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Driving and hindering factors for rural electrification in developing countries: Lessons from Bangladesh



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HIGHLIGHTS

- Rural electrification is essential for bringing about socio-economic developments.
- The pace of rural electrification in the developing countries has been very slow.
- A multitude of issues plays behind in making the task a success or a failure.
- Lack of policy reforms, unrealistic tariffs are the main hinderers.
- Rural electrification cannot be successful by sticking to a rigid model.

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ABSTRACT

Rural electrification is essential for bringing about social and economic developments, but the progress is distressingly slow in most developing countries. The Bangladesh Rural Electrification Program (BREP) has been highlighted as a positive case among developing countries, but from 2006 onwards there have been doubts about the program's chances of success. In this paper, we examine the rural electrification practices in Bangladesh and evaluate the claim that, whereas they were successful up to 2005, they then began to decline in terms of their performance. This study determines the factors behind the initial success of the program as well as those that account for the recent downturn in BREP. We found that the BREP was a clear success in terms of its growth and progress; however, its performance has been declining since 2006. The key driving factors for the success of this program had to do with prioritizing system investment, community involvement, anti-corruption features, standardized practices and performance-based incentives while excluding political parties. The major issues accounting for the decline were the lack of organizational autonomy, a shortage of funding, unrealistic tariffs, and power supply shortages. Renewable-based, off-grid technologies have been successfully supplementing the on-grid program in remote areas.

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1. Introduction

Rural electrification is an essential element in bringing about the social and economic development of the underprivileged rural populations (Barnes, 2007; Barnes et al., 2011; ESMAP, 2007; Palit and Chaurey, 2011; World Bank, 2010a). Still, 1.3 billion people around the world do not have access to electricity, 85% of whom live in rural areas (IEA, 2010). When considering the great importance of electricity, the international community has long emphasized the need to expand modern energy services (including electricity) to the populations of developing countries to alleviate poverty and address other economic, social and environmental issues (IEA, 2010). Governments of all countries have given a high priority to providing access to electricity for their citizens (World Bank, 2008a). Despite the continuous efforts of the

Abbreviations and acronyms: BDT, Bangladesh Taka (1US\$=70 BDT, 2010); BPDB, Bangladesh Power Development Board; BREP, Bangladesh Rural Electrification Program; IDA, International Development Association; IDCOL, Infrastructure Development Company Limited; IEA, International Energy Agency; NRECA, National Rural Electric Cooperative Association; PBS, Palli Bidyut Samity (Rural Electric Cooperative, REC); PO, Partner Organization; PTA, Performance Target Agreement; REB, Rural Electrification Board; REP, Rural Electrification Program; RET, Renewable Energy Technology.

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international community and governments throughout the world, the pace of rural electrification in many developing countries is still very slow (Paul, 2011).

Rural electrification typically poses more challenges than urban electrification in terms of policy, finance, and institutional setup because of its distinct features. Some of the common features that make rural electrification more difficult than urban electrification are the lower number of connections per kilometer of line, the low level of consumption, the lack of industrial load, the heterogeneous landscape, and the lack of motivation for private investors. Despite these challenges, some developing countries have been more successful in providing electricity to their rural populations (Barnes, 2007; Mohan, 1988).

Bangladesh Rural Electrification Program (BREP) was initially applauded for being one of the most successful programs of its kind in a developing country. The country started its rural electrification program in 1980, when barely 2% of rural people had electricity (10% overall coverage). From the beginning, the performance of this program was treated as an exemplary model for other low income countries to emulate (Taniguchi and Kaneko, 2009). Despite the fact that rural electricity coverage in Bangladesh was not very high (35%) compared to other major rural electrification cases, such as Vietnam (33%), Sri Lanka (79%), India (53%), and the Philippines (33%), Bangladesh's REP possessed many unique characteristics that helped label it a successful and made it an exemplary model for other struggling countries. The program received a very distinctive status in South Asian countries with respect to its well-functioning administrative and financial operations and steady progress. The program also pioneered a model for how to tackle adverse economic conditions, a poor infrastructure, and inefficient government services. In light of this distinctiveness, many countries, such as India, Nepal, Senegal and Rwanda, sought to learn from Bangladesh's rural electrification experience. But since 2006, the program has been facing many issues that are raising doubts about its success (Taniguchi and Kaneko, 2009).

