

China's 12th 5-year plan: carbon market(s) in sight

China, as a non-Annex I country, has no mandatory GHG emissions reduction target under the UN Framework Convention on Climate Change (UNFCCC). Now the biggest GHG emitter in the world, China is showing increasing willingness to bear a share of the global emissions reduction effort. In this context, its 12th five-year plan (FYP) was eagerly awaited: among other decisions, it considers establishing carbon markets.

Background: Chinese emissions and mitigation policies

The Chinese emissions' profile

China has recently become the world's largest greenhouse gas (GHG) emitter. In 2005 it was home to 19% of global GHG emissions, with 7,233 million tonnes of CO₂ equivalent (MtCO₂e) emitted, more than twice its 1990 emissions of 3,594 MtCO₂e¹. This increase has been particularly significant in the 2000s, driven by the growth in CO₂ emissions (+166%).

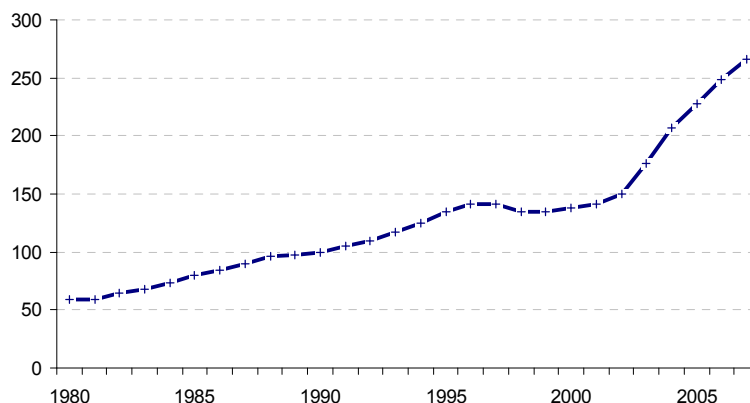
Figure 1 - Chinese CO₂ emissions evolution from 1980 to 2007 (Index; 1990=100)

Between 1980 and 2005, China's CO₂ emissions from fossil fuel use and cement production (excluding LULUCF) nearly quadrupled.

The emissions growth reveals three distinct patterns: a slow increase from 1980 to 1996; a levelling off until 2001; and an abrupt surge since 2001.

The economic crisis in 2008 may have affected this trend but more recent data are not available yet.

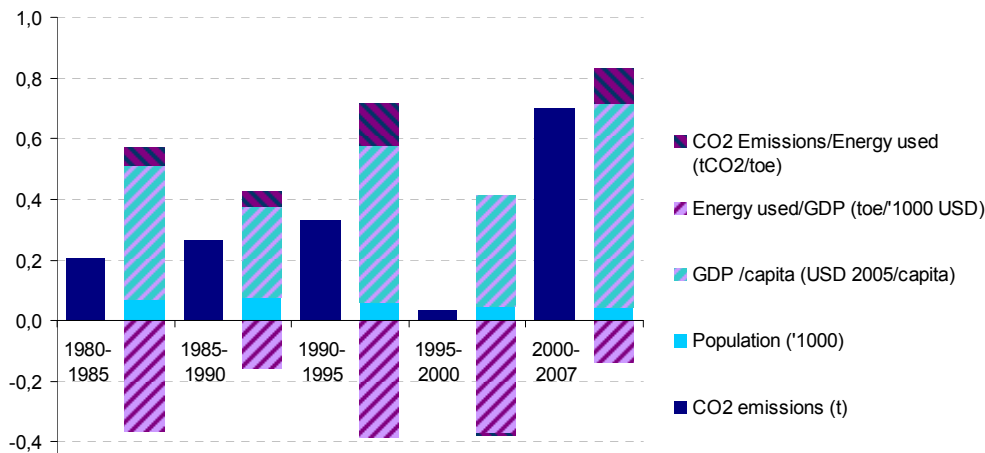
Source: CDC Climat Research from World Bank data, 2010.



CO₂ emissions excluding land-use and forestry (LULUCF) emissions can be expressed as the product of four drivers: population, income (GDP) per capita, energy intensity of GDP, and CO₂ content of energy used.

