EU-China CDM Facilitation Project

Technology Transfer in CDM projects in China

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1 Background: EU, China and the CDM

The strategic relationship between the EU and China, in terms of "interdependence on energy and climate security", is of growing importance to both parties. In 2005, China and the EU agreed to a partnership on climate change, which contains two concrete co-operation goals to be achieved by 2020. The first is to demonstrate and develop, in China and the EU, advanced near "zero-emissions" coal technology. The second goal is to significantly reduce the cost of key technologies and to promote their deployment and dissemination. Furthermore, the Partnership also aims to reinforce EU-China cooperation through the Kyoto Protocol's Clean Development Mechanism (CDM) by strengthening the implementation of CDM, facilitating the exchange of information on CDM projects and encouraging both European and Chinese companies to engage in CDM project co-operation.

This EU-China strategic link on climate change actions through CDM has emerged to be particularly strong, especially because of the cost effectiveness of Greenhouse Gas (GHG) emission reduction in China and the more strict emission caps in the EU Emission Trading Scheme (ETS). Since 2007, the EU has become the largest buyer of Certificated Emission Reductions (CERs) in the Chinese CDM market. At the same time China is the world's largest developing country and is also the largest host to CDM projects. Since the Protocol came into force on 16th February 2005, the volume of CDM projects in China has increased rapidly. By the end of 7th October, 2008, the Chinese government had already approved 1595 CDM projects, among which 286 had been successfully registered with the EB, amounting to 24% of the total of all CDM projects globally. As of 27th October 2008 some estimate that Chinese CERs from CDM projects account for approximately 230 million tons of CO2 equivalent from projects registered with the EB, or over 52% of the global total. Such rapid growth in the EU-China partnership in CDM is emerging as an integral element in the greater scope of both financial and technical transfer from the EU to China.

Technology transfer is also a key component in the realization of the goals of the Protocol and Convention, and it has been one of the important issues under the negotiations. Both Protocol and Convention have stated that developed countries should take measures to transfer greenhouse gas emission reduction technologies to developing countries. Technology transfer, while not explicitly mandated by the CDM, is still seen by many as an important instrument to promote CDM projects of high-quality and high-efficiency emission reduction, to safeguard the environmental integrity of CDM and to promote sustainable development in China.

Despite a strong Chinese CDM market, the process of technology transfer through various forms of international co-operation, including CDM, has been considered by some as "very slow".[1] At the UNFCCC Conference in Bali in December 2007, there was a strong voice from developing countries calling for concrete action on technology transfer and the provision of financial support, together with cost-effective emission reductions. Technology transfer is on the one hand a potential "stumbling block" but on the other hand also an opportunity for a "breakthrough" in the current and future negotiations to reach a consensus on complex issues such as how to define and implement the "common but differentiated responsibilities" of developing and developed countries. Generally speaking, the experiences of technology transfer in other non-Annex I countries shows that:

[1] See " Rise in funding pledged to tackle climate change" http://chinadaily.com.cn/cndy/2008 04/24/content_6639699.htm.

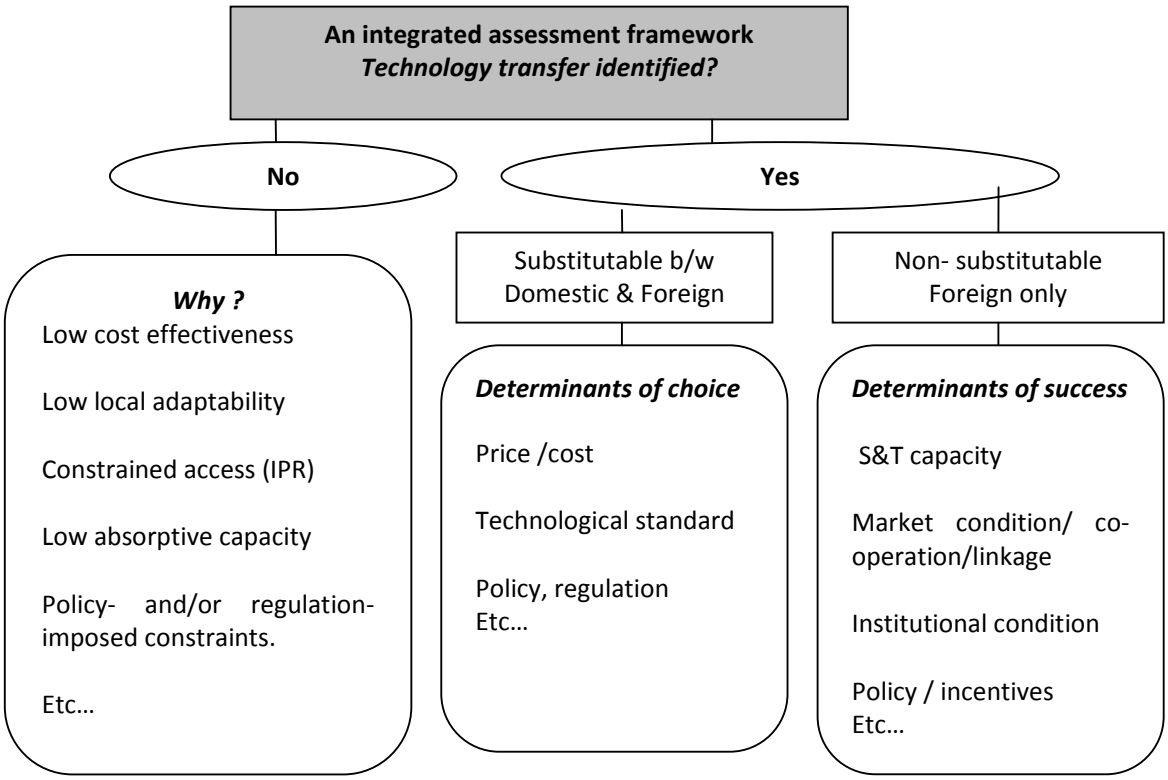
- Technology transfer is associated with active participation of foreign partners and the size of projects and varies largely across different project types.
- In India, some case studies reveal that the incidence of technology transfer is "strikingly low".
- And in other cases such as in the Philippines, Thailand and India, there were positive experiences where innovative institutional designs have helped overcome barriers and have created incentives for technology transfer in CDM projects.

Within the last months, there has been a convergence of several important factors that casts significant uncertainty on the CDM market. One of these factors is the economic downturn that gained momentum through the end of 2008. This has direct implications for the CDM market. By most measures, world trade in goods and international financial flows have fallen sharply through the end of 2008 and beginning of 2009. The CDM, which depends on the flow of goods and capital through the global economy, will not be spared and there are already signs of a significant dip in both the volume and price of CERs. In addition to the economic uncertainty, there is also the uncertainty around future climate policy and the future of CDM itself, on the road to Copenhagen. At the same time, there is significant reason to believe that current market data does not capture the extent to which the CDM has been affected by these factors. This is partly because projects already in work will continue to move forward, and the lead time before CERs are issued. On the other hand, there are preliminary reports of a serious drop in the number of new CDM projects that are starting up. How technology transfer is affected by the current state of the global economy will become more apparent in the coming months.

Important questions still remain unanswered, particularly with respect to the Chinese experience with CDM. Have CDM projects in China realized technology transfer? What are the challenges to technology transfer in CDM projects and how can we cope with them? These are issues that need to be studied and solved and the issues that this report seeks to address. Taking into account both emerging favourable conditions as well as the existing controversy on technology transfer, this report summarizes the findings of the assessment on technology transfer in CDM projects in China based on the experience of the "EU-China CDM Facilitation Project". This report aims to provide interested parties, especially CDM policy makers in both the EU and China, with timely and up-to-date information as well as policy recommendations on how technology transfer can be encouraged and developed as an integral element in the CDM project.

The analytical framework applied here seeks to identify barriers and opportunities to support further technology transfer (see Figure 1.).

Figure 1. Analytical Framework



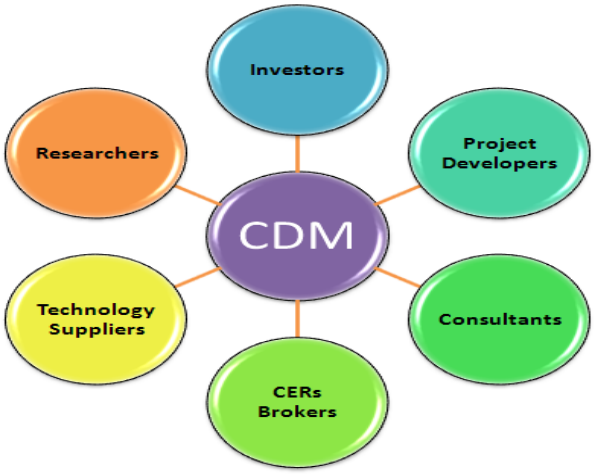
With this approach in mind, the report focuses on the following key aspects:

- The definition/interpretation of the term "technology-transfer", particularly within an operational context and from the viewpoints of various stakeholders involved in Chinese CDM projects/market.
- Technology-transfer in practice, in particular through examination of technology-transfer as described in Project Design Documents (PDDs).
- The barriers to and determinants of technology-transfer.

2 Methodology and data sources

The assessment combines qualitative and quantitative approaches to obtain a holistic and in-depth understanding of the role played by technology transfer in the Chinese CDM market. The data for this assessment was gathered from several sources, which we present in this section.

Figure 2. Overview of Survey Organisation Characteristics



Interviews with European organisations in the Chinese CDM market: 15 European organisations that operate in one or more sectors of the CDM market in China offering a variety of services to project owners and CER buyers were interviewed during October – December 2007. All companies interviewed have their headquarters in Europe but hold a strong Chinese market presence.

Interviews with 10 regional CDM service centres: The service centres are dispersed across China and help provide insight on the diversity of the CDM market in China.

Project Design Document (PDD) reviews[2]: All CDM projects registered at the Executive Board (EB) as of 1st of May 2008 were reviewed to assess the extent to which technology transfer has been identified/occurred. During the PDD review process, there are some operational difficulties that made the assessment less straightforward:

- The information concerning technology transfer in PDDs is, in general, very limited and sometimes missing.
- In some cases, the information provided in the PDD regarding technology transfer turned out to be inconsistent with the actual project implementation when a cross-check was conducted in the form of direct contacts/interviews with the project developers or the project owners.

The above findings thus raise concerns about how technology transfer should be more clearly defined in the PDD and how technology transfer should be given more attention during the approval process both at the DNA and the EB level, both in terms of access to reliable and useful information as well as the consistency between the PDD and practice.

[2] PDD reviews are available upon request

Table 1: Distribution of EB registered & Chinese DNA approved CDM projects (1 May, 2008)

Project type	Number of projects registered at the EB (assessed)	Number of projects registered by the Chinese DNA (not assessed)
Biogas	1	13
Biomass	10	33
Cement	0	6
Coal bed methane	8	49
Energy efficiency	19	199
Fuel switch / LNG	6	26
HFC	10	11
Hydro power	69	574
Landfill gas	10	37
N_2O	8	28
Reforestation	1	3
Solar	0	3
Wind	60	191
Total	202	1173

Case studies on ongoing CDM project[3]: In total, 14 case studies were carried out, covering different projects, across various geographic areas mainly from March – September 2008. At the site visits, project owners and involved stakeholders (e.g. local CDM centres, government agencies and business partners) were interviewed on issues related to technology transfers in their ongoing CDM projects. The selection of the cases mainly among the 202 EB registered CDM projects is based on the criteria that these 14 projects vary by project type and present a comprehensive geographic picture, especially in regions with different CDM-competitiveness.

Table 2: List of surveyed ongoing CDM projects (by project type and region)

Project type	Location	Industry
Energy saving and	Anhui	Utilization of Afterheat in Cement Industry
Energy	Hebei	Handan Iron and Steel company
efficiency	Hubei	Wuhan Iron and Steel company
	Jiangsu	Ultra-super critical power plant
	Yunnan, Hunan	Small hydropower
Renewable	Inner Mongolia, Jiangsu	Wind power
Energy	Hebei	Biomass
Fuel switch	Beijing	Nature Gas Power Plant
CBM/CMM	Shanxi	Coal Bed Methane Recovery
	Jiangsu	HFC23 decomposition
other	Shanxi	N_2O decomposition

[3] Data available in the Impact Assessment of CDM on China's Sustainable Development report

3 Definition of technology transfer

3.1 The "Official" versus "Operational" definition

During government negotiations on the role of technology in GHG mitigation, developing countries have voiced a strong interest in gaining improved access to technology. It has been understood that an improved understanding between different groups on what technology transfer entails and the possible measures to establish and encourage a mutually beneficial process is critical to bridge gaps of misunderstanding and to accelerate the negotiation process at this point. Technology transfer is a broad concept with many different definitions, and is widely variable depending on the context. Most literature covering the topic of technology transfer point to many definitions of technology transfer and argue that an authoritative source does not exist4.

The Agenda 21 adopted by the United Nations Conference on Environment and Development in 1992, offers one acknowledged definition of technology transfer. Chapter 34 of the "Agenda 21" presents a detailed description on the meaning of and the ways to promote technology transfer and reflects an understanding of the term which is often referred to during negotiations on technology transfer for environment and development.

According to the Agenda 21, environmentally sound technologies use all resources in a more sustainable manner, recycle more wastes and products, and handle residual wastes in a more acceptable manner than the technologies for which they were substitutes. Environmentally sound technologies are not just individual technologies, but total systems which include know-how, procedures, goods and services, and equipment as well as Organisational and managerial procedures. This implies that when discussing transfer of technologies, the human resource development and local capacity-building aspects of technology choices, including gender-relevant aspects, should also be addressed.

Agenda 21 stresses that developing countries need easier access to technology information and have particular needs for new and useful technologies to eradicate poverty and distress. The developing countries' development, technology and management capacity needs the support from the international community, i.e. needs long-term and common efforts on providing and receiving technologies by enterprises and governments, and comprehensive training for engineers, managers, scientists and educators. Transfer of state-of-the-art technologies to developing countries shall be facilitated and financed as appropriate, while providing fair incentives to innovators. Consideration must be given to the role of patent protection and intellectual property rights along with an examination of their impact on the access to and transfer of environmentally sound technology. It is necessary to guarantee access for developing countries to environmentally sound technology in its relation to proprietary rights. National policies (including subsidies, tax and regulations) need to encourage the innovation of private and public sectors and eliminate barriers to technology transfer.

The proposals of Agenda 21 also include: the governments of developed countries purchase of patents and licences on commercial terms for their transfer to developing countries on non-commercial terms; support should be provided for programmes of cooperation and assistance, and

[4] "Definitions of technology transfer differ much." (Haake, 2006) "There is surprisingly little consensus on what constitutes technology transfer. In fact, in much of the discussion of technology transfer, the term is not defined." (Kline et al., 2003). "The literature shows a broad array of definitions" (de Coninck et al., 2007).

to the establishment of collaborative network of international research centres on environmentally sound technology; in compliance with relevant international conventions, undertake measures to prevent the abuse of intellectual property rights, including rules with respect to their acquisition through compulsory licensing, with the provision of equitable and adequate compensation.

The Intergovernmental Panel on Climate Change (IPCC), which have an exclusive focus on climate change, offer another recognised definition of technology transfer in the report "Methodological and Technological issues in Technology Transfer" (IPCC, 2002):

> "*Technology transfer […] as the broad set of processes covering the flows of know-how, experience and equipment for mitigating and adapting to climate change amongst different stakeholders such as governments, private sector entities, financial institutions, non-governmental organisations (NGOs) and research/education institutions. The broad and inclusive term "transfer" encompasses diffusion of technologies and technology cooperation across and within countries. It comprises the process of learning to understand, utilise and replicate the technology, including the capacity to choose it and adapt it to local conditions*."

The IPCC's definition of technology transfer is a useful guide in a general sense but does not and was never intended to provide guidance in an operational sense (Cools, 2007). In this study, we establish an "operational" definition of technology transfer, based on IPCC's definition of technology transfer, to apply to our survey. The differences in the understanding of what technology transfer is and how it can be achieved, in particular from the perspective of the wider stakeholders and policymakers, highlight the underlying tension around the issue and, at the same time, underline the need for advancing mutual understanding. In the conducted assessment, the operational definition of technology transfer comprises the following key elements:

- **Foreign origin and degree of novelty:** The technology has to be imported/originated from a developed country. However, the novelty can differ depending on if the imported technology is new to the Chinese market or new to the province or to a specific industrial sector.

- **Capacity building:** Technology transfer covers not only introduction of physical equipments but also dissemination of tacit "know-how" to enhance the ability to manufacture, operate, maintain and master new technologies.

- **Performance improvement:** The outcome of technology transfer is not the new technology per se but improved environmental performance (i.e. more efficient GHG reduction or the capacity to generate more CERs compared to existing technologies).

3.2 The perception of market participants

The perception of technology transfer in the Chinese CDM market among the interviewed European organisations is to a great extent, in line with the operational definition applied to the assessment. Their view stresses:

- Novel, advanced and more efficient equipment from abroad.
- Know-how to operate and maintain a facility in a proper manner.

- Ability to localize and to fit the Chinese condition.

The two latter aspects are of great importance and interest to the interviewed European organisations and are cited as a "key to success" and the way to "secure more sustainable projects". This view echoes observations made by some organisations that "CDM technology is not rocket science" and not all technologies used in CDM projects are necessarily complicated; the expertise in the use of the technology and the ability to adapt technological solutions to the local conditions are as important, if not more important, to maximising a project's overall performance.

Though Chinese project owners expressed similar views on the operational definition of technology transfer, many argued that imported foreign equipment is not always the most critical element, citing instead the importance of gained expertise in the use of the technology (i.e. operation and maintenance).

4 To what extent does technology transfer take place in CDM projects?

In this section, we seek to quantify and clarify the degree to which technology transfer has occurred across different project types. Two methodologies are applied: the first is a straightforward application of the operational definition of technology transfer to the PDD database; the second is an examination of the degree and origin of foreign equipment imports in Chinese CDM projects drawing on interviews, case studies and other activities falling under the EU-China CDM Facilitation Project.

4.1 Technology transfer assessment - PDD reviews

The operational definition of technology transfer was applied to the 202 PDDs for projects registered at the EB as of 1 May 2008. The PDD review first of all showed that there is a difference in understanding what technology transfer is, i.e. the reviewed PDDs define technology transfer differently. It also shows that, on the basis of the PDDs, the CDM projects that mentioned technology transfer account for about 40% of the total projects; secondly, according to the field survey, even among the 40% of projects that mentioned technology transfer, about two thirds involved transaction of equipments at commercial prices without favourable terms; thirdly, among the remaining one third of projects indicating knowledge transfer and capacity building, this i.e. typically translates to training on operation and maintenance, without transfer of core and key operation and maintenance technologies nor the transfer of equipment manufacture technologies.

Based on the types of CDM projects, there is so-called "technology transfer", or more accurately, projects with transfer of foreign equipments and simple training on operation, and they are mainly wind power and non-co_2 projects, such as N2O, HFC-23 and coal-bed gas, etc, accounting for 66%. Energy efficiency projects have larger co-benefits for energy-saving and pollution reduction, and their needs of technology transfer is huge, but the level of it is very low, which is mainly transfer of a few equipments. In addition, in the same type of projects, there is huge difference regarding "technology transfer".

