

ABSTRAK

Adi Janus Sasongko, Studi Efisiensi Energi Listrik Berdasarkan Beban Listrik Yang Digunakan Pada Gedung Laboratorium Terpadu Universitas PGRI Madiun. Skripsi, Program Studi Teknik Elektro, Fakultas Teknik, Universitas PGRI Madiun. Pembimbing (1) Ridam Dwi Laksono, S.Si., M.Pd. (2) Ina Sunaryantiningsih, S.T.,S.Pd.,M.T.

Peningkatan kebutuhan energi listrik pada bangunan pendidikan menuntut pengelolaan energi yang efisien, khususnya pada gedung laboratorium dengan beban listrik cukup besar. Gedung Laboratorium Terpadu Universitas PGRI Madiun (UNIPMA) menggunakan energi listrik untuk mendukung kegiatan pembelajaran, praktikum, penelitian, dan administrasi. Penelitian ini bertujuan menganalisis efisiensi penggunaan energi listrik berdasarkan nilai Intensitas Konsumsi Energi (IKE). Metode yang digunakan adalah deskriptif kuantitatif dengan perhitungan IKE bulanan menggunakan rumus $IKE = \frac{PK}{A(m^2)}$ (kWh/m²). Data meliputi luas ruangan, jenis dan jumlah beban listrik, daya peralatan, waktu operasi, serta konsumsi energi tiap ruangan. Hasil penelitian menunjukkan bahwa Gedung Laboratorium Terpadu UNIPMA secara umum berada pada kategori efisien. Ruangan paling efisien adalah ruang T.403 lantai 4 dan ruang Program Studi Farmasi lantai 5, masing-masing memiliki nilai IKE 6,60 kWh/m², dengan beban 2 lampu TL dan 1 unit AC. Meskipun demikian, beberapa ruangan masih tergolong agak boros akibat penggunaan AC, peralatan laboratorium, dan komputer dengan durasi operasi yang panjang, sehingga masih terdapat potensi penghematan energi.

Kata kunci: IKE, efisiensi energi listrik, gedung laboratorium

ABSTRACT

Adi Janus Sasongko, Study on Electrical Energy Efficiency Based on Electrical Loads Used in the Integrated Laboratory Building of Universitas PGRI Madiun. Undergraduate Thesis, Department of Electrical Engineering, Faculty of Engineering, Universitas PGRI Madiun. Supervisors: (1) Ridam Dwi Laksono, S.Si., M.Pd. and (2) Ina Sunaryantiningsih, S.T., S.Pd., M.T.

The increasing demand for electrical energy in educational buildings requires efficient energy management, especially in laboratory buildings with relatively high electrical loads. The Integrated Laboratory Building of Universitas PGRI Madiun (UNIPMA) utilizes electrical energy to support learning activities, practicum, research, and administration. This study aims to analyze the efficiency of electrical energy usage based on the Energy Consumption Intensity (ECI) value. The research employs a quantitative descriptive method using monthly ECI calculations with the formula $ECI = \frac{PK}{A(m^2)}$ (kWh/m²). The data include room area, type and number of electrical loads, equipment power, operating hours, and room-level energy consumption. The results indicate that the Integrated Laboratory Building of UNIPMA is generally categorized as energy-efficient. The most efficient rooms are Room T.403 on the 4th floor and the Pharmacy Study Program room on the 5th floor, each with an ECI value of 6.60 kWh/m², using two TL lamps and one air conditioner. However, several rooms are classified as moderately inefficient due to prolonged operation of air conditioners, laboratory equipment, and computers, indicating potential opportunities for energy savings.

Keywords: Energy Consumption Intensity (ECI), electrical energy efficiency, laboratory building