

Abstract Submitted
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Exploring the Effects of Low-Level-Jet Velocity Profiles on the Energy Entrainment of Vertical-Axis Wind Turbines DIEGO SIGUENZA, ALI DOOSTTALAB, Purdue University, SHYUAN CHENG, University of Illinois at Urbana-Champaign, HUMBERTO BOCANEGRA-EVANS, Purdue University, LEANORDO P. CHAMORRO, University of Illinois at Urbana-Champaign, LUCIANO CASTILLO, Purdue University — The velocity peaks created by atmospheric low-level jets results in attractive power resource for wind turbines. We experimentally explored the effects of a series of low-level-jet velocity profiles on the energy entrainment in the wakes of a single and a pair of counter-rotating vertical-axis wind turbine models using particle image velocimetry in a wind tunnel. Results show that the positive shear region of the velocity profiles increases the wake asymmetry due to higher vertical velocity gradients. It is also shown that the LLJ velocity profile improves the wake energy entrainment in comparison with standard boundary layer profiles by increasing the mean kinetic energy advection into the wake.

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