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## MINI-GRID ELECTRICITY SERVICE BASED ON LOCAL AGRICULTURAL RESIDUES: FEASIBILITY STUDY IN RURAL GHANA

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### Abstract

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The Sustainable Development Goals (SDGs) are emphatic on the role of energy for development, with a target to ensure universal access to affordable, reliable and modern energy services to about 1.3 billion people without electricity access, and to increase substantially the share of renewable energy in the global energy mix. For remote rural communities in developing countries, where grid extension is often expensive, decentralised biomass mini-grids can be a reliable electricity supply solution. This study investigated the technical and financial feasibility of decentralized electrification based on agricultural waste gasification in five Ghanaian communities. Results show that the projected electricity demand of the communities compares favourably with the potential energy generation from available agricultural residues, a situation that we envisage in many rural communities where agriculture is a predominant livelihood activity. As with most biomass electricity analysis, it is not profitable from the perspective of an entrepreneur with 100% private funding; however, by applying a customer tariff equal to the current expenditure on electricity equivalent uses in the communities, a subsidy of about 35% on initial investment would enable a private entrepreneur an internal rate of return of 15%, whereas a 60% subsidy could enable internal rate of return of 25%.

### Keywords

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Rural electrification, Biomass Mini-grids, Agricultural residues, Energy planning, Feasibility studies, Ghana.

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