ABSTRACT

IMPROVEMENT OF CROSSFLOW TURBINE FOR MICROHYDRO POWER GENERATION IN BANGUN RAHAYU VILLAGE SUB DISTRICT OF TELUK BETUNG BARAT

By

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Microhydro is a technology to convert the potential energy of water into electricity that is useful for supporting social and economic activities of villagers. One of the microhydro plants was located in Bangun Rahayu village, sub district of Teluk Betung Barat. Based on observation and measurement, the microhydro potential in Bangun Rahayu village has head of 6,06, included PVC pipes with a total length of 37,49 meters, and flowrate of 0.0763 m^3/s. From these parameters, the potential of power from the whole system is 4,53 kW, and the specific speed is 66 rpm.

The microhydro plant, however, was very simple and the produced power was 1,207 kW with a total efficiency of 26,65%. This may be atributed to poorly design of the turbine (or rotor). The plant is using crossflow turbine with eight blades and diameter of 0,4 meter. Therefore, the objective of this research was to redesign or modify the existing turbine. The modification was conducted by produced a new turbine with the same size but mounted with 12 blades.

The results of tests showed that modified turbine incresed electricity into 1,34 kW and produced daily energy of 116,24 MJ. The total efficiency of microhydro system is 29,7% of the total head, whereas the effective efficiency was 35,2% of highest potential power of the installation The utilization of daily energy by the vilagers was 61,93 MJ which meant energy utilization efficiency of 53,28%.