EU-China CDM Facilitation Project

The Pre-2012 CDM Market in China

Policy Context and Current Developments

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Acronyms

AAU	Assigned Amount Unit
AE	Applicant Entity
AWG-LCA	Ad Hoc Working Group on Long-term Cooperative Action under the Convention
AWG-KP	Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol
CBM	Coal Bed Methane
CCS	Carbon Capture and Storage
CDM	Clean Development Mechanism
CDM EB	Clean Development Executive Board
CER	Carbon Emission Reduction Credits
CMA	Chinese Meteorological Association
CMM	Coal Market Module
COP 13/14/15	13^{th}/14^{th}/15^{th} Session
COP/MOP	The Conference of the Parties serves as the Meeting of the Parties
DNA	Designated National Authority
DOEs	Designated Operational Entity
EPA	Environmental Protection Agency
EU ETS	European Union Greenhouse Gas Emission Trading Scheme
EUA	European Union Allowances
FEPC	Federation of Electric Power Companies (of Japan)
G-77/China	Group of 77 and China
GHG	Greenhouse Gas
HFC	Hydrofluorocarbons
IET	International Emissions Trading
IPR	Intellectual Property Rights
JI	Joint Implementation
J-Vets	Japanese Voluntary Emissions Trading Scheme
LDC	Least Developed Countries
MEP	Ministry of Environmental Protection (of China)
METI	Ministry of Economy, Trade and Industry (of Japan)
MOF	Ministry of Finance (of China)
MOFA	Ministry of Foreign Affairs (of China)
MOST	Ministry of Science and Technology (of China)
N_2O	Nitrous Oxide
NAP	National Allocation Plan
NDRC	National Development and Reform Commission (Chinese DNA)
PDD	Project Design Document
PFC	Perfluorocarbon
REDD	Reducing Emissions from Deforestation and Degradation
SED	Strategic Economic Dialogue
SIDS	Small Islands
SOEs	State-owned Enterprises
UNFCCC	United Nations Framework Convention on Climate Change

1 Background and Introduction

Since the adoption of the Kyoto Protocol in 1997 and its ratification in 2005, the carbon market has enjoyed steady and consistent expansion. The global carbon market in 2008 grew faster in terms of volume and value of traded credits. The total value was estimated at 92€ billion in 2008, more than double the 40€ billion in 2007[1].

Both the EU and China are important players on the global carbon market. The EU is not only an important source of GHG emissions but has also been at the forefront of policy developments both domestically and internationally by developing a regional carbon market, the European Union Greenhouse Gas Emission Trading Scheme (EU ETS), and by pushing for ambitious emission reductions and renewable energy targets. In addition to internal efforts, EU member states and investors from the private sector are also the main investors in CDM projects and the main buyers of CDM Carbon Emission Reduction Credits (CERs). China, on the other hand is the largest producers of CERs[2]. As the most important *supplier* of CERs, both the *current status* and *future development* of the *CDM market in China* are of great interest and have significant potential impact for the international carbon market. This fact also has important implication for national as well as international climate policy making. At the same time, China needs to consider its position in the context of the international climate regime, in particular its relations with key actors and in any future post-2012 climate agreement.

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 the works 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. Clearly, these recent events have significant relevance to the report presented here. Still, we feel that regardless of the current extraordinary times, this report still provides insights on the state of the CDM Market in China.

The negotiations started at Bali in December 2007 are particularly significant for the future development of the international climate regime and, more specifically, the carbon market. The post-2012 framework will influence the confidence and expectations of market players which are already suffering from the current economic crisis and, in turn, will impact the CDM market in China. The Bangkok Climate Change Talks in April 2008 sent a positive signal to the carbon market, through which the agreement to continue and strengthen the use of emission trading and of the CDM after the Kyoto Protocol expires in 2012 was reached. However, in part due to the global financial crisis and the United States being represented by the Bush Administration, the COP 14 conference held in Poznan in December 2008 achieved limited progress but set the stage for negotiations in the lead up to COP 15 in December 2009.

Though this rapid change is an indication of the priority given to climate issues, it also casts a great deal

[1] The Carbon Market Monitor Report, 2008, Point Carbon

[2] http://cdm.unfccc.int/Statistics/Registration/RegisteredProjByRegionPieChart.html

of uncertainty and volatility, making the assessment of climate policy particularly complex. At the policy level, one can argue that EU and Chinese climate policies have converged on a number of key issues. This convergence is a fundamental common ground for moving forward on enhancing CDM but also a closer partnership. However, at the operational and executive levels, the harmonisation and integration of EU and Chinese climate policies still face significant hurdles before the expected benefits are realised.

The objectives of this report are twofold:

- To provide a detailed overview from both the quantitative and qualitative perspectives of the current development of the CDM market in China, in the context of both Chinese and EU climate policies

- To contribute to an improved understanding and to support deepened dialogue between these two major actors in the emerging global carbon market, based on market dynamics and policy interface identified.

In order to meet these objectives the report assesses recent developments and experience gained from this rapidly developing area of EU and Chinese policy with a particular focus on the CDM. The report primarily targets policymakers and researchers in China and the EU. Furthermore, it seeks to present information and analysis that is relevant for supporting mutual understanding. In other words, this report complements the capacity building being undertaken by the EU-China CDM Facilitation Project at the operational level. At the same time, the report also seeks to provide information and analysis that might be interesting for other carbon market actors, such as project developers, Designated Operating Entities (DOEs), project owners, CER buyers and brokers. Their views on the operation of the carbon market provide constructive insights on how the policy framework functions, and at the same time their engagement in policy development helps policymakers anticipate future directions of the carbon market, which is highly policy driven.

With this in mind, the report begins by providing context on some recent developments at the international level, including UNFCCC, and within the EU's own climate policy framework. The next section moves on to look at how China regulates and manages the CDM market in the context of their climate and energy strategies. This is followed by a more operational assessment of the Chinese CDM market and the implications for market participants involved in the demand and supply sides of emissions trading. Some other important stakeholders are not presented here, namely European public and private buyers of Chinese CERs. This omission does not in any way indicate a lack of importance, rather it is the result of limited project resources. Based on this, the report formulates some concluding comments and puts perspective on future developments of the CDM market in China. The analysis draws on information gathered from official or publicly available data as well as qualitative research conducted in cooperation with China's governmental agencies, international and foreign governments, and other stakeholders over the course of the EU-China CDM Facilitation Project.

2 China in the context of International Cooperation on Climate Change

2.1 Bali Action Plan[3]

The Bali Action Plan launches a '*comprehensive process to enable the full, effective and sustained implementation of the Convention through long-term cooperative action, now, up to and beyond 2012*'.[4] The Bali Action Plan reinstates the importance of using '*various approaches, including markets, to enhance the cost-effectiveness of, and to promote, mitigation actions*' and clearly foresees the continuation and enhancement of the market mechanisms established under the Kyoto Protocol. While there were some important outcomes from Bali, the Bali Roadmap is not an official agreement, and in fact it is difficult to define the exactly nature of the Road Map since it is still very much a work in progress. In any case, what can be said is that the result of Bali is an assemblage of decisions and adopted processes that can roughly be divided into three main categories: Building Blocks, Negotiating Tracks and Supporting Activities.

Firstly, the key **Building Blocks** of the action plan divide major, interrelated themes into manageable sub-issues, which include: mitigation, adaptation, finance and technology.

MITIGATION: At the conclusion of Bali, the Parties agreed to a proposal by India that aims to ensure that mitigation actions by developing country parties are supported by technology, financing and capacity building, subject to "*measurable, reportable and verifiable procedures*". This new paragraph has far-reaching implications for linking developing country participation in a future agreements and building confidence that they will access the means to deliver. Some potentially contentious issues on mitigation include defining what "measurable, reportable and verifiable" means for mitigation actions by both developed and developing countries. These definitions will have consequences that need to be addressed in discussions on finance and technology. There is also uncertainty over the definition of "*comparability of effort*"[5], which will have implications most notably for developed countries.

ADAPTATION AND FINANCE: One of the significant outcomes bringing together both adaptation and finance was the decision to create the Adaptation Fund, which was set up to finance adaptation in developing countries. Financed by external sources, including a 2% levy from CDM projects, anticipated to be worth US$80 million a year with the potential to reach US$300 million by 2012, the size of the Fund is still significantly lower than UN estimates of required funding for poorer countries to adapt to climate change.[6] The Fund has proven to be particularly delicate to negotiate because, unlike other funds under the UNFCCC, it is funded through a levy on CDM projects undertaken in developing countries and is therefore not dependent on donors. Nevertheless, the establishment of the Fund was widely applauded and was seen as one of several positive outcomes for the G-77/China at COP13. Subsequently, one of the few concrete outcomes from COP 14 in Poznan was an agreement on operationalising all three tracks to access financing from the Fund for non-Annex I countries.

TECHNOLOGY: Technology funding is expected to be scaled up when a comprehensive agreement on future commitments is reached, possibly in Copenhagen. Technology transfer is a priority area for China,

[3] This Section on the road from Bali to Copenhagen draws much on the reporting done by the team at "Earth Negotiations Bulletin". Their reports on the Bali Conference, as well as other climate conferences are available online at: www.iisd.ca.

[4] unfccc.int/documentation/documents/advanced_search/items/3594.php?rec=j&priref=600004715.

[5] paragraph b(i) of the Bali Action Plan. The notion of "comparability of effort" refers to the distribution of the burden sharing of mitigation actions between countries.

[6] BusinessGreen, James Murray 15 December 2008, http://www.businessgreen.com/business-green/news/2232624/recriminations-adaptation

as highlighted in the "China's Policies and Actions for Addressing Climate Change" issued in November 2008, underscoring the need for a comprehensive agreement that can facilitate the transfer, capacity building and dissemination of appropriate climate friendly technologies. Parties agreed to kick start a strategic programme to scale up investment in the transfer of both the mitigation and adaptation technologies needed by developing countries.

Negotiating tracks identify the mode and timing of the negotiations. The Bali Action Plan builds on the negotiating tracks on long-term issues (launched at the Montreal Climate Change Conference at the end of 2005). As agreed under the Action Plan, the next two years of talks are to proceed on two tracks: one for those countries not committing to mandatory limits (most notably the United States), and a another building on the Kyoto Protocol, the 1997 update to the original treaty that requires emissions reductions in 36 major industrialized nations, but has been rejected by the United States. These two main negotiating tracks are to be pursued under the two separate working groups. The Ad Hoc Working Group on Long-term Cooperative Action (AWG-LCA), established at COP 13, was formed to resolve as many of the details of a post-2012 climate change agreement in order to enable an agreed outcome to be adopted at the COP15.Additionally, the Ad Hoc Working Group on Further Commitments for Annex I Parties under the Protocol (AWG-KP) is established to help develop an agreement to follow on from the KP.
AWG-LCA 5/6/7 and AWG-KP 7/8/9 will be held in April (Bonn), June (Bonn) and August (TBD) to further negotiations on key issues in the lead up to COP 15 in Copenhagen in December 2009.

Supporting activities, including Reducing Emissions from Deforestation and Degradation (REDD), is as significant for the wider deforestation debate as it is for the protecting the climate. There was an agreement to launch a process for understanding the challenges ahead, including through demonstration activities in the lead up to COP15, in preparation for addressing these issues in a post-2012 agreement.

2.1.1 Post Bali - CDM on the Road to Copenhagen

Following COP13 in 2007, with the Bali Action Plan in hand, the negotiations moved on to a series of working group meetings prior to COP14 in Poznan, Poland in December 2008. 31 March to 4 April 2008, Bangkok, Thailand hosted the meetings of the AWG-LCA and the AWG-KP:

- The main focus of AWG-LCA was on developing its work programme which includes up to 13 or 14 meetings before COP 15 in Copenhagen 2009. The work programme adopted at the end of the meeting aims to further discussions on all elements of the Bali Action Plan.

- The AWG-KP convened for talks on analyzing the means for Annex I parties to reach their emission reduction targets. In its conclusions, AWG-KP 5 indicated that the flexible mechanisms under the Protocol should continue in the post-2012 period and be supplemental to domestic actions in Annex I countries. There was *agreement to explore the continued and strengthened use of emission trading and of the Clean Development Mechanism after the Kyoto Protocol expires in 2012*. Furthermore, it was recognized that the CDM*, in particular, will have to be enhanced and some of its elements reformed*. Nevertheless, the consensus on continuing the use of the mechanisms in the post-2012 period represents an important, reassuring sign for the carbon market. UNFCCC Executive Secretary Yvo de Boer defined this as an 'important signal to businesses' and for all carbon market operators who are looking with interest at the post-2012 developments.[7]

[7] More information on the Bangkok meetings is available at http://www.iisd.ca/climate/ccwg1/

In June 2008, Bonn hosted a series of meetings including sessions of the AWG-LCA and AWG-KP.[8]

- The discussions under the AWG-LCA sought to promote a common understanding of the key issues, which will form the backbone of the post-Kyoto agreement: adaptation, mitigation, technology, finance and the commitment to cooperative and coordinate action.[9] Parties to the Protocol were asked to present concrete proposals for discussion, but only a few countries, mainly from the developing world actually did.[10] The 'need for more targeted proposals in the next sessions was made clear'.[11] More concrete progress was made in the discussions on technology transfer where Parties agreed to the scaling up of practical technology transfer efforts, particularly in Africa.

- Meanwhile, the AWG-KP discussed means to reach emission reduction targets through emissions trading and project based mechanisms, land use, land-use change and forestry and sectoral approaches.[12] Talks continued on the identification of new means available for industrialised countries to meet their emission reduction targets beyond 2012. In particular, the broadening of the range of GHG was discussed with the possible inclusion of new gases such as the group of fluorinated ethers.

The third Climate Change Talks of 2008 took place in Accra, Ghana in August 2008. The talks served as a preliminary meeting to the COP15 in Copenhagen in 2009 and for the preparation of the meeting in Poznan in December 2008.

- The first key issue addressed by the AWD-LCA related to potential mitigation policies particularly Reducing Emissions from Deforestation and Degradation (REDD). The parties involved discussed the drivers of deforestation and forest degradation as well as the potential capacity-building instruments that developing countries could use to reduce emissions though forestry projects. It was agreed that REDD will to be included in the Copenhagen post-2012 agreement. A second important issue discussed in Accra was the potential development of a sectoral approach to a cap-and-trade system, which was strongly supported by Japan. In this regard, it was decided that such an approach should not lead to binding reduction commitments for either Annex I or non-Annex I countries but that each country would be able to decide independently whether or not to establish as sectoral cap to emissions.
- In the meantime, the AWG-KP continued to assess ways to reach emission reductions targets through the flexible mechanisms (in particular, CDM and JI). Following the conclusion of the assessment, the working group decided to allow parties to establish the actual ranges of emission reduction to be achieved by Annex I countries through off-set mechanisms at the COP/MOP in Poznan.

COP 15 held in Poznan, Poland in December 2008 intended to set out the main architecture of a new post-2012 agreement. Under the CDM agenda, parties focused on the operation of the CDM and its regional distribution. The main issues discussed included CDM governance, issues related to

[8] Subsidiary Body for Scientific and Technological Advice (SBSTA) and the Subsidiary Body for Implementation (SBI) also met.

[9] The Bonn meetings had no major deadlines on substantive issues however these meetings resulted in the adoption of 30 conclusions and 4 draft decisions that will be forwarded to the COP or COP/MOP in December 2008, in Poznan, Poland.

[10] International Herald Tribune, *Poor countries seek break in climate talks long deadlocked by You first principle,* June 14 2008, http://www.iht.com/articles/ap/2008/06/14/europe/EU-GEN-Germany-Climate-You-First.php

[11] http://unfccc.int/meetings/sb28/items/4328.php

[12] More information on the Bonn meetings is available at http://www.iisd.ca/download/pdf/enb12375e.pdf

accreditation of Designated Operational Entities (DOEs), methodologies and the CDM's regional and sub-regional distribution. The issue was first taken up by the COP/MOP plenary on 3 December and then considered in a contact group and informal consultations. The COP/MOP plenary adopted the decision on 12 December (FCCC/KP/CMP/2008/L.6). Although there was not any significant breakthrough in Poznan, the negotiations did reach some progress on specific CDM issues. On 12 December 2008, the COP/MOP plenary adopted the decision (FCCC/KP/CMP/2008/L.6).

- In its decision, the COP/MOP notes with serious concern delays in project registration and CER issuance and urges the Board to take effective action to speed up the completeness check process.

- The COP/MOP also requests the Board to make the decision-making process and review criteria publicly available; to complete its revision of the DOE accreditation process and complete its accreditation standard as its highest priority; to develop and apply a system for continuous monitoring of DOEs and improving their performance as a priority and to facilitate accreditation of DOEs from developing countries; and to finalize a policy framework to address non-compliance by DOEs. On methodologies and additionality, the COP/MOP requests the Board to further enhance the objectivity on additionality and baseline identification approaches. The guidelines on Programme of Activities, the implications of the possible inclusion of CCS as CDM activities, and the inclusion of lands "with forests in exhaustion" as afforestation and reforestation CDM activities.

- On regional and sub-regional distribution, the COP/MOP encourages bilateral cooperation, and further private sector engagement in the CDM and DOEs to establish offices and partnerships in developing countries; requests the Board to develop, in cooperation with DOEs, ways to streamline the CDM process in countries hosting fewer than 10 projects, especially in LDCs, SIDS and Africa, without compromising environmental integrity; requests the Board, taking into account its workload, to facilitate the development and approval of methodologies based on the specific needs, and potential for, application in countries underrepresented in the CDM; and encourages parties and the private sector to support the identification and development of project design documents in countries hosting fewer than ten registered CDM projects, especially in LDCs, SIDS and Africa, and to meet the cost of validating these projects.[13]

The next stop is a series of support working group events to be held throughout 2009 following the negotiation tracks identified in the Bali Action Plan. These meetings are part of the lead up to the main event, COP15 at Copenhagen in December 2009, where an agreement on a Kyoto – post-2012 architecture is envisioned.

