

Efficient implementation of CDM in China

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Abstract

China at present ranks as the world's second largest emitter of carbon dioxide (CO₂) after the USA. Given its huge emissions of greenhouse gases and large potential for low-cost emission reductions, China is generally expected to become a major recipient of CDM funding.

The current report has several purposes. First we discuss how CDM is likely to be implemented in China, not least in terms of effectiveness measures. We go on to examine Chinese policies on and priorities for CDM as set forth in international negotiations and reflected in their CDM project system design. We survey recently deployed, internationally funded CDM projects and China's capacity for identifying, approving and carrying out CDM projects and describe China's first CDM project, the Inner Mongolia Huitengxile Wind Farm Development Project, a project that was approved by the Dutch CERUPT in 2003. The report reviews project experiences and developments thus far and finally, inasmuch as the report is a joint ERI/CREIA-FNI production, we look at developments in Norway's climate policy and CDM potential.

To summarize our conclusion, we note that China's domestic CDM apparatus still awaits approval by the State Council, which may indicate waning Chinese interest for (or a wait-and-see attitude towards) CDM. At the same time, however, we expect that the several ongoing international projects with Chinese actors will gradually enhance CDM understanding in China. While CDM capacity is strong centrally in China, there is little knowledge or awareness of it in industrial quarters. The international projects will therefore crucially help bring knowledge to local stakeholders. The Inner Mongolia Huitengxile Wind Farm Development Project is one such example. China has gained valuable experience through its participation in the Dutch CDM program, and CDM information has been disseminated to stakeholders in China, especially industrial actors.

The report sets out several recommendations concerning future Chinese and Norwegian government action.

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Introduction

China at present ranks as the world's second largest emitter of carbon dioxide (CO₂) after the USA, with 13.5 percent of global emissions (Zhang 2001a). Both in economic and ecological terms, China is a dominant global actor. Its population of nearly 1.3 billion people easily makes it the world's most populous country. It is also the world's largest coal producer and consumer (1.28 billion tonnes in 2000) and coal is its largest energy source (67 percent).² While coal has fuelled China's rapid economic growth over the past twenty years, it is also the major cause of GHG emissions.

It is widely expected that China, given its huge emissions of greenhouse gases and large potential for low-cost emission reductions, is likely to become a major recipient of CDM funding (e.g. Zhang 1999). The current report discusses plausible CDM implementation scenarios in China, and the extent to which implementation is likely to be efficient. One element of this requires a review of Chinese CDM policies and priorities as set forth in international negotiations and reflected in China's CDM project system design.

The international interest for CDM in China is reflected in the number of international projects that have been approved recently. These projects will be discussed in the report. We also outline the first CDM project in China, for which approval was given by the Dutch CERUPT in 2003. Project lessons and developments are discussed below.

Moreover, as this a joint FNI, ERI and CREIA project, it was considered important to review developments on both the Norwegian and Chinese sides. The report therefore also discusses developments concerning Norwegian climate policy and CDM potentials.

The report is based on interviews conducted during the climate negotiations (COPs 7, 8 and 9) and the authors' visits to Beijing in the spring and autumn of 2002 and autumn of 2003. Interviews were also carried out in Norway in November 2002. Interviews in China were with officials connected with the following agencies: National Development and Reform Commission (NDRC).³ Ministry of Foreign Affairs (MFA), Ministry of Science and Technology (MOST), Chinese Academy of Sciences (CAS, Chinese Academy of Social Sciences (CASS), Qinghua University, Renmin (People's) University and Energy Research

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² China Statistical Yearbook (2001), Table 7-2 p. 229

³ The 10th National People's Congress in March 2003 approved proposals involving structural and organizational changes. In this connection the State Development Planning Commission (SDPC) was renamed the National Development and Reform Commission.

Institute. We also interviewed bilateral and multilateral donors. In Norway, we conducted interviews with officials at the Ministry of Environment and members of parliament members, both of which represented the government, Norsk Hydro for industry-related information, and officials at DNV (Det norske Veritas) as the envisaged validator.

Background

Kyoto Protocol and the Marrakech Accords

The Kyoto Protocol

The 1st Conference of the Parties (CoP1) to the UNFCCC agreed to initiate a process (Berlin Mandate) to modify the Framework Convention in order to reinforce the commitments of Annex I countries beyond year 2000. The outcome of the Berlin Mandate was the Protocol adopted by COP3 in Kyoto in 1997, which set out legally binding GHG emission reduction objectives for its signatories, the so-called Annex B countries to UNFCCC (Annex I countries without Turkey and Belarus). The Protocol, which is yet to enter into force, is the international framework for achieving the first steps towards the ultimate objective of the UNFCCC. Under the Protocol, Annex B countries committed themselves to reducing or capping their emissions of six specified greenhouse gases in the period 2008–12 relative to 1990 levels by an aggregate of 5.2%. The Protocol provides for a certain degree of flexibility in how the commitments may be met.

The Clean Development Mechanism (CDM) is a key component of the Kyoto Protocol, as defined in Article 12, and the only flexible mechanism providing a practical link between Annex B countries and the developing countries not bound by reduction commitments. It enables Annex B countries to offset a part of their emissions reduction commitments by implementing emissions reduction projects in developing countries. Developing countries with CDM projects in return gain the capacity, technology, and financing for GHG abatement.

The Protocol sets out four fundamental requirements regarding the implementation of CDM projects: 1) voluntary participation of each party involved; 2) real, measurable and long-term benefits related to the mitigation of climate change; 3) reductions in emissions that are additional to any that would occur in the absence of the certified project activity; and 4) that they meet the sustainable development criteria as defined by the host developing country.

The Marrakech Accords

Although certain details of the CDM remain under negotiation, the Marrakech Accords, agreed upon at CoP 7 in November 2001, saw the establishment of the CDM Executive Board, the clarification of project cycle and relevant stakeholders, and recognition that Certified Emissions Reductions (CERs), achieved in non-Annex B countries via CDM projects, can be accrued from the year 2000 and used by Annex B countries within the first commitment period (2008–12).

