ABSTRAK

ANALISIS EFISIENSI OPERASIONAL PLTD KASONAWEJA BERDASARKAN KONSUMSI BAHAN BAKAR DAN VARIASI BEBAN HARIAN MENGGUNAKAN METODE *SPECIFIC FUEL CONSUMPTION* DI MAMBERAMO

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Ketersediaan listrik yang andal menjadi kebutuhan mendasar di wilayah terpencil seperti Kabupaten Mamberamo Raya, tempat Pembangkit Listrik Tenaga Diesel (PLTD) Kasonaweja berperan sebagai satu-satunya sumber energi. Ketidakstabilan beban harian dan mahalnya biaya bahan bakar menjadi kendala utama dalam menjaga performa pembangkit. Penelitian ini mengukur efisiensi operasional PLTD Kasonaweja melalui pendekatan *Specific Fuel Consumption* (SFC), dengan meninjau keterkaitan antara pola pembebanan dan konsumsi bahan bakar harian. Pendekatan deskriptif kuantitatif diterapkan menggunakan data *logsheet* operasional selama 28 hari, yang diolah melalui perbandingan volume bahan bakar terhadap daya listrik yang dihasilkan. Selama periode tersebut, beban rata-rata tercatat 230,47 kW dengan rentang 211,81–244,13 kW dan faktor beban mingguan 94,96%–96,78%, menunjukkan pola pembebanan yang relatif stabil. Nilai SFC aktual berkisar 0,27–0,33 liter/kWh dengan rata-rata 0,30 liter/kWh; SFC cenderung lebih rendah pada beban tinggi dan lebih tinggi pada beban rendah. Menariknya, kenaikan beban tidak selalu diikuti pemakaian bahan bakar yang lebih besar; pada beban tertinggi (244,13 kW), pemakaian justru lebih hemat (65,63 liter/jam) dibandingkan saat beban 227,88 kW (70,83 liter/jam). Dibandingkan standar SPLN 79:1987, nilai SFC rata-rata PLTD Kasonaweja berada di batas atas rentang efisien, sehingga pembangkit ini dapat dikategorikan cukup efisien, dengan efisiensi terbaik pada kondisi beban tinggi. Temuan ini menegaskan SFC sebagai parameter yang lebih tepat untuk menilai kinerja pembangkit dibandingkan satu variabel saja, sekaligus menjadi rujukan bagi pengelola PLTD dalam menyusun strategi pembebanan yang hemat biaya tanpa mengurangi keandalan pasokan listrik di Mamberamo Raya.

Kata kunci : Efisiensi, PLTD, *Specific Fuel Consumption*, Variasi Beban, Mamberamo

ABSTRACT

OPERATIONAL EFFICIENCY ANALYSIS OF THE KASONAWEJA DIESEL POWER PLANT BASED ON FUEL CONSUMPTION AND DAILY LOAD VARIATION USING THE SPECIFIC FUEL CONSUMPTION METHOD IN MAMBERAMO

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Reliable electricity availability is a fundamental need in remote areas such as Mamberamo Raya Regency, where the Kasonaweja Diesel Power Plant (PLTD) serves as the sole energy source. Daily load instability and high fuel costs are major obstacles in maintaining the plant's performance. This study measures the operational efficiency of the Kasonaweja Diesel Power Plant (PLTD) through the Specific Fuel Consumption (SFC) approach, by examining the relationship between loading patterns and daily fuel consumption. A quantitative descriptive approach is applied using operational logsheet data for 28 days, which is processed by comparing fuel volume to electrical power generated. During this period, the average load was recorded at 230.47 kW with a range of 211.81–244.13 kW and a weekly load factor of 94.96%–96.78%, indicating a relatively stable loading pattern. The actual SFC value ranged from 0.27–0.33 liters/kWh with an average of 0.30 liters/kWh; SFC tends to be lower at high loads and higher at low loads. Interestingly, increasing load is not always accompanied by greater fuel consumption; at the highest load (244.13 kW), consumption is actually more efficient (65.63 liters/hour) compared to the load of 227.88 kW (70.83 liters/hour). Compared to the SPLN 79:1987 standard, the average SFC value of the Kasonaweja Diesel Power Plant is at the upper limit of the efficient range, so this plant can be categorized as quite efficient, with the best efficiency under high load conditions. This finding confirms SFC as a more appropriate parameter for assessing plant performance than a single variable alone, while also serving as a reference for Diesel Power Plant managers in developing cost-effective loading strategies without compromising the reliability of electricity supply in

Mamberamo Raya.

Keywords: Efficiency, Diesel Power Plant, Specific Fuel Consumption, Load Variation, Mamberamo