Current development

Implementing the Clean Development Mechanism in China

Duan Maosheng\textsuperscript{a} and Erik Haites\textsuperscript{b}

China accounts for a significant share of global clean development mechanism (CDM) potential. So far, China has lagged behind other large developing countries, such as Brazil and India, in implementing a system for approval of CDM projects. But China now has the foundations for effective participation in the CDM. Eighteen projects had been approved and three had been registered by the CDM Executive Board by the end of 2005. China’s CDM rules have been published, with several aspects of the previously draft CDM rules being modified or clarified. However, the CDM knowledge and awareness of policymakers at the local level needs to be enhanced, and to enable implementation of CDM projects in the rapidly developing energy sector, which is a high priority for China, capacity building for development and commercial banks serving this sector is urgently required.

\textit{Keywords:} China, Clean development mechanism

1. Introduction

The clean development mechanism (CDM) allows greenhouse-gas emission-reduction and afforestation/reforestation projects in developing countries that have ratified the Kyoto Protocol to earn certified emission reductions (CERs).\textsuperscript{1} CERs can be used by industrialized countries that have national emission-limitation commitments under the Kyoto Protocol (Annex I parties) to help meet those commitments.\textsuperscript{2}

To earn CERs, a CDM project must go through an international approval process, which includes approval by the host country, supervised by the CDM Executive Board. The main purpose of the international process is to ensure that the emission reductions or removals are additional to any that would occur in the absence of the project. The designated agency of the host government (designated national authority) must approve the project and indicate that the project assists the country in achieving sustainable development.

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\textsuperscript{1} Afforestation/reforestation projects can earn temporary CERs (tCERs) or long-term CERs (lCERs), which are subject to rules designed to ensure the permanence of the removal. In this paper, CERs should be interpreted to include tCERs and lCERs unless specifically stated otherwise.
\textsuperscript{2} In addition, installations subject to the European Union Emissions Trading Scheme can use CERs for compliance with their obligations from 2005.
Various estimates and indicators suggest that China represents a significant share of the global CDM potential. Thus, the manner in which the CDM is implemented in China could affect the global supply and market price of CERs.

This paper describes the enabling environment for CDM projects in China. Section 2 summarizes the estimates of CDM potential for China. Section 3 outlines the roles and responsibilities of government agencies involved in the approval of a CDM project. Section 4 presents the requirements the Chinese government has established for CDM projects. The contribution to sustainable development criteria, environmental impact assessment (EIA) requirements, and public consultation requirements for CDM projects are presented in the next three sections. Section 8 discusses financing of CDM projects by development and commercial banks in China. Section 9 analyzes the possible synergy between the CDM and China’s energy program. How to realize China's CDM potential is discussed in section 10. Section 11 draws some conclusions.

2. Estimates of CDM potential

Table 1 presents several estimates and indicators of the regional distribution of CDM potential. The data cover all developing countries regardless of their ratification of the Kyoto Protocol. The definitions of the regions may differ among data sources. Some of the estimates include sinks while others do not. Several of the indicators are not directly related to greenhouse gases, but those that are focus only on energy-related CO₂ emissions.

The data suggest that China has 25 percent to 45 percent of the global CDM potential for greenhouse gas emission reduction and removal. China's potential is roughly equivalent to that of the rest of Asia and larger than that of Latin America, Africa, or the Middle East.

China's potential is not yet reflected in registered CDM projects. As of December 31, 2005, only three CDM projects from China had been registered and they represented 1.2 percent of the annual reductions of the 63 projects registered. The projects submitted for validation as of December 22, 2005 suggest that China may achieve its estimated potential for greenhouse gas emission reductions. The 22 projects in China account for 35 percent of the total annual emission reductions of the 513 projects submitted for validation as of that date (Fenhann 2005). However, four HFC-23-destruction projects represent 94 percent of China’s total annual reductions. India and Brazil, with about 200 and 100 projects submitted for validation as of December 22, 2005 each account for about 17 percent of the total annual emission reduction. India (39 percent) and Brazil (16 percent) dominated the emission reductions from developing countries sold between January 2004 and April 2005 (Lecocq and Capoor 2005, 23, figure 3).

