

A CHINA ENVIRONMENTAL HEALTH PROJECT RESEARCH BRIEF

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Carbon Trading in China

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The carbon markets and emissions trading systems that were spurred by the Kyoto Protocol represent potentially important solutions to reduce greenhouse gas emissions over the coming decades. In 2008, 4.9 gigatonnes of carbon dioxide equivalent were traded and the global carbon market transaction reached a value of \$125 billion.¹ Among this, \$90 billion came from the European Union Emission Trading Scheme (EU-ETS) and \$32 billion came from the Clean Development Mechanism (CDM). The new carbon dioxide (CO₂) emissions trading scheme has been increasingly attractive to China, a country not only with the world's highest CO₂ emissions but also one that struggles with balancing economic development and environmental degradation. The environmental impacts of climate change pose large threats to the health of the economy and people of China. (See CEHP Research Brief on Climate Impacts). Reducing emissions of carbon dioxide and other greenhouse gases is increasingly seen by Chinese policymakers as an important goal for reducing domestic pollution.

Carbon trading is one of many creative approaches the international community has generated to minimize the increase of greenhouse gas emissions. Chinese government and enterprises, seeing the potential of this growing new market, decided to closely follow this emerging opportunity. By selling their surplus carbon credits, qualified Chinese companies have been able to finance alternative energy projects. This scheme is expected to help them meet the energy conservation goals targeted in government's Eleventh Five-Year Program, which aims to reduce energy consumption per unit of GDP by 20 percent between 2006 and 2010.² However, the development of carbon market in China is currently facing both internal barriers such as China's current energy policy and external barriers such as the uncertainty of post-2012 climate regime. Unless these barriers are fully resolved, China may not be able to recognize the full potential of the carbon market.

CURRENT STATE OF CHINA'S CARBON MARKETS

In order to fully understand the current development of carbon markets in China, two types of markets must be examined: the compliance market and the voluntary market.

The compliance market is mainly based on the CDM, which is one of the emissions trading schemes created under the Kyoto Protocol. Under the United Nations Framework Convention on Climate Change (UNFCCC), countries with emission caps are listed as Annex I countries, whose greenhouse gas emissions cannot exceed their emission ceiling within certain timeframe. China, currently not listed as one of the Annex I countries, does not have an emission reduction target and is not allowed to participate in the international emission trading market. However, Kyoto Protocol allows Annex I countries to implement emission reduction projects registered under CDM at Non-Annex I countries.³ By purchasing Certified Emission Reductions (CERs) generated from these CDM projects, Annex I countries can offset their CO₂ emissions and provide Non-Annex I countries resources and technology to reduce their carbon intensity.⁴ Other than the project-based carbon transactions under the Kyoto mechanisms, there are allowance-based transactions under regional cap-and-trade system such as EU-ETS.

There is also a voluntary market framework outside the Kyoto compliance market, in which carbon credits are exchanged using Verified/Voluntary Emissions Reductions (VERs). There are two main

drivers pushing rapid expansion of the voluntary market globally: (1) its approval process is much less complex than that under CDM and (2) the uncertainty regarding the role of the CDM system within the post-2012 global climate change agreements.⁵

China currently plays a very active role in the CDM market. According to PriceWaterhouseCoopers, China's CDM market is estimated at \$8 billion per year.⁶ China now has 396 registered CDM projects, slightly behind India.⁷ Some estimate that Chinese projects will reduce 120 million tons of CO₂ emissions annually—approximately 53 percent of the total registered annual reduction until 2012.⁸ The World Bank reports that China's CDM projects took over 73 percent market share of the 2007 transacted volume and are increasingly the destination for buyers of carbon credits.⁹ In this sense, China dominates the primary CER transaction market.

