Design, Fabrication & Analysis of Combined Blade Savonius Type VAWT Turbine

Abstract

Increasing awareness on the issues of climatic changes and sustainable energy use has led to growing levels of interest in small scales, decentralized power generation. Small-scale wind power has significant growth in last ten years, partly due to political support for renewable energy and introduction of feed in to tariffs, which pay home owners for generating their own electricity. Research and development activities in the field of renewable energy have been considerably increased in many countries recently due to worldwide energy crisis. Wind is particularly becoming important. Although considerable progress has already been achieved, the available technical design is not yet adequate to develop reliable wind energy converters corresponding to low wind speed and urban areas. The Savonius turbine appears to be particular promising for such conditions. Present study considers improved design in order to increase the power output from Savonius turbine. Our objective is to investigate power output under modified design of blades which combines elliptical and semicircular blades. The conventional design has more air vacuum, high drag and decreased thrust resulting in low efficiency of turbine. An already carried out research resulted in increased power co-efficient. For that purpose, we have combined elliptical and semicircular blades to decrease air vacuum and drag to increase the thrust. For the higher efficiency concern we have fabricated combined blade Savonius type vertical axis wind turbine to produce increased power and torque output. The power and torque obtained from the fabricated model at the average wind speed of 8 m/sec are 0.235W and 4.32×10^{-3}.