In CoP 7, a draft decision with annexes submitted for the first COP/MOP on the modality and procedure of CDM was made. The annex includes the following:

- 1□ The definitions of ERU, CER, AAU and RMU;
- 2□ The role of COP/MOP;
- 3□ Participation in CDM is voluntary;

- 4□ The regulation on the roles, membership composition and creation and decision making procedure of Executive Board (EB);
- 5□ Affirmation and assignment of Operational Entities (OE);
- 6□ The functions of OE;
- 7□ Participation requirement;
- 8□ Validation, registration and monitoring;

The annex also includes four appendices:

- Standards for the accreditation of operational entities;
- Project design document;
- Terms of reference for establishing guidelines on baselines and monitoring methodologies;
- CDM registry requirements

The following COP 8 agreed on the rules and procedures for the CDM with reference to the implementation of work plan tasks, financial and operational procedures, and the draft rules of procedure. The issue of ‘sinks’ was deferred to COP 9 due to disagreement among the parties involved. At COP 9 in Milan, Italy, nevertheless, the negotiators reached agreement concerning the rules of accounting for Land Use, Land Use Change and Forestry in CDM projects. Definitions and modalities for such projects were agreed in Milan.

Status for CDM in China

China has been skeptical to the introduction of the flexible mechanisms under the UNFCCC and saw the mechanisms, Joint Implementation (JI) and the Clean Development Mechanism (CDM) as instruments for developed countries to escape responsibility. The country’s position on the flexible mechanisms has, however, become more pragmatic with greater focus on maximizing benefits. The on-going process of setting up a national system for identification, approval and implementation of CDM projects in China illustrates the changes in Chinese thinking on CDM after COP7, as will be seen below.

Institutional system

The State Development Planning Commission (renamed the National Reform and Development Commission in March 2003, NDRC) was charged in 1998 with coordinating China’s climate change efforts, following the government’s reorganization that year.⁴ The National Climate Change Co-ordination Committee (*Guojia qihou bianhua duice xietiao lingdao xiaozu*) is the highest climate policy-making organ in China. It is a ministerial level committee chaired by the NDRC. The Committee has 14 members (see fig. 1). A Climate

⁴ Prior to NDRC’s structural reorganization in March 2003 it was known as the State Development and Planning Commission (SDPC). At the time, responsibility for climate change co-ordination in China was with the China Meteorological Administration (CMA). Responsibility was given to SDPC due to its role in economic development. The move signified a shift towards climate change policy-making in China. See Tangen, Heggelund and Hu (2000) for further details on the structural changes of 1998. The NDRC has overall responsibility for economic development issues in China and has been a central actor in the planned economy. The commission is a latecomer in the climate change policy-making process, however, has assumed an increasingly important role as economic and energy issues have inched upwards on the domestic agenda. Its importance received a further boost following its March 2003 restructuring at which time it took over responsibilities of the State Economic and Trade Commission, which was abolished.

Change Office was established in the NDRC the same year. It functions as secretariat to the Co-ordination Committee.

Responsibility for approving CDM projects is shared for the time being between the Climate Change Office and the National Climate Change Co-ordination Committee. This Climate Change Office is currently spearheading efforts to streamline CDM approval and implementation procedure in China, including the setting up of a CDM project approval and implementation system. Final project approval will be taken by a yet-to-be-appointed Council (consisting of NDRC, MoFA, MoST & SEPA as well as MOA or MOF) (see fig. 1). In addition, there are plans to set up a CDM Monitoring and Management Centre (*Jiandu guanli zhongxin*). This Centre, under the guidance of the Climate Change Office in the NDRC, will mainly operate at the project level and will not be involved in policy-making. This structure would provide for the following CDM project application procedure in China. The first step involves submitting proposals to the Monitoring and Management Centre for screening. In the second step the Council/Board reviews the proposals and approves or rejects them. Its decision is final. If approved, the NDRC issues the authorization for the project, and the project can get under way. The Council/Board will most likely consist of the NDRC, the MFA, the MOST, the Ministry of Finance (MOF), State Environmental Protection Administration (SEPA), China Meteorological Administration (CMA) and Ministry of Agriculture (MOA).⁵ The NDRC will have significant leverage in this group as it is the leading commission in China. Its organizational structure has yet to be approved, though this was expected to happen before the end of 2002.⁶ A set of management guidelines and regulations have been prepared and the draft documents were ready in the autumn of 2002, but has awaited internal co-ordination.⁷ It was expected that the CDM regulations would be approved by the State Council in late 2002, however,⁸ but at the time of writing, early 2004, there has been no progress on the approval of the guidelines and institutional organization

There are probably several reasons for the failure to set up and approve a CDM system in China. One may be a decline in the Chinese government's enthusiasm for CDM.⁹ A speech by an MFA official in November 2003¹⁰ made it clear that since the USA, Australia and Russia have not yet ratified the Kyoto Protocol, CDM's market potential is reduced. The official also warned that should the Kyoto Protocol fail to go into effect, it would be necessary to find other solutions to solve the problems connected with global climate change, and other mechanisms similar to the CDM. The paradox is that while China seems content to bide its time, while the significant number of internationally funded CDM capacity-building projects (see below) that have been initiated over the past few years indicated that China is taking active steps to prepare the way for CDM projects in China.

⁵ Authors' interviews Beijing April 2002, and presentation by Ma Aimin, Climate Change Office, NDRC, at UNDP Inception workshop in Beijing, November 2003 for the UNDP project CPR/01/002 and CPR/02/H02 "Building Capacity for the Clean Development Mechanism in China".

⁶ Authors' interviews Beijing April 2002.

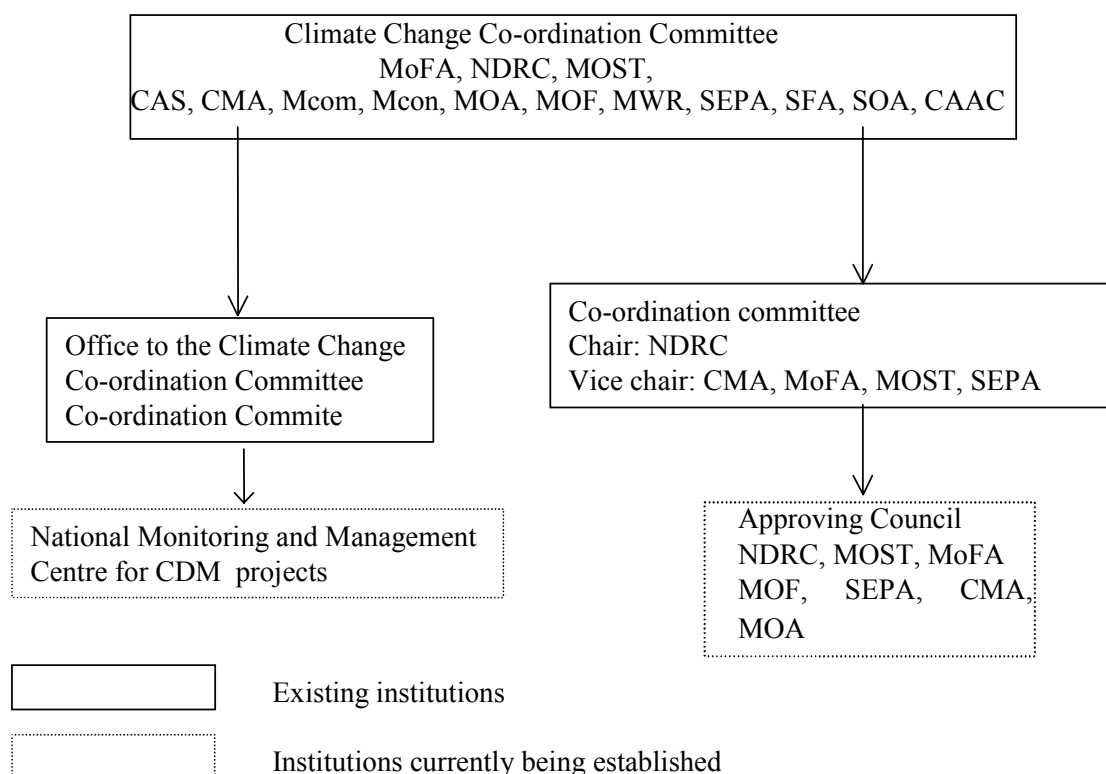
⁷ Authors' interviews Beijing April 2002.