2.2 China at the UNFCCC[14]

China has been particularly active post-Bali and submitted views regarding the direction of the work under AWG-LCA and AWG-KP. The submissions are indicative of China's general position within the UNFCCC and echoes domestic priorities. In particular, China's position takes on IPR, clean technology financing and transfer. China notes that the principle of *common but differentiated responsibilities* will be

[13] International Institute for Sustainable Development (IISD), 15 December 2008. *Earth Negotiations* Bulletin12 (395): 8. Available online at http://www.iisd.ca/climate/cop14/

[14] China, along with 25 other Parties the the UNFCCC, submitted views on the direction the work of the AWGLCA should take under the Bali Action Plan, ahead of the the first meeting of the AWGLCA which took place in Bangkok in early 2008. The submissions are available at http://unfccc.int/resource/docs/2008/awglca1/eng/misc01.pdf

a key point in the negotiation process. China also makes the point that climate change needs to be addressed in the context of sustainable development and mitigation and adaptation, each of which needs to be considered equally. Arguably, China's position follows four key views that have been expressed consistently throughout their engagement at the UNFCCC:

- Quantified emission reduction targets for the Annex I Parties to the Convention that are not Parties to the Kyoto Protocol, taking into account the work of the AWG of Article 3.9 of the Kyoto Protocol (here China makes it explicitly clear that it has uniquely high expectations for the United States, noting that special consideration in the negotiations should be given to ensuring "quantified emission reduction targets [25%-40% of 1990 levels by 2020] for the Annex I Parties to the Convention that are not Party to the Kyoto Protocol.");

- Mitigation action in developing countries and in the context of sustainable development must be *supported by developed countries in terms of technology transfer and funding* to enhance such actions. More explicitly, *developed countries must provide technology, financing and capacity-building in a measurable, reportable and verifiable manner* to enable developing countries to take national mitigation actions;

- *Adaptation and reducing vulnerability to the impacts of climate change requires measures to support developing countries in the form of technology and funding for adaptation*;

- *Trade liberalisation including lower barriers and greater incentives conducive to technology transfer; the provision of associated financial support; and the establishment of appropriate effective mechanisms that enable developing countries to gain access to affordable and advanced climate-friendly technologies.* China suggests that the establishment of such an international mechanism for cooperation on R&D and transfer of technologies would also appropriately address IPR concerns.

In the COP 14 in Poznan, China (along with Japan and other parties) expressed concern over recent delays in project registration in the CDM governance system, the increase in review requests by the CDM EB and over unpredictability in EB's decision making. Delegates therefore agreed to text on governance noting the delays and requesting that the EB speed up the "completeness check process", increase transparency and consistency of its decision-making and refrain from retroactive application of its decisions. China also highlighted the need to simplify accreditation of DOEs and to request the EB to complete, "as its highest priority", the revision of the accreditation process for DOEs and to develop, by COP/MOP 5, a policy framework for addressing DOE non-compliance[15].

2.3 The Carbon Market within the UNFCCC

The Kyoto Protocol created the compliance carbon market by creating a demand for carbon credits (Annex B-countries committed to reduce their emissions), and creating supply for carbon credits through three flexible mechanisms: International Emission Trading (IET), CDM, and JI. The carbon market has developed rapidly as climate change emerges as a top priority on the political agenda at both national and international levels. As the carbon market is highly policy-driven, there is large variation in the quantitative estimations and forecasts of carbon market volume from both the demand and the supply sides.

[15] International Institute for Sustainable Development (IISD), 15 December 2008. *Earth Negotiations* Bulletin12 (395): 8. Available online at http://www.iisd.ca/climate/cop14/

Table 1 Carbon Market Fundamentals- Inside and Outside the EU

Market fundamentals	Policy signals	
	Inside the EU	Outside the EU
Substitute effects between coal and alternative energy sources as results of: Weather (affects hydropower and wind power generation) Price of oil and gas (affects relative prices of coal) **Energy demand shocks as results of:** Temperature (affects energy demand in terms of heating and cooling) Power generation efficiency Changes in Economic growth	**Distance between cap and physical emission as results of EU ETS revisions:** **Government strategies of member states to cover gap between Kyoto targets and national emission reduction potential.** **Demand from voluntary markets:** Voluntary commitments Anticipated mandatory targets Demonstration for Corporate Social Responsibility (CSR)	**Demand from compliance markets outside EU in the context of post-2012 climate regime:** Japan Australia Canada United States

While there is a high level of uncertainty around emissions trading, estimated figures indicate the relative importance of different sources of supply and demand. Total volume for the pre-2012 carbon market is shown below (Table 2).

Table 2: International Carbon Market- Quantitative Estimates

EU ETS	0.5 - 1.5
Other private Japan/CAN/NZ (incl. AAU)	0.0 - 0.5
Governments (UNFCCC)	2.5 - 3.0
Total demand	**3 – 5**
ERU+CERs (CDM/JI)	1.0 - 3.0
Potential Gov. AAUs	7.0 - 8.0
Total potential supply	**8 – 11**

Source: Carbon point, 2008, Unit: Gt.

2.4 China's Bilateral Climate Cooperation outside the UNFCCC

Apart from being engaged at the UNFCCC and with the EU, China is also involved in a number of bilateral initiatives with important global actors such as the United States, Japan and Australia. These bilateral arrangements provide a greater degree of flexibility to deal with climate issues outside the UNFCCC.

Japan: According to The World Bank, Japan has accounted for 20% of purchases of primary CDM/JI offsets on the global carbon market since 2002. Its market share nearly doubled from 6% in 2006 to 11% in 2007, with increased purchases by both public and private actors.[16] Japanese electricity firms are

[16] State and Trends of the Carbon Markets 2008, The World Bank, May 2008.

expected to be a key player in the global offset market as they have not been able to meet their voluntary target of a 20% reduction in CO_2 emissions intensity from the 1990 level.

In October 2008, the Japanese government launched a voluntary pilot ETS which partially integrated two ongoing voluntary reduction schemes (the Voluntary Action Plan of the Keidanren, Japan's powerful business federation) and J-Vets, an existing pilot scheme designed for smaller firms. By the end of 2008, the ETS received applications from 501 entities, short of the 1,000-plus companies initially targeted. However, 90% of the companies taking part in the Keidanren have applied (these firms account for more than half of the country's CO_2 emissions). The pilot ETS will be closely studied and followed by the Ministry of Economy Trade and Industry (METI) in hopes of establishing an official ETS and significantly reducing emissions targets before 2012. The METI is keen on consulting industry groups, such as the Federation of Electric Power Companies (FEPC), who favour sectoral membership in the scheme as separate industries instead of individual company participation.

Another recent development has been the establishment of a Carbon Market Study Group by the Tokyo Stock Exchange in April 2008 to study the feasibility and design of such a market. The Japanese government has been supportive of implementing such an exchange in accelerate the interest and participation in the ETS. The study group is planning to establish the trading platform by November 2009.

In January 2008, Japan announced the establishment of a US$10 billion fund called "Cool Earth Partnership" to support efforts in developing countries to fight climate change. The fund started to distribute money in 2008 and will continue to operate until 2012. The sum is divided into US$8 billion for assistance in climate change mitigation and US$2 billion into grants, technical assistance and aid for countries switching to clean energy. Furthermore, Japan will also be investing US$30 billion in research and development in the energy sector in the next four years.

Cooperation with China on the issue of climate change has steadily increased in the past years and reinforced by the Joint Statement on Climate Change, issued by the Chinese and Japanese governments in May 2008. The two countries reaffirmed their commitment to the objectives and principles of the UNFCCC and the Kyoto Protocol and agreed on the establishment of a closer partnership to further strengthen cooperation, dialogue and exchanges and to enhance their strategic relationship. Priority areas for technical cooperation were identified and include: energy conservation, development of clean coal technology, capture use of methane, CCS and adaptation to climate change. Both sides also committed to exploring new ways to further improve and develop CDM and to encourage private companies on both sides to participate in the Kyoto mechanism.

Australia: Though Australia is a relatively small in terms of population, it is an important player in the global fight against climate change. The countries stance on climate change dramatically changed when the Labour party, led by Prime Minister Kevin Rudd, entered office in November 2007 and promptly ratified the Kyoto Protocol. Next, the Australian Commonwealth, in conjunction with the state and territory Governments, commissioned the ongoing Garnaut Climate Change Review, an independent study conducted by Professor Ross Garnaut. The report explores the central policy issue: "What extent of global mitigation, with Australia playing its proportionate part, provides the greatest excess of gains from reduced risks of climate change over costs of mitigation?"[17] The final report presented on 30 September 2008 provided recommendations for medium and long-term policies and frameworks to address climate change. The recommendations emphasis Australia's need to proportionately contribute to a global agreement that 'adds up' to 450 – 550 ppm emission concentration scenarios or some point

[17] The Garnaut Climate Change Review, Chapter 1, http://www.garnautreview.org.au/synopsis.htm

in between, corresponding to 10% – 25% emission reduction from 2000 levels. [18] To meet these targets, an Australian emissions trading scheme, amongst other initiatives, is also recommended by the Review.

After considering the Garnaut Review, the Australian government issued a White Paper on 15 December 2008 outlining its "Carbon Pollution Reduction Scheme: Australia's Low Pollution Future". The White Paper announced Australian emissions targets 5% reduction by 2020 from 2000 levels with a possibility of deeper cuts to 15% if other nations follow suit and longer term goals of 60% of 2000 levels by 2050. [19] The White Paper also provides details of the proposed cap-and-trade scheme which will cover emissions from sectors including stationary energy, transport, fugitive, industrial processes and waste and forestry sectors (initially agriculture and deforestation emissions will not be covered). The proposed scheme also includes links to international carbon markets, allowing utilisation of CDM and JI units for compliance with scheme obligations, with no quantitative restrictions on the use of Kyoto units. The proposed scheme also intends to auction the majority of carbon pollution permits. However, substantial support to "emission-intensive, trade exposed industries" will be provided.

The White Paper serves as the foundation on which the Australian response to climate change will continue to develop. Legislation to enable the Scheme is currently under way, with a draft expected for public comment in late February 2009. Following public comment, introduction of relevant bills into the Australian Parliament is anticipated for the winter session of 2009. If successful, the Scheme will begin on 1 July 2010.[20]

China is Australia's biggest trading partner, serving as one of China's most important sources of coal, gas and iron ore. In April 2008, Australia and China issued a Joint Statement on Closer Cooperation on Climate Change. The two sides reaffirmed their commitment to the UNFCCC and the Kyoto Protocol and to work closer together to achieve a successful post-Kyoto agreement. The goals of this commitment will be met through: closer policy dialogue at the Ministerial level to finalise the Bali Roadmap; expanding the Australia-China Climate Change Partnership launched in 2003, drawing together the resources and the expertise of Australian and Chinese industry, science and government sectors concerned; and enhance cooperation to develop low emission technologies that will assist both countries in economic development to minimise GHG emissions.

Both countries welcomed current Australia-China cooperation in these areas supported by the Asia Pacific Partnership on Clean Development and Climate, the Australia-China Joint Coordination Group on Clean Coal Technology and the Climate Change Partnership.

United States: During the last eight years, the Bush Administration has shown little interest in international climate change policy, initially even denying the scientific basis for climate change. Since opting out of the Kyoto Protocol in 2001, the administration has been consistent in its policy towards climate change mitigation, opposing any economy-wide measures that would limit CO_2 emissions. Critics have even attributed the modest results of the Poznan conference partly to the subdued stance of the Bush negotiators during the talks and other nations' uncertainty about the United States' position on climate change.

With the exit of the Bush Administration on 20 January 2009, there is renewed hope that the United States will become a leader in combating global climate change. The international community expects that President Obama's pledge to make the country a leader on climate change will give fresh momentum towards building a new post-2012 climate treaty. President Obama's promise to cut the

[18] Ibid. Chapter 12
[19] Carbon Pollution Reduction Scheme: Australia's Low Pollution Future, White Paper, 15 December 2008, http://www.climatechange.gov.au/whitepaper/summary/index.html
[20] Ibid.

country's emissions of GHG back to 1990 levels by 2020 (currently 17% above 1990 levels) and by 80% below 1990 levels by 2050, points toward US prioritisation of energy security and climate change. A key component of these ambitions is the establishment of an economy-wide cap-and-trade program, which is highlighted in the Obama-Biden New Energy for America Plan.

The United States has already implemented a national cap-and-trade system which has been an ongoing success since its launch in 1995 under the 1990 Clean Air Act amendments. The programme places a cap on annual sulphur dioxide and N_2O emissions in a bid to improve air quality, health and the environment. Using 1990 as a baseline, current data from the US government indicates that emissions have fallen dramatically since the inception of the programme in 1995. This suggests that the Acid Rain Program has been an effective market-based approach to reducing acid rain, as well as to setting the precedence for a successful emissions trading scheme. In addition, regional and voluntary cap-and-trade schemes, such as the Western Climate Initiative (WCI), Regional Greenhouse Gas Initiative (RGGI) and the voluntary Chicago Climate Exchange (CCX), continue to evolve and provide experience within the US for reducing GHG emissions with market-based mechanisms.

Additionally, President Obama has promoted a "green energy economy" as the solution to the United States and the international community's financial and environmental woes, pledging to double alternative energy production in the next three years, build a new electricity "smart grid" and provide an economic stimulus plan to promote clean technologies that will create 5 million green jobs. To support him in these ventures, President Obama has handpicked a "green dream team" comprised of leading experts in the fields of energy, environment and climate change, which include: Stephen Chu, a Nobel Prize-winning physicist (to head the Energy Department), John Holdren, a Harvard University expert on climate change (as the White House science advisor), Lisa Jackson, former New Jersey environment chief (to head the EPA), Carol Browner, former head of EPA under the Clinton Administration (for a new White House position coordinating policy on energy, environment and climate change) and Jane Lubchenco, a marine biologist (for the National Oceanic and Atmospheric Administration).

While the Bush Administration itself has been weary of multi-lateral negotiations on climate change, the United States has pursued bilateral agreements with countries such as China and India, allowing the United States to ensure participation of key foreign competitors in alignment with its national Climate Change Policy, which aims to reduce the greenhouse gas intensity of the US economy (i.e. the measure of the ratio of GHG emissions to economic output)[21] in order to provide greater flexibility and control over the measures including agreements that do not threaten either country's energy security or market competitiveness.

One example of a bilateral agreement between China and US is the **Strategic Economic Dialogue (SED)**.[22] The SED, according to the United States and China, is not designed to replace the development of international climate change legislation, a reference to the Kyoto Protocol and its successive legislation but rather to provide an interim measure to pursue the goals of the United States as well as to *"build a solid foundation"*[23] for future developments in such international legislation. The elements of the SED distinctively follow the United States and Chinese national policies on climate change and economic development. This bilateral agreement engages China, whose lack of emission caps under the Kyoto Protocol is a key concern for the United States. Secondly, the partnership intends to promote sustainable

[21] White House Executive Summary of the Global Change Policy Book (February 2002) http://www.whitehouse.gov/news/releases/2002/02/climatechange.html.

[22] Paulson Jr, Henry M, *Remarks by Secretary Henry M Paulson, Jr on Meeting the Challenge: a partnership on energy and environment,* recorded on: US Department of the Treasury: press room, ref: HP-903, (2 April, 2008), available at: www.treas.gov/press/releases/hp903.htm.

[23] Paulson Jr, Henry M, *Remarks by Secretary Henry M Paulson, Jr on Meeting the Challenge: a partnership on energy and environment* (2 April, 2008).

economic development alongside energy security and environmental improvements. In particular, this emphasises clean economic growth through technology innovation, collaboration, and knowledge transfers from the United States to China. This addresses China's interest in technology transfer as well as both countries' energy security and environmental concerns.

During the 4th SED meeting, which took place in Annapolis on 18 June 2008, the United States and China signed a Ten Year Energy and Environment Cooperation Framework (TYF) establishing concrete steps and common goals to enhance cooperation and its effectiveness. During the 5th SED meeting, which took place in Beijing on 4 and 5 December 2008, the United States and China announced consensus on action plans for each of the five goals under TYF, including: clean, efficient and secure electricity production and transmission, clean water, clean air, clean and efficient transportation and conservation of forests, wetlands and ecosystems. The United States and China also announced the establishment of an Energy Efficiency goal, with the aim of completing the action plan by the next meeting of the TYF Steering Committee.[24] However, with the changing administration, it remains to be seen how the Obama Administration will continue this bilateral SED cooperation with China.

[24] *Joint U.S.—China Fact Sheet: The Fifth U.S. – China Strategic Economic Dialogue*, recorded on: US Department of the Treasury: press room, ref: HP-1317, (5 December, 2008), available at: http://www.treas.gov/press/releases/hp1317.htm.

3 EU Internal Climate Policy and External Relations on Climate Change

The EU has been making an effective effort to take the lead in the international climate negotiations, attempting not only to push for commitment from developed countries like the United States, but also to engage developing countries such as China and India. This intended leadership was clearly demonstrated at COP 13 and COP 14, and this ambition is expected to be more evident throughout the negotiations on the post-2012 international climate agreement leading up to COP 15 in December 2009.

To demonstrate the EU's leadership and credibility in the international climate change negotiation, as well as to pave the way for developing a low-carbon economy and create green jobs, a series of policy initiatives are underway establish the EU as a leader in climate change actions and a competitive actor in clean energy technologies.

The integrated ***Energy and Climate Package for Europe*** in 2007 was a proposal by the European Council that aims to address climate change through a broader and more comprehensive set of policies that include integrate climate issues and energy policy. Through this integrated approach, the EU also intends to establish a common ground for co-operation with developing countries in which energy security and energy supply are key issues in the process of economic growth and urbanisation. The Integrated Framework is the vision of developing a coherent internal and external energy strategy to ensure the competitiveness of European industries, while at the same time combating climate change and ensuring security of energy supply.[25] The motivation and objectives underlying the Package provides the interpretation/definition of a potential "***satisfactory***" international climate agreement, in which "*Other developed countries commit to comparable emission reductions and economically more advanced developing countries contribute adequately according to their responsibilities and respective capabilities*". (EU Commission, 2007 and 2008)

Box 1: Targets and plans in the proposed *Energy and Climate Package for Europe* 2007

GHG reduction:
20% reduction by 2020 unilaterally by the EU.
30% reduction by 2020 if a "satisfactory" international climate agreement is reached.