Among those four drivers, only the energy intensity of GDP has been decreasing since 1980. Nevertheless the rate of decrease of energy intensity of GDP has slowed down since 2000 due to a strong increase in electricity use and energy demand by industries, which has mainly been met by coal (80% of the electricity mix) and oil. In parallel, Chinese economic growth has continued at a rapid pace and is responsible for approximately 70% of the CO₂ emissions increase as shown in Figure 2.

¹ Source: WRI, 2010. This figure excludes land-use, land-use change and forestry (LULUCF) and international bunker emissions.

Figure 2 – Drivers of CO₂ emissions growth in China from 1980 to 2007

For each period, the evolution of CO₂ emissions (expressed as a difference of natural logarithms) is shown on the left whereas the impact of the evolution of its drivers² on the same period is shown on the right.

Source: CDC Climat Research from World Bank data (2010).

National policies try to address these four drivers of energy and industrial CO₂ emissions, as well as to increase the CO₂ sink of the forestry sector: annual forest-related CO₂ sequestration is estimated at 47 MtCO₂e over 2000-05, approximately 0.8% of national CO₂ emissions³.

National commitments pre-existing to the 12th five-year plan (FYP)

Climate change was not a high priority as such when the 11th FYP (2006-2010) was designed. Water and air pollution, together with energy conservation and security, were the main environmental issues at the time. Nevertheless climate change has now made it onto the agenda. A first step towards climate-related policies was the National Assessment Report on Climate Change in 2006, followed in June 2007 by the National Climate Change Program (NCCP) and in October 2008 by China's Policies and Actions for Addressing Climate Change (CPAACC).

The NCCP and CPAACC incorporated for the first time climate change considerations into the national socio-economic development program of the 11th FYP. They were expected to deliver a total 2,400 MtCO₂e reduction from business-as-usual emissions. They also implied the decentralisation of energy conservation targets to local governments (provinces, counties, townships) through target-responsibility agreements with a yearly performance assessment (IGES, 2008), foreshadowing future emissions-related decentralisation policies.

International commitments

In 2009 China committed for the first time to reduce its emissions within the framework of the Copenhagen Accord, along with developed and emerging countries. Its core target was a reduction of the CO₂ intensity of the economy of -40 to -45% from 2005 to 2020. The fact that the implied emissions target is not an absolute target, but rather is relative to the level of economic activity, alleviated Chinese concerns about the effect of emissions commitments on economic development. However, it also means that Chinese emissions in absolute terms will depend on the future GDP growth rate (Casella, Delbosch and De Perthuis, 2010)⁴.

² Resulting from the following formula: $CO_2_emissions = population \times \frac{GDP}{population} \times \frac{energy_used}{GDP} \times \frac{CO_2_emissions}{energy_used}$

³ Source: WRI (2010), excluding international bunkers emissions.

⁴ These engagements were further recognized by the United Nations at the Cancún Summit in December 2010. They nevertheless remain voluntary: China and other countries resisted the idea of having any kind of international control over their

Alongside the emission intensity target the commitment was taken to increase the share of non-fossil fuels in primary energy consumption to around 15% by 2020 and to increase forest coverage by 40 million hectares and forest stock volume by 1.3 billion cubic meters by 2020 from the 2005 levels.

Carbon markets in China

China is already familiar with carbon markets through its participation in the Clean Development Mechanism. The CDM, governed by the UNFCCC, has been used to leverage public and private developed countries' funding for emissions reduction projects in China. The Chinese government has successfully put in place a facilitating framework for CDM investors – China is home to 60% of issued CDM credits – and has also taken advantage of the CDM to raise public funds and to influence the development of projects which are more consistent with its national policy goals through a tax differentiated by project type.

As far as carbon markets are concerned, the first private initiative, as reported by Fulton (2011), started in June 2008. The four following years has seen the launch of several trading platforms. Nevertheless only three of them have gained a significant importance: the China Beijing Environment Exchange, the Tianjin Climate Exchange, and the Shanghai Environment and Energy Exchange. Only a few voluntary transactions have been reported so far (Fulton, 2011). One of them related to the first pilot voluntary standard specifically designed for Chinese projects, the Panda Standard, through collaboration between CBEEEX and the French exchange BlueNext.

