

THEME EDITORIAL

Low-cost electrification; the need for access to energy services

by Rona Wilkinson

Introduction: Lack of access

Rural areas in developing countries have limited access to all types of services – health, clean water supplies, communication and roads. This is also true for the provision of energy services, for domestic use, communications, agriculture and income generating activities.

It is estimated that around two billion people do not have access to grid electricity; in sub-Saharan Africa, it is estimated that the percentage of the population that is connected to the grid is between 4% and 25%, and the majority of those live in urban areas.

Why electricity?

Electricity can provide some of the fundamental energy services required by rural communities:

- at a domestic household level for lighting, radio and television, ironing, fans, etc.
- at a community level for clinics, schools, shops, and street lights
- for productive end uses and income generation through milling, crop processing, battery charging, workshop services

Options for supply of electricity

Electricity can be supplied through the grid or through decentralised schemes, where the source of the electrical power is located in a specific community or even in an individual household. In the latter case, renewable energy sources provide the most attractive means of providing this energy, through hydro, solar or

Électrification à bas coût et accès aux services dérivés de l'énergie

Environ deux milliards d'êtres humains n'ont pas accès à l'électricité pour satisfaire les besoins énergétiques de base et fournir l'énergie à des activités productives. Les systèmes décentralisés sont une autre alternative basée sur les ressources hydrauliques, solaires, éoliennes ou l'utilisation de groupes électrogènes. Leur succès est cependant conditionné par plusieurs facteurs non techniques notamment: l'intégration avec d'autres projets de développement, l'évaluation des besoins, la gestion de l'énergie, le financement et l'appui institutionnel, la participation des communautés, la capacité à payer et le niveau des tarifs.

wind power. However if such resources are not available, then the use of diesel generators is another option. In terms of the services provided, off-grid options are often limited to lighting and communication, especially for solar PV and systems that use batteries to supply electricity, as the amount of power they can produce is limited.

Critical success factors

There are various constraints in providing electricity to rural areas. Grid extension has traditionally been seen as the only way to deliver electricity to the population. However, low population density, hard terrain and low levels of demand make it uneconomic to extend the grid to many areas. Harper gives an example, where even though the grid has been extended to villages in Orissa, problems have been experienced with non-payment and electricity theft.

De-centralised schemes are one alternative, and there are a number of success stories all over the world, as shown in many of the articles in this issue.

However, there are a number of aspects that have to be addressed for an off-grid scheme to be sustainable and successful.

These are highlighted by Costa and Eck who give an overall view of what is required for a successful de-centralised electrification scheme, drawing on their experience in North East Brazil.

These aspects for success include:

- Integration with other development projects
As described in the article by McMenemy the most successful energy projects are those that are integrated with other development priorities and projects.- electricity tends to stimulate development projects rather than initiate them. For instance a hydropower scheme can often be built on the back of a water supply project and provide greater benefits.
- Needs assessment and energy management
Irvine Halliday et al look at the importance of carrying out a proper energy needs assessment within a community, looking at consumption, demand and needs and also how to deal with users wanting more electricity than they can afford to pay for.
- Financing options and institutional support

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Rural Electrification schemes do require support at national, local and intermediary level. McMenemy supports this assumption in his paper and looks at how energy projects have a greater chance of sustainability if concerted effort is placed on developing and supporting Institutions at all levels.

- Community participation
The ownership of the plant can be by the community, by a small private business or through an individual. The management, operation and maintenance of the scheme is vital. Rai gives examples of good community participation in Nepal and highlights the importance of involving all

members of the community. Gitonga et al give a detailed case study of the steps involved in setting up a community hydro scheme in Kenya

Harper makes an interesting comparison by looking at how community participation in grid connected villages has led to increased access to supplies

Ability to pay and tariff levels

The amount that the community is able to pay is crucial in ensuring the sustainability of the scheme. Mills sets the scene by discussing how much is already spent on lighting in rural areas, with the conclusion that electricity

is safer, cheaper and a higher quality light than traditional fuel alternatives. Prasad adds an interesting discussion point by agreeing that electricity is cheaper but asking why people still do not opt for electrical lighting.

Foley discusses various tariff structures that have been used and Forssman illustrates the importance of appropriate end use appliances such as energy efficient lightbulbs.

The articles all highlight the need for access to energy services in the developing world, and Piggott turns it full circle by talking about his de-centralised electrification scheme in the Western World, the steps he took and the reasons why it is successful. 🗑️

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Institute (CGCRI) and the Petroleum Conservation Research Agency (PCRA). The latter two have lent their resources to the project, and PCRA staff have just completed energy audits of 13 firms who have expressed interest in being involved in the project. The next step will be the visit of UK and US ceramics experts who will be working with the owners of firms and local institutions to implement measures, and build capacity.

The project in India has highlighted the export market as being a major driver quality improvement in this sector. Quality, in turn, is very closely linked to improvements in productivity and energy efficiency. At the same time, ethical and fair trading initiatives provide an opportunity to link exports directly to improvements in working conditions. To this end, a funding proposal has been submitted to develop an initiative that will link energy efficiency improvements

directly to benefits for workforce via the export market and fair/ethical trade.

In Ghana, the focus has shifted slightly to look at the potential for maximising recovery of logs, as this is the largest source of wasted energy. A sub-sector analysis of the forestry sector has been completed, and this has highlighted a number of key opportunities for intervention. The next phase is to explore mechanisms for firms to add value to timber processing, such as T&G, kiln drying, moulding and other products. 🗑️

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als, and this has introduced incentives for its local and inter-village dissemination.

This is, however, a small success in terms of the project as a whole. No stove project is successful until the stoves are being widely accepted and used as well as easing people's problems. The clay grate is a way of making this stove more financially and logistically accessible to a greater number of, particularly poorer, people.

Jon Rouse (jonrouse@iname.com) is a freelance consultant, presently working at the Water, Engineering and Development Centre (WEDC) in the UK. More about him and this project can be found at:
www.jonrouse.freeserve.co.uk/dev 🗑️