Renewable energy:
20% share of renewable energies in overall EU energy consumption by 2020.
30% share of renewable sources in electricity production by 2020.
10% fuel consumption from renewable energy sources, including biofuels by 2020.

Energy effciency:
20% increase in energy efficiency by 2020.

Low-carbon technology:
European Strategic Energy Technology Plan

Source: EU Commission

In terms of quantitative targets, the Package enforces ambitious goals, particularly in the context of the current situation of GHG reduction and the present level of utilisation of renewable resources. It implies a reduction of 14% GHG compared to 2005 and an increase of 11.5% in renewable energy share,

[25] IISD, 2008, page 4

compared to the level of 8.5% in 2005 which mainly consists of large-scale hydro and conventional biomass.

3.1 EU ETS – Phase I and II

The ETS is currently in its second phase (see Box 2) and is the principle policy instrument that the EU has deployed to pursue its climate objectives. The EU ETS is regarded by many as a proactive market-based approach to create cost effective GHG emissions reductions. It was the first and has become the largest global carbon market segment, as the largest buyer of CDM/JI reduction credits. To date, the EU ETS has created private sector CDM/JI demand of 1.4 billion CERs and EU member states have created additional CDM/JI demand for 5-6 million CERs. The review of the ETS has shown that "the incentive effect of the current ETS has been cushioned by the generous number of allowances handed out in the first phase. The structure of the ETS, with NAPs, has raised the risk of distortions in terms of competition and the internal market. The scope of the ETS, in terms of the sectors of the economy covered and the gases included, has also limited its ability to drive emission cuts." (The EU Commission, COM (2008) 30, final). Based on the lessons learned from Phase I and II, the EU is looking at options for strengthening the Scheme in Phase III.

Box 2: A key figures of EU ETS

Duration:
Phase 1: 2005 – 2007 (warm up)
Phase 2: 2008- 2012 (ongoing)
Phase3: 2013-2020 (under construction)

Coverage:
27 EU member states + Norway + Iceland + Liechtenstein
12,000 installations

Traded volumne:
0,99 Gt CO_2, at a value of 18€ billion in 2006
1,6 Gt CO_2, at a value of 28€ billion in 2007

Link to other GHG reduction schemes:
To non-EU countries such as Japan and the United States
To any other 3rd country listed in Annex B to the Kyoto Protocol.
To CDM from 2005

Allowances distribution (depending on country-size and industry structure):

By country	**By sector**
Germany 22%	Public Power and heat: 53%
United Kingdom 12%	Cements, lime and glass 13%
Poland 10%	Metals 13%
Italy 10 %	Oil & Gas 10%
Spain 7%	Pulp and paper 2%
France6%	other 9%
Other 34%	

Source: EU Commission and Point Carbon, 2008

The CDM has been an important market-based and cost-effective instrument providing a certain level of flexibility to the EU ETS, functioning as a "safety valve" for the industrial sector in the EU. Some estimate shows that the use of cheaper CO_2 credits through investments in CDM may reduce costs of GHG reductions in the EU by 25%. In addition, the CDM has also been an important tool for the governments of the EU member states to enhance bilateral climate co-operation with, and to gain experiences from, developing countries. From the international perspective, the EU ETS is the largest source of demand for CDM credits. The degree to which EU member states are allowed to meet their emission targets through the CDM will have a profound impact on the supply side of the CDM market (in developing countries), in both current first Kyoto period and any post-2012 climate regime.

As a general rule, installations covered in the EU ETS in Phase I and Phase II are allowed to use up to 10% CDM/JI credits to meet their allowance allocation. However, an assessment of actual allocations under Phase I and II, shows that the "harmonised approach" resulted in CDM/JI limits for individual member states of up to 10-15% of approved trade sector caps in most cases, exceeding the 10% threshold.

3.2 EU ETS Phase III – the legislative climate package agreed upon in December 2008

In December 2008, the EU finalised an ambitious climate change action plan designed to help fund low carbon projects in poorer eastern member states and protect the competitiveness of heavy industries in the EU. The main points of the original proposal will remain intact including the underpinning targets to cut emissions by 20%, increase renewable energy capacity to account for 20% of the overall energy mix and, to improve energy efficiency by 20%. Furthermore, EU leaders committed to increasing the target for emissions reduction to 30% in case an international climate agreement is agreed in COP15 in 2009. The package was later submitted to and approved by the European Parliament soon after the deal was reached.

According to the new legislation, the EU ETS will include a tighter cap at 21% below 2005 levels by 2020 and at least 60% of emission credits will have to be auctioned by the same year. Indeed, half of the revenue generated from auctioning will be set designated to fund the development of 12 CCS demonstration projects throughout the EU. Nevertheless, as part of the deal, many of the heaviest industries will be granted large numbers of credits to avoid undermining the competitiveness of European industries. Moreover, the package will allow member states to meet up to half of their emission reduction commitments by buying UN-certified offset credit from CDM projects. Finally, the deal establishes that 12% of the revenues from ETS will be distributed to eastern European member states to support their costs of adaptation while, at the same time, their power sectors will be partially exempted from buying emissions permits on a decreasing scale until 2020.

At the EU level, the additional effort needed to realise the proposed targets involve both direct and indirect costs. According to impact assessments by the European Commission, the overall costs will be "manageable", providing the targets are implemented effectively (see Table 3). At the same time, distributional aspects of burden sharing between member states will have to be managed on the basis of fairness. Furthermore, in the light of fluctuating oil and gas prices, the relative price/cost for such a package can fall. On the other hand, when the climate actions are linked to the overall EU policy framework, in the aspiration of the Lisbon Strategy and the European Sustainable Development Strategy (SDS), its implementation is expected to be able generate significant benefits in the form of enhanced energy security, job creation and business opportunities for small and medium enterprises, as well as progress in innovation and R&D.

Table 3 Cost-Benefit Analysis of the Climate Package

Cost estimate	Benefit forecast
GDP growth reduction by 0.04-0.06%, 2013-2020, or 0.5% of GDP reduction by 2020, compared to business as usual.	Avoid the cost of inaction: 5-20% of global GDP (Stern)
Increased energy and non- CO_2 mitigation cost to meet the targets domestically, 0.45% of GDP in 2020 (or 70€ billion).	Energy security: reduction of oil and gas import of 50€ billion per year (at $61/barrel of oil)
Employment impact between -0.11% and +0,05%, but with differences between sub-sectors.	Potential creation of "green jobs" through large scale innovation and rapid development in the energy sectors.
Environment co-benefits	
Reduced air pollution giving significant health benefits Reduced need for air pollution control measures: 11€ billion per year in 2020	
Technological progress and competitiveness	
Significant energy efficiency improvements First mover advantage, aiming for technological leadership in low carbon technology	

The proposed changes to the EU ETS for Phase III are motivated by the lessons learned from the first (2005-2007) and the ongoing second trading period (2008-2013). The EU-wide cap is considered a major improvement over the bottom-up approach in forms of national NAPs, where the possibility for member states to be easy on their national industries can be limited. Furthermore, the larger extent of auctioning allowances, instead of free allocation, will also more effectively create incentives for emission reduction and set a price/cost on carbon. In particular, the power sector, representing 60% of the emissions covered by the current ETS, may have to pay for 100% of its emissions. However, some energy-intensive industries, such as steel and cement may still be exempted from the auction requirement and receive free allowances beyond 2020.

Box 3. Key modifications proposed on EU EST Phase III (2013-2020)

- Expanded system to include more GHGs: nitrous oxide and perfluorocarbons
- Involvement of all major emitters: new industries included, e.g. aluminium and ammonia producers
- A single EU-wide cap on ETS emission, instead of NAPs at the member state-level
- Progressive replacement of free allocation of allowances by auction of allowances by 2020
- Limitation of use of CDM to the levels used in the current ETS period but with unlimited banking of Phase II allowances into Phase III
- Future link of EU ETS with other mandatory emission trading systems in any third country or in sub-federal and regional systems.

Source: EU Commission, 2008

3.2.1 The role of CDM under the Proposed Legislative Climate Package

The demand for CERs, under the EU ETS in the post-2012 global carbon market, is closely linked the proposed changes in the EU ETS. One important issue is how to achieve a balance between internal mitigation efforts (within the EU or national efforts in the member states) and international off-set in the form of CDM. Both quantitative and qualitative constraints are proposed for the future use of CDM in Phase III of the EU ETS. The limitation of the use of CDM credits is motivated by several concerns. First is the risk that an overly generous use of CDM can dilute the effectiveness of the ETS by increasing the supply of credits and thereby reduce the incentive for governments and companies to promote emission reductions at home. Second, overuse of CDM can also limit the ETS' capacity to act as the key driver to realise the target for renewable energy. Third, it would discourage investments in low carbon technologies within the EU. Fourth, considering that all other emission trading mechanisms in the world are voluntary and are relatively small in terms of volume of traded credits, the EC is especially concerned that European industries will be penalised by a cap as heavy industries (cement, steel, etc.) of other non-Annex I countries, particularly the United States and Japan, will not be bound to emission restrictions. With these concerns in mind, the EU proposes that under an ETS Phase III, access to CDM credits might be increased if an international agreement (covering a post-2012 Climate Regime) is signed. The intention here is to create an incentive for third countries to sign up to an international climate agreement, in the knowledge that European investment and technology could flow as a result.

Table 4 Proposed Restrictions on the use of CDM/JI under EU ETS Phase III

Quantitative	Qualitative
Independent of an international agreement	
▪ Total 1.4 billion tons in ETS ▪ Allowed use during 2008-2012 period ▪ 50% of reduction effort over 2013-2020 period	▪ Projects established before 2013 ▪ Projects after 2013, only if project types accepted by all member states
If an international agreement is reached	
▪ 50% of additional effort can come from CDM but only projects in countries ratifying the agreement.	

Beyond the limitations imposed on the quantity of CDM credits, the EU has also proposed "a new approach" to CDM. Basically, the ambition is to streamline and expand CDM as a flexible mechanism. The rationale behind the need for a new approach is twofold. First, it implies a push in the transition process, in which CDM is enhanced "from a project-based offsetting approach to implementing cap-and-trade system" (Delbeke, 2008, DG Environment). Second, the new approach is also a means of addressing concerns in current CDM projects which are associated with limited scale, environmental integrity and the lack of synergy/co-benefits with national climate and environment initiatives in developing countries.

3.3 EU's position in COP14

The UNCCC COP14 in Poznan, Poland, held in December 2008 focused on long-term cooperation and the post-2012 period, when the Kyoto Protocol's first commitment period expires. As the Bali Conference in 2007 set the deadline for agreement on a post-2012 framework on climate change, COP14 represented

the midpoint to the December 2009 deadline. Considering the backdrop of the global financial crisis and the US still being represented by the Bush Administration, only modest progress was made towards "a shared vision for long-term cooperative action".

At the same time as the Poznan Conference, negotiations regarding the EU's climate and energy package was ongoing, which eventually resulted in an EU deal being struck for 20% emission reduction targets by 2020. The EU also reiterated the pledge to a 30% cut if other developed countries commit to comparable reductions in COP15.

While the results of COP14 were modest, several key points relevant to CDM were advanced:

- Solid work programmes for 2009 negotiations were agreed upon, including a June timeframe for draft text for the new global agreement;
- Regarding CDM, concerns were raised over the delay in registration, the unpredictability of the EB's decision making and the need to simplify accreditation of the DOEs. COP/MOP requested the board to increase transparency, demonstrate the relationship between new and previous decisions, revise the DOE accreditation process and to further enhance objectivity regarding approaches demonstrating additionality and determination of emissions baselines;
- The Adaptation Fund was operationalised. All three tracks to access funds – through implementing entities, accredited national entities and direct access by parties – were enabled. The Fund is expected to start financing adaptation projects and programmes in developing countries in 2009;
- The Poznan Programme on Technology Transfer for developing countries was adopted, funded by 50€ million of existing resources from the Global Environmental Facility.

Though parties who held great expectations for COP14 left with slight disappointment over the impasse of creating any significant breakthroughs, the international process to create a new global climate agreement at COP15 was kept on track.

3.4 The reactions from CDM stakeholders on the future EU ETS

The EU Legislative Package caused strong and diverse reactions at both EU level and the member state levels. The concerns are partly associated with several important aspects. First is the cost versus the benefits of the packages for the EU as a whole. The EU's global competitiveness is a major concern. Second are concerns about the feasibility of achieving the ambitious targets and how the burden will be shared across member states, given the diverse level of economic development and energy and industrial infrastructure.

3.4.1 From CDM market actors: market uncertainty

The agreement has caused some uneasy reactions from CDM market actors regarding the EU's position on CDM in the future EU ETS, which many consider to have created a high degree of regulatory and policy uncertainty. From the industry perspective, the main source of uncertainty is the possibility of an increase in the cost of mitigation resulting from the removal of the "safety valve" (i.e. limiting the use of CDM credits). This would have a potential impact on the competitiveness of EU enterprises in the global market.

Another concern on the limited use of CDM voiced by this stakeholder group is the negative impacts on developing countries. This limitation of CDM is considered a "threat" rather than positive incentive to

supporting developing country engagement in discussions on post-2012 climate regime. The measurable losses from adopting the changes proposed under EU ETS Phase III to limit the use of CDM might include the following: [26]

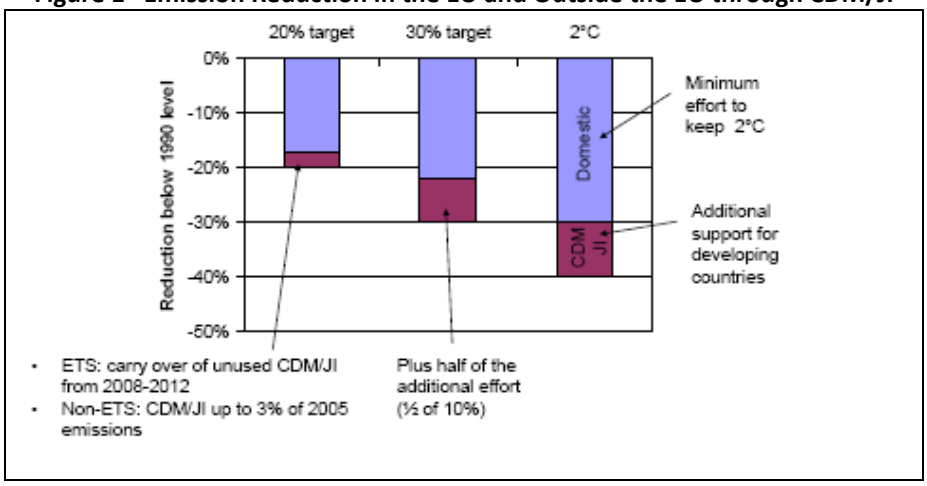
- Foregone emissions reduction of GHG
- Reduction of direct CDM transaction to developing countries
- Reduction of indirect leverage capital investment in developing counties for clean development
- Reduction of transfers to the Adaptation Fund.

In addition, there are losses which are difficult to quantify in the form of foregone technology transfers and sustainable development and co-benefits with national initiatives.

3.4.2 NGOs: 20% unilateral target not enough

In regard to the EU's Legislative Package, NGOs have expressed their disapproval of the 20% unilateral reduction, which they point out is inconsistent with initial EU objectives of maintaining the global temperature threshold and is also weaker than what was agreed for developed countries at the Bali Conference. [27] To be compatible with a target of limiting global temperature increase below 2°C compared to pre-industrial level, according to the estimates made by Ecofys (2008), any EU target should reduce internal emissions by at least 30% below 1990 in the EU. In addition, the EU target must be met through support to developing countries through CDM and/or other carbon mechanisms to reduce emissions by an additional 10%.

Figure 1 Emission Reduction in the EU and Outside the EU through CDM/JI



Source: Höhne, 2008 (Ecofys)

3.5 EU China Climate Partnership

The EU and China are moving ahead with their Partnership on Climate Change, initiated in 2005, which seeks to strengthen cooperation and dialogue on climate change and energy. One of the foundations of the Partnership is the commitment to the implementation of the UNFCCC and the Kyoto Protocol. In

[26] Estimates were presented by Eco Securities, 2008 at Carbon Expo

[27] the range agreed for developed countries reductions was set at 25-40% by 2020 (See Greenpeace notes at the CDM hearing)

addition, the Partnership seeks to support two concrete goals: a) cooperation on the development and demonstration advanced "zero-emissions" coal technology and b) reduce the cost of key energy technologies and promote their deployment and dissemination, specifically to reduce energy intensity and also reinforce cooperation on the CDM. The EU-China Partnership established a Rolling Work Plan which includes several activities, including the EU-China CDM Facilitation Project.

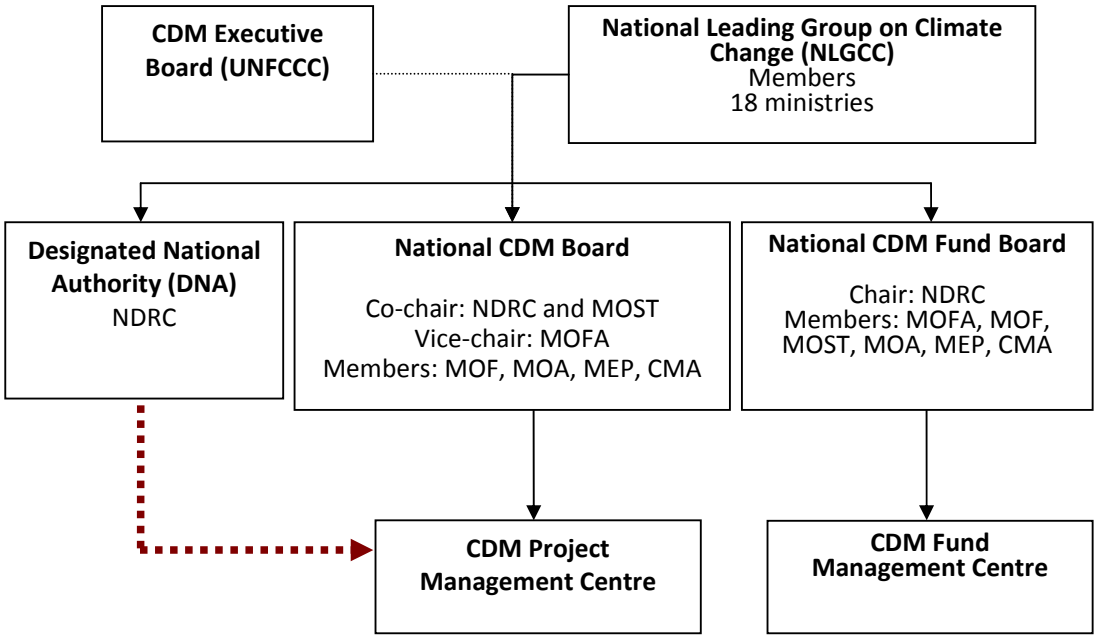
A number of aspects have made this partnership particularly timely and important in the face of pressing global climate change challenges. The strengthening trade and investment relationship between these parties has led to a convergence of their mutual respective economic interests and common environmental concerns. The nature of the EU lends a particular strength to the Partnership in that the diversity of the EU 27 brings the benefit of synergy at the EU level, the member state level, and the bilateral level between China and the EU. Finally, this Partnership also serves to strengthen the engagement of China in discussions around the common interests of climate and energy and demonstrate another aspect of EU's leadership in international efforts to combat climate change.

4 China's CDM policies and broader climate and energy framework

4.1 CDM regulatory framework and policy

Despite the relative novelty of CDM, China has already managed to put in place a high quality and comprehensive CDM regulatory framework. This has been demonstrated by a low rejection rate of CDM projects by the CDM EB (at the UNFCCC). Furthermore, CDM market actors also refer to China's relatively well governed CDM institutions. There are two main operational branches responsible for implementing Chinese CDM activities that we will examine in more detail. We start with an overview of the CDM Project Management Center and then move on to look at the management of CDM Fund Management Centre.

Figure 2 The Structure of CDM Policy-making and Management in China



4.1.1 CDM Project Management

The current management measures applied to CDM projects in China are stipulated in the "Measures for Operation and Management of Clean Development Mechanism Projects in China", which entered into force on 12 October 2005. The management of CDM projects in China involves several major institutions at present, many of which are also involved in China's broader climate change policies. At the highest level is the *National Leading Group on Climate Change* (NLGCC) which is responsible for the review and coordination of important CDM policies. The *National CDM Board*, co-chaired by NDRC and MOST, functions as an advisory body for CDM policy making and is to some extent involved in operational and practical approval procedures. China's DNA for CDM is NDRC, responsible for approving CDM project applications with the administrative assistance of the *CDM Project Management Centre* (CDM PMC). The CDM PMC was established under NDRC and is charged with enforcing and applying China's national CDM measures. The DNA also represents China at the UNFCCC.

Box 4: Key Review aspects in CDM Project Approval at Chinese DNA
Ownership qualification PDD contents and quality Baseline methodologies and GHG emission reductions CER price review Funding and technology transfer conditions Crediting period Monitoring plan Assessment of sustainable development benefits

Evaluation of CDM projects is done by considering some key characteristics of the project. These project characteristics are listed in Box 4 and seek to cover the technical and policy dimensions. The assessment is built upon a combination of national regulations and international CDM rules. There are a few criteria, which are used to guide the evaluation. From a market actor perspective, a few of these criteria are of particular importance.

Eligibility Requirement on Project Owners: Only Chinese funded or Chinese-holding enterprises (with at least 51% of the equity share owned by Chinese entities or citizens) within the territory of China are eligible to conduct CDM projects with foreign partners.

Priority areas for CDM projects in China are energy efficiency improvement, development and utilization of new and renewable energy, and methane recovery and utilization. In other words, CDM projects in these areas are encouraged by the government.

Review of CER Price by Chinese DNA: The DNA performs price review on the CERs resulting from CDM project activities in China. In the Chinese carbon market, there is price guidance for CERs, which is reported to have increased from 8€ to 9€ but is project dependent. This is not a regulation but a recommendation issued by the NDRC.

Requirement on Environmental Impact Assessment (EIA): According to Chinese laws and regulations, especially the Environmental Protection Law and the Law on Environmental Impact Assessment, buildings or construction projects in China shall conduct and submit EIA reports during their initial design stage. This must be approved MEP before construction begins. This applies as much to CDM projects as with any other project. Obtaining EIA approval is one of the pre-conditions for approval from the NDRC.

Requirement on Feasibility Study and other Approval Procedures: Apart from the EIA, all projects in China including CDM projects involving engineering/construction require approvals from the appropriate government agencies before construction can begin. For example, different stages of the project feasibility study need to be conducted and approved by the Development and Reform Commission (or Planning Commission). In the case that the project involves land use, then approval from the relevant land resource administration agency must be obtained.

4.1.2 CDM Fund Management

The CDM Fund was set up with the objective to support and promote China's National Sustainable Development Strategy in particular those national actions for combating climate change. The view of the Chinese government is that these funds should be used to help China meet its broader climate and sustainable development objectives and not be limited only to CDM activities. Though the guidelines for the Fund are still under development, indications are that the fund might also take action through its

asset management strategy investing for example in new technology ventures to promote technology transfer.

The CDM Fund is to be financed through several sources. One important source will be taxes levied on CDM CERs. The Management Measures stipulated that the emission reduction resource in China is owned by the Chinese government, that the emission reductions generated by specific CDM project belong to the project owner, and that the revenue from the transfer of CERs shall be owned jointly by the Chinese government and the project owner. The allocation ratio is defined as below:

1) The Chinese government takes 65% CER transfer benefit from HFC and PFC projects
2) The Chinese government takes 30% CER transfer benefit from N_2O project
3) The Chinese government takes 2% CER transfer benefit from CDM projects in priority areas defined in Article 4 and forestation projects.

Funding for the CDM Fund is also obtained from multilateral sources such as the Asian Development Bank and the World Bank. Funding may also be obtained through contributions from other foreign governments. The Fund will also receive support from the Chinese government.

The revenue from the transfer of CERs is therefore allocated between the Chinese government and the project owners. The portion allocated to the government falls under the management of the CDM Fund. The CDM Fund Management Centre was established in 2006 under the MOF and began operations in March 2007. The operational structure of the CDM Fund is similar to that of the CDM PMC. There is a National CDM Fund Board which is chaired by the NDRC and supported by various other ministries including the MOF.

In concrete terms, the activities of the CDM Fund cover a wide and diverse range of climate relate actions. Some of these activities which are directly related to CDM and which target several of the most pressing shortcomings are identified as below:

- Enhance the institutional and management capacity of CDM regulation and policymaking
- Enhance the participation of wider CDM stakeholders including domestic consultants and financial institutes
- Capacity building for CDM project owners to strengthen understanding of national and international regulations and enhance negotiating skills
- Business facilitation to help support the entry of international CER buyers and investors into the Chinese carbon market
- Strategic investment and asset management as related to CDM projects
- Participate and support the development of CDM methodologies
- Support the applications of Chinese DOEs to the UNFCCC
- Monitoring the development of the international carbon market and climate regime.

On the other hand, as mentioned earlier, the Fund has been set up to support China's broader sustainable development agenda. As such, the CDM Fund is also engaged in a range of non-CDM related activities, which cover four main areas:

- Address broader environmental concerns through capacity building, public awareness raising and physical environment infrastructure
- Creating climate mitigation activities through energy efficiency and renewable energy usage
- Focusing on adaptation to climate change and reducing vulnerability.

4.2 Climate and Energy Policy Framework of China

China's CDM policies are being developed in the context of a rapidly changing domestic climate and energy policy framework. Facing the impact of climate change, and more importantly, to safeguard energy security, the Chinese government, at both the national and regional levels are making efforts to establish favourable conditions to encourage energy saving while fostering the development of renewable energy. The measures consider both the production and consumption of energy for which there are close linkages to climate change issues. China's National Climate Change Programme (NCCP), the Science and Technology Actions on Climate Change and the national white book on China's Climate Change Policies and Actions issued in October 2008 are key documents that outline the national strategies and approaches to be taken.[28] CDM is cited in these documents as one important element for national mitigation efforts and is also indentified as a key link to international cooperation. The framework builds on a three pillars:

- To accelerate improvement of more climate-friendly energy mixture
- To enhance science and technology capacity
- To improve market conditions and to facilitate market dynamics for the market-based mechanism for more efficient energy production and utilisation.

Cutting across each of these pillars, China is implementing a set of sector-specific regulations that seek to support the development of renewable energies such as wind power and biomass as well as more efficient resource utilisation of rest heat and coal bed methane. At the same time, there are set of region-specific strategies, which take into account both the advantages of the diverse strengths and endowments as well as uneven levels of economic development in different regions. CDM is embedded in this broader climate energy framework.

4.2.1 The policy mix: energy conservation and renewable energy

In more concrete terms, the Chinese approach to climate and energy is realised through two overarching strategies, namely the promotion of energy conservation with integration of energy saving and energy efficiency improvement and the deployment of renewable energies. These two aspects, together with market mechanisms such as the CDM, are seen as important tools for combating climate change. Under these overarching strategies, there are a number of regional and sectoral regulations and fiscal instruments. Many of these are highly relevant to the CDM and these are highlighted in Table 5.

At the regional level, each province usually has its own preferential areas for renewable energy and energy efficiency development based both on national requirements/regulations and region specific resources and circumstances. For example, each province has a set of energy consumption standards for energy-intensive industries. Some provinces have stricter regulations on certain industries than others while other provinces are more aggressive on renewable energy and energy conservation measures.

[28] Available online at www.cc**china**.gov.cn/WebSite/CC**China**/UpFile/File188.pdf,www.cc**china**.gov.cn/WebSite/CC**China**/UpFile/File199.pdf and http://www.ccchina.gov.cn/cn/NewsInfo.asp?NewsId=14980

Table 5 Key Chinese Plans and Laws Relevant to Combating Climate Change and the CDM

Supply-side regulation NDRC Energy Bureau of NDRC MOST MEP	Demand-side regulation NDRC MEP Ministry of Housing and Urban Rural Development Ministry of Industry and Information Ministry of Construction
China Renewable Energy Law Energy Development in 11th 5 year Plan	Energy Conservation Law 10 Key Energy Saving Projects 2005-2010
Renewable Energy in 11th 5 Year Plan Renewable Energy Medium and Long Term Plan Medium and Long-term Energy Development Strategy and Plan to 2020.	Building Energy Saving in 11th 5 Year Plan Standards for Building Energy Saving 1000 Enterprises Energy Efficiency Programme

Source: NDRC

4.2.2 Energy Conservation and Energy Efficiency

The 11th five-year plan sets ambitious targets for energy efficiency by setting a target for reduced energy consumption per unit GDP by 20% by 2010. Improving efficiency and enhancing energy saving have become a fundamental national priority, especially when taking account serious energy waste and low energy efficiency in key industry sectors, such as the steel, cement and construction sectors.

Another important initiative is the Energy Conservation Law that was revised and became effective on 1 April 2008. Key elements include:

- Quantitative energy saving targets for each level of government – these targets will be used to assess the performance of local government
- Enforcement of compulsory energy standards for designated manufacturing industries and the phasing out of high energy consumption and high-pollution industries and factories
- Enforcement of compulsory energy saving standards for all new buildings
- Encourage new energy saving building materials and equipment and integration of renewable energy system into buildings (such as solar, wind, geothermal).

BOX 5 Sectoral Example: Energy Efficiency in the Cement Industry
In November 2007, the first energy efficiency standard for the cement industry was issued by Ministry of Construction – the "Code for design of energy conservation of cement plant".[1] The Code has detailed regulations on design and construction, process, electricity system and subsidiary installation energy conservation and systematically improves, for the first time, the energy performance of cement production in China.

These will be achieved through a combination of various fiscal instruments such as governmental subsidies and taxes as well as mandatory standards:

- The Central Government and Provincial governments shall arrange special funds for energy conservation to support research, pilot projects and other strategically important projects
- Enforcement of tax policies in favour of energy conservation, (e.g. to encourage the import of advanced energy-saving technologies and products)

- The government will guide financial institutions to increase their financial support for energy-saving projects, including technological reconstruction project to save energy.

4.2.3 Renewable Energy

In the 11th five-year plan, the target for renewable energy was set to 10% of the total energy consumption by 2010 and 15% by 2020 from the current level of about 7%. Estimated required investment to reach the targets is about US$ 350 billion. In addition, a compulsory 3% quota of installed renewable energy (excluding hydro) is being mandated for all large-scale power generators at both the national and regional levels.

Table 6 Renewable Targets in the Chinese Development Plan

	2006 Actual	2010 Target	2020 Target
Small hydro (gigawatts)	**47**	**60**	**85**
Wind power (gigawatts)	**2.6**	**5**	**30**
Biomass power (gigawatts)	**2.0**	**5.5**	**30**
Solar PV (gigawatts)	**0.08**	**0.3**	**1.8**
Solar hot water (million M^2)	**100**	**150**	**300**

Source: NDRC, 2007 and World Watch, 2008.

China's Renewable Energy Law came into effect in January 2006. Under this initiative, renewable energy will be given preferential treatment in terms of grid connection and power price subsidies through a series of specific measures.[29] These measures and regulations aim to promote the development of renewable energy through the following principals:

- The national government sets the price for most renewable energy
- The additional costs of renewable energy generation are borne by all the end-users, apart from agricultural power users and some under-developed western regions
- The collected fund is allocated among regions to provide the subsidies for the renewable energy producers

Two significant barriers to the further uptake of renewable are higher upfront investment costs and price uncertainty and limited demand. Technological barriers also pose a significant challenge in the Chinese renewable energy market. In order to help overcome these challenges, the Chinese government has implemented a series of support measure which include price support, tax incentives and investment subsidies. For example:

- A feed in tariff system will be adopted for all the renewable energy
- A relatively low tariff will be imposed on imports of

BOX 6 Sectoral Example: Energy Conservation in Buildings

In July 2008, Ministry of Housing and Urban-Rural development of PRC has issued the "Guidelines on residential building heating calculation and energy conservation modification technologies of northern heating areas" for northern part residential building energy conservation.

[29] Examples of measures taken include the Management Measure for Renewable Energy Power Price and Cost Apportionment (January 1, 2006) as well the Interim Measure for the Arrangement of the Income from Additional Renewable Power Price (January 11, 2007), and the Notice on Additional Renewable Power Price Subsidy and Quota Trading (March 10, 2008).

renewable energy equipment. The renewable energy power generation in Western areas of China receive preferential tax rates (for example, Inner Mongolia, Xinjiang, etc.) in accordance with the Western Development Taxation Policy (also known as the "Go West Strategy")

- Chinese government provides subsidies for renewable energy R&D and demonstration projects.

Rapid growth in the renewable energy sector over the last few years has been remarkable, partly as a result of industry's response to the favourable policy signals as well as the development of the CDM market. Another important driver has been the increased awareness and emphasis on the role of science and technology in contributing to improved environmental performance. These co-benefits (i.e. coupling climate benefits with energy efficiency) are becoming particularly evident across several priority areas for CDM projects. There are signs that the Chinese position on renewables and improved energy efficiency has become more selective and targeted on climate change actions. For example, in the wind power sector, regulations have been implemented to support domestic wind power sector through a requirement that 70% of the equipment is domestically sourced. Moreover, preferential treatment will be more targeted at large scale wind installations. Another example of this shift in regulations is for CBM sector, previously targeted because of safety concerns. Now, new regulation also takes environmental and energy efficiency concerns into account by encouraging utilisation of new technology. In the boxes presented below, we briefly outline some important recent developments regarding two preferential CDM project types: wind power and CBM.

4.3 The interplay of CDM and the Climate Policy Framework– Some Comments

Significant resources have been allocated to strengthen the CDM framework to support the development of the carbon market in China. Furthermore, the capacity of the agencies and organisations that participate and manage the CDM has been expanded and improved in part by applying lessons learned and fine tuning based on continual evaluation and reform. As CER volume increases, the addition resources may give additional leverage to the impact of these policies. It has also become more apparent that recent adjustment in the policy mix seeks to target current regulatory shortcomings and also to support technology transfer and diffusion and sustainable development. In other words, government support is becoming more selective.

CDM and National Climate Policy Framework

Current and future planned CDM policy is being brought in line with China's National Climate Policy, helping to reinforce the CDM as a tool for addressing climate change. Initiatives, outside the CDM, addressing support for renewable energy and energy efficiency have mobilised broader stakeholder interests and have also attracted increased resources from both national and international investments. This would not have been possible under the CDM alone. In this way, CDM and other Chinese initiatives on climate have been moving forward together. The increasing importance of climate policy in China's sustainable development strategy is the basis for continued enhancement of the CDM.

Box 7 CBM
Currently, Ministry of Environmental Protection and General Administration of Quality Supervision, Inspection and Quarantine of the PRC jointly issued "CBM (CMM) discharge standard (Provisional)" and became effective on 1 July 2008. The CBM/CMM standard states that methane concentration over 30% is prohibited from being released into the air.

While the various climate-related initiatives being implemented in China seek to achieve ambitious goals, there are also significant barriers in which CDM has an important role to play. A few important issues that have been highlighted are:

- Support provided by government policy is not sufficient to overcome the higher development cost of renewable energy. CER revenue can improve the profitability of the investment, making

unprofitable projects profitable on the margin, and (in the longer term) support the scaling up of renewable energies

- Current capacity in many renewable and energy efficiency sectors in China is lagging. CDM has the potential to expand capacity by bringing in demonstration installations and supporting technology transfer, though these potential benefits are by no means automatic through CDM
- Market structure (e.g. China's power sector is dominated by a few large State-owned Enterprises (SOEs), which account for 90% of installed capacity, plays a role in determining CDM's benefits. At the same time, CDM can serve as an entry point for industry competition and shape partnership opportunities. These aspects impact market dynamics, which in turn imply a change in competition, prices and technological standards.