The development of regulatory carbon markets has also been embraced by the public authorities. In August 2010, the NDRC announced the creation of 13 pilot low-carbon territories. These 8 municipalities and 5 provinces⁵ will implement low carbon development strategies. As such they may implement market-based instruments.

News: the 12th five-year plan unveiled

Regarding climate-energy policies, the 12th FYP, which covers the 2011-2015 period, follows up and expands the ambition of the 11th FYP. Climate change is now addressed as the first priority in the overall social-economic plan. Moreover the groundwork is established for experimentation with market-based mechanisms. Indeed, these could be key to achieving China's 2020 targets.

The extension of the 11th FYP policies

The 12th FYP is based, as the 11th FYP and the Copenhagen Accord commitments, on 4 main pillars:

- Moving to “greener” economic growth
- The reduction in the energy intensity of the economy through energy conservation and energy intensity reduction policies;
- The reduction of the GHG content of the energy used, by increasing the share of renewable energies in primary energy supply;
- The expansion of carbon sequestration by forests.

achievements for reasons of the respect of national sovereignty. GHG inventories can only be monitored and audited at the international level when mitigation actions benefit from international funding (Jeulin and Delbos, 2011).

⁵ Municipalities: Baoding, Chongqing, Guiyang, Hangzhou, Nanchang, Shenzhen, Tianjin and Xiamen; Provinces: Guangdong, Hubei, Liaoning, Shaanxi and Yunnan).

Table 1 gives an outlook of the 11th FYP targets and results as well as the further commitments included in the 12th FYP in these 4 areas. The targets have been specifically and explicitly drawn up to put China in line with its 2020 international commitments.

Table 1 – Targets of the 11th and 12th FYP

	11 th FYP targets & results	12 th FYP targets
Greening economic growth	<ul style="list-style-type: none"> ▪ Raise the contribution to the GDP of services (tourism, financial services, etc.) and high-tech industry (e.g. information technology) → GDP contribution of the service industry rose by 2.5 % pts. ▪ Limit the expansion of energy/ emissions-intensive industries by imposing taxes and raising safety and environmental standards. → Reduction or elimination of tax rebates on exports of glass, cement, nonferrous metal products and most steel products. → Shutdown of “backward production facilities” including a 72 GW capacity in thermal power production and a several million tonnes capacity in industrial sectors. 	<ul style="list-style-type: none"> ▪ Increase the service sector added value ▪ Strengthen technology capacity: 2.2% of GDP spending on R&D, incentives for emerging strategic industries⁶, 3.3 patents per 10,000 inhabitants ▪ Expand domestic demand while limit annual GDP growth to 7% ▪ Develop power (utilities & grid) and transportation (high-speed rail) infrastructures
Energy intensity of the economy	<ul style="list-style-type: none"> ▪ Reduction by 20% below 2005 levels by 2010 [<i>slightly lower the 1980-2000 trend (-27% every 5 years on average), but by far higher than the 3% reduction observed over 2000-2005</i>] → Reduction by 19.1% thanks to energy conservation and efficiency improvement programmes, in particular: <ul style="list-style-type: none"> ▪ The Ten Key Energy Conservation Programmes (2005-2010 and 2011-2020), launched in 2004 to increase energy conservation in all sectors⁷ (-550 MtCO₂e emissions by 2010). ▪ The Top-1000 Energy Consuming Enterprises Programme, implemented in April 2006, to reduce energy intensity of large-scale enterprises to the best level of domestic or international industries (-250 MtCO₂ by 2010, reached 2 years in advance⁸). 	<ul style="list-style-type: none"> ▪ Reduction by 4% in 2011 and 16% by 2015, from 2010. [<i>lower than in 11th FYP as cheapest measures are already taken</i>] ▪ Possible extension of the Top-1000 Energy Consuming Enterprises to a 10,000 Enterprises Program (WRI, 2011).
Carbon intensity of the energy mix	<ul style="list-style-type: none"> ▪ Increase renewable energy (RE) sources in power production to 10% in 2010, 15% in 2020. Non-hydro RE should be 3% of power production by 2010 and 8% by 2020. → Financial incentives (low-interest loans and tax benefits), dedicated funds supporting the construction, research and development of renewable energy sources. → Grid companies required to purchase all electricity generated from RE sources at rates determined by the State Council. ▪ Increase of non-fossil fuel use by 3.1% per year reaching 8.3% of China's total energy use in 2010 	<ul style="list-style-type: none"> ▪ Reduction of the carbon intensity of the economy by 17% below 2010 level by 2015. ▪ 11.4% of RE in primary energy consumption by 2015 ▪ Additional 70 GW of wind powered capacities and 40 GW of nuclear energy by 2015
Forest sequestration	<ul style="list-style-type: none"> ▪ Forest cover to reach 20% in 2010 (19% in 2000) → Forest cover reached 22% in 2010 according to FAO. ▪ Additional sequestration of 50 MtCO₂e/yr between 2005 and 2010 	<ul style="list-style-type: none"> ▪ Increase in forest cover by 12.5 million hectares by 2015. ▪ Increase of forest stock volume by 600 million cubic meters by 2015.

