Will CDM in China make a difference?

For the 2008 Berlin Conference on the Human Dimensions of Global Environmental Change International Conference of the Social-Ecological Research Programme on Long-Term Policies: Governing Social-Ecological Change, Berlin, 22-23 Feb 2008.

Draft, do not cite.

Li Ming[1,2], Joyeeta Gupta[1,3] and Onno Kuik[1],

1) Institute for Environmental Studies, Faculty of Earth and Life Sciences, VU University Amsterdam, De Boelelaan 1087, 1081 HV Amsterdam, Netherlands.
2) Europe China Power BV, Strawinskylaan 1009, 1077 XX Amsterdam, The Netherlands.
3) UNESCO-IHE Institute for Water Education, Delft, NetherlandsInstitute for Environmental Studies.

Email: liming@chinapower.nl; joyeeta.gupta@ivm.vu.nl; onno.kuik@ivm.vu.nl

Abstract (285 words):

If the climate change problem is to be effectively addressed in the long-term, it is not only important that the developed countries reduce their emissions of greenhouse gases, but also that large developing countries like China and India adopt infrastructural and other decisions that will enable them to reduce the rate of growth of their greenhouse gas emissions. The Clean Development Mechanism (CDM) is one such incentive to help these countries alter their development path. China has thus far participated actively in the CDM and is set to generate the largest amount of greenhouse gas emission credits of all the developing countries. Against this background, this paper addresses the question: Will the Clean Development Mechanism make a difference to China's development path? In order to address this question, this paper examines the development discourse in China and its current climate change policy; it examines the policy and organizational framework for decision making in China, some of the statistical information about CDM projects in China, and examines some procedural elements with respect to three brief case studies of CDM projects. On the basis of personal experience in developing projects, extensive interviews and discussions with other project developers and government officials, it assesses the key opportunities and challenges for CDM in China and concludes, inter alia, that procedural bottlenecks to promoting CDM are mostly at the international level, but that if these are addressed, these in combination with growing internal pressure to focus on harmonious development may indeed be the necessary triggers to bring long-term change in China's carbon intensive energy supply. In the meanwhile, CDM may not make much of a difference to China, but China is definitely making a major impact on CDM.

Biographies:

Li Ming is the Managing Director of Europe China Power BV, which is a renewable energy project investor focusing in China. Mr Li is also active in developing CDM related businesses between Europe and China. He has been the guest PhD researcher at Vrije Universiteit since 2006.

Joyeeta Gupta is Professor at the Vrije Universiteit, Amsterdam and Professor at the UNESCO-IHE Institute for Water Education in Delft. She has a PhD in International Law from the Vrije Universiteit, Amsterdam. Dr. Gupta's areas of expertise are in the multidisciplinary (legal, political and policy) analysis of international environmental agreements and multi-level environmental governance.

Onno Kuik is an environmental economist. He has a PhD in Economics and has written many reports and papers on the subject of climate change policies and other environmental problems.

1. Introduction

There is increasingly more evidence that climate change is both a serious and an urgent issue (IPCC 2004). There is also increasing weight given to the argument that structural decisions made at present in different parts of the world, but especially in the rapidly developing economies of the world, will have long-term impacts. This leads many to focus directly on the role of China and India in the area of climate change.

China's energy demand is growing fast to fuel its economic development. IEA (2007) projects that China's demand for primary energy over the period 2005-2030 will more than double. The major share of the increase in demand will be met by coal. Despite its vast domestic reserves and supply of coal, China became a net importer of coal in 2007 and imports are expected to grow in the future. China is already a major importer of crude oil, and its share of imports in domestic demand is expected to rise to 80 percent in 2030. The fast growth in China's energy supply and demand has negative effects on the environment. According to IEA (2007), China has overtaken the US as the biggest emitter of CO_2 in 2007 (although its per capita emissions and its historical contributions are still much lower). Without strong action, energy-related CO_2 emissions in China will more than double over the next 25 years, from 5.1 to 11.4 Gt CO_2 per year (emitting one-third of global CO_2 emissions in 2030). In addition, an unchecked expansion of coal-fired power plants based on prevailing technologies will cause severe damage to the local environment and human health (Vennemo et al., 2006, Liu et al. 2008). The challenge is big and urgent as China's cumulative investments in energy infrastructure over the next 25 years are expected to total about USD 3.7 *trillion* (IEA, 2007).

The question then is – what can be relevant instruments to promote a change in investment patterns in China in such a way that it is more environmentally friendly? The Clean Development Mechanism (CDM) is one such incentive to help these countries alter their development path. China has thus far participated actively in the CDM and is set to generate the largest amount of greenhouse gas emission credits of all the developing countries (see section 3). Against this background, this paper addresses the question: Will the Clean Development Mechanism make a difference to China's development path?

Before delving into the details of this paper, it may make sense to dwell a little on (a) the discourses within China on development, and (b) the current climate change policy of China as an appropriate back drop to the role of CDM in China (see section 2). Then this paper assesses (a) the policy and organizational context of CDM projects in China; (b) some statistical information regarding CDM investments in China; and (c) the procedural aspects of three projects within China. The paper will then draw conclusions about (a) how the CDM process in China can be improved, and (b) whether CDM can be a strategic long-term tool to help China to modify its energy production and consumption patterns in a sustainable direction. The paper combines theoretical insights and practical hands-on experience in developing such projects and will include economic, business and political analysis. It is based on a literature and document review (including Chinese language materials), personal experience in developing CDM projects in China, three small case studies and extensive interviews and discussions with project developers and government officials in China.