3. HFC-23 is one of the hydrofluorocarbon family, chemical compounds that are potent greenhouse gases regulated by the Kyoto Protocol. The total annual emission reductions, as in the case of China, are strongly influenced by nine HFC-23-destruction projects, which account for 45 percent of the total (Fenhann 2005).

4. The data have been adjusted to exclude sales of emission reductions originating in OECD and Transition Economy countries. The rest of Latin America (27 percent) and the rest of Asia (18 percent) account for the balance of the sales during this period.
As of December 31, 2005, China had approved 18 proposed CDM projects and provided a letter of no-objection for 10 others. These 28 projects include eight methane-recovery-and-utilization projects, 11 wind-power, three small-hydropower, one energy-conservation, four HFC-23-destruction, and one fuel-switching project. All of the projects, except the HFC-23-destruction and fuel-switching projects, fall into China’s priority areas for CDM projects, but the HFC-23 projects dominate the annual emission reductions.

Table 1. Estimates and indicators of the regional distribution of CDM potential

<table>
<thead>
<tr>
<th></th>
<th>China</th>
<th>Asia ex. China</th>
<th>Latin America</th>
<th>Africa</th>
<th>Middle East</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimates of CDM potential</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jakeman et al. (2001)(^a)</td>
<td>31%</td>
<td>31%</td>
<td>12%</td>
<td>4%</td>
<td>9%</td>
</tr>
<tr>
<td>Jotzo and Michaelowa (2002)(^b)</td>
<td>47%</td>
<td>25%</td>
<td>7%</td>
<td>11%</td>
<td>11%</td>
</tr>
<tr>
<td>Sijm et al. (2000)(^c)</td>
<td>71 to 78%</td>
<td>10 to 13%</td>
<td>5 to 8%</td>
<td>4 to 11%</td>
<td></td>
</tr>
<tr>
<td>Trexler and Associates (2003)</td>
<td>63 to 75%</td>
<td>7 to 15%</td>
<td>5 to 14%</td>
<td>9 to 13%</td>
<td></td>
</tr>
<tr>
<td>Indicators of CDM potential</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>World energy-related CO(_2) emissions 2010(^d)</td>
<td>35%</td>
<td>30%</td>
<td>14%</td>
<td>8%</td>
<td>13%</td>
</tr>
<tr>
<td>CO(_2) emissions growth 2000 to 2010(^d)</td>
<td>45%</td>
<td>26%</td>
<td>13%</td>
<td>5%</td>
<td>10%</td>
</tr>
<tr>
<td>World population 2000(^e)</td>
<td>26%</td>
<td>42%</td>
<td>11%</td>
<td>13%</td>
<td>8%</td>
</tr>
<tr>
<td>World GDP 2000 (purchasing power parity)(^f)</td>
<td>26%</td>
<td>36%</td>
<td>20%</td>
<td>6%</td>
<td>12%</td>
</tr>
<tr>
<td>World GDP 2000 (market exchange rates)(^f)</td>
<td>18%</td>
<td>37%</td>
<td>25%</td>
<td>10%</td>
<td>10%</td>
</tr>
<tr>
<td>Projected 2010 world GDP (market exchange rates)(^f)</td>
<td>23%</td>
<td>39%</td>
<td>21%</td>
<td>9%</td>
<td>8%</td>
</tr>
<tr>
<td>World official development assistance 1997–2001(^g)</td>
<td>4%</td>
<td>33%</td>
<td>13%</td>
<td>50%</td>
<td>–</td>
</tr>
<tr>
<td>World foreign direct investment 1997–2002(^h)</td>
<td>26%</td>
<td>15%</td>
<td>50%</td>
<td>9%</td>
<td>–</td>
</tr>
<tr>
<td>Projected energy investment 2001–2010(^i)</td>
<td>30%</td>
<td>25%</td>
<td>18%</td>
<td>13%</td>
<td>14%</td>
</tr>
</tbody>
</table>


