## Combined Cycle Power Plant: Gradient-Descent

A combined cycle power plant (CCPP) is composed of gas turbines (GT), steam turbines (ST) and heat recovery steam generators. In a CCPP, the electricity is generated by gas and steam turbines, which are combined in one cycle, and is transferred from one turbine to another. While the Vacuum is colected from and has effect on the Steam Turbine, he other three of the ambient variables effect the GT performance. In this Project we are Implementing the Gradient Descent and also using Inbuilt Gradient Descent Regressor on the Combined Cycle Power Plant Dataset to predict its output.

## Dataset

The dataset contains 9568 data points collected from a Combined Cycle Power Plant over 6 years (2006-2011), when the power plant was set to work with full load. Features consist of hourly average ambient variables Temperature (T), Ambient Pressure (AP), Relative Humidity (RH) and Exhaust Vacuum (V) to predict the net hourly electrical energy output (EP) of the plant.

\* \*\***Attribute Information:**\*\*

Features consist of hourly average ambient variables

- Temperature (T) in the range 1.81°C and 37.11°C,

- Ambient Pressure (AP) in the range 992.89-1033.30 milibar,

- Relative Humidity (RH) in the range 25.56% to 100.16%

- Exhaust Vacuum (V) in teh range 25.36-81.56 cm Hg

- Net hourly electrical energy output (EP) 420.26-495.76 MW

The averages are taken from various sensors located around the plant that record the ambient variables every second. The variables are given without normalization.

## Machine Learning Algos Involved

1.Gradient Boosting Regressor

Steps Involved

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1. Importing the Libraries

2. Importing the data

3. Data Preprocessing

4. EDA

5. Study Correlation

6. Extensive Plotting

7. Feature Scaling

8. Build the model

# Libraries used

1.Pandas

2.Numpy

3.Matplotlib

4.Scikit-learn

5.Seaborn