



# Types of Wind Turbines

## Table of Contents



- [Classify different types of wind turbines with examples.](#)
  - [Detailed Explanation of Types of Wind Turbines](#)

## Classify different types of wind turbines with examples.

Wind turbines are mainly classified as follows:

### 1. Based on axis of rotation:

- **Horizontal Axis Wind Turbine (HAWT):** Shaft parallel to ground.  
*Example:* Three-blade wind turbines.
- **Vertical Axis Wind Turbine (VAWT):** Shaft perpendicular to ground.  
*Example:* Darrieus, Savonius turbines.

### 2. Based on location:

- **Onshore turbines:** Installed on land.
- **Offshore turbines:** Installed in sea or ocean areas.

### 3. Based on size:

- **Small turbines:** Used for domestic purposes.
- **Large turbines:** Used for commercial power generation.

## Detailed Explanation of Types of Wind Turbines

Wind turbines can be grouped into different categories depending on their construction and application. The main classifications are given below:



## 1. According to the Axis of Rotation

### (i) Horizontal Axis Wind Turbine (HAWT):

In this type, the rotating shaft is horizontal, i.e., parallel to the ground. These turbines are mostly used for large-scale power generation and need to be aligned with the wind direction.

**Example:** Three-blade wind turbines used in wind farms.

### (ii) Vertical Axis Wind Turbine (VAWT):

Here, the shaft is vertical, i.e., perpendicular to the ground. These turbines can work irrespective of wind direction and are suitable for areas with low or changing wind.

**Example:** Darrieus turbine and Savonius turbine.

## 2. According to Installation Location

### (i) Onshore Wind Turbine:

These turbines are installed on land. They are easier to construct and maintain compared to offshore systems.

**Example:** Wind farms located in rural or hilly regions.

### (ii) Offshore Wind Turbine:

These are installed in water bodies like seas or oceans where wind speed is generally higher, resulting in more power output.

**Example:** Wind farms in coastal and offshore areas.

## 3. According to Size or Capacity

### (i) Small Wind Turbine:

Used for small-scale applications such as homes or small establishments. Their power rating is relatively low.

**Example:** Small rooftop wind generators.

### (ii) Large Wind Turbine:

These are used for bulk electricity generation and are connected to the power grid. They have high power capacity.

**Example:** Utility-scale wind turbines in large wind farms.

## 4. According to Number of Blades

- **Single-blade type:** Rarely used due to balancing issues.



- **Two-blade type:** Economical but causes more vibration.
- **Three-blade type:** Most common due to better efficiency and smooth operation.

**Example:** Modern commercial wind turbines generally have three blades.