

Turning the Tanker

China's changing economic imperatives and its tentative look to emissions trading



About Sandbag

Sandbag Climate Campaign is a not-for-profit campaigning organisation dedicated to achieving real action to tackle climate change and focused on the issue of emissions trading. Our view is that if emissions trading can be implemented correctly, it has the potential to help deliver deep cuts in carbon emissions and help make the transition to a high tech, low carbon economy.

Sandbag would like to thank all those who kindly shared their invaluable insight and made this report possible.

关于沙袋机构

沙袋 是排放交易的国际专家。

沙袋 是一个英国的政策团体，致力于确保排放交易可以达成应对气候变化和促进低碳经济发展的潜力。

我们到目前为止专注精力于全球最大的排放交易机制 – 欧盟排放交易机制。我们在欧盟排放交易机制的运行、优势和缺点上取得了专业知识，并被认为是行内领先的专家。

我们力求在世界各地排放交易的未来上产生讨论，分享我们迄今学到的经验教训，并对政策制定者在制定新的排放交易系统方面尽可能的给予帮助。

随着中国未来发展国内排放交易系统的计划发布，沙袋非常愿意分享它从欧盟排放交易权制学到的经验教训。

About this Report

This report is not a comprehensive overview of Chinese environmental policy; it intends to act as a starting point for those wishing to better understand why and how China is slowly changing to adopt progressive policy instruments to tackle growing environmental concerns. Sandbag is particularly interested in the proposal to develop pilot emissions trading schemes as a precursor to establishing a national emissions trading scheme (ETS).

It would be absurd to suggest that China is facing anything but an environmental catastrophe if it fails to act soon. It would be equally ridiculous not to look at China in context, a vast country experiencing rapid growth coupled with an increasing dependency on natural resources. We purposefully liken China's task of low carbon development to turning a tanker; a process that requires both time and patience. China has – as this report sets out to show – started to adjust the rudder, but it will take time for this behemoth to come about.

Authors: George Yu, Rob Elsworth

Illustration: Kerry Hyndman, *Chinese Tanker*®, www.kerryhyndman.co.uk

Sandbag Climate Campaign is a not-for-profit enterprise and is registered as a Community Interest Company under UK Company Law. Co. No. 671444

Contents

1. Executive Summary	4
2. Introduction	6
3. From Planning to Guiding	8
4. China and Emissions Trading	15
5. Challenges Remain	23
6. Conclusion	28

1. Executive Summary

Over the past 30 years China has experienced unprecedented economic growth. Its ability to provide cheap goods for Western export markets, coupled with the opening up of domestic markets has transformed the country. Yet a reliance on low skilled labour coupled with high resource use is bringing with it increasingly unwelcome social, environmental and political tensions. This has caused China, through the adoption of the 12th Five Year Guidance (FYG), to pursue a more sustainable economic model, focusing on qualitative economic and social development.

Economic growth has been particularly demanding on China's environment. Now the world's largest polluter, its environmental record is coming under increasing international scrutiny. In spite of increased interest in its climate and environment policy, the international community remains largely in the dark as to what is happening. On international matters it seems Deng Xiaoping's doctrine of keeping a low profile prevails. Interest in China is unlikely to wane, principally because in terms of addressing climate change no country matters more than China. A report from the International Energy Agency (IEA) shows that in 2009 China and the United States of America alone accounted for 41%, or 12Gt, of the world's CO₂ emissions. Successfully addressing climate change will depend on dramatically reducing emissions in a relatively limited number of countries.

China is facing enormous environmental challenges and to try to suggest otherwise would be absurd. Nevertheless China must be understood in context. A rapidly developing super power with a bewilderingly large population, facing increasing social tension fuelled by, amongst other things, its environmental limitations. The Chinese authorities have become acutely aware of the importance of addressing these concerns – social stability is fundamental to the survival of Chinese Communist Party rule – and are starting to set out domestic policies to address them. This process is likely to be slow as China moves to adopt innovative new policy solutions.

International observers are keen to see results; nevertheless, changing the economic model of one of the most powerful economies in the world is likely to take time, and require patience. To better understand how China is starting to initiate this transformation one must first look at the lynchpin of the Chinese economy, the Five Year Guideline.

China's economy has matured into something too sophisticated to be managed in a traditional planned economy style. It is gradually evolving from a planned to a market economy. As such, the traditionally ridged *Five Year Plan* (FYP) has morphed into a more qualitative *Five Year Guideline* (FYG) which places more emphasis on China's systematic long-term growth. The newly adopted 12th FYG runs from 2011 - 2015 and includes prominent energy efficiency and carbon intensity targets. Touted as the greenest FYG ever, it's been crucial in promoting low-carbon development, and encouraging new policy tools, including the use of market mechanisms to achieve environmental outcomes. Emission trading is one of the innovative new policy tools being tested and China has already announced pilot projects to be implemented in five municipal areas – Beijing, Chongqing, Shanghai, Shenzhen and Tianjin – and two provinces – Guangdong and Hubei – from 2013. It has been suggested that these pilot projects will pave the way for a national emissions trading scheme (ETS) to be implemented in 2016 but this timeline seems extremely ambitious.

With a detailed low carbon plan setting out a timeline for implementation, which has already been approved by the National Development and Reform Committee (NDRC), Guangdong looks to be leading the pack. Beijing and Tianjin are also more advanced in their preparation for a pilot ETS. The exact status of the remaining four pilot projects is currently less clear though considerable activity is taking place in all pilot areas.

International assistance is being lent to China to develop its ETS pilots. China will receive a preparation grant from the World Bank's Partnership for Market Readiness (PMR) and Tianjin is to receive both monetary and technical assistance from the Asian Development Bank (ADB). The European Union has announced a grant of 5 million Euros to be spent on supporting ETS

development in China. The British and German governments also have ongoing cooperation project which support the development of domestic ETSs.

It remains to be seen if these pilot projects will be successfully developed in China. For all the activity underway, there continue to be a number of potential stumbling blocks. In a report by the Development Research Centre of the State Council a number of pressing concerns were highlighted, which must be addressed before any ETS could be successfully implemented in China. Concerns include issues surrounding allocation of allowances, market behaviour, trading regulations and responsibilities of parties as well as legal infrastructure. It may not be essential for all these issues to be resolved before implementation of the ETS pilots. After all, the pilots will be crucial for allowing for trial and error improvements to be identified and made. Another significant development in 2012 will be the change of political leadership. Although it's unlikely that any new leadership would deviate greatly from the 12th FYG, any shift of power during what is a time of flux in China is likely to cause some uncertainty and caution.

That said it is encouraging to see the great interest in emissions trading that these pilots have generated. In designing its pilots China is able to benefit from the experiences in countries that have already implemented similar schemes and has shown its great interest to learn from these examples. Communication channels are being established which enable a clearer picture of the efforts China is undertaking to emerge.

It is becoming increasingly clear that China is taking climate change seriously and is in the process of developing Chinese solutions to the problem. This fact can help to increase the confidence with which other countries approach implementing their solutions both here in Europe and also in China's neighbouring countries – particularly Japan and South Korea. It will become increasingly difficult to use the argument that China is not acting as an excuse for inaction elsewhere. In future the largest most dynamic regional carbon markets could be located in Pacific Rim countries not in Europe.

Patience is, however, crucial, in particular for the international community watching eagerly for significant developments. Given the size and complexity of China, as well as the mounting scale of the problems, it will be some time before any environmental policy can be heralded as a success.

2. Introduction

As much of the Western world is gripped by recession, fuelled by financial turmoil and market uncertainty, the picture looks very different for the world's second largest economy, China. Driven by increasing domestic demand and its traditional exports markets, it has so far managed to weather the global economic storm, achieving an annual GDP growth of 9.2% in 2011¹. At the end of 2011, the central government confirmed it would maintain a "prudent monetary policy" and a "proactive fiscal policy" in order to ensure economic consistency and stability in 2012².

China's ability to provide cheap goods for Western markets has paid dividends over the past 30 years³, helping to stoke the fires of a rapidly expanding economy. It is, however, becoming increasingly questionable whether this is a sustainable economic model for China. Being the *engine room to the world* brings with it increasingly unwelcome social, environmental and political problems. Problems both central and provincial governments have become acutely aware of in recent years. This has led to a concerted effort to change the economic model away from manufacturing focused exports, and towards a more balanced approach, with a greater emphasis on developing domestic markets, exploiting various emerging market opportunities, including nascent low carbon technologies. Results are starting to show with China now surpassing Europe and the USA as the world's largest investor in renewable energy⁴ - an area which, although primarily driven by energy security concerns, it believes to be an economic growth opportunity.

In spite of this, when it comes to the environment, China's global image remains overwhelmingly negative. Soaring emissions and an increasing dependency⁵ on a growing number of coal power stations leave little room for optimism. What must not be forgotten is the size of China and the speed at which its economy is developing. The Chinese State is a true giant of gargantuan proportions and its development, by its own admission, had been too fast⁶. Steering China's economy away from a low skilled labour and low resource efficiency, to a more sustainable and stable model is a truly daunting task, but one that should not be ignored. In terms of addressing climate change what happens in China matters.

Why China Matters

Climate change is a global problem and while much of the world's anthropogenic CO₂ emissions currently in the atmosphere have stemmed from western industrialised nations, emissions from fast developing economies are rapidly catching up.