3. Institutional structure for CDM projects in China

The Chinese government has long recognized the importance of mitigating climate change as an important part of sustainable development. In February 1990, the State Council established the National
Climate Change Coordination Committee to coordinate and formulate policies and measures with regard to climate change. As part of the governmental reorganization in 1998, the State Council replaced it with the new National Coordination Committee on Climate Change (NCCCC). In March 2003, China’s new State Council restructured some government institutions, which affected the membership of the committee. The membership of the NCCCC, and of the National CDM Board (NCDMB) as of December 31, 2005 are shown in table 2.

Table 2. Members of the National Coordination Committee on Climate Change (NCCCC) and National CDM Board (NCDMB)

<table>
<thead>
<tr>
<th>NCCCC</th>
<th>NCDMB</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Development and Reform Commission (NDRC)</td>
<td>Chair</td>
</tr>
<tr>
<td>Ministry of Science and Technology (MOST)</td>
<td>Vice-chair</td>
</tr>
<tr>
<td>Ministry of Foreign Affairs (MFA)</td>
<td>Vice-chair</td>
</tr>
<tr>
<td>China Meteorological Administration</td>
<td>Vice-chair</td>
</tr>
<tr>
<td>State Environmental Protection Administration</td>
<td>Vice-chair</td>
</tr>
<tr>
<td>Ministry of Finance</td>
<td>Member</td>
</tr>
<tr>
<td>Ministry of Agriculture</td>
<td>Member</td>
</tr>
<tr>
<td>Ministry of Water Resources</td>
<td>Member</td>
</tr>
<tr>
<td>Ministry of Communications</td>
<td>Member</td>
</tr>
<tr>
<td>Ministry of Construction</td>
<td>Member</td>
</tr>
<tr>
<td>Ministry of Commerce</td>
<td>Member</td>
</tr>
<tr>
<td>State Forestry Administration</td>
<td>Member</td>
</tr>
<tr>
<td>State Oceanic Administration</td>
<td>Member</td>
</tr>
<tr>
<td>Chinese Academy of Sciences</td>
<td>Member</td>
</tr>
<tr>
<td>Civil Aviation Administration of China</td>
<td>Member</td>
</tr>
</tbody>
</table>

The NCCCC is responsible for coordination of important activities, policies, and measures relating to climate change. NCCCC staff, located in the NDRC offices, are responsible for coordination and management of domestic activities relevant to climate change, especially activities related to the implementation of the United Nations Framework Convention on Climate Change (UNFCCC).

On June 30, 2004, the Interim Measures for Operation and Management of Clean Development Mechanism Projects in China came into force and established the rules and procedures for management of CDM projects in China. Based on the experience gained through the approval of CDM projects as well as feedback from stakeholders, the Chinese government issued the Measures for Operation and Management of Clean Development Mechanism Projects in China on October 12, 2005,5 which clarify several issues raised by the interim measures.

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The institutional structure for management of CDM projects in China has been established. Overall responsibility rests with the NCCCC. The NCDMB serves as the executing agency of the NCCCC. As shown in table 2, its members comprise about half of the institutions represented on the NCCCC.

The NCCCC is responsible for the review and coordination of China’s CDM policies. More specifically, its responsibilities are to:

- Review national CDM policies, rules, and standards
- Approve members of the NCDMB
- Review other issues deemed necessary

The responsibilities of the NCDMB are to:

- Review CDM projects with respect to:
  - Participation qualifications
  - Project design documents
  - Baseline methodology and emission reductions
  - Price of CERs
  - Terms relating to funding and technology transfer
  - Crediting period
  - Monitoring plan
  - Expected contribution to sustainable development
  - Compliance with EIA requirements
- Report to the NCCCC on the overall progress of CDM projects, emerging issues, and further recommendations
- Recommend amendments to China’s rules and procedures for CDM

