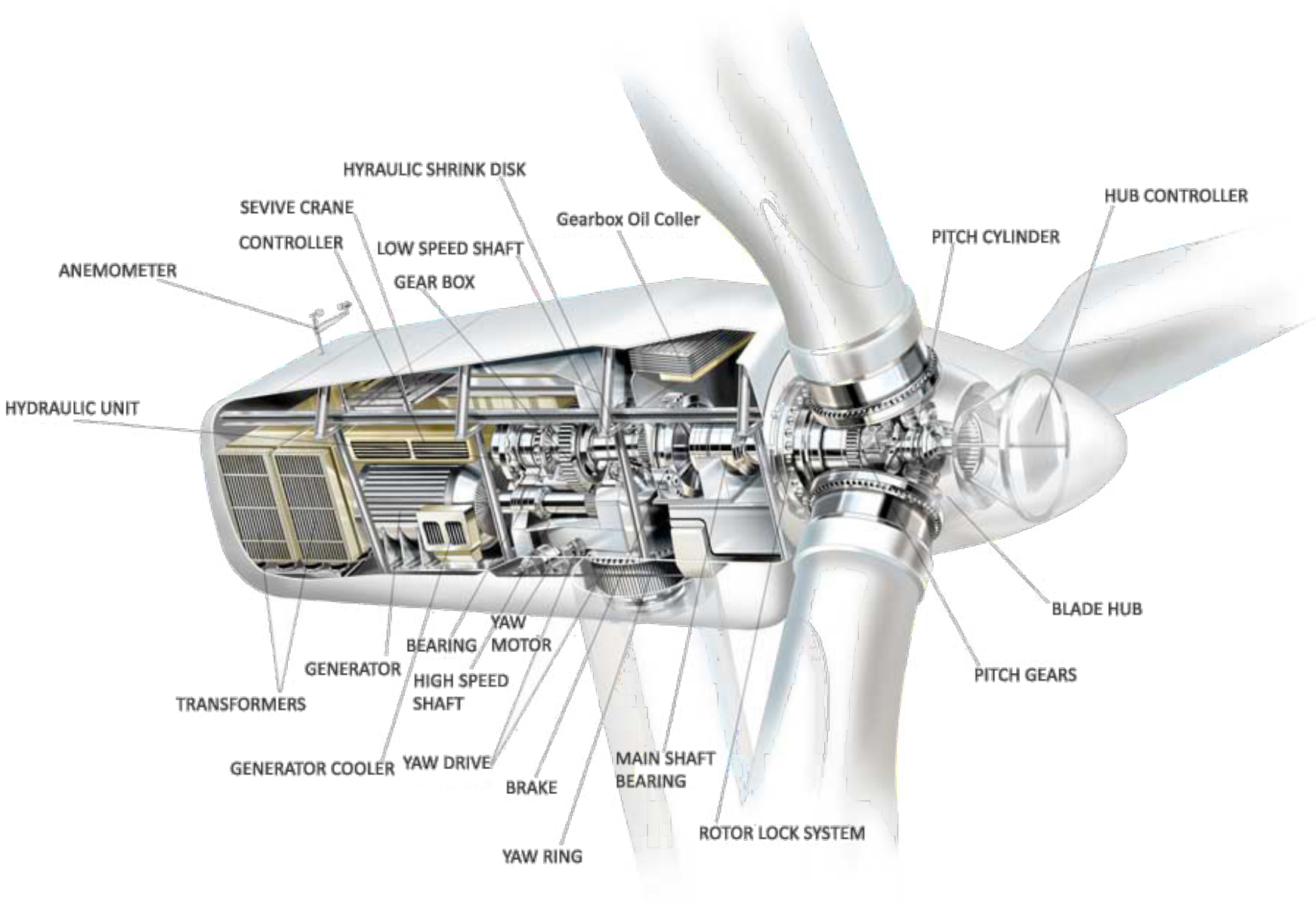
KNOW YOUR DATASET

In [1]:
```
#!pip install pillow
from PIL import Image
#!pip install requests
import requests
from io import BytesIO

response = requests.get('https://www.renewableenergyhub.co.uk/images/design/pages/wind-turbine-diagram.png')
Image.open(BytesIO(response.content))
```

Out[1]:



WIND TURBINE GENERATOR

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WTG PRINCIPLE

Wind turbines work on a simple principle: instead of using electricity to make wind—like a fan—wind turbines use wind to make electricity. Wind turns the propeller-like blades of a turbine around a rotor, which spins a generator, which generates electricity

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KNOW ABOUT WIND TURBINE PARTS

NACELLE

Sits atop the tower and contains the gear box, low- and high-speed shafts, generator, controller, and brake. Some nacelles are large enough for a helicopter to land on.

