# Problem Statement:

Based on the background information provided below generate a model that will predict the thermal load for each 30-minute timestep of 2018. To evaluate the mode please provide the following:

1. A performance score for your model as well as the reason this model is deemed appropriate
2. Plot(s) that describe the goodness of fit (limit to no more than 3)
3. Any uncertainties/deficits of this model selection
4. Your recommendation for next steps to improve the model
5. The output thermal load for 2018 in .csv format
6. Your code

# Background & Data Description:

Attached there are two csv files. One containing data measured by Carbon Lighthouse for a building in Oakland, CA (“Measured\_Data.csv”) and a second file containing expected weather for the year 2018 (“Predicted\_Weather.csv”).

* Measured\_Data: This dataset represents 5 weeks of measured data captured at a 15-min interval. It includes the following columns:
  + Datetime
  + BuildingOccupied = a categorical variable representing whether the building is occupied (1 = occupied, 0 = not occupied) based on operational hours
  + OutdoorTemperature = outdoor air temperature in degrees Fahrenheit
  + OutdoorRelativeHumidity = outdoor air relative humidity
  + ThermalCoolingLoad = a measure of how much air conditioning is occurring in the building. The thermal load is only positive and represents the amount of heat, in units of Refrigerant Tons, that is removed from the spaces using mechanical equipment. Thermal load is expected to increase as more people occupy the space and as outdoor air temperature increases.
* Predicted\_Weather: This dataset represents a ‘typical weather year’ for Oakland, CA and is generated by the National Renewable Energy Laboratory. For this exercise we will assume this predicted weather will represent the weather for the calendar year of 2018. Included in this dataset are all the same fields as ‘Measured\_Data.csv’ with the exception of the thermal load column.

At Carbon Lighthouse, we need to predict when the mechanical cooling equipment (ie. the “air conditioning”) will run and how large the thermal load will be at future times. This information will be input into thermodynamics models that generate predictions of energy use and total cost of running this equipment.