Analisis kinerja daya listrik diesel generator kapasitas 2,5 KW berbahan bakar CPO khusus = Performance of power quality analysis of diesel generator capacity 2,5 KW fueled by special CPO / Very Budiman

Very Budiman, author

Abstrak

[CPO (Crude Palm Oil) Khusus adalah CPO yang telah mendapatkan tambahan zat asam untuk keperluan industri makanan dan telah ditingkatkan nilai density, viskositas, flash point, temperature destilasi dan nilai kalorinya dapat dipergunakan sebagai bahan bakar pada diesel generator penghasil listrik di daerah terpencil (isolated) penghasil kelapa sawit. Penelitian ini bertujuan untuk melakukan studi kinerja dan kualitas daya listrik diesel generator 2.5 kW berbahan bakar CPO Khusus dengan mengacu standar yang berlaku pada berbagai jenis pembebanan. Acuan standar tegangan menggunakan SPLN No.1 tahun 1995, Permen No.3 tahun 2007 dan Permen ESDM No.4 tahun 2009 yaitu +5% dan -10% dari tegangan nominal 220V dan acuan standar frekuensi SNI 04-1922-2002 yaitu dalam rentang toleransi 50±1% Hz. Pada uji pembebanan 36%, 56% dan 92% dari total daya mampu diesel generator, semua jenis bahan bakar yang diujikan menghasilkan tegangan dan frekuensi listrik masih dalam batas standar namun pada uji pembebanan 100%, hanya CPOK50 yang memenuhi standar. Dari analisis statistik, uji beda rata-rata tidak ada perbedaan yang signifikan antara berbagai jenis bahan bakar yang diujikan. Dari hasil uji pembebanan mendadak (sudden load) pada beban 36% dan dilanjutkan pada beban 92% semua jenis bahan bakar masih dalam batas standar. Dari analisis harmonisa tegangan (THDv) dan arus (THDi) semua jenis bahan bakar mempunyai nilai diatas 5% dan tidak ada yang memenuhi standar IEEE 519-1992. Dari analisis keekonomian dengan metode COE (Cost of Electricity) CPOK50 mempunyai nilai COE paling rendah. Berdasarkan parameter-parameter diatas, ketersediaan dan karakteristik yang terbarukan (renewabale) diharapkan CPO bisa menjadi bahan bakar alternatif diesel pembangkit listrik dan bisa sebagai leverage bagi roda perekonomian dan ketahanan energi listrik masyarakat daerah terpencil;CPO (Crude Palm Oil) Special is that CPO has gained additional acidic substances for food and industrial purposes has increased the value of density, viscosity, flash point, distillation temperature and calorific value can be used as a fuel in a diesel generator in remote areas (isolated). This research aims to study the performance and electrical power quality of 2.5 kW diesel generator fueled by Special CPO to various types of loading test. The standard references of voltage using SPLN 1 1995, PERMEN ESDM No. 3 in 2007 and PERMEN ESDM No.4 in 2009 ie + 5% and -10% of the nominal voltage of 220V and frequency standard reference using SNI 04-1922-2002 that is within the range ± 1% tolerance of 50 Hz. In the loading test 36%, 56% and 92% of the total power capacity diesel generators, all kinds of fuels that are tested to produce electrical voltage and frequency are still within the standard limits but at 100% loading test, only CPOK50 that meet the standards. From the statistical analysis, there was no significant difference between the various types of fuel being tested. From the sudden load test at 36% load and 92% load continued on all types of fuel are still within standard limits. From the analysis of harmonic voltage (THDv) and harmonic current (THDi) of all types of fuels that no meet the standards (THD < 5%, IEEE 519-1992). From the economic analysis with COE (Cost of Electricity) methods, the Special CPOK50 at 100% load is the most economical. Base on the result of analysis and calculation of the above parameters, the availability and the characteristic is the renewable energy, CPO is expected to become

an alternative fuel diesel power plants and can be as leverage for the economy and society of electrical energy security at the remote/isolated areas., CPO (Crude Palm Oil) Special is that CPO has gained additional acidic substances for food and industrial purposes has increased the value of density, viscosity, flash point, distillation temperature and calorific value can be used as a fuel in a diesel generator in remote areas (isolated). This research aims to study the performance and electrical power quality of 2.5 kW diesel generator fueled by Special CPO to various types of loading test. The standard references of voltage using SPLN 1 1995, PERMEN ESDM No. 3 in 2007 and PERMEN ESDM No.4 in 2009 ie + 5% and -10% of the nominal voltage of 220V and frequency standard reference using SNI 04-1922-2002 that is within the range ± 1% tolerance of 50 Hz. In the loading test 36%, 56% and 92% of the total power capacity diesel generators, all kinds of fuels that are tested to produce electrical voltage and frequency are still within the standard limits but at 100% loading test, only CPOK50 that meet the standards. From the statistical analysis, there was no significant difference between the various types of fuel being tested. From the sudden load test at 36% load and 92% load continued on all types of fuel are still within standard limits. From the analysis of harmonic voltage (THDv) and harmonic current (THDi) of all types of fuels that no meet the standards (THD < 5%, IEEE 519-1992). From the economic analysis with COE (Cost of Electricity) methods, the Special CPOK50 at 100% load is the most economical. Base on the result of analysis and calculation of the above parameters, the availability and the characteristic is the renewable energy, CPO is expected to become an alternative fuel diesel power plants and can be as leverage for the economy and society of electrical energy security at the remote/isolated areas.]