Homework 4 Load forecast, energy justice

1. Load forecast and EV penetration

Load forecast is very important for power system planning and operation. First visit NYISO website's Custom Reports to explore all sorts of data out there. We will be focusing on day-ahead market (DAM) forcast (1-hour interval), and actual load (5-min interval and 1-hour interval), and comparing them and analyze how to make forecast better. Download one whole year (2021) of Real Time Weighted Integrated Actual Load and Day Head Market Load Forcast for Long Island. (Total 6pts)

- Draw the load curve (0.5pt) and load duration curve (0.5pt) of Long Island.
- Show the characteristics of average day hourly load curve on Long Island
  - All days average (0.5pt)
  - Weekday vs. weekend (0.5pt)
  - Monthly avearge (0.5pt)
  - Seasonal average (0.5pt)
- Find the hour(s)/day(s) with the largest forecast error, and try to explain why? (1pt)
- Now make reasonable assumptions of EV penetration and EV charging on Long Island, and try to show how that would change the load curve. (1pt)
- Should PSEG Long Island worry about it, what policy/incentives should you use to change people's behavior of charging/discharging so to save costs for the utility companies? (1pt)

2. Energy justice

What is energy justice? Use one example to discuss how energy supply/demand may affect equity and justice of specific groups or populations. Write a short essay (~400 words) to explain your thoughts. (Total 4pts)

Further reading:

Arvind Jaggi, Senior Economist, Demand Forecasting & Analysis, Electric Vehicle Forecast Impacts (Gold Book 2021)

Play around the En-ROADS model, and change some of the parameters and check how assumptions affect modeling results.