



Analysis of technology transfer in CDM projects: An update

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ABSTRACT

The clean development mechanism (CDM) contributes to technology transfer by financing emission reduction projects using technologies not available in the host countries. This paper provides the most comprehensive analysis of technology transfer in the CDM to-date, covering 3296 registered and proposed projects. Roughly 36% of the projects accounting for 59% of the annual emission reductions claim to involve technology transfer. Technology transfer is more common for larger projects and projects with foreign participants. Technology transfer is very heterogeneous across project types and usually involves both knowledge and equipment. As the number of projects increases, technology transfer occurs beyond the individual projects. This is observed for several of the most common project types in China and Brazil with the result that the rate of technology transfer for new projects in those countries has fallen significantly.

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1. Introduction

The clean development Mechanism (CDM) does not have an explicit technology transfer mandate, but it contributes to technology transfer by financing emission reduction projects that use technologies currently not available in the host countries. In their project design documents (PDDs) the project participants are requested to “include a description of how environmentally safe and sound technology and know-how to be used is transferred to the host Party(ies)”¹.

The technology transfer claims for CDM projects have been analysed by various researchers for groups of proposed and/or registered projects. Technology transfer claims are related to project characteristics, such as project type and size. Some researchers have also analysed the role of the host country. This paper contributes to the literature in two ways. First, it covers a substantially larger number of projects (3296) than the earlier analyses enabling more robust statistical analyses and capturing changes in the mix of projects. Second, it analyses trends in technology transfer via CDM projects and finds that technology transfer occurs beyond the individual projects.

Technology transfer, data sources and the contributions of this paper to are discussed in the next section. Section 3 updates the patterns of technology transfer for CDM projects. Section 4

analyses trends in technology transfer in the CDM. Conclusions are provided in Section 5.

2. Technology transfer in the CDM

2.1. Technology transfer

In its Special Report on Methodological and Technological Issues in Technology Transfer, the Intergovernmental Panel on Climate Change (IPCC) defines technology transfer “as a broad set of processes covering the flows of know-how, experience and equipment for mitigating and adapting to climate change amongst different stakeholders such as governments, private sector entities, financial institutions, non-governmental organizations (NGOs) and research/education institutions”².

This definition covers every relevant flow of hardware, software, information and knowledge between and within countries, from developed to developing countries and vice versa whether on purely commercial terms or on a preferential basis. The IPCC acknowledges that “the treatment of technology transfer in this report is much broader than that in the UNFCCC or of any particular article of that convention”³.

To evaluate the contribution of the CDM to technology transfer, Schneider et al. (2008) focus on the purchase of technology via trade and transfer of technology as part of an investment.⁴

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¹ UNFCCC (2006, p. 16).

² IPCC (2000, p. 3).

³ IPCC (2000, p. 3).

Technology transfer for a CDM project implemented unilaterally by a host country entity would involve the purchase of technology. A CDM project implemented jointly by developed and developing country entities could involve technology transfer as part of the project investment.

The CDM does not define “technology transfer” so the statements relating to technology transfer reflect the definitions implicitly used by project participants. It can be inferred from the claims that project participants almost universally interpret technology transfer as meaning the use by the CDM project of equipment and/or knowledge not previously available in the host country. The focus is on the technology transfer, if any, associated with the specific CDM project.

2.2. The CDM pipeline

Before a proposed project is registered, an independent designated operational entity (DOE) must validate it to ensure that it meets all of the requirements of a CDM project. As part of this process the DOE must solicit public comments on the proposed project. Once public comments are requested for a project it is considered to be in the CDM pipeline. A high percentage of the proposed projects that enter the pipeline are eventually registered.⁵

This paper analyses the technology transfer claims in the PDDs of 3296 projects in the CDM pipeline as of June 2008, of which over 1000 had been registered. Since most proposed projects are eventually registered, using the projects in the pipeline provides a much larger population for the analysis with essentially the same characteristics as registered projects.