The NDRC, as chair of the NCCCC and co-chair of the NCDMB, has been designated as China’s designated national authority for the CDM. In that capacity, the NDRC has the following responsibilities:

- To accept applications for proposed CDM projects
- To approve proposed CDM projects jointly with MOST and MFA on the basis of the decision of the NCDMB
- To issue written approval letters on behalf of the Government of China
- To supervise the implementation of CDM projects
- To deal with other relevant issues

This institutional arrangement may appear complex, but the project proponent deals only with NDRC, the focal point for CDM project approval, and is not involved in coordination with the other agencies.
4. Requirements for CDM projects in China

China believes that both developed and developing countries can benefit from CDM projects. To meet the requirements of the CDM, attract foreign financing, and ensure that China benefits from CDM projects, the Interim Measures for Operation and Management of Clean Development Mechanism Projects in China specify that CDM projects must satisfy the following general requirements:

- CDM projects must be consistent with China’s laws and regulations, sustainable development strategies and policies, and the overall requirements for national economic and social development planning.
- Implementation of CDM projects must not impose any new obligations on China.
- CDM projects must be approved by relevant departments under the State Council.
- Developed-country funding for CDM projects must be additional to their current official development assistance and their financial obligations under the UNFCCC.
- CDM projects should promote transfer of environmentally sound technology to China.
- Implementation of CDM projects must be transparent and efficient and ensure accountability.
- Current priority areas for CDM projects are energy efficiency, development and utilization of new and renewable energy, and methane recovery and utilization.
- The Chinese partner must be Chinese-funded or a Chinese-held enterprise.

The Interim Measures also prescribed that “revenue from the transfer of CERs shall be owned jointly by the Government of China and the project owner, with allocation ratio of the revenue to be decided by the Government of China.” This generated many questions from international and domestic stakeholders. In response, the recently released Measures prescribe that “the allocation ratios of the revenue are: (1) the government charges 65 percent of the revenue from the transfer of CERs, for HFC and PFC CDM projects; (2) the government charges 30 percent of the revenue from the transfer of CERs, for N2O CDM projects; (3) the government charges 2 percent of the revenue from the transfer of CERs, for priority as well as afforestation and reforestation CDM projects.” These revenue-sharing provisions do not apply to projects approved prior to October 12, 2005.

The above provisions affect mainly CDM projects abating non-CO2 gases, with the objectives being to:

- Ensure that CDM projects hosted by China really contribute to the country’s sustainable development
- Balance the funds flowing into different types of CDM projects
- Encourage the development of priority CDM projects in China
- Mitigate possible negative impacts of certain types of CDM projects

The Measures specify that “charges by the Government of China on CDM projects will be used to support climate change-related activities. Specific rules on the collection and utilization of the charges will be formulated separately by Ministry of Finance in consultation with NDRC and other relevant
The Government of China has decided to establish a Clean Development Fund with the charges, and is now in the process of developing the detailed rules of the fund.6

According to the Measures, the Government will also accept CDM projects without CER buyers from Annex I parties, so unilateral CDM projects are now possible in China.

5. Contribution to sustainable development

The host government must confirm in writing that a proposed CDM project assists it in achieving sustainable development. The Chinese government did not include a specific sustainable development requirement in the Measures. Rather, CDM projects will be expected to conform to China’s sustainable development strategy and policies. The project proponent identifies the sustainable development benefits of the proposed project—including contribution to the economy, the environment, employment, education, and/or poverty alleviation—in the CDM project application form. This allows the project proponent considerable flexibility in elaborating the sustainable development benefits of the proposed CDM project.


The contribution of a proposed CDM project to sustainable development also may be assessed relative to national and regional priorities for industrial development. Those priorities are outlined in the List of Advantageous Industries for Foreign Investments in Central and Western Regions (NDRC and Ministry of Commerce 2004), Guiding List of Industries for Foreign Investments (SDPC, SETC, and MoFTEC 2002), Tenth Five-Year Plan (2001–2005) (available at http://www.ndrc.gov.cn/), the Catalogue of Currently Encouraged Industries, Products and Technologies (State Economic and Trade Commission 2000), and the sustainable-development strategies of more than 20 provinces.

