

China

The World's Carbon Markets: A Case Study Guide to Emissions Trading

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NOTE: Unless otherwise specified, information in this case study is taken from the National Development and Reform Commission's "Market Readiness Proposal (MRP): Establishing a National Emission Trading Scheme in China" dated February 2013.¹

Environmental Policy Overview:

In China, administrative bodies developing mechanisms to fight climate change include the National Development and Reform Commission (NDRC), the National Leading Group to Address Climate Change, various ministries, and representatives of localities and sectors. China's climate change policy system is based on *China's National Climate Change Program* and *The Outline of the Twelfth Five-Year Plan for National Economic and Social Development* (FYP 12, which covers 2011-2015), and special plans and work programs within various sectors and localities support these policies. In addition, the 2009 Resolution of the Standing Committee of the National People's Congress, *Making Active Response to Climate Change*, requires that the government's work plan integrate enacted climate-change related laws.

NDRC indicates that China's climate change-related goals for 2020 include the following:

- Reduce CO₂ per unit of GDP by 40-45% relative to 2005.
- Increase the ratio of non-fossil energy to the consumption of primary energy to 15%.

In addition, goals to be achieved by FYP 12's completion, or the end of 2015, include:

- Relative to the end of the 11th Five-Year Plan (FYP 11), reduce CO₂ per unit of GDP by 17%.
- Reduce national energy consumption per unit of GDP by 16% relative to the end of FYP 11. According to the NDRC, the achievement of this goal will lead to energy-saving capacity of 300 million tons of coal equivalent (tce).
- Increase the ratio of non-fossil energy to the consumption of primary energy to 11.4%.
- Increase acreage of new forests by 12.5 million hectares relative to the end of FYP 11, with forest growing stock increased by 600 million cubic meters and forest coverage raised to 21.66%.²
- Total renewable energy consumption that reaches 478 million tce, or 9.5% of the country's projected energy mix.

To implement greenhouse gas (GHG) emissions targets set in FYP 12, in December 2011 the State Council released the *Work Plan for Greenhouse Gas Emissions Control during the 12th Five-Year Plan Period*. In this document, the national goal is disaggregated into local GHG emissions targets.

Citing data from the International Energy Agency (IEA), NDRC indicates that China's emissions intensity fell 53% from 4.97 kgCO₂/US\$ in 1990 (constant 2000 U.S. dollar) to 2.33 kgCO₂/US\$ in 2009. For the same period, the

world's average emissions intensity dropped by 15%, and the average OECD country's emissions intensity decreased by 25%. IEA data also indicates that China's per capita CO₂ emissions from fossil fuel combustion was 5.13, or 52% of the average OECD country, in 2009. In terms of absolute emissions, however, China's have increased dramatically over the past three decades. According to NDRC, "in light of its national circumstances and development stage, the upward trend of energy consumption and GHG emissions of China cannot be changed fundamentally in the short term."

Major factors influencing the expected upward trend in absolute emissions in the near future include:

- (1) **Population Growth and accelerating urbanization:** According to China's *Second National Assessment Report on Climate Change*, China's 2010 population of 1.34 billion is expected to increase to 1.44 billion by 2020 and peak at 1.47 billion sometime between 2030 and 2040. Based on China's 2010 per capita energy consumption of 2.42 tce, population-driven growth in energy consumption is projected to be 315 million tce. In addition, NDRC notes, "China still has a long way to go in urbanization. It is estimated that by 2020 the newly added urban residents migrated from rural areas will stand at about 200 million. At present, the average per capita energy consumption of urban residents is two times that of rural residents."
- (2) **Economic Development:** For 2000-2009, China's average annual rate of GDP growth was 9%; its 2009 GDP of 34.1 trillion Yuan was 3.4 times its 2000 GDP. Over that same period, China's emissions from fossil fuel combustion increased to 6.8 billion tons in 2009, 2.2 times the 2000 level (See Figure 1). According to FYP 12, China's annual growth rate for coming years will probably be slightly lower, at 7.5%. The *Second National Assessment Report on Climate Change* estimates, however, that per capita GDP will be less than \$10,000. According to NDRC, "world experience has shown that before per capita GDP reaches within the range of \$10,000 to \$15,000, per capita CO₂ emission growth normally follows the high growth rate of GDP, indicating continuous growth rate of energy consumption and CO₂ emissions."

