Flat Type Wind Turbine

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***Abstract* - On the renewable front, we own and operate wind power projects across seven states in India. These renewable power facilities have a combined capacity of more than 1,700 megawatts. Includes 800 megawatts won in India's national wind power tenders held in 2017 and February 2018. Our renewable power business enables us to contribute to the push for clean energy in India. The government targets to grow renewable energy capacity to 175 giga watts by the fiscal year 2022.**

INTRODUCTION

1. Windmills (now in the form of wind turbines) have been used for millennia to convert the wind's kinetic energy into mechanical energy.
2. As early as 200 B.C., mechanical energy was used for specific tasks including grinding grain and pumping water. Nowadays, wind turbines harness kinetic energy from the air and convert it into electricity via a generator.
3. Much like solar PV installations, you can purchase a domestic wind turbine to supply as much or as little electricity as you want.
4. If you are hoping to limit your dependence on the mains as much as possible, you will need a larger turbine, or multiple smaller turbines.
5. If you are simply looking to produce enough electricity for a light in your garden shed, you can get away with a very small turbine.

COMPONENTS AND DESCRIPTION

- Dynamo
- C Type Blade
- Battery
- Fan
- Air vent Chamber

1. Wind turbines work on a simple principle: instead of using electricity to make wind like a fan wind turbine use wind to make electricity.
2. Wind turns the propeller-like blades of a turbine around a rotor, which spins a generator, which creates electricity.
3. Wind turbines work on a very simple principle: the wind turns the blades, which causes the axis to rotate, which is attached to a generator, which produces DC electricity.
4. which is then converted to AC via an inverter that can then be passed on to power your home.

CALCULATIONS

GROSS POWER:

$$P = \frac{1}{2}\rho A V^3$$

P = power,
ρ = air density,
A = swept area of blades given by $A = \pi r^2$
where r is the radius of the blades.
V = velocity of the wind.

Blade length, l = 52 m
Wind speed, v = 12 m/sec
Air density, ρ = 1.23 kg/m3
Power Coefficient, Cp = 0.4

Inserting the value for blade length as the radius of the swept area into equation l = r = 52 m

$$A = \pi r^2$$

$=\pi\times 52^2$
=8495m

We can then calculate the power converted from the wind into rotational energy in the turbine.

$P_{avail} = 1/2\ \rho A v^3\ C_p$
$=1/2\times 1.23\times 8495\times 12^3\times 0.4$
=3.6 MW.

This value is normally defined by the turbine equation, but it is important to understand the relationship between all of these factors and to use this equation to calculate the power at wind speeds other than the rated wind speed.