SMALL RENEWABLE ENERGY BIOGAS LIMBAH CAIR (POME) PABRIK KELAPA SAWIT MENGGUNAKAN TIPE *COVERED LAGOON* SOLUSI ALTERNATIF DEFISIT LISTRIK PROVINSI RIAU

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ABSTRACT

Electrical Company Regional Riau and Riau Islands (WRKR) experience, the power deficit of about 134.4 MW of electricity needs in Riau at the time amounted to 450.7 MW peak load capability while only 316.3 MW power plant, so that had to be done rolling blackouts, in the city of Riau and surrounding. Completion of the power crisis can be done with the use of alternative energy (renewable energy) of renewable energy that can be used to generate electrical energy include biogas. The processing of fresh fruit bunches (FFB = fresh fruit Bunches) into crude palm oil (CPO) and the entire palm oil mill production activities (MCC) produce biomass, both solid and liquid waste, (Palm Oil Mill Effluent / POME). Agroindustri palm plantations are spread almost all districts / cities in Riau, Riau region has 147 units of Palm Oil Mill (MCC) with a total production capacity of 6584 tons / hour, the potential for liquid waste 710,103,744 m3 / year, which is capable of electrical energy in the raised 434.54 MW , with the production of electrical energy 2,476,849,990 kWh / year, electricity sales potential Rp 2,414,928,740,015.87 / yr. Deficit of 134.4 MW of electricity, while the electric energy potential of POME 434.54 MW, still a surplus of 300.14 MW, and when in totalizing the capacity of 316.3 MW power capacity + 434.54 MW = 750.84 MW, more than enough electricity for the needs of Riau province until 2016 only 701 MW. Development of Biomass Power Plant effluent (POME) in addition to meeting the needs of the local and surrounding electrical energy while addressing environmental pollution due to the waste liquid and solid waste in the area around the plant oil palm. Wastewater treatment capable of preventing the emission of CH4 gas directly into the atmosphere. The use of synchronous generators with prime mover PLTBS as Voltage Regulator Bus in Distributed Generation System in Smart Grid is able to improve the voltage drop, power factor controller, reducing losess power, increasing the ratio of electrical and power quality improvement with exsiting distribution network utilization.

Keywords-component; *POME, Renewable energy alternatif, Small Renewable energy.*

ABSTRAK

PT PLN Wilayah Riau dan Kepulauan Riau (WRKR) mengalami defisit listrik sekitar 134,4 MW. Kebutuhan listrik di Riau pada waktu beban puncak sebesar 450,7 MW. Kemampuan pembangkit listrik hanya 316,3 MW, sehingga terpaksa dilakukan pemadaman bergilir di Kota Riau dan sekitarnya. Penyelesaian krisis listrik dapat dilakukan dengan pemanfaatan energi alternatif (renewable energy). Eenergi baru terbarukan yang dapat digunakan untuk menghasilkan energi listrik diantaranya adalah Biogas. Proses pengolahan tandan buah segar (TBS = fresh fruit bunches) menjadi crude palm oil (CPO) dan seluruh aktivitas produksi pabrik kelapa sawit (PKS) menghasilkan biomassa, baik limbah padat maupun cair, (Palm Oil Mill Effluent / POME). Agroindustri perkebunan sawit yang tersebar di wilayah Riau memiliki 147 unit Pabrik Kelapa Sawit (PKS) dengan total kapasitas produksi 6.584 Ton/jam, potensi limbah cair 710,103,744 m^3/tahun. Energi listrik yang mampu di bangkitkan 434.54 MW, dengan produksi energi listrik 2,476,849,990 kWh/tahun, potensi penjualan listrik Rp 2,414,928,740,015.87/thn. Defisit listrik 134,4 MW, sedangkan potensi energi listrik dari POME 434,54 MW, masih surplus 300,14 MW, dan bila dijumlahkan antara kapasitas daya 316,3 MW + 434,54 MW = 750,84 MW, lebih dari cukup untuk kebutuhan listrik Provinsi Riau hingga tahun 2016 hanya 701 MW. Pembangunan Pembangkit Listrik Biomassa limbah cair (POME) selain pemenuhan kebutuhan energi listrik lokal dan sekitarnya sekaligus mengatasi pencemaran lingkungan hidup akibat timbunan sampah limbah padat dan cair di area sekitar pabrik kelapa sawit. Pengolahan limbah cair mampu mencegah emisi gas CH_4 secara langsung ke atmosfir. Penggunaan generator sinkron dengan prime mover PLTBS sebagai Voltage Regulator Bus pada system Distributed Generation pada Smart Grid mampu memperbaiki drop tegangan, power factor controller, mengurangi losess daya listrik, peningkatan rasio kelistrikan serta perbaikan power quality dengan pemanfaatan jaringan distribusi exsiting.