ABSTRAK

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Judul : Peningkatan Penghematan Energi Listrik Konvensional Pada Kandang Ayam Berbasis Tenaga Surya

Kebutuhan akan energi listrik di sektor peternakan, khususnya peternakan unggas seperti kandang ayam *broiler*, terus mengalami peningkatan. Seiring dengan semakin meningkatnya harga energi konvensional dan adanya kekhawatiran terhadap ketergantungan pada sumber energi fosil, penggunaan energi terbarukan menjadi salah satu solusi alternatif yang menarik. Salah satu bentuk energi terbarukan yang potensial dan mudah diterapkan di Indonesia adalah Pembangkit Listrik Tenaga Surya (PLTS). Penelitian ini bertujuan untuk menganalisis potensi penghematan energi listrik konvensional melalui penerapan sistem Pembangkit Listrik Tenaga Surya (PLTS) berbasis *hybrid* pada kandang ayam *broiler*.
Metode yang digunakan meliputi studi konsumsi energi aktual pada sistem konvensional, perencanaan desain PLTS (perhitungan dan simulasi), analisis ekonomis (meliputi perhitungan *payback period*, NPV, IRR, dan BCR). Data diperoleh dari observasi langsung dan pengukuran langsung di lokasi penelitian.
Hasil penelitian menunjukkan bahwa penerapan PLTS mampu menghasilkan energi listrik dengan tingkat penghematan energi hingga 13% dengan nilai Rp 5.563.581,41 per tahun (8 kali siklus operasional). Selain itu, analisis kelayakan ekonomi menunjukkan bahwa investasi PLTS layak dilakukan dengan *Payback Period* dalam 4,78 tahun, nilai NPV positif, IRR di 18,78% dan BCR > 1. Dengan demikian, penerapan sistem PLTS pada kandang ayam terbukti tidak hanya dapat mengurangi beban biaya listrik, tetapi juga mendukung pengembangan peternakan yang ramah lingkungan dan berkelanjutan.

Kata kunci: PLTS, kandang ayam *broiler*, penghematan energi, analisis ekonomi, beban listrik

ABSTRACT

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Title : Enhancement of Conventional Electricity Savings in Poultry Houses Based on Solar Power

The demand for electricity in the livestock sector, particularly in poultry farming such as broiler chicken houses, continues to increase. Along with the rising cost of conventional energy and concerns about dependence on fossil energy sources, the use of renewable energy has become an attractive alternative solution. One of the most potential and easily applicable renewable energy sources in Indonesia is Solar Power Plants (SPP). This study aims to analyze the potential savings of conventional electricity consumption through the implementation of an hybrid Solar Power Plant (SPP) system in broiler chicken houses.
The methods used include the study of actual energy consumption in conventional systems, SPP design planning (calculation and simulation), and economic analysis (including calculations of payback period, NPV, IRR, and BCR). Data were obtained through direct observation and on-site measurements at the research location.
The results showed that the implementation of SPP is capable of generating electricity with an energy saving rate of up to 12%, equivalent to IDR 5.563.581,41 *per year (based on 8 operational cycles). In addition, the economic feasibility analysis indicated that SPP investment is feasible, with a payback period of 4,78 years, a positive NPV, an IRR of 18.78%, and a BCR greater than 1. Thus, the application of SPP in poultry houses has been proven not only to reduce electricity costs but also to support environmentally friendly and sustainable livestock development.*

Keywords*: SPP, broiler chicken house, energy savings, economic analysis, electric load*