United Nations Framework Convention on Climate Change

CDM PROJECT CO-BENEFITS IN THE CHENDEBJI, BHUTAN

Micro hydro power contributing to sustainable rural electrification

Project description	**The e7 Bhutan Micro Hydro Power Project supplies electricity to the village of Chendebji, previously without reliable electricity, from a dedicated 70 kW run-of-river micro hydro turbine on the edge of the village.** Electrification of villages in this region from the Bhutan grid has proven extremely challenging due to the local geography, resulting in many communities suffering a lack of reliable electricity. Electricity from the turbine is now used in domestic and commercial properties, and replaces a range of fuels including wood (cooking, heating, hot water), kerosene (lighting) and diesel (electricity generation).
Co-benefits	**The project illustrates how the CDM can deliver a range of benefits for small isolated mountain communities by:** • Providing access to low-cost electricity and free hot water for the first time to many domestic and commercial customers – to date, 50 households, 5 municipal buildings (including a dispensary) and a temple are connected • Reducing the time and effort involved with collecting firewood and cooking, enabling more productive activities such as weaving and tending livestock • Improving indoor air quality by providing electric rice and curry cookers in place of traditional indoor wood-fired stoves • Enhancing educational opportunities by allowing longer study times at home and providing access to electronic learning devices

"School going children used to study for just 30 minutes since lighting with kerosene for prolonged periods of time used to cost a lot. The free hot water service is appreciated especially during cold winter months." (comments from project participants)

KEY PROJECT BENEFIT

Providing electricity to, and improving the livelihoods of, isolated mountain communities

A wide range of benefits, including improved sanitation services, domestic cooking, heating, and lighting

The turbine house, transmission lines, turbine and generator at Chendebji (courtesy of Choten Duba)

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CO-BENEFITS IN DETAIL

Economic	• Provides low-cost, low-emissions electricity to households for the first time, constituting only 2 % of the average annual income (Nu. 1,92/year ≈ 0.040 USD/year) • Frees up time spent collecting firewood and cooking using slower methods, with all households now having an electric rice cooker and curry cooker, and with the time saved now being used for more productive activities, including social, domestic and educational activities, as well as traditional weaving which generates additional income • Facilitates commercial developments, including a new restaurant, guesthouse and a village store
Social	• Generates approximately 30 kW of power for hot water at the turbine house for use in a free-of-charge communal bathing and washing facility, with over 20 households regularly using this service, particularly in colder months • Replaces wood-fired heating, cooking and hot water generation, with villagers previously needing to collect two bundles (equivalent to two head loads) per household every day in the winter • Enables the use of electric cooking appliances, improving indoor air quality and eliminating smoke inhalation during cooking, with attendant health benefits • Enables the use of vaccine refrigerators, tele-medicine capabilities, and other electric medical devices at the village dispensary • Introduces new electricity-powered learning tools (such as television and computers) and lighting, enabling further education activities during the evening hours
Empowerment	• Increases time available for educational activities by enabling the use of electric rather than high-cost kerosene lamps, increasing time for homework from 30 minutes to 1.5 hours • Involves the community in project planning and implementation

PROJECT FACTS

Project title & number	e7 Bhutan Micro Hydro Power CDM Project – 62
Project type & methodology	Hydro – Run of river AMS-I.A – Electricity generation by the user
Location	Chendebji, Trongsa District, Bhutan Lat: 27° 27' 12" N Long: 90° 19' 30" E
History & CERs	Registered: 23 May 2005 Project operational life: 21 years Expected CERs: 524 (tCO_2 eq/year) Expected total CERs: 11,004 (tCO_2 eq) CERs issued to date: 474
Project link	<http://cdm.unfccc.int/Projects/DB/JACO1113389887.76/view>
Facts as at	November 2010

Chendebji Turbine House and overflow channel (courtesy of Choten Duba)

This factsheet has been compiled from information provided by project participants of the CDM project, either through the project design document, monitoring reports or subsequent correspondence with project participants. The information is not verified as part of the CDM registration or issuance processes. This factsheet is one of a series produced by the UNFCCC secretariat to highlight the types of co-benefits generated by the CDM.