Despite its dominant position in the world's CDM supply, Chinese CDM applications received their first rejections in late 2008. From September to October 2008, seven Chinese CDM applications—all of which were projects related to power generation from coking waste heat utilization—were rejected by the CDM Executive Board.¹⁰ According to the Institute of Global Environment Strategies, the reasons for the rejections were almost exclusively additionality concerns.¹¹ Additionality refers to the requirement that more emission reduction needs to be achieved in addition to what would have occurred without the proposed project. Many projects in the pipeline in China have been questioned regarding their additionality. The generation of electricity through hydropower and wind is especially questionable due to a continuous government push for these projects, which indicates these projects would be launched regardless of the existence of CDM funding. It is not clear whether these recent rejections indicate the Executive Board's attempt to target China by reinforcing the additionality issue. However, Chinese government officials do find it worrisome that the quality of CDM project applications from China is declining. The head of the climate change office within China's National Development and Reform Commission criticized careless mistakes made by Chinese businesses and their lack of understanding of CDM project development during two separate occasions at the China Carbon Forum 2008¹² and the 2008 China Power Business Convention.¹³

CARBON MARKET GROWTH, UNCERTAINTIES AND OBSTACLES

China started approving CDM projects in 2005 and successfully registered 3 projects at the CDM Executive Board that year. This number has dramatically increased, reaching 396 registered projects by February of 2009.¹⁴

Despite the significant growth of the global carbon market during the past years, there is an observed slowdown of CDM project registration and reduction of primary CERs transactions.¹⁵ Globally, the value of primary CERs transacted in 2008 decreased to 5.8 billion, a 20 percent drop from 2007. Such a trend is also reflected in the Chinese carbon market. Based on UNEP Risoe Centre data, in 2007, the Chinese CDM project pipeline tripled that of 2006, while in 2008 the total number of projects in the pipeline did not reach the 2007 levels. Specifically, the growth of China's CDM project pipeline has reduced from a high of 235 during the third quarter of 2007 to about 170 during the fourth quarter of 2008.¹⁶ In 2008, Chinese CDM projects in the pipeline requested 360 million CERs until the end of 2012 compared to 500 million CERs in 2007.¹⁷

TWO MAIN UNCERTAINTIES

Two main uncertainties are slowing down CDM market growth. First, the commitment period of the Kyoto Protocol will end in 2012. No international agreement has been negotiated beyond this timeframe. The uncertainty over the future framework and price makes market players hesitant to develop projects that reach beyond 2012.¹⁸ New project registration takes a long time.¹⁹ The transaction costs can reach \$200,000.²⁰ The uncertainty of the post-2012 CDM market makes companies worry about the financial flow they can expect after 2012.

Second, the majority of the CDM contracts are done through a “pay on delivery” system. Projects will not receive payments until carbon credits are “fully validated, certified, registered, and transferred.”²¹ The lag in cash flow is problematic for projects that involve new technologies, due to the high risk of returns. These factors have shifted buyers’ interests into projects with short finish times and quick returns.²² As the number of “low hanging fruit” projects is decreasing, new project developments will face more difficulties.

THE DEVELOPMENT OF LOCAL EMISSION EXCHANGES

Based on a World Bank report, a secondary market for carbon credits has grown rapidly over the past years²³. A secondary market is where carbon credits are traded after the initial sale transaction. A large segment of this market involves the trading of guaranteed-delivery CERs (gCERs) which offers buyers with guaranteed quality and timing of deliveries.²⁴ Different emission exchanges play an important role in the secondary market. The International Carbon Action Partnership was set up in order to incorporate all these exchanges into a unified global carbon trading system.²⁵ China was not involved in this initiative; however, the opening of three environment exchanges (in Beijing, Shanghai, Tianjin) in China between August and October 2008 shows the Chinese government’s enthusiasm for setting up a comprehensive secondary carbon trading platform as soon as possible.

On 5 August 2008, the Beijing Environment Exchange and the Shanghai Environment and Energy Exchange were established on the same day within less than two hours. The competition to launch the first Chinese environment exchange shows the market’s enthusiasm to start an exchange in the environment and energy sector. The Tianjin Emission Exchange was set up in October 2008 through a partnership between the Chicago Climate Exchange (CCX), the China National Petroleum Corporation Assets Management (CNPCAM), and the Tianjin Property Rights Exchange (TPRE).²⁶ All three exchanges are still in the exploratory stages, currently focusing on emissions trading of sulfur dioxide (SO₂) and water pollutants rather than carbon dioxide (CO₂). However, the local exchanges provide a new trading platform for foreign buyers to purchase emissions credits, bypassing CDM project developers.