2. The development and environmental discourse and policy in China

2.1 The development discourse within China

China's rapid growth in the last decade is not only extremely admirable, but it raises a number of questions (Harcourt 2007). Is this growth focusing on sustainable development? Does it benefit the poor? As Guerrero (2007: 44) puts it: "Those that are beguiled by China's impressive growth rate and the way it compressed 150 years of capitalism into three decades underestimate the disastrous social and environmental impacts of China's catch-up development track, which is now causing huge problems to its people". In fact, although the positive impacts of rapid growth are seen as something to be proud of, increasingly the fourth generation of political leaders in China are worried about the social consequences and many argue that a slower planned growth rate would be more beneficial to China in the long-term (Breslin 2007). An indicator of the social inequality resulting from rapid growth is the Gini coefficient which was 0.29 in 1981 and has become 0.47 in 2005 – which implies that the top 20% of people in China have access to half of the income in China (Breslin 2007). Breslin further argues that unlike in other developing countries, the elite in China are concerned about the inequality impacts because it undermines legitimacy and because it weakens the central party's control over the nation. Hence, there is now an increasing focus on harmonious development. The

environmental consequences of rapid growth have also not been missed by those in power. It is not just the international environmental consequences of rapid growth that, for example, climate change scientists write frequently about that concern the government, but the local consequences. The significant local damage has led the government to stimulate small entrepreneurs to develop their business skills, to focus on rural development to counter a mass influx into the cities, and to discuss the adoption of a green GDP method, "which, if adopted, would change the whole statistic as well as administrative systems in which environmental cost would be discounted from growth rate in evaluating official performance" (Chun 2007: 15). In 1996, the five-year plan (1996-2000) adopted the concept of sustainable development. The Hu Jintao – Wen Jiabao government has adopted a scientific notion of development that includes sustainable development (Wang 2007: 37). Wang (2007: 37-38) argues that sustainable development has become a critical element of academic discourse in China as 636 articles in the last fifteen years had environment and sustainable development in their titles, increasing rapidly in recent years. This, he argues, is especially important since there is strict government control over publications – and allowing such articles implies that the government is seriously interested in exploring and understanding this issue. He explains that in 2006 China published a Green GDP report that discounted resource mismanagement and pollution from growth. As local environmental issues and sustainable development become increasingly important in China, it becomes interesting to examine how China is dealing with global issues such as climate change.

2.2 China's climate change policy

In essence, China's position has not changed much since it made its initial statement at the 1989 Noordwijk Conference on Climate Change which focused on a science based, globally cooperative and equitable solution (Vellinga et al. (eds.) 1990). In its own official National Communications on Climate Change, it reaffirmed that: "all Parties to the Convention should, on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities, protect the climate system for the benefit of present and future generations of mankind" (National Communications 2004).

In July 2007, China announced to the G8 that it was willing to take measures, but reiterated the role of the developed countries based on equity. The recent National Climate Change Programme highlights that "Climate change is a major global issue of common concern to the international community. It is an issue involving both environment and development, but it is ultimately an issue of development." It thus sees climate change as essentially a developmental issue and argues that China's role in climate change is based on Article 4(7) of the Climate Change Convention and that actions taken in China will depend on the resources made available to it by the developed countries. Its own contributions are seen in terms of restructuring the economy, promoting technology advancement and improving energy efficiency, optimising the energy mix by developing low-carbon and renewable energy, promoting afforestation, promoting CDM, reducing population growth and encouraging education, training and public awareness. It also refers to the current strategy of China to move towards a "harmonious society" and minimising impacts on the environment (National Climate Change Programme 2007). A complementary policy document on science and technology in the area of climate change focuses on four principles: (a) combining government leadership with enterprise participa-

tion, (b) combining technological research with policy studies; (c) combining short-term demands with long-term objectives; and (d) combining overall planning with separate implementation. This document lists a number of climate change related energy areas in which the Chinese government will now focus its science and technology efforts (Scientific and Technological Actions on Climate Change, 2007).

China's energy intensity, defined as the ratio of real energy consumption to real GDP, has substantially declined since the economic reforms of 1978 (Fisher-Vanden et al., 2004). Most studies agree that this decline was primarily due to continuing increases in energy efficiency in industry (for an overview of studies, see Liao et al. 2007). Over the period 1990-2002 China's energy intensity fell by 5.6 percent per year on average. In the period 2003-2006, however, the trend has reversed, basically as a result of the boom in construction and the associated excessive expansion of high-energy consuming industries such as iron and steel, non-ferrous metals and cement (Liao et al., 2007). It is timely, therefore, that the Chinese central government in March 2006 set a challenging target to reduce the energy intensity of its economy by 20% over the period 2005-2010 (Lin, et al., 2007; Teng and Gu, 2007).

Recently a number of laws have been adopted on renewable energy (2005), energy conservation (2000), electricity (1995) and on coal (1996). A number of subsidiary regulations focus on many aspects of relevance for climate change both negative in that they promote coal fired plants and positive in that they promote renewable energy and conservation strategies. Efforts are underway to prepare a comprehensive energy law. In 2005 China adopted the China Medium and Long-term Energy Conservation Plan (CMLECP) focusing on 2005-2010 and 2010-2020. This plan lists energy conservation targets and projects aiming to achieve a 240 Mt carbon equivalent saving. In 2006, the government adopted a Top-1000 Enterprise Energy Conservation Action Plan that focuses on energy conservation in specific enterprises. These measures indicate that China is focusing on no-regrets options – options that will benefit China's own environment and will also incidentally have significant impacts on its emissions of greenhouse gases.