As for the sources, the equipments of China's CDM projects are mainly from European Union, United States, Japan, among which EU accounts for about 47%. The technology/equipments from EU are mainly on renewable energy, especially wind power and bio-mass. The export of renewable energy equipments from CDM projects accounts for 80% of the total equipments export from EU to China. The amount of export of energy efficiency technology from EU to China is very low, far less than from Japan to China.

More detailed breakdown of this information is again provided in Table 3.

Table 3: Summary statistics from the review of PDDs (Cut-off date: 1 May, 2008)

Project Type	Total Projects	No TT Occurred	TT Occurred	Breakdown by Country/Region of Origin			
				EU	USA	Japan	Unknown
Coal Bed Methand (CBM)	8	5	3	1,5	1,5	0	0
HFC	10	1	9	1	4	3	1
N2O	8	5	3	1	1	1	0
Fuel Switch	6	0	6	2,5	2,5	1	0
Energy Efficiency (EE)	19	8	11	0	4	6	1
Hydropower	69	67	2	0	0	0	2
Biomass	10	6	4	4	0	0	0
Wind power	60	22	38	26	3	0	9
Land fill	10	4	6	2	2	0	2
Reforestation	1	1	0	0	0	0	0
Biogas	1	1	0	0	0	0	0
Total	**202**	**120**	**82**	**38**	**18**	**11**	**15**

4.2 Summary comments on PDD review

The following are more specific observations that have been made from the PDD review:

- About 41% of project PDDs provide an indication for commercial technology transfer.
- The share of all 202 projects indicating technology transfer varies across different project types. In other words, there is a high variation of technology transfer depending on the type of technology applied (e.g. wind versus biomass).
- The project types with the highest frequency of technology transfer, such as N_2O, HFC23, fuel switch, energy efficiency and landfill gas, are largely associated with imported equipment. Furthermore, technologies for industrial gases such as N_2O, HFC23 and methane were not widespread before CDM arrived. There is a marked increase in the uptake of these projects, arguably in part due to the start of the CDM.
- Wind power projects have a rate of technology transfer of 63% although there is relatively higher rate of imported technology and a relatively lower degree of "novelty". Wind power projects apply similar types of equipment and technologies in many CDM projects. However, interest for larger and more energy efficient foreign wind mills is still a driving force for importing these parts but is, at the same time, limited by domestic regulation requiring local components. The aim of this policy is to improve domestic production capacity and lower down the costs.
- Technology transfer from the EU is concentrated in wind power projects, with Denmark and Spain as two predominant suppliers (and also German technology, to a lesser extent). 68% of wind projects with technology transfer included parts from the EU. Likewise, the USA and Japan have 9% and 5% of the share in projects with technology transfer varying

across different sectors, but especially concentrated in industrial gases and energy efficiency.

- According to the statements in PDDs, 100% of the fuel switch projects studied employ imported technologies, and have involved "operational" technology transfer. The imported technologies to be employed in fuel switch projects are usually the key technologies to promote the energy system transition, which includes, for example, the generic Large CCGT (combined cycle in conjunction with gas turbines),large scale NGCC (Natural Gas-Steam Combined Cycle) Power Technology, etc. The main suppliers of the imported technologies are major multinational producers, such as GE and Siemens.

- Over 55% of energy efficiency CDM projects in China involve technology transfer. The energy efficiency CDM projects in China are dominated by waste heat recovery and waste gas utilisation projects, which not only employ new technologies but also often require the modification of existing technologies and the improvement of production processes. Note however that technology transfer identified in PDDs refers mainly to tangible and measureable actions such as equipment imports of large gas turbines and coke dry quenching (CDQ). However, what is not adequately covered in PDDs are the more difficult to measure forms of technology transfer such as capacity building for local staff to optimise the production process, which is particularly important for energy efficiency improvement projects.

- 40% of biomass projects involve technology from abroad, partly reflecting a relatively high degree of utilisation of domestic equipment and technologies.

- Hydro power projects, in general, have a low frequency of technology transfer (3%). This is partly due to the maturity of hydropower technology in general, and partly due to the availability of local Chinese equipment providers. CDM does provide an adequate incentive for the uptake of hydro power in China however the cost advantages associated with domestic hydro power equipment leaves little room for technology imports.

- The variation of technology transfer within the same project type is also substantial, suggesting that project type alone may not be a sufficient indictor for the likelihood of technology transfer. The variation is associated with several plausible explanations: First, the variation among CDM projects across industries with different industry-specific characteristics implies different levels of technology transfer. It is particularly true for energy efficiency projects, which differ remarkably from each other. Second, the regional- and project- specific factors also lead to different levels of technology transfer even though the technology requirement and characteristics of the projects can be similar. Finally, from a methodological viewpoint, such variation can also be caused by the differences in the quality and the amount of information available in PDDs.

- The technology suppliers are most commonly multinational enterprises from EU countries (e.g. Germany, Demark, France and Spain), the USA and Japan.

- In terms of China's CDM sectors, the USA and Japan dominate the supply of energy efficiency technology in several key CDM sectors such as steel, iron and cement. EU dominance is well represented in renewable energy technology. Given the strategic importance of the Chinese market and the fact that Europe is the largest buyer of CERs, the

EU has an opportunity to scale-up the supply of climate friendly technologies and sustain its competitive edge in this market.

- Some EU actors, in particular German technology suppliers, are active in training and capacity building activities, for example, in the field of energy efficiency in buildings. However, so far there is no methodology for CDM or P-CDM for such projects.

4.3 Assessing technology transfer based on site visits and interviews

In addition to reviewing the available quantitative data, interviews and CDM project site visits were used to complement the PDD assessment. A series of site visits and interviews were conducted with direct contacts with on-the-ground project owners and involved stakeholders. Furthermore, interviews with European organisations provide information from an alternative viewpoint on technology transfer in the CDM projects.

We observe that there is a divergence in what the stakeholders argue versus what the PDD data assessment show. Given the nature of the interviews and the quality of the information available in the PDDs, these diverging points provide useful contrasts, with important practical and policy implications.

A summary of the key messages from the stakeholders is presented as follows:

- The level of technology transfer was generally cited by a range of actors as being low at the current stage in terms of both how technology transfer takes place and the degree of interaction between technology suppliers and project owners.

- The degree to which technology transfer takes place varies across project types. In the interviews with European organisations, wind power, biomass, Coal Mine Methane (CMM) and Coal Bed Methane (CBM) are considered project categories where technology transfer is observed in practice. Because of the importance of coal in China's energy and electricity generation, the interviewed European organisations stressed the importance for China to gain access to efficient technology for producing clean coal.

- On the other hand, hydropower is the only project category where almost all of the interviewed organisations agreed that there is no technology transfer occurring via CDM as there are Chinese companies offering equipment with reasonable efficiency at competitive prices.

- Technology transfer occurs mostly in the form of introducing foreign equipment combined with on-site training of operators and occasionally with training abroad provided by foreign technology suppliers. According to some European interviewees, approximately 60% of all equipment in CDM projects is imported from abroad. This is in particularly true, for industrial gas projects, such as N_2O.

- There is little incentive for project owners to seek technology transfer. As one argued, "Currently, project owners do not pay attention to technology; they just want to know if [their projects] can be a CDM project or not and fear paying too much money for technology". In other words, "CDM is not driven by technology transfer but rather by costs

and by expected revenues from CERs." This reflects the view that many carbon market actors see "CDM as a market-based mechanism and not a development project".

- Project developers' motivations to promote technology transfer are also low, especially during the project design, negotiation and the implementation phases. Imported/more advanced technology is preferable when taking project efficiency and the number of CERs that can be reduced into account. However, the project developers can not take this argument too far, as "they run the risk of loosing the project to another project developer/consultant". Very few project developers systematically look for projects that lead to technology transfer, "as this is up to the project owner to decide".

- Based on the PDD assessment, approximately 40% of the projects covered mentioned technology transfer. The field survey and case studies show that within projects with technology transfer 2/3 cites transfer of capital equipment at market prices. The other 1/3 of projects cites knowledge and capacity training, which typically means training for operation and maintenance. There is no core and crucial technologies transferred for operation and maintenance, let alone the transfer of know-how manufacture.

5 The views on barriers for technology transfer to China through CDM projects

From our survey, a number of observations emerged on barriers to technology transfer. The research underscores the fact that there are convergent views between Chinese and EU stakeholders within both the private and public spheres on what the barriers to technology transfer are, though there are some issues where understanding diverges. Views diverged in particular on impact of different aspects of domestic regulation on technology transfer. These barriers are presented here and serve as a point of departure for how technology transfer under the CDM might be strengthened.

5.1 Blocking technology diffusion and Intellectual Property Rights (IPR)

The concern voiced by several Chinese stakeholders is that technology owners in developed countries are all too effective at protecting their technology, and are able to monopolize access to clean technology and actively seek to limit technology transfer for private interests. For example, for one CDM wind power project covered in the field survey, foreign technology suppliers limited access to key components of the system, preventing Chinese project partners from gaining understanding of the operation and maintenance of core technology. Another example is one N_2O CDM project, where the project contract requires the return of the catalyser used for treating N_2O back to the foreign technology owner. This prevents Chinese companies from analyzing key components which prevents any learning and diffusion of the technology.

On the other hand, European enterprises interviewed explained that exporting to China is favoured over setting up a local production facility and IPR-associated risks is an important factor cited by many. For example, most companies move production of only a few parts to China but keep production of core parts in other countries to protect their IPRs. One approach to protecting IPRs , observed in a few cases, is for a foreign business to set up production in China in cooperation with a strong Chinese partner who shares similar incentives to protect IPR.

5.2 Weak incentives for project owners to pursue technology transfer

The interest of project developers to promote technology transfer is also low. One aspect of this is related to businesses being specialised, the vertical structure of supply chains and the trend in global trade which features more and more trade in “tasks” as opposed to trade in finished goods. Project developers focus on getting the right equipment for the job and often it is more cost effective to buy a finished imported product than to build the equipment in-house. For example if a Chinese wind plant buys a wind turbine from a foreign company to generate electricity, then they only care about how to operate the turbine for power generation or how to maintain the machine. They don’t care about how to manufacture a turbine since this is not their main business. The Chinese project owner has little interest in gaining access to upstream technology. At the same time however, there are an increasing number of project developers who use technology transfer as a strategy to help differentiate their services which is particularly important given the increasingly competitive nature of the CDM market in China.

There is a lack of support, such as subsidies or other policies, to encourage technology suppliers in developed countries to engage in technology transfer to China. The relatively high price of

technology from developed countries results in most Chinese project owners substituting with similar local technologies.

5.3 Price differential and financing issues

Foreign technology is often more expensive than domestic Chinese counterparts, causing many Chinese project owners to substitute with similar but cheaper Chinese technologies. "[There] is not a lack of interest from project owners in the newest technologies; it is an issue of cost". This is often the case especially when project owners do not adequately consider full lifetime costs and benefits of the new technologies (e.g. energy inputs, maintenance and other potentially hidden costs) are not properly assessed. Rather, the focus is on the higher initial investment costs. This is particularly true for SMEs who often have more difficulty in financing larger up-front costs associated with foreign technologies.

5.4 Human resources

Project owners cited the lack of human capital to run their facilities fitted with unfamiliar and/or new technology. Lack of qualified management impedes operations and often results in sub-par performance of installations. This barrier to technology transfer is particularly important for complex process projects, such as energy efficiency.

5.5 Methodology bottlenecks

The lack of methodologies in the fields of construction, buildings and energy efficiency was cited during several interviews as a barrier to scaling up CDM. Likewise, opportunities for technology import within these sectors will not be tapped until relevant methodologies are approved by EB. For most interviewed organisations, the Chinese CDM market is a relatively conducive environment to the development of new methodologies though several barriers were highlighted.

The most common barriers cited include:

- Private companies usually hesitate to finance the development of new methodologies due to the uncertainty around CDM. There were a number of sources of this such as the uncertainty if the CDM will continue in a meaningful way post 2012, or CER price uncertainty.

- New methodologies become a public good as soon they are approved by the EB. This makes it much more appealing to be the second project to make use of a new methodology and fairly unappealing to be a first mover.

- Both the methodology development process and the procedure for EB approval for new methodologies are time consuming.

5.6 The 49/51% rule

Under the current CDM regulation in China, Chinese funded or Chinese-holding enterprises within the territory of China are eligible to conduct CDM projects with foreign partners. Chinese-holding means that Chinese side will hold over 51% shares. Some buyers think that this rule is a particularly important barrier for projects requiring large investments (50 million USD and above) and may also hinder the implementation of more advanced technology. There is, understandably, debate about the importance of this barrier to technology transfer. On other side, Chinese and EU actors interviewed maintained that this factor is not a major barrier, while others did cite it as an important one.

5.7 Sector-specific regulation

While some sector-specific regulation aims to encourage technology transfer, there are conflicting rules that hamper the transfer. For instance, wind power projects are not allowed to import more than 30% of the equipment (by value) from abroad. Project owners are therefore forced to choose Chinese equipment which still lags behind foreign alternatives. China believes the aim of this regulation is to promote the design and manufacture of windmill and domestic production, rather than barriers to technology transfer, but the buyers think this is a barrier.

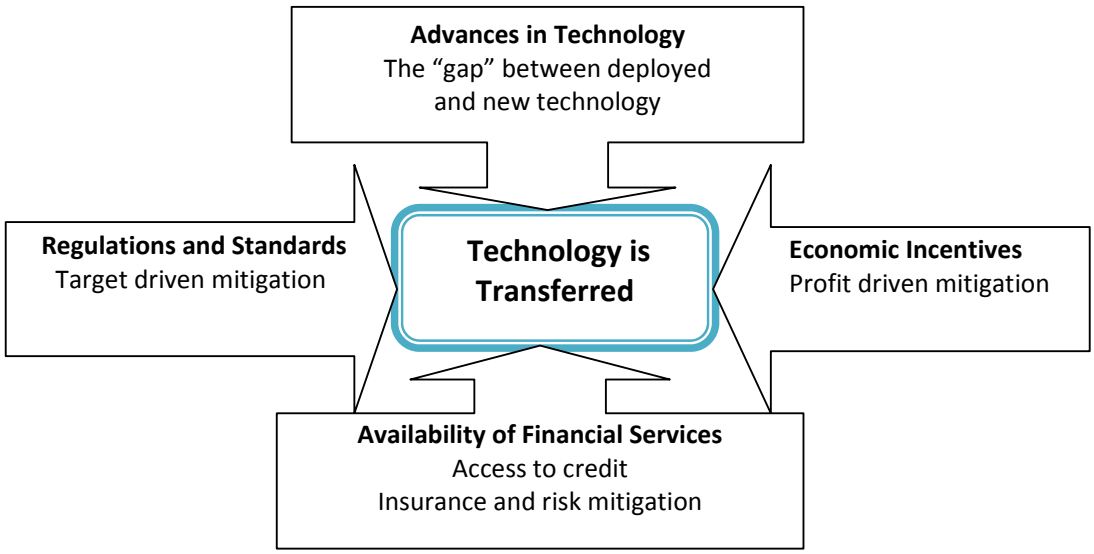
5.8 Potential conflict between additionality and national regulations:

New industry-specific regulations are emerging at both national and regional levels which may lead to conflict with the additionality requirement for CDM projects. Two examples include the new CBM regulation requiring utilisation of CBM/CMM with concentration rate above 30% and the forthcoming regulation on the utilisation of waste heat in the cement industry in several regions. While these regulations will be beneficial for the environment and energy development in these specific sectors in China, introduction of foreign technologies through CDM may be impeded since, by definition, these projects may no longer fulfil the requirements of additionality. The reality is that there is always barriers/gaps between regulation requirement and enforcement. It is nonetheless a barrier to technology transfer that has been identified.

6 Conclusions and suggested approaches to strengthen technology transfer

The framework conditions for technology transfer require that new and improved technologies exist and are commercially viable. Technology transfer also requires an appropriate mix of regulations, market-based instruments and access to human and physcial capital among other things (see Figure 3.). It is not a straightforward task to set up a framework for understanding technology transfer. For one there is the challenge of identifying what is a necessary versus a sufficient condition for the enabling of technology transfer. Beyond simply identifying the important factors, another challenge is to understand the relative importance of each of the factors.

Figure 3. Conditions for technology transfer



The differences in the understanding of what technology transfer is, and how it can be achieved, particularly from the perspectives of wider stakeholders and policymakers, is an indication of the underlying tension around the issue. The operational definition of technology transfer applied here comprises the following key elements: foreign origin and degree of novelty, capacity building and performance improvement. There was generally a common understanding between Chinese CDM market actors regarding the operational definition of technology transfer that was applied here. However, there was less common understanding between public and private sectors regarding the definition. In particular, the main difference in interpretation is over, for example, access to privately-owned clean technology, pricing policies for technology and how technology transfer relates to effort sharing of global mitigation. In this study, we have assembled data through a PDD review, interviews with public and private sector actors and visits to CDM sites in regions of China with CDM activity.

While technology transfer is not an explicit objective of the Clean Development Mechanism, our assessment shows that CDM projects have helped the importing of technologies to China. However, with the goals and expectations of China in mind, the level of technology transfer is low and not generating the benefits hoped for. The findings of the investigation undertaken here reaffirm the importance China puts on technology transfer in its move towards sustainable development. One of the larger challenges with the CDM in China (and other developing

countries) is how the carbon market can make the transition towards better additionality and technology transfer is a key component to this challenge. There is no clear and explicit incentive or reward for technology transfer in the current implementation process of CDM projects *per se*. Indeed it is still the case that the cheapest and the easiest projects would be exhausted first and this does not necessarily align with the goal of supporting technology transfer, particularly if one considers the assumption that more advanced and/or foreign technologies would be more expensive on average. Key conclusions are summarised as follows:

- The views on technology transfer, expressed from both the demand and the supply side of the CDM market and by both private and public actors in China, reflect some serious challenges that CDM as a market-based mechanism need to overcome.

- Approximately 40% of the PDDs indicate TT occurs. The field survey indicates that where TT was claimed in the PDDs, closer investigation of the projects show that in fact around 2/3 of cases involved transaction of equipment at commercial prices (i.e. not subsidised) with no indication of training or transfer of knowledge. The remaining 1/3 of cases indicated capacity building, i.e. primarily training on operation and maintenance.

- As a market mechanism, CDM is not explicitly driven by facilitating technology transfer but by cost calculations and revenues from CERs. While private-sector participation in GHG reduction has indeed increased, technology transfer is still not a primary interest for the private sector.

- The understanding of "technology transfer" has, to some extent, departed from "point-to-point relocation of technology" and has moved towards "sharing technology and knowledge with local stakeholders and partners" and "long-term adoption of environment-friendly technology with local appropriateness". However, it is still unclear how this can be sufficiently supported in practice.

Supporting further technology transfer to China through the CDM will require a broad set of policy initiatives undertaken at the national, bilateral and international level. With this in mind and against the above background, we think it is useful to put forward a list of ideas that might help support technology transfer to China. The suggestions provided in this section are by no means a recipe that taken together will secure technology transfer, nor are they for that matter agreed upon by all the members of the EU-China CDM Facilitation Project. Rather, it is a collection of views from diverse group on a complex challenge. It is clear that a number of these suggestions have important distributional implications, and we have not tried to rank these suggestions in any way. Rather, our hope is to provide an overview of some of the approaches that are being voiced by stakeholders.