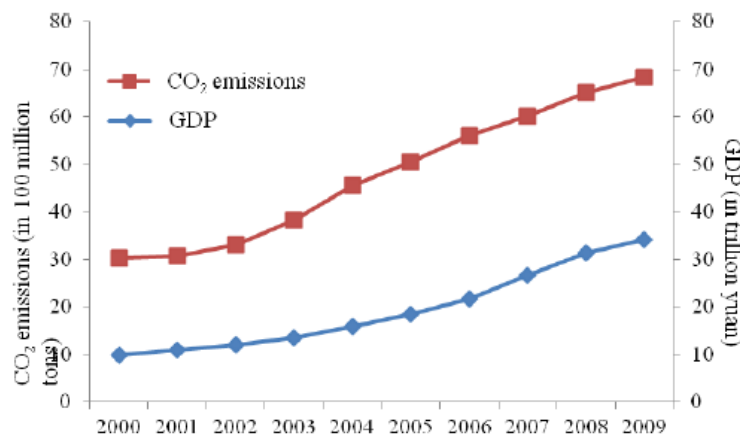


Figure 1 China's GDP and CO₂ emissions growth

Domestic Markets:

In a November 2011 white paper titled "China's Policies and Actions for Addressing Climate Change," the State Council of The People's Republic of China states its intentions to:

1. "Organize provinces, autonomous regions and municipalities chosen to **undertake pilot projects** to compile low-carbon development plans, actively explore low-carbon development modes with local characteristics, take the lead in formulating policies, systems and mechanisms conducive to low-carbon development, and speed up the establishment of industrial systems and consumption patterns."³

2. “Drawing on the experience of the international carbon emissions trading market while taking into consideration its actual conditions, **gradually promote the establishment of a carbon emissions trading market...** and realize the objective of controlling greenhouse gas emissions at minimum cost.”⁴

At present, China does not have a mandatory national emissions trading system (ETS). The country does, however, have experience with climate change-related market mechanisms, including voluntary emissions trading and development of pilot ETS at state and city levels. NDRC states that China aims to establish a national ETS during its Thirteenth Five-Year Plan (FYP 13, which covers 2016-2020), and the country is currently considering frameworks of such a potential policy.

Voluntary Emissions Trading

Beijing, Shanghai, and Tianjin set up emissions trading exchanges in 2008. Since then, voluntary emissions trading has arisen in China, and an array of technical standards and financial channels have been established. A voluntary carbon standard, called the “panda standard”, was introduced in 2009. In June 2012, NDRC released the *Interim Regulation for the Trading of China’s Voluntary GHG Emission Reduction*. This regulation will establish and implement a national level framework for voluntary carbon market trading, including a trading process framework, a regulation framework, and a technology supporting system. The goal of such a framework is to standardize voluntary emissions reductions transactions and improve enterprises’ incentives to participate. In October 2012, NDRC released *Guidelines on Validation and Certification of Voluntary Greenhouse Gas Emission Reduction Projects*. This document specifies and clarifies technical and non-technical requirements for validation and certification.

Pilot ETSS

Through the issuance of *The Notice on Carrying Out the Work of Carbon Emissions Trading Pilot Program* in November 2011, the General Office of the NDRC selected five cities (Beijing, Tianjin, Chongqing, Shanghai, and Shenzhen) and two provinces (Hubei and Guangdong) to submit plans for pilot ETS development.⁵ These pilots aim to propel China towards its FYP 12 goal of “gradually establishing an emissions trading market”, and the seven jurisdictions for pilot ETS are basing their individual policy frameworks on both international examples of ETS and emissions market experience within China.



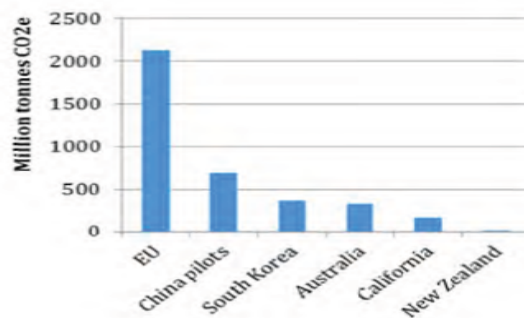
Figure 2: Map of approved pilot carbon trading schemes in China⁶

According to NDRC, “major components of pilot plans may include [a] cap setting and emission allocation mechanism, [a] monitoring, reporting and verification system, [a] registry, trading rules, [an] offset mechanism, etc.”. The majority of preparatory work for launching these pilot programs occurred in 2012. NDRC notes that, “Generally speaking, the preparatory work for each pilot scheme has entered a stage of specifying implementation plan details and building infrastructure.”

Regarding the purpose of the pilots, NDRC continues,

“It is anticipated that the 7 regions would finish all the preparatory work and launch pilot ETS programs into full operation in 2013, and a national unified ETS based on the 7 pilots would be ready during the 13th Five-Year Plan period, which is between 2016 and 2020. The pilot program across China serves as [a] basic foundation for a national-level and unified emissions trading market. Experiences learned from pilot programs will also be valuable to building a national-level and unified emissions trading market.”

