

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) forecast (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 Forecast](#) 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 average (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.