⁸ Authors' interviews Beijing April 2002.

⁹ Authors' interview Beijing November 2003.

¹⁰ Presentation by Gao Feng, MFA, at the UNDP Inception workshop in Beijing, November 2003 for the UNDP project CPR/01/002 and CPR/02/H02 "Building Capacity for the Clean Development Mechanism in China".

Figure 1: Organization of the Chinese CDM apparatus¹¹



Role of the main actors in the selection and approval process for CDM projects

The NDRC will continue to head the domestic process as China's designated CDM authority.¹² The Ministry of Foreign Affairs will continue to head the international negotiations. The Ministry of Science and Technology will provide technical CDM expertise and maintain a seat on the CDM Executive Board. The State Environmental Protection Administration (SEPA), as one of the co-chairs of the Climate Change Coordinating Committee, is a key player but not central in the current process.¹³ It is likely that SEPA would be supportive of the increasing number of CDM projects thanks to the likely secondary benefits, one of SEPA's arguments for proposing CDM projects in China. SEPA may also have a role in the certification process. The State Economic and Trade Commission (SETC) re-entered the negotiation delegation in 2002 and it was expected that it would be part of the

¹¹ Abbreviations in the boxes: MoFA (Ministry of Foreign Affairs), SDPC (State Planning Development Commission), MOST (Ministry of Science and Technology), CAS (Chinese Academy of Sciences), CMA (China Meteorological Administration), Mcom (Ministry of Communications), Mcon (Ministry of Construction), MOA (Ministry of Agriculture), MOF (Ministry of Finance), MWR (Ministry of Water Resources), SEPA (State Environmental Protection Administration), SETC (State Economic and Trade Commission), SFA (State Forestry Administration), SOA (State Oceanographic Administration) and CAAC (General Administration of Civil Aviation of China). See <http://www.ccchina.gov.cn/index1.htm>.

¹² Little institutional infighting is anticipated, as the lead role of the NDRC seems to be undisputed. Authors' interviews Beijing April 2002.

¹³ Some sources stated that SEPA is even less important than environmental ministries in other countries.

Approving Council. The role of the Commission was considered to be an important factor in the implementation of CDM projects, in particular in relation to innovation projects, as it was the 'umbrella' institution for all industrial sectors. Following the March 2003 restructure, the Commission was merged with Ministry of Foreign Trade and Economic Co-operation (MOFTEC) into a new Ministry of Commerce. The role of the new ministry in the CDM process is not yet clear. NDRC took over a number of SETC's duties and was thus strengthened in the process. As a potential member of the Council, the Ministry of Finance will be involved in the financial aspects of the CDM projects (similar to GEF projects). It is not a key policy maker.

International capacity building projects

China's increased interest in the CDM can be seen in the number of joint projects that are being carried out by the Chinese government and bilateral donors or multilateral agencies. We give a brief description of each of the projects in table 2 below. Although five initiatives were anticipated, one has been permanently shelved. The remaining four began implementation in 2002 and 2003. The number of internationally funded climate-related and CDM projects in China expresses the widely held expectations of the international community to CDM performance in China, though it is generally acknowledged that China needs to improve its understanding of CDM and increase capacity in the area. As can be seen from the table, the multilateral agencies such as the World Bank, Asian Development Bank and UNDP all wish to participate in the development of the CDM in China. Canada is a major donor together with European countries.

Project selection criteria could represent one area where the interests of the Chinese clash with those of the donors. China has stated that it prioritizes CDM-financed energy efficiency and renewable energy projects, preferably in its least developed Western regions and with a technology transfer component. Some foreign donors have stressed that investing in the control of methane emissions would be highly efficient for China. The Netherlands, also a major and active donor on the environmental side in China, has originally signed a project with the NDRC (the then State Development Planning Commission), but the project was shelved due mainly to differences concerning project focus.¹⁴ The Dutch project aimed primarily at enterprise capacity building and developing associations of industry (in the chemical, iron and steel sectors) to facilitate the identification of good energy projects and give the enterprises an opportunity to participate in international tenders. The Dutch project therefore involved direct collaboration with Chinese experts in the industry associations. The Chinese government, however, would have preferred the Dutch project to work together with a Chinese university on research. These differences resulted in the Dutch withdrawing its project.¹⁵ Following this withdrawal, the Netherlands instead channeled funding for CDM projects through CERUPT in order to maintain connections directly with the enterprises that are buyers of carbon credits.¹⁶ A wind power project in Inner Mongolia (see below) was selected in 2003 for funding by the Dutch government through CERUPT (Reuters 2003). It is the first Chinese project to be funded under the CDM.

¹⁴ A second factor may have been unresolved difficulties involving the Ministry of Foreign Trade and Economic Co-operation (MOFTEC) and the then State Development Planning Commission. The country's counterpart was the MOFTEC, however, as the partnership agreement was between SDPC and the Netherlands, this created certain bureaucratic obstacles.

¹⁵ It is likely that the Dutch government will await the results of the ongoing initiatives before getting involved in similar projects again in China. Authors' interviews Beijing April 2002, and August 2002.

¹⁶ For a description of CERUPT see: www.carboncredits.nl.

