

Addressing climate change: China's status and policies

Li Junfeng, Yang Xiu, and Zhang Minsi

As a developing country, China faces many challenges and, in particular, must balance the requirements for economic development. This naturally leads to a debate about balancing economic growth with environmental protection and carbon emission control. There has been a gradual change in how China defines the suitable balance, with increasing emphasis being given to sustainable development and environmental protection. To some extent this change reflects the fact that, in spite of significant economic progress over the past 30 years, mistakes have been made with respect to environmental protection, resulting in serious pollution.

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'THIS NATURALLY LEADS TO A DEBATE ABOUT BALANCING ECONOMIC GROWTH WITH ENVIRONMENTAL PROTECTION AND CARBON EMISSION CONTROL.'

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This has implications for China's policies on greenhouse gas emissions (GHG). For example, there is a debate about whether China should set a GHG emission peak and, if so, when to reach it. Those in favour argue that a clearly defined GHG emission peak and a date for reaching it could promote energy structure adjustment and economic restructuring. Opponents argue that China should take natural steps to reach the peak. The latter approach emphasizes that no other countries took administrative measures to achieve a GHG emission peak before they had completed the process of industrialization and urbanization, and that setting such a peak would negatively affect China's economic development.

This article discusses the background and reasons for the controversy and then identifies policies that reflect the increasing emphasis on environmental protection and climate change, before commenting on China's low-carbon pathway. It then discusses the challenge of addressing climate change, before returning to discuss the appropriate balance between economic growth, environmental protection, and carbon emission control.

Overview of China's development

China is the largest developing country in the world with a population in 2012 of 1.35 billion – about a fifth of the world's total. China's economy has grown rapidly since the late 1970s, with GDP increasing from 454.56 billion Yuan in 1980 to 51.9 trillion Yuan in 2012. China has become the world's second largest economy, with a per capita GDP of about US\$6,000 in 2012, ranking 87th in the world.

Continuous and rapid economic development has accelerated the process of industrialization and urbanization, while increasing the sophistication of domestic consumption and the level of energy demand. From 1981 to 2000, China's energy consumption increased from 590 Mtce (Million tonnes of coal equivalent) to 1460 Mtce. Since then, China's energy consumption has grown at an annual average rate of 9.3 per cent, reaching 3620 Mtce in 2012, two and a half times the level in 2000.

China is the world's largest coal producer and consumer. Coal accounts for about 70 per cent of China's primary energy consumption; oil is the next most important source of energy consumption, with natural gas

and non-fossil fuels being relatively unimportant, but growing quickly. China's GHG emissions are driven by the very fast growth of coal and oil consumption, with emissions rising from 3.65 billion tonnes of CO₂e in 1994 to 7.47 billion tonnes of CO₂e in 2005, and reaching about 10 billion tonnes of CO₂e at present. Since 2007, China has replaced the USA as the world's largest emitter of GHG.

Policies and actions for addressing climate change

China has been playing a positive role in international climate change negotiations since the 1990s, promoting a fair and reasonable international mechanism for addressing climate change. China adheres to the UNFCCC and the Kyoto Protocol as the basic framework, and plays an active role in the main channel of international climate change negotiations within the UN framework. China upholds the principles of 'common but differentiated responsibilities', along with fairness and respective capabilities. It abides by the principles of openness and transparency, extensive participation, signatory leadership, and consensus through consultation and insists on the coordination of mitigation, adaptation, funding, and technology issues.

Domestically, there is growing popular support for green and sustainable development, while the central government has strengthened its efforts to tackle climate change. The actions could be summarized into: deepening thinking about sustainable development, introducing increasingly stringent emission targets, and improving top-level planning, systems, and mechanisms.



Gradually deepening thinking on sustainable development

For many years, Chinese political leaders have been emphasizing the growing importance of environmental protection as an integral part of development. For instance, in 2010, 'green development' was introduced into the Twelfth Five Year Plan for National Economic and Social Development (12th FYP) as a separate chapter. In 2011 the report of the Eighteenth Party Congress proposed incorporating 'ecological civilization' as a central part of the process of achieving economic, political, cultural, and social progress. The awareness of ecological progress and sustainable development has gradually deepened.

Increasingly stringent targets

In 2009, China introduced the goal of reducing GHG emissions per unit of GDP by 40–45 per cent in 2020 in comparison to 2005. In 2011 the 12th FYP adopted the following intensity targets: energy per unit of GDP to fall by 16 per cent, and GHG emissions per unit of GDP to fall by 17 per cent, in both cases comparing 2015 with 2010. The same plan also targeted non-fossil energy to rise to 11.4 per cent of total primary energy by 2015, compared to 8.6 per cent in 2010. In addition to tightening intensity targets, China has been setting targets for the absolute levels of coal and energy consumption. In 2012 the 'Development Plan for the Coal Industry' defined a target of 3.9 billion tonnes of coal consumption in 2015, compared to 3.1 billion tonnes in 2010. In 2013 the 'Development Plan for Energy' adopted a target of 4.0 billion tce of primary energy consumption in 2015, compared to 3.3 billion tce in 2010. The Chinese government also issued an action plan for the prevention and control of atmospheric pollution in 2013, which set the target of reducing the concentration of inhalable particles

in 2017 by more than 10 per cent compared to that in 2012.

