Chapter 28
Application of Clean Development Mechanism (CDM) in Renewable Energy Generation from Micro-Hydel Projects of Himachal Pradesh

A. N. Sarkar
Asia-Pacific Institute of Management, India

ABSTRACT

Clean Development Mechanism (CDM) is defined as one of the “flexibility” mechanisms that allows entities based in Developed Countries (Annex I Parties) to develop emission-reducing projects in Developing Countries (non-Annex I Parties), and generate tradable carbon credits corresponding to the volume of carbon emission reductions achieved by those projects. CDM projects have been developed in several parts of the world across the sectoral economies, including renewable energy, with reportedly varying degrees of success and failures. In the renewable energy segment, CDM has been successfully deployed in Micro-Hydel power projects to mitigate and offset green-house gas emissions into the environment. The experiences of different implementing states are vastly different in past decade. CDM applications in Micro-Hydel projects have been quite notable to generate hydro-power and mitigate emissions in the state. This paper takes a holistic review about the current status in the performance of CDM projects in India, with special reference to Himachal Pradesh, particularly in the context of Small (Micro)-Hydel projects with a very high renewable energy potential. The achievements as well as strategy of implementation of Small-Hydel projects in Himachal Pradesh is discussed in the light of selected case studies of CDM projects that are at various stages of formulation, designing and implementation. Guidelines for CDM project designing and the potential for carbon markets for the hydro-power in the context of Himachal Pradesh is discussed. Some of the shortcomings in implementation of Micro-Hydel CDM project in the State are also discussed and highlighted in the paper. The paper has also examined the status of implementation and the quality of projects in the form of illustrative case studies in terms of their ability for energy extraction, creating energy trading opportunities, and stakeholder participation in sharing the project benefits during the lifetime as well as the beyond the life-time of the projects.

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CLEAN DEVELOPMENT MECHANISM (CDM): THE DEFINITION AND CONCEPT

The United Nations Framework Convention on Climate Change (UNFCCC)—adopted in 1992 and bought into force in 1994—established an international framework to address global climate change through stabilization of greenhouse gas concentrations in the earth’s atmosphere. In 1997, at Kyoto, the world’s industrialized countries agreed, in principle, to cut their emissions of greenhouse gases by about five per cent from 1990 levels, by implementing any of these three mechanisms—joint implementation, CDM and emission trading. The CDM is one of the flexible arrangements under the Kyoto protocol, supporting the implementation of sustainable and environment-friendly technologies in developing countries by which emissions could be cut down. By implementing such projects countries, earn CER credits, each equivalent to one tonne of CO₂. These CERs can be traded and sold, and used by industrialized countries to meet a part of their emission reduction targets under the Kyoto Protocol. As on 16 May 2011, with 6,147 CDM projects in various parts of the world, a total of 3,034 projects have been registered with the UNFCCC. All these projects will help reduce 2,756,999 thousand tonnes and 9,067,564 thousand tonnes of carbon dioxide by the end of 2012 and 2020, respectively (provided the UNFCCC registers them all).

Kyoto Protocol (IPCC, 2007) has defined Clean Development Mechanism (CDM) as one of the “flexibility” mechanisms that allows entities based in Developed Countries (Annex I Parties) to develop emission-reducing projects in Developing Countries (non-Annex I Parties), and generate tradable carbon credits corresponding to the volume of carbon emission reductions achieved by those projects. These credits can be counted towards meeting Kyoto targets in Developed countries. The tradable credits are known as “Certified Emission Reductions” (CERs). One CER is equivalent to one metric tonne of carbon dioxide (CO₂) avoided or reduced (1tCO₂=1CER). This is to be achieved by allowing the Annex I countries to meet part of their caps using “Certified Emission Reductions” from CDM emission reduction projects in developing countries (Carbon Trust, 2009). During the first year of project through renewable energy, energy efficiency, and fuel switching (World Bank, 2010).

The Article 12 of the Protocol defined CDM by aiming to meet two the most important objectives round the globe. The first objective is to assist parties not included in Annex I in achieving sustainable development and in contributing to the ultimate objective of the United Nations Framework Convention on Climate Change (UNFCCC, 1997, 2006, 2007 & 2010), which is to prevent dangerous climate change; and the second is to assist parties included in Annex I in achieving compliance with their quantified emission limitation and reduction commitments (greenhouse gas (GHG) emission caps). CDM projects cover a wide array of sectors and technologies involving energy consumption or generation, ranging from the installation of renewable energy generation plants to landfill methane capture, and from animal waste management to fossil fuel switching ((REN-21, 2009). The first CDM project was registered on 18 November 2004, a landfill methane reduction project in Rio de Janeiro, Brazil. Since then, more than two thousand CDM projects have been registered all over the world, and are expected to reduce 336 million tonnes equivalent of CO₂ per year. The CDM has successfully enabled Developed Countries to off-set their greenhouse gas (ghg) emissions, alongside domestic reduction and avoidance, while enabling cleaner development in the Developing Countries. The concept of CDM in the context of energy and environmental security has recently been further expanded to include clean technology, green technology, green energy, eco-innovation, green branding, eco-labelling etc. (Sarkar, 2009,2010a&b, 2011a&b, 2012a,b&c, 2013).