At the same time, within China, we can see a number of different reasons that are motivating local governments to take action (Teng and Gu 2007; see also Gupta 2007). Beijing, for example, is motivated by its obligations as host for the Olympics in 2008 to take action on energy and local pollution through its Green Olympic Policy Plan and thereby it indirectly also reduces the rate of growth of its GHGs. Examples of such measures include increasing renewable energy generation, policies in the building sector, that all new cars should adopt the Euro IV standard from January 2007, an environmental labelling system for vehicles, CNG in Beijing's fleet of public busses, financial subsidies for promoting the use of energy efficient lighting (the Green Lighting Project) and for renovating coal-fired boilers, and so on. While the motivation for Beijing is public image and international obligation, that of Guandong province is its lack of local energy resources which has forced it to develop a highly energy efficient system. It has the lowest energy efficiency standard compared to the rest of the country and focuses on promoting the growth of high tech low energy industry and the service sector. It is focusing on developing LNG as a major source of energy and actively promotes changes in consumer behaviour through market-based mechanisms. It is even developing a cross border emissions trading scheme on SO_2 emissions with Hong Kong that will also have indirect impacts on reducing GHG emissions. In contrast, Shanghai, the biggest and one of the richest

Chinese cities, focuses on using regulations and public awareness and education schemes to reduce energy consumption. It has an energy conservation supervision centre to promote conservation and provides financial subsidies to enhance the use of green electricity. It will host the World Expo in 2010 and is busy trying to improve its green image prior to 2010.

2.3 Inferences

This section explored the context within which CDM projects will play a role in China. It argues that there is a political and academic determination in China to check the negative impacts of rapid economic growth on society and the environment. The reasons are not just the rise of civil protest in society (Howell 2007), the visible local environmental impacts of development and of climate change (Warburton and Horn 2007), the need to present cities as modern hosts for international events (Teng and Gu 2007), as well as in response to global pressure, but also simply because it makes good political sense to the elite for whom the legitimacy of the current government depends on meeting the aspirations of all segments of society (Breslin 2007).

3. The State of CDM investments in China

3.1 Introduction

Both China and India are participating actively in the Clean Development Mechanism that was launched in 1998 and operationalised in 2000. Although the largest numbers of projects are in India (32.54%) the maximum number of credits will accrue from CDM projects in China. About 50% of the projects focus on energy. China and India are also among the top beneficiaries of the projects funded by the Global Environment Facility. This section presents the policy and organizational framework of CDM in China, discusses some recent statistics on CDM and then elaborates on the procedural dimensions of a few projects.

3.2 The policy and organizational framework of CDM in China

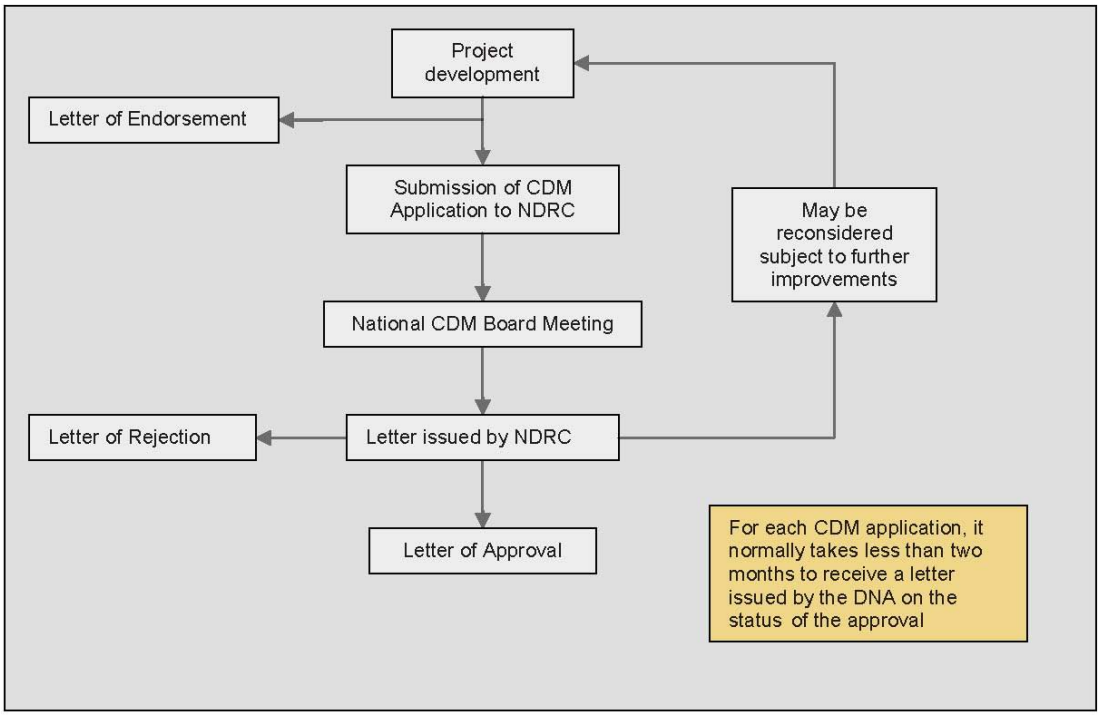
Although China was initially hesitant about participating in project-based emissions trading (Tangen et al. 2001), it has set up a clear organizational framework to deal with CDM projects. The key actors are the National Coordinating Committee on Climate Change (NCCCC), the National CDM Board and the Designated National Authority.

