



Achieving universal energy access and rural development through smart villages



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ARTICLE INFO

Article history:

Received 19 January 2018

Accepted 22 January 2018

Available online xxxx

Keywords:

Energy access

Rural development

Sustainable Development Goals

ABSTRACT

With just 12 years to go to 2030, progress in providing universal energy access and improving rural development outcomes in many rural areas has been too slow if the Sustainable Development Goals are to be met. Over a three-year period, the Smart Villages Initiative gathered evidence and views from over 1000 stakeholders from 70 countries to identify the framework conditions necessary for the provision of energy services to rural communities and to ensure that energy access translates into improved rural development outcomes. This short communication provides an overview of the key findings of this process and suggests a number of “bottom-up” insights and recommendations. These include taking an integrated approach to rural development, building markets to leverage the private sector, creating supportive, coherent and flexible policy frameworks at the national-level; and a re-think of financing mechanisms.

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Introduction

Over 1 billion people remain without access to electricity and 3 billion people cook on inefficient dirty stoves (IEA, 2016): the vast majority live in rural areas. Progress in providing rural access to sustainable modern energy has been too slow if Sustainable Development Goal (SDG) 7 (universal energy access to all) is to be met by 2030 (UN, 2015). A rapid and substantial increase in the rate of deployment of energy services to rural communities is needed.

A key premise of the Smart Villages Initiative¹ is that the required acceleration must be founded on a more integrated approach to rural energy access in which increased emphasis is placed on the use of renewable energy and modern information communication technologies (ICT) to enable productive enterprises and the provision of key services, and in which more effective partnerships are established

between governments, development bodies and the private sector (Holmes, Jones, & Heap, 2015).

The Smart Villages Initiative has identified framework conditions necessary for the provision of energy services to rural communities to enable livelihood opportunities, provision of services (healthcare, education, clean water and sanitation) and the empowerment of rural communities. In the Smart Villages concept, provision of sustainable energy services to rural communities, can have a catalytic impact on the lives of villagers when appropriately integrated with other rural development initiatives. Smart villages provide many of the benefits of 21st Century life to rural communities, and reflect a level of rural development consistent with achieving the SDGs.

Research methodology

A two-year scoping study (Bailey, Henriques, Holmes, & Jain, 2012) identified the benefits of a more holistic approach to energy access and identified the key question for policy and practice: how to establish framework conditions to enable that more holistic and integrated approach, accelerating the deployment of sustainable energy services to catalyse rural development. A significant gap between practitioners and those responsible for policy and funding was also identified, with a need to combine insights of these diverse groups in order to address the key challenges.

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¹ The Smart Villages Initiative (www.e4sv.org) focuses on off-grid energy for rural development and has been undertaken by an interdisciplinary team based at the Universities of Cambridge and Oxford in the UK. The Initiative has been funded by two charities - the Cambridge Malaysian Education and Development Trust and the Templeton World Charity Foundation - and has been undertaken in collaboration with the networks of national science academies in Africa, Asia, America and Europe.

From 2014 to 17, the Smart Villages Initiative organised more than 30 consultation workshops in Africa, Asia, Latin America and Europe involving frontline workers (entrepreneurs, NGOs, development organisations, villagers and civil society organisations), policy makers and regulators, the finance community, and international experts in science, engineering and social science. The workshops gathered evidence and views from over 1000 stakeholders from 70 countries, using a systematic approach to identifying, discussing and synthesising responses to key questions, and giving a 'voice' to frontline practitioners that has been conveyed to relevant audiences in the global South and North through policy briefs, meetings, seminars and joint policy statements with the networks of national science academies. The workshops were complemented by webinars, research projects (see, for example, Van Gevelt, Canales-Holzeis, Jones, & Safdar, 2016; Van Gevelt, Canales-Holzeis, George, & Zaman, 2017), media and forward look workshops, competitions for young entrepreneurs, and reviews of the literature providing some degree of triangulation with the views and experiences discussed at the workshops.²

A core set of questions were addressed at each workshop. These questions focus on identifying barriers and how they can be overcome, and distill key conclusions and recommendations to be conveyed to policy makers. This was augmented by local issues identified by workshop participants. Additional questions were considered according to the regional context of the workshops and the specific focus of some workshops (for example, on the water-energy-food nexus, energy supply to islands, and cookstoves). Iterative development of responses through presentations, plenary and breakout discussions culminated in a final plenary session at each workshop in which key conclusions and messages were agreed upon. The process of synthesis across the workshops identified cross-cutting findings supported by practical evidence of experience.

