ABSTRAK

Ahmad Abdul Azis

Analisis Pengaruh Penggantian kWh Meter Tua Terhadap Pengukuran Energi Listrik Pada PLN ULP Bima Kota

Dibimbing oleh Ir. Ibnu Hajar, S.T., M.Sc., IPU

Penelitian ini bertujuan untuk menganalisis efektivitas penggantian kWh meter tua dan pengaruhnya terhadap optimalisasi sistem pengukuran energi listrik di PLN ULP Bima Kota Tahun 2025. Penggunaan kWh meter analog yang telah berumur lama berpotensi menimbulkan error pembacaan, selisih energi, serta ketidaktepatan dalam penagihan listrik, sehingga PLN melaksanakan program penggantian dengan kWh meter digital yang memiliki akurasi lebih tinggi. Penelitian ini menggunakan data hasil pengujian akurasi kWh meter analog dan digital, realisasi penggantian, serta parameter teknis pendukung lainnya, dengan metode analisis berupa perhitungan persentase error, efektivitas pengukuran, rata-rata realisasi bulanan, dan pencapaian target penggantian. Hasil penelitian menunjukkan bahwa kWh meter analog memiliki rata-rata error sebesar 4,00%, sedangkan kWh meter digital sebesar 0,24%, sehingga penggantian meter mampu menurunkan error pembacaan sebesar 3,76% dan meningkatkan akurasi sistem pengukuran energi listrik secara signifikan. Studi kasus pelanggan dengan IDPEL 443000184884 juga menunjukkan bahwa sebelum penggantian terjadi pencatatan konsumsi yang tidak wajar dan konstan akibat error meter analog, sedangkan setelah penggantian dengan kWh meter digital pola konsumsi kembali normal dan fluktuatif. Selain itu, pelaksanaan program penggantian berjalan secara konsisten dengan total realisasi 5.657 unit selama Januari–November 2025. Dengan demikian, program penggantian kWh meter terbukti efektif dalam meningkatkan akurasi, keandalan, serta optimalisasi sistem pengukuran energi listrik dan berkontribusi dalam menurunkan potensi rugi-rugi energi non-teknis serta meningkatkan kualitas pelayanan kepada pelanggan.

Kata Kunci : kWh meter analog, kWh meter digital, akurasi pengukuran, error pembacaan, penggantian kWh meter, efektivitas, optimalisasi sistem pengukuran energi listrik, PLN ULP Bima Kota.

ABSTRACT

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Analysis of the Effect of Replacing Old kWh Meters on Electrical Energy Measurement at PLN ULP Bima Kota
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This study aims to analyze the effectiveness of replacing old kWh meters and its impact on optimizing the electrical energy measurement system at PLN ULP Bima Kota in 2025. The use of aging analog kWh meters has the potential to cause reading errors, energy discrepancies, and inaccuracies in electricity billing; therefore, PLN has implemented a replacement program using digital kWh meters with higher accuracy. This research utilizes data from accuracy testing of analog and digital kWh meters, meter replacement realization, and other supporting technical parameters. The analysis methods include percentage error calculation, measurement effectiveness, average monthly realization, and target achievement of meter replacement. The results show that analog kWh meters have an average error of 4.00%, while digital kWh meters have an average error of 0.24%, indicating that meter replacement reduces reading errors by 3.76% and significantly improves the accuracy of the electrical energy measurement system. A case study of a customer with IDPEL 443000184884 also indicates that before replacement, the recorded energy consumption was abnormal and constant due to analog meter errors, whereas after replacement with a digital kWh meter, the consumption pattern returned to normal and fluctuative. In addition, the replacement program was implemented consistently, with a total realization of 5,657 units from January to November 2025. Therefore, the replacement of old kWh meters has proven to be effective in improving accuracy, reliability, and optimization of the electrical energy measurement system, as well as reducing the potential for non-technical losses and enhancing the quality of electricity services.

Keywords: analog kWh meter, digital kWh meter, measurement accuracy, reading error, kWh meter replacement, effectiveness, optimization of electrical energy measurement system, PLN ULP Bima Kota.