



## Findings from the Arusha Smart Villages workshop

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### Key points

- 1.3 billion people worldwide have no access to electricity.
- 3 billion people are still cooking with dangerous and inefficient stoves.
- Policy frameworks should support 'home-grown' enterprises providing energy access.
- Evaluative frameworks should be used to assess the outcomes of energy schemes.
- Closer links should be developed between universities and the SMEs in the field.
- National champions for smart villages should be appointed within government.

*The first workshop in the series was held in Arusha, Tanzania from 2nd to 5th June 2014. The organising partners for the Arusha workshop were the Cambridge Malaysian Education and Development Trust, the European Academies Science Advisory Council, the Tanzanian and Kenyan Academies of Sciences, the International Science Programme at the University of Uppsala, and the Swedish Secretariat for Environmental Earth Systems Science.*

*The workshop brought together some 60 people active in progressing off-grid village energy for development in East Africa: a diverse and unique cross-section of scientists, social scientists and local stakeholders with practical experience available of developing energy services for off-grid villages (entrepreneurs, villagers, NGOs, financiers, business leaders, regulators and policy makers, etc.). Through presentations, plenary discussions and breakout groups, views were developed on the current barriers to establishing electricity services in off-grid villages, and recommendations were formulated on what needs to be done to address them.*

*The workshop was judged to have been a great success, and particularly innovative in bringing together a diverse set of actors and stakeholders, sparking new insights into how to tackle issues of village energy for development, and enabling useful new connections to be made. The holistic approach taken by the Smart Villages Initiative, integrating the perspectives and experiences of the full range of stakeholders, was considered to be valuable in overcoming sectoral approaches.*

*This note provides a summary of the workshop's findings and recommendations for policy makers. A more detailed report of the workshop, together with copies of the presentations made at the workshop, is at [www.e4sv.org](http://www.e4sv.org).*

## Key findings

### Solar lights/home systems

Workshop participants noted that substantial reductions in the costs of solar panels and LED lighting, together with innovative financing models tied to mobile telephones, have brought solar lights, and increasingly solar home systems, to a 'tipping point' in which sales are rapidly increasing on a fully commercial basis. In order to enable a further acceleration of the rollout of solar lights and solar home systems, challenges of distribution networks for remote communities need to be addressed. Major international corporations with established distribution networks and associated know-how may have a useful contribution to make.

### Mini-grids

Mini-grids are needed to power many productive uses of electricity (for example milling, welding, machining, water pumping etc.). However, at present mini-grids often require some form of government or donor support to achieve returns which are acceptable to potential investors. There is much current interest in mini-grids and the search is on for scalable business models that will enable fully commercial operation in due course. Hybrid systems involving renewable energy sources along with a diesel engine for backup are emerging as an effective way of tackling issues of intermittency of supply.

*“Workshop participants noted that substantial reductions in the costs of solar panels and LED lighting.”*

### Access to Capital

A second constraint is the availability of working capital for indigenous SMEs (small and medium-sized enterprises) which are spearheading the progress in solar lights and home systems. The limited availability of affordable capital was a strong theme running through the workshop, and was identified as a particular constraint also on the establishment of mini-grids for villages. Financing costs for mini-grids can be punitive as lenders often perceive risks to be high. Support from funding bodies and governments is needed to de-risk investments sufficiently to bring interest rates down.

### Impact investors

Socially oriented 'impact investors', able to offer lower than commercial rates, may also play an important role. Such impact investors may appropriately build a relationship with entrepreneurs similar to venture capital funders, in which they continue to support the entrepreneur as his or her business grows

### Home-based approaches versus mini-grids

An 'energy escalator' approach to upgrading solar home systems promises to bring additional applications such as TVs, refrigerators and sewing machines into the reach of households, and an interesting dynamic is developing between home-based and mini-grid approaches. Mini-grids may be favoured for larger villages, where productive uses of energy may then concentrate, with solar home-based approaches catering for surrounding, more dispersed communities (a 'hub and spoke' model).

