Utilisation of rice residues for decentralised electricity generation in Ghana - DTU Orbit
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Utilisation of rice residues for decentralised electricity generation in Ghana: An economic analysis
Developing countries, especially in Sub-Saharan Africa, face large challenges to achieve universal electrification. Using the case of Ghana, this study explores the role that rice residues can play to help developing countries meet their electrification needs. In Ghana, Levelised Electricity Costs (LEC) of a grid-connected 5 MWe straw combustion plant ranged between 11.6 and 13.0 US cents/kWh, based on region of implementation. Rice straw combustion is a viable grid-connected option in all regions, as the bioenergy Feed-in-Tariff is 29.5 US cents/kWh in Ghana. Residue supply cost contributes significantly (49-54%) to LEC of rice straw combustion. LEC of husk gasification mini-grids ranged between 5 and 53 US cents/kWh for rural populations between 3000 and 250 people. Husk gasification mini-grids can be a suitable electrification solution for these un-electrified populations, as its LEC is lower than the average LEC of grid extension diesel mini-grids and off-grid solar systems for remote communities in Ghana. Electricity produced from husk gasification has the potential to cater to 7% of the needs of un-electrified communities in Ghana. The methodology and analysis of this study can support policymakers of similar countries decide the economic feasibility of decentralised bioenergy solutions while forming national electrification plans.

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