It is increasingly obvious that a limited number of countries produce the overwhelming majority of current global CO₂ emissions. Whilst not taking into account historic contributions, the atlas of pollution⁷ (see Figure 1) depicts China's importance today very clearly. What's more, a 2011 report from the International Energy Agency (IEA) shows that two thirds of global emissions for 2009 originated from just ten countries, with China and the

¹ BBC (17/01/2012) China's Economic Growth Slows to 8.9% in Forth Quarter. *The BBC*. [Online] Available from: <http://www.bbc.co.uk/news/business-16588410> [Accessed 17/01/2012]

² The Economist (17/12/2011) Prudent and Proactive: China Unveils Its Economic Policy for 2012, Sort of. *The Economist*. [Online] Available from: <http://www.economist.com/node/21541873> [Accessed 11/01/2012]

³ Starting from the Ten Year National Economic Development Plan Outline for 1976-1985

⁴ United Nations Environment Programme (2011) *Global Trend in Renewable Energy Investment 2011*. UNEP. [Online] Available from: <http://www.fs-unep-centre.org/publications/global-trends-renewable-energy-investment-2011> [Accessed 13/12/2011]

⁵ U.S. Energy Information Administration (20/12/2011) Rising Asian Demand Drives Global Coal Consumption Growth. *U.S. Energy Information Administration*. [Online] Available from: <http://www.eia.gov/todayinenergy/detail.cfm?id=4390> [Accessed 11/01/2012]

⁶ Chen, X. (01/12/2011) "The Promise of Joining WTO is not the Bottom Line to Open Up". "入市的承诺并非开放的底线". *Southern Weekly*. [Online] Available from: <http://www.infzm.com/content/65589> [Accessed 31/01/2012]

⁷ Guardian. (2011) *World Carbon Dioxide Emissions Data by Country: China Speeds Ahead of the Rest*. [Online] Available from: <http://www.guardian.co.uk/news/datablog/2011/jan/31/world-carbon-dioxide-emissions-country-data-co2> [Accessed 28/08/2011]

United States' share far surpassing those of all others. Combined, these two countries alone produced 12bn tonnes/CO₂, accounting for 41% of world's CO₂ emissions⁸.

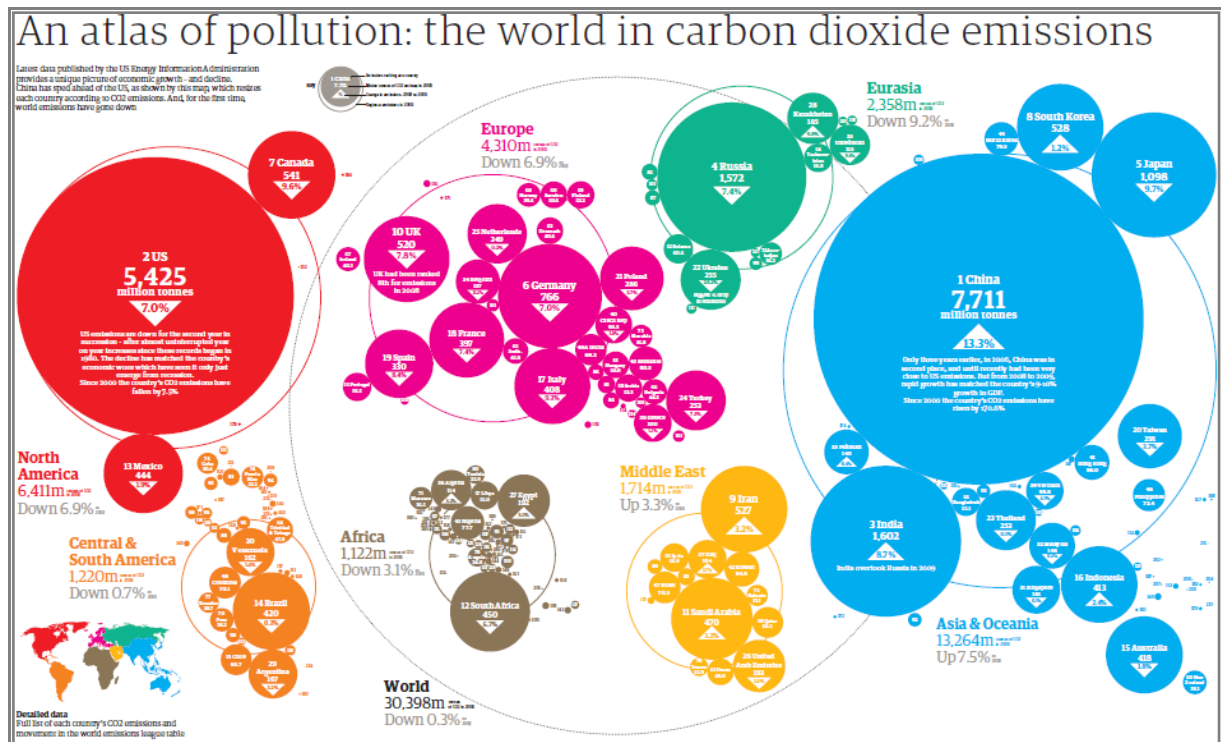


Figure 1: The atlas of pollution

The atlas of pollution above is based on 2009 data. The latest emissions data puts China's 2010 emissions at 8.33bn tonnes/CO₂⁹. Preventing the worst effects of climate change will depend on successfully reducing the CO₂ emissions of a relatively limited number of countries. For this reason, the fact that China is taking climate change and emissions reductions seriously is extremely significant. Much of China's future economic development and prosperity hinges on the newly adopted 12th Five-Year Guideline (FYG), a document notable for the significant importance it places on social harmony, reducing run-away GDP growth and sustainable development. This 12th FYG has been deemed the greenest yet, and is the first port of call when looking to understand China's move towards a more sustainable and balanced economy.

⁸ International Energy Agency (2011) *CO₂ Emissions from Fuel Combustion Highlights*. International Energy Agency. [Online] Available from: <http://www.iea.org/co2highlights/CO2highlights.pdf> [Accessed 26/10/2011]

⁹ Chestney, N (06/06/11), China's CO₂ emissions rose 10 percent in 2010: BP data: *Reuters* [Online] Available from: <http://www.reuters.com/article/2011/06/08/us-energy-bp-emissions-idUSTRE75728120110608> [Accessed 26/10/2011]

3. From Planning to Guiding

China's recent economic history has been characterised by a soviet style planned economy, most notably the iconic Five Year Plan (FYP)¹⁰. Issued by central government, the FYP was essentially a detailed strategic document setting the economic and social direction the country was going to embark on. Originally known as the “*Five-Year Plan for National Economic and Social Development*” it traditionally had a strong focus on the national economy, as evident from the first three FYPs (1952-57, 1958-62, 1966-70), which focused on the development of heavy industry, national infrastructure and defence projects.

As China rapidly develops, it is maturing into something too sophisticated to be managed in a traditional ‘planned economy’ style. The shift toward a ‘Chinese style socialist market economy’ has been reflected in a subtle change in the approach to the five year plan. In 2006 the Chinese government changed the name of the 11th five year programme, from “*plan*” (“*jìhuà* - 计划”) to “*guideline*” (“*guīhuà* - 规划”). This change in wording has sparked extensive scholarly debate about the impact and reason behind such a modification. Mandatory and specific targets were once the most prominent feature in traditional five-year plans. However, Zhikai Dong, a researcher from Chinese Academy of Social Sciences, has noticed a change in the mandatory targets since the 10th FYP¹¹. An increasing number of the targets – although still mandatory – are of greater strategic significance and require sustained efforts. The language presented in the new 12th FYG is more weighted towards the country's systematic long-term economic growth. As well as this there is increasing coverage of necessary social improvement. The *guideline* is depicted more as a roadmap as compared to traditional FYPs, which were more detailed and quantitative. The shift towards a more systemic outlook reflects the fact that the central government is exploring innovative new approaches - such as market instruments - to address emerging challenges^{12,13}.

The 12th Five-Year Guideline

2011 marked the start of the 12th FYG, which turns more attention to the qualitative growth of China. The 12th FYG sets out to lower GDP growth, instead it prioritises a transition of the economic model; from a low skilled labour and resource intensive one, to one with a higher position in the value chain, which is particularly supportive of innovation and technology advancement.

The 12th FYG also seeks to redistribute the nation's wealth amongst its citizens, especially through the provision of more social benefits and improvements of the social welfare system. These goals are best delivered through a more compatible political system (better social management and public service providers), which still requires further reform.

Fundamentally, it seems that a consensus¹⁴ has been reached in Beijing that the system and institutions used to support the country during its economic boom can no longer sustain

¹⁰ People.com.cn (2011) Review the 11th Five-Year Guideline. Look forward to the 12th Five-Year Guideline “回顾十一五 展望十二五”. *People's Daily*. [Online] Available from: <http://finance.people.com.cn/GB/8215/179399/204463/index.html> [Accessed 25/09/2011]

¹¹ Zhao, X. (Saturday 05/03/2011) The Third Transformation in China's History “第三次历史性转型”. *Beijing Evening News*. p. 14. [Online] Available from: http://bjwb.bjd.com.cn/html/2011-03/05/content_375755.htm [Accessed 28/09/2011]

¹² Lu, Y. (10/10/2005) *The Significance from Five-Year Plan to Five-Year Guideline* “新华时评：从“五年计划”到“五年规划”的意义”. [Online] Available from: http://news.xinhuanet.com/politics/2005-10/10/content_3602338.htm [04/10/2011]

¹³ Li, Z. (03/02/2010) Eight Instructions from Hu on Facilitating Economic Development Model “胡锦涛就加快经济发展方式转变重点工作提 8 点意见”. *People's Daily*. [Online] Available from: <http://politics.people.com.cn/GB/1024/10924459.html> [Accessed 02/10/2011]

¹⁴ Gao, Y. (17/11/2011) “Colossal State-Run Enterprises Might Be the Biggest Obstacle to the Economic Transformation.” “张维迎：庞大国企部门或是经济转型最大障碍.” [Online] Available from: <http://www.daonong.com/USA/ziliao/20111117/32821.html> [Accessed 29/01/2012]

its future needs. China will now have to transform itself in a way that that no country has done before. Given such a backdrop, the FYG will start to initiate and determine how China will reach this massive transformation.

Environmental Targets enter the Five Year Plan

It was Deng Xiaoping's political reform and opening up policy of the late 1970's which set the ball rolling for China's unprecedented economic growth. Manufacturing quickly developed into the powerful engine to the country's economic growth, and the country's energy demand started to grow rapidly from the 1990s. But this energy-intensive economic model is unsurprisingly demanding on China's own natural and social resources; there has been well documented evidence of substantial destruction to the natural environment, as well as causing increasing social unrest and discontent. The recent protest in Haining due to the pollution from a solar panel factory¹⁵, the furious public reaction from the public to Conoco Phillips' late reporting and slow response to the oil spillage in China's Bohai Sea¹⁶, and the escalating demands for more transparency of air quality data in Beijing¹⁷ are just some examples of rising public sensitivity towards environmental issues.

Having recognised the importance of the environment and the increasing demand for environmental justice from the public, environmental issues were first mentioned in the 6th FYP (1980 – 1985), one year after the first Environmental Protection Law came into force, a piece of legislation which addressed all pollution issues and the corresponding legal responsibilities for violators. However, mandatory targets to curb pollution did not appear until the 11th FYG (2006 – 2010).