The NCCCC, established in 1990, is an inter-ministerial coordinating body and is the highest policymaking organ for climate policymaking in China. It consists of 7 ministries including the Ministries of Foreign Affairs, Finance, Science and Technology, Agriculture, the National Development and Reform Commission (NDRC), the China Meteorological Administration, and the State Environmental Protection Agency. The NCCCC supervises and coordinates ministries and agencies in their efforts to deal with climate strategy, policy and regulations.

The NCCCC has established the National CDM Board. Its main responsibilities include developing regulations and procedures for the operation and management of CDM projects in China and reviewing and approving CDM applications from project developers. The National Development and Reform Commission (NDRC) and the Ministry of Science and Technology (MOST) serve as co-chairs of, and the Ministry of Foreign Affairs (MFA) serves as the vice chair of, the National CDM Board. Other Board members are the State Environmental Protection Administration, China Meteorological Administration, the Ministry of Finance, and the Ministry of Agriculture.

The NDRC is the designated national authority (DNA) in China and Gao Guangsheng is the present director general of the Office of the National Coordination Committee for Climate Change. The process of submitting a project proposal for approval is illustrated in Figure 1.

Figure 1. The process of approving CDM project proposals in China



Source: NCCCC

The Chinese government specifies that only Chinese nationals and Chinese funded or Chinese-holding enterprises within the territory of China are eligible to conduct CDM projects with foreign partners and are qualified to submit CDM project proposals to the National CDM Board. The government policy is that projects developed in the areas of energy efficiency improvement, development and utilization of new and renewable energy and methane recovery and utilization will be prioritised.

The project developer in China needs to submit (a) a Clean Development Mechanism project application form; (b) a CDM project design document (PDD); (c) a certificate of enterprise status, and (d) general information on the project (including details on the pro-

ject owner; details about the foreign partner(s); project information; the total investment and project financing; technical descriptions of the project activity; the estimated GHG (greenhouse gas) emission reductions; the expected economic and environmental benefits of the project; the approval status of the construction of the project and the environmental impact assessment, accompanied by the approval certificate, where available; and details of the current status of the project) to the Designated National CDM Authority DNA). The government also explicitly encourages unilateral CDM project development through its policy. The policy states that if there is no foreign buyer for the Certified Emission Reductions (CERs) at the time a project is submitted for approval, the project design document must state that the CERs generated will be transferred into China's national account in the CDM registry and can only be transferred to a foreign purchaser with the explicit authorization of China's Designated National Authority for CDM.

In determining whether a project will be approved, the Chinese DNA checks the proposals to ensure that the proposed project is (a) consistent with Chinese laws and regulations, sustainable development strategies and policies, and the overall requirements for national economic and social development planning; (b) conforms to the requirements of the Climate Change Convention, the Kyoto Protocol and relevant decisions by the Conference of the Parties and are, inter alia, transparent, highly efficient and accountable; (c) does not introduce any new obligation for China other than those under the Convention and the Protocol; (d) incorporates the promotion of environmentally sound technology transfer to China; and (e) is not funded from official development assistance or from resources earmarked for fulfilling the investor country's financial obligations under the Convention.

According to the rules, the NDRC has a period of 20 days to make a decision on the proposal, following submission of the proposal and the receipt of an expert review. If necessary, this period can be extended to 30 days following permission from the Chair or the Vice-chair of the NDRC; and subject to the clause that the applicant is informed about the delay and the reasons for the delay.

Finally, unlike in most other countries, the Chinese policy is that the revenue accruing from the sale of CERs is shared by the Government of China and the project owner. In the case of HFC and PFC projects, the Government takes 65% of the transferred benefit; in the case of N_2O projects, the government takes 30% of the transferred benefit and in the priority areas and afforestation projects, the Government takes 2% of the transferred benefit. As yet, it has not been decided how these revenues will be spent, but the revenues are earmarked for investment in climate change related projects.

3.3 Data on CDM projects in China

As of 16 January 2008, China has approved 1068 projects. Most of the projects were developed and approved in the last two years, demonstrating the rapid development of CDM implementation in China. According to the NCCCC, there were 2 CDM projects approved by China in 2004, 25 in 2005, 224 in 2006, 702 in 2007, and 115 projects up to January 16th, 2008.

China now has 11 HFC projects that have been validated or registered, while the world total is 19 projects according to the UNEP Risoe CDM/JI Pipeline Analysis and Data-

base as of 1 February 2008. In addition to the disincentive provided by the tax system, no new HFC projects are expected in China.

At the end of 2007, at the global level CDM projects were issued 102 million tonnes of CERs, and approximately 25 million tons of CERs came from projects in China, accounting for 25% of the total (see Figure 2). Early 2008, 28 projects in China have been issued CERs and 147 projects are registered with the Executive Board, and no projects have been rejected or withdrawn. This demonstrates that China actively participates in CDM activities.

