

Science for Environment Policy

Factors influencing wind power technology transfer

New research has investigated the many ways in which technological transfer occurs for wind power projects in developing countries. These range from trading with developed countries, to local innovation. In India and China, successful transfer was found to depend more on existing capabilities in these countries than international projects, such as the Clean Development Mechanism (CDM).

The CDM¹ is designed to enable projects in developing countries to reduce their GHG emissions using support from developed countries. In return, developed countries receive carbon credits that contribute towards their commitments to reduce emissions. Although it is not a formal obligation, the CDM aims to promote the transfer of [technology](#) from developed to developing countries.

The study researched this aim by investigating how technological transfer has occurred for wind power CDM projects. It used a broad definition of technological transfer that considers skills and knowledge, as well as actual equipment, such as turbines. The researchers analysed a range of information sources for their study: project development documents, researched annual reports, supplier websites, industry reports and academic journals, as well as interviews with experts and company officials. In total, they assessed 182 wind CDM projects in 14 countries. India and China were the major host countries, accounting for 86% of these projects. They are also major producers of wind power technology; 73.6% of wind turbines for CDM projects are manufactured within their borders (either by national companies or foreign companies established there).

From these projects, the study identified five different mechanisms by which technological transfer can occur. The first was international trade, whereby turbines are imported from abroad: roughly one quarter (24.2%) of the projects fell within this category. The second is foreign development investment, whereby foreign countries establish subsidiaries in the host country: this accounted for 19.5% of the projects.

A total of 14.7% of the projects were joint ventures, which have a business association between a foreign company and a local company to share equity and risks. Nearly a quarter (23.7%) of projects used licensing, whereby the foreign company entered a legal contract with the local company to give intellectual property rights for technology. Finally, in 17.9% of the projects, a locally owned firm provided their own innovation and technology.

These findings illustrate the complexity and variety of technology transfer. However, a broad range of mechanisms is only seen in India and China. In China, wind power initially relied on trade with Europe, but by 2010, the share of domestically manufactured turbines rose by 100%. Joint ventures emerged and foreign development investments became important, helped by energy and industrial policies that introduced feed-in tariffs and wind-energy obligations for energy companies, whilst providing subsidies for technology and R&D on the supply side.

The story in India was different. Again, international trade was an important form of initial technological transfer, but higher customs duties attracted foreign development investment, joint ventures and licensing agreements. The study suggests that in both China and India it is questionable whether the CDM was actually an instigator of the impressive wind industry, or a contributor further down the line to enable developments.



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1. See: <http://cdm.unfccc.int>