

عنوان مقاله:

CFD INVESTIGATION OF IMPROVEMENT OF THE PERFORMANCE OF SAVONIUS WIND TURBINE ROTOR

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خلاصه مقاله:

In this paper a numerical study is presented with the aim of evaluating the performance of using curved stator blade on Vertical Axis Wind Turbine (VAWT). The flow over the Savonius turbine was assumed to be twodimensional(2D), viscous, turbulent and steady. Simulations were performed in a Computational Fluid Dynamics CFD software FLUENT, using Reynold's Averaged Navier-Stokes Equations (RANSE) solver with unstructured mesh. Turbulence was modeled with the k-e model. The effects of varying Reynolds number and stator blade have been investigated. The static torque values of the rotor have been measured by experiments and calculated by numerical analysis, and finally they have been compared. The best results have been obtained by means of the rotor with curtain. This simulation determines the aerodynamic behavior of the rotor and stator blade. Torque coefficients have been investigated in this present research work by measuring the pressure distribution on the blade surfaces at various wind angles. For the turbine, the numerical results of pressure and torque were compared for the two cases. From the simulation data it can be concluded that the torque and performance of VAWT increase with stator blades.

کلمات کلیدی:

Wind Turbine, Savonius, aerodynamics, numerical, simulation, FLUENT, performance

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