The most recent 12th FYG is claimed by the leading economist, Angang Hu, to herald the beginning of the 'green era'¹⁸ in China's history. Not only does it significantly strengthen China's commitment to energy savings and low carbon development but it gives environmental issues centre stage, promising a stronger-than-ever environmental commitment by relating the concept of low carbon development to a variety of different aspects of the plan. For example, the 12th FYG's chapter on environmental protection starts with a resolution to establish the concept of green and low-carbon development¹⁹. Furthermore, it has named renewable energy, electric and hybrid cars as the strategic emerging industries for development and innovation. Lastly, it has set an unprecedented high number of environmentally focused targets (10 out of 28 targets), which form part of the country's long-term environmental and sustainability commitments²⁰, including:

¹⁵ Watts, J. (18/09/2011) Solar Panel Factory Protests Tarnish China's Clean-Tech Efforts. *The Guardian*. [Online] Available from: <http://www.guardian.co.uk/world/2011/sep/18/chinese-solar-panel-factory-protest?INTCMP=SRCH> [Accessed 29/09/2011]

¹⁶ Watts, J. (07/07/2011) Chinese Oil Spill Half the Size of London Went Unreported for A Month. *The Guardian*. [Online] Available from: <http://www.guardian.co.uk/environment/blog/2011/jul/07/china-oil-spill-cover-up-bohai-sea?INTCMP=SRCH> [Accessed 25/09/2011]

¹⁷ Wong, E. (06/12/2011) Outrage Grows over Air Pollution and China's Response. *The New York Times*. [Online] Available from: http://www.nytimes.com/2011/12/07/world/asia/beijing-journal-anger-grows-over-air-pollution-in-china.html?_r=1 [Accessed 03/01/2012]

¹⁸ Hu, A. (08/03/2011) *China's Green Era Begins*. [Online] Available from: <http://www.chinadialogue.net/article/show/single/ch/4149> [Accessed 10/12/2012]

¹⁹ Xinhuanet.com (2011) *The 12th Five-Year Guideline for National Economy and Social Development*. [Online] Available from: http://news.xinhuanet.com/politics/2011-03/16/c_121193916.htm [Accessed 25/09/2011]

²⁰ Singapore International Water Week (2011) *China Business Forum 2011 Summary*. [Online] Available from: <http://www.siww.com.sg/business-forums> [Accessed 08/01/2012]

Table 1: Environmental Targets in 12th FYG

Targets	11 th FYG Targets set (% decrease on 10 th FYP)	11 th FYG Target achieved end 2011	12 th FYG Targets set (% decrease on 11 th FYG)
Energy Efficiency increased by (%)	20	19.1	16
Carbon Intensity decreased by (%)		N/A	17
Water Consumption per unit of Value Added Industrial Output decreased by (%)	30	36.7	30
Non-Fossil Fuel in Primary Energy Consumption (%)	N/A	8.3	11.4
Chemical Oxygen Demand decreased by (%)	10	12.45	8
Sulphur Dioxide decreased by (%)	10	14.29	8
Ammonia Nitrogen decreased by (%)		N/A	10
Nitrous Oxide decreased by (%)		N/A	10
Forest Coverage rate (%)	20	20.36	21.7
Forest Stock increased by (million cubic metre)	N/A	137	143

Beyond the 12th FYG China is showing further commitment on climate change by developing a national climate change law. This was announced in late 2010 at the joint GLOBE²¹ / National Peoples Conference Legislators' Forum. The first draft of that law is expected in 2012 and passage is likely by 2015. Although the climate change law is unlikely to raise the overall level of ambition²² it will set up the essential domestic frameworks to measure, manage, report and verify emissions of greenhouse gases²³.

Turing targets into reality – target based promotion

Setting targets is one thing but successfully implementing them in a meaningful manner is another. The assessment system is one typical concept in Chinese politics, where politicians and local officials are promoted based on the successful completion of a number of tasks assigned to them at the beginning of the term. Traditionally these targets have been associated with the economic growth of their region. Failure to meet the assigned targets will result in slow promotion or, in extreme cases, demotion or removal from the position. As environmental concerns have been intensifying over the last decade, environmental targets were made mandatory in the 11th FYG and integrated into the assessment system. Provincial leaders were obliged to use all means at their disposal to meet the targets in order to avoid any discredit in the assessment. This sudden demand to meet environmental targets helps to explain the draconian measures taken in 2010 when the power supply was shutdown from regions struggling to meet the energy efficiency targets²⁴.

²¹GLOBE International is an NGO founded by legislators with the mission to respond to urgent environmental challenges by coordinating national policy measures and through advancement of complimentary legislation.

²² China is committed under the Copenhagen accord to reduce the carbon intensity of GDP by 40-45 per cent from 2005 levels by 2020.

²³ GLOBE International, *GLOBE Hosts Visit of China Climate Law Team to London and Brussels* (online) <http://www.globeinternational.info/2012/globe-host-visit-of-china-climate-law-team-to-london-and-brussels/> [Accessed 22/01/2012]

²⁴ Watts, J. (19/09/2010) China resorts to blackouts in pursuit of energy efficiency. *The Guardian*. [Online] Available from: <http://www.guardian.co.uk/world/2010/sep/19/china-blackouts-energy-efficiency> [Accessed 23/01/2012]

For the successful completion of these new environmental targets set out in the 12th FYG period, promotion of local officials again needs to be linked to the assessment system. During the December 2011 national meeting on environmental affairs – attended by all provincial environmental leaders and major state-owned natural resources companies - the Minister of Environmental Protection required the signing of a liability paper by all the regional chiefs to achieve reductions of major pollutants, which will be part of the assessment for officials²⁵.

Distribution of the FYG targets

In order to reach these targets at a national level, the aggregated effort is distributed among the provinces depending on the region's existing economic and environmental performance. The allocation process of targets is a result of an agreement between National Development and Reform Commission (NDRC) and provincial Development and Reform Commission (DRCs) (see Figure 2). Provincial DRCs will then further distribute targets to cities and local regions for actual implementation. Provincial level targets are in stark contrast to the 11th FYG where each province was assigned and expected to achieve the same energy efficiency target.

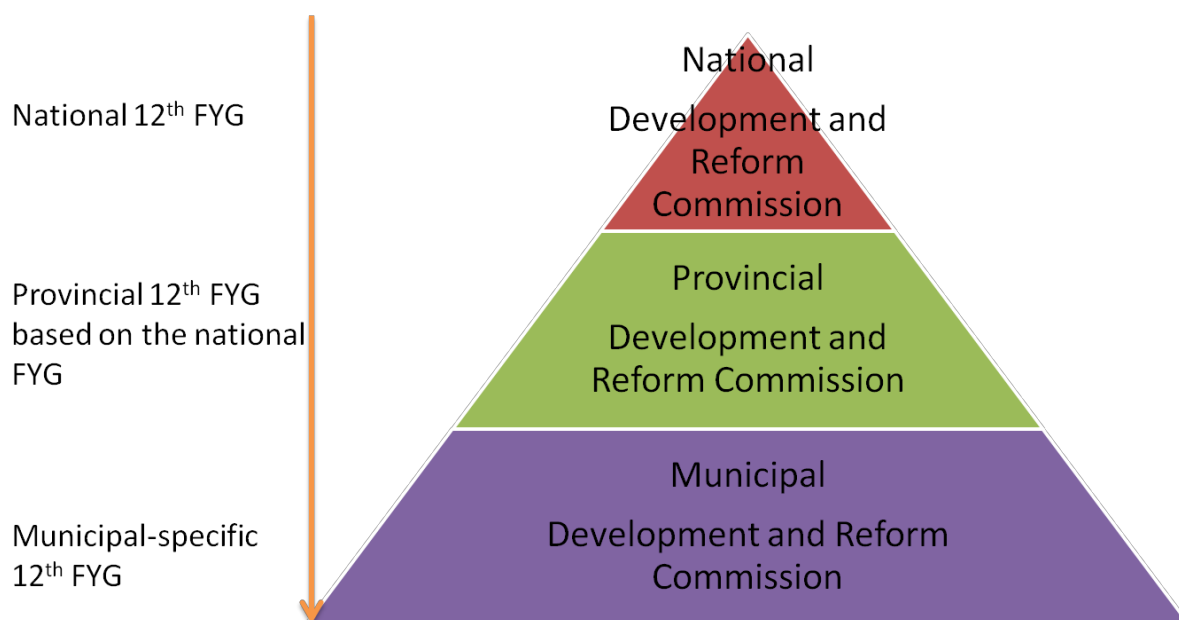


Figure 2: Hierarchy of FYG and Corresponding DRC

Prominent Environmental Targets in the 12th FYG

Two particularly prominent targets emerging from the 12th FYP include:

- The **Energy Efficiency** target – a 16% improvement from 2010 level and
- The **Carbon Intensity** target – a 17% reduction from 2010 level

²⁵ Wang, E. (21/12/2011) *The Liability Paper of Reduction on Pollutants Signed by Local Environmental Officials* “环保部长与地方签署‘十二五’污染物总量减排责任书”. [Online] Available from: <http://www.21cbh.com/HTML/2011-12-21/50MDY5XzM4OTg5OQ.html> [Accessed 23/12/2012]

Energy efficiency is defined as energy consumed (with the unit of Standard Coal²⁶) per 10,000RMB²⁷ of gross domestic product (GDP), while **carbon intensity** is defined as carbon dioxide emitted per 10,000RMB of GDP. These two concepts are interlinked such that any improvement in energy efficiency will impact carbon intensity of the economy. Nevertheless, there are other factors influencing these targets, including energy consumption pattern, industry distribution, the level of technology development and additional policies.

The **energy efficiency target** first appeared in the 11th FYG, where a 20% reduction from 2005 levels was mandated by 2010. The target was narrowly missed (see Table 1) although some regions achieved higher reductions. Most of the efforts were made through conventional command and control measures, by shutting down old or inefficient energy intensive installations, or ordering local governments to stop providing favourable policies to inefficient small-scale factories. In August 2010 news that China was to close 2,087 inefficient and polluting factories - including steel mills and cements works – was reported widely in the Western media. They spoke in detail about the 'iron hand'²⁸ being used to improve the countries energy efficiency as well as the need to conceal any embarrassment²⁹ that might come if the 11th FYG targets were not met. What was missing from much of the commentary was the fact that reliance on central control has left Chinese industry incapable of meeting targets. Their dependence on State guidance has left swathes of industry largely unable to plan and react to market forces, leaving them inefficient and polluting. The subtle change from *planning* to *guiding* reflects the need to embrace new policy options that install new capacity in China's industrial sectors, allowing industries more autonomy to plan more accurately and modernise to suit the needs of a dynamic Chinese economy.