Sources: Fulton (2011), Hannon et al. (2011), Jinbao (2011), NDRC (2011).

⁶ Biotechnologies, clean electric vehicles, next generation of information technologies, low energy intensive products, renewable energies.

⁷ It covers 9 energy-intensive industries: iron and steel, petroleum and petrochemicals, chemicals, electric power generation, non-ferrous metals, coal mining, construction materials, textiles, and paper and pulp.

⁸ Seligsohn, 2009.

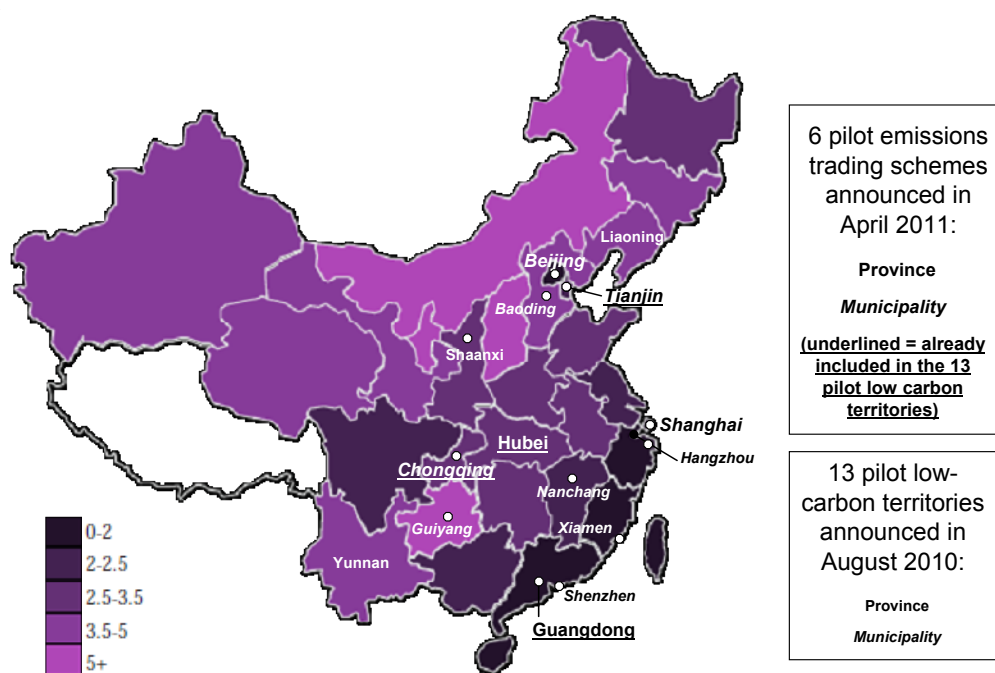
Carbon markets in the 12th FYP

According to Wei Ng and Mabey (2011), several economic tools have been suggested for the implementation of national climate-energy policies, such as sectoral performance standards (in October 2010), but also carbon taxes (in May 2010) and carbon markets (in December 2010). So far, only emissions standards and carbon markets have benefited from political momentum but it is likely that China will use the full range of economic instruments to pursue its low carbon strategy.