With these potential benefits and barriers in mind, it is instructive to consider China's position in the UNFCCC. China for one, has staked its interests firmly on the benefits that CDM could bring in terms of improved access to technology transfer and sustainable development beyond the financial benefits. CDM is also seen as a point from which more comprehensive plans to address global climate change can depart from with greater involvement of developing countries. This is reflected partly in the recurring issues brought up by China in international climate cooperation and negotiations. In this way, the experience of CDM in China and its integration with national climate policy serve as a lens through which one can improve their understanding of the issues being brought to the international discussions, in particular those concerns voiced by developing countries. Furthermore, from a technical point of view, wrestling with issues related to "additionality" in the context of a rapidly changing landscape of Chinese Climate and Energy policy add a layer of complexity to discussions of future rules on CDM or equivalent. UNFCCC has realised that there are some important issues around additionality that need to be resolved. China, in the meanwhile, is moving to address some of these complex rules in a practical sense. For example, a "net additionality" can still exist where a project overshoots the enforced mandatory standard. The emissions reductions, which are in excess of the required reductions, can be counted as emission reductions in accordance with additionality requirements. In other cases, mandatory standards are not enforced perfectly (or at all). As such, emissions reductions that fall short of the un-enforced standard could still are considered "additional". Though these cases will surely come up in the future, to date, these situations have only been discussed as hypothetical problems. Greater, clarity at the national and international levels will be required to address these issues.

The means China deploys towards achieving the objectives of its various policies (fostering technology transfer, supporting domestic industry and so forth) will need to be balanced with the concerns and interests of foreign investors and other stakeholders. The success of these policies hinge upon how China addresses the continued and enlarged opening of the energy and other climate related sectors. Unless managed properly, there is risk of that these policies backfire and deliver counterproductive results.

In brief, the continued progress on improving the institutional framework and the industrial capacity to meet the climate challenge is dependent on the degree of transparency and fairness applied. In particular, China is wrestling to find the right balance with the following issues:

- Setting a level playing field for domestic versus foreign actors
- Government intervention and market mechanisms
- National priorities and international climate cooperation.

5 An overview of the CDM market in China[30]

The number of CDM projects in the global carbon market has increased sharply the last years. In an international comparison, China's share of the number of projects is about 35%. However, the Chinese projects are on average larger than in the rest of the world, which result in a global market share of 54% if one includes project up to 2012 – and 57% of the total amount of CERs if it is calculated to 2020. According to the database from UNEP Risoe, by the 1 January 2009, the number of Chinese CDM projects in the pipeline was 1608 and the number of EB-registered projects was 352. The annual emission reductions were 332.4 Mt in the pipeline and 131.8 Mt as EB-registered. The distribution across different project types and the corresponding CER volumes both in pipeline and EB-registered are given in Table 7. Table 8 also presents information from the period prior to 2007, in which a rapid growth in the CDM market in China can be observed. In this section, we address each of these observations in more detail in terms of the distribution of project types, issuance rates across different project types and region specific observations. Beyond the quantitative description or the market volume in terms of the number of projects and CERs, we also discuss CER price, taking into account China specific characteristics.

5.1 Key observations

Rapid growth in both number of projects and number of CERs

There is a rapid growth in the number of CDM projects both in the pipeline and registered at the EB since the beginning of 2006. The number of projects in the pipeline has increased over 11-fold (from 138 to 1608) by the end of 2008. Nevertheless, the rapid increase in the volume of CERs in the pipeline has not been passed through to EB-registered projects. As a result, only around 22% (352 out of 1608) of the projects in the pipeline are registered at the EB by 1 January 2009. The trend is similar if one looks at CER volume instead of number of projects. This suggests that there is an administrative bottleneck at both the EB and DOE level. On the other hand, the discrepancy between the growth rates in the number of projects and the number of annual CERs suggest that the large increase in the number of CDM projects in the pipeline is driven by an increase number of projects with relative small amount of annual CERs.

Increased relative importance of renewable energy and energy efficiency projects

Small hydro CDM projects dominate the CDM pipeline as well as EB-registered projects. The number of ***wind power*** projects has also increased substantially, by almost 6-fold in the pipeline and by 3-fold for EB-registered projects. Despite a large number of projects, the share CERs from renewable energy CDM projects in the form of hydro, solar and biomass is still low. ***Biomass*** CDM projects show a moderate increase and have small shares of the total number of projects and the total annual CERs in both the pipeline and for EB-registered projects. As of1 January 2009, renewable energy [31]only accounted for about 39% and 18.13% of CERs in pipeline and for EB registered, respectively, and presented a significant increase for EB-registered projects since 1 January 2006. The increase of renewable energy project scale is mainly due to the fast development of wind power projects in China.

The number of ***energy efficiency CDM projects***[32] shows the second most rapid growth in the pipeline and the most rapid growth for EB-registered projects. Since 1 Jan. 2006, the number of energy efficiency projects in the pipeline has increased by over 10-fold (from 22 to 248) and the volume of annual CERs has increased by more than 15-fold (from 3.1 Mt to 45.8 Mt). For EB-registered projects, the increase seems to be more remarkable. The number of project has increased from only 1 to 40 and the number of annual CERs from 0.1 Mt to 12.3 Mt by 1 January 2009. In terms of the relative importance of energy

[30] We grateful for the access we've been granted to the data from CDM PMC.
[31] Renewable Energy refers to the small hydro, wind power, and biomass.
[32] Energy efficiency projects refer to the EE own generation and EE industry in table 7.

efficiency CDM projects, the shares of such projects in the total number of CDM projects in the pipeline and for EB-registered projects are about 15.5% and 11.4% respectively. In terms of annual CERs, the shares are about 14% and 9.4%.

The majority of energy efficiency projects were undertaken in the power sector (own generation) while in the industrial sector, cement and steel industries are most representative. There is an important caveat, from the perspective of methodology. According to the UNFCCC, while there is a wide array of methodologies available for CDM projects in the power sector (more than 35), only two methodologies have been used frequently and account for 75% of the registered CDM projects in the power sector.

Decrease in "low-hanging fruit" projects

CDM projects related to industrial gas destruction, such as ***HFCs*** *and* ***N_2O***, have been controversial because of the low investment costs and the large amount of CERs generated. During the observed period, despite the fact that large shares of CERs were generated from a small number of HFC projects, the shares of these projects in the total annual CERs have indeed decreased in the pipeline from 52.9% to 25.5% from December 2006 to May 2008. Likewise, EB-registered projects decreased from 89.9% to 56.7% during the same period. Because HFC destruction potentials in the Chinese market has, to a large extent, been exhausted and as a result of the income-sharing CDM management measure (taxation of at 65% for HFC projects) in China, this decreasing trend is intensified. From 1 May 2008 to 1 January 2009, the share of total annual CERs continued to decrease from 25.5% to 19.9% in pipeline, and the annual CERs from registered projects decreased from 56.7% to 43.8%, correspondently.

Other important project types

Because of the coal-dominated energy structure, China has a great potential in the fields of CBM/CMM projects. There has been a significant increase in both the number of projects and number of annual CERs, in particular among EB-registered projects, which have increased substantially. Nevertheless, the large number of projects (60 by 1 January 2009) and the large volume of CERs (27 Mt by 1 January 2009) in the pipeline suggest that a large potential remains unexplored. The numbers of **fuel switch** and **land-fill** projects in the pipeline have increased rapidly since the beginning of 2006. In terms of CERs, the amounts expected to be generated in these two project types have almost doubled during the investigated period. However, in both the pine line and for EB-registered projects, fuel switch and land fill a small share.

Key Observation – Summary

In summary, at present, hydropower, energy efficiency and wind power represent the majority of China's CDM projects. These three types of CDM projects accounted for 81.5% of the total number of projects in the pipeline, with an annual CER volume of for 49% of the total CER volume. Among the EB-registered CDM projects, these projects accounted for 77% of the total, and the annual CER-volume accounted for 26.3%. The comparison between projects in the pipeline and the EB-registry during the rapid development of the CDM market suggests that there is a large number of CDM projects which are stuck in the pipeline. There is indeed a decrease in so- called "low-hanging fruits" while the relative importance of projects in the fields of renewable energy and energy efficiency have increased over time. Such a structural shift in project types indicate that project size is decreasing while the complexity in terms of CDM methodology and project implementation is increasing.

Table 7 Chinese CDM Projects and Annual CER-volume- by Project Type
Unit: thousand tons (KT), by 1 January 2009[33]

	CDM Projects in pipeline					Registered CDM Projects				
Type	No.	% in Total	Annual CER (ktCO2e/yr)	% in Total	Average annual CER (ktCO2e/yr/Project)	No.	% in Total	Annual CER (ktCO2e/yr)	% in Total	Average annual CER (ktCO2e/yr/Project)
Hydro	762	47.63%	78778	23.89%	103.38	140	39.77%	12195	9.25%	87.11
Wind	303	18.94%	38356	11.63%	126.59	91	25.85%	10106	7.66%	111.06
EE own generation	239	14.94%	44588	13.52%	186.56	40	11.36%	12347	9.36%	308.68
Biomass energy	61	3.81%	11475	3.48%	188.11	11	3.13%	1605	1.22%	145.92
Coal bed/mine methane	60	3.75%	26990	8.19%	449.84	14	3.98%	7612	5.77%	543.70
Landfill gas	51	3.19%	7953	2.41%	155.94	16	4.55%	3271	2.48%	204.44
Fossil fuel switch	31	1.94%	27993	8.49%	902.99	9	2.56%	7827	5.94%	869.65
N2O	28	1.75%	21753	6.60%	776.88	19	5.40%	18965	14.38%	998.13
Biogas	24	1.50%	1388	0.42%	57.85	1	0.28%	110	0.08%	110.46
HFCs	11	0.69%	65650	19.91%	5968.22	10	2.84%	57785	43.83%	5778.55
EE Industry	9	0.56%	1128	0.34%	125.29	0	0.00%	0	0.00%	0.00
Cement	6	0.38%	1330	0.40%	221.70	0	0.00%	0	0.00%	0.00
EE Supply side	6	0.38%	2038	0.62%	339.66	0	0.00%	0	0.00%	0.00
Reforestation	5	0.31%	164	0.05%	32.84	1	0.28%	26	0.02%	25.80
Solar	4	0.25%	143	0.04%	35.77	0	0.00%	0	0.00%	0.00
Total	1600	100.00%	329727	100.00%	9671.63	352	100.00%	131849	100.00%	9183.48

[33] Source of Data: UNEP Risoe Center, CDM pipeline statistic, 1 January 2009

Table 8 Chinese CDM Projects and Annual CER-volume- by Project Type
Unit: million tons (MT), by 30 Dec. 2006

	CDM Projects in pipeline					Registered CDM Projects				
Type	**No.**	**% in Total**	**Annual CER (MT/YR)**	**% in Total**	**Average annual CER** (MT/YR/Project)	No.	**% in Total**	**Annual CER (MT/YR)**	**% in Total**	**Average annual CER** (MT/YR/Project)
biogas	3	2.2	0.1	0.1	0.05	0	0	0	0	0
biomass	5	3.6	1.0	1.5	0.20	0	0	0	0	0
cement	0	0.0	0	0.0	0	0	0	0	0	0
Coal bed/mine methane	17	12.3	9.8	14.3	0.58	2	6.1	0.4	1.3	0.21
EE industry/EE own generation	22	15.9	3.1	4.5	0.14	1	3.0	0.1	0.3	0.11
Fossil fuel switch	11	8.0	8.5	12.4	0.77	0	0.0	0	0.0	
HFCs	5	3.6	36.3	52.9	7.26	4	12.1	28.3	89.8	7.07
Hydro	32	23.2	3.9	5.7	0.12	6	18.2	0.6	1.9	0.10
Landfill gas	12	8.7	2.3	3.4	0.19	4	12.1	0.7	2.2	0.17
N2O	0	0	0	0	0	0	0.0	0	0.0	0
Reforestation	2	1.4	0.0	0	0.01	1	3.0	0.0	0.0	0.03
Solar	0	0.0	0	0	0	0	0.0	0	0.0	0
wind	29	21.0	3.2	4.7	0.11	15	45.5	1.3	4.1	0.09
total	138	100	68.6	100	0.50	33	100	31.5	100	0.95

5.2 Issuance rates of Chinese CDM Projects

By 1 January 2009, the EB-registry had a total of ***84*** Chinese projects with a total of ***around 100 Mt*** in issued CERs, which has more than doubled by 1 May 2008. Thus, China is now the largest host country for issued CERs and accounts for ***41.6%*** of the total, followed by India (22.5%) and South Korea (14.8%) and Brazil (11.8%) (see table 9).

Table 9 Top countries by Issued CERs (Unit: million tons (MT), by 1 January 2009)

Top countries by issued CERs	MCERs	Share
China	**100.0**	**41.6%**
India	**54.1**	**22.5%**
South Korea	**35.5**	**14.8%**
Brazil	**28.4**	**11.8%**
Mexico	**5.0**	**1.9%**
Vietnam	**4.5**	**1.2%**
Chile	**2.9**	**1.2%**
Egypt	**2.4**	**1.0%**

Source: UNEP Risoe Center, CDM pipeline statistic, 1 January 2009

Key observations:

- The issuance rates vary largely across seven different project types (i.e. biomass, coal bed methane, energy efficiency, HFCs, hydropower, landfill gas and wind). For industrial gas, such as HFCs, the issuance rate is high at an average level above 100%, overshooting the expected performance indicated in PDDs
- For CDM projects of renewable energy, such as hydropower and wind power, the issuance rate is generally lower, at a level of 87% and 75%, respectively. Within the same project type, the variations are also large, from around 10% to 160% depending on the specific project
- For other project types, the issuance rates are at a low level, below 30%, except for energy efficiency (60%)
- HFC CERs account for 84% of current issued CERs. However, this share is expected to decrease by 2012 to a lower level of 65% of total CERs issued from CDM projects from China. Conversely, the share of CERs from renewable and energy efficiency projects will increase to above 20% by 2012.

There are several reasons why the issuance rates vary both across different project types and within the same project type. Firstly, from the perspective of the CDM project cycle, there are risks associated with monitoring through to the issuance process that may lead to either reduced CERs or a delay of issuance of CERs. This is illustrated in Table 9.

Table 10 Risks Associated with Monitoring through to the CER Issuance Process

CDM project cycle	Delivery risk
Monitoring	Delay in operation Technology mismatch and underperformance Mismatch between monitoring plan in PDD and actual emission reduction
Verification	DOE capacity bottleneck UNFCCC capacity bottleneck Limited verification guidance

Secondly, complexity in applied methodology and technology as well as unexpected market/local conditions implies substantial risks to the delivery of CERs. For instance, “overestimation of the potential generation of gas at the modelling stage, inadequate design of gas capture systems and suboptimal operation of landfills” are common reasons behind the underperformance for landfill projects (World Bank, 2007). In the case of biomass, insufficient supply of raw material (e.g. straw) often turns out to be an unexpected hazard, which in turn leads to both increased investment costs and underperformance for CDM projects.

45 Chinese wind projects have delivered CERs. However, the issuances for the wind power projects vary substantial from 10% to 132%. Two further observations can be made about the high variation of issuance rates for wind projects. First, project size is not necessarily correlated with issuance rate. The issuance can be high, or low for both large- and small-scaled wind power projects. Second, while issuance rates vary across different regions due to variation in weather conditions and wind resources, the issuance rates of different wind power projects in the same region can also vary substantially. For instance, while three projects in Jilin province had a high issuance rate close to or above 100%, there are two other projects with very low issuance rates around 40% or below. One explanation put forward for this variability is that there are fluctuations in important aspects of wind power implementation such as variable quality and performance of equipment and human capacity with respect to design and installation efficiency. Furthermore, it is also provides some support to the claim that the project developers lack experience with a complex monitoring and verification process.

