

Abstract Submitted
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Effect of turbulence intensity on power generation in a 4x3 wind turbine array¹ MURAT TUTKUN, Norwegian Defense Research Establishment, ELIZABETH CAMP, RAUL BAYOAN CAL, Portland State University, Department of Mechanical and Materials Engineering — Turbulence intensity is highly variable in the atmospheric boundary layer. This is the typical environment where wind farms are placed and operate. The characteristics of the turbulence have the ability to impact the power production of wind turbines. Here, a wind tunnel study on a 4x3 wind turbine array is performed in which the turbulence intensity is varied independently. These experiments are carried out in a wind tunnel setting and the power is measured using torque and angular frequency sensing devices. The levels of turbulence are varied via a dynamic grid. Three cases are obtained one passive and two active (with two distinct ranges). Power production along the centerline of the array was measured for each of the cases using model turbines outfitted with torque sensors.

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