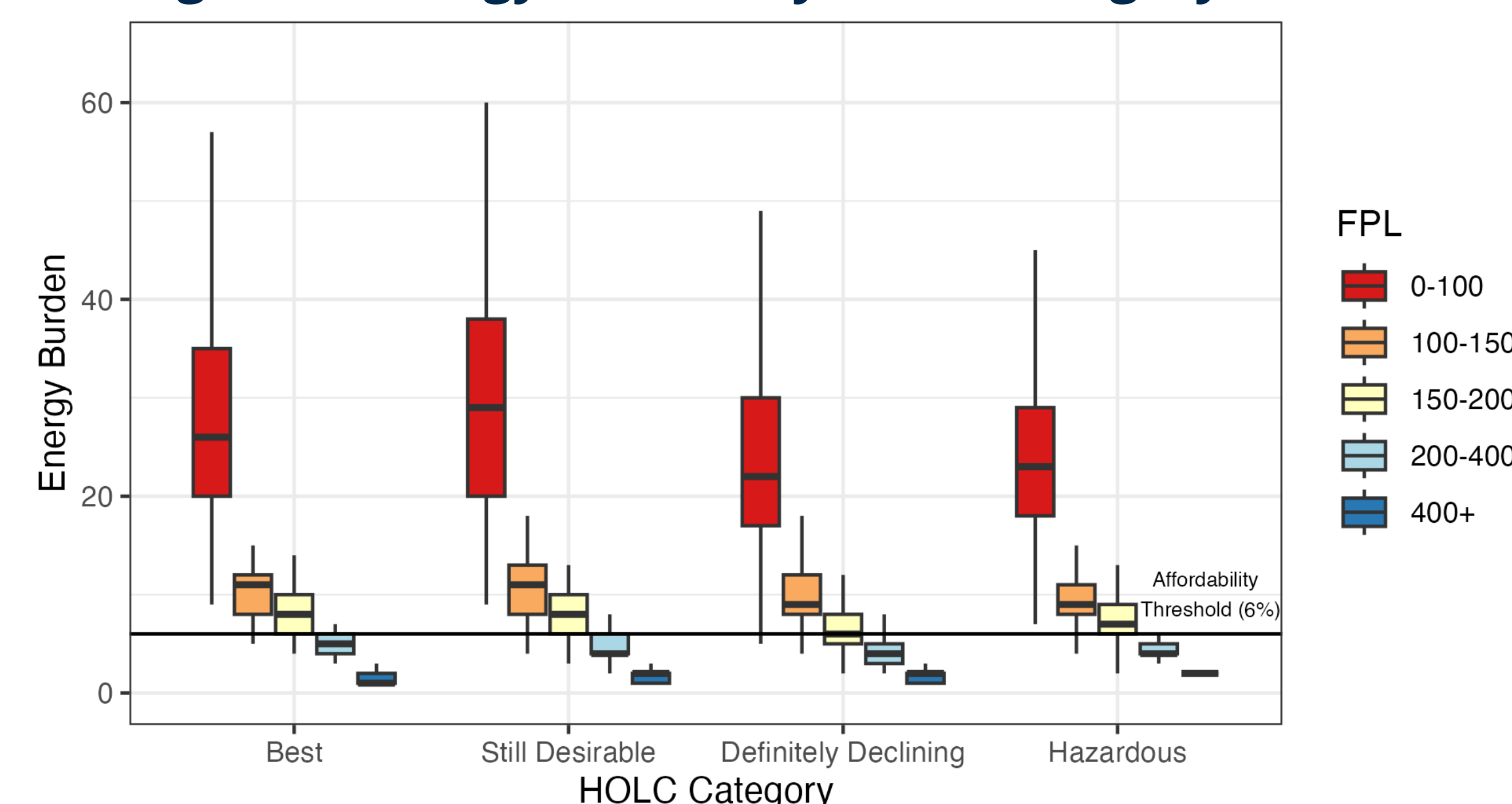
CONCLUSIONS

- **Trend in Energy Burden:** In Figure 2, the median shows an upward trend with increasing energy burden as the HOLC category decreases from "best" to "hazardous." Similarly, Figure 4 demonstrates that FPL greatly affects one's energy burden, regardless of HOLC category. For those in the 0-100 FPL range, the median energy burden is 3.8x the acceptable energy burden threshold of 6% and 11.5x higher than those in the 400+ FPL.

- **Relationship between FPL and HOLC**: Figure 3 shows that more people in worse HOLC areas also fall into these lower FPLs. The percentage of households at 400+ FPL in areas previously rated as "Best" is nearly double (1.96 times) that in areas previously rated as "Hazardous".

- There is more room for research on other factors that can be associated with redlining and energy burdens, such as the disconnection rates in an area. Additionally, these redlined neighborhoods are still affected by the structural racism that was put in place, and are thus more susceptible to heat island effect and have worse access to healthy foods, although the research is still inconsistent (Swope, 2022).

NEXT STEPS

This project brought attention to the lack of energy data available, and led to the Energy Equity Project's further research on energy data reporting in U.S. agencies, specifically by auditing the Michigan Public Service Commission (MPSC) website. This revealed the lack of census-tract resolution data that could be used to understand electricity and natural gas rates, outages and reliability, and disconnections rates, inhibiting further research working towards the recognition pillar of environmental justice.

Our future work aims to create a standardized pipeline for state energy regulatory data that collects and processes this data, but more importantly provides a centralized site for researchers/non-profits/grassroots organizations to engage with the data.

SOURCES

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