The 12th FYP represents another milestone of Chinese climate policy as it integrates for the first time the idea of using market-based instruments. Pilot emissions reduction schemes should be created in some provinces and municipalities. The experimental nature of this approach is not new to China. For example, the Top 1000 Enterprises Program, which has proved to be a core policy for energy conservation, was built upon the success of a voluntary target-setting energy efficiency pilot project in the Shandong Province.

Six carbon markets could start in 2013 to help six provinces and municipalities⁹ achieve their own energy efficiency or emissions intensity targets, which are disaggregated from the national commitments and differentiated to account for each province's economic and environmental situation. Carbon markets will probably be based on the baseline-and-credit principle - rather than a cap-and-trade scheme which imposes an absolute cap on emissions.

Figure 3 – CO₂ intensity of Chinese provinces in 2007 (in tCO₂/10,000 yuan GDP) and territories included in 2010 and 2011 low carbon programs



Source: UNDP (2010) from China National Bureau of Statistics (2008), Chen (2011).

Towards a national Chinese carbon market?

The further development of carbon markets in China will strongly depend on the results from the first experiments. The provincial/municipal carbon markets that have been announced for 2013 will have to prove their efficiency in a difficult context: first, the connection between them should be limited if any; second, there will be risks of carbon leakage from covered to

⁹ Municipalities: Beijing, Chongqing, Shanghai and Tianjin; Provinces: Guangdong, Hebei. Source: Chen (2011).

non-covered participants – in the power sector in particular – which could make the environmental assessment more delicate.

Implementing carbon markets represents a major shift for China; the designation of a limited number of regional low carbon initiatives including carbon markets at the beginning is probably driven by the will to ensure regional development and to reduce regional inequalities. Enlarging the scope might represent a political risk as economic targets imposed by the government might interfere with environmental targets. On the other hand, carbon markets could also assist the Chinese government in pursuing various environmental goals. For instance, the use of carbon mitigation mechanisms may not be restricted to addressing the issue of energy/industrial emissions, but also be used in the future to reward afforestation projects with carbon credits to be used at the national or international levels, following an initiative of the State Forestry Administration (Chen and Reklef, 2010).

Most interestingly, the technical infrastructure at the basis of carbon markets is being built quite rapidly. Its most important element is the creation of a complete emissions statistical framework, which includes the ability to monitor the impacts of energy conservation and emissions reductions policies. In parallel, China is also engaged in carbon market capacity building dialogues bilaterally (e.g. with the European Union) and multilaterally (e.g. by applying to engage in the Partnership for Market Readiness of the World Bank). Even if a unified Chinese carbon market remains far from being set up, some experimental schemes can be implemented in the short term and lead to innovative and interrelated measures to ensure China will meet all its targets.

To find out more...

- Chen K. and Reklef S. (2010). "China targets forest carbon trading", Point Carbon, 18 November 2010
- Chen K. (2011). "China drafts province-level CO₂ reduction targets: report", Point Carbon, 10 April 2011.
- Climate Analysis Indicators Tool (CAIT) Version 8.0. (Washington, DC: World Resources Institute, 2011).
- Fulton M. (2011). "12th Five Year plan – Chinese Leadership Towards A Low Carbon Economy", Deutsche Bank Group, 4 April 2011.
- Hannon A. et al. (2011). "Delivering low carbon growth – A guide to China's 12th Five Year plan", The Climate Group, March 2011.
- Jinbao W. (2011). "Report on the work of the government", 5 March 2011.
- NDRC (2011). "Report on the implementation of the 2010 plan for national economic and social development and on the 2011 draft plan for national economic and social development", 5 March 2011.
- Seligsohn D. (2009). "China's 1000 Enterprise Energy Conservation Program Beats Target", China FAQs Convened by the World Resources Institute <http://www.chinafaqs.org/blog-posts/chinas-1000-enterprise-energy-conservation-program-beats-target>
- UNDP (2010). "China and a Sustainable Future: Towards a Low Carbon Economy and Society", April 2010.
- Wei Ng S. and Mabey N. (2011). "Chinese Challenge or Low Carbon Opportunity?", E3G, March 2011.
- World Bank (2010). "World Development Indicators & Global Development Finance", The World Bank, 10 December 2010.