

Design of Palm Oil Biomass Processing Network for Electricity Generation using MINLP Model: A Case Study on Iskandar Malaysia

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ABSTRACT

This paper presents a general decentralized energy generation (DEG) optimization model for developing countries. A mixed integer nonlinear programming (MINLP) model has been formulated and implemented, representing decisions regarding (1) the optimal number, locations, and sizes of various types of processing plants, (2) the amounts of biomass transported, and electricity to be transmitted between the selected locations over a selected period, and minimizes the objective function of overall generation cost. The model has been applied first for designing a DEG system using palm oil biomass for Iskandar Malaysia region of the state of Johor, Malaysia and then extended to entire state. We investigated the benefits of more distributed types of processing networks, in terms of the overall economics and the robustness to demand variations.

No change in designed DEG system and distribution network was observed when the demand was lowered to 90%, 75% and 60% of original demand.

Keywords: *Palm oil biomass; bio-power; decentralized electricity generation; optimization; supply chain network*