For perspective on the size of Chinese provinces, Guangdong, one of China’s most developed provinces, emitted 508 Mt CO₂e in 2007, 28 MtCO₂e more than Germany did during that year.⁷ As shown in Figure 2, these seven pilot schemes are collectively expected to cover 700 MtCO₂e, a quantity only behind the 2.1 GtCO₂e that the EU ETS covers, by 2014.⁸



California’s Emissions Trading scheme will scale up from 165 Mt CO₂e to 406 Mt CO₂e in 2015

Figure 3: Current and future emission trading systems⁹

The provinces and municipalities of these pilot programs were carefully selected. Together, they comprise about 25% of the country’s annual GDP, and they represent the spectrum of economic development and wealth within the country. For example, Guangdong is one of the wealthiest, most developed provinces in China, whereas Hubei is far less developed and wealthy. In addition, the pilot project for Shenzhen, which is a city located within Guangdong, will be subject to Guangdong’s ETS as well as its own program. As a result, Shenzhen has the unique task of developing a system that is different from, but compatible with, the Guangdong system. Running pilots in diverse regions, and thereby educating policy makers about what types of programs best suit specific types of regions, is intended to aid the country’s national ETS planning process.^{10,11}

Development of National ETS in China

As stated above, the Chinese government is developing seven pilot ETSS for 2013-2015 and aiming to set up a unified emissions trading market during FYP 13. NDRC indicates that issues related to the development of China’s ETS

include: scope; cap setting; allowance allocation; monitoring, reporting, and verification (MRV); registries; compliance mechanisms; price containment mechanisms; offset mechanisms; market oversight; and participants and trading.

Regarding scope, the Chinese government will consider MRV capabilities, cost-effectiveness, and international experiences before determining the national ETS's covered sectors. NDRC states, "the covered sectors should reach certain emissions volume and have significant potentials for emission reductions; otherwise, it is hard to achieve the objective to cut emissions of greenhouse gases through [a] market mechanism."

As it does for scope, NDRC considers cap-setting an important element for an eventual national ETS, and both an absolute cap and an intensity-based cap are under consideration. When comparing the two, NDRC states,

"Each of them has its own pros and cons. But generally, the absolute cap is more favorable for controlling a scheme's cap when an economy is on a climbing trajectory, but it increases the abatement cost. The intensity target helps control the cost when an economy is booming, and address some problems like over-allocation and price collapse when the economy is waning. The majority of economists prefer an absolute cap. Because if the cap [were] framed in intensity terms, there would be uncertainty in the market about the number of permits available until after the GDP data for that year had been published."

While further study is needed, NDRC identified three possible options for cap-setting:

1. Separate the national target into an ETS portion and a non-ETS portion, then directly allocate emission allowances to enterprises/installations at the national level.
2. Disaggregate the national GHG target into targets for local governments. Local governments then divide their targets into an ETS portion and a non-ETS portion. The targets for ETS portions of local-level targets accumulate to form the national ETS cap.
3. The national government determines ETS inclusion criteria and allocation methodology, but gives local governments some degree of flexibility.

As for an allowance allocation method for a national cap, NDRC notes pros and cons to both auctions and free allocations, and it has not determined the extent to which it will use either methodology. According to NDRC, however, China's seven pilots have chosen free allocation as their main method, and auctioning as a supplement.

Regarding price containment, China has yet to determine which, if any, mechanisms its national programs will use. Price floors and ceilings, among others, are under consideration.

China's national ETS's use of offsets is another unknown. According to NRDC, many issues concerning CERs, CCERs, and VERs will be studied in the course of designing a national ETS, including the following questions:

1. What types of reduction credits are allowed (CERs, CCERs, VERs, etc.)?
2. Can these reduction credits be used for fulfilling compliance obligations?
3. From which jurisdiction(s) must credits derive?
4. What proportion of an entity's compliance obligation may derive from credits?
5. To what extent are credits and allowances fungible?

International Markets:

Since 2005, China has been the world's foremost developer of CDM projects. As of November 2012, the Chinese government had approved 4,778 CDM projects, 2,708 of which—52.1% of the world's total—had been successfully registered after the CDM Executive Board's approval. The estimated annual emissions reductions average from Chinese CDM projects is close to 460 million tons of CO₂ equivalent, or 65% of the world's total reductions from registered CDM projects.

Technology	CO ₂ e Mt	% of total
Hydropower	102	27%
Wind	91	24%
HFC reduction	66	17%
Waste Heat Recovery	29	8%
Coal mine methane	27	7%
LNG	25	7%
N ₂ O	22	6%
Other	21	6%
Total	383	100%

Source: UNEP Risoe

Table 1: Registered Chinese CDM projects by technology¹²

Regulation and Oversight:

In order to ensure the smooth implementation of ETS in China, NDRC intends to develop a comprehensive and coordinated market oversight system. Key steps include:

1. Designate a competent authority to take charge of the daily operation and management of the ETS.
2. Establish a coordination mechanism among government agencies to avoid overlap of functions.
3. Set up an expert committee or think-tank that will provide technical support for decision making.

