conferenceseries.com

2nd World Congress on **Wind and Renewable Energy** 5th World Congress and Expo on **Green Energy**

June 14-16, 2018 | London, UK

Advances in wind energy conversion

Asfaw Beyene San Diego State University, USA

Which contributed to its sharp rise in share and market. however, the technology still faces some challenges, especially related to its intermittent and part-load operation. Off-design operation is a serious matter because system efficiency drops considerably at off-design loads, one strategy to address this challenge for wind turbine blades and obtain a more consistent efficiency over a wide load range, is varying the blade geometry. Predictable morphing of wind turbine blade in reaction to wind load conditions has been introduced recently. The concept, derived from fish locomotion, also has similarities to spoilers and ailerons, known to reduce flow separation and improve performance using passive changes in blade geometry. In this work, we employ a fully coupled technique on CFD (Computational Fluid Dynamics) and FEM (Finite Element Method) models to introduce continuous morph to desired and predetermined blade design geometry, the NACA 4412 profile, which is commonly used in wind turbine applications. Then we assess the aerodynamic behaviour of a morphing wind turbine airfoil using a two-dimensional computation. The work is focused on resolving force distribution based on trailing edge deflection, wind speed, and material elasticity, i.e., Young's Module. The computational and wind tunnel results will be presented together with a summary of the prospects for the industry.

Biography

Asfaw Beyene graduated with PhD from Warsaw University of Tech, Warsaw, Poland. He is a Fellow Member of ASME and currently serves as Director of the Renewable Energy and Energy Efficiency at San Diego State University, USA. His research integrates analytical, computational, and experimental techniques to address fundamental and practical problems of energy conversion. He has developed novel methods for wind and wave energy conversion. Over the years, he has attracted several millions of dollars in funding from NSF, DOE, US Navy, CEC, and others. He is the recipient of many research and teaching awards. He has authored significant number of refereed journal articles, conference proceedings, and technical reports.

abeyene@sdsu.edu

Notes: