

TECHNICAL ASSISTANCE COMPLETION REPORT

Division : South Asia Energy Division (SAEN)

TA No., Country and Name			Amount Approved: \$700,000		
TA 4766-BHU : Accelerated Rural Electrification			Revised Amount: \$700,000		
Executing Agency Department of Energy		Source of Funding \$300,000 (Government of Finland); \$400,000 (TASF- Others)	Amount Undisbursed: \$23,256.82	Amount Utilized: \$676,473.18	
TA Approval Date: 28 Feb 2006	TA Signing Date: 29 Mar 2006	Fielding of First Consultant: 4 Sep 2006	TA Completion Date Original: 30 Jun 2008 Actual: 31 Dec 2009		
			Account Closing Date Original: 30 Jun 2008 Actual: 30 Jun 2010		
Description					
<p>Bhutan has been only the South Asia country with a surplus electricity, which is exported to India. Despite of the nation's power surplus, most people in Bhutan was not able to access to electricity as of 2006. Approximately 65% of rural households had no access to electricity. Base on the Rural Electrification Master Plan formulated in 2005, the Government of Bhutan set up its development goal to achieve 100% electrification in the country by 2020. While the master plan mainly included grid extensions to rural households, solar power electrification was also considered on an off-grid basis in remote areas where access is difficult or population is scattered.</p> <p>The Government promoted rural electrification through the Department of Energy (DOE). After the power sector reforms in 2001-02, DOE became the government's policy and planning entity and the Bhutan Power Corporation (BPC) was spin off from DOE to promote implementation of rural electrification through grid extensions. The responsibilities for implementing off-grid rural electrification only were retained by DOE.</p> <p>During the decade from 1995 to 2006, the Asian Development Bank (ADB) had helped Bhutan expand rural electrification through three consecutive loans. To continue the development for rural electrification and facilitate the achievement of the development goal, the government requested ADB to provide an advisory technical assistance (TA) project for DOE and BPC in formulating new approaches that could accelerate rural electrification. The TA was requested to address various issues, covering policy reforms, institutional arrangements, capacity building, financing, quality assurance, and funding coordination. The TA was thus envisaged to provide valuable inputs on rural electrification for the Tenth Five Year Plan (2008-2013) and for future ADB financing for rural electrification.</p>					
Expected Impact, Outcome and Outputs					
<p>The TA was designed to improve the overall efficiency of the power sector and expand the coverage of rural electrification. It will achieve this impact by (i) developing new approaches to accelerating rural electrification through the involvement of other government agencies, the private sector, and communities; (ii) pilot-testing private sector or community-based models for rural electrification; and (iii) conducting training, building capacity, and raising awareness of how they may be involved in rural electrification among district and block development planners, development consultants, private entrepreneurs, and contractors. The TA planned to develop the necessary institutional framework to expand rural electrification, and help prepare any subsequent investment projects for rural electrification and renewable energy development that was programmed after 2008.</p> <p>The TA intended to make the following three outputs:</p> <p>(i) Component 1: New approaches to accelerating rural electrification through grid expansion. The first component aimed to recommend institutional models for involving the various levels of governments, the private sector, and communities in rural electrification. These models should include a wide range of options including cooperatives, energy supply services, outsourcing of billing and collection, and operation and maintenance of distribution systems. The new approaches were expected to be pilot-tested before considering their adaptation and replication.</p> <p>(ii) Component 2: New approaches to accelerating rural electrification through off-grid renewable energy use. This component was envisaged to recommend and pilot-test business options for using renewable energy in rural electrification, specific policies, incentives, and institutional arrangements needed to facilitate such options.</p> <p>(iii) Component 3: Training, capacity building, and raising awareness. Workshops, seminars, and study tours were expected to contribute to improving awareness of other government agencies, contractors, and communities which involve in rural electrification.</p>					
Delivery of Inputs and Conduct of Activities					
The TA was approved on 28 February 2006, and the consultancy services were contracted on 25 July 2006. The					

services were provided from 4 September 2006 to 31 December 2009. Their completion was extended twice for a cumulative extension of one year from the original completion date. The extension was requested for implementation support mainly for action plans proposed by the TA. To manage procurement of solar home systems for off-grid rural electrification, the database was developed. Also, specific training programs were rolled out for DOE and BPC staff and contracted village technicians for rural electrification operations jointly with the Japan International Corporation Agency (JICA). In spite of the extension, the TA's input was productive since some action plans were implemented.

During the TA implementation, the consulting firm provided a total of 13.0 person-months from international consultants and 45.5 person-months from national consultants. The consulting services were also extended to an individual national consultant (with 3.0 person-month) to assist environmental assessment for on-grid pilot rural electrification project sites. The total person-month input is much greater than envisaged particularly for national consultant within the budget; the economy of input was well-managed. The executing agency was satisfied with the input provided from the consultant. The performance of the consultant, the executing agency, and ADB support were considered thus satisfactory.

Evaluation of Outputs and Achievement of Outcome

The TA focused on the operations, maintenance and sustainability aspects of on-grid and off-grid rural electrification. A pilot on-grid electrification project was tested for BPC at selected villages to promote efficient technology transfer of single phase transformers and telescopic poles from Nepal, which are now to be applied for the next phase of physical projects financed by ADB.¹ To effectively manage DOE's off-grid rural electrification through solar home systems, the TA developed operational procedures based on the database system as well as handbooks and guidelines. A series of workshops and training were also conducted to create awareness and capacity of efficient construction for linemen, local contractors, and contracted community technicians. To establish the community base management for further remote rural electrification, training programs were organized for community electricians from their villages. They developed their skills in house wiring, meter reading, bill delivery and collection and minor maintenance required for operations of on-grid and off-grid rural electrification. This will eventually create employment opportunities for villagers and at the same time help DOE and BPC in carrying its operational work efficiently in remote villages. This scheme was further studied and refined to be applied for the ongoing ADB and JICA financed projects for rural electrification. Under the projects, 120 community technicians plan to be deployed.

For on-grid rural electrification component, six pilot projects were undertaken. Capacity building activities included training of DOE/BPC staff and construction contractors on awareness of BPC construction standards, and study tour to Nepal and Thailand to see new technological applications. As part of the process of unifying the standards, the TA also developed procedures and monitoring of off-grid electrification, database for solar home system procurement under the off-grid rural electrification component.

Overall Assessment and Rating

The TA is rated as successful. The TA was efficient and effective as it has produced useful outputs within the budget and pilot tested some approaches adopted for subsequent physical projects. DOE and BPC were satisfied with the TA outcome achieved. While the TA was extended mainly to implement new approaches, it eventually contributed to assuring the overall quality of the outputs.

Major Lessons

It is valuable to study and pilot test new approaches in advance of any subsequent physical financing projects. Such a consistent approach is expected to make synergy effects between capacity development TA and financing projects. Lessons learned from the TA were reflected to the Rural Renewable Energy Development Project.¹

Recommendations and Follow-Up Actions

There are no further follow-up actions.

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¹ ADB. 2010. *Report and Recommendation of the President to the Board of Directors: Proposed Grant to the Kingdom of Bhutan for the Rural Renewable Energy Development Project*. Manila.