In order to meet the new energy efficiency target, a supplementary Energy Saving and Emission Reduction Plan (ESERP), was launched by the State Council in September 2011 to complement the 12th FYG³⁰. It outlines fifty different ways to improve energy efficiency within different sectors of the economy, with specific targets (energy efficiency and reductions on consumption of Chemical Oxygen Demand (COD), ammonia nitrogen, sulphur dioxide and nitrous oxide) allocated to each province.

Secondly, the **carbon intensity target** is a newly added indicator as part of China's commitment of reducing its carbon intensity by 40 - 45% compared to 2005 levels by 2020³¹. This commitment was made by the Chinese government ahead of the UNFCCC's 16th Conference of the Parties (COP) in Copenhagen, and was later included in the Copenhagen Accord³². In order to successfully meet this 12FYP target of -17% by 2015, an outline on how to control greenhouse gases emissions was released by the NDRC. It identifies major areas of work that are crucial to meeting this target. Low-carbon zones, emissions trading and capacity building on measurement, reporting and verification (MRV) are all included in this outline. In addition, carbon intensity targets for each province are also set in the document.

²⁶ National Research Council, Chinese Academy of Science & Chinese Academy of Engineering (2000) *Cooperation in the Energy Futures of China and the United States*. [Online] Washington, National Academy Press. Available from: http://www.nap.edu/openbook.php?record_id=9736&page=92#p2000a4298940092002 [Accessed 14/09/2011]

²⁷ The Renminbi (RMB 元) is the official currency of the People's Republic of China.

²⁸ Bradsher, K. (09/08/2010) In Crackdown on Energy Use, China to Shut 2,000 Factories. *The New York Times*. [Online] Available from: <http://www.nytimes.com/2010/08/10/business/energy-environment/10yuan.html> [Accessed 20/09/2011]

²⁹ Jackson, A. (21/08/2010) China Closes Factories as Green Deadline Looms. *AFP*. [Online] Available from: http://www.google.com/hostednews/afp/article/ALeqM5iSiBWKx4u5r8v2uRdK8Mxr_7Krog [Accessed 24/10/2011]

³⁰ China. State Council. (2011) *12th Five-Year Guideline to Energy Conservation and Emission Reduction*. “十二五”节能减排综合性工作方案”. NRDC (2011) No. 26. Beijing, State Council.

³¹ Cao, H. (26/11/2009) State Council: Carbon Emission Per Unit of GDP Down by 40 – 45% by 2020” 国务院：2020 年单位 GDP 二氧化碳排放降 40%至 45%. *People's Daily*. [Online] Available from: <http://finance.people.com.cn/GB/10461522.html> [Accessed 27/09/2011]

³² Finamore, B. (2010) *China Record Its Climate Actions by Copenhagen Accord Deadline*. [Online] Available from http://switchboard.nrdc.org/blogs/bfinamore/china_records_its_climate_acti.html [Accessed 20/09/2011]

With the goal of transforming China's economic model at the heart of the 12th FYG, a number of suggestions as to how this may come about have been included. Ideas such as increasing domestic consumer demand, expansion of the service industry, encouraging technological advancement and changing China's energy consumption pattern, all show the variety of approaches China is looking at to meet its obligations.

In addition to the various national means of decarbonisation, specific sectors, cities and provinces are also in the list of transformation through the pilot projects of low-carbon zones (LCZs) around the country. The concept was first proposed to coincide with China's international commitment in the Copenhagen Accord, where the country has pledged a reduction target on its carbon intensity. This was followed by a number of proposals from various regions in China regarding the country's economic growth while reducing carbon emissions and effectively promoting green development. A number of regions were chosen to be low-carbon zones, namely five provinces, Guangdong, Liaoning, Hubei, Shaanxi and Yunnan; and eight cities, Tianjin, Chongqing, Shenzhen, Xiamen, Nanchang, Guiyang, Baoding and Hangzhou. The specific areas of work include: each of the selected regions to develop guidelines on low-carbon development; to provide a number of favourable policies supporting low-carbon development; to establish low-carbon industries; to create the inventory and management system for greenhouse emissions and to promote low-carbon lifestyles³³.

Along with the low-carbon zones, emission trading is another innovative idea promoted in the 12th FYG. The NDRC sought it as a market-based tool to facilitate meeting 2020 emission targets and to transition the economic model, at low cost. Based on the existing performance of each applicable region and the quality of applications, seven regions or municipalities have been chosen to implement pilot projects: Guangdong, Hubei, Beijing, Tianjin, Shanghai, Chongqing and Shenzhen. Further to the development of trading methods, all pilot areas are required to develop the regulations, caps, permit allocation plans and registries that are all necessary to ensure smooth progress³⁴. Sun Cuihua, Deputy Director of the climate change department of NDRC hopes that the pilot emission trading will start from 2013, and nation-wide trading from 2016.

Dedicated 'zones' and 'pilots' are the favoured method of experimenting with liberal economic practices in China. Just as the special economic zones of the 1980's acted as a catalyst for economic success, low carbon zones and emissions trading pilots will become the testing ground for China's latest economic transformation. It has to be made clear that there is no direct relationship between the LCZs and the pilot ETs. The low-carbon zones are at a higher level to promote low-carbon development from different perspectives, whereas the emissions trading pilot projects are intended to specifically mitigate carbon emission from designated sectors. However, for those regions (Guangdong, Hubei, Tianjin, Chongqing and Shenzhen) that are working on both projects, it is no surprise to see that they will include their pilot ETs as part of the LCZ, which is already the case in Guangdong³⁵.

³³ China. NDRC. (2010) *The Notice to Pilot Provincial and City Low-Carbon Programmes*. "国家发改委关于开展低碳省区和低碳城市试点工作的通知"[2010] No. 1587. Beijing, NDRC.

³⁴ China. NDRC. (2011) *The Notice to Start Emission Trading Pilot Projects*. [2011] No. 2601. Beijing, NDRC.

³⁵ Chen, H. and Wu, Z. (11/01/2012) Guangdong's Low-Carbon Proposal Firstly Approved by NDRC. "广东低碳试点方案率先获国家发改委批复". *Southern Daily*. [Online] Available from: http://nf.nfdaily.cn/nfrb/content/2012-01/11/content_36275259.htm [Accessed 16/01/2012]

Carbon Tax

In parallel with the pilot ETS to be launched during the 12th FYG, a carbon tax is also on the political agenda in order to curb carbon emissions. It was raised as early as 2007, when a number of top institutions (including Institute of Fiscal Science, the Institute of Environmental Planning, the Energy Development and Reform Commission and Tsinghua University) participated in the preliminary research on the topic³⁶. Research entitled “The Framework Design of China’s Carbon Tax System”, has confirmed the introduction of carbon tax to China.

In this study, a carbon tax is hoped to arrive in 2012 or during the mid-late 12th FYG period. The scheme is first designed to include carbon-intensive business, before a wider group to be levied. In order to avoid any unnecessary big shakeup in business growth, the research suggests a very low level of tariff (RMB 10 per tonne of CO₂ emitted), in order to encourage a gradual change in the business model, and in the long-term, increase competitiveness³⁷. The carbon tax is designed to subsidise key industries and generate national funds that will specifically improve energy efficiency, energy-saving technology and renewable energy development.

Dr Jiang Kejun, Director of the Energy Research Institute of the NDRC, has rejected the mutual exclusiveness of a carbon tax and an ETS. The carbon tax provides a fixed cost for carbon, whereas in the case of an ETS, the market determines the price of carbon. When the carbon price reaches a certain level, businesses are then able to choose whether they want to trade emission rights in the market or pay the tax³⁸. It may well be the case that a carbon tax and ETS can co-exist in China but with so little information available, clarification from the government on such a relationship is very much needed.

³⁶ Lin, M. and Yang, F. (27/01/2012) *China's Carbon Tax is Very Real* [Online] Available from: <http://www.chinadialogue.net/article/show/single/en/4742-China-s-carbon-tax-is-very-real> [Accessed 26/01/2012]

³⁷ Liang, J. and Wang, H. (05/01/2012) China Planning Carbon Tax as Independent Tax Category, It May Be Levied Before 2015. “中国拟碳税单独成税 2015年前或开征”. *Reuters*. [Online] Available from: <http://www.chinanews.com/cj/2012/01-05/3581265.shtml> [Accessed 29/01/2012]

³⁸ Zhang, H. (28/05/2010) Time of Carbon Tax Has Come In China? 中国碳税时代来临? *Beijing Business Today*. p.5. [Online] Available from: http://www.bjbusiness.com.cn/site1/bjsb/html/2010-05/28/content_98639.htm [Accessed 29/01/2012]

4. China and Emissions Trading

China's interest in carbon markets as a means of realising emissions reductions might come as a surprise to some. The idea that a communist country would actively seek to implement market mechanisms seems unlikely. However, there are a number of reasons for this.

Firstly, the 12th FYG has set itself enormous goals and the Chinese government knows that if these are to be achieved a number of fundamental things need to change. One of these changes is the need to move away from command and control measures, towards more dynamic and flexible policies that encourage innovation. Comments by Sun Zhen, Deputy Director-General at the NDRC²⁶ have highlighted the fact that that command and control measures (i.e. shutting down less efficient factories and power stations) have been used to their maximum effort to reduce emission – there are only so many factories that can be closed. Such an approach has now become so exhausted that further closures are likely to have a profoundly negative effect. Having seen emissions trading providing emissions reduction incentives in the most affordable way for businesses in Europe, the Chinese government is keen to understand how it could utilise such an approach. It is also worth noting that the concept of emissions trading is not completely new, the USA and China worked together on the feasibility of sulphur trading in China, culminating in a memorandum of understanding and a trial market in sulphur emissions being established³⁹.