BLADES

Lifts and rotates when wind is blown over them, causing the rotor to spin. Most turbines have either two or three blades.

ROTOR

Blades and hub together form the rotor. Used to pass the Rotating energy from blades to Gearbox Low Speed Shaft.

LOW-SPEED SHAFT

It is connected rotor and used to Turns the low-speed shaft at about 30-60 rpm depends on Gearbox.

GEAR BOX

Connects the low-speed shaft to the high-speed shaft and increases the rotational speeds from about 30-60 rotations per minute (rpm), to about 1,000-1,800 rpm; this is the rotational speed required by most generators to produce electricity. The gear box is a costly (and heavy) part of the wind turbine.

HIGH-SPEED SHAFT

It is connected between Gearbox and Generator to Drive the generator at High speed to generate the electricity.

GENERATOR

Produces 50-cycle AC electricity; it is usually an Distributed Frequency induction generator (DFIG).

ANEMOMETER

Measures the wind speed and transmits wind speed data to the controller.

PITCH SYSTEM

Turns (or pitches) blades out of the wind to control the rotor speed, and to keep the rotor from turning in winds that are too high or too low to produce electricity.

WIND VANE

Measures wind direction and communicates with the yaw drive to orient the turbine properly with respect to the wind.

YAW DRIVE

Orients upwind turbines to keep them facing the wind when the direction changes. Downwind turbines don't require a yaw drive because the wind manually blows the rotor away from it.

TRANSFORMER

Transformer are used to transform the electrical voltage from one level to another level.

DATA DESCRIPTION

The dataset show the information of a single turbine generator in 10 minutual slots from last few years as shown below. The data says that the Turbine Generators Parameters like Power, Temperatures, Speeds and Position during Operation.

From this i am going to "Predict the Wind Speed trend" for next time slot and Checking the "relationship between the Average Active Power and Other Parameters for applying Linear Regression".

Variable	Definition	Data Type
Date	Date of a Observation Created	Format (DD-MM-YYYY)
Time	10 Minutes Time Slot of a Observation Created	Format (HH:MM:SS)
Avg_Active_Power	Average Power Generated by a turbine in a 10 Minute time slot	Integer
Avg_Ambient_Temp	Average Ambient Temperature Measured by a turbine during a 10 Minute time slot	Integer
Avg_Generator_Speed	Average Generator Speed Measured by a turbine during a 10 Minute time slot	Integer
Avg_Nacelle_Pos	Average Nacelle Position of a turbine as per wind direction during a 10 Minute time slot	Integer
Avg_Pitch_Angle	Average Pitch Angle of a turbine as per wind Speed during a 10 Minute time slot	Integer
Avg_Rotor_Speed	Average Rotor Speed of a turbine as per wind Speed during a 10 Minute time slot	Integer
Avg_Wind_Speed	Average Wind Speed of a turbine during a 10 Minute time slot	Integer
Bearing_DE_Temp	Average Bearing Drive End Temperature of a turbine during a 10 Minute time slot	Integer
Bearing_NDE_Temp	Average Non Bearing Drive End Temperature of a turbine during a 10 Minute time slot	Integer
Gearbox_bearing_Temp	Average Gearbox Bearing Temperature of a turbine during a 10 Minute time slot	Integer

Gearbox_oil_Temp	Average Gearbox Oil Temperature of a turbine during a 10 Minute time slot	Integer
Generator_winds_Temp_1	Average Generator winding R Phase Temperature of a turbine during a 10 Minute time slot	Integer
Generator_winds_Temp_2	Average Generator winding Y Phase Temperature of a turbine during a 10 Minute time slot	Integer
Generator_winds_Temp_3	Average Generator winding B Phase Temperature of a turbine during a 10 Minute time slot	Integer
Generator�s_sliprings_Temp	Average Generator's sliprings Temperature of a turbine during a 10 Minute time slot	Integer
Hydraulic_group_pressure	Average Hydraulic Group Pressure of a turbine during a 10 Minute time slot	Integer
Nacelle_Misalignment_Avg_Wind_Dir	Average Nacelle Misalignment & Wind Direction of a turbine during a 10 Minute time slot	Integer
Trafo_1_wind_Temp	Average Transformer winding R Phase Temperature of a turbine during a 10 Minute time slot	Integer
Trafo_2_wind_Temp	Average Transformer winding Y Phase Temperature of a turbine during a 10 Minute time slot	Integer
Trafo_3_wind_Temp	Average Transformer winding B Phase Temperature of a turbine during a 10 Minute time slot	Integer