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The role of residues from the Palm oil production process in a sustainable energy system

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With the energy sector contributing an estimated 25 percent of atmospheric green house gas concentrations, the transition to a sustainable energy sector to meet the two degrees target of global temperature rise requires drastic reductions as part of future energy planning. Various forms of bioenergy under the right conditions, has the potential to contribute towards a sustainable energy system. However numerous environmental impacts from the sourcing of biomass for energy especially food security has been a major drawback for bioenergy growth as well as the driving force towards the less expensive and readily available lignocellulosic biomass. This study investigates the role of solid residues from the production process of palm oil in the share of primary energy supply using a 10 MW biomass fired power plant. Given an estimated global palm oil production for 2018 of 69.77 million metric tons across 18.11 million hectares of land, 373.07 million tons of high-energy solid residues from the palm oil sector are available for energy generation. Findings from this study revealed that cumulatively, solid residues from the global palm oil sector has the potential to generate 273.65 TWh of electrical energy per year if all the residues are put into use. However if 60 percent of these residues are used, an estimated 164.17 TWh of electrical energy could be harnessed. With an energy capacity of 273.65 TWh, residues from the palm oil industry has the potential to supply 1.13 percent of the global electricity production representing a 4.60 percent growth in global renewable energy supply with respect to 2016. Furthermore, to power a 10 MW biomass - powered plant at full load with an 80 percent uptime, 48 - 155 ktons of green palm residues will be required, equivalent to an estimated palm area of 7676 hectares. Given net neutrality for bioenergy and less life cycle emissions, a cumulative 166.56 million tons CO2eq emissions can be saved annually if solid residues from the global process of palm oil production are utilized for energy at a 100 percent rate. Estimates for the emission savings and the energy gain from the use of palm oil residues is very promising and has an important contribution to make in the transition to a sustainable economy.

Biography

Bobbo Nfor Tansi is a PhD student at the Brandenburg Technical University Cottbus Germany. As a PhD student he assisted as a student lecturer at his university, offering courses in energy security and sustainability

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