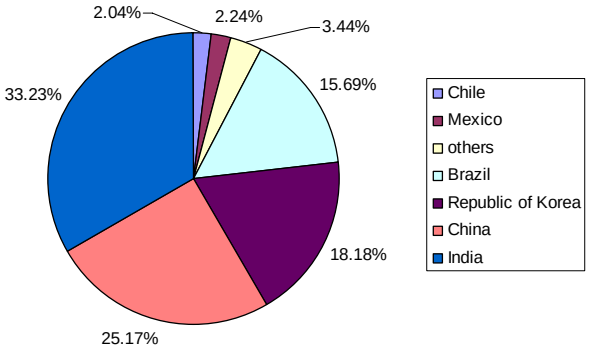


Figure 2 CER issued by host party as of December 21, 2007. (source: http://cdm.unfccc.int/Statistics/Issuance/CERsIssuedByHostPartyPieChart.html)

Of the Chinese CDM projects approved by the Chinese DNA, 700 focus on renewable energy (72%), 165 focus on energy efficiency improvement (17%), 61deal with methane recovery (6%), 17 focus on N_2O destruction (2%), 13 on HFCs (1%), 12 on fuel switch and replacement (1%), 1 on afforestation and reforestation (0.1%), and 7 miscellaneous (0.7%) (see Figure 3).

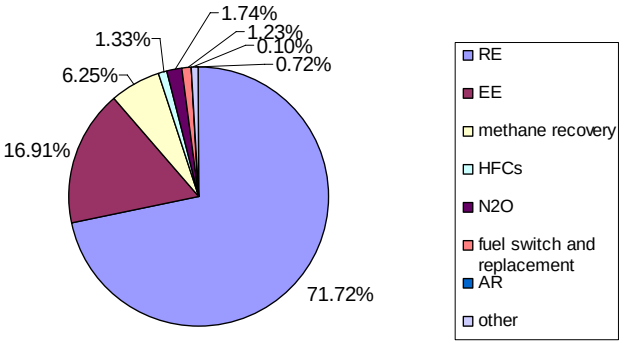


Figure 3 CDM projects approved by Chinese DNA (RE: Renewable energy, EE: Energy efficiency, HFCs: HFCs decomposition, N_2O: N_2O decomposition, AR: Afforestation and reforestation. As of November 27, 2007. Source: http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File1599.pdf)

Figure 3 demonstrates that the Chinese policy of differential taxing of the benefits from CDM projects has indeed led to priority being given to renewable energy, energy efficiency improvement and methane recovery.

3.4 Case studies of CDM projects in China

There are expectations that the Chinese share in global CERs will rise rapidly to about 50% in 2012. However, discussions and interviews with project developers and government officials in China reveal a growing degree of frustration. Although there are a relatively large number of CDM projects in China, and the national policy is fairly clear, project developers face a number of practical problems which through extending the lead time of a project, reduces its financial viability and hence attractiveness to the investors. This sub-section first explains the project activities cycle in China and then examines the transaction costs of implementation in three case studies. Although much more data was available to the authors, the project developers were not willing to make the specificities known since they were afraid that this might prejudice the approval process of their projects. Hence, we focus here on three case studies of projects that have been through the entire process and have already received CERs.

The experiences of project developers with the CDM project activities cycle in China is illustrated in Figure 4. Project developers have to develop a Project Idea Note (PIN) (oject Idea Note and a Project Design Document (PDD). Subsequently, a Designated Operational Entity (DOE) has to be requested to validate the Project and submit documents and files to the DNA. Hereafter, there is an independent review process which feeds into the decision making process of the DNA. Then the DNA prepares the Letter of Approval (LoA). The next step is to get the project registered with the Executive Board (EB), followed by verification by another DOE, certification by the EB, and finally the CERs are issued.

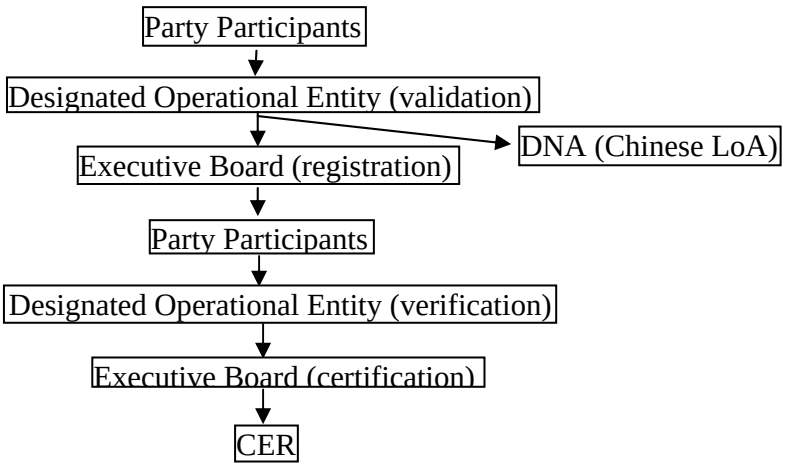


Figure 4 CDM projects activities cycle

Three case studies of different types of projects are introduced here to examine the complications of CDM implementation in China. These case studies include the Xiaogushan hydropower project, the Ningxia tianjing shenzhou 30.6MW wind-farm pro-

ject, and the Anding landfill gas recovery and utilization project. All these projects have been registered and have received CERs following completion of the first phase of these projects. These case studies focus only on the time factor as illustrated in Table 1.Table 1 suggests that the time spent on the process of validation, registration and issuance is different among the three case study projects. The Xiaogushan hydro project received its Letter of Approval on 30 Aug. 2005, and then one year passed before the project was registered successfully by the Executive Board. In the case of the Ningxia tianjing wing-farm project, more than 14 months passed before approval from the Executive Board was received. The Anding landfill gas recovery project took about one and a half years to be registered by the EB. Another year passes on average before CERs are issued on the projects. Thus, the cost in time for the Xiaogushan, Ningxia tianjing and Anding projects from the LoA to CER issuance is 24 months, 20 months and 36 months respectively. This time expenditure does not include the actual development of the project idea, the PIN and the PDD and the process of getting the Letter of Approval in China. While the time taken to receive the letter of approval is officially only 20 days, it can in practice take considerably more time.

