

**PROTOTIPE PEMBANGKIT LISTRIK TENAGA MIKROHIDRO DENGAN TURBIN
ARCHIMEDES SCREW DI SAWAH SLOWOK DESA PACET KABUPATEN
MOJOKERTO**

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ABSTRAK

Indonesia memiliki potensi besar dalam pemanfaatan energi air yang melimpah sebagai sumber energi terbarukan. Termasuk potensi energi air dari saluran irigasi Sawah Slowok Pacet-Mojokerto untuk dijadikan PLTMH yang belum dimanfaatkan secara optimal. Permasalahan yang ada di daerah tersebut adalah kurangnya fasilitas energi listrik terkhusus dalam segi penerangan jalan di area sawah dan beberapa rumah penduduk, terutama saat melakukan aktivitas di pagi buta dan malam hari. Pada penelitian ini membahas perancangan suatu PLTMH menggunakan turbin *Archimedes Screw* dan menggunakan generator magnet permanen 500 Watt sehingga dapat menghasilkan listrik dengan low rpm. Turbin ini memiliki keunggulan seperti kemampuan beroperasi pada head rendah dengan $H < 10$ m, tidak memerlukan pipa pesat dan ramah terhadap ekosistem sungai. Jadi turbin ini cocok digunakan dikawasan pedesaan, seperti Desa Pacet. Dengan pengambilan data awal untuk mengetahui debit air dilakukan dengan metode benda apung, dan didapat hasil kecepatan aliran air 0,569 m/s dan debit air 0.256 m³/s dan luas penampang aliran (A) 0,45 m².

Kata Kunci: Energi air, PLTMH, Turbin *Archimedes Screw*

PROTOTYPE OF MICROHYDRO POWER PLANT USING AN ARCHIMEDES SCREW TURBINE IN SLOWOK RICE FIELD PACET VILLAGE MOJOKERTO REGENCY

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ABSTRACT

Indonesia has significant potential for utilizing abundant water resources as renewable energy, including water flow from irrigation channels that have not been optimally developed, such as those in the Slowok rice fields, Pacet Village, Mojokerto Regency. One of the main problems in this area is the limited availability of electrical energy, especially for street lighting and household lighting during early morning and nighttime activities. This study discusses the design and implementation of a micro-hydro power plant (PLTMH) prototype using an Archimedes Screw turbine combined with a 500 W permanent magnet generator capable of producing electrical power at low rotational speeds. The Archimedes Screw turbine offers several advantages, including the ability to operate at low head conditions ($H < 10$ m), no requirement for a penstock, and an environmentally friendly design that is safe for aquatic ecosystems, making it suitable for rural areas such as Pacet Village. Preliminary data collection to determine water discharge was carried out using the float method, resulting in a flow velocity of 0.569 m/s, a discharge of 0.256 m³/s, and a flow cross-sectional area of 0.45 m². The results indicate that the irrigation channel has sufficient hydraulic potential to support the operation of a micro-hydro power system and demonstrates the feasibility of developing a small-scale, environmentally friendly renewable energy solution based on an Archimedes Screw turbine.

Keywords: Water Energy, PLTMH, Archimedes Screw Turbine.