

## **Focus: The Environment**

### **A Market Solution**

#### **Instituting market-based mechanisms may be an effective way to address China's environmental woes**

by Richard L. Sandor

Emerging economies struggling to balance the need for economic development with the need for a cleaner environment are beginning to consider market-based mechanisms such as emissions trading to address local air quality and global climate change. These emerging markets, particularly China, bring new responsibilities, risks, and opportunities for corporations and traders. The International Energy Agency reported in its 2007 *World Energy Outlook* that China will become one of the biggest contributors to global increases in energy use and emissions by 2030. The report notes that China will surpass the United States in energy consumption by 2010 and that projected sulfur dioxide (SO<sub>2</sub>) emissions will rise from 26 million tons in 2005 to 30 million tons in 2030. China is turning to these pressing environmental issues with a heightened sense of urgency, and market-based mechanisms could serve as a useful tool to address them.

Over the last 40 years, futures trading has undergone subtle but important changes. It has expanded from trade in primary commodities to incorporate financial commodities, such as interest rate and currency futures and stock index futures. Financial markets are now beginning to address environmental issues, and environment-related trading holds great market potential.

#### **Quick Glance**

- Projected to become the biggest emitter of greenhouse gases in the next decade, China is looking for various solutions, including market-based mechanisms, to address its pressing environmental concerns.
- Creating a market for emissions trading could help to achieve China's twin goals of curbing pollution and perpetuating economic growth.
- Any design for an emissions exchange market should take into account flexibility, transparency, enforcement, and coordination among government bodies.

#### **The global carbon trade market**

As the issue of global warming receives intensified and sustained attention from corporate leaders to academics and average citizens, market-based mechanisms such as emissions trading—which allows companies and other entities to buy and sell "credits" earned from emission reductions pursuant to an emissions cap—have become widely accepted as a cost-effective method of addressing climate change and other environmental concerns. Market-based mechanisms are tools that can complement regulatory systems by providing price transparency, reliability, and flexibility.

The global market in greenhouse gases (GHGs), sometimes also referred to as the "carbon market," was valued at more than \$30 billion in 2006, a 200 percent jump over 2005 figures, according to the World Bank, and daily traded volume averaged about 4.4 million metric tons, worth roughly \$100 million. The Chicago Climate Exchange (CCX) (see [The Chicago Climate Exchange](#)) saw its traded volume soar from 10.8 million metric tons of carbon dioxide (CO<sub>2</sub>) in 2006 to more than 17.4 million in 2007. The global carbon market is also attracting diverse entrants—from small entrepreneurs in India to farmers in Cambodia—all of whom are exploring the possibility of entering the global GHG market, often through the creation of mitigation or offset programs.

This surge of interest is occurring in mandatory compliance markets, such as the EU Emissions Trading Scheme (ETS), and CCX's legally binding voluntary programs, signaling that global markets for emissions trading may be maturing.

### **Will China embrace market-based environmental solutions?**

With CO<sub>2</sub> emission levels projected to account for more than one-quarter of the global total by 2030, China is looking for ways to curb emissions (see [Emissions Trading in China](#)). One successful program it has been studying is the US cap-and-trade program for SO<sub>2</sub>. In 1995, the United States established a cap-and-trade system to reduce SO<sub>2</sub> emissions, which cause acid rain, under the 1990 US Clean Air Act Amendments.

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Under the cap-and-trade program, total emissions are capped, and polluting entities are allotted an emissions quota. Entities that emit less than their quota may sell the remainder to those that emit more than their quota, thus creating an economic incentive to reduce emissions. According to the US Environmental Protection Agency (EPA), the program in 2005 had reduced SO<sub>2</sub> emissions by more than 5.5 million tons from 1990 levels, or roughly 35 percent of total emissions in the power sector. While the program will cost about \$3 billion per year by 2010, the environmental and health benefits will total more than \$100 billion, according to the EPA.

China could also use such a cap-and-trade program to address its mounting GHG emissions. Such a program would not only help Chinese industries generate new revenue but also increase energy efficiency. A cap-and-trade program would provide critical flexibility, price transparency, and a rules-based system to support sales of project-based credits from China and help expand the nation's knowledge of energy efficiency and emission reductions. China understands the GHG problem, has ratified the Kyoto Protocol, and actively participates in the Clean Development Mechanism, one of three mechanisms under the Kyoto Protocol that allows participants to earn "certified emission reductions" based on their carbon-reduction efforts (see the *CBR*, November-December 2002, [The Clean Development Mechanism in China](#)).

