

ABSTRAK

STUDI POTENSI DAN PERANCANGAN *ARCHIMEDES SCREW TURBINE* UNTUK PEMANFAATAN ENERGI MIKROHIDRO PADA SALURAN IRIGASI BENDUNGAN DESA BUKOPOSO KABUPATEN MESUJI

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Energi merupakan salah satu kebutuhan terpenting di Indonesia yang terus mengalami peningkatan seiring dengan berkembangnya pertumbuhan populasi dan industrialisasi. Sementara itu energi fosil terus mengalami penipisan dan penggunaan berdampak negatif terhadap lingkungan, sehingga diperlukan pemanfaatan energi baru terbarukan (EBT) untuk mengatasi masalah tersebut. Indonesia menjadi salah satu negara yang mempunyai sumber EBT yang cukup besar seperti energi air. Salah satu daerah yang mempunyai potensi energi air di Indonesia adalah Desa Bukoposo, Kab. Mesuji yang terletak di Provinsi Lampung dengan sumber energi air berasal dari saluran irigasi bendungan. Penelitian ini bertujuan mengetahui potensi energi mikrohidro, merancang *Archimedes Screw Turbine*, dan membandingkan potensi energi. Metode penelitian meliputi pengukuran luas penampang, pengukuran kecepatan aliran dengan metode benda apung, pengukuran *head* total dengan metode *waterpass*, dan perhitungan data serta melakukan perancangan *Archimedes Screw Turbine* dengan *Software* autodesk inventor. Hasil Penelitian menunjukkan potensi energi mikrohidro pada saluran irigasi bendungan Desa Bukoposo mempunyai debit $0,2709 \text{ m}^3$, *Head* total 0,79 m, dan daya hidrolis 2099,45 watt. Hasil perancangan AST diperoleh diameter turbin 0,30 m, diameter poros 0,0894 m, 1,6 m *pitch* 0,30 m, jumlah ulir 5 buah, kemiringan turbin 30° , kemiringan ulir 26° . Hasil perbandingan menunjukkan bahwa potensi energi yang dibangkitkan AST sebesar 1679,55 watt dapat memenuhi kebutuhan penerangan pada BBIAT Desa Bukoposo sebesar 545 watt.

Kata Kunci : Energi Baru Terbarukan, Mikrohidro, *Archimedes screw turbine*.

ABSTRACT

STUDY OF THE POTENTIAL AND DESIGN OF AN ARCHIMEDES SCREW TURBINE FOR MICROHYDRO ENERGI UTILIZATION IN THE IRRIGATION CHANNEL OF BUKOPOSO VILLAGE DAM IN MESUJI REGENCY

By

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Energy is one of the most important needs in Indonesia, which continues to increase in line with population growth and industrialization. Meanwhile, fossil fuels continue to deplete and their use has a negative impact on the environment, so it is necessary to utilize new and renewable energy (EBT) to overcome this problem. Indonesia is one of the countries that has considerable EBT resources, such as water energy. One of the areas that has water energy potential in Indonesia is Bukoposo Village, Mesuji Regency, located in Lampung Province, with water energy sources coming from dam irrigation channels. This study aims to determine the potential of micro-hydro energy, design an Archimedes Screw Turbine, and compare energy potential. The research methods include measuring the cross-sectional area, measuring the flow velocity using the floating object method, measuring the total head using the waterpass method, and calculating the data and designing the Archimedes Screw Turbine using Autodesk Inventor software. The results of the study show that the micro-hydro energy potential in the irrigation channel of the Bukoposo Village dam has a discharge of 0.2709 m³, a total head of 0.79 m, and a hydraulic power of 2099.45 watts. The AST design results obtained a turbine diameter of 0.30 m, a shaft diameter of 0.0894 m, a pitch of 1.6 m, 5 threads, a turbine inclination of 30°, and a thread inclination of 26°. The comparison results show that the energy potential generated by AST, amounting to 1679.55 watts, can meet the lighting needs of BBIAT in Bukoposo Village, which is 545 watts.

Keywords : *New Renewable Energy, Microhydro, Archimedes screw turbine.*