

# Kajian keekonomian pembangkit listrik dari biogas berbasis pome dengan bantuan perangkat lunak superpro designer 9.0 = Economic study for biogas powerplan base on pome with superpro designer 9.0 software / Nadjib Aulawy

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## Abstrak

[Tesis ini meneliti POME (Palm Oil Mill Effluent) sebagai basis biogas untuk sumber energi listrik. Untuk mendapatkan biogas, POME diproses secara anaerobic digestion menggunakan digester. Berdasar kelebihan dan kelemahan yang ada dipilih digester tipe kolam anaerobic sebagai acuan pengembangan. Pengembangan dilakukan dengan merinci setiap tahapan proses. Model pembangkit listrik biogas dengan proses anaerobic digestion yang rinci dibangun menggunakan perangkat lunak SuperPro Designer 9.0. Hasil simulasi untuk pabrik kelapa sawit

dengan kapasitas 30 ton tandan buah segar (TBS)/jam diperoleh biogas dengan perbandingan CH<sub>4</sub> : CO<sub>2</sub> sebesar 59,8 : 41,2. Sedangkan dari perhitungan analisis keekonomian menunjukkan bahwa pembangunan pembangkit listrik biogas berbasis POME layak namun belum terlalu menarik untuk investasi di bidang energi secara keekonomian; This thesis examines POME (Palm Oil Mill Effluent) as a biogas basis for a source of electrical energy. The digester is using to processed POME with anaerobic digestion obtain biogas. Anaerobic pond digester is selected as a reference to develop based on the existing strengths and weaknesses of many anaerobic digester types. Development is done by detailing every stage of the process. The biogas power plant model with detailed anaerobic digestion process was built using SuperPro Designer 9.0 software. The simulation results for palm oil mill with a capacity of 30 tonnes of fresh fruit bunches (FFB)/h produced biogas with a ratio

of CH<sub>4</sub> : CO<sub>2</sub> of 59.8 : 41.2. While the calculation of the economic analysis indicates that the construction of biogas power plants base on POME viable but not attractive for investment in the field of energy., This thesis examines POME (Palm Oil Mill Effluent) as a biogas basis for a source of electrical energy. The digester is using to processed POME with anaerobic digestion obtain biogas. Anaerobic pond digester is selected as a reference to develop based on the existing strengths and weaknesses of many anaerobic digester types. Development is done by detailing every stage of the process. The biogas power plant model with detailed anaerobic digestion process was built using SuperPro Designer 9.0 software. The simulation results for palm oil mill with a capacity of 30 tonnes of fresh fruit bunches (FFB)/h produced biogas with a ratio of CH<sub>4</sub> : CO<sub>2</sub> of 59.8 : 41.2. While the calculation of the economic analysis indicates that the construction of biogas power plants base on POME viable but not attractive for investment in the field of energy]