ABSTRAK

Zudan Nugraha Aulia Azmi, **"ANALISA BEBAN PENDINGIN PADA LANTAI 1 GEDUNG 628 SHARED SERVICE CENTER BANDAR UDARA INTERNASIONAL SOEKARNO-HATTA SEBAGAI EVALUASI PELUANG PENGHEMATAN ENERGI".** Tugas Akhir, Universitas Sangga Buana YPKP, 2026.

Sistem pengkondisian udara (AC) dan pencahayaan merupakan komponen yang mendominasi konsumsi energi pada operasional gedung perkantoran, sehingga pelaksanaan audit energi menjadi langkah krusial untuk mengidentifikasi potensi efisiensi. Penelitian ini bertujuan untuk melakukan audit energi awal serta menganalisis beban pendinginan dan pencahayaan di Lantai 1 Gedung No. 628 Shared Service Center (SSC) PT. Angkasa Pura Indonesia, Bandara Internasional Soekarno-Hatta (CGK), Tangerang. Perhitungan beban pendinginan dilakukan menggunakan metode *Cooling Load Temperature Difference* (CLTD) berbasis standar ASHRAE, sedangkan evaluasi sistem penerangan mengacu pada SNI 03-6197-2000.

Hasil analisis terhadap kondisi aktual menunjukkan bahwa seluruh ruangan—termasuk ruang Head of SSC, Div. Head SSC, Procurement, Lobby, serta Ruang Rapat Finance dan Procurement—telah memenuhi standar kenyamanan tata udara dan pencahayaan yang dipersyaratkan. Kapasitas total AC terpasang sebesar 186.000 Btu/jam dinilai sangat mumpuni dalam mengatasi beban pendinginan maksimum sebesar 86.825 Btu/jam yang terjadi pada titik puncak pukul 15.00 WIB. Hal ini mengindikasikan bahwa sistem tata udara eksisting memiliki keandalan yang tinggi dalam menjaga temperatur ruangan.

Meskipun tingkat pencahayaan eksisting sudah memenuhi aspek kenyamanan visual, penelitian ini merumuskan peluang penghematan energi melalui substitusi teknologi, yaitu mengganti 80 unit lampu *Fluorescent* TL 2x36W dengan lampu LED panel 40W. Rekomendasi ini mampu mereduksi konsumsi daya armatur sebesar 44,4%, yang berpotensi menghemat energi hingga 6.081 kWh/tahun atau setara dengan reduksi biaya sebesar Rp 8.783.767,- per tahun. Berdasarkan analisis finansial, investasi ini dinyatakan sangat layak untuk diimplementasikan dengan nilai *Net Present Value* (NPV) positif sebesar Rp 60.843.765,- dan periode pengembalian modal (payback period) yang relatif singkat selama 1,37 tahun atau 16,4 bulan.

Kata kunci : Audit Energi, Beban Pendinginan, CLTD, Sistem Penerangan, *Net Present Value.*

ABSTRACT

Zudan Nugrha Aulia Azmi, ***"COOLING LOAD ANALYSIS ON THE 1ST FLOOR OF THE 628 SHARED SERVICE CENTER BUILDING AT SOEKARNO-HATTA INTERNATIONAL AIRPORT AS AN EVALUATION OF ENERGY SAVING OPPORTUNITIES".*** *Final Project, Sangga Buana University YPKP, 2026.*

Air conditioning and lighting systems represent the most energy-intensive components in office building operations, making energy audits a pivotal step in identifying efficiency potential. This study aims to conduct a preliminary energy audit and analyze the cooling and lighting loads on the 1st Floor of Building No. 628 Shared Service Center (SSC) PT. Angkasa Pura Indonesia, Soekarno-Hatta International Airport (CGK), Tangerang. The cooling load was evaluated using the Cooling Load Temperature Difference (CLTD) method based on ASHRAE standards, while the lighting system performance was assessed against SNI 03-6197-2000.

The actual measurement results indicate that all assessed rooms—comprising the Head of SSC, Div. Head SSC, Procurement, Lobby, as well as the Finance and Procurement Meeting Rooms—successfully meet the established standards for thermal and visual comfort. Furthermore, the total installed AC capacity of 186,000 Btu/hr is highly adequate to handle the peak cooling load of 86,825 Btu/hr occurring at 15:00 WIB. This indicates that the existing air conditioning system possesses high reliability in maintaining indoor thermal stability.

Although the existing lighting system provides sufficient visual comfort, this study proposes an energy conservation opportunity by retrofitting 80 units of 2x36W TL Fluorescent lamps with 40W LED panel lamps. This technical intervention is capable of reducing luminaire power consumption by 44.4%, yielding an annual energy saving of 6,081 kWh, which translates to a cost reduction of IDR 8,783,767 per year. Financial feasibility analysis confirms that this investment is highly viable, generating a positive Net Present Value (NPV) of IDR 60,843,765 with a relatively short payback period of 1.37 years (16.4 months).

*Keywords: E*nergy Audit, Cooling Load, CLTD, Lighting System, Net Present Value.