China's policymakers are encouraged to deepen their understanding of the potential of CDM for China and to build on the experience gained to date. China's amibition with CDM follows through three stages. The first stage is one of doubt and undertainty about the market and its processes. The second stage is characterised rapid development and increasing volume of CERs. The third stage is one where rational and careful strengthening of the market helps move the CDM towards serving broader public interests. CDM becomes a pillar in China's path towards a more sustainable development – i.e. CDM is an important part of China's comprehensive steps towards economic development and sustainable development process. China's interest in the financial benefits from CERs are secondary to the need to shift towards generating better additionality from CDM projects, especially the further promotion of technology transfer.

6.1 Chinese perspectives on the EU and CDM

There is an expression of a need for a change in the way CDM is seen in the EU[5]. In particular the EU needs to recognize that there are significant benefits for the EU for supporting technology transfer to China, not only the business and trade opportunities but also the benefits of mitigation of climate change. There is the potential that technology transfer can result in trade benefits to EU and promote and raise the competitiveness of EU companies in the Chinese CDM market and even the global clean technologies market. This is linked to the grasp under the EU-China Climate Partnership Framework for EU companies to exist and expand in the Chinese market and will help further establish the EU status in international negotiations. There is also an interest in seeing more practical actions from EU to help remove the technology transfer barriers from the supply side, and to be more active in the promotion of technology transfer in CDM projects such as financial support (see subsection below).

6.2 Targeted financial support

As expressed by many project owners, an important barrier to technology transfer is lack of financial incentives to pursue technology transfer. Some different suggestions on how to approach this barrier are listed below:

- Set up a CDM technology transfer compensation mechanism with support from EU members. This fund could be used to support the development of new methodologies or support collaborative research and development efforts, in particular for energy efficiency or emission reduction technology for sectors such as iron and steel, cement and electricity generation.

- Financial support with a particular focus on encouraging and facilitating technology transfer and diffusion can be offered to CDM project owners, possibly drawing from the financial resources of the CDM fund.

- Consideration of different financial arrangements such as "green loans", technology export credit guarantees, fast track approvals for technology export, and export subsidies for preferential technologies made available to project owners to overcome larger initial investments that are associated with more expensive, advanced technology.

6.3 CDM project management and monitoring

- Introduce a clearer and more operational definition of technology transfer in the project approval process, at least at the DNA level.

- Prioritise technologies to reflect China's interest in promoting more sustainable development and be aligned with China's other initiatives for tackling climate change. The priorities can then be used as a basis for setting policies that can help support the deployment and diffusion of these technologies (such as energy efficiency in pollution intensive industries such as iron and steel industries) through the Chinese CDM market.

[5] In this context the EU refers to both the member states as well as the EU Commission.

- Refine and strengthen the monitoring and project assessment process to ensure the quality of the information on technology transfer in the PDD and that the process of technology imported abroad is clearly described and verifiable.

6.4 Market regulation and support

Policy will need to strike a balance between the need for foreign technology transfer and national technology innovation and R&D. This would need to balance targeted support for the transfer of appropriate technologies through CDM projects, maintain National Treatment (i.e. no favourable treatment of domestic suppliers) for foreign technology suppliers and support domestic research and development and innovation. The CDM fund (CDMF), which would be financed in part by a tax adjustments on CERs has the potential to play a useful role in supporting and encouraging domestic R&D of advanced energy conservation and emission reduction. Some concrete suggestions on how market regulations might be tailored to support technology transfer include:

- Economic incentives and/or preferential treatment of projects based on the potential level and scope of technology transfer. These incentives could be applicable to both domestic project owners as well as foreign technology suppliers.

- CDM projects differentiated on the basis of their potential to generate technology transfer. At the same time, the introduction of foreign technology and the need to encourage domestic innovation should be balanced. The possible criteria that can be used to differentiate CDM projects include, for example:
    - Identification of priority areas in terms of degree or potential for technology transfer;
    - The degree to which local science-industry linkages through co-operation efforts can be created;
    - The degree to which local appropriateness of technology and local manufacturing capacity can be promoted.

6.5 Capacity building and enhancement

The current need for capacity building has changed substantially with the rapid development of the CDM market in China. A lack of capacity and the corresponding lack of access to information is an important reason why CDM projects suffer from a low rate of technology transfer rate. Taking advantage of the established national and regional institutional infrastructures as well as existing science and technology capacities, capacity building for CDM may promote technology transfer through channels such as:

- Establishing an information exchange platform between project owner and technology supplier, such as a regular technology exchange conference.

- Involving local universities and research institutes, in particular as a way of strengthening the interactions between project owners and technology suppliers as well as adapting foreign technologies to local needs.

- Integrating CDM projects with local and regional strategies for energy efficiency improvement and pollutant controls. This may enhance the interest among local enterprises to become more involved in CDM projects and can create possible channels for technology diffusion and the promotion of regional development.

- Publishing technology transfer related information on CDM projects on Chinese CDM official websites.

6.6 CDM development at the international level:

- Define technology transfer more clearly in operational terms at the international level.

- Enhance verification along the project chain and ensure that technology transfer information described in PDD is consistent, observable and measureable.

- There is an emerging demand for methodologies for CDM projects which allows for the broader participation of SMEs. There is a need to accelerate the development CDM methodologies for small scale projects that have together taken great reduction potentials (e.g. construction, energy efficiency in buildings, P-CDM, etc.). These types of projects will better respond to the aspirations and priorities of developing countries in terms of delivering significant social and environmental benefits. This has the potential to serve as a common ground conducive to deepening the dialogue and co-operation between Annex-I and non Annex-I.

- The roles of technology owners and suppliers in CDM regime will be taken into consideration and adopted in the future CDM international rules.

Appendix 1: Operational definition of technology transfer

The operational definition for evaluation of technology transfer is based on Cools (2007). The grading is 1 to 5 where 1 indicates that the criterion is not fulfilled, 3 the criterion is fulfilled, and 5 the criteria is very well fulfilled.

1. Origin

Criterion: The technology originated abroad (either from developed or developing country).

Indicator: The technological equipment (major or essential part) is imported from abroad, or it is manufactured in the host country but the rights to the technology (patents, licenses, trademark or copyright) are owned by foreign actors.

Grading: 5: All technology originates from abroad. 3: Major or essential parts originates from abroad or is manufactured in the host country but the rights to the technology (patents, licenses, trademark or copyright) are owned by foreign actors. 1: No parts or rights to the technology originate from abroad.

2a. Novelty (Country)

Criterion: The technology is new in the country.

Indicator: The technology in question origins from abroad and is not already in use in the country. As defined here the novelty criterion cannot be fulfilled if the origin criterion is not fulfilled.

Grading: The highest grading for novelty criterion is determined by the grading of origin. 5: It is the 1^{st}, 2^{nd} or 3^{rd} project with this technology in the country. 4: It is the 4^{th}, 5^{th} or 6^{th} project with this technology in the country. 3: It is the 7^{th}, 8^{th} or 9^{th} project with this technology in the country.

3. Improvement

Criterion: The technology to be used is better than technologies already in use in similar projects.

Indicator: The technology is more environmentally efficient than alternative technologies in use: if the technology fulfils the origin criterion and the novelty criterion is also more environmentally efficient (here defined as better in reducing GHG) than existing technologies in similar projects (i.e. wind power technology that originate from abroad and is new in the province needs also to be better than existing wind power technology).

Grading: The highest grading is determined from the grading of the novelty criterion. If more environmentally efficient compared to existing technologies in similar projects the grading is the same as for novelty criterion.

4. Capacity

Criterion: The capacity to operate and maintain the technology is also transferred to the community.

Indicator: Local employees will be those operating and maintaining the technology throughout the project.

Grading: 5: Local employees operate and maintain the technology throughout the project. 3: Local employees operate the technology throughout the project. 1: Local employees are not involved in operating or maintaining the project.

The grading of the 4 different criteria (1, 2a, 3 and 4) is added together to decide if technology transfer has occurred or not. If a sum of 12 or more is reached, technology transfer has occurred according to our definition. To distinguish the different grades between “absolutely no technology transfer” and “a high degree of technology transfer”, four different categories have been created. These are determined by the sum of the four criteria as illustrated below:

Intervals for the different categories of technology transfer and no technology transfer

Sum of the four criteria	Degree of technology transfer
4-7	Absolutely no technology transfer
8-11	No technology transfer
12-16	Technology transfer
17-20	High degree of technology transfer

Appendix 2: Interviews with European Organisations on technology transfer

II-1: Organisation 1

1	General Data	
1.1	Date and Place of the Interview	22 of October
1.2	Interviewed Organisation **Organisation 1** • **Developing emission reduction projects under the Kyoto Protocol's Clean Development Mechanism and purchasing the associated CERs** • **Providing non-CDM emission reduction projects a route to alternative and voluntary markets through the brokerage of VERs** • **Investing in clean technologies and their implementation in China** Interviewed Person (s)	X **Buyer** □ **Project Developer** □ **Investor** □ **Consultant** X **Other (Broker for VERs)**

2	Organisation Background	**Based in Europe, though HQ in Beijing**
2.1	Size and number of employees in the company	**~40 employees in Beijing**
2.2	What are your main activities worldwide/China?	**Organisation 1 focuses solely on China. They mainly sell CERs as this generates the highest return[6]. They pay a fixed price to Project Owners for a fixed crediting period.** **Organisation 1 also acts as broker for VERs. Buyers of VERs are primarily US companies (non Kyoto compliant companies). The US buys now cheap VERs to build an advantage when the US carbon trade system will be in place and credits will be then more expensive.** **Also companies that cannot invest in CDM because of the 50% ownership rule are offered VERs.** **Sometimes they broker pre-registration CERs from CDM-projects to VERs. A "goldstandard" for VERs exists and they also avoid projects that are not typical types of CDM-projects.**
2.3	When did your organisation first become	**2004 and originally as a broker (deal with**

[6] Only one time have they acted as a broker for the Austrian Government.

	aware of CDM and began developing capacity in the area?	**Austrian Government)**
2.4	What is your core business in terms of CDM in China?	**Purchasing of CERs from Project Owners to offset/sell on the secondary market.**
2.5	How many people in your company are working on CDM?	**All (+ recruitment)**
2.6	Yearly growth rate for CDM related business	**No figure/hard to estimate! Market has become more competitive and everybody wants to buy CERs from the primary market. Most competitors want to grow their business geographically but Organiation 1 focus is on deepening their business in China.**

3	CDM Operations in China	
3.1	When did your organisation began developing capacity in the area of CDM?	**2004**
3.2	In what type of CDM projects are you involved now? How do you see your CDM projects types developing over the next 5 years?	**Today: all except HFC as these projects were bought early by Japanese companies.** **X wind X hydro X biomass X coal mine methane X other** **In 5 years: "a bloodbath" is expected even though Organisation 1 has seen consolidation during the last year and most actors also have strong financial backing.** **□ wind □ hydro □ biomass □ coal mine methane □ other** **Wind & hydro will be bread and butter for everybody. Which projects will be viable in the future depends on the development of new methodologies[7], but Organisation 1 wants to be involved in most project types.** **As the market will be increasingly more competitive choosing the right partners and identifying projects quickly will be of central importance.** **Furthermore Organisation 1 wants to become an electricity operator (utility) to diversify their business and reduce their risk exposure.** **Regarding PCDM Company one does see problems with contracting issues**
3.3	How would you rate your experience, if any, with local officials during the project development?	Company ones business department deals with this **□ very positive**

[7] They won't develop methodologies on their own as it takes to much time to get an methodology approved. "No money in this". This could be changed if you get IP protection for methodologies for lets say 6 months.

	Why?	✓ **positive** □ **negative** □ **very negative**
3.4	How would you rate Regional CDM Centers' capacity to assist project developers and project owners?	**Regional CDM Service Centres could be a barrier. Bribes are common and ongoing ("it happens all the time". 7 or 8 Regional CDM Service Centres are official the others are more like private initiatives. But note that they know what they are doing and they are good for China even though buyers worry about these Centres.** **The establishment of these centres is a good thing for CDM in China, especially for project owners. CDM centres can help projects owners identify the projects that can be registered as CDM and make them aware of international standards and rules that have to be respected for CDM (World Convention on Dams example)** □ **excellent** **X good** □ **modest** □ **poor**
3.5	What areas require capacity building in relation to local operators and officials?	**One employee mentions contracting issues as most Project Owners are unfamiliar with ERPAs and their not familiar with UK law either.** **They also need more training on funding (financial issues) of projects and also registration services. World Commission on Dams also needs to be highlighted and they need to raise their awareness regarding "standards" that might come up.**

4	CDM Market Opportunities and Challenges	
4.1	What do you consider are the main barriers (if any) you face in developing CDM projects in China?	□ **<u>rules and regulations</u> : □ lack □bad regulation □ badly implemented □ other** **The rules themselves are not a barrier even though the 50% regulation is somehow problematic (although it makes sure that the majority of projects are Chinese owned).** **One employee mentions integrity as important for the market to exist.** **Lack of available methodologies could be a problem. The CDM fund has no impact though they would like to have information about how the 2% fee will be used and he**

		suggests it should be use as an official channel for funding new methodologies. **□ <u>business practices:</u> □ corruption □ local authorities □ other** **CDM Service Centres are a slight problem** **□ <u>human resources</u>: □ contracting issues □ other** **Lack of resources at NDRC is a bottleneck and also lack of DOEs is also a major bottleneck. Regarding a Chinese DOE one employee would prefer a big private company that's being monitored as confidence is vital. (? Connected to a university or a government Organisation)** **Earlier one employee mentioned that project owners do lack knowledge about contracting issues (ERPAs)** **□ <u>IP protection</u>** **Not much to mention.**
4.2	How do you see the barriers you identified changing over the next 5 years?	**In 5 years:**
4.3	How do you see the CDM administration in China today and in 5 years? Which changes, if any, you expect or would you like to see? Why?	**Today:** **In 5 years:** **Changes expected:**
4.4	How do you see your company's competitiveness vis-a'-vis local competitors today and in 5 years?	**Today: To be a buyer you have to be based in an Annex 1 country and that's why Organisation 1 is based in Europe. Regarding their Chinese competitors some of them are really good and their advantage is their good local knowledge and good relationship with locals ("Guanxi"). Most likely it will be difficult to compete with these companies regarding the "easy" projects.** **But as these kind of projects become**

		scarce, local competitors will find it more difficult to compete as their strength is not the contracting issues and the technical issues. As the market gets more and more competitive price of CERs might be an issue. **Moreover, Chinese can only be intermediaries, not buyers, so they are not only potential competitors but also potential partners.** **In 5 years:**
4.5	Is the China market conducive to the development of new methodologies?	**□ very conducive** **✓ conducive** **□ partly conducive** **□ not at all conducive** **Did not get a clear picture on this one but my impression is that the incentives for private companies to develop is limited and that this has to be done by universities and governmental Organisations and also that methodology issues deserve more attention. The general feeling is that project owners are open to the development of new methodologies but the whole process of registration and approval is too long (1½ year or more) and there is no IP protection.**
4.6	How would you describe the dynamics between government institutions, banks and private companies in the CDM market? How do they affect the CDM market?	

5	Technology Transfer	
5.1	How do you define technology transfer?	**Primarily export of western based technologies not present in China and primarily equipment.**

5.2	What is your opinion about the importance of technology transfer in CDM?	**This is something that should be addressed by project owners.**
5.3	In your view, what are the main drivers behind increased technology transfer through CDM today (if any)?	**National policies, laws and regulations. One employee mentions that IGCC plants could be competitive with CCS technology and a law could trigger this.** **Development at the international level could also trigger such as a new crediting period after 2012 and also if the US would take on targets to reduce CO2.** **More expensive technologies are too expensive (marginal abatement cost) and they look more for complete packages. Financing could also be an issue.** **"Gold standard" is no driver for tech transfer.**
5.4	Have you avoided CDM-projects due to unfamiliar technology or due to other barriers (political, economic, legal or social)?	**It has happened**
5.5	Are you specifically looking for projects that lead to tech transfer? Why or why not?	**No**
5.6	What would encourage you to focus more on projects that contribute to tech transfer?	**Clear economic incentives from markets or increased demand for CERs from the carbon market.**
5.7	Are there any barriers to the implementation of new technologies in China through CDM?	**In terms of regulations, China is quite pro tech transfer.** **IPR is an investor myth; if the project is managed correctly and with the right partners there should be no IPR related problems.** **The 51% rule could hamper implementation of new technologies as new technology in most cases increases the price of the project and project owners prefer to choose cheaper options.**

		One employee also mentions that as NDRC has to approve all the projects it happens that they reject projects due to several reasons, the costs of technology transfer might be one.
5.8	Have CDM contributed to the use of new technology which had not been used before in the province/ region where your CDM projects were implemented?	**One employee mentions that windpower tech transfer has happened thanks to CDM. No tech transfer in hydro.**
5.9	What sectors and type of CDM projects and technologies do you believe have the greatest potential for CDM during the coming years and why?	
5.10	In your opinion, what needs to happen to increase incentives for tech transfer through CDM?	
5.11	What would happen if the Chinese DNA added firm requirements on technology transfer in present Chinese CDM rules?	**That should be avoided as CDM is a market based instrument and this should be up to the market decide. Tech transfer happens even without being the primary focus of CDM.**
5.12	In your opinion are there other instruments/ways better suited to promote technology transfer then CDM if we focus on mitigation?	

II-2: Organisation 2

1	General Data	
1.1	Date and Place of the Interview	**9 of Nov 2007**
1.2	Interviewed Organisation **Organisation 2** Interviewed Person (s)	X **Buyer** **X Project Developer** □ **Investor** **X Consultant** □ **Other**

2	Organisation Background	
2.1	Size and number of employees in the company	**30 people.**
2.2	What are your main activities worldwide/China?	**Organisation 2 started operations in 2003 before the big flow of competitors entered the market. It's founded by 3 people and initially focus was on sustainable development issues with a strong technology base, but eventually they entered the carbon market. It started as a joint venture between these people. Initially they where a Chinese company. Now Organisation 2 is a part of a big Organisation together with some other Organisations. This is due to the fact that bigger companies are entering the market and therefore this merger was necessary.**
2.3	When did your organisation first become aware of CDM and began developing capacity in the area?	**2003 (roughly)**
2.4	What is your core business in terms of CDM in China?	**CDM project development, develop and invest in windfarms (one company they invest = international company), methane capture and reuse and biogas plants [8], advisory service concerning energy efficiency and renewable and research. They work on one CDM project at a time.**
2.5	How many people in your company are working on CDM?	**30**

[8] Organization 2 is actively involved in methane capture and reuse through our fully owned subsidiary. Subsidiary 1, a 100% owned subsidiary of Organization 2 design, build and operate biogas plants based on the anaerobic digestion of organic wastes. Subsidiary 1 and its partners specialize in the treatment of waste, from which biogas is captured and utilized to generate heat and electricity. Its technologies are keys to reducing pollution and mitigating climate change and are based on many years of experience in Europe and Asia.

2.6	Yearly growth rate for CDM related business	?

3	CDM Operations in China	
3.1	When did your organisation began developing capacity in the area of CDM?	
3.2	In what type of CDM projects are you involved now? How do you see your CDM projects types developing over the next 5 years?	**Today: Organisation 2 is involved in various projects but the big chunk consists of hydro projects (12-15). They have 1 wind (registered by EB). They are also involved in methane capture and N2O (chemical plant, BASF is involved).** **Sometimes they opt for VERs in wind and hydro projects when for example the owner is based in Hong Kong. This is a barrier.[9]** **In 5 years:** **They are working a lot on new areas and also on new methodologies. They want to move into the cutting edge rather than "bread and butter projects". They are looking at energy eff in motor engines and in lamps and also at P-CDM.**
3.3	How would you rate your experience, if any, with local officials during the project development? Why?	□ **very positive** □ **positive** □ **negative** □ **very negative**
3.4	How would you rate Regional CDM Centers' capacity to assist project developers and project owners?	□ **excellent** □ **good** □ **modest** □ **poor**
3.5	What areas require capacity building in relation to local operators and officials?	