Improving top-level planning, systems and mechanism

China has carried out major strategic studies and strengthened top-level planning for addressing climate change, and further improved its related management systems and working mechanisms. For instance, China has built a 'Carbon Reduction Target Accountability System', which is a management system under which 'carbon reduction agreements' are signed between upper and lower-levels of government, between governments and enterprises, and between management teams and implementation teams within enterprises. The government has also organized the compilation of the National Plan for Addressing Climate Change (2013–20) and promoted legislation on climate change. China is in the process of adjusting its industrial structure, including transforming and upgrading traditional industries, supporting the development of strategic and newly emerging industries, developing the service industry, as well as speeding up the elimination of inefficient production capacity.

..... **'CHINA HAS BEEN PLAYING A POSITIVE ROLE IN INTERNATIONAL CLIMATE CHANGE NEGOTIATIONS SINCE THE 1990S ...'**

Meanwhile China is improving its energy structure, including promoting the clean utilization of fossil fuel, and developing non-fossil fuel sources and applications. China is promoting energy conservation and improved energy efficiency, by enhancing the evaluation of energy saving initiatives, implementing key energy conservation projects, and improving energy efficiency standards and labelling.

China also devotes attention to forest carbon sinks and controlling emissions in other areas. It has also taken positive action to enhance its capability across major sectors to enable it to adapt to climate change and respond to extreme weather and climate-related events.

China's low-carbon future

Two groups of low-carbon pilot projects in 42 provinces and cities, along with carbon emission trading pilot programs in seven provinces and cities have been implemented. These pilot programs aim to explore low-carbon pathways from the bottom up, offering economic incentives for low-carbon innovation.

As a result of the policies undertaken by China since 2005, the country's energy consumption per unit of GDP has decreased by 26.4 per cent, and its carbon emission intensity per unit of GDP has decreased by 28 per cent, while the proportion of non-fossil energy has increased to 9.1 per cent. China has also increased its forest resources by 1,723 million cubic metres compared to the original 12,456 million cubic metres.

Although China still has a long way to go before it succeeds in controlling total energy consumption, protecting the environment, and promoting low-carbon development, it is fair to say that China has already reached a consensus concerning the development pathway. Top-level decision makers have identified 'sustainable growth' as growth that balances quality and efficiency, realizes a low-carbon transition, and strictly controls energy consumption, especially in relation to coal.

Challenges for addressing climate change

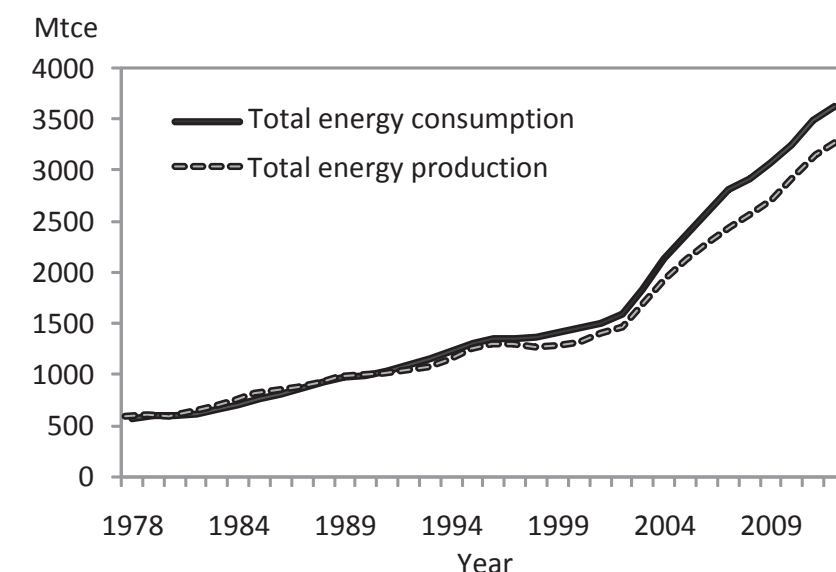
As a developing country in the process of industrialization and urbanization, China is still facing many challenges,

including continued economic development, environmental protection, and addressing climate change. All relevant policies need to be developed on the basis of China's national realities.

First, there are economic imbalances between China's east and west regions, and between urban and rural areas. On the one hand, the eastern coastal cities such as Shanghai, Beijing, and Shenzhen are well ahead on economic development, with per capita GDP exceeding \$10,000, close to the middle level of developed countries. Meanwhile, economic development in western regions is relatively backward. According to the United Nations standard, there are still 130 million people in China living below the poverty line. Solving the problems of adequate food and clothing is still a major challenge in these regions. On the other hand, per capita disposable income of China's urban residents is three times that of rural residents, while basic public services and social development in rural areas are much weaker than in urban areas. Most people in rural areas expect an improvement in living standards and economic conditions.