Table 2: Ongoing and planned CDM projects in China

Agency/ Country	Project purpose	Amount USD	Status
World Bank, Germany (GTZ) and Switzerland ¹⁷	National Strategy Study (NSS) on CDM for China. Methodological and technical issues for CDM. CDM project case studies. Renewable energy	USD 970,000	Co-operation program in Nov. 2001. Inception report completed summer 2002. Formal contracts with agencies in May 2002. Study to be completed in 2003 (CHECK OUT, yes)
Canada ¹⁸	Establish a CDM enterprise network. Develop CDM operational models. Research study of carbon sinks. Case studies in transportation and renewable energy.	USD 3.36 million	MOU signed 31 May 2002, Under implementation
ADB project financed by Canadian Co-operation Fund for Climate Change	Small and middle-size renewable energy projects. Development of CDM guidelines. Development of good practice design examples.	USD 975,000	Implementation began in autumn 2002 and the final report was delivered in the end of 2003.
UNDP project funded by UN Foundation and Norway	Capacity building and strengthening of government institutions and stake holders. CDM pre-feasibility studies for enterprises. Implementation of CDM pilot projects. Dissemination of information.	USD 2 million	Funding in place June 2002. Inception workshop held in November 2003. Implementation to begin in January 2004.
PCF investment; Coal-bed methane ¹⁹	Coal-bed methane project, for capture of coal-bed methane associated with coal-mining operation and utilization of methane for power generation, thereby displacing coal-thermal generation	USD 12.75 million	Under the stage of preparation
PCF investment; run-of-river project ²⁰	a run of river hydro project to displace coal-thermal power generation.	USD 8.5 million	Under the stage of preparation

¹⁷ According to the World Bank and following the recommendation of the Government of China, Italy will participate with additional components, i.e. pilot programs amounting to app. USD 300,000.

¹⁸ In addition to CDM, the Canadian project also includes components such as awareness and outreach tools and mechanisms; The preparation of China's National Communications; Climate change research on Adaptation and Impacts. See <http://www.ccchina.gov.cn/english/>.

¹⁹ The PCF is only one of investors in the project, which is expected to reduce emissions by as much as 29 MtCO₂e.

²⁰ Total emissions reduction from the project is expected to reach 3.7 MtCO₂e.

Although China has been hesitant to join the World Bank Prototype Carbon Fund (PCF), the PCF reached an agreement with the Chinese government in 2003 regarding basic terms of purchase for several CDM assets. The World Bank PCF is preparing two CDM projects in China, investing a total of \$21.25 million.²¹

Domestic capacity

One of the important issues in relation to CDM in China concerns the dissemination of knowledge and domestic capacity building both centrally and locally. Capacity building is actually one of the major elements of all the international projects either in relation to central organs, local actors or the business sector. The Ministry of Foreign Affairs, the National Development and Reform Commission, the Ministry of Science and Technology undoubtedly have the highest level of expertise of the commissions and ministries with regard to international and domestic CDM policy-making issues, and they employ staff who work full time on these issues. Within the academic community Qinghua University and the Energy Research Institute (ERI, subordinate to the NDRC) have the greatest capacity with regard to technical aspects of CDM. They are involved in the majority of the current international projects. Qinghua University and its technical expertise have close connections with the Ministry of Science and Technology and the university has for instance been commissioned to carry out all AIJ feasibility studies (Haugwitz 2001). The close ties between ERI and the National Development and Reform Commission make it a key agency. Finally, the Beijing University Guanghua School of Management has carried out studies for the China Council for International Co-operation on Environment and Development (CCICED), but plays apparently a less central role in the domestic policy making processes than either ERI or Qinghua.²²

Natural and technological sciences were involved in China's initial climate change studies, and the CDM process has so far has been dominated by technical and engineering experts. Research has tended to concentrate on the benefits CDM could bring in terms of energy efficiency technologies, and less on market attractiveness to potential investors. The donors interviewed for this study stressed the need to expand capacity for CDM research and to take on economists, marketing specialists and industrialists who understand how the workings of international carbon market. There are indications that funding of the social sciences, economics in particular, for climate change research and policy recommendations, also on CMD, is beginning to mount. The Chinese Academy of Social Sciences (CASS), together with Renmin University (the People's University), was awarded a subcontract to carry out the CDM Policy Building Support for the UNDP project in November 2003. It has also been suggested that CASS may be given a seat on the Climate Change Co-ordination Committee at their annual meeting at which committee changes take place. At the time of writing, January 2004, this has not yet materialized.²³ The sharper focus on social sciences may be related to the fact that universities and institutions such as the CASS (for instance the Institute of World Economics and Politics) possess competent experts (economists) in CDM and climate change concerns in general. There is also a general trend in China for social science to play an increasingly important role in decision making in China (see Li 2001).

²¹ <http://prototypecarbonfund.org/router.cfm?Page=Events>. See 2003 PCF Annual Report. 'PCF prepares CDM projects in China', Point Carbon, 5 December, 2003, <http://www.pointcarbon.com/article.php?articleID=2914>

²² The research has been prepared for the Working Group on Trade and Environment.

²³ Authors' interviews Beijing April 2002..

Case Study: CERUPT

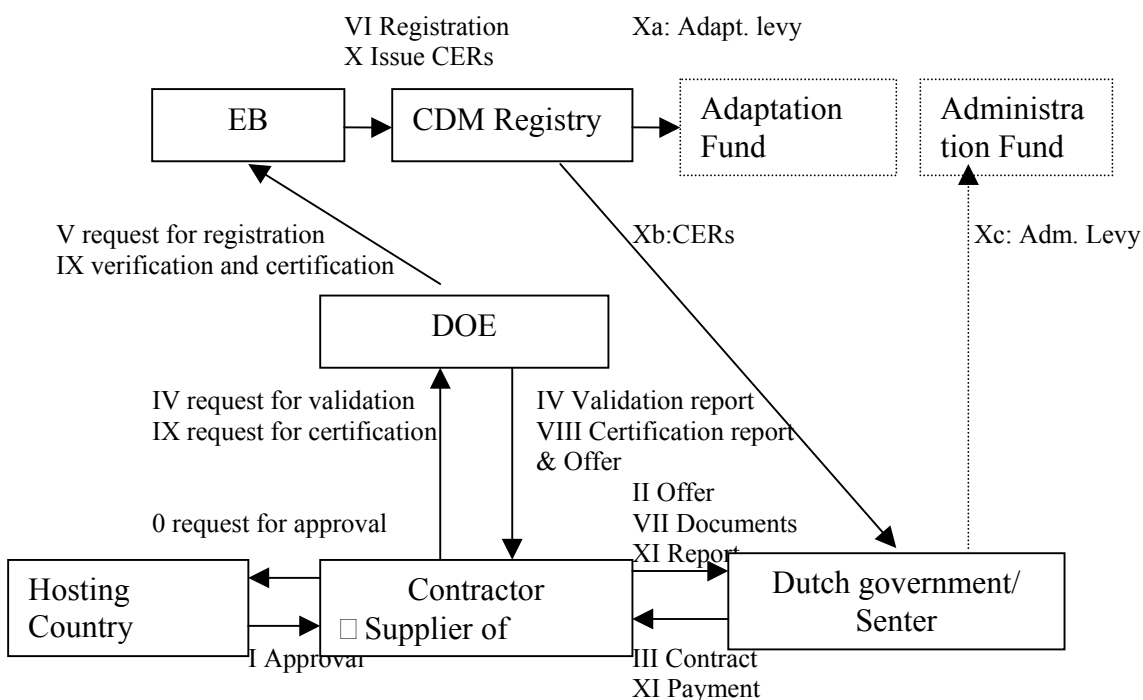
Several international programs aimed at financing CDM projects are presently under way. One of them is the Dutch CERUPT. Others are the World Bank's Prototype Carbon Fund (PCF), as well as the Capacity Building Initiatives by the UN institutions in addition to certain bilateral programs. The Dutch CERUPT project is the most tangible and advanced program that China has participated in to date, and it has given China a good opportunity to test its knowledge and capacity.

