

Question 18.1

Describe analytics models and data that could be used to make good recommendations to the power company.

Here are some questions to consider:

- The bottom-line question is which shutoffs should be done each month, given the capacity constraints. One consideration is that some of the capacity – the workers' time – is taken up by travel, so maybe the shutoffs can be scheduled in a way that increases the number of them that can be done.
- Not every shutoff is equal. Some shutoffs shouldn't be done at all, because if the power is left on, those people are likely to pay the bill eventually. How can you identify which shutoffs should or shouldn't be done? And among the ones to shut off, how should they be prioritized?

Answer 18.1

Step 1: Identify household who have the ability but not willing to pay from the population for shutoff analysis

Given: Household income, number of people per household, household zip code, length of subscription, credit score, late payment rate

Use: Random forest or support vector machine

To: Classify population into three groups, namely those unable to pay, those who pay or late payment, and those who have the ability but not willing to pay

Step 2: Given target group from previous step, predict benefits for power shutoff. Assuming company has sufficient history power consumption data, time series analysis can be utilized for prediction.

Given: Household zip code, history power consumption per household, household income, payment history, length of subscription

Use: ARIMA or simple regression

To: Predict power consumption by household on the next billing date

Step 3: Rank household power shutoff priority based on results from previous steps and household demographic information. Eventually, the goal is to output a list of shutoff ranks based on range of data and number of workers, with high probability of household to default in close areas being a higher priority to shutoff.

Given: Household zip code, distance to household location, shutoff time, predicted power consumption by household

Use: Optimization model with an objective function to maximize profits from power shutoff.

Model constraints would be labor and travel cost

To: Sort the treatment group (household who have the ability but not willing to pay) by power consumption and demographic factors