Case Study

# Rural Renewable Energy Development Project

Bhutan

February 2012

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| Quick facts | |
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| Donor | Asian Development Bank |
| Time scale | October 2010 - June 2015 |
| Topic | Renewable energy |
| Lead agency | Department of Energy - Ministry of Economic Affairs |

Rural electrification has been an integral part of the Royal Government of Bhutan's strategy to reduce poverty and stimulate economic activities in rural areas. From 2005 to 2009, an average growth rate of 17% per year was observed in the domestic demand for electricity in Bhutan. Moreover, overall electricity consumption was projected to increase as rural economies developed and households increasingly relied on electricity.

Power supply shortages have been experienced in Bhutan, especially during the dry winter season. This is mainly due to the fact that hydropower is the major source of energy in Bhutan and despite an annual net power surplus, power generation from the plants is very seasonal i.e. in winter, the hydropower generation is reduced due to low river flows. Therefore, the existing generation system has been unable to meet the rapid increase in demand during the dry winter peak periods. For this reason, the Bhutan Power Corporation has been forced to limit power supply to the industry sector during past winters, resulting in economic and revenue losses. Importing power from India was evaluated as a potential solution, but was deemed unfeasible due to India's severe power deficit.

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# Rural Renewable Energy Development Project

Bhutan

In view of the rising demand for electricity and increasing reliance on hydropower as an energy source, it was deemed critical to broaden the energy mix by means of harnessing other forms of clean renewable energy sources. In order to improve national energy security, the Department of Energy, Ministry of Economic Affairs of Bhutan developed a renewable energy policy. The policy aims to promote alternative renewable energy sources other than large hydropower, and to diversify the energy supply base through wind, solar, biomass, and micro hydropower. Since wider rural electrification coverage was expected to make the domestic demand supply balance even tighter, it was ascertained that additional alternative energy sources were required to be developed to meet the country's demand. It was also decided that the option to export additional power from renewable energy to neighboring countries be left open, if there was availability of surplus power in the future.

With respect to rural electrification, the Asian Development Bank approved a grant of US$21.59 million for the 'Rural Renewable Energy Development Project' in Bhutan. The agency with overall responsibility for the project execution is the Department of Energy - Ministry of Economic Affairs. The grant was approved on the 29th October 2010 and the project is scheduled to be completed by the 30th June 2015.

The main components of the project are:

i. on-grid rural electrification sourced from hydropower (5,075 new households);
ii. off-grid rural electrification sourced from solar power (1,896 new solar home systems installed and 2,500 existing systems rehabilitated);
iii. establishment and grid-connection of pilot wind power generation mills (two 180-kilowatt turbines and three additional wind masts installed); and
iv. a pilot program to promote domestic biogas plants (1,600 new households).

The implementing agencies are:

i. Bhutan Power Corporation for the on-grid rural electrification and wind power components;
ii. Department of Energy for the off-grid rural electrification; and
iii. Department of Livestock, Ministry of Agriculture and Forests and Bhutan Development Bank (formerly known as the Bhutan Development Finance Corporation) for the biogas component.

The project areas are scattered throughout the country – six Dzongkhags (districts) i.e. Lhuentse, Mongar, Samdrup Jongkhar, Trashigang, Trashiyangtse, and Zhemgang in the eastern and central regions for on-grid rural electrification; Tshimalakha in Chukha as a pilot project site for wind power generation; and Chukha, Samtse, Tsirang, and Sarpang as pilot target areas for the biogas plants.

Initial environmental examination was prepared for all project components as per ADB's Safeguard Policy 2009, the Royal Government of Bhutan's Environmental Impact Assessment Guidelines and other policies and legislations. The project has been environmentally classified as a Category B Project, as it is not expected to result in any adverse irreversible impacts. Furthermore, environmental clearance has been issued for all components by the National Environment Commission of Bhutan.

All relevant stakeholders, including affected communities and people, were consulted during the project preparation i.e. design and planning phases. Furthermore, public consultation with all stakeholders will continue throughout project implementation, as required by the ADB Safeguard Policy Statement. The project has proved beneficial for poverty reduction and income generation. As rural areas usually fall behind in access to both social services and income opportunities, the grid's expansion, along with development of other infrastructure

# Rural Renewable Energy Development Project

Bhutan

such as roads and public utilities, is expected to boost the local economy and provide additional health, educational and recreational related benefits. The Bhutan Power Corporation will assign 120 village technicians (40% women) responsible for performing on-grid and off-grid rural electrification operation and maintenance services.

The impact of the project will be to sustain inclusive economic growth by widening the access to reliable and affordable clean energy services. As an outcome, the coverage and mix of clean energy supply will be expanded throughout the country in a sustainable manner. In sum, the project will contribute to achieving the Royal Government of Bhutan's goal of "electricity for all" by 2013. The latter will be achieved by diversifying energy supply sources to meet a growing demand (particularly in the winter dry seasons) and by introducing modern cooking to rural households using renewable and clean biogas.

## References

Draft 'Bhutan Renewable Energy Policy 2011'.
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## Photos, press clippings, video materials:

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