Lessons from Bhutan Micro Hydro Power CDM Project

Takao Shiraishi, Kansai Electric Co., e8 member

Renewable Energy & Sustainable Development
in Jakarta, Indonesia
January 19-20, 2009

Location of Bhutan
Objectives of the Project

• To demonstrate the first project under the Clean Development Mechanism (CDM) based on a micro hydropower station

• To construct a micro hydropower station in a remote village in Bhutan to support Rural Electrification

• To contribute to the CDM rule-making process by presenting the problems encountered and corrective measures taken
History of the Project

2001/11: Pre-feasibility Study conducted for a micro hydropower station.

2002/11: Feasibility Study conducted. The e7 Fund and the Bhutan government concluded an MoU.

2003/6: Government of Japan, as Annex I country, approved the project as a CDM.

2004/2: Government of Bhutan approved the project as CDM project as host country (Non Annex I country).

2005/5: Project was registered as a CDM project by UNFCCC.

2005/8: Project began generating electricity.

2007/9: Two years monitoring finished

Outlined Map of Project Site

Power House Output: 70 kW

Effective head: 50m
Chendebji Electrification Map

Executive Board of CDM
- Approval as CDM Project
- CO₂ Credit

Designated Operational Entity (DOE)
- Approval as CDM Project
- validation, verification, certification

Funding Organizations
- Government of Japan (France/Canada)
- e7 Bhutan Project
- e7 Fund

Micro Hydro Power Station
- O&M
- Pay Rates
- Local Community
- Sell Power
- Construct the Power House
- EPC Contractor

Department of Energy (DOE)
- Nepal Commission Secretariat (NECS)
- Government of Bhutan
- Ministry of Finance (MOF)

*DNA: Designated National Authority (Focal Point)
Pre-Feasibility Study
Pre-Feasibility Study Report
Tender Preparation
Contract
Construction Preparation
Construction
Monitoring

Start of Operation

Project beneficiary (Chendebji)
Power House

Electricity Generator (Alternator)
- Maximum operating water: 0.2m³/s
- Rated output: 70 kW
- Expected annual generation: 582,540 kWh
- Expected Annual CER generation: 500t-CO₂/year for 21 years
Distribution Lines

Public Consultation
Studying under Kerosene Lamps (in absence of electricity – before project)

Dining under Electricity (after project)
Lessons Learnt by Host Party

• Bhutan is grateful to e8 for selecting Bhutan as host country to pilot its first CDM project

• For successful implementation of CDM project, the Annex I party and the host country should have a very friendly and long standing relationship (The Bhutan-e8 relationship dates back to 1998)

• For pilot projects, the smaller the size, the better because it does not cost much when problems are encountered; we now have more confidence for going into larger CDM projects although certain rules still need to be clarified

Lessons Learnt by Host Party (cont.)

• Strong, CDM conversant and proactive DNA is essential for successful implementation of CDM project

• Adequate CDM awareness among policy/decision makers is necessary for timely approval of the CDM project by the host government

• Easy to justify CDM project if there is sufficient evidence of CDM benefits

• A basic CDM lesson: preparing the PDD is not easy, the DOE would like to verify everything in the PDD before the validation report is issued
Lessons Learnt by Host Party (cont.)

• Stakeholders, especially local ones, need to be well informed of climate change and related impacts

• Involvement of all stakeholders, especially the community directly affected by the project, from planning through to operation, is essential and helps the community take ownership of the project

• Host party should understand all relevant laws and regulations in the host country in order to avoid delay during project implementation

Lessons Learnt by Host Party (cont.)

• Sustainable Development is real and measurable

• Examples of progress in the few months since the project was completed:
  – new restaurant and new shop (economic sustainability)
  – students perform relatively better in studies
  – increase in local CDM capacity (social sustainability)
  – community buys less kerosene for lighting (environment sustainability)

• Close cooperation and proper technology transfer to local counterparts is essential for long term sustainability
Lessons Learnt by e8

Project Selection

- Simplified Small-Scale CDM (SSC) process benefits project developers by allowing faster and easier completion of the entire process than with normal scale CDM.

- Cooperation with and involvement of the host country greatly facilitates the CDM process.

Lessons Learnt by e8 (cont.)

Rural Electrification Project

- Easy to justify 'additionality' because of project's financial barrier.

- Emissions reductions from Rural Electrification projects are too small to cover CDM-related costs. Not attractive for investors.

Need more incentives. e.g. Use of public funds?
Lessons Learnt by e8 (cont.)

Transaction Costs for SSC project

To encourage 'Micro Hydro' Scale CDM projects, and despite the reduction in the high $5,000 registration fee, Monitoring, Verification and Certification procedures should be simplified or skipped to reduce transaction costs.

Need for some 'bail out' measures!

Flow of CDM Approval
Result of Monitoring

- There were some troubles on mechanical and operation at initial stage.
- In spite of some initial troubles, the power station is operating smoothly.
Thank you for your kind attention!

For more information:
shiraisi@kepco.co.jp