Table 1. The time cost of CDM implementation of 3 different projects in China from the LOI to CER issuance.

Name of Project	Xiaogushan	Ningxia tianjing	Anding
Type	Hydropower	Wind-farm	Landfill gas recovery
LoA date	30 Aug. 2005	4 Apr.2005	1 Nov. 2004
Registration date	11 Aug. 2006	13 Jul. 2006	21 May 2006
CER Issuance date	24 Aug. 2007	18 Dec. 2006	5 Nov. 2007
Time cost	24 months	20 months	36 months

It is also critical to note that the development of the CDM market is very uneven in China. Most of the registered projects in China are located in Gansu, Inner Mongolia, Shandong, Jilin, Jiangsu and Hebei provinces. Moreover, renewable energy is the focus of projects in the middle and western parts of China and energy efficiency projects are mainly developed in the Eastern part of China (State Information Centre, 2007).

3.5 Inferences

This section has demonstrated that although China was initially sceptical about project-based mechanisms, once China accepted the idea of the CDM, it very efficiently set up a framework for promoting CDM projects and developing a policy to push CDM projects towards its domestic priorities. In terms of promoting CDM projects, it has set clear guidelines and a strict procedural timetable, on the one hand, and, on the other hand, it encourages the development of unilaterally developed CDM projects through creating a system by which the CERs are temporarily transferred to the government. In terms of pushing CDM projects in a specific direction, China not only has a priority list of areas, but it provides incentives to project developers through a differential taxing system on the benefits accruing from the projects. Although the bulk of CERs issued to China at present is going for HFC projects, no new HFC projects are expected.

This indicates that there is a clear and supportive institutional framework in place and that a large number of entrepreneurs are motivated to enter the CDM market and that the

response from these entrepreneurs has been explosive. However, the enthusiasm has been followed by rapid frustration as a result of the long and complicated process of registration, verification and certification of projects especially at the international level. These transaction costs cut into the financial viability of the projects and reduce the enthusiasm of the investors to develop such projects. Zhang (2006) argues that the DOE plays a very important role in the CDM project cycle and because none of the DOEs is from China, "*CDM projects in China have to rely on the expensive services of foreign DOEs for validation, registration, verification, and certification*" (Zhang, 2006: 3698). This situation has not yet changed: at the moment CDM EB has accredited 18 DOEs, but none of them is from China.[1]

Furthermore, these projects are based on an expectation that the price of CERs will rise as stringent targets are eventually negotiated at the international level. The uncertainty about future targets also has an impact. Finally, there is many a slip between project design and implementation and problems at the implementation stage may become more evident at a later stage. A recent in-depth analysis of an Activities Implemented Jointly project sponsored by the Dutch government reveals that poor project design and implementation may lead to a failed project (Gupta et al., forthcoming).

4. Opportunities and Challenges

4.1 Introduction

Based on personal experience in project development, interviews with other project developers and the literature, this section highlights the key opportunities and challenges in the area of CDM.

Given that CDM aims to generate resources for certified emission reductions of greenhouse gases in projects that also focus on sustainable development, it provides a number of opportunities to China. In theory, it can promote sustainable development and mitigate emissions in China, global climate change of China through enhancing energy efficiency and investments in renewable energy via the introduction of modern technologies and management experiences. Such projects, if well designed, not only contribute to improving the global environment, but also the local environment. For example, methane is both a greenhouse gas but also potentially locally explosive, and yet it can be collected and channelled as power or fuel. Such projects in their building, maintenance and operational phase should provide additional job opportunities to local residents; as well as the need to create an institutional framework creates work at the government and consultancy level.

There is always a gap between theory and reality. To capitalise on this potential, the Chinese government and DNA have actively developed policies to prioritise sectors, developed criteria to ensure that projects are consistent with national policies and demonstrate technology transfer as well as the credibility of investors by not allowing a diver-

[1] See for a list of DOEs: http://cdm.unfccc.int/DOE (accessed on 7 February 2008).

sion of aid resources into CDM projects. In addition, the domestic differential tax system serves to generate revenues for the government while being a steering instrument. Finally, as the stakeholders were quick to point out, it can provide an opportunity for the world to know China better. More and more experts, scholars, and consultants are coming to China and getting to know China through the CDM. The institutional framework, the growing familiarity with market mechanisms and the rapid development in China have provided the setting for quantum jumps in the development of CDM projects.

4.2 Procedural challenges

However, there are a number of procedural challenges at national and international level. At the national level, the government stipulation that only Chinese-owned enterprises and enterprises with at least 51% of their equities owned by Chinese are eligible to represent China during the implementation of CDM project activities may contribute to the integrity of CDM projects hosted in China, but it also reduces the incentive for and does not capitalise on the ability and willingness of potential foreign enterprises and joint ventures to participate in CDM activities in the country with the largest CDM potential (Zhu, 2006). Apart from this, the procedures within China could set a very good example of best practices for other developing countries.