The Dutch CERUPT 2001

Certified Emission Reductions Unit Procurement Tender (CERUPT) 2001 is a Dutch Government purchase scheme aimed at acquiring at least 3 million Certified Emission Reductions (CERs) from other hosting countries. Responsibility for CDM in the Netherlands is with the Minister of Housing, Spatial Planning and the Environment. The Minister appointed *Senter* as the tendering authority for CERUPT. Tendering is conducted through public procurement in compliance with EU directives, the minimum amount for each contractor being 100,000 CERs. No maximum amount is set. Senter's specifications of the highest prices it would pay for the CERs to be generated from different types of CDM projects are as follows:

- Renewable Energy (excluding biomass) EUR 5.50
- Energy production by using clean, sustainable grown biomass (excluding waste) EUR 4.40
- Energy efficiency improvement EUR 4.40
- Others, among which fossil fuel switch and methane recovery EUR 3.30

The procedures and relevant stakeholders of this program have been designed with reference to the Project Cycle derived from CoP7. The parties involved and steps taken are displayed in the following chart.



China's Participation - the First CDM Project in China

The tender was announced November 1, 2001. Responding to this, the Chinese Renewable Energy Industries Association (CREIA) assisted two of its member companies – Wind and Solar Water Heater – to write and submit an Expression of Interest. In May 2002, one of the two projects – the Inner Mongolia Huitengxile Wind Farm Development Project – was shortlisted for proposal preparation.

Located at Huitengxile, Inner Mongolia Autonomous Region, China, projected overall capacity for this project is 31.2MW, to be achieved in two stages: a) 25.8MW, construction of which is set to start in May 2004, and b) 5.4MW, already up and running as of January 2002.

The lifetime of this CDM project will be 10 years, i.e. 2004–13. The price of CERs proposed by the supplier, the Inner Mongolia Wind Power Corporation, is estimated at EUR5.40/ton CO₂. The total emission reductions estimated over the ten year cycle are 644,951 CERs with 578,741 CERs(2004–12) already contracted with the Dutch government. Total revenue generated from CERs sales will be EUR 3,125,201.

By 26 September 2002, the Proposal, which contained a baseline study, environmental impact assessment, business plan, evidence of non-exclusion, etc. was submitted to Senter. In October, the Chinese Government issued a Letter of Approval for the only CDM project to be approved under the CERUPT scheme in 2001. Senter thereupon organized a field trip to the site. In November, the project's validator (DOE, Designated operational entity) submitted their Validation Report to Senter. The final element of the proposal submission was hence in place, and everything was therefore ready for contract evaluation. In March 2003, Senter awarded a contract to the project, the first CDM project in China. After several rounds of negotiation, the contract was duly signed by the two parties in December 2003, and is presently awaiting validation and registration with the EB.

Lessons and Challenges

China's participation in the Dutch CDM program has been a valuable experience. Complex procedures, both international and national, were brought into play, some for the first time, and clarifications made. Documentation was produced with the assistance of Western consultancies. The local team learned lessons and enhanced capacity through actual practice. CDM knowledge has been disseminated to various stakeholders in China, especially in the industrial sector. More enterprises are learning about CDM as a philosophy and paying more attention to relevant programs and financing opportunities related to CDM. The Chinese Government was asked to speed up the development of its national approval procedures, operational guidelines and institutional structure. Chinese efforts here will ease domestic procedures for future CDM projects. In addition, the response and position of the Chinese Government on CDM as a representative of the hosting countries have also contributed to the advance of this mechanism internationally.

The “learning by doing” process of China's first CDM project, provided several useful lessons for future CDM projects.

- Positive points:
 - The number of demonstration programs has risen in China. Such programs include PCF and CERUPT

- Several CDM studies and capacity building initiatives are being undertaken in China at the moment
 - The Chinese Government have expressed their support of CDM
 - Chinese industry is learning about CDM and interest is mounting
 - Big international companies like Shell, BP and others have started to pay attention to the CDM market
- Potential Risks:
 - Political risk: the Kyoto Protocol has not yet entered into force. Without the participation of the USA, it depends crucially on decisions made by big emitting countries like Russia and Canada
 - Technical risk: necessary CDM procedures and documentation are rather complicated, requiring the use of expertise for related consultation services and project packing. Resources such as these are, however, very limited locally. As far as the domestic system is concerned, the operational guidelines and institutional apparatus have yet to be finalized. The delays have caused technical difficulties and risks in securing national approval. As far as the international system is concerned, a tremendous capacity building effort is required to tackle the technical bottlenecks in terms, for instance, of baseline identification, monitoring plan development, validation and verification conduction etc.
 - Financial risk: CDM projects have high transaction costs occur. Not only are there charges on many procedures like registration, validation, monitoring, verification and so on as identified in CoP7, there are implementation costs for, i.a., consultation services, etc. All these could cause margins to shrink so much that the deal simply becomes less of an attractive project for industry.
 - Price concerns: the Chinese Government consider the present CER price is too low, and that it could result either in more time spent on negotiations with international institutions or fewer approved CDM project proposals.

Service providers

Services for CDM projects during the process can basically be divided into two kinds: project identification and project packing, and consultation services from a Designated operational entity (DOE) as defined in the Marrakech Accords. The first kind of services relate to the early preparation phase of the CDM project, during which specific projects are identified, and Project Idea Notes (PIN) and proposal are prepared, the latter including the Project Design Document (PDD) and Letter of Approval from the host government. The second kind of services, e.g., validation, registration, monitoring, verification and certification follow the project cycle and procedures set out at CoP7.

