Contribution ID: **271** Type: **Poster Presentation**

Mathematical Modeling of a Concentrator-Diffuser Wind Energy system

Thursday, 14 July 2011 17:00 (2 hours)

<p> Optimization of power output from ducted wind turbines has been the focus of many researchers in recent years. However many have dwelt much on diffusers than concentrators (nozzles) . Diffusers are characterized by flow separation due to deceleration of the fluid and this leads to energy dissipation. On the other hand a concentrator is accompanied by a favourable pressure gradient which stabilizes the boundary layer and thus minimizes energy dissipation. This study presents a mathematical model of a concentrator-Diffuser system which has been developed to optimize the power output of a low speed wind turbine. Optimization of the inclination angles of both the concentrator and the diffuser, ducts exit ratios and the reduction in backpressure were found to augment the mass flow at the rotor due to increased pressure drop and reduction in flow separation. It is illustrated that Power coefficients (Cp) of about 0.65 are achievable.

Level (Hons, MSc,
   PhD, other)?

PhD student

Consider for a student
   award (Yes / No)?

yes

Would you like to <br> submit a short paper <br> for the Conference
 Proceedings (Yes / No)?

Yes

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