At the present moment, the key procedural bottlenecks are however at the international level. As demonstrated in the chapter, there are domestic procedures and international procedures. While the domestic procedures are time-bound and therefore allow investors to calculate the transaction costs, the international procedures for registration, verification and certification are not time bound and the international entities like the DOE, the EB and the COP are unable to cope with the rapid rise in the number of projects seeking approval. As of 16 January 2008, China had approved 1068 projects but only 154 projects had been registered by the Executive Board, which accounts for only 17% of Chinese projects. This demonstrates that the bottleneck in implementing and attracting new projects at present lies primarily at the stages after the Chinese DNA approval. This is not just the experience of the project developers and the government officials consulted, but it is also recorded in the literature. The literature points to the lack of capacity of the CDMs Executive Board to assess and approve projects and that it is a bottleneck in the process (ECP 2005; Reuters/Planetark 9 November 2006, Skjaerseth and Wettestad, forthcoming). Furthermore, since it is unclear what the future of CDM will be, many see the importance of improving the procedure rapidly to ensure rapid approval prior to 2012 (Shen, 2007).

4.3 Other challenges

Although CDM project development has increased rapidly in China, the project developers are still relatively few and concentrated in specific areas. The vast majority of enterprises, commercial banks, stakeholders are unaware of CDM and its potential. The need to engage these groups is critical to promoting a nation wide revolution in the way energy and other greenhouse gas projects are conducted in China.

Although CDM has the additional theoretical advantage of leveraging additional foreign direct investments in China, this has not been taken very seriously by the Chinese offi-

cials (Zhu, 2006). This is because such projects tend to be far more complicated and financially risky than other FDI projects.

A critical fear expressed by the China CDM Project Board Members is with respect to the future of CDM. As long as China is seen as a developing country, it can continue to capitalise on the potential that CDM offers provides the procedural and transaction costs do not become so large as to make such projects unattractive. During this process, the sale of cost-effective CER credits is not a threat to China's development or its role within the climate regime. However, if China is seen as a developed country within the near future and is obliged to both take on targets and withdraw from CDM, there may be two risks; the first is that the cost-effective emission reduction options may have already been sold, and second the option to capitalise on resources becomes less. This may be why, the government keeps citing Article 4(7) of the Climate Change Convention.

While it is of critical importance for the Chinese government to ensure that good quality technology transfer is included in CDM projects, the process of managing the international transfer mechanism is a key challenge for the Chinese government (Liu, 2007).

The price of CERs is also unreliable. On the one hand, it is unclear how the future commitments and development of CDM projects will influence the price of CERs. For example, the price of allowances traded within the European Union has been very volatile over the past few years: it has gone from high values (almost 30 Euro) to very low values (0.1 Euro) to about 20 Euros in early 2008. At the same time, the domestic conditions in China may also change because of the volatility in coal, power, and natural gas prices.

4.4 Inferences

This section discussed that CDM had the theoretical potential of bringing technology, resources and management skills to China and that the Chinese government has successfully optimised these opportunities by developing a skilful policy framework supported by time-bound procedures. However, its nationalistic tendency tends to reduce some of the opportunities for project development. It discussed that the key bottleneck are the present international procedures. To be fair to the Executive Board, it could scarcely have anticipated the sudden explosion in the number and breadth of proposals, but it may be able to adjust its procedures given time. At the same time, clearly the Chinese government and the Chinese project developers are in a hurry, as the situation regarding the price of CERs is uncertain and the post-2012 role for China within CDM is unclear.

5. Conclusion

This paper addressed the question – Will CDM make a difference to China's growth? Will it make a dent in the policies?

We believe that a number of points can be made here. First, international aid is "minisucle" in relation to China's GDP (Howell, 2007: 22) and foreign investment likewise. The total potential CDM opportunities in the period up till 2012 are estimated at 0.2 – 0.3%

of inward bound foreign direct investment (FDI). China has been issued 25 million tons of CERs, nearly a quarter of the total in the world, which will bring more tax income and foreign investment in China. The CDM investments are likewise marginal in terms of the sectoral investments needed and in terms of foreign investment in China. However, having said that, CDM is very visible in China and this visibility implies that its impact is likely to be more than a mere consideration of the financial impetus it brings to China.

Second, the CDM discussion in China is likely to bring in yet another dimension to the existing dialogue within China on the need to green its development pattern. On the one hand, it is the carrot that accompanies the stick of international pressure. On the other hand, it complements the existing academic and political discussion within China on development; it provides the growing civil society with support and it tries marginally to bring to shame foreign and domestic investors who invest in older and less environment friendly technologies. As Wen puts it "too much growth, too little development" (Wen 2007: 30) have led to 87,000 mass protests last year and the time is ripe for a different approach to development. "Given the deepening fissures within society and the potential for social discontent and protest, the importance of fashioning robust, predictable and legitimate arrangements for the articulation and intermediation of diverse and conflicting interests cannot be underestimated" (Howell 2007: 22). The need to thus focus on sustainable development within China will receive an additional impetus from CDM.

Third, existing government policy and the supporting time-bound procedural framework provides a solid support for domestic entrepreneurs to develop bilateral and unilateral project proposals on issues prioritised by the government. This provides the key incentive for change since clearly the government sees CDM as a potential for change. However, at the domestic level, the policies restrict the role of foreign companies and joint ventures to develop projects, and at the international level, the slow registration, verification and certification procedures are casting a damper on the enthusiasm of entrepreneurs by affecting the viability of projects.

Fourth, the urgency of the Chinese government and project developers to seek rapid change in procedures at international level does not just reflect the economic short-term concerns of individual entrepreneurs, but also the long-term political concern about how long China may be allowed to participate in CDM and when China may have to take on its own emission reduction targets.