1) Project identification and project packing

In China, services for CDM project identification and packing are provided by a number of organizations ranging from industrial associations to research institutes.

Given the advantages of close ties with the business sector and a good knowledge of governmental preferences and policies, industrial associations have the advantage over others and are more likely to be awarded a CDM project contract from a pool of projects to be developed. The Chinese Renewable Energy Industries Association (CREIA), for example, helped one of its company members submit a successful wind project proposal under the Dutch CERUPT scheme in 2001. Other associations, such as CEC& CEDA (China Enterprise Confederation & China Enterprise Directors Association), CMIF (China Machinery Industry Federation), CNTIC (China National Textile Industry Council), etc, are all potential CDM players. These associations were mainly created during government restructuring, and their management and staff are former government officials, including some very high-ranking officials such as former ministers or vice-ministers. The organizations are normally national associations, often managing the industry on behalf of the Government, and maintaining institutional and financial capacity. As soon as their staff are equipped with CDM related knowledge and information, they will be able to act as an important bridge between the Government and companies for the identification of CDM projects. It is worth noting that the CEC& CEDA have begun to work together with CCICED (China Council for International Cooperation and Environment Development) in certain areas.

Research organizations in China, various institutes and universities for instance, have also participated in the early preparation phase of CDM projects. However, they work mainly with industrial associations in project packing, as this is where the bulk of their expertise lies, developed through involvement in CDM research from the very beginning.²⁴ Only the first two of these organizations, ERI and the Nuclear Energy Technology Institute (NETI) of Qinghua University, have had any significant involvement in the CDM. They have conducted several CDM/AIJ joint studies with international institutions such as WB, UNDP, NIRA (National Institute for Research Advancement), NEDO (New Energy and Industrial Technology Development Organization) in areas concerning market assessment, methodology confirmation and operational procedures and guidelines. Given their accumulated knowledge and experience, they are also fit to serve as technology support units for the Chinese Government at COP negotiations.

International consultancies specializing in climate project development, like Trexler & Associates, EcoSecurities, IT Power, Green Capital, etc., are presently involved in providing assistance on specific CDM initiatives in China. Undoubtedly, CDM project packaging will remain a leading priority given the related experience they have obtained in China.

The following types of organizations are currently either totally or relatively unaware of CDM. But given suitable capacity building measures, they could become important stakeholders in CDM projects.

- Institutions for international trade promotion could become CDM service providers, as their work involves promoting foreign investment, technology transfer, etc. These institutions maintain connections with Chinese and foreign government bodies and NGOs in China for the promotion of international trade, such as foreign Chamber of Commerce.

²⁴ Among these institutions we can mention the ERI (Energy Research Institute) of the NDRC, the Nuclear Energy Technology Institute (NETI) of Qinghua University, the Centre for Environmentally Sustainable Technology Transfer of Administrative Centre for China's Agenda (ACCA) 21, the Agricultural Meteorology Institute, the Environmental Economics Institute of Renmin University of China, the Guanghua School of Management of Peking University and the International Politics and Economics Institute of the Chinese Academy of Social Sciences.

Some of them have already started engaging in investment consulting, including activities in the climate change field. The main Chinese government body is the China Council for the Promotion of International Trade.

- Financial organizations like banks could become involved in CDM services too. Since 1993, banks in China have been functioning as ordinary commercial banks. The Chinese Government has standardized the management of financial institutions, established oversight systems for financial company operations, and set up a set of principles in compliance with international conventions. Financial organizations have gained their own decision-making power on investments, and their finance and investment capacity has been improved. Although restrictions still exist in relation to certain investment activities (including CDM), as the reform of China's investment and financing system progresses, and particularly as foreign capital banks enter the country after China's WTO membership, most obstacles hampering CDM services will be overcome.

2) Consultation services needed from a DOE defined in Marrakech Accords

There are currently seven candidate companies worldwide that have applied to become DOE to be accredited by the CDM Executive Board. Two are European (based in Norway and Germany) and five are based in the Asia-Pacific zone (two from Japan). None, however, are from China. This kind of situation means that CDM projects in China have to rely completely on the expensive services of foreign consultancies with the wherewithal and drive to become DOEs. Transaction costs of CDM projects would inevitably be high. That said, it does not necessarily mean that local DOE cannot be found or established. Actually, the two foreign investment consultancies in China and Chinese investment consultancies could meet requirements if the demand for DOE services remains high and the market relatively steady.

Foreign Investment Consultancies in China. With the expanding business of foreign investors in China, a set of world-known corporations is making its way into China's consulting market. Some of the biggest international accountant firms, Deloitte, PriceWaterhouse, KPMG International and Ernst & Young, have set up offices in China. These firms acted initially only as investment consultants for foreign investors and companies. They were soon receiving investment commissions from the Government and the large commercial banks. At present, their main market is in investment and financing for large enterprises and their market share of the consultancy sector is growing by the year. International verification companies like DNV (Det Norske Veritas) and SGS are professionals in areas such as validation, monitoring, verification, and certification, all necessary for appointment as a DOE. It is highly likely, therefore, that their Chinese offices would be interested in proffering the services required by CDM projects in China. Their experience of international practices, the standards and credits they have developed through many years of operation, and their human resources and global information network would absolutely put them in a very forward position in competition with other CDM service providers.

Chinese Investment Consultancies. China had no investment consultancies before the open door policy was introduced in the late 1970s. China's investment consultancies emerged in the wake of China's reform of its economic system, and, especially, following the high level of foreign investment put into China. These investment consultancies exist in various forms. Some are large, state-owned investment consultancies, like the China International Investment Consultation for Engineering Corporation. In the past, the corporation's operations were

restricted to reviewing and evaluating the country's investment activities. Nowadays, its customers number companies and foreign investors, and it undertakes the evaluation of investments. Similar businesses are offshoots of the large commercial banks or big investment companies. Most are state-owned and funded by the Government or by parent companies, both of which imply strong financial backing. In the present climate, the monopoly held by these companies has begun to give way.

Most independent (or private) investment consultancies in China were founded after 1992, and most of their employees were former government officials. These institutions underwent standardization after years of competition. A major asset has been the engagement of staff with foreign experience. They have enhanced the capacity of these institutions and helped set up professional investment consultancies. They offer consultation services not only on Government investments, but private investments too. In fact, the balance has slowly moved towards the latter. These companies are becoming more robust and experienced professionally, and their market share is growing rapidly. When tenders are out for CDM contracts, they will not be caught waiting.

