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# China's Climate- and Energy-security Dilemma: Shaping a New Path of Economic Growth

Karl Hallding, Guoyi Han, and Marie Olsson

**Abstract:** China is undergoing modernization at a scale and speed the world has never witnessed. As climate change increasingly dominates the global agenda, China faces the challenge of shaping a new growth path in a climate-constrained world. The paper argues that China's current climate and energy policy is, at best, a "repackaging" of existing energy and environmental strategies with co-benefits for the mitigation of climate change. Nevertheless, even though policies are not climate-change driven, the quick (rhetorical) endorsement of low-carbon development and the strong momentum of green technologies indicate that political ambitions are in favour of finding a more sustainable development pathway. A new growth path would, however, require a fundamental shift, with development and energy strategies being set within climate security constraints. The eventual success of this new path remains uncertain.

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**Keywords:** China, climate change, Scientific Development Concept, climate security, sustainable development

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## Introduction

The issue of global climate security has reached the apex of the global agenda at a time when China faces tremendous development and energy security challenges in its efforts to develop into a harmonious and globally responsible society (Liu and Diamond 2005; Zeng et al. 2008). Until very recently China had no climate security-related policy as such, but had from the early 2000s started developing an extensive set of policy measures and programmes in pursuit of energy security and energy efficiency. Because of the close link between energy use and greenhouse gas emissions, these same policies became the foundation when China began putting together a coherent framework to address climate security in 2006.

This policy transformation has been closely associated with the political focus of the current leadership under President Hu Jintao and Premier Wen Jiabao – in particular the search for alternative development pathways under the new guiding principles of the Scientific Development Concept and the building of a Harmonious Society. Alongside China's increasing equity gap, energy, resources and pollution intensities became key areas of concern when the Hu–Wen administration took office in 2003.

The purpose of this paper is to provide a brief account of the latest development of climate and energy politics in connection with the Scientific Development Concept in China. It argues that while there are indicators of significant awareness and political ambition, China's dilemma regarding energy and climate security is closely linked to its struggle to master a low-carbon development path in the midst of rapid industrialization and urbanization. The development path China will have to discover lies in truly uncharted territory where no country has yet travelled.

## The Climate- and Energy-security Dilemma

After three decades of near two-digit economic growth, China still has immense developmental needs. In its ambition to attain a harmonious society, the Chinese leadership has identified three main goals: economic development, social stability, and poverty alleviation. While only roughly one-twentieth of the country's population live under OECD-like conditions, almost half of China's estimated 1.3 billion citizens still live on less

than 2 USD (PPP) a day (Chen and Ravallion 2008). There is no doubting China's justifiable right to development, but development is dependent on growth, and growth is fuelled by energy. Over the past decade the question of how development can be generated more energy efficiently and fuelled by resources other than coal, gas, and oil has been centre stage in Chinese policy making.

By the turn of the century it had become increasingly obvious that the single-minded focus on rapid economic growth had its limits and that China would be confronted with three deep-seated sustainability problems during the coming decades (United Nations Development Programme and Stockholm Environment Institute 2002). Firstly, despite strict and successful family planning policies, population growth would increase pressure on already notoriously scarce and unevenly distributed resources. Furthermore, reckless economic growth would worsen the resource pressure while widening the chasms between the haves and the have nots. Finally, a newly aroused capitalist enthusiasm mixed with a socialist heritage of government subsidies for basic resources such as water and petrol would create the basis for large-scale exploitation of human and natural resources.

Energy security has traditionally been seen as a national concern, with the establishment of resilient energy systems and the securing of sufficient and predictably priced energy supplies necessary for economic development and growth. China's focus on energy security is, however, not only a matter of keeping an enthusiastically growing economy healthy; it is also about political survival. In China, growth and political legitimacy are intricately linked, and the political leadership take very seriously the prognoses that social stability will be jeopardized if growth falls (*The Economist* 2008).

With rapid globalization, rising energy prices and the prospect of dwindling global oil reserves, it is becoming increasingly clear that narrow national strategies will not be sufficient to secure national energy security. As Chinese growth has increased, so has its importance for global growth at large. In recent years Chinese growth has made a greater contribution to global growth than that of the U.S. (*The Economist* 2007). China's energy security has thus become a matter with potentially far-reaching consequences for the world economy (Hallding 2008).

Climate security, on the other hand, is inherently a global matter: avoiding large-scale damage from climate change that could have far-reaching global economic and security implications. The viable long-term

strategies for achieving climate security rest heavily on global or multilateral institutions and are highly dependent on international cooperation. Still, individual countries can and must act to strengthen climate security by limiting the potential damage from climate change impacts through national and local adaptation strategies (Ding, Dai, and Zhao 2008; Yergin 2006). There are also increasing concerns that individual countries will begin developing hard security responses to protect against the consequences of climate change.

