

Energy policies for off-grid villages in Tanzania

Andrew Mnzava



It is hard to talk about development in off-grid villages without talking about energy. Health, education, food security, productive enterprise and environmental well-being, as well as participatory democracy, can all be achieved if good policies are in place, but they depend not only on access to energy but on the provision of information.

Sustainable and clean energy is a big challenge for off-grid villages in developing countries like Tanzania, aggravated by a lack of appropriate policies. Policy formulation needs to look at how best to boost energy access while addressing the barriers that hinder it, most of which relate to knowledge of local developers, financing for off-grid energy projects, the regulatory framework, and knowledge and awareness of the respective communities.

National policies

One of the key successes in supporting rural electrification, and specifically off-grid projects, has been the formulation of a Rural Energy Agency (REA). Tanzania is a good example of this process, with major support beginning in 2005 with the passing of the Rural Energy Act. Today, a Rural Energy Board (REB) comprising government, the private sector, consumer representatives and development partners, governs and oversees Tanzania's REA and the Rural Energy Fund (REF). The REF is capitalised through funds from specific taxes on petroleum products and electricity, and by development partners including the World Bank/International Development Agency (IDA), the Swedish International Cooperation Agency (Sida), the Norwegian Agency for International Cooperation (Norad), and the US government, among others.

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Despite the presence of such agencies, many countries do not have specific renewable energy policies that foster the development of clean energy and directly support off-grid energy development. As a result, many REA

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bodies have found themselves mostly engaged in grid extension¹, with very few supporting off-grid projects. This may be due to a number of challenges ranging from financing to regulatory issues. Key policies should be put in place to overcome such barriers.

The government of Tanzania has an ambitious programme to support off-grid projects in development centres that will not be reached by the interconnected grid before 2020, if at all. A development centre, according to the national electrification prospectus, “is typically a settlement with a population of at least 1,500 inhabitants in 2012, with some existing social or administrative infrastructure (school, dispensary, police station, etc.), good access by roads and some business activities”. In total, 154 projects have been drafted, 18 with power supplied by mini-hydro plants, 63 by rice-husk-fuelled gasifiers and 73 by hybrid diesel-photovoltaic systems¹.

When we look at the sustainability of off-grid projects in general a number of challenges commonly arise, calling for specific responses.

Local developers

Local or national developers are off-grid energy developers who generate and supply power to their surrounding communities. Several individuals or groups may have the potential capital to become local developers but lack information about how to go about setting up off-grid power generation. Even those who have begun a project face challenges arising from a lack of skills in technical planning and implementation and overall project and business management.

This calls for capacity building, awareness raising and specific training of local and national off-grid developers on how to design, build and run a successful off-grid power business².

Financing

Developing national energy policies for off-grid villages involves both institutions and communities, as was demonstrated by the analysis of the *Mini-Grid Policy Toolkit*³ developed by the Africa-EU Renewable Energy Cooperation Programme (RECP). Project financing is one of the biggest

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challenges. Loans from financial institutions have not been successful because of their high interest rates and the very long pay-back time of the developers' projects. Governments have tried to introduce subsidies and matching grants, as well as performance grants with support from the World Bank and development partners, but the rate of uptake is still poor and success stories are very few and far between. This relates to deficiencies in developers' skills and knowledge, institutional and regulatory complications, and low community awareness and acceptance.

Corporate finance can be raised to develop and demonstrate business models, and different sources of equity and debt capital can be made available, but access remains challenging³. Both the financial sector and the developers' side may lack enough information on how off-grid projects should be designed, implemented and managed, and how developers qualify for funding.

This mini-hydro has been developed on one of the Rift Valley farms in southwest Tanzania to support local agriculture with the provision of clean and sustainable energy.



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There is a need for bridging between developers and financiers about the availability and offer of loans or grants.

Institutions and the regulatory framework

When it comes to environmental issues, the National Environmental Management Council (NEMC) of Tanzania provides environmental impact assessment certificates before any project can be implemented. If a project involves rivers, such as a hydro project, then the developer needs a permit from the relevant water basin authorities under the Ministry of Water. These are some of the key institutions with regulations that need to be met for a project to be a success – without mentioning the general ones which are also necessary such as business registration, business licensing, tax certificates and so on.

In Tanzania there is one national utility company, TANESCO, which is the main off-taker of generated power. Most developers prefer to sell their power to TANESCO for a guaranteed one-time return on investment, though recently it has proved to be impossible because of long delays in TANESCO's payment to the developers.

Bureaucracy therefore remains a challenge for national off-grid energy developers, particularly considering their lack of experience and skills in the industry. This is exacerbated when there are no links or connections providing ease of access to information between one institution and another, which means that it can take developers up to a year to negotiate all the steps involved in gaining the necessary permits.

A national policy is needed to provide a one-stop centre of information for all applications to facilitate investment in off-grid projects for sustainable development.

Communities-consumers

There have been extensive studies of project financing but very few in terms of consumer financing. Consumer financing is another way of looking at the ability and capacity of consumers and clusters of communities to pay for the power supplied. This has been a challenge in a number of rural communities where off-grid projects have been implemented. Several villagers have failed to connect power to their households as a result of lack of funds to pay for the connection, as well as an inability to pay monthly bills⁶.

National policies need to address the issue of community and consumer knowledge and ensure the consumer has the capability to take off-grid power



Table 1 Cost comparison of energy sources⁶

	Electricity		Kerosene	
Upfront costs (TZS)	Cheapest	Expensive	Cheapest	Expensive
Fixed costs	310,295	377,045	5,500	13,250
Recurring costs	79,411	79,411	14,840	14,840
TOTAL	389,706	456,456	20,340	28,090
Annualised costs (TZS)	Cheapest	Expensive	Cheapest	Expensive
Fixed costs	37,816	43,933	637	1,660
Recurring costs	79,411	79,411	14,840	14,840
TOTAL	117,227	123,404	15,477	16,500

US\$ 1 = TZS 2,000

Government efforts to introduce subsidies and grants for each house connected mean that the developer gets paid, but still the rate of uptake has been very slow. Awareness raising, empowering communities and creating community-based models can all help to solve some of the issues, and also lead to improved project safety.

GreenMax Capital advisors have shown the cost comparisons between electricity and kerosene, a common energy fuel in rural areas (Table 1)⁶. Notably, unfavourable upfront and annualised costs are a matter of concern for developers when looking for pay-back on their investment, leading most to sell their power to large national utilities rather than finding ways to provide for off-grid villages⁷.

In several countries, the community model has proved to be the best option for remote areas. In these cases the owners and managers in a cooperative or community-based organisation are also the consumers, and therefore have a strong interest in the quality of the service and a real presence in managing it^{3,7}.

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through economic empowerment, ensure that the consumer has the capability to take power generated off-grid.

Summary

There is a need to formulate national policies for off-grid renewable energy that address all the key angles discussed in this essay. The policies should harmonise the various areas discussed to achieve successful implementation of off-grid energy projects and hence increase the development of off-grid villages. Clearly, clean and better energy would provide villages with better health services day and night, better education and easy access to information through radio, television and mobile phones, as well as ease of starting and establishing small business enterprises for economic development, such as food processing machines to increase food productivity and storage to improve food security.

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Author

Andrew Mnzava is a Senior Research Officer with the Commission for Science and Technology (COSTECH) in Tanzania and has been extensively involved in rural electrification programmes. andrewmnzava@me.com / andrewmnzava@gmail.com