Based on these resources, a proposed CDM project could be considered as supportive of China’s sustainable development if it:

- Supports the sustainable development goals and actions of the national and local governments
- Matches the national and local industrial development plans/programs
- Is in an industry for which investment is encouraged
- Uses encouraged technologies or produces encouraged products
- Yields environmental benefits, such as reduction of other air pollutants
- Yields social benefits, such as improved quality of life for the local population or alleviation of poverty, and/or

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Yields economic benefits, such as attraction of new investment, or increased local employment

Twenty-three of the 28 projects approved or for which a letter of no-objection has been provided fall into the priority areas specified by the Chinese government in the Measures. They all have obvious sustainable development benefits. The others are four HFC-23-destruction projects and one fuel-switching project. China is the world’s largest emitter of HFC-23. The sustainable development benefits of HFC-23 destruction are not obvious. The Government thus has decided to collect 65 percent of the CER sales revenue and use the funds for sustainable development projects.

6. Environmental impact assessment

If the environmental impacts of a proposed CDM project are significant, the project participants must undertake an EIA in accordance with the procedures established by the host government. The Measures do not impose a specific EIA requirement on proposed CDM projects. But any project implemented in China is subject to the relevant EIA requirements, including public participation in the EIA process.

In China, the laws governing the EIA of a project are the Environmental Protection Law—Regulations on the Environmental Protection of Construction Projects, and Environmental Impact Assessment Law of the People’s Republic of China. The laws divide projects into several categories, according to the extent of possible impact, and define the EIA requirement for each, specifically:

- In the case of possible significant impact, an EIA report, including a complete evaluation of the possible impacts, must be compiled.
- In the case of possible limited impact, an EIA report sheet must be compiled.
- In the case of little impact, an environmental impact sheet must be completed.7

The State Environmental Protection Administration has prepared a list of the EIA requirements for different project types. The EIA requirements for different types of CDM projects are given in table 3.

In addition to the national laws and regulations, some regions have EIA regulations. The Regulations of Guangdong Province on Environmental Protection in Construction Projects are an example. Thus the EIA requirements for a proposed CDM project may differ by region.

The project participants must inform the NCDMB whether an EIA is required, whether it has been completed, and whether the EIA has been approved by relevant authorities. The NCDMB simply checks that a proposed CDM project has met the relevant EIA requirements; it does not assess the environmental impacts of the proposed project. Unless the EIA document has been approved by the relevant environmental authorities, the CDM project cannot begin operation and thus cannot generate CERs.

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7. The format and required information for an EIA report, EIA report sheet, and environmental impact sheet are different. The time allotted to the relevant environmental authorities to review them and make a decision also differs. For example, the State Environmental Protection Administration must review an EIA report and make relevant decisions within 60 working days, while in the cases of an EIA report sheet and an environmental impact sheet, the time periods are 30 and 15 working days, respectively.
Table 3. Expected EIA requirements for different types of possible CDM projects

<table>
<thead>
<tr>
<th>Project type</th>
<th>EIA report</th>
<th>EIA report sheet</th>
<th>Environmental impact sheet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coal-bed methane recovery</td>
<td>√</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>(in sensitive areas)</td>
<td></td>
<td>(in other areas)</td>
<td></td>
</tr>
<tr>
<td>Thermal (except natural gas), hydro, and waste-incineration power plants</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Natural gas-fired power plants</td>
<td>√</td>
<td>(&gt;300 MW, in sensitive areas)</td>
<td></td>
</tr>
<tr>
<td>Wind, geothermal, tidal, biogas, and PV power projects</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Solid waste sanitary landfill or incineration</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forest planting</td>
<td></td>
<td>(in sensitive areas)</td>
<td>(in other areas)</td>
</tr>
<tr>
<td>Cement production</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(in sensitive areas)</td>
<td></td>
<td>(in other areas)</td>
<td></td>
</tr>
</tbody>
</table>