The CDM Pipeline for June 2008 is the primary source of data for the projects⁶ (Fenhann, 2008). It classifies projects into 26 different project types. A few new project types have been added and some projects have been reclassified over time. A CDM project may be implemented by project participants from the host country alone – a “unilateral” project – or jointly with foreign participants. Small projects may use simplified baseline and monitoring modalities.⁷

Information about technology transfer has to be collected from the individual PDDs. In many cases the PDD explicitly states that the project involves no transfer of technology. Where claims for technology transfer were made, they were coded for the nature of the technology transfer activity (imported equipment, training local staff, etc.). The codes distinguish transfer of both equipment and knowledge from transfer of equipment or knowledge alone. In addition to the nature of the technology transfer, the source countries were recorded.⁸

⁴ Worrell et al. (2001) discuss transfer of energy efficient technologies for industry prior to establishment of the CDM.

⁵ The CDM Pipeline (Fenhann, 2008) for December 2008 indicates that 1243 projects had been registered while 107 had been withdrawn or rejected; a success rate of 92%.

⁶ It lists, *inter alia*, the host country, the project type, the methodology used, the estimated annual emission reductions, and the countries that have agreed to buy credits generated by the project. Projects with no credit buyer are classified as “unilateral” projects.

⁷ The definition of a small-scale project has changed over time. To use a small-scale methodology to calculate the emission reductions, a proposed project must meet the definition of a small-scale project applicable when the PDD is prepared. Since a project is classified as a small-scale project based on the methodology used, the definition of small-scale when the PDD was prepared applies for the project. A few projects use both a small-scale methodology and a methodology for a regular project. Those projects are classified as regular projects.

⁸ If the source was not identified, the project's developers were contacted to determine the origins of the technology. Often the source is not known because the

A host country can incorporate technology transfer requirements into its criteria for approval of CDM projects.⁹ In addition, host country characteristics, such as tariffs or other barriers to imports of relevant technologies, perceived and effective protection of intellectual property rights, and restrictions on foreign investment, can have an impact on technology transfer.

2.3. Previous analyses

The technology transfer claims for CDM projects have been analysed by various researchers for groups of registered projects (De Coninck et al., 2007; Dechezleprêtre et al., 2007) and for groups of proposed and registered projects (Haïtes et al., 2006; Seres, 2007; Seres, 2008). This paper covers a much larger number of projects (3296) than any of the earlier analyses capturing changes in the mix of projects and enabling more robust statistical analyses.

This paper replicates the analysis of technology transfer claims by project characteristics of previous studies. The larger number of projects covered by this study allows analyses of the sources of imported technology and links between technology supply and credit purchases. Potential market power by technology suppliers is also analysed. Host countries can have a significant impact on the rate of technology transfer.

This paper is the first to analyse trends in technology transfer via CDM projects. As the number of projects in the pipeline has grown, the mix has changed and the average size has fallen. The frequency of technology transfer claims has declined as a share of the estimated annual emission reductions. The rate of technology transfer has fallen significantly in two of the three host countries with the largest number of projects – China and Brazil – and remained low in the third – India. This trend suggests that more projects of a given type can lead to technology transfer beyond the individual CDM projects.

3. Patterns of technology transfer for CDM projects

3.1. Technology transfer by project type

Table 1 shows the percentage of projects and of estimated annual emission reductions for which technology transfer is claimed by project type. Technology transfer is claimed for 36% of the projects representing 59% of the estimated annual emission reductions. Technology transfer ranges from 0% to 100% for different project types. Technology transfer rates are low for mature technologies such as cement, fugitive methane, and hydro.¹⁰ Projects that claim technology transfer are, on average, substantially larger than those that make no technology transfer claim. This is true for most project types as well.

The patterns are broadly similar for unilateral and small-scale projects. Over 39% of all projects are unilateral projects, but they account for only about 21% of the annual emission reductions.¹¹ About 30% of the unilateral projects claim technology transfer and those that claim technology transfer are somewhat larger than the

(footnote continued)

technology supplier for a proposed project has not yet been selected, so the source remains “unknown” for about 20% of the projects that claim technology transfer.

⁹ Van der Gaast et al. (2009) provides insights on improving the CDM for technology transfer in accordance with host countries' development priorities.

¹⁰ Dechezleprêtre et al. (2008, p. 24) find low innovation rates for cement, methane, hydro, ocean, and geothermal indicating that these are mature technologies that probably are already available in many developing countries leading to low rates of technology transfer.

¹¹ All but two – Energy distribution and Transport – of the 26 project types have unilateral projects.

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