[9] The price difference is much bigger in the VER market due to various reasons. On the CDM market buyers most often are less care less about from what kind of CDM project the CERs comes from.

4	CDM Market Opportunities and Challenges	
4.1	What do you consider are the main barriers (if any) you face in developing CDM projects in China?	**□ <u>rules and regulations</u> : □ lack □bad regulation □ badly implemented □ other** **The regulations is OK and the DNA tries hard. Though some articles are ill tailored and are rather developed to make life easier for the DNA than the P.O and P.D. But note that the DNA is understaffed considering the flow of projects.** **Language is a barrier from his perspective as Project Owners only speak Chinese. One employee also mentions that the fact that all material until DNA approval has to be submitted in Chinese which from his perspective increases the likelihood for misunderstandings.[10] A problem for the project developer could also be that project owners are unwilling to disclose information that they need to provide the project developer with (for example they most often use their personal relationship when raising funding for the project). For the project developer this boils down to the fact that it takes more time than necessary to finalize all document for DNA approval.** **Sometimes the DNA is unwilling to disclose information to all stakeholders on the same terms.** **□ <u>business practices:</u> □ corruption □ local authorities □ other** **The DNA has developed this new rule that requires the Project Owner to personally hand over all doc for approval to the DNA (or let someone else do it supported by a Power of Attorney).** **It could also be noted that CDM and its possibilities is not that very well known in the country. This means that the project developers has to take a on a pretty huge risk (develop PDD and monitoring and verification protocol , registration and validation fee etc) to convince project owners to be involved in a CDM activity. But obviously they push these risks forward**

[10] **Most (or even all) material has to be submitted in both Chinese and English.**

		to internal or external buyers (but still it's a risk). **some project developers have problems to write all necessary documentation in English for EB approval-** **Staffing at the DNA is also an issue.** **(Japanese companies are really aggressive and want to come as close to the P.O as possible. When it comes to hydro this is a small risk).** **□ <u>human resources</u>: □ contracting issues □ other** **Some place still plays an important role. One employee mentioned that their big clients/buyers actually prefer this as it also implies that Organisation 2 have a stable source for CDM –projects. One employee admit that this is their primary source of projects.** **Those on the ground could probably also run into some corruption and bribes.** **Sometimes it could be difficult for P.O to understand the purpose of stakeholder dialogues.** **□ <u>IP protection</u>**
4.2	How do you see the barriers you identified changing over the next 5 years?	**In 5 years: Hard to tell but in the end its al politics and therefore rules etc can change rapidly as soon as a certain advantage disappears.**
4.3	How do you see the CDM administration in China today and in 5 years? Which changes, if any, you expect or would you like to see? Why?	**Organisation two would like to see:** • **Periodic update of whats going on within EB in both Chinese and English as this would benefit P.O. also updated about methodologies, monitoring etc.** **In 5 years:** **Most likely reliance on consultants should decrease over time (earlier P.D could use P.O and that's not as easy any more).** **One employee would personally also see that additionality test is replaced by something like latest available technology instead as additionality is by passed since long.**

		Obviously this requires international agreement. **Changes expected:**
4.4	How do you see your company's competitiveness vis-a'-vis local competitors today and in 5 years?	**Today:** **Chinese companies have an advantage as their cost level is lower compared to European companies and they are also closer to the field given their established networks.** **Organisation 2 is more of an expert. They have more technical expertise and do not really compete with price. They also have a better mix of technical and CDM knowledge. They have a deeper technical knowledge which gives them a competitive edge the more difficult CDM project and on the same time they are not solely dependent on CDM. They also have an advantage due to the fact that they have a strong cooperation with technology suppliers within Organisation 2.** **In 5 years:**
4.5	Is the China market conducive to the development of new methodologies?	□ **very conducive** □ **conducive** □ **partly conducive** □ **not at all conducive**
4.6	How would you describe the dynamics between government institutions, banks and private companies in the CDM market? How do they affect the CDM market?	**P.O primarily interact with banks that they already have a cooperation with and they do not really think in a 20-25 year perspective (in for example hydro) as it is quite common that they sell on their project to someone else after implementation to be able to find a new project. Do to this fact you could at times encounter refurbishing problems.**

5	Technology Transfer	No question where asked about tech transfer as we had already talked for almost three hours.

5.1	How do you define technology transfer?	
5.2	What is your opinion about the importance of technology transfer in CDM?	
5.3	In your view, what are the main drivers behind increased technology transfer?	
5.4	What creates incentives for tech transfer through CDM?	
5.5	Are you specifically looking for projects that lead to tech transfer? Why or why not?	
5.6	What would encourage you to focus more on projects that contribute to tech transfer?	
5.7	What are the barriers to the implementation of new technologies in China?	
5.8	Have CDM contributed to the use of new technology which had not been used before in the province/ region where your CDM projects were implemented?	

5.9	What sectors and type of CDM projects and technologies do you believe have the greatest potential for CDM during the coming years?	
5.10	In your opinion, what needs to happen to increase incentives for tech transfer through CDM?	

II-3: Organisation 3

1	General Data	
1.1	Date and Place of the Interview	
1.2	Interviewed Organisation **Organisation 3** Interviewed Person (s)	X **Buyer** **X Project Developer** □ **Investor** **X Consultant** □ **Other**

2	Organisation Background	
2.1	Size and number of employees in the company	**50 people in all (including consultancy). 8 people working on CDM in china (?).**
2.2	What are your main activities worldwide/China?	**Basically to assist project owners through the whole projectcyle from idea (PIN stage) to yearly verification. They develop all necessary documentation for the P.O. They make sure that they get all necessary information for PDD writing and they also help with application for permits (if needed) and EIA and FSR.**
2.3	When did your organisation first become aware of CDM and began developing capacity in the area?	
2.4	What is your core business in terms of CDM in China?	**Project development**
2.5	How many people in your company are working on CDM?	**8(?)**

2.6	Yearly growth rate for CDM related business	**?**

3	CDM Operations in China	
3.1	When did your organisation began developing capacity in the area of CDM?	**2004 (?)**
3.2	In what type of CDM projects are you involved now? How do you see your CDM projects types developing over the next 5 years?	**Today: Organisation 3 has focused on industrial projects. They are involved in cement, landfill, waste heat, wastegas, biomass, wind and hydro)** **□ wind □ hydro □ biomass □ coal mine methane □ other** **In 5 years:** **□ wind □ hydro □ biomass □ coal mine methane □ other** **Renewable projects will continue to escalate as for example most HFC projects are gone (but China will still be a very interesting country for CDM).** **Energy saving projects within industry could also be of interest ("end of the pipe"). More complex energy saving projects could be to difficult for CDM.**
3.3	How would you rate your experience, if any, with local officials during the project development? Why?	**□ very positive No clear opinion** **□ positive** **□ negative** **□ very negative**
3.4	How would you rate Regional CDM Centers' capacity to assist project developers and project owners?	**□ excellent** **□ good** **□ modest** **□ poor** **They are more like a competitor, but they do not always know what's best from a commercial point of view. There not that many either. Organisation 3 prefers to have a direct contact with P.O and not use intermediaries such as regional cdm service centres. One employee says that you need that personal relationship with the P.O in order to build trust. This sometimes more important than money. One employee mentions that they do a lot of training for P.O for example regarding monitoring.**

3.5	What areas require capacity building in relation to local operators and officials?	

4	CDM Market Opportunities and Challenges	
4.1	What do you consider are the main barriers (if any) you face in developing CDM projects in China?	**□ <u>rules and regulations</u> : □ lack □bad regulation □ badly implemented □ other Over all the DNA knows what they are doing and they have made progress and you also know where they stand.** **The 49/51% rule is a barrier as it stops projects from happening (though those projects qualifies as VER projects/ or you could try to find a partner).** **A barrier is that CDM is an international mechanism. That itself could cause problems for example for P.O as most of all available information is in English.** **□ <u>business practices:</u> □ corruption □ local authorities □ other** **You have to know how to do business in China. If you are aware of this you should be fine. Sometimes it could be an advantage to be a foreigner (as CDM is designed internationally??).** **Even though some P.O are involved in more than one CDM project awareness is still a barrier. For example it still Organisation 3 who approach potential P.O rather than the opposite (they have their own business team).** **One big risk is insecurity about what will happen with CDM after 2012. Most investors have entered the carbon market pretty recently and it takes a long time to take a project from the PIN stage to an issuance of CERs and first at that time you get return on your investment (they buyer pays first when issuance has taken place). If risks increases further investors might take their money else ware. Investors are very much aware of what's going on within the UNFCCC framework. To cope with this risk (that increases cost for everybody**

		involved) simplifications or "speedy solutions" are welcomed. To make the project-cycle more efficient all involved parties has to be more efficient to reduce time spent on each project. **One employee also mentions the fact that it's very important with experienced DOEs as less experienced DOEs results in less efficient work (questions going back and forward between P.O/P.D and DOE).** **□ <u>human resources</u>: □ contracting issues □ other** **To find good people could be difficult but in the case of Organisation 3 it's at least not difficult to keep people.** **Organisation 3 always have to help P.O monitoring plan and preparations before verification.** **50 page ERPAs could be very difficult for P.O to grasp. Most ERPAs don't have articles about delivery guarantees but why not develop standard ERPAs.** **□ <u>IP protection</u>** **Could be a potential concern for suppliers of equipment (sooner or later they will copy your product)**
4.2	How do you see the barriers you identified changing over the next 5 years?	**In 5 years:**
4.3	How do you see the CDM administration in China today and in 5 years? Which changes, if any, you expect or would you like to see? Why?	**Today:** **In 5 years:** **Changes expected:**

4.4	How do you see your company's competitiveness vis-a'-vis local competitors today and in 5 years?	**Today:** **In 5 years:**
4.5	Is the China market conducive to the development of new methodologies?	**□ very conducive** **X conducive** **□ partly conducive** **□ not at all conducive** **To develop methodologies is part of their business but its not core business.**
4.6	How would you describe the dynamics between government institutions, banks and private companies in the CDM market? How do they affect the CDM market?	

5	Technology Transfer	
5.1	How do you define technology transfer?	**One employee's view of tech transfer is in line with ours. He also mentions an example of "soft" tech transfer. Organisation 3 has implemented a Coal Mine Methane project and they have established their own maintenance company to operate and maintain the facility in order to maximize the number of CERs generated.** **As response to what I said about promote more even geographical distribution of CDM projects one employee mentions that agricultural projects in the west could be of interest. He also mentions a Danish company that has provided P.O with efficient tech fro agricultural residues (but still 1 HFC project generates the same amount of CERs as 40 biomass projects).**

5.2	What is your opinion about the importance of technology transfer in CDM?	**One employee mentions that Organisation 3 sometimes try to convince P.O to use imported/better technology instead of older technology as old tech might not be additional. Sometimes this argument convinces P.O as it also could improve efficiency of the facility and also the number of CERs. But they can not take this argument to far as they then run the risk of loosing the project to another project developer/consultant.** **For industrial projects a high return on investments is of utmost importance as it's not their core business. This could be a barrier for energy efficiency,,, "it has to be pushed".**
5.3	In your view, what are the main drivers behind increased technology transfer?	**P.O are aware of new technologies in most cases as this could generate more CERs compared to more older technologies. Its P.O decision. Some P.D might be less keen on pushing this issue as their core competence is to write PDDs and don't have that much on site experience. (but PDDs are risk rated??)**
5.4	What creates incentives for tech transfer through CDM?	**Newer and more efficient technologies could generate more CERs. Newer and more efficient technologies could also require less maintenance compared to older technologies.**
5.5	Are you specifically looking for projects that lead to tech transfer? Why or why not?	
5.6	What would encourage you to focus more on projects that contribute to tech transfer?	
5.7	What are the barriers to the implementation of new technologies in China?	**Some suppliers could feel that it's too difficult to do business in China. Language and "ways to do business" could be too difficult to overcome. It could be perceived as to unfamiliar and risky for them.** **IP could be an issue but if someone has a**

		license to produce certain equipment they should be fine.
5.8	Have CDM contributed to the use of new technology which had not been used before in the province/ region where your CDM projects were implemented?	**Within renewable agricultural projects could be interesting and they could also be expanded. He also mentions different technologies for coal mine projects.**
5.9	What sectors and type of CDM projects and technologies do you believe have the greatest potential for CDM during the coming years?	**There is no great potential for pulp and paper CDM projects. The potential for biomass projects using woodchips is not that great either and the equipment needed does not necessarily have to be imported from abroad.** **CCS has potential but prices for carbon credits has to go up considerably and if it succeeds it could also have an negative impact on other kinds of CDM projects.** **One employee believes that energy efficiency in buildings is more of a regulatory thing then something for CDM (monitoring is difficult, establish baselines could be difficult and it could also be difficult to bundle these kind of projects). He does not have high hopes for CDM projects within the transport sector either (but maybe for a city).** **He also mentions (as an idea) that energy saving projects for producers could be an interesting idea (refrigerators) but then it has to be connected to the producer rather than the consumer and it also has to be easy to monitor.**
5.10	In your opinion, what needs to happen to increase incentives for tech transfer through CDM?	

II-4: Organisation 4

1	General Data	
1.1	Date and Place of the Interview	19 October 2007
1.2	Interviewed Organisation **Organisation 4** Interviewed Person (s)	□ **Buyer** **X Project Developer** □ **Investor** **X Consultant** □ **Other**

2	Organisation Background	
2.1	Size and number of employees in the company	**10 people and approx 50 clients**
2.2	What are your main activities worldwide/China?	**Organisation 4 strictly focus on CDM and primarily in China.** **Main activities are:** • **Identification of projects with local owner and appointment of buyer for the owner (this more in the past as today there are many more buyers and more competition)** • **Signing a framework agreement with buyers (no. of CERs) and then find them in the market** • **Service provider- Organisation 4 is present during the whole process and it is one of the few that holds a stakeholder consultation with all the stakeholders involved.** **In 5 years, Organisation 4 sees its role as service provider increasing but understands the necessity of developing new business models to adapt to the increase in competition.**
2.3	When did your organisation first become aware of CDM and began developing capacity in the area?	**Organisation 4 was founded in 2004 by one person.** **They have 8-9 partners in China (with some only 2-3 projects), at least some of these seems to be Regional CDM Service Centres. For example they have one "solid" partner in Gansu: One employee was previously in Gansu where, in partnership with MoST, Organisation 4 helped with the establishment of the Development Promotion Center in Science and Technology (which acts as a CDM centre)**

		and the private company X. These are the main partners of Organisation 4 in Gansu and 60% of their business comes from Gansu. **Organisation 4 worked as a consultant for some Organisations (CDM procurement and development capacity), etc.**
2.4	What is your core business in terms of CDM in China?	**Project development, CER procurement services, CDM Capacity building, feasibility studies and soft loan/ grant applications, Project identification, Project formulation, Project inception, Project implementation, Project monitoring, Project evaluation Studies, Development of tender documents for procurement**
2.5	How many people in your company are working on CDM?	**10 on business areas identified above + a Danish fund. Identification of new projects takes most of the time. Their framework business is risky due to price changes. To them to act as a service provider becomes more important but less profitable**
2.6	Yearly growth rate for CDM related business	

3	CDM Operations in China	
3.1	When did your organisation began developing capacity in the area of CDM?	**2004 (but track record before that)**
3.2	In what type of CDM projects are you involved now? How do you see your CDM projects types developing over the next 5 years?	**Today:** **✓ wind ✓ hydro ✓ biomass ✓ coal mine methane ✓other** **Wind & Hydro 60%, few in biomass, 1 in CCM but looking at more, cement waste, 1 VER landfill** **□ wind □ hydro □ biomass □ coal mine methane □ other** **In 5 years: wind&hydro less and less, more into waste gases, waste heat fugitive emissions, looking at the agriculture sector for possible projects in biogas.**
3.3	How would you rate your experience, if any, with local officials during the project development? Why?	**□ very positive** **□ positive** **X negative** **Sometimes helpful sometimes not**

		Buyers have a negative attitude to these as some of them tend to monopolise markets and some concerns has also been voiced from the national level. **□ very negative**
3.4	How would you rate Regional CDM Centers' capacity to assist project developers and project owners?	**□ excellent** **□ good** **X modest** **Sometimes it is unclear who they work for and represent (sometimes they work for both sides) and whether they are public or private entities (e.g. Ninxia Center est. 1993 is private but acts as it was a public institution)** **Sometimes it is also unclear how competent they are. These Centres started to establish themselves in 2003. Anyhow Organisation 4 seems to quite positive primarily because they have a partnership with the centre in Gansu and they mention for example that they have good experiences from centres when it comes to gather residents for stakeholder dialogues**[11] **□ poor**
3.5	What areas require capacity building in relation to local operators and officials?	

4	CDM Market Opportunities and Challenges	
4.1	What do you consider are the main barriers (if any) you face in developing CDM projects in China?	**Overall CDM is a success in China!** **□ <u>rules and regulations</u> : □ lack □bad regulation □ badly implemented □ other** **Government bias against foreign companies. Difficult to get access to NDRC. NDRC arrange meetings but they are in Chinese and are more of a monologue than a dialogue. Guanshi relationships exists. Organisation 4 also believs that NDRC are biased towards some Chinese universities**

[11] One employee mentioned that the quality of stakeholder dialogues that different project developers arrange varies. For their stakeholder dialogue for "Gold Standard projects" they invited residents to roundtables and asked for their comments. Full reports from these can be found in their PDDs. For their gold standard projects they also undertake audits by DOEs for hydro projects above 20 MWh.

		when it comes to approval of new project types/methodologies (for example programmatic CDM) **□ <u>business practices:</u> □ corruption □ local authorities □ other** **Its unclear to Organisation 4 if regional CDM service centres are public or private.** **Most barriers are of financial nature. For example: investors cannot also purchase CERs, minimum price stops some small projects from happening (they become VER projects instead).** **Tech transfer could also be hampered by the minimum price.** **□ <u>human resources</u>: □ contracting issues □ other** **Lack of DOEs is a barrier and their qualifications. Organisation 4 only works with experienced DOEs such as TÛV. DNV has difficulties due to the fact that they have lost personnel. Organisation 4 mentions that knowledge about EB decisions is vital. DNV has outsourced too much of their services to local consultants. TÜV works in pairs with one from Germany and one person from China. SGS do most of their work on verification.** **□ <u>IP protection</u>**
4.2	How do you see the barriers you identified changing over the next 5 years?	**In 5 years:**
4.3	How do you see the CDM administration in China today and in 5 years? Which changes, if any, you expect or would you like to see? Why?	**Today:** **In 5 years:** **Changes expected:**

4.4	How do you see your company's competitiveness vis-a'-vis local competitors today and in 5 years?	**Today: The competition will be tougher from Chinese competitiors. Organisation 4's disadvantage is that they are more expensive compared to Chinese competitors but on the same time more experienced. They have also profiled themselves with gold standard projects and with comprehensive stakeholder dialogues.** **In 5 years: The easy project will be done by Organisation 4's Chinese partners/competitors while Organisation 4 opt for more complex projects that for example could require more investments and technology transfer.**
4.5	Is the China market conducive to the development of new methodologies?	**□ very conducive** **X conducive** **No obvious obstacles. Organisation 4 have asked buyers if they are interested in doing meth work.** **□ partly conducive** **□ not at all conducive**
4.6	How would you describe the dynamics between government institutions, banks and private companies in the CDM market? How do they affect the CDM market?	**Local banks use simple criteria to assess whether or not a project is viable and they don't take into account revenue streams from CERs in their calculations. Maybe the understanding of CDM as a concept is a little bit higher in the eastern parts of China where most projects are implemented (due to economic activity, some provinces lack CDM projects)[12]**

5	Technology Transfer	
5.1	How do you define technology transfer?	**Broad definition. Clearly it includes equipment, training and localization of equipment is also important.**

[12] The projects that Organization 4 has been involved in are primarily located in the western parts of China + Inner Mongolia + a few in the eastern parts of China (within the industry).

