Goal: Determine which customers power should be shut off for failure to pay bill. We should only consider customers that we believe are capable of paying and but do not, rather than all non-paying customers. From that subset we should prioritize which of the capable of paying customers should be shut off to maximize company revenue, based on prior power usage. Finally, based on the priority we should determine which can be shut off based on worker availability

**Step 1: Determine which of the non-paying customers are capable of paying**

Given: Payment History (both number of missed payments and current amount due, and previous amount of on time payments), Income, Credit Score, Debt Level, Own vs. Rent Home, Duration at Current Residence.

Use: Logistic Regression

To: Determine probability that customer is able to pay.

**Step 2: Estimate Future Power Usage**

Given: Power usage history, historical power prices

Use: Exponential Smoothing

To: Estimate future power usage

**Step 3: Estimate Future Power Prices**

Given: Historical Power Prices

Use: Exponential Smoothing

To: Estimate future power prices

Note: There may be much better estimates of future prices available either internally or from outside sources.

**Step 4: Prioritize Shutoffs**

Given: forecasted power usage (output of model 2), forecasted power costs (output of model 3), probability of being able to pay (output of model 1), shutoff/turn-on labor cost

Use: Multiplication!

To: Calculate expected value of shutting off each customer

5: **Determine best selection of customers to shut off based on priority (output of model 4) and availability of labor**

Given: Expected value of shutoff (Output of Model 4), location of each customer, starting and ending location of workers, Number of available shutoff workers, avg. time required per shutoff, variance of required time to shutoff, hours worked per day.

Use: Clustering, Simulation, or Optimization

To: Determine which grouping of shutoff customers maximizes expected value to the company given worker constraints.

We would first use clustering to assign each worker a cluster of customers, choosing K based on the number of available workers. We would then optimize within each cluster so that the customers shut off maximized value to the company based on the constraints of the number of homes the worker could reach in a given day based on average shut off time and travel time. We could alternatively use simulation to determine the best homes in each cluster. This could be a better alternative if there is significant variability in shut-off time at each home.