Effect of the Phase-Shift Angle on the vertical axis Savonius wind turbine performance as a renewable-energy harvesting instrument

Publons ID	(not set)
Wos ID	WOS:000824053600006
Doi	10.1016/j.egyr.2022.06.092
Title	Effect of the Phase-Shift Angle on the vertical axis Savonius wind turbine performance as a renewable-energy harvesting instrument
First Author	
Last Author	
Authors	Prabowoputra, DM; Prabowo, AR;
Publish Date	NOV 2022
Journal Name	ENERGY REPORTS
Citation	2
Abstract	Wind energy is the third-largest renewable energy source after hydro and solar energy, so it has great potential in increasing renewable energy as a percentage of national energy. However, wind energy installation is only at 0.25% of the existing potential; so, it still needs to be developed. One of the development efforts is to optimize the wind turbine rotor design. Savonius rotors are among the most popular rotors to convert wind energy into electrical energy. The Savonius turbine is a simple structure, easy to modify to upgrade Savonius performance, and can be operated at low velocity. Phase-shift angles of 0 degrees, 30 degrees, 60 degrees, and 90 degrees were utilized in this study on a two-stage Savonius wind turbine. This study was carried out using Solver CFX utilizing the Computational Fluid Dynamic technique on the ANSYS Student version software. An SST (shear stress transport) turbulence model with steady-state turbulence was used. The purpose of this study was to assess the influence of PSA on the performance of the Savonius two-stage turbine. Factorial design analysis was used in conjunction with the CFD approach. The results indicated that PSA influenced the Savonius turbine's performance, with 30 degrees being the optimal PSA. Simultaneously, the C-pmax may be obtained using 0.29. The factorial design study with two components revealed that the Phase-Shift Angle had a considerable effect on rotor performance, and the two factors (TSR and PSA) had an interaction. (c) 2022 The Author(s). Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).
Publish Type	Journal
Publish Year	2022
Page Begin	57
Page End	66
Issn	2352-4847
Eissn	
Url	https://www.webofscience.com/wos/woscc/full-record/WOS:000824053600006
Author	DANDUN MAHESA PRABOWOPUTRA, S.T, M.T