5.2	What is your opinion about the importance of technology transfer in CDM?	**Foreign equipment is most often expensive compared to Chinese equipment and you must also bear in mind cost for maintenance is not a huge burden so therefore many Project Owners opt for Chinese equipment. Project Owners care more about economics/costs and standard CDM projects does not require that much tech transfer. Though for more complicated projects technology transfer could happen.**
5.3	In your view, what are the main drivers behind increased technology transfer through CDM today (if any)?	**Lack of projects and lack of easy access to the low hanging fruits could give a push as well as a more fierce competitive market that could fore some companies to develop their business further away from the "bread and butter projects".**
5.4	Have you avoided CDM-projects due to unfamiliar technology or due to other barriers (political, economic, legal or social)?	**One employee mentions one case (cold and heat storage in aquifers??) involving a dutch company which decided to drop out due to risk and insufficient incentives.**
5.5	Are you specifically looking for projects that lead to tech transfer? Why or why not?	**Not systematically as this is up to the Project Owner to decide but they are thinking of for example introduction of cement waste heat. They are also thinking of developing their business in the sense that they want to establish a closer cooperation with suppliers though this requires that they bring in foreign investors.**
5.6	What would encourage you to focus more on projects that contribute to tech transfer?	
5.7	Are there any barriers to the implementation of new technologies in China through CDM?	**IP protection could be an issue as enforcement of IP is a common problem. It's more common to export to China than setting up production protection. They keep core production in Europe. If you wish to set up production in China you need to cooperate with good/strong Chinese partners and make sure that they also have incentives to protect IP.** **Floor price policy.**

5.8	Have CDM contributed to the use of new technology which had not been used before in the province/ region where your CDM projects were implemented?	**Coal mine methane, Coal bed methane. (early on in windpower) (Maybe in waste gas projects fugitive emissions?)**
5.9	What sectors and type of CDM projects and technologies do you believe have the greatest potential for CDM during the coming years and why?	**The potential for energy efficiency is great. Programtic CDM could generate an increased interest in small-scale projects. CDM projects in the construction sector could happen, "green buildings". Projects within the transport sector are not likely. Biofuels/biomass potentially.**
5.10	In your opinion, what needs to happen to increase incentives for tech transfer through CDM?	
5.11	What would happen if the Chinese DNA added firm requirements on technology transfer in present Chinese CDM rules?	**No fan of this but maybe clear rules about bundling could spur this (?).**
5.12	In your opinion are there other instruments/ways better suited to promote technology transfer then CDM if we focus on mitigation?	

II-5: Organisation 5

1	General Data	
1.1	Date and Place of the Interview	25.10.2007
1.2	Interviewed Organisation **Organisation 5** Interviewed Person (s)	□ **Buyer** **X Project Developer** □ **Investor** **X Consultant** □ **Other**

2	Organisation Background	**The company is from X but its clients are mostly European. They provide "full service" to buyers (i.e. project indentification, PDD writing, project development, monitoring and validation, selling of CERs)** **Buyers are interested in CERs after 2012 and pay also for monitoring and validation.**
2.1	Size and number of employees in the company	
2.2	What are your main activities worldwide/China?	
2.3	When did your organisation first become aware of CDM and began developing capacity in the area?	**2006**
2.4	What is your core business in terms of CDM in China?	
2.5	How many people in your company are working on CDM?	**2 offices:** **15 people (1 European)**
2.6	Yearly growth rate for CDM related business	**In 15 months of activity they developed an average of 2 projects a months (currently 30 projects) for 20-30m CERs.**

3	CDM Operations in China	
3.1	When did your organisation began developing capacity in the area of CDM?	
3.2	In what type of CDM projects are you involved now? How do you see your CDM projects types developing over the next 5 years?	**Today: 1. Renewables (not so much hydro) 2. Energy efficiency (power companies as buyers) 3. Coal mine methane** **□ wind □ hydro □ biomass □ coal mine methane □ other**

		In 5 years: **It is very much up to the Chinese authorities and how much they want CDM to develop. It also depends on UNFCCC and the way CDM will be conceived in the post-2012 regime.** **□ wind □ hydro □ biomass □ coal mine methane □ other**
3.3	How would you rate your experience, if any, with local officials during the project development? Why? **N.B. The Organisation 5 has very strong ties with SEPA and NDRC.**	X **very positive** □ **positive** □ **negative** □ **very negative**
3.4	How would you rate Regional CDM Centers' capacity to assist project developers and project owners? **Experience is Gansu and Hebei.** **The status of these Regional CDM Centers is not really clear but the majority of them seems to belong to MoST.**	□ **excellent** **X good- but it depends** □ **modest** □ **poor**
3.5	What areas require capacity building in relation to local operators and officials?	**PDD writing is still of bad quality.**

4	CDM Market Opportunities and Challenges	
4.1	What do you consider are the main barriers (if any) you face in developing CDM projects in China?	□ **<u>rules and regulations</u> : □ lack □bad regulation □ badly implemented □ other** **A more transparent process to get access to info related to the development in CDM regulations.** □ **<u>business practices:</u> □ corruption □ local authorities □ other** **Guanxi (50% of projects are done through guanxi especially the big ones)** □ **<u>human resources</u>: □ contracting issues □ other** **DOEs → capacity problem.** □ **<u>IP protection</u>**

4.2	How do you see the barriers you identified changing over the next 5 years?	**In 5 years:**
4.3	How do you see the CDM administration in China today and in 5 years? Which changes, if any, you expect or would you like to see? Why?	**Today:** **In 5 years:** **Changes expected:**
4.4	How do you see your company's competitiveness vis-a'-vis local competitors today and in 5 years? **Organisation 5 feels that they are better positioned than their Chinese competitors. They provide a better quality service and are not worried about the future as their reputation will consolidate and they will be chosen for the quality of their service.**	**Today:** **In 5 years:**
4.5	Is the China market conducive to the development of new methodologies?	**X very conducive** **□ conducive** **□ partly conducive** **□ not at all conducive**
4.6	How would you describe the dynamics between government institutions, banks and private companies in the CDM market? How do they affect the CDM market?	

5	Technology Transfer	
5.1	How do you define technology transfer?	
5.2	What is your opinion about the importance of technology transfer in CDM?	**CDM represent only one small area of tech transfer in China. Investors in new technologies prefer to invest into other areas than CDM. One of the main reasons is the 50% project ownership rule.**
5.3	In your view, what are the main drivers behind increased technology transfer through CDM today (if any)?	
5.4	Have you avoided CDM-projects due to unfamiliar technology or due to other barriers (political, economic, legal or social)?	
5.5	Are you specifically looking for projects that lead to tech transfer? Why or why not?	**No, but the situation is improving as before it was more difficult to find projects that would lead to technology transfer.**
5.6	What would encourage you to focus more on projects that contribute to tech transfer?	
5.7	Are there any barriers to the implementation of new technologies in China through CDM?	

5.8	Have CDM contributed to the use of new technology which had not been used before in the province/ region where your CDM projects were implemented?	
5.9	What sectors and type of CDM projects and technologies do you believe have the greatest potential for CDM during the coming years and why?	**Maybe renewables in the Northern part of China.**
5.10	In your opinion, what needs to happen to increase incentives for tech transfer through CDM?	
5.11	What would happen if the Chinese DNA added firm requirements on technology transfer in present Chinese CDM rules?	
5.12	In your opinion are there other instruments/ways better suited to promote technology transfer then CDM if we focus on mitigation?	

I-6: Organisation 6

1	General Data	
1.1	Date and Place of the Interview	22 of November, 2007
1.2	Interviewed Organisation **Organisation 6** Interviewed Person (s)	X **Buyer** **X Project Developer** **X Investor** **X Consultant** □ **Other** **Organisation 6 is basically involved in most business areas of the carbon market through its subsidiaries (Subsidiary 1, Subsidiary 2 and Subsidiary 3.)**

2	Organisation Background	

2.1	Size and number of employees in the company	(?)
2.2	What are your main activities worldwide/China?	**Subsidiary one is based in London, but 30 people work in Beijing. They have offices around the world. Subsidiary 1 is co-funded with Subsidiary 3. Basically Organisation 6 has merged their carbon business with Subsidiary 3's. Subsidiary 1 is primarily an asset developer for Project Owners (sellers) but they are also a buyer.** **Subsidiary 2 business is project development with China as their sole market. Their business is to identify projects that lack sufficient funding and package them to attract investors. If need be they can take stakes in projects in order to show investors/financial institutions that they believe in the projects. They could also help for example technology suppliers with finding partners for joint ventures. Subsidiary 2 has so far scanned 60 projects and found 5 projects to be viable to proceed with.** **Subsidiary is based in Beijing (co financed with Subsidiary 3) They do environmental and social audits for potential investors, market reports, carbon strategies, market entry research and also environmental impact assessments.**
2.3	When did your organisation first become aware of CDM and began developing capacity in the area?	**Organisation 6 is a new company and it started in 2004 with a small hydro and wind project**
2.4	What is your core business in terms of CDM in China?	**See 2.1**
2.5	How many people in your company are working on CDM?	**30-50**
2.6	Yearly growth rate for CDM related business	**No clear answer**

3	CDM Operations in China	
3.1	When did your organisation began developing capacity in the area of CDM?	**Organisation 6 is a new company and it started in 2004 with a small hydro and wind project**
3.2	In what type of CDM projects are you	**Today: They seem to be involved in all**

	involved now? How do you see your CDM projects types developing over the next 5 years?	**project types with a strong preference for renewable energy.** **□ wind □ hydro □ biomass □ coal mine methane □ other** **In 5 years:** **□ wind □ hydro □ biomass □ coal mine methane □ other**
3.3	How would you rate your experience, if any, with local officials during the project development? Why?	**No clear answer. Seem as if Subsidiary 1 could have a better opinion about this.**
3.4	How would you rate Regional CDM Centers' capacity to assist project developers and project owners?	**No clear answer. Seems as if Subsidiary 1 could have a better opinion about this.**
3.5	What areas require capacity building in relation to local operators and officials?	

4	CDM Market Opportunities and Challenges	
4.1	What do you consider are the main barriers (if any) you face in developing CDM projects in China? **Uncertainty for the period after 2012 is an increasing problem for big projects (due to costs and time). Sometimes these projects are turned into VER projects due to this fact.** **Some buyers are committed to buy CERs for the period after 2012 (2017), but to a much lower price. Those who are interested in this are primarily big buyers. Though it is more common to add a option in ERPAs for CERs after 2012.** **Over supply does not seem to be something that worries Organisation 6.**	**□ <u>rules and regulations</u> : □ lack □bad regulation □ badly implemented □ other** **No complaints except for the 49/51% rule.** **□ <u>business practices:</u> □ corruption □ local authorities □ other** **Guanshi does not seem to be an issue.** **NDRC should not be a watchdog over the watchdog DOEs.** **□ <u>human resources</u>: □ contracting issues □ other** **Project Owners has to understand that this is not a game and that they have responsibilities over a very long period of time. Though most ERPAs are best effort based.** **□ <u>IP protection</u>** **Does not seem to be an issue**
4.2	How do you see the barriers you identified changing over the next 5 years?	**In 5 years: We did not discuss this.**

4.3	How do you see the CDM administration in China today and in 5 years? Which changes, if any, you expect or would you like to see? Why?	**We did not discuss this.** **Today:** **In 5 years:** **Changes expected:**
4.4	How do you see your company's competitiveness vis-a'-vis local competitors today and in 5 years?	**We did not discuss this.** **Today:** **In 5 years:**
4.5	Is the China market conducive to the development of new methodologies?	**□ very conducive** **X conducive** **□ partly conducive** **□ not at all conducive** **Subsidiary 1 has developed a couple of methodologies (Coal Bed Methane) and they also have a couple of methodologies on its way. The difficulty is obviously that it will be available for everybody as soon as its been approved by EB.** **They have one PCDM project on its way,,, or maybe it's a VER-project (check website). Could be that it's the 51% that makes it a VER-project instead of a CDM project.**
4.6	How would you describe the dynamics between government institutions, banks and private companies in the CDM market? How do they affect the CDM market?	

5	Technology Transfer	
5.1	How do you define technology transfer?	**One employee believes that for tech transfer to occur the tech itself should be produced in China and they should also be able to maintain the technique (the Chinese view).**

5.2	What is your opinion about the importance of technology transfer in CDM?	**Some P.O gives weight to the technology. It's important but it has to make economic sense to them as they want to minimize their capital expenditures. They seldom apply a lifecycle perspective primarily due to cash constraints. One employee mentioned that for example European wind power is of much higher quality and efficiency but it's difficult to compete with Chinese suppliers due to costs. To be able to sell European equipment you have to help with finance and the equipment has to come to a lower cost. P.O also needs to be educated regarding how to apply lifecycle perspective.** **Some P.O would actually like to become suppliers of equipment.**
5.3	In your view, what are the main drivers behind increased technology transfer?	
5.4	What creates incentives for tech transfer through CDM?	
5.5	Are you specifically looking for projects that lead to tech transfer? Why or why not?	**Yes, but in the end it's always up to the P.O to decide what equipment to use.**
5.6	What would encourage you to focus more on projects that contribute to tech transfer?	**They already look at this but the rule that decides that foreign companies can not own more than 49% of the shares in a Chinese company. Foreign companies finds it difficult to sell minority stakes in Chinese companies**
5.7	What are the barriers to the implementation of new technologies in China?	**The rule that decides that foreign companies can not own more than 49% of the shares in a Chinese company. Projects that are economical viable but require large investments (like 50 million USD) is hampered by this facts which also reduces the likelihood for tech transfer. You don't**

		want to invest 80-90% of the total investments but only own less than 50% of the company and only be able to take 49% of profits made. Coal bed methane is probably the only exception where this makes economic sense. It is also more or less impossible to sell minority stakes. **It does not make sense for bioenergy projects.**
5.8	Have CDM contributed to the use of new technology which had not been used before in the province/ region where your CDM projects were implemented?	**Biomass like biodigestion but not so much within direct combustion. Biodiesel is too expensive.** **Probably some in the cement and steal industry. Most likely also within energy efficiency projects.** **We would prably also find evidence of tech transfer within services around verification and monitoring.**
5.9	What sectors and type of CDM projects and technologies do you believe have the greatest potential for CDM during the coming years?	**In Coal Mine methane probably even though most of these projects already have been implemented.** **Renewable like wind offshore could also happen if electricity tariffs increase (tariffs are moving upwards slowly but it's not transparent in the sense that no one knows when and why it will happen). One employee also mentioned; aerobic digestion, crop waste, gasification, and maybe bioduels.** **Transmission losses in grids could be interesting and also optimization of grids. They have an ongoing programme for this but the need is endless.** **Efficiency to end users, controlling heat in buildings (controle systems, insulation etc. Services or technologies for energy efficiency in the broad sense could be very interesting. Organisation 6 looks at equipment for this.** **Energy efficiency in large scale industries, waste heat, waste gas.** **Unfortunately interest from large investors in energy eff in buildings is farily low.**
5.10	In your opinion, what needs to happen to increase incentives for tech transfer through CDM?	**The 51% rule needs to be changed. Currently some investments are hampered by this fact.** **Electricity tariffs also have to go up to increase incentives for energy efficiency in the broad sense and also to make some renewable energy projects interesting.**

		P.O needs to be more aware about lifecycle costs.

II-7:Organisation 7

1	General Data	
1.1	Date and Place of the Interview	10 of Dec, 2007
1.2	Interviewed Organisation **Organisation 7** Interviewed Person (s)	□ **Buyer** □ **Project Developer** □ **Investor** □ **Consultant** □ **Other**

2	Organisation Background	
2.1	Size and number of employees in the company	?
2.2	What are your main activities worldwide/China?	Advisory: **They provides financial, strategic and policy advice within four key markets: clean fuels, clean power, clean technology and carbon finance.** Carbon markets: **They have 2 funds investing in JI and CDM projects worldwide.** Asset management: **They manage one of the world's largest private equity funds dedicated to clean tech (broad definition). their goal is to back high growth clean tech companies that contribute to a lower carbon economy and a more sustainable environment and generate attractive returns for their investors.** **Initially they where more advisory orientated towards utilities within the EU ETS and also orientated towards promoting clean tech business/companies (windfarms). Then they evolved this**
2.3	When did your organisation first become aware of CDM and began developing capacity in the area?	**During 2005 they started their first carbon fund (100 M euros). This fund is fully invested and last year they launched a new fund (800 M euros). 50-60% is invested in China. Though they have offices world wide. The major investors in this fund are 2**

		pension funds.
2.4	What is your core business in terms of CDM in China?	**Carbon markets (?)**
2.5	How many people in your company are working on CDM?	**15 (within carbon markets)?**
2.6	Yearly growth rate for CDM related business	**Significant!**

3	CDM Operations in China	
3.1	When did your organisation began developing capacity in the area of CDM?	**2005**
3.2	In what type of CDM projects are you involved now? How do you see your CDM projects types developing over the next 5 years?	**Today: They have invested in most project types (wind, biomass, landfill, hydro) but they seem to focus on industrial projects such as steal and cement.** **In 5 years:** **Their intention is to broaden the scope: biofuels, bioagas is interesting as well as P-cdm.** **Regarding Coal Bed Methane Organisation 7 see difficulties in terms of lack of human skills/know how. To be operated properly the staff of these facilities has to change their operational routines to run the facilities properly from a CDM perspective. Though they are additional in the sense that CDM help these projects breake-even even though electricity tariffs are low (he mentions that Company X has been involved in one of their projects (Coal mine air ventilation technology).** **Another reason why Organisation 7 is reluctant towards CMM/CBM is that they have a strong corporate responsibility and they are concerned about safety issues in project types.** **Organisation 7 also see a potential in energy efficiency projects. That's one of the reasons why they bought Company X a while ago as they have developed several methodologies within that area. Quality tones has a slightly different business approach in the sense that they have**

		worked closely together with suppliers of technology for which there has been a lack of (by EB) approved technologies. They operate on a success fee basis.
3.3	How would you rate your experience, if any, with local officials during the project development? Why?	□ **very positive** □ **positive** □ **negative** □ **very negative**
3.4	How would you rate Regional CDM Centers' capacity to assist project developers and project owners?	□ **excellent** □ **good** □ **modest** □ **poor**
3.5	What areas require capacity building in relation to local operators and officials?	

