ABSTRAK

ANALISIS KOMPARATIF KINERJA DAN EFISIENSI MESIN GENSET BERBAHAN BAKAR GAS DAN DIESEL PADA OPERASI KONTINU DI BASS OIL SUKANANTI LIMITED

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(2026: xv + 62 Halaman, 11 Gambar, 9 Tabel, 4 Lampiran)

Ketersediaan energi listrik yang stabil menjadi faktor penting dalam mendukung operasi produksi minyak dan gas bumi yang berjalan secara kontinu. Pada lapangan migas yang tidak terhubung langsung dengan jaringan listrik utama, generator set berbahan bakar gas dan diesel digunakan sebagai sumber daya listrik utama maupun cadangan. Penelitian ini bertujuan membandingkan kinerja teknis dan efisiensi ekonomis genset gas alam dan genset diesel B40 pada operasi kontinu di BASS Oil Sukananti Limited. Metode penelitian menggunakan pendekatan kuantitatif komparatif berbasis data operasi aktual. Parameter yang dianalisis meliputi energi listrik, *specific fuel consumption*, *heat rate*, efisiensi termal, dan biaya bahan bakar per kWh. Data genset gas dianalisis pada hari ke-11 sampai ke-20, sedangkan data genset diesel dianalisis pada hari ke-21 sampai ke-30. Hasil rekapitulasi total 10 hari menunjukkan bahwa genset diesel lebih unggul secara teknis dengan SFC 0,4517 kg/kWh, heat rate 19.642,03 kJ/kWh, dan efisiensi termal 18,33%. Genset gas memiliki SFC 0,6623 kg/kWh, heat rate 29.947,75 kJ/kWh, dan efisiensi termal 12,02%. Namun, genset gas lebih unggul secara ekonomis karena biaya bahan bakarnya sebesar Rp6.324/kWh, lebih rendah dibandingkan genset diesel sebesar Rp14.532/kWh. Hasil penelitian menunjukkan bahwa efisiensi teknis tidak selalu sejalan dengan efisiensi ekonomis.

Kata Kunci: genset gas, genset diesel, SFC, heat rate, biaya per kWh

ABSTRACT

COMPARATIVE ANALYSIS OF PERFORMANCE AND EFFICIENCY OF GAS AND DIESEL GENERATOR ENGINES IN CONTINUOUS OPERATION AT BASS OIL SUKANANTI LIMITED

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Stable electricity supply is essential to support continuous oil and gas production operations. In oilfield areas that are not directly connected to the main electricity grid, gas and diesel generator sets are commonly used as either primary or backup power sources. This study aims to compare the technical performance and economic efficiency of a natural gas generator and a B40 diesel generator under continuous operation at BASS Oil Sukananti Limited. The research used a quantitative comparative approach based on actual operating data. The analyzed parameters include electrical energy, specific fuel consumption, heat rate, thermal efficiency, and fuel cost per kWh. Gas generator data were analyzed from day 11 to day 20, while diesel generator data were analyzed from day 21 to day 30. The 10-day total recap showed that the diesel generator had better technical performance, with an SFC of 0.4517 kg/kWh, heat rate of 19,642.03 kJ/kWh, and thermal efficiency of 18.33%. The gas generator had an SFC of 0.6623 kg/kWh, heat rate of 29,947.75 kJ/kWh, and thermal efficiency of 12.02%. However, the gas generator was more economical, with a fuel cost of Rp6,324/kWh, lower than the diesel generator at Rp14,532/kWh. The results indicate that technical efficiency does not always align with economic efficiency.

Keywords : *gas generator, diesel generator, SFC, heat rate, cost per kWh*