Climate Policy and the CDM Potential in Norway

Overall Attitude and Strategy

Climate change is a major concern in Norway. The Norwegian Government is particularly concerned, and wants to play a useful role internationally. Norway was the third industrialized country to ratify the Kyoto Protocol, and it has a seat on the COP/MOP to UNFCCC. Internationally, Norway has said it is willing to do its share to achieve the global objective of climate mitigation through the obligations and cooperation laid down in the Kyoto Protocol. Steps have been taken to facilitate the implementation of Kyoto mechanisms. Companies like Norsk Hydro and Statoil, working together with the Norwegian government, have invested in the Prototype Carbon Fund (PCF), a scheme that promotes international carbon trade. Industrikraft Midt-Norge, a power sector company, and Government of Norway have signed a letter of intent to invest in the newly established Community Development Carbon Fund. Norway is in the process of formulating a climate policy that will enable effective reductions to be realized domestically while linking up with other countries' climate regimes. International collaboration under the Kyoto flexible mechanisms is also envisaged. June 18, 2002, the Norwegian Parliament (Storting) approved the Government's Supplementary White Paper, which sets out a domestic greenhouse gas Emissions Trading System (ETS) and other climate-related measures. The newly designed ETS is one of the first domestic systems in the world, and may impact on system designs in other countries, or, indeed, the EU.

Supplementary White Paper

The White Paper approved by the Parliament is a supplement to a White Paper submitted by a previous Government in June 2001. It extends in time the levying of a CO₂ tax to 2008 and the implementation of a quota-based domestic ETS from 2005 till 2007 for businesses not currently liable for the CO₂ taxation. The combined policy instrument is supposed to be more effective in ensuring cuts in Norwegian emissions and providing "demonstrable progress" as required by the Kyoto Protocol. Børge Brende, Norway's Minister of Environment, says that Norway is introducing a quota-based emissions trading system at this early date in an effort "to stimulate cost-effective action in Norway ... and give industry and the authorities useful

experience of emissions trading, (see press release, March 22, 2002, Ministry of Environment).

The CO₂ tax in Norway has been in effect since 1991. It is a series of tariffs on various fuels rising to over 300NOK/tCO₂e (about 40USD/tCO₂e), and covering 65 percent of current domestic CO₂ emissions. The scheme will be faded out in 2008, partly to avoid industries that have previously paid high CO₂ taxes increasing their emissions as the cost of purchasing emission allowances or other compliance tools falls below the cost of the CO₂ tax. Maintaining tax revenues was also a motive (see Buen 2002).

The new ETS will target particular areas not presently liable for CO₂ taxation including manufacturing processes (mainly found in the smelting, cement and petrochemical industries), gas firing and spill oil use and burning of coal and coal used in cement production. The ETS will cap emissions from these sources at 80 percent of 1990 levels. Permits will be grandfathered (granted) based on historical emissions. Banking is allowed on a year-by-year basis in the period 2005–07. The system of permit trading put in place will be based on the businesses' emission levels. All credits matching the Kyoto requirements are also bankable into the Kyoto period (cf. Buen 2002).

Obstacles in the way of continued action

Legislation securing proper implementation of the ETS is under preparation at the moment and the ETS bill is expected to be ready in April 2003²⁵ However, several bottlenecks need to be addressed before the rules are set out in detail. The financial penalty for entities that cannot meet the standard seems to be a sensitive issue. Relatively high penalties will harm the competitive edge of emissions-intensive industries, which are already operating in a fiercely competitive international market. On the other hand, low penalties may encourage businesses to pay the fines rather than taking action to reduce emissions. Another problem is that linking the Norwegian ETS to the EU scheme could be complicated as Norway differs from other EU member states in a number of respects. Norway, for one, has had a CO₂ tax since 1991. Because of this tax, several low-cost abatement measures have been implemented in Norway. Marginal abatement costs in Norway are therefore likely to be higher than in the EU. Second, renewable energy sources (hydropower) account for about 70 percent of stationary energy use, and about 99 percent of electricity production on the Norwegian mainland. Power generation is therefore not an important point source of emissions in Norway, while it is the most important source in the EU. Third, Norway is a major producer of petroleum products, and the shares of emissions from the petroleum sector (25 percent of total CO₂ emissions) are therefore much higher in Norway. Finally, the abundance of hydropower in Norway has attracted many energy-intensive industries, and their emissions (20 percent of total CO₂ emissions) will clearly be larger than from similar industries in most other industrialized countries (Buen 2002).

Feedbacks from Related Industries

The targeted industries have accepted the 20 percent GHG emissions reduction ceiling, they would prefer a voluntary scheme with the environmental authorities rather than a mandatory cap-and-trade scheme. They are concerned that until the EU and other OECD countries have specified their own emission reduction targets, most of their international competitors will

²⁵ Author's interview, Oslo, November 2002

enjoy a more lenient abatement regime. The sector is lobbying the relevant department in an effort to ease their obligations, especially the envisaged financial penalties. They are also unhappy with what is known as the applicable reduction basis (or average standard) that was set up recently for the private sector, as they are concerned that businesses set up before and after 1990 will be treated unfairly.

The sector has begun to consider how it might meet its reduction targets. However, before deciding on the most feasible approach, more research is needed. The national system is not ready either, and a prospective EU directive which will impact on European carbon market significantly has yet to be issued. Besides, the international CDM market is just in its infancy, and many uncertain factors will doubtless influence CER prices. A long-term strategy has been prepared to enable mainland industry to meet its ETS reduction targets (applicable from 2005) and the off-shore oil sector to meet its targets (planned to come into force in 2008). The following points summarize these developments²⁶

- The private sector will bear the brunt of the responsibility of meeting reduction targets. The private sector will also devise the most suitable methodology.
- Research is urgently required to evaluate different emission reduction methods and , to facilitate the acquisition of credits in the domestic trading system and international carbon market, or concerning investments in CDM projects in developing countries.
- The private sector must decide on the most effective means of emission reduction. Much will depend here on its business development strategy and manufacturing peculiarities.
- A flexible international emission reduction mechanism is the most likely option for the off-shore sector. Business in the sector are already paying CO₂ taxes to the tune of 300 NOK/ton CO₂e, so they would clearly welcome other options, including CDM, to mitigate the current high costs of reduction.
- Several factors will have an impact of investors thinking when it comes to choosing among several CDM projects. One concerns the capacity and effectiveness of approval procedures, operational guidelines, institutional structures etc.) in the host country. Another concerns the climate of investment, i.e., whether the country is investor friendly. A third concerns predictability in the area of CDM policy. The fourth factor concerns the project's level of risk. A low risk scenario is naturally to be preferred.
- When real actions need to be taken in the future, businesses will probably concentrate on their own areas of trade and expertise and even do CDM projects at their own plants in the hosting country. They may also implement programs with which they are familiar and trust, such as PCF.

