

Review of Vertical Axis Wind Turbine

Authors : Amare Worku, Harikrishnan Muralidharan

Abstract : The research for more environmentally friendly sources of energy is a result of growing environmental awareness. In this aspect, wind energy is a very good option and there are two different wind turbines, horizontal axis wind turbine (HAWT) and vertical axis turbine (VAWT). For locations outside of integrated grid networks, vertical axis wind turbines (VAWT) present a feasible solution. However, those turbines have several drawbacks related to various setups, VAWT has a very low efficiency when compared with HAWT, but they work under different conditions and installation areas. This paper reviewed numerous measurements taken to improve the efficiency of VAWT configurations, either directly or indirectly related to the performance efficiency of the turbine. Additionally, the comparison and advantages of HAWT and VAWT turbines and also the findings of the design methodologies used for the VAWT design have been reviewed together with efficiency enhancement revision. Most of the newly modified designs are based on the turbine blade structure modification but need other studies on behalf other than electromechanical modification. Some of the techniques, like continuous variation of pitch angle control and swept area control, are not the most effective since VAWT is Omni-directional, and so wind direction is not a problem like HAWT. Hybrid system technology has become one of the most important and efficient methods to enhance the efficiency of VAWT. Besides hybridization, the contra-rotating method is also good if the installation area is big enough in an urban area.

Keywords : wind turbine, horizontal axis wind turbine, vertical axis wind turbine, hybridization

Conference Title : ICEPE 2023 : International Conference on Electrical and Power Engineering

Conference Location : New York, United States

Conference Dates : May 15-16, 2023