

Abstract :: Propagating Jatropha Trees for sustainable development applications

Biomass residues from local farming communities are underutilized. These residues can be used for electricity generation, deliver transportation fuels and processed materials used as fertilizers.

Offering a better utilization of biomass residues from, for example, the multi-use Jatropha Tree. Jatropha can be grown in arid, infertile and idle land as a primary and secondary crop as undergrowth in tree plantations, shade for leguminous like crops, promoting biodiversity and improving soil quality. Jatropha, being a perennial plant with a 20 to 35 years productive lifetime, can be a part of a plan that eradicates slash and burn practices, employs reusing biomass residues, diverting these wastes from dumping and road-side burning.

The Jatropha seeds are easy to press, and deliver an oil with a good fuel quality. Utilizing infertile land and depleted farmland to grow Jatropha via localized farming cooperatives on a 400 ha space will produce enough yield to run a small rural factory for pressing Jatropha seed oil, and run a 1 MWe power plant providing almost 900 kW of excess energy for local use, plus a 1200 kW for a 33% electrical efficiency and a 90% overall efficiency in combined cooling heating and power (CCHP) applications. The Jatropha oil can be used directly as a diesel fuel replacement. The energy required to run the factory is extracted through gasification of bio-residues. After conversion, leftovers of the gasification process are an excellent fertilizers.

Selectively growing Jatropha as an inter-crop, as well as a main crop in infertile, idle land, improves land utilization. Jatropha planting has been underway in a number of existing plantations in The Philippines. Since 2005, one municipality is producing oil from Jatropha on a small scale. Two to three year old 150 ha Jatropha plantations are producing, and can be used to generate an estimated 600 kWe continuous power. The average estimated agricultural production projects enough biomass will be available for 900 kW to 1.1 MW on a continuous basis. With an average grid utilisation rate (load) of 50% indicates a peak power production between 1.8 MW to 2.6 MW for an area containing 1000 ha of arable land. Power can be produced using Jatropha at rates starting at \$0.12/kWh.

This business model provides a sustainable method for producing bio-energy and bio-energy carriers that empowers local farmers and citizenry to produce Jatropha seeds for oil, electricity from bio-waste materials and producing fertilizer. Electricity production techniques employed are well-known since the 1930's, and have been improved greatly in reliability and availability. Direct employment in the factories are nine, full-time persons for each 400 ha farmed. Indirect employment can run into many more much higher, as family farming can employ at least two members of the family for each hectare. The modular factories can process input from 1000 ha maximum. Small scale production can commence 90 days after obtaining permits.

We hope we can meet so that we can convey our interest to review, evaluate and benchmark your Jatropha farm design, equipment and processes to identify energy saving measures, prepare for on-site generation and to help your organization better serve your stakeholders.



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