Secondly, there is a well-thought out logic behind the choice of regions for China's seven emissions trading pilot projects. Each of the seven regions has been selected carefully to reflect the different levels of economic development and wealth of the country. For example, Guangdong, the wealthiest and most developed province, and Hubei, with a lower level of development as compared the other five regions. Running pilots in these differing areas will allow China to test emissions trading models that suit differing situations, allowing for experience to be gathered on a municipal / provincial level before any such scheme is implemented on the national level.

Thirdly, it is hoped that an emission trading scheme may help wean China's power generation and heavy industry off its dependency on state support. As well as helping to improve efficiency by introducing strategic long-term planning, introducing financial derivatives, optimising resource allocation, encouraging energy efficiency and investment in nascent technologies. It is these co-benefits that make emissions trading an attractive proposition as well as acting as a device to break the green barrier in international trade, especially given that more countries are increasingly enforcing progressively stringent regulations on the environmental impacts of products⁴⁰.

Lastly, implementing emissions trading systems requires robust methods for providing accurate data to measure, report and verify (MRV) emissions, something that will benefit China domestically by allowing it to better understand how its industry is performing. It will also be required to fulfil MRV obligations under an international post-2020 agreement, foreseen under the Durban Platform.

There are compelling reasons for China to experiment with emission trading, although it is not a panacea for China's environmental woes, rather it should be considered as one policy amongst many that are needed to create the right incentives to realise meaningful change.

³⁹ EPA. (2011) *Clean Air Market Partnerships – China*. [Online] Available from: <http://www.epa.gov/airmarkt/international/china/index.html> [Accessed 03/01/2011]

⁴⁰ Huang, Q. (15/08/2007) Green Barrier Disguise Face of Protectionism. *China Daily*, p. 10. [Online] Available from: http://www.chinadaily.com.cn/opinion/2007-08/15/content_6027388.htm [Accessed 27/09/2011]

China's Emissions Trading Pilot Projects

Command and control measures are commonly used in China in order to achieve its desired social, economic and political goals. It is therefore not surprising to see the 12th FYG groaning with mandatory targets. The revelation comes in the ways China intends to achieve these targets, not only do provinces have more autonomy in deciding how they are achieved, but market mechanisms will be used to achieve them. The introduction of market mechanisms comes after the acknowledgement that command and controls measures alone are not sufficient⁴¹ to achieve the carbon intensity targets. As already mentioned, seven regions have been chosen to implement pilot projects: Guangdong, Hubei, Beijing, Tianjin, Shanghai, Chongqing and Shenzhen. The following section will look at the progress made so far in these pilot project regions.

Chinese pilot ETs - what we know so far

From 2006 - 2010, **Beijing** has increased its energy efficiency by 26.59% from 2005 levels, making it the most energy-efficient region in the country (see Table 2). It has achieved this mainly through the relocation of heavy industry, higher GDP contributions from a larger service industry, diversification of energy consumption patterns and the application of energy-efficient technology⁴². Yet, the capital is assigned an ambitious target of 17% under the 12th FYG period. Based on Beijing's own 12th FYG⁴³, the Beijing municipal DRC has produced a detailed outline of the capital's energy development for the next five years, with a cap of 20 million tonnes on annual coal consumption by 2015⁴⁴. Furthermore, it has appointed a number of public and private energy service companies (ENSCos)⁴⁵ to take on the responsibilities for the monitoring and auditing of the energy consumption in the city. Preliminary work has included a greenhouse gas inventory of buildings, transport networks and public organisations.

Location	Achieved Energy Intensity in 2010 (standard coal/tonne/10,000RMB GDP)	Energy Efficiency to be increased by 2015 (%)	Carbon Intensity to be reduced by 2015(%)
Beijing	0.582	17	18
Guangdong	0.664	18	19.5
Tianjin	0.826	18	19
Shanghai	0.712	18	19
Hubei	1.183	16	17
Chongqing	1.127	16	17
Shenzhen	0.513	7.84	15

Table 2: Energy Efficiency of Each Region⁴⁶

⁴¹ Wang, E. (18/05/2011) *Command and Control is not Sufficient to Meet Carbon Intensity Target* “国家发改委应对气候变化司副巡视员孙楠：碳强度指标落实不能单靠行政手段”。 [Online] Available from: <http://www.21cbh.com/HTML/2011-5-18/5NMDAwMDIzODg5NW.html> [Accessed 27/09/2011]

⁴² Beijing DRC. (2011) *Beijing's 12th Five-Year Guideline for Energy Conservation, Emission Reduction and Climate Change* “北京市“十二五”时期节能降耗及应对气候变化规划”。 [Online] Available from: www.bjpc.gov.cn/fzgh_1/quihua/12_5/zx/zh/201108/P020110906379363381153.doc [Accessed 10/09/2011]

⁴³ Each province has to prepare a separate local FYG, based on the national one.

⁴⁴ Beijing DRC. (2011) *Beijing's 12th Five-Year Guideline for Energy Development* “北京市“十二五”时期能源发展建设规划”。 Beijing, Beijing DRC.

⁴⁵ Beijing DRC (2011) *List of Recommended Organisations for Energy Audit and Consulting* “关于发布北京市能源审计咨询机构推荐名单的通知”。 [Online] Available from: <http://www.bjpc.gov.cn/tztg/201109/t1603108.htm> [Accessed 26/09/2011]

⁴⁶ National Bureau of Statistics of China (2011) *Announcement on the Results of Each Region in Meeting the Energy Conservation Target during the 11th Five-Year Guideline* “国家发改委、国家统计局关于“十一五”各地区节能目标完成情况的公告”。 Beijing, National Bureau of Statistics of China. [Online] Available from: http://www.stats.gov.cn/tjdt/zygg/qjtjgg/t20110610_402731394.htm [Accessed 10/10/2011]

While Beijing is one of the most prominent pilot project locations, there remains a considerable amount of uncertainty as to what carbon trading in the capital might look like. Nevertheless, Beijing has an informed business community including one of the leading environmental exchanges, the China Beijing Environmental Exchange (CBEEEX). CBEEEX has been proactive in advocating emission trading as a cost effective means of emissions mitigation. Amongst other things their work has involved setting up the “Panda Standard”⁴⁷, which is targeting Agriculture, Forestry and Other Land Use (AFOLU) offset projects, generating carbon credits for the voluntary market. The Panda Standard has been developed in partnership between CBEEEX and the BlueNext Environmental Exchange⁴⁸.

The Panda Standard creates voluntary emission reductions (VERs) which are used by organisations who, while having no legal obligation to reduce their emissions, wish to buy offset credits as a way to mitigate their carbon footprint as part of their corporate social responsibility (CSR) strategy. This partnership has generated experience and capacity that will prove invaluable in helping to set up a more rigorous mandatory Beijing or even nationwide scheme. The Beijing municipal DRC is now working with CBEEEX and focusing on building an exchange platform for Beijing’s pilot project⁴⁹, based on Chinese specific requirements, as well as the international carbon trading rules.

In March 2012 the Beijing Municipal Government released draft rules for its pilot scheme. Although just a draft it gives vital insight into how the Beijing pilot scheme may operate. The draft design suggests that the pilot is considering three classes of tradable emissions certificates: those covering upstream direct emissions, downstream indirect emissions and ‘baseline and credit’ project emissions to be used as offsets. In order to avoid double counting the upstream and downstream markets may be kept as separately traded markets but with offset credits from sectors outside of the two markets being available for use in both.

While the document did not set out precisely which sectors the pilot will include, it did recommend mandatory participation for corporations emitting on average above 10,000 tonnes per year from 2009 - 2011⁵⁰. A number of installations have been asked to provide emissions data, including: thermal electricity providers, the heating sector, manufacturers and major public buildings. The creation of a market in downstream indirect emissions is consistent with Beijing’s Guideline of Energy Saving to Non-Commercial Buildings in Beijing⁵¹, which suggests carbon trading could be used to leverage energy efficiency improvements from existing public buildings. Research⁵² carried out by the Ministry of Housing and Urban-Rural Development (MOHURD) is also believed to be in the opportunities that carbon trading in the building sector.

It has also been suggested that the draft rules include proposals for the inclusion of price containment measures – a feature which they have presumably realised is necessary from recent experiences in Europe where economic forecasts proved inaccurate leading to very low prices.

⁴⁷ China Beijing Environmental Exchange. (2009) Panda Standard for Voluntary Emission Reduction in Agriculture and Forestry Projects in China. Beijing. China Beijing Environmental Exchange.

⁴⁸ BlueNext is owned by the NYSE Euronext (60%) and Caisse des Dépôts (40%).

⁴⁹ Phoenix TV (2011) *MEI Dwen: Carbon Market Might Embrace for a Large Growth Next Year* 梅德文: 碳市场明年或将面临大发展. [Video] Available from: <http://finance.ifeng.com/news/special/2011dws/20110917/4610071.shtml> [Accessed 28/09/2011]

⁵⁰ IETA Beijing draft rules briefing (received via personal communication).

⁵¹ Beijing Municipal Commission of Housing and Urban-Rural Development. (2011) *Beijing’s 12th Five-Year Guideline of Energy Saving to Non-Commercial Buildings in Beijing* “北京市“十二五”时期民用建筑节能规划”. [Online] Available from: <http://www.bjjs.gov.cn/publish/portal0/tab490/info65232.htm> [Accessed 02/10/2011]

⁵² Federal Ministry for the Environment, Nature Conservation and Nuclear Safety. (2010) *The Carbon Market and China’s New Buildings*. [Online] Available from: <http://www.bmu-klimaschutzinitiative.de/en/projects?p=6&d=544>

Guangdong Province, had an annual greenhouse gases emission of 508 million tonnes of CO₂ equivalent in 2007⁵³ (Germany emitted 480 million tonnes CO₂ in 2007), and is the second most energy-efficient region (see Table 2) in the country. It achieved this title by phasing out or retrofitting less energy efficient heavy industry, developing energy consumption monitoring systems and mandating energy saving measures in the building and transportation sectors. Its energy efficiency has increased by 16.42% compared to the 2005 level. For the next 5 years, the province is aiming to lower its energy intensity by 18%, which is confirmed in the provincial Energy Saving Plan⁵⁴.

