

## **Modeling and Numerical Simulation for the Newly Designed Four Cavity Blades Vertical Axis Wind Turbine**

### **Abstract**

The last years have proved that Vertical Axis Wind Turbines (VAWTs) are more suitable for urban areas than Horizontal Axis Wind Turbines (HAWTs). To date, very little has been published in this area to assess good performance and lifetime of VAWTs either in open or urban areas. The main goal of this current research is to investigate numerically the aerodynamic performance of a newly designed cavity type vertical axis wind turbine having four blades. In the current new design the power generated depends on the drag force generated by the individual blades and interactions between them in a rotating configuration. For numerical investigation, commercially available computational fluid dynamic CFD software GAMBIT and FLUENT were used. In this numerical analysis the Shear Stress Transport (SST)  $k$ - $\omega$  turbulence model is used which is better than the other turbulence models available as suggested by some researchers. The computed results show good agreement with published experimental results.

**Keywords;** Computational Fluid Dynamics (CFD), Performance Analysis, Turbulent Model, Vertical Axis Wind Turbine, Wind Energy