### Technologies

With regard to technologies, all renewable energy sources are anticipated to play a useful role. It is expected that costs will continue to come down, and new technologies such as printable organic solar cells may come on the market in 5 to 10 years, potentially offering substantial further cost reductions. Improved control systems, more easily used 'plug and play' technologies, better batteries, and upfront consideration of environmental impacts and recycling of energy system components are needed..

## Recommendations

*“A supportive and coherent policy and regulatory framework should be put in place...”*

### Integration

Initiatives on energy access should be integrated with other development initiatives, for example on healthcare, education and clean water / sanitation. Associated investments in productive enterprises – in the home (e.g. sewing machines and food mixers) as well as in the community – are essential to achieve progress up through the levels of energy access and development. As well as enabling the creation of new enterprises, there should be a focus on increasing the productivity of existing income generating activities, including agriculture. Financing schemes should be tuned to the seasonality of incomes.

### Public-private-community partnerships

Public-private partnerships should be extended to include communities in which energy schemes are developed, as community ownership and involvement are key to the success of mini-grid initiatives. Rural Energy Agencies have an important role to play in facilitating connections between key players.

### Collaboration

Some frustration was expressed that there is a confusing array of funding schemes, and that funders sometimes seem to compete rather than to cooperate. Frameworks to enable better cooperation between funders should urgently be put in place in East African countries and for the region as a whole.

### Policy/regulatory framework

A supportive and coherent policy and regulatory framework should be put in place which sets clear targets, establishes systems to measure progress, and supports the creation of indigenous businesses. Entrepreneurs made a plea for less red tape and some breathing space in relation to taxation regimes in order to get their businesses off the ground. In developing policies, regulatory frameworks and support schemes, governments and funders should consider how to support ‘home-grown’ enterprises which are well rooted in the communities in which they operate. Participants cited many examples of bottom up innovations emerging from rural communities that need nurturing in order to reach maturity: governments and donors should support business incubation and development, and advisory support services.

### Information sharing

The value of sharing of information and experiences was consistently stressed. The governments of East African countries should more systematically discuss their approaches and share good practices, for example, the supportive policy and regulatory framework recently put in place by the Tanzanian government, and the ‘one-stop shop’ set up by the Rwandan government to provide advice to entrepreneurs initiating energy projects. Case studies of smart villages should be publicised: they will help to promote the concept and inspire communities to pursue this route. Government and donor funding may usefully support the creation of datasets, for example maps of wind or hydro potential, that are useful to entrepreneurs but which they could not fund themselves.

### Evaluation

More work should be undertaken to develop and apply approaches to evaluate the outcomes of energy schemes in respect of development benefits, and to identify what works and why. The absence of evaluation systems is acting as a barrier to financiers supporting schemes.

### Capacity building

Government and donor funding should focus on capacity building for all key actors, and enabling local people to 'do it for themselves' rather than being continuing recipients of aid. For all energy projects and initiatives there should be systematic analysis across all stages and actors to ensure that the necessary capacities, knowledge and skills are in place: training schemes should be put in place where there are gaps. There are too many failed projects and wasted resources: a manual should be prepared which focuses on the process of how to design projects to suit local circumstances.

### Research & Development

Closer links should be developed between university researchers and the SMEs implementing energy access on the ground. There should be more emphasis on applied research and getting researchers out into the field.

### Championing smart villages

National champions for smart villages should be appointed in governments to stimulate appropriate initiatives and ensure integration across government departments and agencies.

Download in full: [e4sv.org/publication/findings-from-the-arusha-smart-villages-workshop](http://e4sv.org/publication/findings-from-the-arusha-smart-villages-workshop)

## Notes

The concept of the 'smart village' is that modern energy access acts as a catalyst for development – education, health, food and water security, productive enterprise, environmental protection and participatory democracy – which in turn supports further improvements in energy access. The Smart Villages Initiative is evaluating how to provide sustainable energy to off-grid villages so as to catalyse their development and enable them to become smart villages (see [www.e4sv.org](http://www.e4sv.org) for more details). Through a series of international workshops (two in each of Africa, Asia and Latin America) and follow-up activities it aims to provide policy makers, donors and other stakeholders new insights into the challenges of supplying off-grid village energy for development, and how they may be overcome.

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