

ABSTRAK

Dicky Kurniawan: *Audit Energi dan Analisis Penghematan pada Gedung Sekolah SMP IT Bina Insan Batang Kuis*. Skripsi. Fakultas Teknik, Universitas Negeri Medan. 2025.

Penelitian ini mengkaji efisiensi energi listrik pada bangunan sekolah, berfokus pada sistem pencahayaan dan pendingin udara di SMP IT Bina Insan Batang Kuis, dilatarbelakangi oleh meningkatnya biaya operasional dan isu konservasi energi. Meskipun Intensitas Konsumsi Energi (IKE) awal gedung tergolong 'Efisien' (10.77 kWh/m²/bulan), audit energi rinci mengidentifikasi adanya potensi pemborosan. Tujuan penelitian adalah menganalisis IKE, mengidentifikasi peluang hemat energi (PHE), dan menentukan prioritas rekomendasi menggunakan metode Analytical Hierarchy Process (AHP). Metode ini melibatkan audit energi (observasi, pengukuran) dan kuesioner AHP kepada pemangku kepentingan untuk menilai kriteria biaya, kemudahan, potensi hemat, dan kenyamanan. Hasil menunjukkan penggantian lampu CFL ke LED dapat menghemat 37,2% energi pencahayaan, sementara penggantian AC konvensional ke inverter menghemat 17,78% energi pendinginan. Analisis AHP secara konsisten menempatkan penggantian lampu LED sebagai prioritas utama. Disimpulkan, penggantian sistem pencahayaan adalah rekomendasi paling optimal karena unggul dari segi biaya, kemudahan, dan penerimaan pemangku kepentingan.

Kata Kunci: Audit Energi, Intensitas Konsumsi Energi (IKE), Penghematan Energi, Analytical Hierarchy Process (AHP), Sistem Pencahayaan, Sistem Pendingin Udara.

ABSTRACT

Dicky Kurniawan: *Energy Audit and Savings Analysis in the SMP IT Bina Insan Batang Kuis School Building*. Thesis. Faculty of Engineering, State University of Medan. 2025.

This research investigates the electrical energy efficiency in a school building, focusing on the lighting and air conditioning systems at SMP IT Bina Insan Batang Kuis, motivated by rising operational costs and energy conservation issues. Although the building's initial Energy Consumption Intensity (IKE) was classified as 'Efficient' (10.77 kWh/m²/month), a detailed energy audit revealed potential wastage. The study aims to analyze the IKE, identify energy-saving opportunities (PHE), and prioritize recommendations using the Analytical Hierarchy Process (AHP) method. This method involved an energy audit (observation, measurement) and AHP questionnaires distributed to stakeholders to evaluate criteria of cost, ease of implementation, savings potential, and comfort. Results show that replacing CFL lamps with LEDs can save 37.2% in lighting energy, while switching conventional AC units to inverter types can save 17.78% in cooling energy. The AHP analysis consistently ranked LED lamp replacement as the top priority. It is concluded that upgrading the lighting system is the most optimal and recommended efficiency measure, excelling in terms of cost, ease of implementation, and stakeholder acceptance.

Keywords: Energy Audit, Energy Consumption Intensity (IKE), Energy Saving, Analytical Hierarchy Process (AHP), Lighting System, Air Conditioning System.