

## **ABSTRACT**

*Water is a renewable energy source that can replace fossil energy for electricity generation. Hydroelectric power plants are increasingly being used given the fossil energy that can not be renewed and also has some adverse effects on the environment. In this study, the writer will study vortex turbines because they have the advantage of being able to operate at low water levels and testing the number of blades which amount to 3, 4, 5, 6, 7, and 8 types of flat plates and then varying the discharge amounting to 0, 0016 m<sup>3</sup>/s, 0.0021 m<sup>3</sup>/s, 0.0028 m<sup>3</sup>/s, and 0.0031 m<sup>3</sup>/s. From the test results obtained that the number of blades 8 with a diameter of 10 cm diameter with a height of 8.5 cm and made from PVC has the maximum mechanical power value at 0.0031 m<sup>3</sup> / s discharge with a value of 1.661 watts. This can also be seen in the results of mechanical power testing shows that the most optimal blade 8. Then for the efficiency value, the number of blades 8 has the greatest value compared to the variations in the number of blades at discharge 0.0021 m<sup>3</sup>/s with its efficiency. From this it can be concluded that in the geometry and design of this turbine for the shape of a flat plate blade type the number of blades 8 is the most maximum and efficient form.*

*Keyword: Hydro power plant, vortex turbine, mechanical power, efficiency.*