4	CDM Market Opportunities and Challenges	
4.1	What do you consider are the main barriers (if any) you face in developing CDM projects in China?	□ **<u>rules and regulations</u> :** □ **lack** □**bad regulation** □ **badly implemented** □ **other** **Minimum CER price is a barrier. Likewise the 49/51% rule is a risk as investors run a risk of loose control of their investment and in the case of suppliers also their technologies. Both these barriers could potentially hamper new technologies. These barriers are one reason why some decide to turn projects into VER projects (Organisation 7 are involved in the VER market but are worried about NDRC will do? Will they regulate an unregulated market driven by branding rather than complicance?).** □ **<u>business practices:</u>** □ **corruption** □ **local authorities** □ **other** **In the central and western parts of China Project Owners lack access to lawyers that has experience of international law.** □ **<u>human resources</u>:** □ **contracting issues** □ **other** **See 3.2. Lack of know how is a concern (operate facilities properly) especially**

		when it comes to new technologies. Though Organisation 7 seem to more in less in all projects make sure that staff is trained properly (by those who supply equipment to the project). □ **<u>IP protection</u>** **IP protection is still a concern (a new technology could be copied within 3-6 months)**
4.2	How do you see the barriers you identified changing over the next 5 years?	**In 5 years:** **No explicit answer though he mentions that NDRC might opt for unilateral deals to increase their control of the Chinese CDM market.**
4.3	How do you see the CDM administration in China today and in 5 years? Which changes, if any, you expect or would you like to see? Why?	**Today:** **In 5 years:** **Changes expected:**
4.4	How do you see your company's competitiveness vis-a'-vis local competitors today and in 5 years?	**Today:** **In 5 years:**
4.5	Is the China market conducive to the development of new methodologies?	**Yes it is conducive (see info about Company X). Though 2012 is getting closer!**

4.6	How would you describe the dynamics between government institutions, banks and private companies in the CDM market? How do they affect the CDM market?	**Earlier one employee mentioned that NDRC might opt for unilateral CDM which in away answers this question.**

5	Technology Transfer	
5.1	How do you define technology transfer?	**At several occasions one employee mentioned that "know how" is essential for CDM projects and that this is something that they always see as a key to success.**
5.2	What is your opinion about the importance of technology transfer in CDM?	**Its important in the sense that foreign equipment has better performance and higher quality and can generate more CERs compared to already available Chinese technologies.**
5.3	In your view, what are the main drivers behind increased technology transfer?	**See 5.2.**
5.4	What creates incentives for tech transfer through CDM?	**See 5.2.** **Once again one employee mentions know how. This is important both for CMM and landfill gas projects as knowledge about how to operate the facility is important for its overall performance. In these cases Organisation 7 brings in expertise (not necessarily from abroad)**
5.5	Are you specifically looking for projects that lead to tech transfer? Why or why not?	**They do work closely with suppliers but in the end it's the performance of individual technologies that not techn**

5.6	What would encourage you to focus more on projects that contribute to tech transfer?	
5.7	What are the barriers to the implementation of new technologies in China?	**Floor price, the 49/51% rule. Project Owners focus on costs (bottom line) and not so much on lifecycle cost which is negative for European equipment suppliers as they are more expensive than Chinese equipment (One employee exemplified this with the previous mentioned coal mine methane air ventilation technology from Company X). To deal with this barrier Organisation 7 to "spell out" the advantages about European equipment and tell them about the importance of high quality over time and also to maximize performance and CERs to Chinese owners. Put it simply they are better engineering solutions.**
5.8	Have CDM contributed to the use of new technology which had not been used before in the province/ region where your CDM projects were implemented?	**In N2O projects. During the early days in windpower and probably also within some biomass projects. He mentions BWE boiler technology from Denmark (Company X).**
5.9	What sectors and type of CDM projects and technologies do you believe have the greatest potential for CDM during the coming years?	**Know how about pellets is needed and knowledge about biofuels as these project types has potential. Clean Coal has potential as well as IGCC and CCS technology.**
5.10	In your opinion, what needs to happen to increase incentives for tech transfer through CDM?	

II-8: Organisation 8

1	General Data	
1.1	Date and Place of the Interview	22 of November 2007
1.2	Interviewed Organisation **Organisation 8** Interviewed Person (s)	□ **Buyer** □ **Project Developer** □ **Investor** □ **Consultant** □ **Other**

2	Organisation Background	**Organisation 8 is a state owned European company.**
2.1	Size and number of employees in the company	**Within Organisation 8 three people work with CDM. They have people working on CDM in other continents as well.**
2.2	What are your main activities worldwide/China?	**Organisation 8 finances private projects in developing countries where private banks are unable to take on the risks. Most projects are therefore high risk projects where Organisation 8 offers loans of 8-18 years. Loans are given both to companies from many different countries. They do not provide loans to companies within the military, tobacco sectors.**
2.3	When did your organisation first become aware of CDM and began developing capacity in the area?	**Organisation 8 has worked within the renewable energy field for a long time and heard about CDM 2004. Back then they cooperated with another Organisation. Today they can cope with the CDM project cycle on their own and only use TÜV for technical due diligence. In those they don't use TÜV for validation or verification as that would cause conflict of interest. Organisation 8 can pay for most things up front if need be except from CERs. Note though that Company X can pay for CERs up front to some extent.**
2.4	What is your core business in terms of CDM in China?	**Financing and project development. Their CDM management service is basically assess potential CDM projects for owners and then contract consultants to do the PDD. They also hire validator and arrange with host country approvals. So far they have offered this service once and in those cases they could offer financing but it does not have to be the case.**

2.5	How many people in your company are working on CDM?	**3 in Beijing.**
2.6	Yearly growth rate for CDM related business	**?**

3	CDM Operations in China	
3.1	When did your organisation began developing capacity in the area of CDM?	**2004**
3.2	In what type of CDM projects are you involved now? How do you see your CDM projects types developing over the next 5 years?	**Today: Organisation 8 is financing approx. 12-15 CDM projects worldwide. So far they have developed 1 project where they have offered their CDM Management service rather than their financial services.** **□ wind □ hydro □ biomass □ coal mine methane □ other** **In 5 years:** **□ wind □ hydro □ biomass □ coal mine methane □ other**
3.3	How would you rate your experience, if any, with local officials during the project development? Why?	**It seems as if Orgamization 8 don't have much contact with local officials. They use intermediaries for this (consultants/project delvelopers)** **□ very positive** **□ positive** **□ negative** **□ very negative**
3.4	How would you rate Regional CDM Centers' capacity to assist project developers and project owners?	**No real experience. They use intermediaries for this (consultants/project delvelopers). They actually prefer local developers rather than European as they are more competitive in terms of price fro their services and they are also better in handling the DNA.**
3.5	What areas require capacity building in relation to local operators and officials?	

4	CDM Market Opportunities and Challenges	
4.1	What do you consider are the main barriers (if any) you face in developing CDM projects in China?	□ **<u>rules and regulations</u> : □ lack □bad regulation □ badly implemented □ other** **Organisation 8 trusts the DNA. They are transparent and have established rules etc even though the 51% rule is a problem both for tech suppliers and for Organisation 8 as a provider of loans. The reason for this rule is probably that the Chinese government wants to control financial markets. Too much liquidity could spur inflation and therefore they could actually stop banks from offering loans.** **This rule forces some potential CDM projects into the VER market instead where there currently is no regulation.** **Even though one employee mentions that the DNA is good and that there are no major difficulties in the current rules he mentions that they prefer to work with MOST instead of NDRC as they are more "international" and speak better English. He also mentioned that there seem to be some tention between NDRC and MOST.** **□ <u>business practices:</u> □ corruption □ local authorities □ other** **Many P.O do not qualify for loans from Organisation 8, due to the fact that Organisation 8 is not allowed to finance 100% Chinese owned companies. At least 25% of the company has to be owned by non-Chinese. This means that they can invest in subsidiaries in for example the cement or energy sector.** **□ <u>human resources</u>: □ contracting issues □ other** **□ <u>IP protection</u>**
4.2	How do you see the barriers you identified changing over the next 5 years?	**In 5 years:**

4.3	How do you see the CDM administration in China today and in 5 years? Which changes, if any, you expect or would you like to see? Why?	**Today:** **In 5 years:** **Changes expected:**
4.4	How do you see your company's competitiveness vis-a'-vis local competitors today and in 5 years?	**Today:** **In 5 years:**
4.5	Is the China market conducive to the development of new methodologies?	□ **very conducive** □ **conducive** □ **partly conducive** □ **not at all conducive**
4.6	How would you describe the dynamics between government institutions, banks and private companies in the CDM market? How do they affect the CDM market?	

5	Technology Transfer	
5.1	How do you define technology transfer?	**More or less as we do.**

5.2	What is your opinion about the importance of technology transfer in CDM?	**It's not up to them its up to the P.O. Sometimes they give suggestions so they do what they can, but they don't insist if the P.O is not interested. Organisation 8 point is that the technology used in a CDM project should be proved in China or elsewhere and they also require that local staff is trained. For Bio and Wind projects Organisation 8 prefer international technologies and this is most of the time also the wish of the P.O.**
5.3	In your view, what are the main drivers behind increased technology transfer?	**CDM is not driven by technology transfer it is rather driven by costs. P.O often wants the newest technologies, but cost is an issue. But P.O starts to get more aware about quality and lifecycle costs but still it's a long way to go.** **Note that Chinese banks most often only grant loans for 1 year at a time. They supply short term loans which finance long term loans from international lenders. Likewise Power Purchase agreements (PPA) also have a duration of 1 year. From a financial perspective this could be perceived as a risk for P.A. but it seems to work.**
5.4	What creates incentives for tech transfer through CDM?	
5.5	Are you specifically looking for projects that lead to tech transfer? Why or why not?	**No and they would probably not finance a project with unproven technology. International lenders would probably act in the same way while Chinese banks probably would act a little bit different (they don't value quality as much).**
5.6	What would encourage you to focus more on projects that contribute to tech transfer?	

5.7	What are the barriers to the implementation of new technologies in China?	**There is a fear of duplication = fear of loosing your know-how to Chinese companises. Local regulations supports Chinese companies (?). If you set up subsidiaries you can get tax reductions for certain technologies up to 7 years (One employee promised to send information).**
5.8	Have CDM contributed to the use of new technology which had not been used before in the province/ region where your CDM projects were implemented?	**One employee mentions a windfarm in X province that uses European technology. In this case there where also capacity building components involved.** **He also mentions hydro in X province and a chicken farm project (capturing methane).**
5.9	What sectors and type of CDM projects and technologies do you believe have the greatest potential for CDM during the coming years?	**Biomass. Organisation 8 are currently looking into 3 different biomass projects.**
5.10	In your opinion, what needs to happen to increase incentives for tech transfer through CDM?	**The 51% rule needs to be changed and also P.O has to start looking at costs from a lifecycle perspective and also banks has to take this into account as well when approving loans.**

II-9: Organisation 9

1	General Data	
1.1	Date and Place of the Interview	26 of October at 10.30 am
1.2	Interviewed Organisation **Organisation 9** Interviewed Person (s)	□ **Buyer** □ **Project Developer** □ **Investor** **X Consultant** □ **Other**

2	Organisation Background	
2.1	Size and number of employees in the company	Not clear
2.2	What are your main activities worldwide/China?	**Global consulting firm on environment, climate change & energy with aim to assist private sector companies on environmental issues to give them a competitive advantage. They have done GHG mitigation studies, investigated CDM project opportunities and also due**

		diligence on project level. In China they have mostly done work for western companies such as due diligence for buyers, looked into sector possibilities and carbon footprinting.
2.3	When did your organisation first become aware of CDM and began developing capacity in the area?	**2000**
2.4	What is your core business in terms of CDM in China?	**Due diligence (social, economic, environment) and strategic studies on climate, energy and environmental issues**
2.5	How many people in your company are working on CDM?	**?**
2.6	Yearly growth rate for CDM related business	**?**

3	CDM Operations in China	
3.1	When did your organisation began developing capacity in the area of CDM?	**Organisation 9 has been around for quite a while (or at least as long as I can remember)**
3.2	In what type of CDM projects are you involved now? How do you see your CDM projects types developing over the next 5 years?	**Today:** **□ wind □ hydro □ biomass X coal mine methane □ other** **They have also been involved in a HFC project 18 months ago. Organisation 9 company policy does not allow them to take risks. This more than rules limits their business opportunities in China.** **In 5 years:** **□ wind □ hydro □ biomass □ coal mine methane □ other** **They did not mention any specific project category as I recall but they did mention monitoring of projects as a growing business opportunity and "diversifying" and a wish that their core competence (strategic studies) could be of more interest in the future. Organisation 8 structure has limited their involvement in CDM.**
3.3	How would you rate your experience, if any, with local officials during the project development? Why?	**□ very positive** **X positive** **□ negative** **□ very negative**

		No experience
3.4	How would you rate Regional CDM Centers' capacity to assist project developers and project owners?	□ **excellent** □ **good** □ **modest** □ **poor** **No experience**
3.5	What areas require capacity building in relation to local operators and officials?	**-**

4	CDM Market Opportunities and Challenges	
4.1	What do you consider are the main barriers (if any) you face in developing CDM projects in China? • **Investors are not aware of CDM opportunities** • **There should be more methodologies available**	□ **<u>rules and regulations</u> : □ lack □bad regulation □ badly implemented □ other** □ **<u>business practices:</u> □ corruption □ local authorities □ other** □ **<u>human resources</u>: □ contracting issues □ other** □ **<u>IP protection</u>**
4.2	How do you see the barriers you identified changing over the next 5 years? **The market will diversify and there will be more interest from international investors.**	**In 5 years:**
4.3	How do you see the CDM administration in China today and in 5 years? Which changes, if any, you expect or would you like to see? Why?	**Today:** **In 5 years:** **Changes expected:**

4.4	How do you see your company's competitiveness vis-a'-vis local competitors today and in 5 years?	**Today:** **In 5 years:**
4.5	Is the China market conducive to the development of new methodologies? **Buyers (private sector) are usually involved in the development of new methodologies**	□ **very conducive** □ **conducive** □ **partly conducive** □ **not at all conducive**
4.6	How would you describe the dynamics between government institutions, banks and private companies in the CDM market? How do they affect the CDM market?	

5	Technology Transfer	
5.1	How do you define technology transfer?	**In line with our thinking.**
5.2	What is your opinion about the importance of technology transfer in CDM?	
5.3	In your view, what are the main drivers behind increased technology transfer?	**No clear answer**

5.4	What creates incentives for tech transfer through CDM?	**Legal structures needs to be addressed for example the 51% ownership rule.**
5.5	Are you specifically looking for projects that lead to tech transfer? Why or why not?	**Not their business**
5.6	What would encourage you to focus more on projects that contribute to tech transfer?	**No answer**
5.7	What are the barriers to the implementation of new technologies in China?	**Legal structures need to be addressed(e.g. 51% rule).** **The tariffs are low and are the same for any source of energy. This does not create incentives for more expensive energy resources compared to coal** **Biomass projects are currently hampered by the fact that they require extensive transport of fuel and also gathering of fuel. The infrastructure could also be a obstacle (lack of roads)**
5.8	Have CDM contributed to the use of new technology which had not been used before in the province/ region where your CDM projects were implemented?	
5.9	What sectors and type of CDM projects and technologies do you believe have the greatest potential for CDM during the coming years?	
5.10	In your opinion, what needs to happen to increase incentives for tech transfer through CDM?	

II-10: Organisation 10

Interview Organisation
Organisation 10

Organisation Background
Organisation 10 is mainly a buyer but normally help develop the PDDs for projects. They collect CERs and VERs (from projects pre-registered CDM) worldwide and sell them to major businesses, buyers etc. Mainly done by European (CER) and US (VER) offices. Departments: Orignation – to find projects, Implementation – from PIN to CER issuance, Commercial – selling.
Started in 1997 so is one of the earliest companies working on the Kyoto Protocol.
300 staff worldwide, 18 in Beijing and 13 in X province – all local staff. 60% of their total project portfolio is in China.

CDM Opportunities in China
Working on 150 projects in China – 13 are registered. Worldwide have 100 projects registered. = largest player in market.
Projects involved in are right across the board, wind hydro, biomass, n20, landfill etc.
See opportunities over next 5 years in industry related projects, heat recovery, oil&gas sector (fuel switch) to natural gas etc.
Source projects through contacting local govts, intermediate companies, and finding by themselves through attending workshops, expos etc. Now a lot of clients approach them first due to their visibility.
Experience with local project owners: at the beginning, quite difficult as they don't know the documentation and why they have to provide it. Once through the first time, it gets easier 2nd and 3rd time. Still though, have a lot of new developers so at first have to explain a lot.
Main need for cap-build: show them the main principle of CDM = developers need to know the barriers and difficulties of doing the project on-site as well as the good side of projects, as that all goes into the reckoning of whether the project is done – no good to just paper over cracks and hope for best.

Opportunities and Challenges
Barriers – EB more strict for additionality now, and more evidence is now required.
As awareness is rising, it is becoming easier – NDRC is doing a lot, so more and more clients know more.
Govt likes to know what barriers are there and try to help projects owners.
"Some projects approved by NDRC but prices change – materials, electricity charges etc, = IRR less, so projects go on hold as not as profitable anymore.
On their own project ERPAs, they have first refusal for CERs after 2012, which isn't so strict.
Introduction of new meths needs to be accompanied by cap-build of officials and especially DOEs, as they don't have the experience it leads to them asking a lot of questions = delays.
China mkt is ok for development of new meth – they have to do the PDD, registration, and pay for validation of a new meth CDM project, usually project owner doesn't pay anything, just provide documents. It takes 1 year to do due to EB

Technology Transfer
N_2O projects have foreign and new technology in them. Only several companies can provide it so leads to a v.high price – which is then linked to the CER prices. Projects normally compare between different suppliers. They pay for tech.
Currently, project owners don't pay attention to technology – they just want to know if it can be a CDM project or not – and fear paying too much money for tech.

In future, N_2O is still worth it. Some TT required e.g. wind needs to upgrade in the turbine tech.
Also big energy intensive companies trying to improve efficiency (due to the govt targets). Now they can detail the payback/revenue available from investing in the top technology and they will be more willing to go for it. Additionality is still there as there is always the option of going for the lesser technology.
A lot of heat recovery and waste gas recovery can be done in the energy field.
Another barrier for TT is that in poorer provinces, they don't have the money to invest in the heat recovery tech.

II-11: Organisation 11

1	General Data	
1.1	Date and Place of the Interview	15-10-2007
1.2	Interviewed Organisation **Organisation Eleven** Interviewed Person (s)	□ **Buyer** □ **Project Developer** □ **Investor** ✓ **Consultant** □ **Other**

2	Organisation Background	
2.1	Size and number of employees in the company	**6.5 people (one employee in Beijing every two months)**
2.2	What are your main activities worldwide/China?	**1. Direct development of CDM projects (identification, PDD writing, verification, monitoring -> in expansion since the end of cooperation with CRM)** **2. Capacity building > training of financial institutions in China on CDM,** **3. Commissioned by the private sector for technical due diligence, renewable energy design and tech installation..**
2.3	When did your organisation first become aware of CDM and began developing capacity in the area?	**2000**
2.4	What is your core business in terms of CDM in China?	
2.5	How many people in your company are working on CDM?	