Achieving smart villages

The extensive programmes of engagement have provided up to date insights from the 'frontline' on the challenges of rural energy access for development (embodied in becoming 'smart villages') and how those challenges can best be addressed. These 'bottom-up' insights and recommendations are summarised in this section.

Taking an integrated approach

A consistent message from the workshops was that, typically, village level development initiatives - for example on energy access, connectivity, health and education, productive enterprise etc. - are undertaken separately and with little or no coordination. Consequently, potential synergies are missed and the full development benefits of energy access are not realised.

Workshop participants considered that the current silos need to be replaced by a more integrated approach addressing the development of villages holistically. Participants further stated that rural and urban development should be addressed within an integrated planning framework which stimulates and intensifies connections between villages and cities and that future interventions in villages will typically provide greater development benefits if designed to address several SDGs rather than only one SDG.

In order to realise this more integrated approach, much better levels of collaboration are needed between the key players: for example, across government ministries, and between the different levels of governance (local, regional and national), and the public and private sectors. Within governments, appointment of senior champions with the authority to establish the required integrated working can be helpful. Effective academic support is also needed, requiring

interdisciplinary collaboration between the natural, social and engineering sciences.

A particular concern, often expressed by frontline workers, was the lack of coordination between international development organisations resulting in many rounds of calls for proposals for relatively small amounts of funding, each addressing particular elements of the overall rural development challenge. Better coordination between development organisations is needed with the aim of providing a more seamless experience for frontline workers, reducing their transaction costs and enabling them to scale up their activities.

Building markets

There was increasing evidence from participants that, given supportive framework conditions, the private sector can make an important contribution to rural energy access. Governments and development organisations have a key role to play in supporting the creation of effective markets and ecosystems of players (including manufacturers, distributors, retailers, operators, financiers etc.) to realise the contribution of the private sector. In contrast, schemes which provide energy technologies to villagers for free, hamper the creation of such markets and undermine the sustainability of businesses. They have repeatedly been shown not to work, and they can prolong a counter-productive handout mentality in rural communities. To the extent that subsidies are used to enable access by the poorer segments of rural communities, they need to be carefully targeted and set up so as to complement rather than cut across commercial endeavours.

In some areas such as East Africa, technologies that provide energy services at the individual household level - pico-solar lights, solar home systems and clean cookstoves - are increasingly being sold on a commercial basis achieving rapid rates of deployment scale up. Business models based on 'pay-as-you-go' or 'pay for services' approaches, together with big reductions in the costs of solar PV and increases in the efficiency of appliances have enabled this breakthrough. As costs continue to fall and appliance efficiencies increase, a greater proportion of rural communities will be able to buy into these technologies.

These technologies operating at the household level can make an important contribution by getting households onto the first level of energy access more quickly, particularly for dispersed populations (Alstone, Gershenson, & Kammen, 2015; Sovacool, 2012; Van Gevelt et al., 2016). With universal electricity access by 2030 as the target, the rate of deployment must be further accelerated. In order to do so, the commercial companies spearheading current progress need to have better access to affordable finance, support from government and development agencies in establishing the necessary skill base, and to build distribution networks, potentially in collaboration with other organisations providing products and services to rural communities.

The step up to the higher levels of electricity access that can be supplied by mini-grids is largely motivated by their ability to support productive enterprise. For now, mini-grids typically require some level of subsidy. However, the entrepreneurial drive, capacity to sustain the operation and maintenance of schemes over time, and capability to undertake vital engagement with villagers of the private sector point to its important role in moving beyond pilot schemes to the wide-scale and rapid deployment necessary to meet the 2030 universal energy access target. Effective public-private-community partnerships are needed, supported by well targeted and time-limited subsidies focusing on capital rather than operational costs.

Workshop participants repeatedly stressed the importance of support from governments and development organisations to reduce mini-grid costs (including through technical developments, economies of scale, reducing setup overheads and financing costs) and to increase revenues (through appropriate tariffs, stimulating productive enterprises, and increasing the load factors and level of connections of schemes). Over time, these developments should reduce the levels of

² The underpinning workshop and technical reports, together with the individual workshop presentations and policy briefs are available at www.e4sv.org.

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