7. Public consultation

As part of the validation of a proposed CDM project, a designated operational entity must verify that comments by local stakeholders have been invited, a summary of the comments received has been provided, and a report on how the comments were taken into account has been received. The Measures do not establish specific requirements regarding stakeholder consultation for CDM projects. The requirement for stakeholder consultation can be met as part of the EIA process, if applicable, or through a consultation process designed by the project participants.

The Environmental Impact Assessment Law of the People’s Republic of China requires the developers of projects with possible significant impacts to invite, before submitting the EIA report to the competent authority for approval, comments from related units, experts, and the public in the form of an assessment meeting or hearing. An explanation of the reasons why the comments received have, or have not, been adopted must be included in the EIA report. Thus, the public consultation requirements of the EIA process for a proposed CDM project with possible significant impacts is likely to meet the validation requirement.

Local authorities may formulate their own requirements for stakeholder participation in EIA. For example, the Regulations of Tianjin Municipal Government on Environmental Protection in Construction Projects prescribe that the project developer shall invite the comments of units and residents in the place where the project is located, in accordance with related laws and regulations, and that the EIA report shall include a chapter describing the participation of the public.
In summary, if the potential impacts are significant and an EIA report is necessary, the EIA process requires consultation with local stakeholders in the form of an assessment meeting or hearing. If the potential impacts are limited or little, consultation with local stakeholders may be required by local regulations or the environmental protection authorities in the process of reviewing and approving the project. Consultation could take the form of a request for comments distributed by the project developer or an assessment meeting or hearing.

8. Financing CDM projects

Most of the 18 CDM projects approved by the Chinese government by December 31, 2005 have relied on foreign financing. The feasibility study for the CDM of each project was funded mainly by foreign sources, and the CDM components of these projects were financed through emission-reduction purchase contracts with Annex I governments or international carbon funds.

Development and commercial banks in China currently view CDM projects as ordinary commercial projects and ignore the expected revenue from the sale of CERs in their analyses. Chinese banks have not yet formulated rules or procedures for CDM projects. This is partly due to the very limited awareness of the CDM within the financial sector and partly due to the unattractive economic potential of many CDM projects.

To achieve China's estimated emission-reduction potential, it will be necessary for development and commercial banks to help finance viable CDM projects. The awareness of the banks regarding CDM projects will thus need to be raised. They can use their existing rules and procedures to evaluate CDM projects, but should include revenue from the sale of CERs in the analysis. They will also need to consider the risks associated with CDM projects, including, inter alia, the possibility that the project will not be approved by the Chinese government, not be validated by the designated operational entity, not be registered by the CDM Executive Board, not earn the projected quantity of CERs, or not receive the projected price for the CERs.

Since the energy sector will be the top priority for CDM project development in China, raising the awareness of development and commercial banks should focus on the groups responsible for the energy sector in banks with a large number of energy-sector clients. Once they understand the CDM, Chinese banks may develop specialized financial products aimed at CDM projects. This will happen only when the CER market has matured and the banks have gained sufficient experience with CDM projects. Considering the uncertainties related to CDM projects, the currently limited size of the international carbon market, and the relevant capacity of banks in China, the process could take some time.

9. Synergies between the CDM and China’s energy program

China is an energy giant, accounting for 11.4 percent of world energy consumption in 2001, which ranks it second, just behind the United States (International Energy Agency 2003a). China’s energy system is dominated by coal. Although its significance has been decreasing since the 1990s, coal still accounted for 67 percent of China’s total energy consumption in 2003. Most of China’s energy experts predict that coal will still account for about 60 percent of the country’s total energy consumption in
2020. The production, transportation, and use of coal have caused serious environmental problems in China.

