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The value of cooperatives in rural electrification

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ABSTRACT

The electricity sectors of many developing countries underwent substantial reforms during the 1980s and 1990s, driven by global agendas of privatization and liberalization. However, rural electrification offered little by way of market incentives for profit-seeking private companies and was often neglected. As a consequence, delivery models for rural electrification need to change. This paper will review the experiences of various rural electrification delivery models that have been established in developing countries, including concessionary models, dealership approaches and the strengthening of small and medium-sized energy businesses. It will use examples from the USA, Bangladesh and Nepal, together with a detailed case study of a Nepali rural electric cooperative, to explore the role that local cooperatives can play in extending electricity access. It is shown that although there is no magic bullet solution to deliver rural electrification, if offered appropriate financial and institutional support, socially orientated cooperative businesses can be a willing, efficient and effective means of extending and managing rural electricity services. It is expected that this paper will be of particular value to policy-makers, donors, project planners and implementers currently working in the field of rural electrification.

1. Introduction

The importance of rural electrification for achieving both human and economic development has been well documented (DFID, 2002; GNESD, 2007; IEA, 2004). However, the provision of electricity to rural areas was often neglected during the widespread privatization and liberalization of electricity sectors during the 1980s and 1990s (Cherni and Preston, 2007; Haanyika, 2006). As it stands, rural electrification in developing countries provides little by way of market incentives for profit-seeking private companies (Haanyika, 2006). It is characterized by geographical remoteness, dispersed consumers, higher costs of supply and maintenance, low consumption and limited ability to pay (Reiche et al., 2000). World Bank research has shown that in some instances, particularly those of the most isolated or poorest of communities, an electrification project may lie beyond both the boundary of market efficiency and that of sustainability (projects that would not be viable under normal market conditions unless the initial costs were subsidized, but could then independently finance their maintenance and operating costs) (Navas-Sabater et al., 2002).

As a consequence of this privatization, several developing countries have had to redress their rural electrification policies and implementation processes (Haanyika, 2006). This paper will review the experiences of the various delivery models that have been established in developing countries, including concessionary models, dealership approaches, and the strengthening of small and medium-sized energy businesses. It will use examples from the USA, Bangladesh and Nepal, together with a detailed case study of a Nepali rural electric cooperative, to explore the role that local cooperatives can play in extending electricity access to the rural poor.

Although the need to improve rural access to modern energy services is well established, the optimal way for achieving this goal remains unclear. This paper highlights the opportunities arising from the involvement of 'third-way' socially orientated cooperative businesses and will be of value to those policy-makers, donors, project planners and implementers working in the field of rural electrification today.

2. Electricity sector reforms and rural electrification

Inspired by the initial success of Chilean and UK reforms pioneered in the late 1970s and early 1980s, numerous developing countries proceeded to privatize and liberalize their electricity sectors during the 1980s and 1990s, believing the prevailing ideology that the market would revitalize their 'decaying state infrastructure' that was 'intrinsically inefficient and inevitably mismanaged' (Cherni and Preston, 2007, pp. 143, 145). According to neo-liberal doctrine, increased liberalization and the

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privatization of state-owned utilities would encourage competition, lower energy prices and improve sector efficiency, flexibility and transparency (Froggatt and Takács, 2002). Privatization would increase state revenues, provide access to valuable foreign direct investment (supposedly leading to greater macro-economic stability) and reduce fiscal pressures on state budgets (Cherni and Preston, 2007, pp. 144–5).

Although the World Bank emphasized that the reforms' principle objective was service expansion, 'specific policies for rural electrification were not integral to the initial reforms' and it was mistakenly assumed that improvements would be 'an almost inevitable consequence of better market operations' (Cherni and Preston, 2007, p. 145). In general, rural electrification is not considered a profitable market, particularly in developing countries. The clients' physical isolation, the low density of settlements and minimal consumption all increase the per capita and per kWh cost of distribution and maintenance. Unsurprisingly, therefore, rural electrification often found itself left by the wayside following privatization. Initial increases in private investment (particularly in Latin America) fell after 1997 due to 'poor returns and uncertainty about possible regulatory developments' (IEA, 2004, p. 355). On the whole, tariffs have increased in developing countries (particularly in rural areas), rural electrification rates have experienced sharp drops and electricity consumption has declined as a result of the reforms (Haanyika, 2006).

