

## **ABSTRACT**

*The blade is one of the wind turbine components that functions to convert wind energy into mechanical energy. In this research, a taper blade design for The Sky Dancer wind turbine has been designed, with an electric power 500 watt at a wind speed 12 m/s, a horizontal axis with a micro scale, using a NACA 6513 airfoil and the material used is pine wood. The design process is carried out by simulation using Qblade software to determine the performance of the designed taper blade and three-dimensional (3D) design software to create a 3D image of the taper blade and analyze the strength of the material in the design of the taper blade. The results of this research found that the taper blade design type at the tip speed ratio 7 has a power coefficient 49% with a total electrical energy 1146 watt. The analysis results of the pine wood material structure obtained a maximum stress value  $5,295 \times 10^6$  N/m<sup>2</sup>, a maximum deflection 9.102 mm and a factor of safety  $8,51 \times 10^5$ .*

**Keywords:** *Taper, The Sky Dancer, Tip Speed Ratio*