In that sense one can argue that even if CDM has thus far not had a major impact in changing development patterns in China, China will definitely have a significant impact on the development of CDM as an instrument.

Acknowledgements:

The second author has worked on this project as part of two projects – the Netherlands Organization of Scientific Research VIDI project on International and Private Environmental Governance: Sustainable Development, Good Governance and the Rule of Law (contract number: 452-02-031), and the European Commission financed Adaptation and Mitigation (ADAM) Project (contract number: 98476).

References:

Breslin, S. (2007). The Political Economy of Development in China: Political Agendas and Economic Realities, *Development*, 50(3): 3-10.

China's National Climate Change Programma (2007). National Development and Reform Commission of the Peoples' Republic of China, Beijing.

China's Scientific and Technological Actions on Climate Change (2007). Policy document of the Ministry of Science and Technology and fourteen other agencies, Ministry of Science and Technology, Beijing.

Chun, L. (2007). Recasting Development in China, *Development*, 50(3): 11-16.

ECP (2005). Improving the Clean Development Mechanism, Report presented at a UNFCCC Side Event in Montreal, Canada by the European Climate Platform.

Fisher-Vanden, K., Jefferson, G.H., Liu, H., and Tao, Q. (2004). What is Driving China's Decline in Energy Intensity? *Resource and Energy Economics*, 26: 77-97.

Guerrero, D. (2007). China's New Role in Asia and the South, *Development*, 50(3): 44-47.

Gupta, J. P. van Beukering, H. van Asselt, L. Brander, S. Hess and K. van der Leeuw (2008). Achieving Sustainable Development Through Project Based Flexibility Mechanisms: Lessons from Five AIJ Projects, *Climate Policy*, 8(3), in press.

Harcourt, W. (2007). Editorial - China: An Emerging Economic Power, with a difference, *Development*, 50(3): 1-2.

Howell, J. (2007). Civil Society in China: Chipping Away at the Edges, *Development*, 50(3): 17-23.

IEA (2007). World Energy Outlook 2007. OECD/IEA, Paris.

Liao, H., Fan, Y., and Wei, Y.-M. (2007). What Induced China's Energy Intensity to Fluctuate: 1997-2006? *Energy Policy*, 35: 4640-4649.

Lin, J., Zhou, N., Levine, M., and Fridley, D. (2007). Taking Out 1 Billion Tons of CO2: The Magic of China's 11th Five-Year Plan? *Energy Policy*: doi: 10.1016/j.enpol.2007.10.033.

Liu H. Ni W. (2008) Strategic thinking on IGCC development in China. *Energy Policy* 36 (1) 1-11

Liu L.C., Wu G. (2007) The Status and Thoughts of CDM Projects in China. *Energy and Environment*. 29 (3):34 – 40.(in Chinese)

China Government (2004). National Communications of China, available at UNFCCC website.

Orient morning paper (2005). http://www.china5e.com/news/meitan/200504/200504250103.html

Researching Group of China's Energy Demand and Supply (2007). Analysis on China's Energy Demand and Supply. *Statistic Research*, 24(10): 3-8.(in Chinese)

Reuters/Planetark (2006). Investors Vary of Kyoto Market Controls, 9 November 2006,

Shen H.S., Wang N.A., Shao C.M (2007). Analysis of the Present Status and Problem of Clean Development Mechanism. *Journal of Anhui Agriculture Science*, 35(30):9054-9056.(in chiese)

Skjaerseth, J. and J. Wettestad (2008). Implementing EU Emissions Trading: Success or Failure, *INEA* 8(3) forthcoming.

State Information Center (2007). http://zjyb.hd.gov.cn/jcyc/P020070813336033388297.doc

Tangen, K, G. Heggelund and J. Buen (2001). China's Climate Change Positions: At a Turning Point?, *Energy and Environment*, 12(2&3): 237-252.

Teng, F. and Gu, A. (2007). Climate Change: National and Local Policy Opportunities in China, *Environmental Sciences*, 4(3): 183-194.

The Ministry of Science and Technology of P.R.C.(2007). http://www.most.gov.cn/kjbgz/200704/t20070424_43364.htm

Vellinga, P., P. Kendall and J. Gupta (1999). The Noordwijk Conference Report, Ministry of VROM, The Hague.

Vennemo, H., Aunan, K., Jinghua, F., Holtedahl, P., Tao, H., and Seip, H.M. (2006). Domestic Environmental Benefits of China's Energy-Related CDM Potential. Climatic Change, 75: 215-239.Wang, H. (2007). China's Changing Approach to Sustainable Development, *Development*, 50(3): 36-43.

Warburton, J. and L. Horn (2007). China's Environmental Crises: What Does it Mean for Development?, *Development*, 50(3): 48-56.

Wen, D.J. (2007). Too Much Growth: Too Little Development: The Reality Behind China's Economic Miracle, *Development*, 50(3): 30-35.

World Bank et al. (2004). Clean Development Mechanism in China: Taking a Proactive and Sustainable Approach. The World Bank, Washington D.C.

Zhang, Y. (2007). Rural Population of 73.7 Million in China. Rural Economy, 10 :16 (in Chinese)

Zhang, Z. (2006). Toward an Effective Implementation of Clean Development Mechanism Projects in China, *Energy Policy*, 34: 3691-3701.

Zhu X.L., Pan J.H.(2006) China's CDM Policies and Their Development Implications: Major Concerns for CDM Implementation. *Chinese Journal of Population, Resources and Environment*, 4(2):3 – 27.