

Assignment 4 Load Forecast, energy and climate 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 comparing them and analyze how to make forecast better. Download one whole year (2023) of [Real_Time_Dispatch_Actual_Load](#) and [Day Head Market Load Forecast](#) for New York City. (2.5pts)

- Plot the load curve and load duration curve of New York City.
 - **Load Curve:** Plot the NYC hourly actual load for 2022, highlighting daily, weekly, and seasonal variations.
 - * **Load Duration Curve:** Sort the load data in descending order and plot it to show the distribution of demand over time. This reveals the percentage of time different demand levels occur.
- Show the characteristics of hourly load curve of an average day in New York City
 - All days average
 - Weekday vs. weekend
 - Monthly average
 - Seasonal average (Winter, Spring, Summer, and Fall)
- Find the hour(s)/day(s) with the largest forecast error [actual - forecast], and try to explain why (e.g., weather events, holidays, disruptions)?
- Now make reasonable assumptions of EV penetration rate and EV charging in New York City, and try to show how that would change the load curve.
- Should ConEdison/NYPA worry about it, what policy/incentives should you use to change people's charging behavior so to save costs for the utility companies?

2. Energy and climate justice

Check the launch of [NYC Climate Justice Hub](#), a partnership between the New York City Environmental Justice Alliance (NYC-EJA) and The City University of New York (CUNY) to advance climate solutions led by communities of color on the front lines.

Check also the New York State climate justice [programs and resources](#)

What is energy justice? How is it different from climate justice? Use examples to discuss how energy supply/demand or climate impact may affect equity and justice of specific groups or populations. Write a short essay (~300 words) to explain your thoughts. (Total 2.5pts)

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.