

Introduction

Despite a need to do so, utility companies across the country have faced challenges raising rates. As they turn increasingly to green energy, encounter demographic changes in communities, and old infrastructure becomes inefficient or requiring replacements, utilities find themselves needing more money for their day to day needs on top of staying up to date. Not surprisingly though, few customers are excited about paying more every month for gas, water, or electricity. Such increases on monthly bills are particularly impactful for those with low incomes. This means that utilities have had to balance rate increases and infrastructure investments with equitable practices that do not overburden communities. However, they can only do so if they understand what these communities look like—which ones are going to be most hit by a rate hike? Which communities rely on different utilities? And which communities are similar to each other in both of these respects?

In a state that has big wealth differences unique segments (e.g. literally islands of people) Hawaii poses a unique challenge in this respect. Communities can vary widely from island to island—from the urban sprawl of Honolulu to the more rural towns that dot the Big Island—and even within the same island too. Such differences are often reflected in income and infrastructure. Different kinds of buildings and services have different utility requirements. Just as, if not more, important for the sake of making equitable rate changes, the socioeconomic status of the people in these communities must also be considered. Getting even a basic understanding of the communities requires looking at different groups of nested data. In other words, we need to look at a large, medium, and small scale.

Data

The data being used in this project come from the Census Bureau's American Community Survey estimates (Table S1901). In particular, we are interested in three levels of geographic 'scales' (i.e. zip code, county, and state levels) and their respective median household incomes. This way we can have multiple levels to understand how communities are relative to their neighbors, their communities, and their entire state. Median household income is our placeholder to broadly represent socioeconomic status. Also of note, these Census data are from 2017. While more recent estimates exist at higher levels of data (e.g. state), 2017 is the most recent available data for points as specific as zip codes for the entire state. These data will help us evaluate the general socioeconomic status of communities in Hawaii, ranging from the largest scale (state) to at a fine-grain scale (zip codes). I also used [unitedstateszipcodes.org](https://www.unitedstateszipcodes.org) to doublecheck the validity of some zip codes that did not cleanly translate into the data.

I will also be using data from Foursquare to look at what general kinds of business and venues are prominent in these communities. This is an admittedly somewhat secondary analyses to our main question of evaluating potential communities at most financial risk of increased utility costs. However, this broader venue data could help add a different dimension to our question by showing us whether certain communities are more similar to others in their venues. Such similar venues could be suggestive of similar kinds of utility needs. In other words, broadly speaking, we'll be looking at what communities can afford and what they need.