

Abstract Submitted
for the DFD19 Meeting of
The American Physical Society

Enhanced Power for a New Design of Savonius Rotors¹ ABDELKADER FILALI, OMAR MATAR, Imperial College London, HAMZA SEMMARI, ADEL BOUMAARAF, KHAOULA ZITOUNI, Ecole Nationale Polytechnique de Constantine, Algeria, LYES KHEZZAR, Khalifa University of Science and Technology, UAE — The present work involves the investigation and improvement of the performance of a vertical Savonius rotor. This study is based on numerical simulation of the aerodynamic behaviour of different proposed rotor designs. An exhaustive literature review allowed us to identify the influential parameters and helped us to conclude that the power of the Savonius rotor can be significantly improved by a careful and judicious choice of these parameters. The numerical approach was first validated with experimental and numerical studies previously published in the literature for the case of a semi-circular blade rotor (conventional). Then, an improvement process based on the modification of the blades profile to an elliptical shape was adopted. A second improvement of the Savonius rotor is conducted by introducing new air collectors of different aerodynamic profiles referred to here as ‘Model I and ‘Model II. All these geometrical considerations and propositions have made it possible to define an optimal geometrical configuration.

¹Royal Academy of Engineering Research Chair in Multiphase Fluid Dynamics for OKM

Omar Matar
Imperial College Londond

Date submitted: 29 Jul 2019

Electronic form version 1.4