Opportunities for Implementing International Mechanisms Like the CDM

Although the Norwegian Government has stated that significant reductions should be made inside Norway, it can not be ignored that there is wide gap between ETS-facilitated reductions and the Kyoto targets based on current emission estimations. Norwegian GHG emissions have been growing steadily since 1990. In June 2002, the Norwegian Pollution Control Authority (SFT) and Statistics Norway (SSB) reported that Norway's GHG emissions, of which CO₂ represents three quarters, rose by 2 percent in 2001, after a brief decline in 2000. Total GHG emissions are now about 8 percent over 1990 levels. In comparison with Norway's Kyoto

²⁶ Author's interview with industry official. Oslo, November 2002.

target, that means 1 percent over 1990 levels. In other words, emissions need to be cut by 7 percent.

The domestic measures are designed to effect a reduction of 6 million tonnes of carbon dioxide equivalent (MtCO₂e) per year. GHG emissions in 2010, in a business-as-usual scenario, are estimated at 9 MtCO₂e, however. In addition to this, the government has granted construction and operating licenses for three gas-fired combined cycle power plants on the Norwegian mainland, though the decision to build any of them is currently on hold. But if they were to be included in the equation, Norway would need to reduce emission to the order of 13 MtCO₂e per year from baseline. If the three gas-fired power plants are taken into account, CDM or other Kyoto mechanisms will have to deal with a gap ranging from 3 MtCO₂e/year to 7 MtCO₂e/year.

Conclusions and Recommendations

Chinese government

China is in the process of defining responsibilities and functions of the various organs that will be involved in the system of identification, approval and implementation of CDM projects. The outcome could strongly influence investors' willingness to invest in Chinese CDM projects. Clear lines of authority, streamlined procedures and transparency are likely to foster effective implementation and make CDM-projects attractive for outside investors.

Another important step is being taken by international assistance organisations and bilateral and multilateral donors to build CDM implementation capacity. A number of large CDM capacity building projects are set to be implemented in 2004. This assistance could greatly benefit China and future CDM investors if it helps create an effective system for approval of projects and enhance awareness of the opportunities offered by CDM among local stakeholders. The commitment of the Dutch government to provide funding through CERUPT in 2003 for the wind power project in Inner Mongolia could be an important experience for China, along with the two PCF projects.

With regard to CDM effectiveness in China in the future, the analysis points to a few challenges that could be influential:

Disseminate expertise and involve stakeholders

China has managed to build vital expertise in its civil service with regard to CDM policy making. A few research institutes have also improved their knowledge of technical aspects of CDM projects. China should take steps to ensure that economists and market specialists become fluent with the international market, raising the country's chances of competing successfully internationally for CDM projects. Local stakeholder involvement is also likely to provide considerable benefits. Although the government has given CDM rules and procedures considerable attention, local authorities and project developers have not been very involved in that process. As we approach a period where projects will be evaluated as commercial ventures, it will be increasingly important to bring in project developers in China, as in the investor countries. Early participation of local project developers could shape implementation procedures, and could make the system far more effective.

Project selection criteria

While Chinese authorities would like to prioritize energy efficiency and renewable energy, many investors would probably prefer a focus on a broader scope of projects. The Chinese selection process could have a major impact on the number of projects and the size of investments.

Timing

Timing is important and it seems likely that there will be considerable learning-by-doing effects from the implementation of the first projects in China. As experiences are gained, procedures will be streamlined and transactions costs cut. Gaining experiences in an early phase is therefore likely to greatly increase the effectiveness of the system, and hence the number of CDM projects China will attract.

Search costs

It would be useful to establish a CDM database in order to reduce transaction costs and to increase information exchange. On the one hand, western companies do not know where to find good CDM projects in China, and, on the other, Chinese companies do not know that they make money from the carbon trade. There is no such platform yet that allows dialogues to be set up between Chinese and Western stakeholders. What a potential database would contain would have to be discussed.

Shortage of buyers

A number of companies have visited China and tried to help Chinese companies acquire CDM projects. However, there are no clear CDM project funding channels, despite the long list of potential projects in China. There are simply not enough buyers at this stage. For example, PCF of the World Bank can only buy 10 percent of CERs for the GHG emission reductions.

Transaction cost under the Marrakech accords

Registration fees, validation, monitoring, verification, certification and share of proceeds; both the amounts involved and who will bear them remain undecided and under discussion. It is also a problem that there are no clear standards for baseline studies or approval procedures under the UNFCCC or EB.

Institutional Cost with Chinese government

Currently, there is no clear guidance on national approval procedures and institution structure. Moreover, institutional costs in China, registration fees and eventual taxation have yet to be settled. But there will definitely be a charge.

Implementation Cost

Expertise and consultancy are required to assist industry through the rather complicated CDM procedures and in the preparation of proper documentation. It is impossible for each enterprise to have either the knowledge or the personnel for CDM projects. Consultancies or intermediate companies will therefore need to package CDM projects for the industrial sector. However, there are virtually no consultancies or intermediate company in China with sufficient CDM capacity. So far, the Chinese have had to rely on expensive foreign consultancies, compounding the already high implementation costs.

Norwegian government

The report recommends that the Norwegian Government pilot a CDM project implementation collaboration with China, especially aimed at facilitating inter-business information exchange in the field of biomass for energy, hydro-power technologies etc.

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Appendix 1

Abbreviations

CAS	Chinese Academy of Sciences
CASS	Chinese Academy of Social Sciences
CDM	Clean Development Mechanism
CERs	Certified Emissions Reductions
CERUPT	Certified Emission Reductions Unit Procurement Tender
CMA	China Meteorological Administration
CREIA	China Renewable Energy Industries Association
DOE	Designated operational entity
ERI	the Energy Research Institute
FCCC	Framework Convention on Climate Change
GEF	Global Environment Facility
JI	Joint Implementation
MOA	Ministry of Agriculture
MOF	Ministry of Finance
MOFA	Ministry of Foreign Affairs
MOFTEC	Ministry of Foreign Trade and Economic Co-operation (abolished)
MOST	Ministry of Science and Technology
NDRC	National Development and Reform Commission
OE	Operational Entities
PCF	Prototype Carbon Fund
SC	State Council
SDPC	State Development Planning Commission
SEPA	State Environmental Protection Administration
SETC	State Economic and Trade Commission (abolished)
SPC	State Planning Commission (former SDPC, now NDRC)