The challenge for the global community as well as for individual countries, and perhaps for China in particular, is therefore to develop energy security strategies within the limitations of climate security. In its search for energy security strategies constrained by climate security, China faces several underlying dilemmas:

To begin with, China is at a development stage of rapid industrialization and urbanization at a time when climate security has been put at the top of the global agenda, and the sheer size of the Chinese economy means that its development-related emissions have a large impact on global climate change. In attempting to decouple its carbon emissions from growth, China faces a challenge that no other country has previously mastered at a similar stage of development (Pomfret 2008).

Secondly, mounting domestic development challenges make it imperative for China to maintain high economic growth to finance a wide variety of much needed social reforms (Zheng and Tok 2007). The need to reduce growing social disparities and provide development opportunities for the almost 50 per cent of the population that lives on less than 2 USD (PPP) a day is particularly urgent. Equally important is the halting of the rampant environmental degradation, which limits growth potential and adds to social instability (Liu and Diamond 2005; Warburton and Horn 2007).

Thirdly, with coal forming the foundation of its energy system, China faces a great challenge in its attempts to transform its energy structure to such an extent that the global target of a maximum increase of 2°C is within reach (Hallding 2008). Committing to a climate deal implies massive structural transformation for China, not only of its energy mix but also of its energy-intensive sectors such as transport and building.

Finally, China's tradition of aligning with the G77 view that climate change is predominantly an OECD-world problem is becoming more and more contradictory as China has recently become the world's largest

carbon emitter. With these escalating emissions it will also prove increasingly difficult for China to keep up its foreign policy ambition to act as a “responsible great power” and to convince the world that its development is not a threat to global climate security.

Climate change is moving up on the Chinese political agenda, but it is unlikely that the government will agree to any climate mitigation actions that compromise the national targets of sustaining economic growth, maintaining social stability and alleviating poverty. A steady energy supply is vital to sustain economic growth, and energy security is a key driving force behind most of the development-related political decision-making in China. Therefore, any proposed climate mitigation deal must be understood in the context of China's development strategy and its close connection to energy security.

## Unpacking the Scientific Development Concept

When the Hu–Wen administration came to power in late 2002, they inherited an increasingly divided society with devastating environmental conditions, mounting resource scarcities, alarming social and regional disparities and increasing international fears about the global implications of China's rise (Zheng and Tok 2007). The vice chairman of the National Development and Reform Commission (NDRC), Zhang Xiaoqiang, expressed China's predicament as follows:

after more than twenty years of remarkable economic growth, China has grown to a giant with one leg – the economic being too long, and the other leg – the social being too short, making it hard to walk without the risk of falling (Han 2004).

To address these concerns and build a “pro-people” image, the Hu–Wen administration set about shifting the focus of the national agenda from economic growth to social harmony (Fewsmith 2004; Zheng and Tok 2007).

## Building a Well-off Society in an All-around Way and the Five Coordinations

Once in office, Hu Jintao wanted to assert power and distance his administration from the single-minded growth policies of the Jiang Zemin era, which had resulted in mounting social and ecological problems. As a first step he reconnected to the goal that Deng Xiaoping had set at the

beginning of the reform period: that by the turn of the millennium China should have developed into a modestly well-off society. The Well-off Society concept implied that economic growth needs to be balanced with the sometimes conflicting goals of social equality and environmental protection, a broader growth strategy than during the Jiang era.

The Well-off Society was applied by focusing heavily on economic growth, and expressed as a quadrupling of per capita income to reach 1,000 USD by the year 2000. The target was reached a few years ahead of time, but critics claimed that wealth was not well distributed, that the country was facing difficult social and ecological problems, and that China should strive for a well-off society of higher quality. In a response, the Hu–Wen leadership brought up the idea of rebranding it a Well-off Society in an All-around Way, setting a new target for 2020 where the “all-around way” suffix signalled a focus on a more balanced and comprehensive growth model.

The need to stay poised between dialectically opposing forces was further emphasized through the proclamation of the Five Coordinations, which aimed to achieve a balance between urban and rural areas, between coastal and inland regions, between economic and social dimensions, between human society and natural systems, and between domestic issues and continued opening up to the outside world.

## The Scientific Development Concept and the Vision of a Harmonious Society

The concept of a Well-off Society in an All-around Way based on the Five Coordinations evolved into the Scientific Development Concept, which was first introduced in autumn 2003 and formally endorsed by the National Peoples Congress in March 2004 (see also Holbig 2009 in this issue). Since the opening of the Eleventh National People’s Congress in March 2008, the Scientific Development Concept has been incorporated into the constitution and is used as a guiding principal for China’s socio-economic development.