Due to a high concentration of energy intensive industries across the province, the Plan has set out various measures to transform these industries to become more environmentally aware, promoting different renewable energy sources, capacity building on energy data collection and MRV as well as establishing standards. In early 2011, several institutes jointly presented a Roadmap for Guangdong Province developing the low-carbon economy after two years of study⁵⁵. It proposes a provincial-wide ETS, operational 3 - 5 years from 2011, and an inter-provincial scheme unfolding in the following 5 - 10 years. In September 2011 a follow-up feasibility study on the ETS of power and building material sectors began⁵⁶ coinciding with the culmination of the survey of the provincial carbon emissions⁵⁷. At the beginning of October 2011, the province announced that the Southern United Asset and Equity Exchange (SUAEE) will be the official exchange for Guangdong's scheme⁵⁸. In the meantime, Guangdong has submitted its official plan on low-carbon development during the 12th FYG period to the NDRC. This describes the guiding principle on how the province is going to transform itself into a low-carbon economy, through:

- Acceleration of the change of economic development model; promotion of low-carbon development of industries;
- Promotion of optimisation of energy consumption pattern and energy saving;
- Green planning;
- Frequent communication with Hong Kong and Macau, facilitating a wider cooperation to address climate change;
- The creation of an institution that promotes low-carbon development.

Guangdong's low-carbon plan has been approved by the NDRC which confirms not only the emissions trading pilot scheme, but also the four-phases of the implementation - from regional to national level - during the 12th FYG period. Furthermore, Lu Xiulu, Director of the Guangdong DRC confirmed a cap of 660million tonnes CO₂ in 2015⁵⁹ – the first quantified cap of any of the seven pilots. This cap is likely to leave room for emission to grow for the coming years. With this in mind it will be important to know how allowances are to be allocated to better understand where the demand in the market will come from.

⁵³ Guangdong DRC (2010) *Guangdong's Action Plan to the Provincial Low-Carbon Development* “广东省开展国家低碳省试点工作实施方案”. Guangzhou, Guangdong DRC.

⁵⁴ The Economic and Information Commission of Guangdong Province. (2011) *Guangdong's 12th Five-Year Guideline for Energy Conservation* “广东省“十二五”节能规划”. [Online] Available from: <http://www.gdei.gov.cn/flxx/jnjh/zcfg/201107/P020110721398855166025.doc> [Accessed 20/09/2011]

⁵⁵ Fu, W. (08/04/2011) *The Roadmap to Guangdong's Low-Carbon Development Unveiled* “广东低碳发展路线图首揭面纱”. [Online] Available from: <http://www.gdkjb.com/a/guangdongkeji/toubanxinwen/2011/0408/6052.html> [Accessed 28/09/2011]

⁵⁶ Huang, Y. (21/09/2011) Guangdong Hopeful to be the First Regional Carbon Market “粤有望建成首个地方性碳市场”. *Southern Daily*. p 7. [Online] Available from: http://epaper.nfdaily.cn/html/2011-09/21/content_7008468.htm [Accessed 29/09/2011]

⁵⁷ Qu, Y. (22/09/2011) *Guangdong Planning to Build Regional Carbon Market by 2013* “广东拟在 2013 年建成地方性碳交易体系”. [Online] Available from: <http://china.caixin.cn/2011-09-22/100308403.html> [Accessed 29/09/2011]

⁵⁸ Liu, Z. (04/10/2011) Guangdong On the Way to Carbon Exchange “广东正筹建碳排放交易所”. *New Express Daily*. p. 10. [Online] Available from: <http://epaper.xkb.com.cn/view.php?id=730070> [Accessed 06/10/2011]

⁵⁹ Chen, K. (13/03/12) Point Carbon, China sets 660-mln tonne CO₂ cap for Guangdong, [Online] Available from: <http://www.pointcarbon.com/news/1.1798440>. [Accessed 14/03/12]



Figure 3: Timeline of the Implementation of ETS in Guangdong

As the second wealthiest city in the country, **Tianjin** was recognised for its excellent performance in achieving energy efficiency during the 11th FYG period, exceeding the assigned target by 1%. With challenging targets of energy efficiency (18%) and carbon intensity (17%) lying ahead for the 12th FYG, Tianjin authority has devised a number of approaches to create synergy with business and the public to meet these targets.

In addition to the various measures to improve the energy efficiency of the city and decouple economic growth from carbon intensive power production, the municipal DRC has also proposed to pilot an emission trading scheme. As early as 2008 the Tianjin Climate Exchange was established under the partnership between Petro China, the Chicago Climate Exchange and the Tianjin Property Rights Exchange (managed by the Tianjin Municipal Government). The Exchange serves as a platform for the trading of greenhouse gases emission rights, major pollutants (e.g. sulphur dioxide and COD) emission rights and undertakes research studies on carbon markets.

In December 2011, the Asian Development Bank (ADB) approved a grant of \$750,000 for designing the Tianjin Emission Trading Scheme. The project will attract both international and national experts to develop the scheme in Tianjin, from preparation to implementation. The three main objectives of the ABD grant are:

- *“Provide strategic policy advice on the overall design of the Tianjin emission trading system;*
- *Prepare detailed design of the Tianjin emission trading system, including the trading rules and regulatory system;*
- *Commission the trading platform and registry for the Tianjin emission trading system.”⁶⁰*

A timeline indicating progress of the pilot scheme was also included in the ADB project document (see Figure 4). The document also identifies risks that may deter the progress of the project, such as the lack of transparency, weak market regulations and inadequate methodologies to monitor and measure emissions. Ultimately it is hoped that Tianjin’s pilot ETS will “provide valuable lessons for the design of a nationwide system to reduce the carbon intensity of the Chinese economy”⁶¹.

⁶⁰ Asian Development Bank (2011) *People’s Republic of China: Developing Tianjin Emission Trading System (Cofinanced by the Climate Change Fund)*. Asian Development Bank. [Online] Available from: www.adb.org/Documents/TARs/PRC/45038-001-prc-tar.pdf [Accessed 25/01/2012]

⁶¹ Allan, A. (25/01/2012) *ABD Grants \$750,000 to China to Build ETS*. [Online] Available from: <http://www.pointcarbon.com/news/1.1728254?&ref=searchlist> [Accessed 25/01/2011]

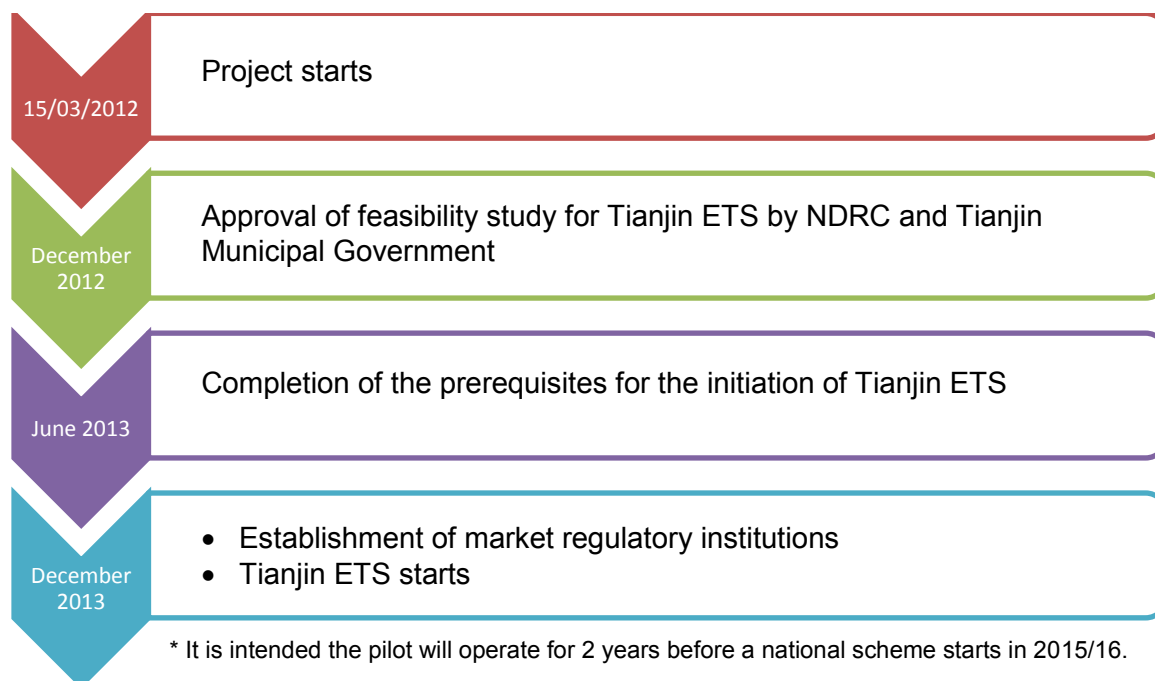


Figure 4: Timeline of Tianjin ETS

The Remaining Four...

The remaining four proposed pilot projects – **Hubei**, **Chongqing**, **Shanghai** and **Shenzhen** – have, like Beijing, Guangdong and Tianjin, met the energy efficiency targets set out in the 11th FYG. They now have been given challenging emissions reduction targets, especially for those who have an energy intensity below 1 tonne of standard coal per 10,000 RMB GDP by 2010 (Table 2), a very high performance, as only 10 out of 30 provinces and municipalities in the country have obtained such a status.

The targets set for each region vary according to its level of development. As such **Shanghai** and **Shenzhen** will face tougher targets and have to look for more radical methods to meet the obligations as compared to **Chongqing** and **Hubei**. At the time of writing, none of these regions has released specific plans to improve the energy efficiency under their own jurisdictions, but there are many policies dealing with transport, energy-intensive industries and the building sector.

As early as 2010, Wuhan, the capital city of **Hubei** province, had applied to establish the national exchange for carbon trading. The decision is as of yet unknown, but a local Carbon Reduction Association was formed, with more than 60 major local businesses being the members, dedicating to explore the potential that market-based instruments can bring to reduce carbon emission. In addition, the Association has drafted a plan for emission measurement, verification and reporting systems for business⁶². As the only other Province amongst the seven pilot schemes it is likely that Hubei, like Guangdong, will focus on direct emitters in specific sectors and that schemes similar in design to the ETS may emerge.

