

Chapter 89

International Development Partnerships and Diffusion of Renewable Energy Powered Lighting Technologies in Off-Grid Communities in Developing Countries: Exploratory Study in Talamanca, Costa Rica

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ABSTRACT

Worldwide, 1.4 billion people virtually live in darkness after sunset. New lighting technologies, such as light emitting diodes (LED), powered by renewable energy allow non-electrified communities to access for the first time in their lives clean, durable, affordable, and higher quality lighting service. The international NGOs play an important intermediary role in diffusion of these technologies to off-grid communities and commonly operate via development partnerships. With the goal of providing insights into the nature of these partnerships and factors that influence their effectiveness, the exploratory case study was conducted which examined and compared development partnerships promoting renewable energy powered lighting technologies in off-grid indigenous communities in Talamanca, Costa Rica. The study acknowledged the catalytic role of the international NGOs and emphasized the centrality of locally embedded organizations and their capacities in successful implementation of development interventions. A set of factors was identified that contribute to the effectiveness of the development partnership in renewable energy in off-grid communities.

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INTRODUCTION

Sustainable energy services are central to economic development and poverty alleviation (Modi et al, 2006). Yet 1.4 billion of the world population do not have access to electricity (EIA, 2010b). Majority of people without electricity live in remote rural areas far from a national grid (EIA, 2010a). Off-grid renewable energy technologies¹ can be particularly suitable for these areas given the prohibitive costs of expanding grid into remote and rural areas, growing environmental concerns over conventional energy, the abundance of renewable energy resources in most of developing countries, reduced costs of renewable energy technologies and their improved efficiency and reliability (EIA, 2010a; World Bank, 2008).

Off-grid renewable energy appears to be most relevant for lighting, refrigeration, telecommunications, applications in agro-processing, water pumping and other productive uses with lighting being the most common application. Among the poorest of the poor, lighting is frequently the most expensive energy item they have to acquire, amounting up to 30% of disposable income (Lighting Africa, n.d.). Despite the expenditures, many households receive little value in return. Fuel-based lighting sources they rely upon, such as kerosene, are inefficient, provide limited and poor quality light, pose significant health and fire hazards. Furthermore, fuel-based lighting is responsible for about 190 million metric tons of carbon dioxide per year, equivalent to one-third the total emissions from the United Kingdom (Mills, 2005).

New lighting technologies, such as light emitting diodes (LED), powered by renewable energy allow non-electrified communities to access for the first time in their lives clean, durable, affordable and higher quality lighting service (Adkins, Eapen, Kaluwire, Nair, & Modi, 2010; Peon, Doluweera, Platonova, Irvine-Halliday, & Irvine-Halliday, 2005). The benefits of adequate and reliable lighting can be profound. Ability for

children to study after dark enables education and literacy. Replacement of unhealthy and unsafe fuel-based lighting sources improves indoor air quality and health. Ability to extend work hours after sunset allows to increase scarce disposable income. Avoiding burning kerosene for lighting also can positively impact environment through reduction in carbon dioxide emissions and less deforestation (Schultz, Platonova, Doluweera, & Irvine-Halliday, 2008). These are some of the benefits new lighting technologies powered by renewable energy can offer to the off-grid communities.

So far, renewable energy powered lighting solutions have been introduced in a number of developing countries around the world. Without being exhaustive, I note few examples of these efforts. Light Up The World, an international NGO, pioneered the use of LED lighting powered by renewable energy in developing countries. For the past decade, together with partners and supported by donors the organization has introduced its technology and approach in over 50 countries in the developing world (Schultz et al., 2008). LED technology has been also successfully introduced as part of the Millennium Development Project in Malawi (Adkins et al., 2010). IFC and World Bank launched a program which supports development and deployment of affordable, clean, and efficient modern lighting and energy solutions for Sub-Saharan Africans who are currently denied access to the electricity grid (Lighting Africa, n.d.).

The international development non-governmental organizations (NGOs)² have been playing an increasingly important role in the diffusion of the renewable energy technologies in developing countries (Biagini & Sagar, 2004). These NGOs facilitate the provision of technologies that address basic energy needs, provide funding, build necessary capacities, apply innovative delivery mechanisms and commonly operate via partnerships with other actors. This chapter deals with the partnership aspect of this work partly because development partnerships are increasingly pro-

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