



SUMMARY DOCUMENT

Possible Ways of Minimization of the Rural Electrification Cost in Nepalese Context

For

Rural Electrification Development Alliance of Nepal (REGDAN)

Summary

This study's purpose was to examine ways in which the costs of rural electrification in Nepal could be minimised. The project analysed: i) the implementation modalities, ii) current difficulties and issues and iii) the possible ways to minimise costs. The project identified the difficulties of rural electrification in Nepal – particularly with poor economic returns available from projects that have high initial investment, but low revenue potential. Costs of rural electrification were analysed for Butwal Power Company (BPC), South Lalitpur Rural Electric Cooperative (SLREC) and Nepal Electricity Authority (NEA). Various recommendations were made as to possible ways to reduce costs whilst improving services.

About REGDAN

The Rural Electrification Global Development Alliance of Nepal (REGDAN), consisting of Butwal Power Company (BPC), South Lalitpur Rural Electric Cooperative (SLREC) and Winrock International, Nepal (WI), has been formed to facilitate sustainable and cost effective expansion of electrification services to rural areas. The partners, through this alliance, are extending rural electrification services to new areas emphasizing equitable distribution of electricity benefits, promotion of innovations in technology, financing mechanisms and management systems. The partners believe that this effort sets a new standard for extending sustainable rural electrification in Nepal through public-private partnership that promotes innovations, which reduce costs but increase the quality of rural electrification.

About the Study

In order to undertake cost effective rural electrification in a sustainable manner, it has become essential to develop suitable rural electrification models. Winrock International Nepal (WIN) commissioned People, Energy and Environment Development Association (PEEDA) to undertake this study of “Possible Ways of the Minimization of the Rural Electrification Cost in the Nepalese Context”. The major objectives of the study were (i) to analyze the cost of grid-based rural electrification under different implementation modalities and organizations (such as government, public and private ownership, namely, SLREC and BPC), (ii) identify the current difficulties, problems and issues related to rural electrification, analyze the ownership and management options under different modalities and finally, (iii) determine the possible ways of cost minimization of rural electrification.

PEEDA designed detailed questionnaire and checklist for use in field surveys. Using these, data of 42 different projects were collected from different RE implementation agencies of Nepal namely, BPC, SLREC and NEA. These projects deal with different technologies, physical terrain, and local socio-economic as well as levels of infrastructure developments. In order to make the projects comparable, analysis was done on per consumer basis. Various suggestions are then given in extending sustainable rural electrification with reduced cost but improved quality.



From the analysis, the cost of distribution line per consumer is found to be the least in case of BPC as compared to that of SLREC and NEA. The considerable distances between the households are responsible for making the SLREC and NEA schemes costlier. When the cost distribution of different major components (such as poles, conductors, transformers, etc) out of the total cost of electrification were compared in between BPC, SLREC and NEA, BPC had invested relatively smaller amount i.e. only 8% of the total cost of electrification in transformers and majority of the costs consists of investment in poles and conductors. On the per consumer basis, the cost of poles, conductor and transformer were the highest in case of SLREC. When the cost of different types of commonly used poles were analysed, the cost of steel pole was almost 6 times higher than that of concrete and wooden poles. In case of conductor, the cost of bundled conductor was much more expensive (around NRs 30,000/km higher in case of 2-wire, and the difference in cost was almost double in case of 4-wire) than the ACSR conductor. Since our objective was to analyze the cost of grid-based rural electrification, this study has attempted to calculate the average per unit cost of substations and transmission lines of different voltage levels. In case of NEA, the non-technical loss, due to various fraudulent activities, is found to be as high as the technical loss in a system. The different approaches of BPC, SLREC and NEA in planning, implementation and construction are discussed in the report.

The presently faced challenges and difficulties related to rural electrification are:

- Losses in distribution network
- Theft by direct hooking from nearby Low Voltage (LV) line
- Lack of use of appropriate and/or innovative technology
- High investment and low return

Based on the above analysis, the study presents various options for reducing the cost of Rural Electrification as follows:

- 1kV system
- Cut-out metering method
- Ready-made house wiring
- Bundled conductor
- Single phase techniques
- Use of local materials for poles
- SWER (Single wire earth return) technique
- Implementation of participatory concept
- Promotion of the effective use of electricity
- Proper demand forecast and network planning
- Prioritizing areas of rural electrification
- Enabling environment for private sector participation
- Smart Subsidy

Project Data

- Project Period: October to November 2007
- Client: Winrock International
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