

Abstract

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Innovative Design Investigation of an augmented Drag vertical axis wind turbine under unsteady characteristics

The important of wind energy is increased nowadays in many countries according to intensive electric power demand. Most of the wind turbine designs are conducted with large scale to build farms of power plants. These types are high cost as initial and installation cost. This work is concerned with a new type of vertical axis wind turbine (VAWT), which is provided with a nozzle. The nozzle is used to duplicate the wind speed in the region whose have speeds not more than 3 m/s. Moreover, this design is promising in the zones of wind speed less than 4 m/s to be a stand-alone unit for electric generation. The study is performed numerically to survey the influence of this nozzle on the performance and power coefficient of the Drag Vertical Axis Wind Turbine (DVAWT). This type of electric power generation is intended for rural and domestic application. The results indicated that the new design increases the maximum power coefficient by 29% compared with the conventional drag turbine. The new design is supplied with a fixed part to comply the wind direction whatever it is abounded without any mechanical control parts are needed. This type of electric power generation is intended for rural and domestic application. Moreover, this type of wind turbine is assisting in the development of the rustic zones in Egypt.