

Development of a CDM Project Contributing to Global Warming Prevention and Sustainable Development

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1. Introduction

The Third Session of the Conference of the Parties held in Kyoto (COP-3) agreed the Kyoto Protocol, which legally binds reduction target on greenhouse gas emissions for industrial countries. Japan promised to reduce the emission volume by 6% from the 1990 level. In COP-3 they also approved three mechanisms to assist each industrial country in achieving the target: emissions trading (ET), joint implementation (JI) and clean development mechanism (CDM). The authors have been conducting the feasibility study to develop a CDM project in Malaysia, which attempts to collect the landfill gas (LFG) from a final landfill and to generate power by the collected LFG. Development of a CDM project includes not only examination of technical, social and financial feasibility and making conceptual design but also obtaining approvals from the various organizations pertinent to CDM. How a CDM project is being developed is discussed in this paper.

2. CDM

CDM is designed to help industrial countries meet their own binding emissions targets and to help developing countries achieve sustainable development. In CDM, industrial countries implement projects that can reduce greenhouse gas emissions in developing countries, and their activities result in certified emissions reductions (CER), which can be used to achieve the targets.

Since the CDM involves emissions in developing countries, which do not have targets, this in effect increases the overall emissions cap. Approval, validation and verification are therefore particularly important for this mechanism. Review of these applications will be made by a designated operational entity (DOE) accredited from the CDM executive board, by the New Methodology Panel and by the CDM executive board.

3. Outline of Project

This LFG collection and power generation project plans to be implemented at the Krubong Landfill, City of Melaka, Malaysia, where 750 tons of solid waste is dumped daily and is scheduled to be closed within two years. Total amount of solid waste at this landfill is assessed at 2 million tons when it closes.

The landfill may be covered with soil after its closure to contain the LFG and minimize rain water seeping into the landfill. This should contribute to the safety closure of the landfill. The LFG will be collected by the facility comprising of vertically driven perforated wells and pipes connecting the vertical wells and running on the top surface of the landfill (Refer to Sketch below).

It is very important in terms of the facility design and financial feasibility to evaluate the LFG volume that the project will be able to collect. For accurate estimate, the site investigation was made by digging five boreholes. In the site investigation, the waste samples obtained from the boreholes are analyzed at laboratory, and the volume and composition of the LFG coming up from the boreholes are measured. By applying an estimation model with its parameters calibrated by the findings from the site investigation, it is estimated to collect 190,000tons of the LFG in CO₂ equivalent in the first year and 70,000tons in the 10th year. The project is assumed to last ten years.

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One or two gas engines will be installed in the landfill area near the gate to generate electricity, which will be sold to the power company through the Small Renewable Energy Program in Malaysia.

There are a few options on how to operate this CDM project, one of which is an operation by a special purpose company participated by Japanese and Malaysian companies. The financial analysis based on those estimates suggests it is commercially feasible only with CER.



4. Greenhouse Gas Emissions Reduction

The greenhouse gas emission reduction is computed by the difference in the emission volume with and without the project. Since it is difficult to measure emission volume from landfills in general, captured volume is measured and is converted to emission reduction volume. The emission volume without the project is termed the baseline emission. The baseline emission is not the emission volume at present but considers changes in policies, regulations, social conditions, business opportunities and others, which may take place during the crediting period. It should be decided in the conservative, explicit and logical manner. Since it turns out that all the LFG would emit to the air without this project, the project could earn CER equivalent to the methane gas volume in the LFG it collects. In addition, the power generated by this project will replace the electricity generated by burning fossil fuel, and due CER could be credited.

5. Approval Process

Each country is supposed to have an organization to manage CDM projects. In Malaysia, National Steering Committee on CDM (NSCCDM) was established under National Steering Committee on Climate Change to promote CDM projects and administer CDM applications. There are two technical committees under NSCCDM, where CDM application is submitted to for review. To apply, a formal paper called "Project Idea Note (PIN)" has to be filled in and should be submitted. After approval is obtained both from the Japanese Government and Malaysian Government, the validated PDD by DOE will be submitted to the New Methodology Panel and CDM Executive Board for approval and registration.

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