Table 11 The Issuance Rate of EB Registered CDM Projects from CDM, by 1 January 2009[34]

	No. of Projects		CER Issued		Delivery Rates			To 2012		To 2020	
Type	**EB Registered**	**CER Isssued**	**CER Issued (kCER:s)**	**% of Total**	**Min**	**Max**	**Average**	**Projected Volume (Kton CO2e)**	**% of Total**	**Projected Volume (Kton CO2e)**	**% of Total**
Biogas	1	0	0	0%	0%	0%	0%	5881	0%	14565	0%
Biomass energy	11	1	109	0%	64%	64%	64%	49678	3%	137861	3%
Cement	0	0	0	0%	0%	0%	0%	5565	0%	14011	0%
Coal bed/mine methane	14	2	638	1%	34%	86%	60%	125963	8%	323800	8%
EE own generation	40	5	2,533	3%	52%	104%	76%	197094	13%	483435	12%
EE Industry	0	0	0	0%	0%	0%	0%	5096	0%	11456	0%
EE Supply side	0	0	0	0%	0%	0%	0%	7956	1%	21285	1%
Fossil fuel switch	9	0	0	0%	0%	0%	0%	127455	8%	332514	8%
HFCs	10	9	83,996	84%	95%	116%	103%	373797	24%	900380	22%
Hydro	140	16	1,733	2%	47%	160%	98%	328860	21%	954427	24%
Landfill gas	16	4	219	0%	16%	32%	25%	38283	2%	95159	2%
N2O	19	1	7,102	7%	129%	129%	129%	106339	7%	280648	7%
Reforestation	1	0	0	0%	0%	0%	0%	472	0%	2209	0%
Solar	0	0	0	0%	0%	0%	0%	695	0%	1431	0%
Wind	91	46	3,664	4%	10%	132%	78%	164729	11%	470619	12%
Total	***352***	***84***	***99,994***	***100%***	***0%***	***160%***	***42%***	***1537864***	***100%***	***4043800***	***100%***

[34] Source of Data: UNEP Risoe Center, CDM pipeline statistic, 1 January 2009

Table 12 The Issuance Rate of EB Registered Wind Power CDM Projects from CDM, by 1 January, 2009[35]

Project Title	Province	1st preriod ktCO2/yr	2012 ktCO2	2020 ktCO2	Issued kCERs	Expected kCERs	Issuance success
Yichun Shimaodingzi Wind Power Project 30.6MW	Heilongjiang	72	385	963	33	25	132%
Yichun Daqingshan Wind Power Project	Heilongjiang	38	219	524	36	28	129%
Fujian Dongshan Wujiaobay 30MW Wind Power Project	Fujian	58	316	782	31	24	127%
Wuerguli 30 MW Wind Power Project	Heilongjiang	75	395	999	54	44	123%
Zhangbei Manjing Windfarm Project	Hebei	94	659	1412	270	229	118%
Huitengxile Windfarm Project (Inner Mongolia)	Inner Mongolia	51	411	514	117	103	114%
Changling Wind Power Project	Jilin	20	123	283	18	17	106%
Yichun Erduoyan Wind Power Project 28.05 MW	Heilongjiang	62	343	845	41	39	105%
Zhangbei Mijiagou 49.5 MW Windfarm Project	Hebei	109	628	1501	143	139	103%
Jilin Taobei Huaneng 49,3 MW wind power project	Jilin	94	510	941	59	59	100%
Jilin Taonan Wind Power Project	Jilin	93	648	1388	165	171	97%
Hebei Kangbao Wolongtushan 30 MW Wind Farm Project	Hebei	59	337	811	69	72	97%
Hebei Chengde Songshan Wind Farm Project	Hebei	106	609	1457	71	78	91%
Fujian Zhangpu Liuao 45MW Wind Power Project	Fujian	84	427	1090	26	29	89%
Jilin Baicheng ChaganHot Wind Power Project	Jilin	56	300	746	17	20	88%
Jiangsu Rudong Huangang Dongling Wind Power Project	Jiangsu	205	1175	2817	132	150	88%
Datang Jilin Shuangliao Wind Farm Project	Jilin	104	594	1423	79	91	87%
The 30 MW Tuoli Wind-Farm Project in Urumqi, Xinjiang	Xinjiang	94	656	1406	133	155	86%
Saihanba East 45.05 MW Windfarm Project	Inner Mongolia	112	676	1571	100	117	86%
Liaoning Zhangwu 24.65MW Wind-farm Project	Liaoning	35	334	615	133	158	84%
Xinjiang Dabancheng Sanchang First Phase Wind Farm Project	Xinjiang	81	461	1109	81	97	84%
Inner Mongolia Chifeng Dongshan 49.3 MW Wind	Inner	126	753	1759	175	209	84%

[35] Source of Data: UNEP Risoe Center, CDM pipeline statistic, 1 January 2009

Power Project	Mongolia						
Heilongjiang Huafu Muling Wind Farm Project	Heilongjiang	77	426	1046	65	81	80%
Guyuan 30.6MW Wind-farm Project	Hebei	69	378	935	58	74	78%
Fujian Zhangpu Liuao 30.6 MW Wind Power Project	Fujian	52	361	774	94	124	76%
Hebei Shangyi Manjing East Wind Farm Project	Hebei	120	691	1655	53	70	75%
Liaoning Kangping 24.65MW Wind-farm Project	Liaoning	42	423	741	151	202	75%
Ningxia Helanshan Wind-farm Project, Ningxia Autonomous Region	Ningxia	173	1213	2690	381	518	74%
Inner Mongolia Chifeng Saihanba West 30.6 MW Windfarm Project	Inner Mongolia	83	464	1131	36	50	73%
The Wulabo 30 MW Wind-Farm Project in Urumqi, Xinjiang of China	Xinjiang	83	418	1093	34	48	71%
Rongcheng Dongchudao Wind Farm	Shandong	29	164	397	9	13	71%
Liaoning Changtu Wind Farm Project	Liaoning	101	576	1385	48	72	67%
Ningxia Yinyi 49.50MW Wind-farm Project, China	Ningxia	98	495	1282	45	69	65%
Guohua Hulunbeier Xinbaerhu Youqi 49.5MW Wind Farm Project	Inner Mongolia	125	726	1692	46	72	64%
Ningxia Tianjing Shenzhou 30.6 MW Wind-farm Project	Ningxia	50	437	819	90	145	62%
Inner Mongolia Huitengxile Jingneng 100MW Wind Power Project	Inner Mongolia	261	1498	3592	106	190	55%
Qixia Tangshanpeng Windfarm Project	Shandong	38	230	511	12	21	55%
Saihanba North 45.05 MW Windfarm Project	Inner Mongolia	112	676	1571	61	117	53%
Ningxia Tianjing 50.25MW Wind-farm Project	Ningxia	92	528	1268	43	82	52%
Jilin Tongyu Tuanjie wind project, 100.3 MW	Jilin	255	1465	3502	80	182	44%
Huadian Inner Mongolia Huitengxile 100.25MW Wind Farm Project	Inner Mongolia	264	1575	3632	76	200	38%
Guangdong Nan'ao Huaneng 45.05 MW Wind Power Project	Guangdong	82	512	1175	30	96	31%
Jilin Changling Wind Farm Phase I Project	Jilin	100	598	1396	31	106	29%
Jilin Taobei Fuyu 49.5MW Wind Power Project	Jilin	62	384	880	18	66	27%
Jiangsu Dongtai 201 MW Wind Power project	Jiangsu	399	2146	5346	88	388	23%
Rudong County Wind Farm Project	Jiangsu	199	1229	2822	24	229	10%

5.3 Regional Dimensions

The sheer size of China and the uneven distribution of natural resources and disparate levels of development is important to the regional dimension of the CDM market. The development of CDM at the regional level appears to be closely related to the region-specific institutional framework and policy initiatives underway.

5.3.1 Economic conditions and energy needs

The macroeconomic conditions (in Table 13), indicated by Gross Regional Product (GRP), show the size of population and GRP per capita. The energy efficiency (measured by energy consumption per unit GRP), the size of electricity production and the growth rate of CO_2 emission during the period 1990-2004 are presented to provide a CDM-specific context across regions.

- CDM projects are more commonly undertaken in regions with larger population, low level of economic development and/or low per capita income, for instance, in Yunnan, Gansu and Guizhou. For more advanced regions with medium per capital GRP, such as Shandong and Jiangsu, there are also a considerable number of CDM projects. On the other hand the richest provinces/cities have in general fewer CDM projects such as the cities Beijing and Shanghai and the province of Guangdong, suggesting an a more complex correlation between income and the number of CDM projects.
- In regions with low energy efficiency and high growth of CO_2 emission, the number of CDM projects in the pipeline is also likely to be large, such as in the provinces of Hebei, Shanxi, Sichuan and Inner Mongolia
- Outliers include the provinces of Hainan, Ningxia and Xinjiang with limited number of CDM projects, despite rich natural resources and high growth of CO_2 emission.

5.3.2 The regional distribution of CDM projects

The project types that make up the largest share in the pipeline are hydropower (763), wind (303) and energy efficiency for power generation (240). In addition to these dominant project types, there are also a notable number of CDM projects for biomass. The regional distribution, the endowment of natural resources and the type of industrial base seem to be the most important determinants for the number of CDM projects. Some observations on the distribution of CDM projects are:

- Hydropower projects are highly concentrated to Yunnan, Sichuan and Hunan
- Wind power projects are highly concentrated to Inner Mongolia
- Energy efficiency projects are more evenly distributed across provinces where large-scale heavy and energy-intensive industries and manufacturing are located, such as in Shanxi, Jiangsu, Shandong, Hubei and Anhui.

The distribution of CERs across regions gives a different impression and is dependent on the emission reduction technology deployed and project size. In other words, the distribution of CERs follows a different pattern from the distribution of projects. Some observations help clarify this pattern:

- The large volume of reductions in relatively few HFCs and N_2O, projects in Jiangsu, Zhejiang, Shandong and Liaoning
- Small hydropower produces lower volumes of credits per project. Sichuan and Yunnan have a high concentration of hydropower projects
- Inner Mongolia has the largest share of wind power project and also has the largest share of wind generated CERs

- Energy efficiency in power generation is more or less evenly spread across regions and likewise the distribution of CERs reflects CDM projects
- For CBM, the CERs are highly concentrated in Shanxi province
- Fuel switch projects generate a considerable amount of CERs despite a limited number of such projects. They are located in more advanced/higher income regions such as Zhejiang, Jiangsu, Guangdong and Fujian, likely due to the high initial investments required.

The observations suggest that to some extent, CDM is delivering on its promises to support less developed regions where natural resources are least utilised, industry is least efficient and at the same time mitigate emissions. While these factors explain the patterns to some degree, there are also important region-specific policies and institutional factors that drive or hamper CDM development.

Table 13 General Economic and energy Indicators (by region, 2007)

Region	GRP	Population	GRP per capita	Energy / unit GRP	Electricity	CO_2 Growth rate	CDM	CER
	100 million Yuna	10000 person	Yuan	Ton of SCE/ 10 000Yuan	(100 million kWh)	1990-2004 %	unit	MT/YR
Beijing	7870,3	1581	50467	0,8	611,57	4,7	9	3,6
Tianjin	4359,2	1075	41163	1,1	433,65	4,0	2	0,2
Hebei	11660,4	6898	16962	1,9	1734,83	6,2	44	7,7
Shanxi	4752,5	3375	14123	2,9	1097,68	6,4	61	19,6
Inner Mongolia	4791,5	2397	20053	2,4	884,91	8,5	70	13
Liaoning	9251,2	4271	21788	1,8	1228,27	4,5	28	14,9
Jilin	4275,1	2723	15720	1,6	412,46	2,8	30	4,8
Heilongjiang	6188,9	3823	16195	1,4	597,05	2,1	21	2,6
Shanghai	10366,4	1815	57695	0,9	990,15	6,4	6	3,3
Jiangsu	21645,1	7550	28814	0,9	2569,75	6,7	48	33
Zhejiang	15742,5	4980	31874	0,9	1909,23	12,9	27	25,2
Anhui	6148,7	6110	10055	1,2	662,18	5,6	25	5,2
Fujian	7614,6	3558	21471	0,9	866,84	9,5	27	7
Jiangxi	4670,5	4339	10798	1,0	446,2	5,7	28	3,1
Shandong	22077,4	9309	23794	1,2	2272,07	7,8	54	22,9
Henan	12496,0	9392	13313	1,3	1523,5	-	40	21,7
Hubei	7581,3	5693	13296	1,5	876,76	7,2	45	5,8
Hunan	7568,9	6342	11950	1,4	768,77	-	72	6,4
Guangdong	26204,5	9304	28332	0,8	3004,03	9,6	30	8,8
Guangxi	4828,5	4719	10296	1,2	579,46	9,3	40	3,5
Hainan	1052,9	836	12654	0,9	97,68	12,9	3	0,1
Chongqing	3491,6	2808	12457	1,4	405,2	4,3	19	2,7
Sichuan	8637,8	8169	10546	1,5	1059,44	16.0*	113	19,3
Guizhou	2282,0	3757	5787	3,2	581,98	7.0	57	5,3
Yunnan	4006,7	4483	8970	1,7	645,61	6,8	146	12,9
Shaanxi	4523,7	3735	12138	1,4	580,73	6,0	18	1,8
Gansu	2276,7	2606	8757	2,2	536,33	4,9	65	7,5
Qinghai	641,6	548	11762	3,1	244,41	6,2	14	1,5
Ningxia	710,8	604	11847	4,1	377,85	8,8	12	1,5
Xinjiang	3045,3	2050	15000	2,1	356,2	7,0	19	3,4

**The growth rate of CO_2 emission of Sichuan province is for the period of 2000-2004.*

Table 14 Distribution of CDM Projects in Pipeline- by Region and Project Type (By 1 January 2009)[36]

Provinces	Biogas	Biomass energy	Cement	Coal bed/mine methane	Energy distribution	EE industry	EE own generation	EE supply side	Fossil fuel switch	HFCs	Hydro	Landfill gas	N2O	Reforestation	Solar	Wind
Guizhou		1		2		4					50					
Gansu				1			1				76					8
Yunnan						1	3				163	3	4	2		2
Anhui		6		8			16					1	1			
Guangxi			1				6				46	2	1	2		
Sichuan			1	2			4			1	145	2	5	1		
Jiangxi		2		1			9				16	2				2
Qinghai									1		15	1				
Ningxia				2	1		2		1		1				3	7
Hunan		3					9		1		83	2				
Shaanxi	2			1			5				18		1		1	
Chongqing				4			2				21		1			
Hainan							3				8					2
Hubei		4		1		1	20		1		27	2				2
Henan	5	8		8		1	20		2		2	2	2			2
Shanxi	1	1	2	22			26		2		9	2	4			6
Xinjiang					1		2				10	1				9
Jilin	1	7		1		1	8				6	1				18
Heilongjiang		3		3	1		4				2		1			32
Hebei	1	4		1			15				2	2	1			31
Inner Mongolia	2	1	1	1			7		1		1		2			94
Fujian		1					2		2		32	2				11
Liaoning				2			8				1	7	1			23
Shandong	5	9				1	26	1		2		3	4			25
Guangdong	1						4		6		15	5				10
Jiangsu	4	10					21	1	4	3		6				8
Zhejiang		1	1				10	2	4	5	14	3				6
Beijing	1						2		4			1				2
Shanghai							3	2	2							3
Total	**24**	**61**	**6**	**60**	**3**	**9**	**240**	**6**	**31**	**11**	**763**	**51**	**28**	**5**	**4**	**303**

[36] Source of Data: UNEP Risoe Center, CDM pipeline statistic, 1 January 2009

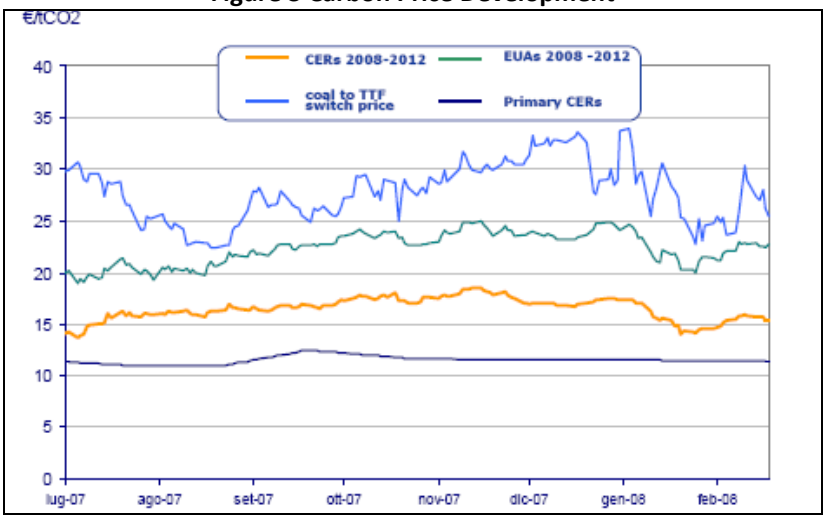
Table 15 Distribution of Annual CERs in the Pipeline- by Region and Project Type (By 1 January 2009)

Province/ City	Annual CER (KT/YR)	Biogas	Biomass energy	Cement	Coal bed/mine methane	Reforesta-tion	EE Supply Side	EE Industry	EE Own Generation	Fossil Fuel Switch	HFCs	Hydro	Landfill gas	N2O	Solar	Wind
Chongqing	3999	0	0	0	1375	0	0	0	475	0	0	1732	0	165	0	0
Zhejiang	34122	0	154	169	0	0	711	0	817	4123	26905	491	444	0	0	308
Yunnan	16667	0	0	0	0	13	0	99	201	0	0	15431	269	509	0	146
Xinjiang	138	0	0	0	0	0	0	0	0	0	0	33	0	0	0	105
Tianjin	282	53	0	0	0	0	0	0	99	0	0	0	130	0	0	0
Sichuan	26347	0	0	236	580	27	0	0	495	0	2066	21772	236	936	0	0
Shanghai	5201	0	0	0	0	0	656	0	1603	2622	0	0	0	0	0	319
Shaanxi	3127	84	0	0	335	0	0	0	646	0	0	1452	0	575	34	0
Shanxi	25620	72	131	363	15624	0	0	0	6083	171	0	222	84	2309	0	561
Shandong	25402	292	1403	0	0	0	38	6	5980	0	14358	0	335	835	0	2102
Qinghai	249	0	0	0	0	0	0	0	0	0	0	0	249	0	0	0
Ningxia	2547	0	0	0	659	0	0	0	188	49	0	487	0	0	109	700
Inner Mongolia	19917	63	260	377	263	0	0	0	2635	594	0	56	0	368	0	15301
Liaoning	18871	0	0	0	1554	0	0	0	3194	0	0	67	1024	10017	0	3014
Jiangxi	73	0	0	0	0	0	0	0	73	0	0	0	0	0	0	0
Jiangsu	35036	295	1309	0	0	0	632	0	3220	4514	22322	0	931	0	0	1813
Jilin	6753	68	1968	0	64	0	0	374	1139	0	0	449	317	0	0	2374
Hunan	10037	0	778	0	0	0	0	0	985	20	0	7973	281	0	0	0
Hubei	7458	0	607	0	144	0	0	63	4752	210	0	1315	139	0	0	169
Heilongjiang	6628	0	677	0	1068	0	0	0	463	0	0	358	0	307	0	3017
Henan	11775	254	1515	0	2010	0	0	98	1796	1404	0	60	133	4396	0	109
Hebei	131	0	131	0	0	0	0	0	0	0	0	0	0	0	0	0
Hainan	1035	0	0	0	0	0	0	0	607	0	0	260	0	0	0	168
Guizhou	5667	0	572	0	597	0	0	487	0	0	0	4010	0	0	0	0
Guangxi	6907	0	0	184	0	125	0	0	535	0	0	4931	230	902	0	0
Guangdong	10037	45	0	0	0	0	0	0	434	5402	0	1402	1941	0	0	813
Gansu	9904	0	0	0	297	0	0	0	28	0	0	8690	0	0	0	890
Fujian	9489	0	145	0	0	0	0	0	534	5503	0	2082	245	0	0	981
Beijing	3494	95	0	0	0	0	0	0	110	3089	0	0	76	0	0	124
Anhui	5763	0	737	0	1649	0	0	0	2978	0	0	0	164	234	0	0
Total	**312673**	**1320**	**10386**	**1330**	**26219**	**164**	**2038**	**1128**	**40068**	**27701**	**65650**	**73272**	**7227**	**21554**	**143**	**33015**

5.4 Price, price guidance and CER supply

Technology is one of the fundamental determinants of CER price. CER price varies across different project types, which is partly explained by technological differences. At the same time, CER price varies within project types, to some degree this is dependent on the degree to which the risk is transferred between the buyer and the seller. According to the World Bank (2008), the CER price in the primary market has been in the range of Euro 8-13, with an average contracted price 9.90€ throughout 2007 and the first half of 2008. This is a 24% average increase from 2006. According to the New Carbon Finance (2008), the ECX CFI future CER contracts were in the range of 12.82€ to 22.84€ from March to December 2008. In January 2009, given the dire global economic outlook, the price for CERs dropped to 9.65€.[37]

Figure 3 Carbon Price Development



Source: Enel, 2008, carbon insight.