MRV criteria and capacity for national ETS has yet to be defined. In developing MRV, China will study experiences both domestically and internationally.

With regard to registries, the goal is that national and local registries ensure smooth transfers and use resources efficiently. Analyses of the relations between national and local registries shall include: (1) determining whether local registries need to establish independent registries; (2) if local areas will require registries, clarify the positioning and functions of registries at both national and local levels; and (3) if local registries are not needed, identify the functions of relevant local organizations in the operation of the national registry.

Recent Environmental History:

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UNIQUE ISSUES:

1. No other ETS has built itself from the bottom up using provincial- and city-scale pilot schemes.
2. As the largest developing country in the world, the scale at which China grapples with environmental sustainability as its economy develops is unparalleled.
3. China is the first country with a single party government structure to take steps towards developing a nation-wide ETS.

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Disclaimer: The authors encourage readers to please contact them with any corrections, additions, revisions, or any other comments, including any relevant citations. This will be invaluable in strengthening and updating the case studies and ensuring they are as correct and informative as possible

¹ Submission to the World Bank Partnership for Market Readiness (PMR). Available at http://www.thepmr.org/system/files/documents/China_MRP_final_19-02-2013rev_0.pdf

² The Information Office of the State Council, China (November, 2011). "China's Policies and Actions for Addressing Climate Change." Available at http://www.gov.cn/english/official/2011-11/22/content_2000272_8.htm

³ The Information Office of the State Council, China (November, 2011). "China's Policies and Actions for Addressing Climate Change." Available at http://www.gov.cn/english/official/2011-11/22/content_2000272_8.htm

⁴ The Information Office of the State Council, China (November, 2011). "China's Policies and Actions for Addressing Climate Change." Available at http://www.gov.cn/english/official/2011-11/22/content_2000272_8.htm

⁵ These ETS pilot regions are not to be confused with the country's five provinces (Guangdong, Liaoning, Hubei, Shaanxi, and Yunnan) and eight municipalities (Tianjin, Chongqing, Shenzhen, Xiamen, Nanchang, Guiyang, Baoding, and Hangzhou) that have been chosen as low carbon zones (LCZs). The LCZs comprise over 300 million people and 20% of the country's annual GDP. While some areas overlap (Guangdong, Hubei, Chongqing, and Shenzhen), LCZs are not required to design ETS pilots. Source: Sandbag (2012). Available at http://www.sandbag.org.uk/site_media/pdfs/reports/Sandbag_Turning_The_Tanker_Chinese_Final.pdf

⁶ IETA (2013) *IETA China Pilots Analysis*

⁷ Sandbag (2012). Available at http://www.sandbag.org.uk/site_media/pdfs/reports/Sandbag_Turning_The_Tanker_Chinese_Final.pdf

⁸ Scotney, Richard, Sarah Chapman, Cameron Hepburn, and Cui Jie. "Carbon Markets and Climate Policy in China: China's pursuit of a clean energy future." Prepared for The Climate Institute by Climate Bridge. October 2012. http://climatebridge.com/wp-content/uploads/2012/10/ClimateBridge_CarbonMarketsandClimatePolicyinChina_October2012.pdf

⁹ Scotney, Richard, Sarah Chapman, Cameron Hepburn, and Cui Jie. "Carbon Markets and Climate Policy in China: China's pursuit of a clean energy future." Prepared for The Climate Institute by Climate Bridge. October 2012. http://climatebridge.com/wp-content/uploads/2012/10/ClimateBridge_CarbonMarketsandClimatePolicyinChina_October2012.pdf

¹⁰ http://www.sandbag.org.uk/site_media/pdfs/reports/Sandbag_Turning_The_Tanker_Chinese_Final.pdf

¹¹ Scotney, Richard, Sarah Chapman, Cameron Hepburn, and Cui Jie. "Carbon Markets and Climate Policy in China: China's pursuit of a clean energy future." Prepared for The Climate Institute by Climate Bridge. October 2012. http://climatebridge.com/wp-content/uploads/2012/10/ClimateBridge_CarbonMarketsandClimatePolicyinChina_October2012.pdf

¹² Scotney, Richard, Sarah Chapman, Cameron Hepburn, and Cui Jie. "Carbon Markets and Climate Policy in China: China's pursuit of a clean energy future." Prepared for The Climate Institute by Climate Bridge. October 2012. http://climatebridge.com/wp-content/uploads/2012/10/ClimateBridge_CarbonMarketsandClimatePolicyinChina_October2012.pdf