In **Shanghai**, China's financial hub, the Shanghai Environment Energy Exchange has recently been restructured as a limited corporation, where State Grid and the China Clean Development Mechanism (CDM) Fund backed by the Ministry of Finance are amongst the shareholders⁶³. The Shanghai Environment Energy Exchange (SEEX) is the main

⁶² Cnmn.com.cn (15/01/2012) *Wuhan Exploring ETS for More Than 4 Years* “武汉率先探索碳排放交易近4年”. [Online] Available from: <http://yq.cnmn.com.cn/ShowNews.aspx?id=227586> [Accessed 17/01/2012]

⁶³ Shanghai Environment Energy Exchange (23/12/2011) *Shanghai Environment Energy Ltd established*. “上海环境能源交易所股份有限公司揭牌仪式在沪举行” [Online] Available from: <http://www.cneeex.com/jiepaiyishi/xiangguanbaodao/20111223xwtg.html> [Accessed 27/12/2011]

participant in the pilot project design, and has submitted a proposal to the municipal DRC which recommends the inclusion of the electricity as well as the steel sector into the pilot ETS⁶⁴. Despite this submission no official decision has been made and a number of unresolved issues – such as trading legalisation and permit allocation – remain a barrier to the development of a scheme in the municipality. As a city based pilot it seems likely that one of the key questions will be how to allocate indirect emissions to end users of energy for example in buildings.

At the sub-provincial division level, **Shenzhen** has the same power as any provincial capital city in terms of policy making in economics and law i.e. has the authority to make its local economic and legal policies. In addition, the legacy of being a Special Economic Zone (SEZ) benefits Shenzhen, giving it greater flexibility to try nascent policies, given the successful achievements in economic development in the last 30 years under more progressive approaches. At the moment, the China Shenzhen Emission Rights Exchange is accumulating experience on voluntary emission reductions, as preparation for the forthcoming mandatory scheme in the city. Meanwhile, it has been reported that Su Wei, the director of the climate change department of NDRC, was very impressed with all the work building up to the ETS. Although details were not disclosed, he confirmed that Shenzhen is leading the way compared to the other regions⁶⁵. Shenzhen is developing a pilot ETS, but as it is located within Guangdong province it will also be a part of the Guangdong pilot ETS as well as its LCZ. It will be interesting to see how it utilises its unique muscles to develop a scheme that will be different from, but at the same time coherent with, the Guangdong scheme. It may be that as with Beijing more than one market is developed covering upstream and downstream emissions separately.

Intra-pilot collaboration

One of the advantages of developing a range of pilots is that different approaches can be tested to see which work in a Chinese context. Dr Jiang Kejun has commented that China is drawing from all examples to see how best to implement emissions trading and “different designs”⁶⁶ will be implemented in each of the regions, in order to seek the most appropriate type for China.

That said it would be unusual if the designers of the different schemes did not collaborate to some degree as they will all be facing similar challenges and may benefit greatly from sharing their thoughts and ideas. The prize for early collaboration might be that pilot schemes can be linked together creating a larger, more liquid market in the longer term though this may not be something that is considered at the start to enable each region to tailor its policies to suit its own circumstances. While China’s emissions trading ambitions are currently at a provincial level, intentions to link schemes have been touched upon in a White Paper published by the State Council Information Office, reporting on the government intentions to gradually establish trans-provincial and trans-regional ETSS⁶⁷. Lu Xiulu, deputy Director of the Guangdong DRC, said Guangdong would propose cross-provincial trading to potentially start in 2014⁶⁸.

⁶⁴ China Business Network (2012) *Shanghai ETS Almost Ready.* 上海“碳交易”试点方案基本就位” [Video] Available from: <http://v.qq.com/play/9vFN3YFd1GT.html> [Accessed 23/01/2012]

⁶⁵ China Shenzhen Emission Rights Exchange (2012) *China Shenzhen Emission Rights Exchange was Praised for Its Work on Emission Trading Scheme.* 深圳排放权交易所成绩获肯定. [Online] Available from: http://www.cerx.cn/cn/trade_details.aspx?ArticleID=243 [Accessed 20/02/2012]

⁶⁶ Morton, A. (08/09/2011) *Beijing Praises Emission Plan.* [Online] Available from: <http://www.smh.com.au/environment/climate-change/beijing-praises-emissions-plan-20110907-1jxql.html> [Accessed 20/09/2011]

⁶⁷ China US Focus, (22/11/11), [White Paper] *China’s Policies and Actions for Addressing Climate Change,* <http://www.chinausfocus.com/library/government-resources/chinese-resources/documents/white-paper-chinas-policies-and-actions-for-addressing-climate-change-november-2011/> [Accessed 29/01/12]

⁶⁸ Chen, K. (13/03/12) *Point Carbon, China sets 660-mln tonne CO2 cap for Guangdong,* [Online] Available from: <http://www.pointcarbon.com/news/1.1798440>. [Accessed 14/03/12]

International cooperation

China's emissions trading ambitions are exclusively domestic, though a number of international partners are working with China on ETS related issues. The World Bank has approved a preparation grant from China under the Partnership for Market Readiness (PMR) to research and implement market-based instruments to reduce GHG emissions. China is investing the fund into investigating domestic mitigation options and the role of market instruments⁶⁹. As previously mentioned, the Asian Development Bank has also offered both monetary and technical assistance to fully develop the ETS pilot in Tianjin. The European Union has announced a grant of 5 million Euros to be spent on supporting ETS development in China. The Federal Ministry of Environment, Nature Conservation and Nuclear Safety (BMU) in Germany and the MOHURD have cooperated on a number of environmental projects, including research into carbon trading in the building sector in China⁷⁰. The British Government has also supported a number of policy studies on China's regional ETSs and continues to support the development of low-carbon policies in China through its *Prosperity SPF Programme*⁷¹.

While still a long way of it seems there is huge scope to – in the future – link with other international systems. China's neighbouring countries, South Korea and Australia, are in the process of setting up emissions trading schemes, and New Zealand launched an ETS in 2010. Designing a national system with linking in mind would save a huge amount of time and money in the long term.

⁶⁹ World Bank. (02/06/2011) *Partnership Approves Grants for Eight Carbon Market Initiatives*. [Online] Available from: <http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/EASTASIAPACIFICEXT/EXTEAPREGTOPENVIRONMENT/0,,contentMDK:22929905~menuPK:502892~pagePK:2865114~piPK:2865167~theSitePK:502886,00.html> [Accessed 29/09/2011]

⁷⁰ Lu, C. (29/03/2011) *Green Research Project of Carbon Market and Building Sector Drawn into Conclusion*. " 碳交易与建筑行业绿色研究项目已尘埃落定". [Online] Available from: <http://news.hexun.com/2011-03-29/128317484.html> [Accessed 27/09/2011]

⁷¹ British Embassy Beijing, *FCO Global Prosperity Fund*, [Online] Available from: <http://ukinchina.fco.gov.uk/en/about-us/working-with-china/ProsperitySPF>, [Accessed 27/02/2012]

5. Challenges Remain

China has made its intentions clear: it will use emissions trading as one means of reducing its carbon emissions and as a way of incentivising low carbon growth. Conversely, it must be reiterated that all pilot emissions trading plans are in their infancy. There remain a number of stumbling blocks that must be overcome before a meaningful scheme can be implemented.

To date there are a limited number of fully functioning ETSs worldwide, the European Union's ETS remains the largest and most developed, although there are a number of smaller active schemes, for example in New Zealand and Switzerland as well as several that are scheduled to come online in the near future, including those in Australia, California and South Korea.

Proponents of emissions trading will undoubtedly be encouraged by the news that the world's largest polluter is looking to implement regional emissions trading pilots as a precursor to a national system. As seen in the previous section, Beijing, Guangdong and Tianjin are the most advanced in their plans to establish ETS pilots, much work remains in the other areas before a clear understanding of what will take place can be known. In a report⁷² by the Development Research Centre of the State Council a number of pressing concerns were highlighted include issues surrounding allocation of allowances, market behaviour, trading regulations, responsibilities of parties as well as legal infrastructure⁷³. Some further challenges are explored below:

Setting a Cap on Emissions

No matter the size or scope of the scheme implemented, a cap on emissions will need to be imposed, as proposed by the Development Research Centre of the State Council. The gathering of reliable data needed to calculate the caps or obligations poses a challenge. Setting the cap will be pivotal in ensuring any mandatory scheme will be effective. As history has shown, in the EU ETS, a cap set at an inappropriate level would cause it to function ineffectively. Voluntary approaches can provide valuable learning but do not provide any certainty that investments in low carbon solutions will be made, nor do they guarantee the mitigation of emissions or generate the scale of investments necessary to change the path of development.

To date Guangdong has announced it will set a cap of 660million tonnes CO₂ in 2015, which is an absolute cap on emissions in line with its 12th FYG target to reduce carbon intensity by 19.5%. Beijing is expected to be the next to follow in setting a cap in line with its 17% carbon intensity target. A key question in converting intensity or efficiency targets into an absolute number of tonnes is what assumptions to include about the likely economic growth over the period and also the expected trends in energy production and consumption. One way of protecting the market against a higher or lower than expected growth rate, is to set a portion of the emissions allowances to one side to be released into the market only if certain conditions are met. The announced draft design for the Beijing pilot has been suggested to contain such a measure, which will make the setting of the cap a little bit easier to get right since it allows for adjustments to supply to be made in a clear and transparent manner.

⁷² Liu, S., Zhou, H. and Xuan, X. (2011) *A Number of Issues to be Solved regarding to the Domestic Carbon Market in China* “建立我国碳市场需要解决的几个问题”. [Online] Available from: http://people.chinareform.org.cn/L/liushijin/Article/201108/t20110830_120195.htm [Accessed 03/09/2011]

⁷³ The Chinese Academy of Social Sciences (CASS) is working on the legal infrastructure of a national emissions trading scheme.

Which Sectors?

Another area to consider is which installations or economic sectors which will be included in any pilot or national scheme. To bring all industrial installations into a regional pilot ETS might force some participants, for example those with less capital or less influence out of the market or out of the region. Such a situation could lead to a reduction in tax revenue or employment for the local government. Fears of such effects might in turn lead to companies fighting for exemption. On the other hand, a decision to have only a limited number of sectors in the ETS might spark intense lobbying from powerful and influential state companies and create a market with too few participants controlling too much supply and not enough demand. Either way excessive lobbying from companies could lead to a fragmented market across the country. More positively, emissions trading can be seen as a way to help different regions of the country to become more equal, if the introduction of carbon pricing helps to redistribute wealth to different areas. In the EU this has been achieved explicitly by giving countries with lower than average GDP a more generous target (and those with higher GDP a correspondingly higher target) so that money can flow to these regions. This may provide an attractive model for China given the wider aspirations of the 12th FYG.