The demand for CERs is also largely expectation driven and is strongly influenced by the EU ETS as it is responsible for the largest portion of CER demand. One interpretation of the historical CER price is that under Phase I and II the over allocation of allowances was supposed to put downward pressure on the demand for CERs. However the observed demand for CERs was in fact higher than expected which reflected the markets expectation of a future correction in allowance allocation and increased mitigation costs. Under the anticipated ETS Phase III, there is indeed a planned correction in the number of allowanced allocated which implies an increased supply of CERs. At the same time, Phase III may impose restrictions on the usage of CERs in order to limit the risk that the EU relies too heavily on offsetting. On the other hand, the supply of CER is also driven by price expectation (as opposed to the present price) and the developments on the demand side. Furthermore, supply is just as sensitive as demand to the volatile regulatory environment. Taken together, these factors among others illustrate potential for CER price volatility.

[37] Bloomberg, "Australia Cuts Carbon Credit Amount After UN Review", Jan 22, 2009.

A particular feature of the Chinese carbon market is the government will give unwritten price guidance for CERs to a certain project if necessary. The NDRC does not fix the price for CER, yet the 15th clause of Operation and Management Method of CDM in China stipulates that the deal price is an element for validation by National CDM Project Board (The Board). When drafting Operation and Management Method of CDM in China in 2004, there were some considerations on pricing that were public. This price guidance is thought to be necessary until present because of the immaturity of the CDM market in China, market disadvantages of the project owners, etc. Generally, during the review of CDM projects, Chinese government will review the CER price. If the price is thought by the government to be too unreasonable, the CDM Board will make suggestions on the price to the project owners. Upcoming adjustments to the ETS under Phase III, in particular the limits on CER that are likely to be imposed, will lead to a potential decoupling of the CER and EUA prices which has direct implications for this dampening effect.

Reactions from the market to the Chinese Government's price guidance are mixed. While there are some legitimate reasons for the price guidance such as sending a clear price signal and reducing uncertainty, there are also some arguments against the price guidance. There are also concerns regarding the transparency in the price review and price guidance process. Foreign market actors have requested more timely precise disclosure of the price guidance and motivation behind the guidance.

From the Chinese point of view, motivation for price guidance rests on a number of considerations; the main points are as follows:

- One consideration is that there is no international regulation or law that formally regulates fiscal interventions in CDM management in terms of price setting and taxation. At the same time, developed countries have indirect influence on the price of carbon through various regulations on the demand for different types of emission credits, setting a precedent for public intervention.

- There is also a significant risk that competition between domestic actors puts Chinese interests at a disadvantage in the bargaining process (with foreign project developers, for example). This is compounded by information asymmetry, namely the lack of experience of domestic firms in the CDM process and limited knowledge of the international carbon market. This is even more severe for project types in which there are many suppliers of CERs but few buyers. Furthermore, by Chinese law, CERs generated in China are the property of the Chinese government. As such, these CERs have strategic importance at the national level which further motivates the need for price guidance.

- The price guidance is not fixed but allowed to fluctuate with periodic adjustment within a certain band which is set with consideration of a few important factors. For one, price is adjusted according to the technology categories, risks related to methodology, implementation and contractual terms associated with CDM projects. Other factors include considerations of project scale, location and sector. Price guidance is also based on close monitoring of the international carbon market and seeking to balance on the one hand government interests and on the other hand keep price low enough in the face of price competition from other developing countries. Indirectly, price guidance is an addition tool for encouraging and discouraging the development of different CDM project types.

In practice, reactions from the market to the Chinese government's price guidance are mixed. While there are some good reasons for the price guidance such as sending a clear price signal and reducing uncertainty, there are also some strong arguments against this type of government intervention. For one the policy de-links carbon price and marginal abatement costs and increases the compliance costs for CER buyers. Furthermore it also has the potential to induce oversupply of some types of CERs. There are also concerns regarding the transparency in the price review and price guidance process. Foreign market actors have requested timelier, precise disclosure of the price adjustment and motivation behind these decisions. Finally, from a financial sector perspective, the price guidance may restrict options for project finance. The risk implied by the price guidance puts pressure on project developers to require more upfront capital to finance their projects. All else being equal, the floor may restrict CDM investment.

6 Stakeholders in the Chinese CDM market

This section reviews some key characteristics and views of major stakeholders in the Chinese CDM market, presenting a more detailed picture of the organisational landscape. The information presented here covers namely Chinese project owners, project developers, Regional CDM Service Centres and DOEs. Some other important stakeholders are not presented here, namely European public and private buyers of Chinese CERs. This omission does not in any way indicate a lack of importance, rather it is the result of limited project resources.

Mapping CDM stakeholders across China provides a complementary picture to the rapidly increasing scale of the CDM market and evolving policy framework to illustrate the impact that CDM is having, not only in addressing climate mitigation but also in improving the understanding of the CDM market in achieving technology transfer and sustainable development objectives.

6.1 Project owners in the CDM market in China

Up until 2006, project owners were for the most part involved in smaller scale activities under the CDM. This reflected the limited awareness of CDM in China, a shortage of capacity in execution of CDM projects and a general immaturity of the policy framework. However more recently, there has been a marked increase in the participation of large-scale state-owned enterprises (SOEs) and investment groups. The engagement of these resource rich and influential corporations has profound implications for any enhancement of the CDM. These SOEs are involved in sectors such as:

- Energy intensive manufacturing industries (such as iron, steel, chemicals and cement)
- Power generation (traditional and renewable energy sources such as hydro and wind).

For instance, as the largest player in China's **cement industry**, Anhui Conch Cement Corporation ltd. has more than 50 branches across China; 21 sites have implemented CDM projects in the fields of waste heat recovery and utilization for power generation. The total annual emission reduction from this corporation alone amounts to 2.3 Mt, which accounts for nearly 50% of China's CDM emission reduction from its cement industry in the CDM Pipeline. In addition, by 1 January 2009, there was a total of 132 waste heat recovery and utilisation projects in the CDM Pipeline, in which most of the large-scale cement producers in China were involved as project owners. [38]

In the case of the **steel industry**, as of 1 January 2009, a total of 9 CDM projects in energy efficiency have been successfully registered with the EB. Additionally, there are over 50 such projects in the pipeline, which also involve some of the largest steel producers in China.

The most illustrative example of the high level of concentration (a result of the important presence of the Big Five such SOEs) in the CDM market is the power generation sector. These five largest power generation SOEs all have a large number of CDM projects, and are highly concentrated in CDM project types such as wind power and hydro power. There are also a few CDM projects in the fields of fuel switch and biomass. For these large-scaled CDM projects the majority of buyers are investment banks, power companies and governmental agencies from the EU. It is interesting to observe that the largest source of demand for emissions credits is from large actors within the EU ETS, while at the same time, the largest

[38] Statistic based on the data from UNEP Risoe Center, CDM pipeline statistic, 1 January 2009.

source of supply of emissions credits is also from large scale actors within the Chinese power sector (excluding HFC projects).

Table 16 The Big Five and their CDM project in the Pipeline

Company	No of Project	Annual CERs, by PPD (tCO2e, 1 May, 2008)
China Datang Corporation (DT)	17 wind 1 hydro 1 biomass	2083
China Huaneng Corporation (HN)	9 wind 6 hydro 2 fuel switch	5868
China Huadian Corporation (HD)	5 wind 5 fuel switch 1 biomass	5912
China Power Investment Corporation (ZDT)	8 Wind 4 Hydro 2 Fuel switch	2380
China Guodian Corporation (GD)	34 wind 4 hydro 4 biomass	7008
Total:	**103**	**23251**

Table 16 and Table 17 illustrate the significant presence of the Big Five in the key CDM project types they are active in. The figures underline the relative importance of these SOEs in the Chinese CDM market, particularly with respect to wind and fuel switch.

Table 17 The Big Five and their share of CERs in the pipeline by project type

Project type	CER by Big-Five (Mt/yr)	CER in pipe line (Mt/yr)	Share by Big-Five
Wind	8,7	22,7	38.3%
Hydro	5,1	58,6	8.7%
Biomass	0,9	5,8	15.2%
Fuel Switch	8,6	25,1	34.2%
Total	23,3	112,2	21.0%

These Big Five have each established close co-operation with domestic and international CDM actors and some have even set up their own in-house departments to develop CDM projects. CDM is considered, to a degree, a part of their move away from a traditional fossil fuel base towards a portfolio that draws more on renewables and more advanced technology. This move is driven on the one hand by pressure from the evolving policy framework and on the other hand, by competition within the power sector as they move forward to expand their generating capacity to meet Chinas rapidly increased appetite for electricity. Given the particular importance of the Big Five in the Chinese CDM market, some brief notes on each are in order:

- **Datang Corporation** undertakes CDM project development with the help of its subsidiary the *China National Water Resources and Electric Power Material & Equipment Corporation Ltd.*

Currently, Datang Corporation has 19 CDM projects approved by NDRC, most of which are wind power projects.

- **China Huaneng Group** established a CDM Leadership Team, which incorporates CDM into group management, linking CDM considerations directly to strategy and planning decisions. Apart from the Leadership team, the Group has set up the *Huaneng Renewable Energy (holding) Corporation Ltd.* to work directly with *Green Capital Company* and *Easy Carbon* in the development of CDM project. Huaneng Group has 17 CDM projected approved by NDRC, mainly wind power, hydro power and fuel switch projects
- **China Huadian Corporation** established the *China Huadian Corporation New Energy Development Company Ltd.* to implement CDM projects. China Huadian Corporation has the least *number* of projects approved by NDRC however the high emission reduction achieved in each a fuel switch project means that its total annual emission reductions are the second in terms of volume
- **China Power Investment Corporation** set up the *China Power Complete Equipment Co. Ltd* to develop CDM projects. According to the estimates from CDM PMC, there have currently 14 projects approved by NDRC, mainly in wind, hydro power fuel switch projects
- **China Guodian Corporation** manages CDM project development through its three subsidiaries; *the Guodian Longyuan Power Company Ltd., Guodian Power Development Company Ltd. and Guodian Kehuan Company.* Guodian Longyuan Power Group uses China Fulin Wind Power Consulting Company and Easy Carbon Consulting Company Ltd. for technical support in CDM developments. Recently, China Guodian Corporation has 42 CDM projects approved by NDRC, mainly wind and biomass power projects.

The increased presence of these large SOEs has marked a change in the market where more CDM projects are now initiated by project owners themselves, as opposed to the earlier stages where it was the project developers who drove CDM development. In effect, this brings CDM project development closer to the core business of the SOEs. Now with the backing of these large corporations who have access to technology and human capacity, there may be more opportunities to improve the quality CDM.

In addition to these major market actors, there is also another distinctly different segment of project owners characterised by smaller scale projects and a high variation in project quality. Quite a few of these project owners have low awareness and limited knowledge and capacity for engaging in CDM projects. This is one explanation for the mismatch between CDM potential and CDM realised at the regional level. Taken together, the SOEs and the smaller actors make up a CDM market in China that is "two-tiered".

Despite the rapid development of CDM, project owners in China face a series of challenges. Some of their views are summarised here:

- The benefits for engaging in CDM project are perceived as being insufficient to overcome the risks. Specifically, the returns on investment are uncertain; the time lag from start to CER issuance is long because of administrative bottlenecks and uncertainty around project implementation. Even large corporations are influenced by this risk, with examples of wind power projects that are running at a loss
- Despite efforts by the Chinese government to improve the investment climate for renewables and energy efficiency, the support for CDM projects is seen as insufficient. While regulations

exist to promote these projects, the actual fiscal measures and grid connection regulations are not always effectively enforced

- Technical and financial difficulties hamper project development through the full project cycle to different degrees from pre-start through to completion. Lack of human capacity to implement new technology or acquire the required financing is often cited as barriers to CDM projects
- There is also recognition that increasing demand for energy, increasing energy prices and tightening environmental standards will inevitably require more renewables and energy efficiency. Thus getting a head start, regardless of current regulation, makes good business sense. Furthermore, corporate social responsibility is also cited as a motivation for engaging in CDM.

6.2 CDM Project Developers in the Chinese market

By 1 January 2009, there were over 260 CDM domestic and foreign consultant companies involved in 1608 CDM projects in China.[39] However, the size, scope of service provided and the level of human resource capacity vary substantially across different project developers. Furthermore, many of them, in particular the larger ones, are "multifunctional" in the way that they provide *full turn-key service*, a comprehensive approach which follows the project from the identification stage (PIN) through to PDD writing, project development, monitoring and evaluation, verification and selling of CERs.

Both the pipeline and EB-registered projects show a high concentration of the large project developers:

- Among the EB-registered projects, 242 out of 352 CDM projects (i.e. more than 68%) were developed by the top 20 developers. In terms of the number of annual CERs, the share is more than 67%
- In the pipeline, 878 out of 1608 projects (i.e. more than 54%) were developed by the top 20 developers. In terms of number of annual CERs, the share is about 44%.

While some of these have a highly diversified project portfolio, others are highly specialised. For example, the multinationals, such as Camco International and Eco Securities cover almost all project types, including CBM, energy efficiency, wind, hydro and biomass. On the other hand, domestic consultants are much more specialised, preferring to focus on one project type only, usually either wind or small hydro. Chinese project developers consist of a mixture of:

- Academic institutions, such as Tsinghua University, Hunan University
- Regional CDM service centres, of which there are over 20 throughout China
- Newly established domestic (or joint venture) consultant companies, such as Easy Carbon, Cleanergy Investment Service, etc.

[39] Source of Data: UNEP Risoe Center, CDM pipeline statistic, 1 January 2009

Table 18 Top 20 Consultants of EB Registered CDM Projects (By 1 January, 2009)

Name	No.	CER (ktCO2e/yr)
EcoSecurities	47	6778.02
Tsinghua University	33	21541.41
Carbon Resource Management	20	2214.87
Millennium Capital Services	16	3304.28
Cleanergy Investment Service (Beijing) Co.	13	539.91
CWEME	13	1443.87
Hunan CDM Project Service Center	13	1194.14
CAMCO	12	12372.53
Easy Carbon	11	1672.38
Hunan University	8	601.21
Beijing Tianqing Power International CDM Consulting	7	671.57
Beijing Haohua Rivers International Water Engineering Consulting Co.	6	347.95
CasperVanderTak	6	560.69
Ningxia CDM Service Centre	6	1012.39
Tuttle International	6	911.32
Arreon Carbon UK	5	218.60
China Power Complete Equipment Company	5	761.00
Gansu Huike Center for Transferring on Resource and Environmental Technology	5	272.07
Green Capital Consulting	5	2551.64
SEPA FECO	5	29354.57
Total	**242**	**88324.40**

Table 19 Top 20 Consultants by Pipeline (By 1 January, 2009)

Name	No.	CER (ktCO2e/yr)
Beijing Tianqing Power International CDM Consulting	109	11928.65
EcoSecurities	106	14838.87
Tsinghua University	65	29939.62
CAMCO	60	21076.24
CWEME	54	6966.99
Carbon Resource Management	49	7342.32
China Fulin Windpower Development Corporation	40	5222.69
Easy Carbon	40	6081.31
Millennium Capital Services	38	7075.85
Hunan CDM Project Service Center	36	3380.54
Cleanergy Investment Service (Beijing) Co.	33	1657.63
KOE Environmental Consultancy	32	3457.43
Beijing Changjiang River International Holding	31	6519.85
AGET	29	1269.69
Beijing Ruichi Electric Power Information Technology	29	8543.84
Beijing Haohua Rivers International Water Engineering Consulting Co.	28	2938.59
CasperVanderTak, Gansu Tonghe Investment Project Consulting	26	2432.49
Shanghai JEC Environmental Consultant Co.	26	2693.30
Gansu Huike Center for Transferring on Resource and Environmental Technology	24	2081.12
CREIA	23	2597.68
Total	**878**	**148044.67**

A few of the more established European project developers operating in the Chinese CDM market have shared their views.[40] Generally, EU project developers have expressed some positive views on the current regulatory framework, which is largely seen to facilitate the market in terms of the policy framework in general and CDM policy in particular. Another positive view is that the current CDM market is conducive to the development of new methodologies. Many EU project developers consider new methodologies as a necessity for the further development in the CDM market. As the availability of 'bread and butter' projects using established methodologies will decrease, it will become necessary to develop new methodologies for more advanced projects. Other specific views and concerns include:

- The uncertainties over a post-Kyoto regime are a main concern in terms of defining the development and the degree of their involvement in the CDM market. More specifically, the insecurity surrounding post-2012 developments pose a significant risk to investments in the CDM market. Lengthy procedures considered an important barrier - the process from project approval to the start of project implementation can take well over 12 months. As a result, these organisations cannot expect financial returns for at least 30 months from the beginning of the CDM project process

- The 51% ownership rule is considered a key barrier in the development of CDM projects in China as it significantly limits foreign investment and discourages potential foreign investors to invest in CDM projects in China. The fact that operators cannot completely own or manage the project represents a barrier to technologically innovative investments as it would dramatically increase the risk of their investment. While there are many complaints, the 51% rule was described by some as one of the "*necessary evils with whom you have to live".* Some European operators went so far as to agreed that the rule was fair, as it ensures that the recipient country has full ownership of the project which in turn promotes sustainable development in the country.