OBSTACLES IN CREATING A CAP AND TRADE SYSTEM

Despite the recent surge of environment exchanges, China still faces a number of obstacles when constructing the carbon markets. According to Dr. Eric Zusman, a climate policy researcher at the Institute for Global Environment Strategies in Japan, China faces two main obstacles in creating its own cap and trade system.²⁷

First, China lacks the mature financial market and human capacity to handle the trading. According to Dr. Zusman, “a trading regime requires creating, allocating, and enforcing permits; [China] is essentially developing a new set of property rights. As the problems with creating a market for sulfur dioxide in China have attested, there is uncertainty as to whether or not China has a sufficient administrative capacity to handle such an endeavor right now.”²⁸

Second, as a non-Annex I party, China does not face the responsibility of reducing greenhouse gas emissions. Thus, there is no internal demand for carbon credits. However, discussions during the China Carbon Forum 2008 recommended that the Chinese environmental exchanges list carbon credits generated in non-Chinese companies.²⁹ It is expected that the launching of local environmental exchanges can bring transparency to carbon pricing and help Chinese companies gain better positions in the carbon trading market.

The existing CDM policy in China also creates certain barriers for the development of a mature carbon market. Based on the *Measures for Operation and Management of Clean Development Mechanism Projects in China*, CDM project to be implemented in China should be owned by Chinese funded or

Chinese-holding enterprises.³⁰ While resulting emissions reduction belongs to the project owner, the revenue is split between the Chinese government and the project owner.³¹ These extra restrictions on project and revenue ownership spur criticism and debate from foreign entities and investors. Further, the Chinese government set price at \$10 per ton for primary CERs in China is considered as the tacit price floor of the global primary carbon market.³² However, with current global CERs traded at \$11.5, a significant drop from past year, CDM project developers have much less financial incentive to buy primary carbon credits from the Chinese market.³³

GLOBAL SUPPORT TO DEAL WITH UNCERTAINTIES OF POST-2012 CARBON MARKETS

Several international organizations and donor countries have collaborated with Chinese entities to assist in the capacity building and policy development of China's primary carbon market. While the majority of the donor countries focus on CDM project development, the World Bank and the Asian Development Bank (ADB) have placed special attention on ensuring the continuity between the current and post-2012 carbon market.³⁴

Instead of the "pay on delivery" mechanism, the ADB provides financing and technical assistance during the early stages of project development through its Carbon Market Initiative. ADB is planning an innovative fund called the "Future Carbon Fund" that will purchase carbon credits expected to be generated up to the year 2020. This fund will be operational by the first quarter of 2009.³⁵

The World Bank currently manages twelve different carbon funds and facilities in China. Instead of providing grants to projects, the World Bank purchases emission reductions that have been verified by a third-party auditor.³⁶ The bank also provides small portions of loans to help projects in China to take off.

INCENTIVES AND QUESTIONS OF OFFSET EFFECTIVENESS

Chinese CERs are generated from three main types of projects: Trifluoromethane (HFC23); renewable energy; and energy efficiency.³⁷ Based on a WWF-Hong Kong study, the number of hydropower and energy efficiency projects is increasing dramatically.³⁸ In terms of CER generation, alternative energy projects are also showing significant growth rates. According to Dr. Chen Hongbo from the Research Center for Sustainable Development under the Chinese Academy of Social Sciences, China's current CDM project development has three priority areas: energy efficiency, renewable energy, and methane recovery and utilization.³⁹

Many people also question the real impact CDM projects can have on China's national goal of emissions reduction. HFC23 destruction related projects, for example, can only yield quick financial benefits rather than more advanced emission reduction technology. As a byproduct of the manufacturing of refrigerant HFC22, HFC23 brings in a global warming potential 11,700 times greater than CO₂.⁴⁰ Although reduction of HFC23 can generate substantial greenhouse gas emission reduction, some worry about the risk of a "perverse incentive" that factories may generate more HFC22 in order to sell more HFC23-reduction CDM credits.⁴¹ The estimated cost of destroying HFC23 is only \$0.2/ton of CO₂ equivalent while estimated reduction cost for renewable energy is about \$10/ton.⁴² Considering the market price of carbon currently at about \$18/ton—a steep fall from \$30/ton since August—projects like HFC23 destruction that can generate large financial benefits are inevitably attractive.⁴³ Based on the UNEP pipeline data, China currently has ten registered HFC23 projects, generating about 59 million tons of CO₂ equivalent greenhouse gas emission reduction a year.⁴⁴ However, According to Dr. Joanna Lewis (a China energy researcher at Georgetown University), the real incentive for Chinese businesses to reduce their greenhouse gas emissions does not come from the CDM, but from the energy conservation goals stated in the 11th Five-Year Program. Notably, the CDM has not yet brought much change in China's energy mix.⁴⁵