Parallel to the evolution of the Scientific Development Concept, yet another concept – the Harmonious Society – began being circulated by the leadership as a long-term visionary goal for Chinese society. The Harmonious Society has been described by Hu Jintao as “democracy, the rule of law, justice, sincerity, amity and vitality” as well as a better relationship between the people and the government and between man and nature (Zheng and Tok 2007).

If the Harmonious Society is the endpoint for the Chinese development endeavour, the Scientific Development Concept guides the way to that goal. Seen in the context of the Hu–Wen administration's aim of promoting broad economic development, providing development while at the same time dramatically reducing energy and pollution intensities has become a key part of implementing the Scientific Development Concept.

## The Emergence of Energy and Climate Policy under the Scientific Development Concept

Already by the early part of this century China's rapidly increasing dependence on oil imports had begun alerting the leadership to energy security. This issue was further emphasized with the endemic energy shortages and blackouts in 2003, and by 2004 a picture of a sudden increase in the energy intensity that had started at the turn of the millennium began emerging (Jiang 2004a, 2004b). When China's top policy-makers met for the Central Economic Work Conference in late 2004, they decided – in the spirit of the Scientific Development Concept – that energy and resource saving should become important targets in economic restructuring (*Xinhua News Agency* 2004).

Both the ninth and the tenth five-year plans had failed badly on both energy and pollution reduction targets, so the Hu–Wen administration showed its political commitment to reversing these trends during the eleventh five-year programme period (2006–2010) by setting ambitious compulsory targets to reduce energy intensity and pollution from their 2005 levels by 20 and 10 per cent respectively (OECD 2007). Other targets, though not compulsory, included increasing the share of renewables in the nation's energy mix to 10 per cent from the current 7 per cent by 2010, and to 15 per cent by 2020, as well as strong efforts on forestation, tree planting and the protection of the ecological environment.

It was not until 2005/06 that climate security began surfacing as a serious issue on the Chinese leadership's agenda. This coincided with the rapid advance of the global climate change debate, which was driven by the release of Al Gore's movie *An Inconvenient Truth* and the publication of the Stern report. Domestic research about the severe climate impacts on China had furthermore drawn the Hu–Wen administration's attention to China's role in climate change. The climate issue moved rapidly up the



agenda, and by June 2007 China had published its *National Climate Change Programme* (National Development and Reform Commission 2007).

The following chronology of events illustrates how the Chinese leadership's attention to climate change notably intensified during 2007.

- January: China's *National Climate Change Assessment Report* is released and emphasizes the devastating impacts of climate change on China.
- January: Immediately following the release of the report, the National Expert Group on Climate Change is established to advise the government on climate change issues.
- June: China publishes its *National Climate Change Programme*. The climate change coordination group under the NDRC is elevated to a National Climate Change Leading Group directly under the State Council and led by Premier Wen Jiabao.
- September: A special mechanism for external relations on climate change is established under the Ministry of Foreign Affairs. A designated top climate change representative is appointed.
- September: President Hu Jintao delivers an important climate speech at the annual APEC meeting outlining China's stand on climate change.
- November: Premier Wen Jiabao delivers a keynote speech on combating climate change during the third East Asia Summit in Singapore.
- December: The Chinese delegation at the COP13 Bali Climate Conference is widely praised for its constructive and flexible attitude (Bezlova 2007; Casey 2007).

The activity continued through 2008, with climate change being one of the key issues during the Eleventh National People's Congress in March and the China Development Forum in April. In October the *White Paper on Climate Change* was published and China announced initiatives for international climate talks (Information Office of the State Council 2008).

The evolution of an energy and climate policy under the Hu–Wen administration demonstrates several important developments. To begin with, an ambitious climate change programme has been established through the repackaging of policies originally developed in response to energy security and ecological concerns. The climate change strategy that has emerged also fits very well under the Scientific Development Con-

cept, and the Hu–Wen administration's articulated ambition to build a “resource-saving and environmentally friendly society” (Fewsmith 2008).

Moreover, a climate change debate, although contentious and politically sensitive, has gained momentum in China, and the idea of low-carbon economic development is now being discussed and explored as a comprehensive way to solve resource, energy, and environmental challenges in the rapid industrialization and urbanization process (Ding et al. 2008). Leading economists are exploring the macroeconomic consequences of a low-carbon economy, with expectations that it may also have positive side effects such as stabilizing growth, creating jobs, and developing competitive advantages.

Last but not least, one of the central features of the Scientific Development Concept is the aim of developing China into an innovation society as an essential prerequisite for competitiveness in the global economy. Clean technology is an area where China wants to reach a world leadership position, and China has considerable potential to be inspired by, and in turn drive, a global transition to a low-carbon future (Climate Group 2008, 2009).