- The buyers have usually been more involved in the development of CDM projects than the owners Consultants, in particular, are very often contracted by the buyer to ensure the smooth progression of the project. Buyers on the other hand are involved in activities which would normally fall into the project owner's responsibility. The role of the owners could be strengthened through capacity building programmes targeting owners. In particular, training on the international CDM system, the role of project owners, and CDM project development and monitoring are regarded as a key element for an improved CDM system in China.

- A major concern shared by project owners, developers and buyers is regarding to the slow and complex procedure due to the long project pipeline. Since the huge amount of CDM projects emerges in Chinese market, the capacity of all the stakeholders in the project approval procedure has been challenged. The capacity and working efficiency of DOEs are particular highlighted by project partners as a key challenge. Project developers, together with project owners expressed their expectation on the reform of some regulations and methodology approval system from EB.

- IPR is often highlighted as a barrier to CDM development in China but not as a primary barrier. In fact, many of the current CDM projects do not require advanced or specialised technology and employ readily available technologies.

[40] The views expressed here were gathered through a series of interviews conducted by Development Solutions during 2007 – 2008.

6.3 CDM service centres

Between 2005 and 2007, a total of 27 provincial CDM centres were established[41] with governmental support from, in most cases, the provincial Science & Technology Committees and/or the Regional Development and Reform Committee. In a few cases, the provincial CDM centres had already been established with formal or informal linkages with universities/other academic institutes when established. For example; the CDM Project Centre of Shandong Province was set up jointly by the S&T Committee and Shandong Normal University; Shanxi Air CDM Technique Centre has a strong linkage with Shanxi Fine Working Magnesium Technology Research Institute; Yunnan CDM technology Service Centre was established as an affiliated unit inside Yunnan Province Science and Technology Information Research Institute; and so on.

In addition to local support, all the established centres have received, to various degrees, support in the form of financial and/ or technical assistance from foreign agencies and international organizations. The support was provided through bilateral and multilateral cooperation agreements with the MOST and /or the NDRC. Table 20 summarises some of these arrangements.

Table 20 An overview of the Regional CDM Centres

International cooperation partnership	Domestic organisation/agency	Location of CDM Service Centres
United Nationals Development Programme (UNDP): Carbon Finance for Achieving Millennium Development Goals (MDGs) in China	MOST & China International Centre for Economic and Technical Exchanges (CICETE)	12 provinces (Inner Mongolia, Qinghai, Henan, Xinjiang, etc)
China-Canada: China—Canada CDM Capacity Building Project	MOST	Hebei, Shanxi, Hunan, Zhejiang, Gansu, Ningxia, Shandong(Sino-Canada CDM PDD Development Project)
China-Netherlands(ING): Sino-Dutch CDM Capacity Building Project	MOST & China 21st Century Agenda Management Centre	Fujian, Guangdong, Jiangxi, Chongqing, Heilongjiang
China-Japan(NEDO): Sino-Japan Cooperation Local Capacity Building for Implementation of CDM	MOST	Hebei, Shandong
China-France： Sino-France Capacity Building Cooperation Project	MOST, NDRC, MOFA (Ministry of Foreign Affairs) and China 21st Century Agenda Management Centre	Yunan, Guangxi, Guizhou, Sichuan

The legal status of the provincial CDM service centers differ from one another, depending on their financing sources and the function of the CDM Centers. Some of them are recognized as units of the provincial government, while the majority of them are considered consulting agencies. Generally speaking, the existing CDM Centres can be divided into the following three categories:

- Governmental unit
- State-holding companies

[41] http://cdm.ccchina.gov.cn/web/NewsInfo.asp?Newsld=1984

- Private-holding companies.

The operational praxis and activities of the CDM Centers cover CDM related consulting services, training and capacity building of local stakeholders, regional-policy oriented research and CDM methodology development. A more detailed specification is given in Table 21, based on information collected through interviews with 10 provincial CDM Centres over the course 2008. Nevertheless, depending on human resources capacity and the degree of interaction between the CDM service centres and local governments, the scope of activities and degree of sophistication of consulting services differ substantially across different regions.

Table 21 The General Functions of Provincial CDM Service Centres

CDM consulting	Training &Capacity Building	Policy & Methodology
Project and partner screening	Information dissemination	Regional CDM potential assessment
PDD writing	Training courses on CDM	Regional impact assessment
CDM application	Facilitation conferences	Methodology development
Technical assistance		

Many provincial CDM service centers provide services that are similar to their private consulting sector counterparts. While each CDM center has tended to focus on its own region, an increasing number of these centers have expanded their activities to other provinces. Their business activities are similar to other commercially oriented consulting agencies since a large number of these CDM centers are self-financed or at least are not wholly dependent on public financing.

In most cases, their relatively small scale and limited degree of specialization in terms of both function and technical area has resulted in a limited number of CDM projects that have been developed under these centers, see Table 22. According to interviews, some CDM centers have not yet developed any CDM projects. On the other hand, there are also some exceptions. For example the Hunan CDM Project Service Centre has developed 73 CDM projects, among which 39 have been approved by NDRC with more than 10 projects registered in EB by 25 April 2008.[42] This has brought a total of 2 billion RMB in estimated CERs income so far, and has brought this CDM Center to a competitive position in the consulting market.

Table 22 Performance of CDM Centres (by 1 May 2008)

Title	No. of project (EB-registered)	No. of project (pipeline)
Hebei CDM Project Office	2	6
Hunan CDM project service centre	11	39
Ningxia CDM service centre	5	7
Guizhou CDM Technology&Service Centre	-	3
Shanxi Air CDM Technique Centre	-	1
Yunnan CDM Technical Centre	-	1
Hubei Provincial Service Centre for CDM		3
Total	**18**	**60**

[42] http://www.hncdm.com/About/About_Centre.html

Furthermore, a few provincial CDM services centers, in particular those with strong human resource capacity and local science and technology links, have demonstrated their potential competitiveness in the following aspects:

- Many provincial CDM centres have devoted large resources to capacity building activities, which involve stakeholders from both private and public sectors. These activities have contributed to enhance awareness of CDM among both local enterprises and policy makers.
- Through interactions with local government, the provincial CDM centers have played a role in integrating CDM with regional development across key industrial and energy sectors in their regions. This role can be a potential source of opportunity to move from a narrow project-base towards a more sector-oriented strategy in the regional development.
- While there is a lack of incentives for developing CDM methodology in the private consulting market, a few provincial CDM centres have the potential to conduct methodology development through their co-operation with local universities and research institutes. Furthermore, the knowledge of and experiences gained in local industrial sectors will also strengthen their ability to carry out such research- and technology-intensive consulting services.

Regarding project developers who are purely private sector consulting agencies, their relationship with the CDM Centers can be described as one of competition and, in some cases, co-operation. Experiences differ largely as some cooperate with regional CDM Centres to identify project owners while other organisations regard them as competitors and prefer to approach project owners directly. There is indeed some confusion regarding the role and status of these centres among foreign operators (e.g. particular buyers who do not usually deal with them directly and find it difficult to discern their exact role and their independence, transparency and impartiality).

Given their activities and performance to date, it seems that the CDM Centres have the potential to support regional policy development and capacity strengthening. A few centres have already performed some work in this area such as studies on integrating the national policy of “energy conservation and emission reductions” into the CDM development and research on project development towards a more sustainable energy structure for regional development. However, national coordination and support are extremely important if this positive development is to continue. International co-operation is considered an important resource for capacity building and CDM development at the regional level. Another important role that provincial CDM centres might play is through their research capacity in developing methodologies, the lack of which is a serious bottleneck in the process of CDM market development.

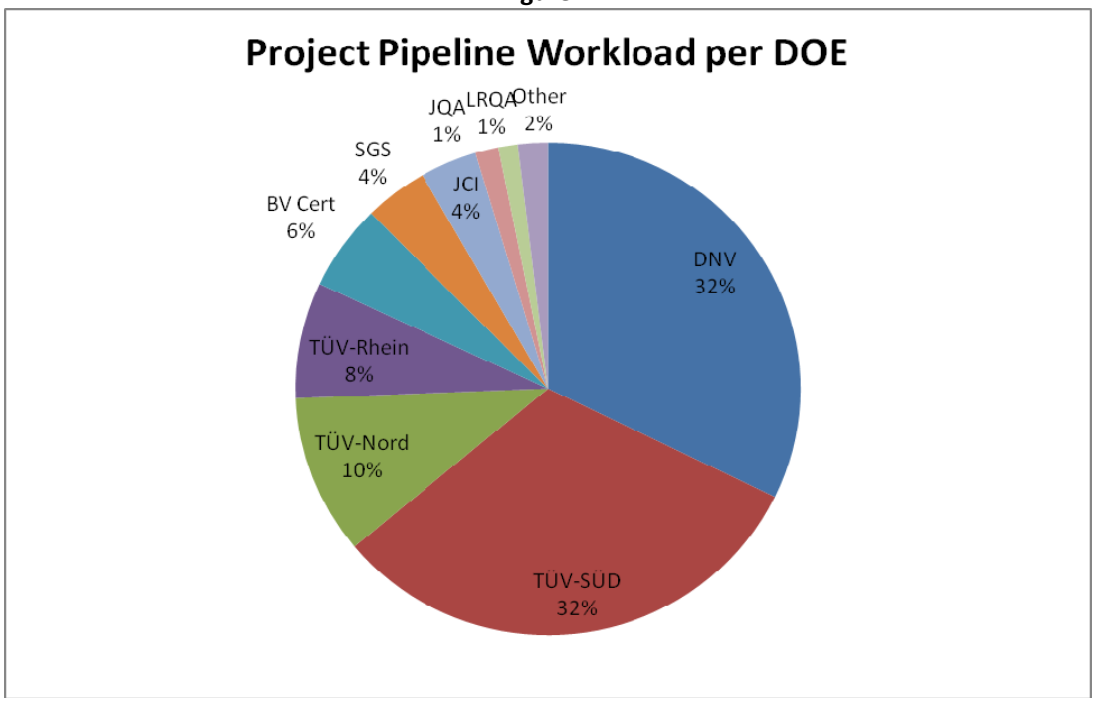
Taking account of both advantages and disadvantages, the provincial CDM centres have the potential to be a key and valuable player in raising CDM awareness such as training project owners in CDM regulations, procedures, project management and monitoring. To achieve this, impartiality and transparency are needed, and their role and status need to be clarified.

6.4 Designated Operating Entities (DOEs)

DOEs, authorised to validate greenhouse gas emission reduction projects and verify/certify the emissions they reduce, are a key stakeholder in the CDM project cycle as they perform a mandatory function within the project cycle. The DOEs in China are all international organisations with no domestic firm having received accreditation as of January 2009. As elucidated in Table 2, DOEs tend to work across the spectrum of project types, with validation services dominated by a small number of firms, demonstrated by the top four DOEs accounting for 82.2% of the pipeline (see diagram 7). With a growing project pipeline, the demand for DOE services is increasing, resulting in longer project approval timelines and a

bottleneck of projects waiting to be validated, causing frustration for project developers and investors.

Figure 4



Source: Data analysis on "UNEP Risoe CDM/JI Pipeline Analysis and Database, January 1 2009

Furthermore, in a move to enforce the environmental integrity of CDM, the CDM EB withdrew the accreditation status of Det Norske Veritasdue (DNV) in December 2008 due to non-conformities with CDM rules. This is significant as the Norwegian based DNV is the leading DOE in China in terms of number of projects with 515 and 32.2% of the pipeline as of 1 January 2009 (see Table 23).

Table 23 Number of CDM projects by DOE by Project Type in China Breakdown

Name	Hydro	% Hydro	Wind	% Wind	EE	% EE	Biogas	% of Biogas	Biomass/ Fuel Switch	% Biomass/ Fuel Switch	Other	% Other	Total	% Total
DNV	215	28.2%	129	42.6%	70	27.6%	54	40.0%	28	30.4%	19	35.2%	515	32.2%
TÜV-SÜD	272	35.7%	56	18.5%	112	44.1%	38	28.1%	22	23.9%	10	18.5%	510	31.9%
TÜV-Nord	107	14.0%	20	6.6%	26	10.2%	9	6.7%	6	6.5%	0	0.0%	168	10.5%
TÜV-Rhein	51	6.7%	34	11.2%	5	2.0%	4	3.0%	24	26.1%	4	7.4%	122	7.6%
BV Cert	28	3.7%	45	14.9%	11	4.3%	0	0.0%	6	6.5%	0	0.0%	90	5.6%
SGS	16	2.1%	12	4.0%	10	3.9%	9	6.7%	4	4.3%	12	22.2%	63	3.9%
JCI	40	5.2%	1	0.3%	6	2.4%	12	8.9%	0	0.0%	0	0.0%	59	3.7%
JQA	1	0.1%	1	0.3%	8	3.1%	4	3.0%	1	1.1%	7	13.0%	22	1.4%
LRQA	7	0.9%	1	0.3%	4	1.6%	5	3.7%	1	1.1%	2	3.7%	20	1.3%
Deloitte	10	1.3%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	10	0.6%
KEMCO	4	0.5%	1	0.3%	2	0.8%	0	0.0%	0	0.0%	0	0.0%	7	0.4%
JACO	7	0.9%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	7	0.4%
KFQ	4	0.5%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	4	0.3%
AENOR	0	0.0%	1	0.3%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	0.1%
CEC	0	0.0%	1	0.3%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	0.1%
CQC	0	0.0%	1	0.3%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	0.1%
	762	100.0%	303	100.0%	254	100.0%	135	100.0%	92	100.0%	54	100.0%	1600	100.0%

Source: Data analysis on "UNEP Risoe CDM/JI Pipeline Analysis and Database, January 1st 2009"

In an effort to build local Chinese capacity to perform validation services, as of January 2009 there were four Chinese AE firms within the DOE accreditation process, which include China Environmental United Certification Center Co., Ltd. (CEC), Tsinghua Coway International, Techtrans Co., Ltd., Dahua Engineering Management Group Ltd. and China Quality Certification Center, (CQC). According to the UNFCCC,[43] to date all four domestic Applicant Entities (AEs) have been issued an indicative letter for completing the desk review and on-site assessment stage of the accreditation process, with Tsinghua and CEC further advanced at the Call for Inputs stage.[44]

The lack of DOEs is a major concern for all CDM stakeholders, as a result Chinese delegates, amongst other nations at the COP/MOP 4 in December 2008 at Poznań , "expressed concern over recent delays in project registration and increase in review requests by the CDM Executive Board" and "highlighted the need to simplify accreditation of DOEs and delegates agreed, inter alia, to request the Board to complete "as its highest priority" revision of the accreditation process for DOEs and develop, by COP/MOP 5, a policy framework for addressing non-compliance by DOEs."[45]

[43] UNFCCC, as of 21 January 2009, http://cdm.unfccc.int/DOE/ListIL/index.html
[44] UNFCCC, as of 21 January 21, 2009, http://cdm.unfccc.int/DOE/CallForInputs/index.html
[45] iisd, 15 December 2008, agenda item FCCC/KP/CMP/2008/4, http://www.iisd.ca/vol12/enb12395e.html,

7 Concluding Remarks

Under UNFCCC, both the EU and China have stated their respective positions clearly. The EU is looking to build and maintain momentum gathered from the EU ETS and its integrated Climate and Energy Package. China has made its interests clear and established a position, building on their own domestic climate and energy policies and has indicated their willingness to assume responsibility in tackling climate change. CDM is one of the links through which common interests and concerns are being addressed.

While there is a growing convergence in terms the aspirations of these two parties on climate issues, there are still possibilities of divergence on how to proceed on identifying *common but differentiated responsibilities*, weighing efforts for mitigation versus support for technology transfer and financial support for developing countries. However, despite some potential stumbling blocks, there is a strong willingness and a number of opportunities which will be conducive to moving forward.

EU ETS Phase III could possibly impose restrictions on the use of CERs. However, this is not an indication of a reduced ambition for deepening cooperation and dialogue with China and other developing countries. Given the breadth and depth of the climate discussion, CDM must be taken in the broader context of sustainable development as well as science and technology cooperation. In other words, restricting CDM does not necessarily close the door on other more innovating and sustainable approaches to address climate change. These ambitions are reflected clearly in the shift of EU's views on how the CDM should be strengthened and streamlined. More specifically CDM is now seen less as a safety valve to mitigate risks to EU enterprises and more as an instrument to promote sustainable development and technology transfer. This is an example where we see convergence between EU and China on climate change.

As China is addressing its own energy security and environmental challenges, it has brought climate change to a higher priority on the agenda because of the co-benefits generated through tackling these immediate issues. CDM plays a key role in supporting China as it engages with the international community on climate. The interest in CDM from the Chinese side is motivated by not only the potential financial rewards but also by the potential for increased access to technology.

While there is broad agreement that technology transfer is linked to carbon market, CDM projects do not necessarily lead to technology transfer. At the government level, the CDM policy framework has been successful at establishing an international carbon market, which we see in the increasing trade volume and uptake across different regions, and deploying different technologies. Further experience is also helping to strengthen the market – better actors, learning by doing, the shift in the types of projects and technologies which are being deployed, which perhaps are a better match with the original intention of CDM.

Future success of CDM depends on engagement from the EU and China as well as the application and enforcement of the right policy mix. China's approach in applying CDM to promote sustainable development will need to sustain transparency and fairness – specifically in terms of setting a level playing field between foreign and domestic actors, between government intervention and market mechanisms and between national priorities and international climate cooperation. Continued engagement and cooperation between the EU and China will be essential throughout the negotiations in the lead up to COP 15 in order to ensure a positive outcome.

On the EU side, the recognition that CDM is not only an important offset/safety valve but also a necessary component of international efforts to tackle climate change is important as it creates the basis for the meaningful participation of developing countries. Continued dialogue and cooperation building

on points of mutual understanding and shared priorities will enable the EU and China to continue closer cooperation on climate change.