However, in a system that begins only with regional coverage, it is sensible to start with sectors which do not compete for business with operators in uncapped regions. Some sectors are more mobile than others in that it is easier for some companies to decide to shift production to somewhere outside the pilot region. Sectors such as electricity and transport however tend, by and large, to provide services to a population whose demand for energy exists in one place and does not move. In the end, if the policies are well designed the cost of complying with emissions trading is unlikely to be a major burden for many and therefore the attractiveness of moving location will be limited. In each scheme, different sets of participants may be included to meet the circumstances in that area.

How to include downstream emissions?

One question facing the city and municipality pilots in particular is how to include many downstream users of energy so that there are a viable number of participants? A key issue is not to allow double counting of emissions and it is therefore likely that separate markets for upstream (direct) emissions and downstream (indirect) emissions will be needed. In addition offsetting credits may be used from projects in sectors outside both markets to help meet demand. For emissions from the use of energy in buildings a decision will need to be taken about which legal entity to attribute the emissions to – the owner of the building or the occupier? New buildings will also need to be able to enter the scheme. To create an incentive on the builders of new buildings to be as efficient as possible they could either be required to buy all their allowances from the market (i.e. no free allocation) or be given some free allowances according to a benchmark set at an appropriately ambitious level (i.e. calculated by no of tonnes of CO₂ expected for that property type per meter squared).

What about transport?

Aviation is the only form of transport to be included into the EU ETS so far. This has proved somewhat controversial, although the EU continues to defend its position on the basis that it is implementing the polluter pays principle for activities related to European economic activity. The EU's emissions trading directive contains a clause that exempts non-EU countries from the scheme when they implement '*equivalent measures*'. Although equivalent measures is not yet defined, the Chinese pilot projects could provide an interesting way for China to avoid being included in the EU scheme, if they include flights departing from the major airports in their own pilot. This would help to boost demand in the pilot market and ensure any revenues from auctioning were gathered in China.

For road transport the situation for cities is more difficult than for the regional provinces. In the regions the geographic coverage is big enough that they could choose to implement

caps on the operators of fuel refineries corresponding to the amount of emissions in the products they sell. This is administratively easy. For the cities it may be more appropriate to look at the owners of petrol stations and for the caps to be applied at this level. If transport remains uncapped then it is likely the sector will be a source of offset credits for the other sectors. In which case it will be important to develop robust methodologies that only credit activities that clearly go beyond 'business as usual' and deliver a genuine reduction in emissions across the whole supply chain. For example, use of electric vehicles may not deliver a reduction in emissions if the electricity is produced from carbon intensive coal based generation.

Cost pass-through in markets with regulated prices

A key question for China in considering introducing carbon pricing via a traded market is the effect this will have in sectors where the market price for the product is regulated. This is a particular challenge in the electricity sector where prices are currently regulated. The best way to address this problem is for the price regulation to be adjusted to reflect the new costs of carbon that will be included in the production of electricity from fossil fuels. Obviously, because in trading the exact price of carbon cannot be known in advance, the regulator will need to predict what level of increase to allow. To make this task easier it is possible to include design features in the trading pilots, which help to regulate price by adjusting the supply of allowances into the market. For example, if a fixed volume of allowances are set aside and only released into the market if prices reach a certain level, then the regulator has a better idea of what the maximum price will reach in the market and what the increase should be.

Monitoring, Reporting and Verification

It is crucial in emissions trading that all market participants have confidence that what they are trading is genuine. This places a high degree of importance on the monitoring and verification of the activities of the participants. The question of how the costs of these activities should be paid for and by whom is a key concern for the developers of the pilot projects. In the EU the costs of monitoring, reporting and employing a third party verifier are all born by the participants. The Government also bears a cost of overseeing the whole process and conducting checks to ensure the accuracy of the records received.

In theory this can be afforded by the Government, since the market will be creating a new commodity, which can boost the local economy, creating new jobs in industries such as professional reporting and verification services, as well as commodity exchanges and brokerage, which will all contribute tax revenues. In addition, Governments can choose to offer some emissions allowances at an auction, which also raises revenues. Finally it is possible to levy taxes on transactions of the traded commodities themselves, further increasing revenue. In terms of the costs to industries taking part, Government may initially wish to provide some form of compensation for example, a reduction in employment tax or corporation tax to offset the costs incurred.

Overall it is worth investing on this very important aspect, in the interests of creating a successful market with a high degree of confidence in the commodity that is being traded.

Aside from the cost issue the other important factor is that there are stiff penalties for a failure to follow the rules and that these penalties are set in advance and equally applied to all participants. In addition to penalties such as fines, to maintain environmental integrity, any failure to submit allowances to cover emissions should be made good in the next compliance period. In order to help with the scrutiny of the scheme China should make data relating to emissions and submissions of allowances open to the public so that third parties and competitors can assist in checking for irregularities.

Will participants embrace trading?

A particular challenge for China may be the degree to which the participants, who are used to a more command and control policy environment, will embrace the concept of trading. If targets are set which are modest and relatively cheap and easy to meet the preferred option may be to simply comply, without considering the benefits of trading. In setting the targets and choosing the sectors to include, it will be important to create some buyers by setting targets that are relatively hard to meet through their own actions. This could be achieved either by including a sector where the solutions are still relatively difficult or expensive to deliver or by creating ambitious targets in a particular sector.

As long as the rules are clear and there is a high degree of confidence in the integrity of the market regulations being adhered to a secondary market is likely to emerge with financial companies playing a role. This can help to encourage participants to take part in trading.

2012 Leadership Change

2012 is the year for leadership change in China. It is hotly anticipated that Hu Jintao will be replaced by Xi Jinping as party chief and president. Although not the official position of the Government, Xi Jinping's current role as vice-chairman of China's Central Military Commission, and the fact he visited the USA to meet with President Obama in February 2012, means he's the most likely leader in waiting. The lack of official information on such decisions has left speculation to lead the debate.

Little is known about the politics of Xi Jinping. The son of one of Communist China's founding members, he is considered to be a 'princeling', accustomed to the workings of the communist party and its leadership. His wife, a famous folk singer, Peng Liyuan, also lends him a popular touch.

It remains to be seen what the change in leadership will usher in but given that it's taking place during an unprecedented time of change for China it's likely to add to international interest. The task at hand is enormous and growing social discontent has fuelled calls for caution from Conservatives. Will Xi Jinping be willing or able to speed up the economic and social reforms needed in China? What is clear, as documented in this report, is that the new leadership will be inheriting an extremely progressive 12th FYG. It would seem unlikely that they would deviate from the FYG but more reassurance is needed to settle the nerves of the watching world. One positive signal given was during a recent visit to the USA by Xi Jinping, where he stated his optimism that Beijing and Washington could find common ground over diplomatic crises, as well as climate change and energy, trade, and the direction of global economic growth⁷⁴.

China and the International Climate Negotiations

This report has focused on China's domestic efforts to address emissions reductions. This strategy should not be confused with China's position at the international climate negotiations. The United Nations Framework Convention on Climate Change (UNFCCC) sets the overall framework for intergovernmental efforts to tackle climate change.

Like many intergovernmental processes its ability to set the agenda and act is hampered by the size and scale of the negotiations at hand. The UNFCCC to date has made huge progress in highlighting and creating consensus around the need to act on tackling climate change. Nevertheless, the process has been slow and has been subject to increasing public attention for its limitations.

⁷⁴ Buckley, C (16/01/12). *China's President-in-Waiting Xi Woos U.S. Before Visit*. Reuters. [Online] Available from: <http://uk.reuters.com/article/2012/01/16/uk-china-usa-xi-idUKTRE80F0YA20120116> [Accessed 23/01/12]

In international climate negotiations China is classed as a developing economy and its interests have been to protect the favourable position granted to developing countries under the rules of the Kyoto Protocol, namely not yet being required to cap emissions and the principle of common but differentiated responsibilities (CBDR). But the world is not the same as when the Kyoto Protocol was adopted in 1997. China's fast growing economy has meant that its share of responsibility (and its ability to act) is changing, as is the need for action. Finally it seems enough time has elapsed for China's domestic climate policy to be sufficiently developed to give reassurance that it can soften its international position. At the latest Conference of the Parties (COP) in Durban, China played a very significant role in the meeting when the head of the Chinese delegation Xie Zhenhua, commented that China was ready to implement a legally binding deal by 2020,⁷⁵ if appropriate conditions were met.

⁷⁵ The Climate Group (2011) *Durban: Post-COP 17 Briefing*. The Climate Group [Online] Available from: <http://www.theclimategroup.org/assets/files/COP17---Post-COP-briefing---Dec23.pdf> [Accessed 29/01/2012]

6. Conclusion

An often heard comment is that there is little point in countries or regions like Europe taking action to tackle climate change because alone they cannot ensure a global solution. Equally, countries such as Japan and South Korea are hesitant to move forward unilaterally for fear that their international competitiveness will be undermined. Many commentators still point to the rapid increase in emissions in emerging economies such as China as a reason to hold back on ambition. However, as this briefing hopefully illustrates, the progressive 12th FYG, innovative policy mechanisms, and the announcement of a climate change law all demonstrate that China is very serious in its efforts to redirect its economy onto a low carbon pathway. They have recognised the potential of adopting a different growth pathway and have publicly stated that they would not “follow the path of the US”⁷⁶ in terms of high per-capita emissions.

The fact that China is moving ahead with pilot emissions trading systems is very significant. It demonstrates that there is a growing understanding that market-based mechanisms can combine high levels of ambition with sufficient flexibility to allow regulated sectors to adapt. By setting the outcome in terms of emissions reductions required but not specifying solutions, China is seeking to unlock innovation and encourage greater autonomy in its industries and power sector.

At the present time there are still many unknown details about China’s proposed emissions trading pilot projects. This is because, put simply, there is little information being made publically available. Nevertheless, China has made its intentions clear a range of different approaches will be trialled in different provinces to provide invaluable experience for developing a national scheme which will, ultimately, assist in the transformation of its economy into a global low carbon leader.

⁷⁶ Black, R. (25/10/2011), China 'won't follow US' on carbon emissions. *The BBC*. [Online] Available from: <http://www.bbc.co.uk/news/science-environment-15444858> [Accessed 17/04/2012]