1. **Wind Electric Conversion Systems (WECS)**

Wind is a free energy resource. It is available is large quantity, approximated to over 1670 Trillion kWh/year over the earth but uneven distributed [1]. This electricity generation method converts the wind energy into mechanical energy which rotates the shafts. The mechanical energy therefore gives rise to electrical energy.

**Modes of operation**

1. Constant-speed with pitch control
2. Variable speed
3. Nearly constant speed – Normally used due to its simplicity

**Mini Disadvantages – base on normally used mode**

1. lower aerodynamic efficiencies without pitch control
2. low power factor
3. high stresses in mechanical and supporting elements
4. excessive reactive power demands from the grid
5. **Photovoltaic Systems (PV)**

The solar is another clean and renewable energy, it is obtained by conversion of insolation into electrical energy. The maximum solar insolation that can be harnessed have value of 1370W/m^2.

**Types of PV systems**

1. *Flat plate systems* – stationery with stable tilt (However-change tilt with seasons)
2. *Concentrating system* – requires two axis tracking.

**Mini Disadvantages – based on concentrating system**

1. The functionality of the concentrating systems requires locations that have clear skies throughout the whole year.
2. They require 2-2.5 times area consumed by the flat plate system to prevent being exposed to shadow of the surrounding panels.

**Future Recommendations**

**Wind power**

1. The used of **Variable Speed operating mode** to increase the amount of wind energy harnessed and to eliminate the stress on the wind turbine components such as the blades and the tower.

**References**

[1] 1392136

[2] mukund1999wind

[3] 921466