

**DESIGN BLADES WIND TURBINE MICRO SCALE TAPER-
TYPE HORIZONTAL AXIS WITH MIXED AIRFOIL
VARIATIONS**

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ABSTRACT

*Energy is a fundamental need in economic development. Indonesia is a country with abundant natural resources potential, especially wind energy potential. In 2019, Indonesia has wind energy potential of 60,6 GW and wind energy is not yet maximized. So a method is needed to be able to overcome this, one of which is by utilizing renewable energy through micro-scale wind turbines. Micro-scale wind turbines themselves have several advantages such as easier installation and can be adjusted to the potential wind speed in certain areas. Blades are one of the wind turbine systems that serve to convert the kinetic energy of the wind into mechanical energy. The purpose of this study was to find out the design, performance and electrical energy of NACA 4412, NACA 4415 and NACA 4418 mixed airfoil taper blades. This study used horizontal axis wind turbine number of blades 3 with a type of taper mixed airfoil designed and made using materials of mahogany wood (*Swietenia macrophylla*) for micro-scale wind turbines generator power capacity 500 Wp at a maximum wind speed of 12 m / s with a blade radius of 0,8 m, twist (pitch 7°) is 6,55°-15,88° and chord (0,044 m) is 0,07 m – 0,12 m using airfoil NACA 4412, NACA 4415 and NACA 4418. Bar testing is conducted for 3 days and for data retrieval time is done for 24 hours. For blade performance (Cp) was obtained at a value of 51% in TSR 5 with the acquisition of total electrical energy generated by the first day of testing of 549,57 Wh, the second day of 560,68 Wh and the third day of 375,54 Wh.*

Keywords: *Taper Mixed Airfoil, Blade Performance, Energy*