In light of these market inadequacies and a heightened awareness concerning the importance of electrification for human and economic development (particularly with regard to achieving the Millennium Development Goals) (DFID, 2002; GNESD, 2007), the governments of some developing countries such as Brazil and Peru subsequently reasserted their role as key providers of rural electrification. They introduced specific rural electrification laws, regulations, funds, subsidies and authorities, thereby improving their institutional frameworks to better meet service expansion needs (Haanyika, 2006). A specific rural electrification fund even had to be established in Chile, where reforms had initially been considered successful, since 'the progress of rural electrification lagged as a result of the privatization of the power sector' (Barnes and Halpern, 2001, p. 35).

Nevertheless, these retrofit measures left much room for improvement (Cherni and Preston, 2007). For example, the mere creation of a rural electrification fund from 'the proceeds of the sale of the public electricity companies' has proved unlikely to succeed, either the 'urban-based utility (public or private) [often] acquires the majority of funds, [and only extends] service marginally along the periphery of the existing grid' or the 'funds remain unutilized as the traditional utilities, public or private, face strong political and financial pressures to focus their resources on the urban and peri-urban customer base' (Barnes and Halpern, 2001, p. 33). Therefore, alternative delivery models have been sought to better target rural electrification. The outcomes of some of these models will be reviewed in the next section.

3. The experiences of rural electrification delivery models

Private sector investment is often believed to be vital for a programme's long-term sustainability and a number of different approaches aimed at encouraging private sector participation have been tried across developing countries (Barnes and Halpern, 2001). These range from dealer networks offering consumer credit schemes for solar home systems (for example, in Kenya), the creation of concessionary areas for rural electrification (for example, in north-west Argentina) and the assisted development of emerging retail markets for local energy service companies (for example, in India, Sri Lanka and Laos).

The success of the above delivery models has been mixed. While the dealer credit approach has been successful in Kenya, it has tended not to work as well in countries where a strong network presence is not already available (Barnes and Halpern, 2001, p. 33). In Sri Lanka dealers in a World Bank-funded project rejected a credit scheme 'because of the time and difficulties associated with collecting fees' (Bond et al., 2007, p. 6539). The experience with concessionary companies in Peru has shown that they tend to focus on those areas closest to the existing grid network that are most likely to create a profit, rather than prioritizing areas on the basis of social development needs (Miranda and Soria, 2006). Nevertheless, this model has been more successful in countries where output-based contracting subsidies have been introduced (for example, in Chile, Argentina, Cape Verde and Panama) (Barnes and Halpern, 2001).

These output-based targets, 'using private providers and linking payments of subsidies to outputs', appear to be particularly adept at mobilizing private investment whilst ensuring that subsidies are well-targeted and operational efficiency is achieved (Tomkins, 2001, p. 47). For example, 'when many areas are being electrified under a phased programme, grants are paid as a certain number of villages gain access to electricity or a certain number of consumers get connections' (Tomkins, 2001, p. 50). In this way, the government is able to direct the concessionary's investment towards the areas of greatest need, whilst minimizing budgetary expenditure and regulating participating companies on the basis of contracts (Barnes and Halpern, 2001, pp. 33–34). However, even with such subsidies in place, uptake can be slow and the process of monitoring and ensuring accountability can present administrative challenges for governments (Tomkins, 2001, p. 55).

The funding of local businesses to provide electricity services has been favoured by international donors such as the World Bank. Nieuwenhout et al. (2001) point out that this 'approach centralizes the requirement for capital, which can make financing easier' (Bond et al., 2007, p. 6539). The World Bank works alongside motivated communities or local entrepreneurs to develop viable business models before they can seek further assistance with loans and subsidies (Martinot et al., 2001, p. 55). Ensuring that businesses offer a high quality of service is essential since service quality directly impacts their customers' willingness to pay (Nieuwenhout et al., 2001) and untimely fee collection remains one of the most important barriers to a successful business model (Bond et al., 2007).

To combat these pitfalls, some businesses have introduced adjusted payment schedules and tariff levels (such as cross subsidies) for poorer users (Srinivasan, 2005). Prepayment technologies (such as those used in South Africa) can also be used to limit demand and help 'customers not to incur unaffordable consumption costs' (Bekker et al., 2008, p. 3133–4). The small and medium-sized business approach has seen some success. In Zambia, following the requests of local energy service companies (ESCOs), the government no longer donates PV systems but allows ESCOs to purchase the systems from them over a 20-year period, passing on system ownership at the end of the sale (Ellegard et al., 2004, p. 1259–60).

However, while micro-enterprise management models for off-grid rural electrification projects can be successful post-installation (as shown in the model promoted by the international non-governmental organization Practical Action in Peru) (Sanchez, 2007), it is often considerably more challenging to engage local entrepreneurs in the initial capital investment stage. Experience in Mali, Morocco and South Africa shows that local entrepreneurs are not encouraged to become shareholders in the Decentralized Services Societies established by the international