To discourage superfluous HFC23 projects and to collect a portion of the revenue stream, the Chinese government has imposed a 65 percent tax on revenues generated from HFC23 destruction-related CDM projects and created the China CDM Fund to support the development of other climate change-related activities. Taxes on NO₂ projects are 30 percent while renewable energy projects that are considered as development priority face 2 percent levies.⁴⁶ The Asian Development Bank also provides technical assistance, in terms of capacity building, to help China manage the China CDM Fund.⁴⁷

THE ROLE OF HONG KONG

Its location and well developed financial infrastructure provide Hong Kong the ambition to become a potential carbon trading hub of Asia.⁴⁸ However, this vision faces some challenges.

In June 2008, the Chinese government announced *Arrangements for the Implementation of Clean Development Mechanism Projects in the Hong Kong Special Administrative Region* which allows companies in Hong Kong to participate in CDM projects and sell CERs generated from projects based in Hong Kong.⁴⁹ The Hong Kong Environmental Protection Department will act as a liaison to collect CDM project applications from Hong Kong and pass them to the National Development and Reform Commission for approval. Also, CDM projects based in Hong Kong do not face the CDM levy their mainland counterparts face.⁵⁰ However, companies in Hong Kong still cannot generate CERs from CDM projects in mainland China and continue to be treated as foreign entities.⁵¹ This restriction means Hong Kong companies can not carry out CDM projects on plants they own inside mainland China. It appears likely that these new efforts to encourage the Hong Kong carbon trading scheme were introduced too late. Many emissions reduction projects in Hong Kong that could have benefited from the CDM have already been launched, which means they do not meet the additionality requirement.⁵² However, investors and entities from Hong Kong still show great interest in the global carbon market and are approaching the voluntary market even though the selling price would be much lower than the primary CERs price.⁵³

THE NEXT STEP

Although the large number of CDM projects in the pipeline suggests China still has a great potential for CO₂ emissions reductions, many have criticized Chinese businesses for “getting money by doing nothing.” Considering that the majority of China’s CERs consists of non-carbon offsets such as HFC destruction, current CDM development in China has not yet made a substantial impact on the existing energy infrastructure. China has come under considerable international pressure to accept hard emission reduction targets, however, most people believe China will not make stronger reduction commitments until a post-2012 regime with a strong U.S. participation established.

One alternative strategy that has increasingly been mentioned to encourage CO₂ reductions and more carbon trading in China is a sector-based approach which targets CO₂ emission reduction within a specific sector instead of the entire economy. According to Ms. Jennifer Morgan, director of the global climate change program of E3G, an EU-China initiative is carrying out feasibility studies focusing on the cement, iron, and steel sectors.⁵⁴ The hope is that China will take a firm commitment of emission reduction in these segments and create more internal incentives to further expand its carbon market activities. Other than the sector-based approach, carbon crediting based on national appropriate mitigation actions (NAMAs) is also widely discussed. Non-Annex I countries can earn carbon credits by generating verified mitigations using NAMAs.⁵⁵

Another strategy is the so-called Programmatic CDM (PCDM) that aims to ease the project development and application process by allowing projects to bundle into an eligible CDM program activity. At a China Environment Forum meeting held in November 2008, Dr. Chen Hongbo suggested that the PCDM could be especially beneficial for projects within rural areas because the size of the projects is relatively small.⁵⁶ The PCDM approach can significantly shorten the application

procedure and reduce the transaction costs. Dr. Chen noted a few remaining challenges to PCDM, namely that bundling up of these small projects would require more coordination and requirements for the CDM would need to be revised if the PCDM was introduced.

As the dominant supplier of carbon credits within the global carbon market, China certainly stands at a great position in this relatively new market. The launch of three environmental exchanges also indicates China's efforts to try out different market mechanisms in order to better understand and exploit this new trading scheme. However, the carbon market today can not yet deliver the emission reductions that were anticipated. The Chinese government and businesses still treat carbon trading as an extra stream of profits rather than a tool that they can utilize to achieve real emission reductions. While playing a very active role in the compliance market, China's voluntary and secondary market development remains uncertain. Ultimately, without a hard CO₂ emissions reduction target—even in limited high-energy intensive industries—it is less likely carbon trading will significantly spur enough investment and true abatement activities in China.

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