Forecasting

Description of problem:

The energy industry is undergoing a transformative journey, marked by rapid modernization and technological advancements. Infrastructure upgrades, integration of intermittent renewable energy sources, and evolving consumer demands are reshaping the sector. However, this progress comes with its challenges. Supply, demand, and prices are increasingly volatile, rendering the future less predictable. Moreover, the industry's traditional business models are being fundamentally challenged. In this competitive and dynamic landscape, accurate decision-making is pivotal. The industry relies heavily on probabilistic forecasts to navigate this uncertain future, making innovative and precise forecasting methods essential that aids stakeholders in making strategic decisions amidst the shifting energy landscape. This competition invites participants to develop forecasting techniques such as regression, machine learning to accelerate the global transition to net-zero.

Requirements:

1. **Understanding of problem statement and scope**

   How well team understand the problem statement for forecasting of electricity demand and price in power market. Also understanding its scope and working.

2. **Problem Solving and Analytical Skills**

   This involves how teams are handling the datasets. How well they segregate dependent and independent variables, what kinds of algorithms they are using, and how they research on the field of exploratory data analysis.

   a. **Data cleaning:** This involves checking and correcting data errors, outliers, missing values, and inconsistencies.

   b. **Descriptive statistics:** This involves calculating and displaying measures of central tendency, variability, and distribution of the data, such as mean, median, mode, standard deviation, range, and percentiles.

c. **Correlation and relationships:** This involves measuring and displaying the strength and direction of the associations between variables, using techniques such as correlation analysis, scatter plots, and cross-tabulations.
d. **Data visualization:** This involves creating and interpreting graphical representations of the data, such as histograms, box plots, scatter plots, line plots, heatmaps, and bar charts.
e. **Feature engineering:** This involves transforming, scaling, encoding, or creating new variables from the existing ones to enhance the data quality or extract meaningful in-sights.

3. Completeness

Completeness refers to the extent to which a model captures all the relevant factors, variables and provide the required outcome. A complete model should account for completion of code and should provide the result in csv file. A complete model should also be able to handle missing data, outliers, and structural changes in the data.

a. **Accuracy:** how close the forecast is to the actual outcome. Accuracy can be measured by different metrics, such as mean absolute error (MAE), root mean squared error (RMSE), mean absolute percentage error (MAPE), or symmetric mean absolute percentage error (sMAPE).
b. **Precision:** how consistent the forecast is over repeated trials.
c. **Clarity:** This includes neat and clean code, proper use of library, variables name, functions name, etc. these factors should be understandable.

4. Operability

a. **Robustness:** sensitivity or stability of the forecast, Performance of the simulation, usages of hyperparameter like epochs, learning rate, etc.
b. **Scalability:** How well a forecasting model can handle large amounts of datasets or complexity in terms of training time and prediction time for other simulated/real-time data.
c. **Innovative:** How simple or complicated or novelty are the forecasting models or methods. This can be evaluated by the number of parameters, variables, equations, algorithms, ensemble methods, and libraries involved in the forecasting process.

5. Presentation Skill

How well do they understand, explain, and document the forecasting models or methods. This includes the presentation and explanation of process, graphs, and charts of the forecasting process and results. Also, the documentation of the forecasting process, working process of algorithms, variables used, and conclusion of forecasting.