

# Electricity Usage Forecasting & Price Prediction

**Team:** Ensemble

**Members:**

Hyndavi Renikunta (hrenik2)

Sunil Belde (sbelde3)

Sourabh Swargam (sswarg2)

Sharmisha Parvathaneni (sparva3)



UNIVERSITY OF  
ILLINOIS CHICAGO

# Problem

- Analysing and Forecasting the Energy Usage in an Urban City (Houston, TX)
- The key issue in generating electricity is to determine how much capacity to generate in order to meet future demand.
- Electricity usage forecasting involves predicting the demand for electricity over a specific period. This process has several uses, including energy procurement, where it helps suppliers purchase the right amount of energy to ensure a steady supply.
- The advancement of smart infrastructure and integration of distributed renewable power has raised future supply, demand, and pricing uncertainties. This unpredictability has increased interest in price prediction and energy analysis.
- Our initial Hypothesis is that the energy usage would show seasonality and trends across the year.

# Data

- The data we want to use is from the following [source](#).
- The data has already been collected but it needs to be validated and preprocessed before they can be merged into one dataset.
- The dataset contains information about energy usage from Financial Year 2011 -2017.
- The information is either text or integers/floats, which pertains to the address, bill date, amount due and units of electricity used.
- There are 7 tables in the dataset:
  - July 2011 to June 2012 - 57,430 Rows, 24 Columns
  - May 2012 to April 2013 - 65,806 Rows, 24 Columns
  - July 2012 to June 2013 - 66,776 Rows, 24 Columns
  - July 2013 to June 2014 - 67,838 Rows, 24 Columns
  - FY 2015 - 37 Rows, 29 Columns
  - FY 2016 - 36 Rows, 29 Columns
  - FY 2017 - 35 Rows, 29 Columns



# Proposed Solution

- To meet the future demand of electricity generation, we would like to perform the preliminary analysis to identify the patterns and forecast the usage.
- The scope of the project is to develop a static system that can accurately forecast future electricity usage and prices.
- Techniques that can be used include time series analysis (ARIMA), regression analysis and clustering (K-Means).
- The end result will be answering the following questions on electricity usage.
  - Identifying peak usage periods.
  - Discovering inefficiencies
  - Tracking progress of where energy is consumed more.
  - Identifying critical areas to take preventive measures.
- In future this analysis can be extended to cover other regions or parts of the country. We can also include some of the features like weather conditions and socio-economic factors.

# Teamwork

| Team Member            | Data Table                                  |
|------------------------|---|
| Hyndavi Renikunta      | July 2011 to June 2012 - 57,430 Data Points |
| Sunil Belde            | May 2012 to April 2013 - 65,806 Data Points |
| Sourabh Swargam        | July 2012 to June 2013 - 66,776 Data Points |
| Sharmisha Parvathaneni | July 2013 to June 2014 - 67,838 Data Points |

Once the data in the above tables has been pre-processed, validated and merged into one dataset, we will be performing the Time Series Analysis, Forecasting and Clustering.