2.6	Yearly growth rate for CDM related business	**Depends on the development of CDM after 2012**

3	CDM Operations in China	
3.1	When did your organisation began developing capacity in the area of CDM?	**2000**
3.2	In what type of CDM projects are you involved now? How do you see your CDM projects types developing over the next 5 years?	**Today:** **□ wind □ hydro □ biomass □ coal mine methane □ other** **Doing 5 projects – please check website for types.** **In 5 years:** **□ wind □ hydro □ biomass □ coal mine methane □ other** **Current type of projects to continue.**
3.3	How would you rate your experience, if any, with local officials during the project development? Why?	**□ very positive** **□ positive** **□ negative** **□ very negative**
3.4	How would you rate Regional CDM Centers' capacity to assist project developers and project owners?	**□ excellent** **□ good** **□ modest** **□ poor**
3.5	What areas require capacity building in relation to local operators and officials?	

4	CDM Market Opportunities and Challenges	
4.1	What do you consider are the main barriers (if any) you face in developing CDM projects in China?	**□ <u>rules and regulations</u> : □ lack □bad regulation □ badly implemented □ other** **2/3 of cases of investors turned off by 51% rule** **Contracting – complex contracts required, not 2 page agreements as is the norm in China.** **□ <u>business practices:</u> □ corruption □ local authorities □ other** **It's a seller's market. Project owners only interested in the cash** **Guangxi is a prerequisite** **Financial and budgetary knowledge is**

		very low **□ <u>human resources</u>: □ contracting issues □ other** **<u>HR rate is higher than local competitors so difficult to compete e.g. in bidding</u>** **□ <u>IP protection</u>** **Also problem**
4.2	How do you see the barriers you identified changing over the next 5 years?	**In 5 years:**
4.3	How do you see the CDM administration in China today and in 5 years? Which changes, if any, you expect or would you like to see? Why?	**Today:** **In 5 years:** **Changes expected:**
4.4	How do you see your company's competitiveness vis-a'-vis local competitors today and in 5 years?	**Today:** **In 5 years:**
4.5	Is the China market conducive to the development of new methodologies?	**□ very conducive** **□ conducive** **□ partly conducive** **□ not at all conducive** **Doable – look at E.E. in buildings, municipal waste treatment**

4.6	How would you describe the dynamics between government institutions, banks and private companies in the CDM market? How do they affect the CDM market?	

5	Technology Transfer	
5.1	How do you define technology transfer?	
5.2	What is your opinion about the importance of technology transfer in CDM?	
5.3	In your view, what are the main drivers behind increased technology transfer through CDM today (if any)?	
5.4	Have you avoided CDM-projects due to unfamiliar technology or due to other barriers (political, economic, legal or social)?	
5.5	Are you specifically looking for projects that lead to tech transfer? Why or why not?	

5.6	What would encourage you to focus more on projects that contribute to tech transfer?	
5.7	Are there any barriers to the implementation of new technologies in China through CDM?	
5.8	Have CDM contributed to the use of new technology which had not been used before in the province/ region where your CDM projects were implemented?	
5.9	What sectors and type of CDM projects and technologies do you believe have the greatest potential for CDM during the coming years and why?	
5.10	In your opinion, what needs to happen to increase incentives for tech transfer through CDM?	
5.11	What would happen if the Chinese DNA added firm requirements on technology transfer in present Chinese CDM rules?	
5.12	In your opinion are there other instruments/ways better suited to promote technology transfer then CDM if we focus on mitigation?	

II-12: Organisation 12

1	General Data	
1.1	Date and Place of the Interview	1 of November 2007
	Interviewed Organisation **Organisation 12** Interviewed Person (s)	□ **Buyer** □ **Project Developer** □ **Investor** □ **Consultant** □ **Other**

2	Organisation Background	**Lawfirm**
2.1	Size and number of employees in the company	**Many people worldwide and several offices in China**
2.2	What are your main activities worldwide/China?	**They don't have much if any experience of CDM. They do consultancy work regarding laws, accounting and tax issues. They have worked with one geothermal project though this is not a CDM project.**
2.3	When did your organisation first become aware of CDM and began developing capacity in the area?	**?**
2.4	What is your core business in terms of CDM in China?	**CDM contracts are currently not good enough (not very detailed/ too informal).** • **More legal training is important** • **Involve lawyers at an early stage, sign letter of intent and include articles governing obligations, duties breach of contract etc.**
2.5	How many people in your company are working on CDM?	**?**
2.6	Yearly growth rate for CDM related business	**?**

3	CDM Operations in China	
3.1	When did your organisation began developing capacity in the area of CDM?	**?**
3.2	In what type of CDM projects are you involved now? How do you see your CDM projects types developing over the next 5 years?	**Today:** □ **wind** □ **hydro** □ **biomass** □ **coal mine methane** □ **other** **In 5 years:** □ **wind** □ **hydro** □ **biomass** □ **coal mine methane** □ **other**

3.3	How would you rate your experience, if any, with local officials during the project development? Why?	□ **very positive** □ **positive** □ **negative** □ **very negative**
3.4	How would you rate Regional CDM Centers' capacity to assist project developers and project owners?	□ **excellent** □ **good** □ **modest** □ **poor**
3.5	What areas require capacity building in relation to local operators and officials?	

4	CDM Market Opportunities and Challenges	
4.1	What do you consider are the main barriers (if any) you face in developing CDM projects in China?	□ **rules and regulations : □ lack □bad regulation □ badly implemented □ other** □ **business practices: □ corruption □ local authorities □ other** □ **human resources: □ contracting issues □ other** □ **IP protection**
4.2	How do you see the barriers you identified changing over the next 5 years?	**In 5 years:**
4.3	How do you see the CDM administration in China today and in 5 years? Which changes, if any, you expect or would you like to see? Why?	**Today:** **In 5 years:** **Changes expected:**

4.4	How do you see your company's competitiveness vis-a'-vis local competitors today and in 5 years?	
4.5	Is the China market conducive to the development of new methodologies?	□ **very conducive** □ **conducive** □ **partly conducive** □ **not at all conducive**
4.6	How would you describe the dynamics between government institutions, banks and private companies in the CDM market? How do they affect the CDM market?	

5	Technology Transfer	
5.1	How do you define technology transfer?	**No point asking!**
5.2	What is your opinion about the importance of technology transfer in CDM?	**No point asking!**
5.3	In your view, what are the main drivers behind increased technology transfer?	**No point asking!**

5.4	What creates incentives for tech transfer through CDM?	**No point asking!**
5.5	Are you specifically looking for projects that lead to tech transfer? Why or why not?	**No point asking!**
5.6	What would encourage you to focus more on projects that contribute to tech transfer?	**No point asking!**
5.7	What are the barriers to the implementation of new technologies in China?	**No point asking!**
5.8	Have CDM contributed to the use of new technology which had not been used before in the province/ region where your CDM projects were implemented?	**No point asking!**
5.9	What sectors and type of CDM projects and technologies do you believe have the greatest potential for CDM during the coming years?	**No point asking!**
5.10	In your opinion, what needs to happen to increase incentives for tech transfer through CDM?	**No point asking!**

II-13: Organisation 13

1	General Data	
1.1	Date and Place of the Interview	7 Dec at DS office
1.2	Interviewed Organisation **Organisation 13** Interviewed Person (s)	□ **Buyer** □ **Project Developer** □ **Investor** □ **Consultant** □ **Other**

2	Organisation Background	
2.1	Size and number of employees in the company	
2.2	What are your main activities worldwide/China?	
2.3	When did your organisation first become aware of CDM and began developing capacity in the area?	**A couple of years ago?**
2.4	What is your core business in terms of CDM in China?	
2.5	How many people in your company are working on CDM?	
2.6	Yearly growth rate for CDM related business	

3	CDM Operations in China	
3.1	When did your organisation began developing capacity in the area of CDM?	**A couple of years ago. They try to package their deals with a CDM component and they are planning of arranging workshops on their core competences/technologies in combination with CDM. Though he also mentions that they are aware of additionality that could pose a problem for control automotation that has a very short payback period (1 year in China compared to 6 year in Europe).**
3.2	In what type of CDM projects are you involved now? How do you see your CDM projects types developing over the next 5 years?	**Today:** **□ wind □ hydro □ biomass □ coal mine methane □ other** **In 5 years:** **„„„„ energy efficiency in the broad sense**

		within electricity production, within industry and within buildings,,,,,
3.3	How would you rate your experience, if any, with local officials during the project development? Why?	**Mixed.**
3.4	How would you rate Regional CDM Centers' capacity to assist project developers and project owners?	**No experience.**
3.5	What areas require capacity building in relation to local operators and officials?	**See 4.1.**

4	CDM Market Opportunities and Challenges	
4.1	What do you consider are the main barriers (if any) you face in developing CDM projects in China?	**□ <u>rules and regulations</u> : □ lack □bad regulation □ badly implemented □ other** **□ <u>business practices:</u> □ corruption □ local authorities □ other** **As always when you do something for the first time you have to roll with the punches and learn as you go along.** **Competition (unfair?) is a problem is something that you have to take into account. One employee mentions several projects that they have suddenly lost in late stages due to different reasons and at times this is due to the fact that potential projects does not generate enough money for Managers ("in the pocket"). Lesson learnt "you have to find companies that are well managed".** **□ <u>human resources</u>: □ contracting issues □ other** **This could pose problems in the sense that if you implement a new technology that requires skilled personnel its likely you will loose them fairly soon just because their skills are worth a lot to others as well and then you have to start all over again. For example people who know automation technology would get offers from many**

		different places. They would probably also earn more than managers which could also be a problem. **Also see 5.9.** □ **<u>IP protection</u>**
4.2	How do you see the barriers you identified changing over the next 5 years?	**In 5 years:**
4.3	How do you see the CDM administration in China today and in 5 years? Which changes, if any, you expect or would you like to see? Why?	**Today:** **In 5 years:** **Changes expected:**
4.4	How do you see your company's competitiveness vis-a'-vis local competitors today and in 5 years?	**Today:** **In 5 years:**
4.5	Is the China market conducive to the development of new methodologies?	**Organisation 13 has discussed with a Chinese university and other Organisations to develop the now missing but much needed methodology.**
4.6	How would you describe the dynamics between government institutions, banks and private companies in the CDM market? How do they affect the CDM market?	

5	Technology Transfer	
5.1	How do you define technology transfer?	**More or less as we do. One employee emphasizes the importance of training and teaching staff how to operate a project activity properly. Organisation 13 does offer training for bigger projects. According to one employee lack of this is why some project activities perform less well.**
5.2	What is your opinion about the importance of technology transfer in CDM?	**In this it could significantly reduce coal use and consumption. CDM could generate an extra revenue stream.**
5.3	In your view, what are the main drivers behind increased technology transfer?	**Better performance in facilities, less need for maintenance. Less coal consumption. Organisation 13 offers complete packages (financial solutions, performance contracting and maintenance) which could guarantee CER deliveries.**
5.4	What creates incentives for tech transfer through CDM?	**Better performance in facilities, less need for maintenance. Less coal consumption.**
5.5	Are you specifically looking for projects that lead to tech transfer? Why or why not?	
5.6	What would encourage you to focus more on projects that contribute to tech transfer?	**Relevant approved methodologies.**
5.7	What are the barriers to the implementation of new technologies in China?	**No relevant methodologies approved. High expectations on returns. Lack of qualified management which makes operation less well tuned (under performance).** **If management don't see any money in it for themselves it could be a barrier and it wont be any money in the pocket for those who decide if Organisation 13 offer the would solution. Provincial decision**

		makers/officials have to back many of those projects where Organisation 13 sees a potential for CDM and thereby tech transfer.
5.8	Have CDM contributed to the use of new technology which had not been used before in the province/ region where your CDM projects were implemented?	**?**
5.9	What sectors and type of CDM projects and technologies do you believe have the greatest potential for CDM during the coming years?	**One employee mentions energy efficiency in buildings (OBVIOUSLY) even though there is now approved meth available as of now. To upgrade residential buildings using CDM is interesting as this would reduce the risks of Chinese managers expecting higher returns on investments. Though still you have a currency risk** **The technology itself is not really high tech but it is new in China. The set up also needs to be different which also would generate technology transfer. What is beneficial is that everything is centralized in China which in this case is an advantage for implementation. The obstacle is lack of well educated people to deal with management (and operation?).** **One employee also mentions biomass though the obstacle is that it could be difficult for them to supply the grid as utility companies want to opt for bigger plants and the price could also be an issue (it is cheaper to produce electricity firing coal). If you build big plants that will require a lot of transports to feed the plant which would be considered as leakage and therefore reduce CER volumes. One employee mentions that 10 MWh could be an interesting size while bigger plants than that would be to difficult due to the above reasons.**
5.10	In your opinion, what needs to happen to increase incentives for tech transfer through CDM?	

II-14: Organisation 14

1	General Data	
1.1	Date and Place of the Interview	**29 of November, 2007**
1.2	Interviewed Organisation **Organisation 14** Interviewed Person (s)	In a sense they are both a buyer/developer and owner

2	Organisation Background	
2.1	Size and number of employees in the company	Started in 2005 by a number of investment banks
2.2	What are your main activities worldwide/China?	**Organisation 14 invests money in CDM projects which they own parts of. Most often they own projects/facilities through a Chinese subsidiary. In a way you can say that Organisation is owner, developer and buyer of CERs. Primarily the focus is on coal mine, and landfill gas projects, but to some extent they also invest in renewable energy projects. They have financial backing from two major financial institutions.**
2.3	When did your organisation first become aware of CDM and began developing capacity in the area?	2005
2.4	What is your core business in terms of CDM in China?	**Run and own projects. So far no only small amounts of CERs have been issued, but they don't intend to sell them in the near future as they believe that price will go up considerably.**
2.5	How many people in your company are working on CDM?	**100 worldwide. Approx 50 of these in China**
2.6	Yearly growth rate for CDM related business	**Satisfactory!**

3	CDM Operations in China	
3.1	When did your organisation began developing capacity in the area of CDM?	2005
3.2	In what type of CDM projects are you involved now?	**Today: In all Organisation 14 has roughly 200 projects in various stages of**

	How do you see your CDM projects types developing over the next 5 years?	**implementation. Primarily they invest in coal mine methane, landfill gas but to some extent also renewable energy. They don't want to "spread to thin". Note that they perceive renewable to be less viable as they take stakes or fully own facilities that they invest in.** **□ wind □ hydro □ biomass □ coal mine methane □ other** **In 5 years:** **□ wind □ hydro □ biomass □ coal mine methane □ other**
3.3	How would you rate your experience, if any, with local officials during the project development? Why?	**□ very positive** **□ positive** **□ negative** **□ very negative**
3.4	How would you rate Regional CDM Centers' capacity to assist project developers and project owners?	**□ excellent** **□ good** **□ modest** **□ poor**
3.5	What areas require capacity building in relation to local operators and officials?	

4	CDM Market Opportunities and Challenges	
4.1	What do you consider are the main barriers (if any) you face in developing CDM projects in China?	**□ <u>rules and regulations</u> : □ lack □bad regulation □ badly implemented □ other** **Bureaucracy is an issue, but you learn how to deal with it if you spend enough time here. Organisation 14 believes that it's a problem for China vs. other countries that you are not allowed to do CER sharing in China between seller and buyer.** **□ <u>business practices:</u> □ corruption □ local authorities □ other** **Project owners in general try to quote to much some services. For example for engineering stuff when they deal with foreign companies "so you have to be streetsmart".**

		□ <u>human resources</u>: □ contracting issues □ other **It can be challenging to find/recruit well educated people and keep them. You have to train them a lot but always run the risk of loosing them.** **□ <u>IP protection</u>** **Known to be an obstacle but no problem for Organisation 14. Ask equipment suppliers.**
4.2	How do you see the barriers you identified changing over the next 5 years?	**In 5 years:** **One employee believes that NDRC should relax approval rules for for China as they would actually earn more (he mentions the example of submitting PDDs in both Chinese and English for approval, which no one is good enough for registration).** **Relaxed rules would also help smaller projects as overheads/transaction costs makes them less economical viable compared to larger projects.** **"snappier rules would generate more money and technology"** **They don't announce changes in the routines. Its not transparent!**
4.3	How do you see the CDM administration in China today and in 5 years? Which changes, if any, you expect or would you like to see? Why?	**Today:** **In 5 years:** **Changes expected:**
4.4	How do you see your company's competitiveness vis-a'-vis local competitors today and in 5 years?	**Only small changes compared with today.** **Services surrounding the market will increase (for example PDD writing). More Chinese companies will enter the market in cooperation with foreign subsidiaries (for example equipment suppliers)** **The market will also be "frocked with Chinese intermediaries,,, the Chinese way". You have to find out which ones of these that you need and which ones you don't need.**

		"It's a crowded business". "Its hot and attractive". **One employee is not aware of much consolidation so far but it could start to happen when issuance starts to kick in for real and as market insecurity decrease. The big banks will be the big buyers and increase their share of the market.** **In 5 years:**
4.5	Is the China market conducive to the development of new methodologies?	**X very conducive** **□ conducive** **□ partly conducive** **□ not at all conducive** **Most methodologies are applicable with only a few exemptions. Organisation 14 have done a few methodologies but in these cases they have done their homework first,,,, that is they have good projects lined up. If they have a good project that lacks a methodology that will be a part in the negotiation.**
4.6	How would you describe the dynamics between government institutions, banks and private companies in the CDM market? How do they affect the CDM market?	

