

Rural Electrification policy: The potential in micro hydro electricity

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Developing countries particularly those within the Sub-Saharan African region like Kenya account for almost half of the 1.2 Billion people in the world without access to electricity. These countries have a greater challenge of dealing with outcomes related to the lack of modern energy by rural households, who comprise a bigger proportion of their population. Part of the explanation is the energy policy preoccupation with centralized grid electrification whose economics does not favour scattered and low income households in the vast rural areas. Subsequently, even with heavy rural electrification campaigns, new patterns of large section of the population that does not take up connection and limitation of electricity to very basic uses by household's calls for alternative considerations in energy policy.

While decentralized fuel based micro grids have been considered as potential options, they suffer from the problem of volatile fuel prices leaving the mostly low income rural households vulnerable to external shocks. The discourse in sustainable development calls for a shift from the reliance on fossil-based electrification, due its costly consequences on environment in terms of climate change. The use of decentralized renewable energy technologies like solar, micro hydro and even wind for generation of cheaper electricity present a new opportunity for these nations. Although solar home systems have been popularized in countries like Kenya, other renewable energy technologies like micro hydro do receive little or no policy attention.

State agencies particularly rural electrification authorities in developing nations are hesitant to formally deploy small scale interventions like micro hydro grids for electrifying rural households, partly because there is scarcity of evidence on how households might benefit from such small scale technology. Our case study in Kenya demonstrates that micro hydroelectricity can fulfil the primary electricity demand for a rural household located near such a resource. Specifically, we find that such access considerably reduces the amount of kerosene that is consumed in a household. It is our view that with support such as technical aid in repair of in micro hydro schemes, it is possible for these households to completely eliminate the use of kerosene lighting in their households.

Although such a small scale energy may not supply enough electricity for applications such as cooking, we note that cooking and other intense applications are rare events among rural households even with grid electrification due to other impediments cited in literature. Another benefit is that mobile phones can also be conveniently and cheaply charged within the household, therefore reducing instances where mobile handsets have to be taken far away from home for re-charging.

Further, it is widely believed that access to electricity leads to improved education outcomes, because it provides clean and quality reading light. It is important to not this may not be potentially be the case if the change in study time is anything to go by. Our results show that children who live in households with

micro hydro connectivity actually study less (by almost an hour) compared to children who have no access to electricity. It's our view that in the absence of other programs to improve education outcomes, children may become pre-occupied with entertainment enabled by electricity access such as TV watching at the expense of their study time. Further studies tracking the change in other education indicators must also be considered.