

Effects of Blade Preset Pitch/ Offset on Curved-Blade Darrieus Vertical Axis Wind Turbine Performance

Paul C. Klimas
Mark H. Worstell
Advanced Energy Projects Division 4715
Sandia National Laboratories
Albuquerque, NM 87185

Abstract

Current designs of curved-blade Darrieus vertical-axis wind turbines (VAWTs) have blades mounted in such a way that the position vector from the axis of rotation intersects the blade chord perpendicularly between the -25% and -50% chord points. This paper describes the effects on aerodynamic performance of the Sandia National Laboratories' (SNL) 5-m-dia turbine when its symmetrical cross-section blades are mounted such that the axis of rotation-blade chord position vector effects a normal intersection with the blade chord at points between -180% and +77% chord. These variations produce significant changes in cut-in tip-speed ratio, peak efficiency, and peak power.