In recent years, China has notably stepped up its focus on the environment, driven by increasing incidents of public unrest related to pollution as well as statistics that show the poor state of its environment (see [China Data: Environmental Report Card](#)). There is considerable interest in and enthusiasm for, developing market-based solutions to environmental issues in China, as shown by the numerous studies conducted by Chinese and international experts over the years on the use of market-based mechanisms to address problems such as SO<sub>2</sub> emissions and the impact of GHGs. Perhaps a sign of growing interest in emissions trading exchanges in China, Beijing Shenwu Thermal Energy Technology Co. Ltd. joined CCX in 2006 as its first China-based member.

As the *CBR* went to press, the 13th United Nations Climate Change Conference was convening in Bali, Indonesia. The international community assembled at the conference will likely look to China to play a leading role in addressing the issue of climate change. Despite initial US and PRC objections to mandatory GHG reduction levels proposed by the European Union, reports have emerged that indicate a compromise may soon be reached and a final agreement signed.

If China decides to pursue a route that takes market-based solutions as part of its overall emissions-reduction strategy, any market design must take into account specific Chinese economic conditions and provide structures to ensure price transparency, effective monitoring and enforcement, and other attributes of a functioning market.

## **The Chicago Climate Exchange**

Established in 2003 as the world's first, and North America's only, multinational and multi-sector marketplace for reducing and trading greenhouse gas (GHG) emissions, the Chicago Climate Exchange (CCX) is a voluntary but legally binding program that allows participants to reach their emissions-reduction objectives through onsite emissions-reductions, allowance trading, and the use of various tradable offset projects. (The CCX Environmental Compliance Committee oversees member compliance with reduction targets. Members that do not meet the targets must purchase Carbon Financial Instrument contracts through CCX to meet their annual reduction requirements.)

CCX has a diverse membership, boasting more than 360 global entities. Members fall into three categories: emitters, who commit to reduce their emissions; indirect emitters, who commit to offset their energy use; and other participants, including offset and liquidity providers. The exchange's members span four continents, and they have already cut their emissions by more than 23.5 million metric tons of carbon dioxide worldwide. Recent expansion in CCX membership means that the program's legally binding reduction commitments—4 percent below baseline (annual average emissions from 1998-2001) during Phase I (2003-06) and 6 percent below baseline during Phase II (2007-10)—now cover 540 million metric tons of carbon dioxide equivalent, which is more industrial GHG emissions than any other national emissions-reduction program. Phase III is currently in the nascent stage of planning.

The CCX offset model includes projects in forestry, agriculture, renewable fuels, and fuel efficiency and allows rural areas to bring environmental projects to the market and participate in new income opportunities. Not only can such mitigation projects help address climate change challenges, they can also be significant sources of income in poor and rural areas. In fact, reducing poverty is a key goal of the Clean Development Mechanism (CDM), which was established through the Kyoto Protocol to allow developing countries to establish GHG mitigation projects that would also generate revenue through the sale of carbon credits and increased local investment.

Meanwhile, CCX has registered several projects—including innovative approaches to energy efficiency and heat recovery—provided by PRC enterprises that, for various reasons, do not fall under the CDM framework or timetable. This serves CCX's broader goals of building market institutions and infrastructure, developing human capital in environmental trading, and sustaining a viable multi-sector and multinational system for GHG emissions trading.

CCX and its participants are currently building the infrastructure and market mechanisms that can provide price signals and incentives for industry to shift toward cleaner and more efficient use of energy to reduce GHG emissions. Price transparency provided through CCX's electronic trading platform helps businesses, governments, and entrepreneurs to gauge investment return and the value of innovation. In fact, entrepreneurs have already used CCX prices to secure investment to finance promising new technologies. Existing businesses can also gauge which investments will yield the highest level of GHG emission reductions at the lowest cost.

