**Hourly Energy Consumption Forecast**

**Business Objective:**

PJM Interconnection LLC (PJM) is a regional transmission organization (RTO) in the

United States. It is part of the Eastern Interconnection grid operating an electric

transmission system serving all or parts of Delaware, Illinois, Indiana, Kentucky,

Maryland, Michigan, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee,

Virginia, West Virginia, and the District of Columbia.

**Acknowledgment:**

The hourly power consumption data comes from PJM&#39;s website and are in

megawatts (MW).

**Approch:**

The regions have changed over the years so data may only appear for certain

dates per region.

Split the last year into a test set- can you build a model to predict energy

consumption?

Find trends in energy consumption around hours of the day, holidays, or long term

trends?

Understand how daily trends change depending of the time of year. Summer trends

are very different than winter trends.

Forecast for next 30 days.

**Some general factors that can influence electricity consumption :**

Seasonal variations: Electricity demand tends to be higher during the summer and winter months, as people use more energy to heat or cool their homes.

Economic factors: The state of the local economy and job market can influence electricity consumption, as businesses and factories use more energy during periods of growth.

Population density: The number of people living in a region can affect electricity demand, as more people means more households and businesses using energy.

Energy prices: The cost of electricity can affect consumption patterns, as higher prices may encourage people to conserve energy or switch to alternative sources.

Infrastructure: The availability and reliability of the local power grid can influence energy consumption, as power outages or brownouts may force people to reduce their energy use.

Demographics: The age, income, and lifestyle of the population can also affect electricity consumption patterns, as younger people and those with higher incomes may use more energy for activities such as electronics and travel.

Government policies: Regulations and incentives from local and national governments can influence energy consumption, such as tax credits for energy-efficient appliances or subsidies for renewable energy sources.

Renewable energy sources: The use of renewable energy sources such as solar and wind power can also impact electricity consumption patterns.

**Aspects helps to Reduce Energy Consumption:**

Peak demand: This refers to the highest level of electricity demand reached during a given period of time, usually a day. **Understanding peak demand is important for utilities** to ensure they have enough capacity to meet the needs of their customers during periods of high demand.

Load factor: This is the ratio of the **average energy demand** to the **peak demand** over a specific time period. A high load factor indicates that a system is being used efficiently, whereas a **low load factor indicates that energy is being wasted**.

Time of use pricing: This is a pricing scheme in which electricity prices vary depending on the time of day. Customers are charged higher prices during peak demand periods and lower prices during off-peak periods. **Time of use pricing can help reduce overall energy consumption** and encourage customers to shift their energy usage to off-peak hours.

Demand response: This is a system in which utilities incentivize customers to reduce their energy usage during periods of high demand. Customers are **given financial incentives or other rewards** for reducing their energy consumption during these periods.

Energy storage: Energy storage systems such as **batteries** and **pumped hydro** can help store excess electricity generated from renewable sources and release it when needed. This can help improve the reliability and stability of the electricity grid and reduce the need for fossil fuel-based peaker plants.

Smart grids: Smart grids use advanced technologies to optimize the generation, transmission, and distribution of electricity. This includes real-time monitoring of electricity consumption and the ability to adjust supply to meet demand, which can help reduce energy waste and improve efficiency.

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