International organizations and research institutions have conducted numerous research and case studies to determine the issues influencing the REP's performance (Barnes and Foley, 2004; Fulkerson et al., 2005; Palit and Chaurey, 2011; Peters et al., 2009). Barnes (2007), for instance, summarize the crucial factors determining the success of rural electrification programs in developing countries. These studies allow for the fact that the performances of the different programs vary due to a number of different factors. Although the rural electrification program in Bangladesh has been an applauded case, no study has been performed to figure out the real causes behind its performance. In this paper, we comprehensively examine the Bangladesh's REP with the aim of evaluating the extent to which the program is successful and later cast doubt on the reasons for its success. We also determine the driving and hindering features influencing the performance of the program. This study can provide valuable insights for other developing countries facing electricity access problems.

This paper is organized in the following manner. Section 1 introduces the background to the problems and the research objectives of this paper. Section 2 discusses the methodological approach adopted in this paper. Section 3 describes the status of rural electrification in Bangladesh and its position in major developing countries. Section 4 presents the challenging features of rural electrification in a generic form for developing countries, but emphasizes that they are equally applicable in Bangladesh's case. Section 5 provides a rural electrification overview for Bangladesh, while Sections 5.1–5.3 deal with technology, institutional, and financing policy issues. Section 6 describes the performance of rural electrification in Bangladesh and examines the extent of the program's successes as well as its setbacks. Section 7

highlights the driving factors behind the success of the on-grid and off-grid rural electrification program in Bangladesh. Section 8 presents the factors hampering the success of the program. Section 9 presents the corrective measures needed to tackle the issues hindering the program, and finally, Section 10 offers some conclusions.

2. Methodological approach

This paper examines the Bangladesh Rural Electrification Program (BREP) with the aim of evaluating the performance and determining the driving and hindering factors influencing the performance of the program. The rural electrification program involved multiple aspects such a technology, institutional and financing policy issues, and there appear no clear methodological framework to deal with the aspects together. This paper, therefore, used exploratory research approach to evaluate the performances and applied features of BREP to gain insights and lessons from this program. This paper evaluated the performances of BREP in terms of progress and growth of village coverage, line constructed, and connection established. The driving and hindering factors behind the performance of BREP were derived from the insights gained from this program and literatures on successful cases.

3. Rural electrification status in Bangladesh and its position within developing countries

Bangladesh is a country of 162 million people; 73% of the people live in rural areas. Of 117 million rural people, only 35% of them (41 million) had access to electricity as of December 2010. Bangladesh set the target to provide electricity to everyone by the year 2020. Until the year 2006, the country had every year provided electricity to an additional 4.4 million rural people by expanding the grid. The government's study finds that grid extension alone will not be sufficient to achieve the target of providing electricity to everyone. Thus, Bangladesh has taken serious efforts to disseminate renewable energy technologies, and consequently, it now hopes to bring 10 million rural people under renewable-based, off-grid electrification systems by 2012. If the trend continues, the country would achieve electrification for everyone by 2020. However, since 2006 there have been doubts that the grid-based rural electrification program will achieve its targets.

From a developing country perspective, the majority (64%) of the people who do not have access to electricity live in South Asia and Sub-Saharan Africa (Table 1). Among the major countries that are greatly facing challenges in providing access to electricity, Bangladesh is one of the top-ranked countries in terms of the number of people with and without electricity. In South Asia, 493 million people do not have access to electricity, and Bangladesh is the second largest country after India in terms of the number of people who do not have access to electricity.

The number of people who are gaining access to electricity each year is quite remarkable, but the population growth rates are even higher than the electrification rates in many developing countries. In its new policy scenarios of 2010,¹ the IEA predicts that 1.2 billion people will still lack access to electricity in the year 2030 and most (87%) of them will be living in rural areas. Though the progress of rural electrification is on course, there is still a long way to go and further dedicated efforts are required to provide

¹ The 2010 edition of the world energy outlook sets out three policy scenarios for the year 2035. According to these definitions, the new policy scenario takes into account the broad policy commitments that were already announced in June 2010.

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