Predicting Electricity Consumption in Commercial Buildings
(Inspired from conversations with staff at the California Public Utilities Commission)

Issue Statement
There is broad interest in exploring the feasibility of renewable energy independence at different scales in California and/or North America. For example, a recent study in Europe combined renewable resource potential data and geographically granular annual load data to create heat maps of the state and/or continent that show how well matched potential is to load at different scales (town or zip code to metropolitan area or county to region to state to continent).

A key element to understanding these issues – and one that is overlooked by the European study – is how the timing of electricity consumption correlates with the timing of renewable energy production from wind and solar sources. Understanding these issues at the *building scale* requires electricity consumption on hourly time scales. Yet building-level electricity consumption data are not typically publicly available, either because it's not measured or the owners of the data (the building residents) don't share it. This limits the scope of studies one can pursue to understand the potential for energy independence.

Proposal:
Build a model that predicts hourly electricity consumption in buildings where we don't have consumption data but we do have other information like weather, square footage, year of construction, and location. At least some of the data one could use to train a predictive model like this one are available for residential buildings at https://dataport.pecanstreet.org/. (You'll need to apply for data access.)

There are a number of ways those predictions could be applied. One option is to study how well energy potential matches electricity demand, as discussed above. If you wish you can look for other options that interest you more.