To achieve sustainable development, China has attached great importance to energy policies that: (1) improve energy efficiency, to achieve social and economic development with less energy consumption; (2) improve the energy consumption structure, mainly by decreasing the use of coal to alleviate its environmental consequences; and (3) develop new and renewable energy, to substitute for coal and to electrify remote areas.

China plans to reduce the energy intensity of its GDP by 20 percent during 2001–2005. To achieve this, specific unit energy consumption targets have been set for such products as electricity, steel, non-ferrous metals, synthesis ammonia, cement, glass, etc., and specific energy-efficiency targets have been established for new residential and commercial buildings and industries such as metallurgy, electric power, non-ferrous metal, chemicals, building materials, light industry, textiles, and automobile manufacturing.

China also has set ambitious national renewable-energy development targets for 2005 and 2015: about 0.7 percent and 2 percent of total energy consumption respectively. China's Renewable Energy Law, which will come into force as of January 1, 2006, provides for: (1) medium- and long-term renewable-energy development goals at both central and provincial levels; (2) compulsory purchase by power grid companies of all renewable electricity generated within the coverage of their grids; (3) economic incentives, such as preferential customs duties, taxes, preferential prices, and low-interest loans, for renewable-energy technologies; and (4) support for research and development of related technologies.

There is no doubt that China's energy sector offers significant greenhouse-gas-reduction potential. Thus CDM projects to improve energy efficiency and utilize renewable energy sources could contribute to achievement of China's energy and sustainable-development goals. Evidence of this synergy is the fact that the 28 CDM projects approved or for which a letter of no-objection has been provided include eight methane-recovery-and-utilization projects, 11 wind, three small-hydro, one energy-conservation, and one fuel-switching project.

Two factors could limit the contribution of CDM projects. China's ambitious energy-efficiency and renewable-energy projects could lead to relatively stringent baselines for such projects and reduce the economic viability of the incremental emission reductions that would earn CERs. Secondly, the most cost-effective CDM projects appear to be those that yield large reductions of gases with high global warming potential, such as HFC-23 destruction. The global supply of CERs from such projects could reduce the economic viability of some energy-efficiency and renewable-energy projects.

8. The baseline for a CDM project activity should take into account relevant national and/or sectoral policies and circumstances, such as sectoral reform initiatives, local fuel availability, power-sector expansion plans, and the economic situation in the project sector. The CDM Executive Board has provided clarification on the treatment of some national and/or sectoral policies and regulations in determining a baseline scenario, but additional issues remain unresolved.

9. The global warming potential (GWP) of a greenhouse gas is its cumulative radiative forcing (a measure of its climate impact) relative to that of an equal mass (e.g., 1 ton) of CO2 over a specified time period. The Kyoto Protocol has adopted the 1995 estimates of the 100-year GWPs published by the Intergovernmental Panel on Climate Change. Methodologies submitted and/or approved, address destruction of HFC-23 (GWP of 11,700), reducing emissions of PFCs (CF4 with GWP of 6,500, and C2F6, with a GWP of 9,200) in aluminum production; destruction of N2O (GWP of 310) generated by adipic acid production; and capture and destruction or use of methane (CH4, with a GWP of 21) from landfills, oil wells, wastewater treatment plants, and animal manure.
10. Realizing China’s CDM potential

Some authors have claimed that China lags behind other developing countries in implementing a system for identification, approval, and implementation of CDM projects (Haites 2004; Michaelowa et al. 2000; Tangen and Heggelund 2003; Zhang 2004a, 2004b). But China now has the foundations for effective participation in the CDM; the basic policies have been adopted, the institutional structure to approve CDM projects has been established, and the system has been applied to a number of proposed projects. These foundations have been established with the aid of several internationally funded projects. The feasibility study for each proposed project was funded mainly by foreign sources, and their implementation is being financed through emission-reduction purchase contracts.