### **Case Study: CCX's Experience in the United States**

In the United States, CCX provides an effective vehicle for farmers and foresters to deliver GHG emissions-reduction credits from carbon sink activities to the market place. Through the agricultural offset program, more than 1 million acres of conservation tillage and grassland in several midwestern states have been registered, verified, and sold through the exchange, as well as several agricultural methane destruction projects. The forestry offset program includes standardized protocols for reforestation, afforestation, and avoided deforestation. In addition to several commercial forest companies, CCX currently has forest offsets registered in Costa Rica. These programs—along with emission audits, CCX's electronic trading platform, and a self-governance system—form an end-to-end carbon market infrastructure for participants of the exchange.

CCX is also active in the market for criteria pollutants—six common air pollutants including carbon monoxide and sulfur and nitrogen oxides—covered by the mandatory cap-and-trade program created under the US Clean Air Act Amendments in 1990. CCX's wholly owned subsidiary, the Chicago Climate Futures Exchange (CCFE), is the world's first environmental derivatives exchange that handles the criteria pollutants market. As the market developed, market participants needed hedging tools to manage risk in a cost-effective way. CCFE currently offers standardized and cleared Sulfur Financial Instrument futures and options contracts and Nitrogen Financial Instrument futures and options contracts. CCFE's participants may secure transparent pricing, standardized futures, and options contracts on an anonymous electronic trading platform. The hedging tools offered by CCFE, including prompt and deferred years for both futures and options, have increased liquidity and eased volatility in the sulfur dioxide market. To date, the sulfur dioxide program has formed a solid institutional base in terms of compliance, trade, and environmental performance.

### **A nascent market with potential**

Participants in CCX have achieved significant reductions and gained practical experience in building an efficient emissions management and monitoring system. The recent successes of CCX and other similar exchanges mark what many analysts consider the beginning stage of a global GHG market that is destined to blossom into one of the biggest financial markets in the world. Given China's increasing emphasis on energy efficiency, renewable energy, and improved air quality, the adoption of market-based mechanisms could offer a flexible and cost-effective path to achieving the twin goals of maximum environmental benefit and economic growth.

—Richard L. Sandor

### **Emissions Trading in China**

China has been researching various emission trading schemes since the early 1990s and has collaborated extensively with the US Environmental Protection Agency (EPA). In the last decade, China set up several pilot programs to trade sulfur dioxide emissions, notably in Benxi, Liaoning; Taiyuan, Shanxi; and Nantong, Jiangsu. The programs in Benxi and Nantong, part of a cooperative project between the PRC State Environmental Protection Administration (SEPA), EPA, and the US-based nongovernmental organization Environmental Defense, were later extended to four provinces (Henan, Jiangsu, Shandong, and Shanxi) and three cities (Liuzhou, Shanghai, and Tianjin), according to a May 2003 report from the US embassy in Beijing.

In February 2007, the United Nations Development Program (UNDP), the PRC Ministry of Science and Technology, and the PRC Ministry of Commerce jointly announced a project to expand the Clean Development Mechanism (CDM) Framework in 12 western provinces. The \$1.7 million project, largely funded by ArcelorMittal, will establish CDM technical service centers in the 12 provinces. The project aims to improve access to sustainable resources in western China and "use carbon trading as a tool to generate income for impoverished communities in China's western region by increasing investment and job opportunities through promoting 'green' industry," according to a UNDP press release.

The Beijing Equity Exchange also announced in November 2007 plans to set up an exchange to handle environmental pollutants. No timeline was given for the exchange's establishment. Also in November, China established its first CDM fund, which will be managed by the Ministry of Finance and will receive \$3 billion from the \$15 billion generated by the 885 CDM projects currently in China, according to official reports. These projects—which are expected to provide more than 1 billion metric tons of carbon credits—aim to improve energy efficiency and use clean technology to generate power.

### **More work to be done**

These pilot projects have given China some emissions trading experience, but the country likely still needs to take several steps before it can set up an effective trading system. First, analysts seem to agree that China needs a formal legal structure for emissions trading, including an effective compliance system. As with other laws in China, enforcement will be crucial. Beijing will also have to establish a quota-allocation method, a national registry or tracking system for quotas, and a way to measure and verify emissions. For trading schemes that involve the power sector, price reform is also an issue. Finally, an effective trading system will require consistent coordination among government actors at all levels.

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