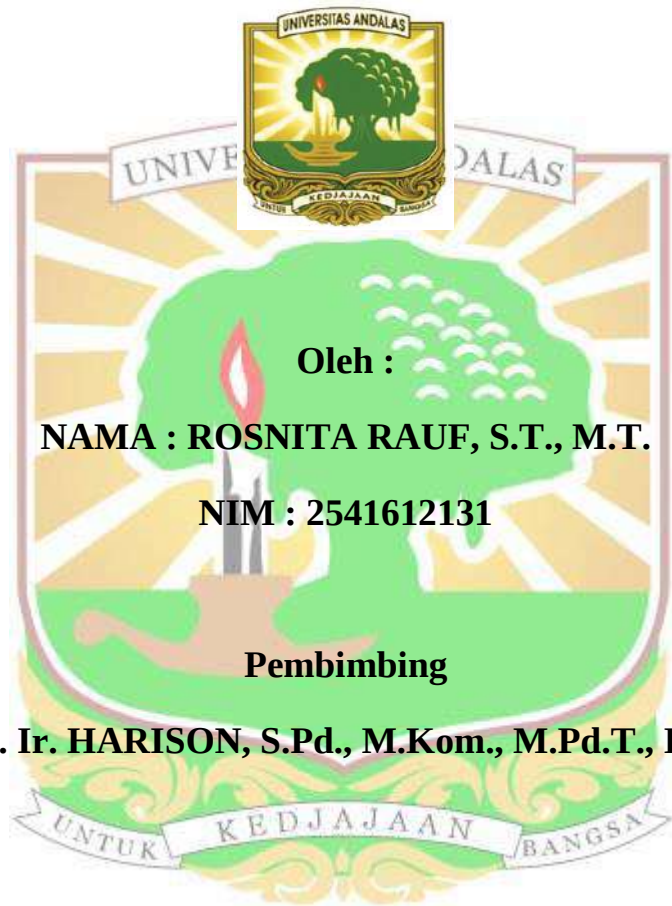


LAPORAN TEKNIK

PERENCANAAN PIKOHIDRO KEMPING GROUND

DESA BANGUN REJO, KAB. SOLOK SELATAN



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ABSTRAK

Kawasan Kemping Ground di Desa Bangun Rejo, Nagari Lubuk Gadang Selatan, Kecamatan Sangir, Kabupaten Solok Selatan, Provinsi Sumatera Barat, yang berada di dalam wilayah Taman Nasional Kerinci Seblat (TNKS), menghadapi risiko keselamatan tinggi akibat interaksi negatif manusia dengan satwa liar, khususnya Harimau Sumatera (*Panthera tigris sumatrae*) yang kerap melintas di depan posko pantau. Ketiadaan infrastruktur listrik komersial (PLN) memicu kondisi gelap gulita di malam hari sehingga menciptakan titik buta (blind spot) yang membahayakan keselamatan petugas kehutanan dan peneliti. Proyek akhir ini bertujuan untuk mendokumentasikan, merancang, dan mengevaluasi implementasi Pembangkit Listrik Tenaga Piko-Hidro (PLTPH) sebagai solusi kemandirian energi berbasis potensi lokal serta instrumen preventif keselamatan operasional posko. Metode pelaksanaan mencakup pengujian parameter hidrolik riil melalui current meter, pengecekan geometri sipil, serta pengujian kinerja elektrik (commissioning test). Berdasarkan hasil analisis, dengan head desain 12 meter dan debit desain 0,140 m³/detik, sistem yang menggunakan turbin Crossflow berdiameter 225 mm² ini mampu menghasilkan daya output mekanis turbin sebesar 10 kW. Melalui transmisi mekanis puli dan V-belt, daya dikonversikan oleh Generator AC Marelli berkapasitas 15 kVA 3 Fasa. Listrik disalurkan melalui kabel udara twisted (TIC) sepanjang 220 meter. Investasi pembangunan proyek ini menelan total biaya sebesar Rp 523.241.000,- yang bersumber dari DAK Kementerian Kehutanan Provinsi Sumatera Barat. Penerapan teknologi ini berhasil mewujudkan kemandirian energi yang andal, menyinari perimeter luar ruang guna memantau pergerakan satwa liar secara aman, sekaligus menumbuhkan logika konservasi hutan yang berkelanjutan bagi ekosistem sekitar.

Kata Kunci: Pikohidro, TNKS, Turbin Crossflow, Generator Marelli

ABSTRACT

The Camping Ground area in Bangun Rejo Village, Lubuk Gadang Selatan Nagari, Sangir District, Solok Selatan Regency, West Sumatra Province, which is located within the Kerinci Seblat National Park (TNKS) area, faces a high safety risk due to negative human-wildlife interactions, particularly with the Sumatran Tiger (*Panthera tigris sumatrae*) that frequently crosses in front of the monitoring post. The lack of commercial electricity infrastructure (PLN) results in pitch-black conditions at night, creating blind spots that endanger the safety of forestry officers and researchers. This final project aims to document, design, and evaluate the implementation of Pico Hydro Power Plants (PLTPH) as a solution for energy independence based on local potential and as a preventive instrument for the operational safety of the outpost.

The implementation method includes testing actual hydraulic parameters using a current meter, checking civil geometry, and conducting electrical performance testing (commissioning). Based on the analysis results, with a design head of 12 meters and a design flow rate of 0.140 m³/second, the system using a Crossflow turbine with a diameter of 225 mm² is capable of producing a turbine mechanical output power of 10 kW. Through mechanical transmission via pulleys and V-belts, the power is converted by a 15 kVA 3-phase Marelli AC Generator.

Electricity is transmitted through a 220-meter twisted aerial cable (TIC). The investment for this project's development amounted to Rp 523,241,000, sourced from the DAK of the Ministry of Forestry of West Sumatra Province. The implementation of this technology has successfully achieved reliable energy independence, illuminated the outdoor perimeter to safely monitor wildlife movements, and fostered a sustainable forest conservation logic for the surrounding ecosystem.

Keywords: Pico-hydro, TNKS, Crossflow Turbine, Marelli Generator