China also has benefited from several internationally funded CDM capacity-building projects. These projects, listed in table 4, have targeted, respectively: methodological issues; CDM case studies; CDM potential analysis; potential project development; domestic CDM policy recommendations; and training for people from industries, central and local governments, and technical support organizations. They have helped local Chinese experts and relevant national policymakers to better understand CDM issues.

To build on these foundations and realize China’s CDM potential will require several initiatives. Some of these are described below.

The CDM capacity of policymakers at local levels needs to be enhanced. Proposed CDM projects may be affected by local policies and regulations, so the support of knowledgeable local officials is a necessity for the success of CDM projects. Systematic in-depth and hands-on training for local experts who are familiar with local circumstances, is very important and necessary. The internationally funded projects have strengthened the capacity of Chinese experts sufficiently to enable them to serve as CDM trainers in China.

Capacity building is needed in the energy sector. Energy efficiency and renewable-energy projects are a priority for China and the potential for such projects is large. China’s energy sector is developing very rapidly, so prompt action is required to capture the associated low-cost emission-reduction potential.

Capacity building for groups responsible for the energy sector in development and commercial banks is urgently needed. Their lack of understanding may lead to rejection of CDM projects proposed by clients. If unilateral projects become common, the support of local financial institutions will be even more crucial.
Table 4. Selected CDM capacity-building projects in China

<table>
<thead>
<tr>
<th>Project</th>
<th>Methodological issues</th>
<th>Case studies</th>
<th>Emission reduction potential</th>
<th>Policy study</th>
<th>Training</th>
<th>Support government</th>
<th>Project identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>World Bank/GTZ/Switzerland/Italy China CDM Study Project</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>–</td>
<td>–</td>
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<tr>
<td>Asian Development Bank Opportunities for the CDM in China’s Energy Sector Project</td>
<td>–</td>
<td>x</td>
<td>–</td>
<td>–</td>
<td>x</td>
<td>x</td>
<td>x</td>
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<tr>
<td>CDM component of the China-Canada Cooperation on Climate Change (C5) Project</td>
<td>x</td>
<td>x</td>
<td>–</td>
<td>x</td>
<td>–</td>
<td>x</td>
<td>x</td>
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<tr>
<td>UNDP (UNF) Building Capacity for Clean Development Mechanism in China</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>MOST-funded projects</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
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<tr>
<td>Canada-funded Local CDM Capacity Building Project</td>
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<td>x</td>
<td>–</td>
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<td>–</td>
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<tr>
<td>Japan-funded Local CDM Capacity Building Project</td>
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<td>x</td>
<td>–</td>
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<td>x</td>
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</tbody>
</table>

Foreign governments and international development agencies can support these initiatives financially and by contributing expertise. However, China must assume increasing responsibility for the achievement of its CDM potential.

11. Conclusions

China is widely considered to be one of the most important suppliers of CERs. Estimates suggest that China represents 25 percent to 45 percent of the global CDM potential. China's potential is roughly equivalent to that of the rest of Asia and larger than that of Latin America, Africa, or the Middle East.

China has lagged behind other large developing countries, such as Brazil and India, in implementing a system for approval of CDM projects, but it now has the foundations in place for effective participation in the CDM; the basic policies have been adopted, the institutional structure to approve CDM projects has been established, and the system has been applied to a number of proposed projects. These foundations have been established with the aid of several internationally funded projects.

The Chinese government views the CDM as an important mechanism for promoting sustainable development, especially in the energy sector, and thus has made significant efforts to create a favorable environment for implementation of CDM projects. Eighteen projects had been approved and three had been registered by the CDM Executive Board as of December 31, 2005.
The CDM knowledge and awareness of policymakers at the local level needs, however, to be enhanced. Capacity building also is needed in the energy sector, because it is developing very rapidly and CDM projects in this sector are a priority. To enable CDM projects in the energy sector to be implemented, capacity building for groups in development and commercial banks serving this sector is urgently needed.

References


World Resources Institute. 2005. CAIT—The Climate Analysis Indicators Tool, version 1.5, World Resources Institute, Washington, D.C.