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This creates controversy with respect to balancing economic development and addressing climate change, and there are quite different views on climate change. For example, Academician Ding Zhongli proposed that the phenomenon of climate change should be questioned because of its uncertainty. Furthermore, a considerable number of academics



China's total energy consumption and production during 1978–2012

and government officials are sceptical and often associate climate change with an international conspiracy. They maintain that climate change is related to international politics, economics, and diplomacy, and that China should deal very carefully indeed with this issue for that reason.

Second, energy is still an important factor restricting China's economic development. Since the reforms of the late 1970's, energy consumption has grown faster than energy production. Domestic energy supply insufficiency is an increasingly serious concern. As shown in the figure 'China's total energy consumption and production during 1978–2012', China had a surplus of domestic energy production over domestic consumption in 1978. From 1992, China has been a net importer of energy. In 2012, China imported about 300 Mtce to meet domestic energy consumption, which was more than the UK's 2012 total energy consumption. Meanwhile, China's power generation capacity has increased steeply. In most years since 2000, generation output growth exceeded 10 per cent and the elasticity of electricity production

(the ratio of electricity production growth rate and the GDP growth rate) exceeded 1, as shown in the table 'Growth of China's electricity'. It is expected that China's total power generation capacity will exceed 1.2 TW in 2013 and that total capacity will reach nearly 2 TW by 2020, significantly more than US generation capacity of about 1.1 TW.

Third, environmental problems such as air pollution are becoming more and more acute in China. These problems are related to the rapid growth of energy consumption and the coal-dominated energy structure. For example, at the end of 2012 and in early 2013, serious haze pollution covered over one million square kilometres of the middle and eastern region of China, affecting hundreds of millions of people. The PM_{2.5} (fine particles, less than 2.5 micrometres in diameter) concentrations in the affected regions exceeded the World Health Organization standard by tens of times (75 ppm in the interim target), in some areas even reaching 1000 ppm, causing serious harm to people's health and safety. Reviewing the economic development path over

Growth of China's electricity production		
<i>Year</i>	<i>Growth rate of electricity production over preceding year (%)</i>	<i>Elasticity ratio of energy production</i>
2000	9.4	1.12
2001	9.2	1.11
2002	11.7	1.29
2003	15.5	1.55
2004	15.3	1.51
2005	13.5	1.19
2006	14.6	1.15
2007	14.5	1.02
2008	5.6	0.58
2009	7.1	0.78
2010	13.3	1.28
2011	12.0	1.29

the past three decades, China still has the extensive growth characteristics consistent with 'sacrificing the environment for economic growth'. The relative shortage of resources and the limited government capacity to deal with the environmental challenges have become basic realities for China. Former premier Wen Jiabao pointed out that China was facing unbalanced, uncoordinated, and unsustainable development problems. It is fair to say that both the problems of environmental pollution and of economic development are urgent and that it is difficult to solve them together in the short term.

Faced with these challenges, there are controversies in China related to climate change. Although the trend towards addressing climate change has gradually become more influential, some of the public and local government officials still consider economic growth to be the priority. Support for growth as the priority can be explained by: economic imbalances between China's different regions, and between urban and rural areas; the different views of scientific knowledge still to be found on climate change issues; and because

the idea that 'development is the absolute principle' has long been ingrained and many people believe that economic development will solve most social problems.

The balance between economic growth, environmental protection, and carbon emission control

There are important debates in China concerning the appropriate balance between economic growth, environmental protection, and carbon emission control. China is the world's largest developing country, in the process of rapid industrialization and urbanization and facing many development challenges. Controlling local environmental pollution and promoting domestic economic development are both priorities, and will influence the way in which China addresses climate change and low-carbon development. China should tackle climate change in conjunction with environmental protection (especially haze governance), energy structure adjustment, and through the promotion of economic transformation. As with the control of environmental pollution, controlling GHG emissions is

a long-term process which must be seen in the context of achieving low-carbon development in China's current development stage and national conditions.

'CHINA HAS TO COMPLETE ITS INDUSTRIALIZATION AND URBANIZATION AND TO ACHIEVE LOW-CARBON DEVELOPMENT IN THE CONTEXT OF ITS ENERGY CONSTRAINTS AND EMISSION LIMITS.'

China's decision-makers have shown determination and a positive attitude to addressing climate change and promoting sustainable development, with emissions targets becoming stricter and domestic policies increasingly emphasizing low-carbon development. China will achieve low-carbon development through continued efforts over decades, with the process occurring in three steps: first, some developed cities and regions will reach a GHG peak; second, the government will achieve effective GHG emissions management at a national level; and finally, there will be absolute GHG emissions reduction. It still remains to be seen whether China will establish an official GHG emissions peak and, if so, when and what that peak will be.

China has to complete its industrialization and urbanization and to achieve low-carbon development in the context of its energy constraints and emission limits. This is an unprecedented endeavour, which needs China's persistence and determination in facing difficulties, as well as international cooperation and exchanges and the help of the international community. In this way, through its successful development of a sustainable low-carbon energy system, China will make its own contribution to the international community.