Title: Energy Production, Consumption, and Demand Forecasting

Role: Data Scientist Associate at AkumenIA

Goal: To create highly accurate forecasting models for energy production, consumption, and demand.

Methodology:

1. Data Quality Reporting:
   * Analyzed the dataset to identify missing data, duplicates, incoherent data, and outliers.
   * Prepared a report on the analysis for the client.
2. Data Preprocessing:
   * Cleaned the dataset and structured it to be suitable for machine learning models.
3. First Iteration of Building Machine Learning Models:
   * Utilized the client's data to create forecasting models for energy production, demand, and consumption.
   * Achieved Mean Absolute Percentage Errors (MAPE) of 0.015%, 0.03%, and 0.035% for energy production, demand, and consumption models, respectively.
   * Models used: Long Short-Term Memory (LSTM), Temporal Fusion Transformer (TFT), and Facebook's Prophet.
4. Feature Engineering & Data Scraping:
   * The client desired to further improve model accuracy.
   * Scraped additional data that might have correlations with target variables, such as Google Trends, Human Capital Project (HCP) indices, Bank Al-Maghrib (BKAM) data, press releases, and weather data.
5. Second Iteration of Building Machine Learning Models:
   * Reiterated the forecasting models using external data to improve accuracy.
   * Achieved MAPE values of 0.009%, 0.023%, and 0.028% for energy production, demand, and consumption models, respectively.

Results:

The final forecasting models demonstrated significant improvement in accuracy, with MAPE values reduced to 0.009% for energy production, 0.023% for demand, and 0.028% for consumption. By incorporating external data and refining the models, we successfully met the client's goal of creating highly accurate forecasting models for energy production, consumption, and demand.