5	Technology Transfer	
5.1	How do you define technology transfer?	**"to build and operate".** **One employee tells us an experience when he actually saw a company buying certain equipment from abroad picking it into pieces with the aim to see if they could start to produce it themselves. Technologies they can steal but not "human IPR".** **Quote 1; "CDM technologies is not rocket science",, a generator is a generator".** **Quote 2; "Project owners cut corners", "they buy cheap crap" which will produce less CERs.**

		Organisation 14 has established cooperation's with equipment suppliers for the kind of project they invest in. Roughly 60-70% of equipment in their projects is imported for C.B.M projects. Though it varies from project to projects and it's also depending on size.
5.2	What is your opinion about the importance of technology transfer in CDM?	**It's not the technologies themselves that are important. It's what amount o CERs they can produce that is of importrance. As Organisation 14 takes own their projects it's important to them to give more consideration to quality, operational and costs for maintenance.**
5.3	In your view, what are the main drivers behind increased technology transfer?	
5.4	What creates incentives for tech transfer through CDM?	**If a certain piece of equipment can produce more CERs (or more electricity they would take it into consideration.**
5.5	Are you specifically looking for projects that lead to tech transfer? Why or why not?	**No that's not their business model. They invest more or less in the same kind of projects all the time though with some exceptions.**
5.6	What would encourage you to focus more on projects that contribute to tech transfer?	
5.7	What are the barriers to the implementation of new technologies in China?	**See question 4.1-4.2.**

5.8	Have CDM contributed to the use of new technology which had not been used before in the province/ region where your CDM projects were implemented?	**One employee mentions solar and wind projects.** **Large scale chemical industry projects, combined cycle plants and methane to power plants. "the heavy pieces".**
5.9	What sectors and type of CDM projects and technologies do you believe have the greatest potential for CDM during the coming years?	**One employee mentions agricultural projects, N2O fertilizers** **He also believes that transport could be interesting as well as energy efficiency in industry and in buildings.**
5.10	In your opinion, what needs to happen to increase incentives for tech transfer through CDM?	**Ask suppliers of equipment.**

II-15: Organisation 15

1	General Data	
1.1	Date and Place of the Interview	The 24 of October 2007
1.2	Interviewed Organisation **Organisation 15** Interviewed Person (s)	□ **Buyer** □ **Project Developer** □ **Investor** □ **Consultant** □ **Other**

2	Organisation Background	
2.1	Size and number of employees in the company	
2.2	What are your main activities worldwide/China?	**Carbon asset management, Brokerage, Climate neutralization, etc**
2.3	When did your organisation first become aware of CDM and began developing capacity in the area?	
2.4	What is your core business in terms of CDM in China?	**Carbon asset management**
2.5	How many people in your company are working on CDM?	**In China 11 people (1 European). Though number of staff is increasing rapidly.**

2.6	Yearly growth rate for CDM related business	**Growing rapidly.**

3	CDM Operations in China	
3.1	When did your organisation began developing capacity in the area of CDM?	**2006 in China**
3.2	In what type of CDM projects are you involved now? How do you see your CDM projects types developing over the next 5 years?	**Today: They have more than 100 projects in their portfolio though in various stages of development. Basically they gets involved in any projects that they can get hold of: hydro, waste heat and recovery, wind[13] etc.** **In 5 years:** **□ wind □ hydro □ biomass □ coal mine methane □ other** **On the commercial side in China they will continue to grow but not as fast as during the last year. They will also continue to develop their business in other countries to be less dependent on Chinas. It's also worth while noting that monitoring and verifying becomes increasingly more important as project development slows down.**
3.3	How would you rate your experience, if any, with local officials during the project development? Why?	**□ very positive** **□ positive** **□ negative: Organisation 15 seems to be pretty negative or at least "not comfortable" with them. They show up when Organisation 15 visits projects. To one employee its often unclear who they represent and why.** **□ very negative**
3.4	How would you rate Regional CDM Centers' capacity to assist project developers and project owners?	**One employee mentions that they often act as developers rather than something else. Therefore they are more or less a competitor.**

[13] **For CERs from wind projects you have to pay a lot more than minimum price. One employee mentions that Company X has paid 11.40 euro.**

3.5	What areas require capacity building in relation to local operators and officials?	

4	CDM Market Opportunities and Challenges	
4.1	What do you consider are the main barriers (if any) you face in developing CDM projects in China?	□ **<u>rules and regulations</u> : □ lack □bad regulation □ badly implemented □ other** **Minimum price, IRR calculations are sometimes exaggerated in order to get permits to build a facility. The process to get a project approved is also pretty time consuming and the number of documents to submit is extensive.** □ **<u>business practices:</u> □ corruption □ local authorities □ other** **How Chinese privately do business is something (a drawback) that you have to understand to be able to do business.** **Chinese consultants/developers want to become buyers which obviously increase competition and some of them already act as buyers (HQ in for example UK).** □ **<u>human resources</u>: □ contracting issues □ other** **There is a lack of DOEs ("tragically behind") which in turn make lives more difficult for developers/consultants/buyers. DNV has been plundered by buyers which also generates a lack of competence as DOEs have to train new staff. Organisation 15 is unsure about the usefulness of Chinese DOEs given Chinese business practices and also due to the fact that at least some of them also act as developers. This could cause problems for the integrity of CDM.** [14] **"CDM Centres can only improve"** □ **<u>IP protection</u>**
4.2	How do you see the barriers you identified changing over the next 5 years?	**In 5 years:**

[14] **Organization 15 cooperates with some other organizations.**

4.3	How do you see the CDM administration in China today and in 5 years? Which changes, if any, you expect or would you like to see? Why?	**Today:** **In 5 years:** **Changes expected:**
4.4	How do you see your company's competitiveness vis-a'-vis local competitors today and in 5 years?	**Today: Hard to tell. Though CDM is not unattractive. Competition has increased. There are several European and Japanese competitors and an increasing number of Chinese competitors. Organisation 15's Japanese's competitors primarily do business through their already established networks.** **In 5 years: See 3.2.** **Organisation 15 is also thinking about establishing a closer cooperation with equipment suppliers.**
4.5	Is the China market conducive to the development of new methodologies?	**□ very conducive** **□ conducive** **X partly conducive: not now but maybe in the future. They have looked at the possibility of developing methodologies but not systematically. They have also looked at P-CDM, but waits for futher clarity on the subject. Currently they are busy with the low-hanging fruits. They are also afraid that P-CDM could flood the market,,,, which obviously would reduce Organisation 15's revenues.** **□ not at all conducive**
4.6	How would you describe the dynamics between government institutions, banks and private companies in the CDM market? How do they affect the CDM market?	**Investments banks are already players at the market (for example Merril Lynch, Deutsche Bank etc). Some companies at the Chinese carbon market has close cooperation (co-buying) with investment banks. Others have strong financial backing from investment banks. Organisation 15 has tried to explain CDM for the Chinese bank X.**

5	Technology Transfer	
5.1	How do you define technology transfer?	**Novel and advanced technologies transferred to developing countries, know how as well as knowledge how to operate and maintain facilities.**
5.2	What is your opinion about the importance of technology transfer in CDM?	**It's not of great importance for those active at the market but it does exist. Lack of tech transfer within CDM has been criticized, but this should be marketed. It could also be realized via support to SMEs. Organisation 15 is looking at the potential for cooperating with equipment suppliers as part of a new business model. Whats makes it difficult is the cap on how much a foreign company can own (the 49/51% rule makes it's difficult).**
5.3	In your view, what are the main drivers behind increased technology transfer?	**CDM itself. Currently there is no demand from the Chinese side except from NDRC. Chinese Owners primarily look at the initial investment rather than the lifecycle costs and they prefer to buy the cheapest equipment even though more expensive and foreign equipment could prove additionality but as mentioned under 5.2. they are interested.**
5.4	What creates incentives for tech transfer through CDM?	**Get rid of the 49/51% rule!**
5.5	Are you specifically looking for projects that lead to tech transfer? Why or why not?	**No not currently. [busy with low hanging fruits]**
5.6	What would encourage you to focus more on projects that contribute to tech transfer?	**See answers above**

5.7	What are the barriers to the implementation of new technologies in China?	**See answers above**
5.8	Have CDM contributed to the use of new technology which had not been used before in the province/ region where your CDM projects were implemented?	**We could probably find examples of this within waste heat and recovery, hydro and wind.**
5.9	What sectors and type of CDM projects and technologies do you believe have the greatest potential for CDM during the coming years?	**Coal mine methane, waste handling (room for improvement), iron and steal, energy eff, waste heat and recovery and combined cycle power plants.** **Biomass projects are not that common (first project during 2005). One employee says that there are no mature technologies to a decent price (BWE technology). Investment costs are high for more advanced technologies. The Chinese government is supportive but these kind of projects are not that financial profitable. Though additionality should be easy to prove.**
5.10	In your opinion, what needs to happen to increase incentives for tech transfer through CDM?	

Appendix 3: Interviews with regional CDM Service Centres

III-1: CDM Center 1

	CDM Center 1
Interview partner	Mr. X
Interview date	18. January 2008
1. Start of CDM business	
2. Who started Center	CDM has been set up by Mr.X
3. Who supports Center today	The CDM Center is a private company which closely cooperates with the one consultancy company
4. CDM services	PDD development, project sourcing; CDM trainings and conferences, and CDM information services via website.
5. No. and type of CDM projects developed	3 projects are EB registered, 2 are under review, 3 are at validation.
6. Assessment of CDM contribution to technology transfer in province	There is no technology transfer. The turbines for wind projects are bought e.g. from Germany and Spain. Province X has a Sino-Country X Joint Venture for wind turbine production. Most of the wind technology up to 2006/07 is all domestically produced, but there is not yet a breakthrough. But the domestic technology has not yet reached the quality of the foreign technology.
7. Assessment of importance of technology transfer in CDM projects	-
8. Biggest barriers for technology transfer	There is no mechanism for TT in the Kyoto protocol/CDM. This kind of mechanism should be installed in order to bring advanced technologies from the developed countries to such underdeveloped places such as X Province, this would be a great benefit. But the Chinese government is already doing quite a lot to support companies to switch to "energy saving and emission reduction" technologies. European companies fear also the weak implementation of intellectual property rights in China. But there has been some progress.
9. Possible incentives for an improved technology transfer via CDM	There should be regulations concerning the TT in the carbon market.
10. Sectors and projects types with good CDM potential in province	X province has one of China's largest coal reserves – we need clean coal technology. The energy consumption of our industry is also high, so there is a high potential for energy efficiency projects. I also hope that technologies for Silicium production can be transferred to X province. Project owner: There is potential for CDM projects in agriculture, cattle raising, cement production, and

	hydropower. Project owner: Except wind power, we plan to have PV and biogas projects.

III-2: CDM Center 2

	CDM Center 2
Interview partner	Mr. X,
Interview date	25. December 2007
1. Start of CDM business	
2. Who started Center	CDM Center is part of the Centre for the Progress of Scientific Development, which is in turn supervised by the Provincial Science & Technology Department.
3. Who supports Center today	The Center is part of the provincial government, but its set-up has been initially supported by the ADB and later on by the Sino-Country X CDM capacity development programme.
4. CDM services	PDD development, project sourcing; CDM trainings and conferences, and CDM information services via website.
5. No. and type of CDM projects developed	4 projects are EB registered, 4 are at validation
6. Assessment of CDM contribution to technology transfer in province	Technology transfer is very important, especially for industry and agricultural type of projects. But so far there is not much TT. We have two cases of technology transfer: for a biomass project in Province X and one in Province Y. We established cooperation with a European company who provided the project owner with the CSTR technology for animal waste management.
7. Assessment of importance of technology transfer in CDM projects	The government wants to promote TT through CDM projects, because the purpose of the CDM is to have investment and import technologies. If there is no TT, the project might fail to register with the UN. In order to support the TT, we should increase our ability. If there is not TT, the CDM project might face more restrictions. We should follow the new Kyoto Protocol's policies. This still needs to be discussed among governments and companies.
8. Biggest barriers for technology transfer	There exists few appropriate projects for TT and the negotiations with the buyers are very difficult, because their requests are very harsh, there are many restriction on TT from the foreigners' side. There are three models: 1. Pure TT, 2. Joint Ventures which are shareholders in the investment for technologies, and 3. import of foreign technologies.
9. Possible incentives for an improved technology transfer via CDM	
10. Sectors and projects types with good CDM potential in province	Biogas from agriculture, Prinvince X has good solar radiation, so solar energy, industry projects. Gansu has the world's second largest nickel industry. Mental smelting, mine explorations, patrol refinery and chemical industry. Two Project owners said that the potential of small hydro power is almost realised.

III-3: CDM Center 3

	CDM Center 3
Interview partner	Mr. X
Interview date	26. November 2007
1. Start of CDM business	
2. Who started Center	Provincial Development & Reform Commission, supported by the China-Country X CDM Capacity Building Programme
3. Who supports Center today	Public part of center is supported by the Provincial Science & Technology Department; Private part of center, Company X.
4. CDM services	PDD development, project sourcing; CDM trainings and conferences, CDM information services via website and QQ messenger, software development for measuring emission reductions in CDM projects.
5. No. and type of CDM projects developed	30 projects have DOE valildation, 35 have DNA approval, none is yet EB approved.
6. Assessment of CDM contribution to technology transfer in province	There is not much TT going on in Province X CDM projects, because most of them are hydro power projects, which rely on domestic technology.
7. Assessment of importance of technology transfer in CDM projects	In general TT is an important feature of the Kyoto Protocol, but for hydro power projects it is not necessary anymore.
8. Biggest barriers for technology transfer	Foreign companies are not interested in TT, but in carbon trading.
9. Possible incentives for an improved technology transfer via CDM	EB should make some more concrete regulations how TT could happen in CDM projects. TT should be included in the negotiations for the ERPA.
10. Sectors and projects types with good CDM potential in province	Small hydro power projects.

III-4: CDM Center 4

	CDM Center 4
Interview partner	Mr. X
Interview date	10. December 2007
1. Start of CDM business	
2. Who started Center	CDM Center 4 is part of Institute of Scientific & Technical Information of Province X, which is in turn supervised by the Provincial Development and Reform Commission and the Science & Technology Department
3. Who supports Center today	The Center is part of the provincial government, but its set-up is supported by the CDM capacity development programme of one foreign Development Agency.

4. CDM services	PDD development for hydro power projects; CDM trainings and conferences; consulting services for energy savings and emission reductions.
5. No. and type of CDM projects developed	1 at validation, 4 in development.
6. Assessment of CDM contribution to technology transfer in province	There is no technology transfer for hydropower projects. There might be some technology transfer for biomass and methane projects, but the CDM Center is not involved in these project types. Project owner: some of the technology for hydro power projects comes from Joint Ventures, thus foreign technology produced in China.
7. Assessment of importance of technology transfer in CDM projects	Technology transfer is a very important part of the CDM, especially for waste gas and waste heat recovery projects. But the Center has not yet developed these kind of projects.
8. Biggest barriers for technology transfer	Foreign companies would like to cooperate with Chinese companies, but their technology is very expensive, e.g. the technology of one US company which would be needed for biomass projects. So the lack of technology transfer is in reality a financial barrier.
9. Possible incentives for an improved technology transfer via CDM	
10. Sectors and projects types with good CDM potential in province	Besides abundant hydro resources, Province X has a large steel/metal production, has China's second largest copper production (with a lot of waste water) and chemistry industry, these sectors have a good potential for energy efficiency projects and waste water recovery. Waste heat recovery and biomass projects also have a good potential. However, the Center has not yet developed these kinds of projects, but they are in the preparation status, they are just the compiling relevant data.

III-5: CDM Center 5

	CDM Center 5
Interview partner	Ms.X
Interview date	Dec. 2007
1. Start of CDM business	
2. Who started Center	Province X Science and Technology Department
3. Who supports Center today	Self financing
4. CDM services	Consulting and enterprise training, CDM project application (whole process), technology aid to companies.
5. No. and type of CDM projects	The center is specialized at CMM, renewable energy power generation, fill switch (from coal/oil to natural gas); landfill

developed	gas recycling, etc. Involved in over 30 projects, has made 10 PIN (project idea note), and 2 PDD (in cement waste heat recycling and power generation). No projects have been approved.
6. Assessment of CDM contribution to technology transfer in province	Yes, new technology used in biomass power generation.
7. Assessment of importance of technology transfer in CDM projects	It's important
8. Biggest barriers for technology transfer	Not enough fund
9. Possible incentives for an improved technology transfer via CDM	More fund, and more information.
10. Sectors and projects types with good CDM potential in province	PCDM (because supported by China), and CMM (big source in the province)

III-6: CDM Centre 6

	CDM Centre 6
Interview partner	Ms. X
Interview date	Dec. 2007
1. Start of CDM business	
2. Who started Center	Province X Science and Technology Department
3. Who supports Center today	Financed by companies
4. CDM services	Training (lecturing), help for CDM application, PDD writing
5. No. and type of CDM projects developed	Has been involved in more than 40 projects. Made files for 11 projects. Project type: Industrial furnace gas, cement waste heat, animal wastes biomass, small hydro. 4 projects have been approved by NDRC
6. Assessment of CDM contribution to technology transfer in province	Yes, coke furnace gas power generation technology from America. (There are other technology transfers, but need official file from Chinese government to get more concrete statistic information)
7. Assessment of importance of technology transfer in CDM projects	It depends. Some times it's necessary, but sometimes new technology is not necessary and expensive
8. Biggest barriers for technology	

transfer	
9. Possible incentives for an improved technology transfer via CDM	Relevant national policy is needed
10. Sectors and projects types with good CDM potential in province	Biomass; Industrial furnace gas (from iron and steel industry); aluminium and iron industries

III-7:CDM Centre 7

	CDM Centre 7
Interview partner	Mr.X
Interview date	Dec. 2007
1. Start of CDM business	
2. Who started Center	Province X Science and Technology Department
3. Who supports Center today	Two national units (one is Province X science and technology information research institute, the other is Province X exchange center for Science and Technology)
4. CDM services	Research of status quo; communicate with foreign experts; capacity building; Provide CDM application service, but needs outside help for whole process
5. No. and type of CDM projects developed	Specialized in renewable energy. Have done projects in Small hydro, industrial energy saving, biomass. Involved in more than 40 projects, 5 have been approved by NDRC.
6. Assessment of CDM contribution to technology transfer in province	No, projects cooperate with national institutes. No foreign technologies used
7. Assessment of importance of technology transfer in CDM projects	Yes, it's important. And the centre supports it.
8. Biggest barriers for technology transfer	Companies will choose easier-found technologies, and the patent issue is complex or key technology could not be transferred, companies are afraid of entanglement, and few Organisation could provide service to solve the problem; fund problems;
9. Possible incentives for an improved technology transfer via CDM	Government policy. Especially for medium and small sized companies.
10. Sectors and projects types with good CDM potential in province	Some small hydro (depend on international methodology), industrial energy saving (industrial city), and agricultural/animal waste recycling (agricultural province), waste landfill gas

III-8: CDM Center 8

	CDM Center 8
Interview partner	Ms. X
Interview date	Dec. 2007
1. Start of CDM business	
2. Who started Center	Province X Science and Technology Department
3. Who supports Centre today	
4. CDM services	Some training work, and PDD writing (very beginning)
5. No. and type of CDM projects developed	Not done any projects yet.
6. Assessment of CDM contribution to technology transfer in province	Not sure
7. Assessment of importance of technology transfer in CDM projects	Important
8. Biggest barriers for technology transfer	Not enough fund and information
9. Possible incentives for an improved technology transfer via CDM	Government (NDRC) promotion and introduction. Easier fund access to bank
10. Sectors and projects types with good CDM potential in province	Industrial energy recycling (industrial city)

III-9: CDM Centre 9

	CDM Centre 9
Interview partner	Mr. X
Interview date	Dec. 2007
1. Start of CDM business	
2. Who started Center	Province X Science and Technology Department & Province X University
3. Who supports Center today	Companies
4. CDM services	Training; whole process of CDM application (PDD writing…); Propagendize (inside province X); consulting and research
5. No. and type of CDM projects	Specialized in renewable energy, industrial waste, landfill gas, waste incineration, furnace gas recycling. 6-7 projects, 2

developed	approved by NDRC. Iron and steel factory furnace gas power generation
6. Assessment of CDM contribution to technology transfer in province	No contribution
7. Assessment of importance of technology transfer in CDM projects	It depends on the situation of companies
8. Biggest barriers for technology transfer	Not big profit; some national policies (70% or more instruments must be national in some industries, like wind); company awareness of new technology is low
9. Possible incentives for an improved technology transfer via CDM	Pay more attention (both country and company), raise the company awareness and level.
10. Sectors and projects types with good CDM potential in province	Iron and steel industries waste heat recycling; some difficult but high GWP projects

III-10: CDM Center 10

	CDM Centre 10
Interview partner	Someone works in the Centres
Interview date	Dec. 2007
1. Start of CDM business	
2. Who started Center	Province X Science and Technology Center
3. Who supports Center today	Productivity promotion center; 21 century development center; Science and technology information research institute; 21century agenda sub-center
4. CDM services	Training for experts and for other service Organisations; CDM application (PDD writing…); advertising; consulting, and connection with international network etc.
5. No. and type of CDM projects developed	N/A
6. Assessment of CDM contribution to technology transfer in province	Not sure
7. Assessment of importance of technology transfer in CDM projects	N/A
8. Biggest barriers for technology	N/A

transfer	
9. Possible incentives for an improved technology transfer via CDM	N/A
10. Sectors and projects types with good CDM potential in province	In new energy and renewable energies such as waste power generation, biomass and manure biogas utilization, hydro, solar, and wind power utilization. In industrial areas, energy efficiency is of high potential. Some other areas are also available such as land fill gas and methane utilization.