## Energy- and Climate-related Targets and Ambitions

There are three key sets of interrelated climate and energy targets in China:

- The compulsory energy intensity targets of the eleventh five-year programme.
- The renewable energy targets for 2010 and 2020.
- The goals and emission mitigation targets stipulated in the *National Climate Change Programme*.

After the failure to reach targets for reduced energy intensity during the tenth five-year plan (2001-2005), the Hu–Wen administration showed its political clout by setting compulsory targets to reduce energy intensity by 20 per cent and pollution intensity by 10 per cent within the eleventh five-year programme (2006-2010).

Although China sees climate change as a key development challenge, its *National Climate Change Programme* from June 2007 made China the first developing country to publish a national strategy addressing

global warming. The overall goal of the *National Climate Change Programme* is to:

make significant progress on controlling greenhouse gas emission; continue to enhance the national adaptive capacity to climate change; enhance climate change-related scientific and technological research to reach a new level; greatly improve public awareness of climate change; and strengthen the organizational and institutional development in the area of climate change (National Development and Reform Commission 2007).

Furthermore, ambitious goals for renewable energy development have been set for long-term energy security purposes (table 1). In 2005, a target was set to increase the share of renewable energy in the nation's energy mix to 10 per cent by 2010 and 15 per cent by 2020, which will require an investment of about 120 billion USD by 2020. Since 2006 China has maintained an annual investment of more than 10 billion USD, second only to Germany. China has also set a less ambitious objective of having 30 per cent or more of its total energy requirements satisfied by renewable sources by 2050 (Martinot 2007).

Table 1: Main Renewable Energy Development Targets (GW, unless otherwise specified)

Development Target	2005	2010	2020	Potential
Big hydro	80	120	225	540
Small hydro	35	60	75	
Wind	1.3	5	30	1000
Biomass	2	505	30	500 mTEE
Solar PV	0.07	0.3	1.8	5,000 MJ/m <sup>3</sup>
Solar hot water	80 Mm <sup>2</sup>	150 Mm <sup>2</sup>	300 Mm <sup>2</sup>	
Ethanol	0.80 Mt	2 Mt	10 Mt	150 Mtce
Biodiesel	0.05	0.2	2 Mt	
Biomass pellets	0	1 Mt	50 Mt	
Biogas and biomass gasification	8 Gm <sup>3</sup> /y	19 Gm <sup>3</sup> /y	44 Gm <sup>3</sup> /y	
Geothermal energy	30 MW	110 MW	0.5-1.0	6
Share of total primary energy (incl. big hydro)	Approx. 7.5%	10%	15%	

Source: National Development and Reform Commission 2007.

China's rapid development in both investment in and production of renewable energy has received international recognition, and the country is already regarded as one of the most attractive countries for renewable energy investment (Climate Group 2009). In wind power, for example, China has moved well ahead of the targets set and is now expected to have more than 100 GW installed by 2020, as compared to the original target of 30 GW.

The *National Climate Change Programme* also set specific yet indicative targets for renewable energy development for 2010. The successful implementation of the programme would result in 950 million tonnes of avoided CO<sub>2</sub> emissions by 2010 (table 2) (National Development and Reform Commission 2007).

Table 2: Mitigation Targets Set in the *National Climate Change Programme*

Target	Avoided emissions
More efficient thermal electricity production and transmission, including developments in the cogeneration of heat and power	110 million tonnes
Increased share of hydro power	500 million tonnes
Increased share of nuclear power	50 million tonnes
Reuse of coal-bed and coal-mine methane for electricity generation	200 million tonnes
Biomass energy development	30 million tonnes
Wind, solar, geothermal, ocean energy, etc.	60 million tonnes

Source: National Development and Reform Commission 2007.

## Discussion

Based on this brief account of the recent development of climate and energy policies in China, several observations can be made:

- Since China until only a few years ago paid limited attention to climate change, there are no policies with the overarching aim of mitigating climate change (Richerzhagen and Scholz 2008). China's climate-relevant actions have been the positive side effects of policies aimed at improving energy efficiency, increasing non-fossil-fuel energy sources, increasing forest coverage, and improving environmental conditions (mostly air quality-related). Since the release of *China's National Climate Change Programme* in 2007 these climate-

related policies have been revamped as the main structure of China's climate policy.

- The fact, however, that China's climate-related policy framework is driven mainly or partly by concerns other than climate change does not reduce the value of China's considerable progress in reducing its carbon intensity; nor does it make these policies less effective.
- China's climate policy should be reviewed against the backdrop of the shift in development policy under the banner of the Scientific Development Concept, which highlights the delicate balance between economic growth, energy security, environment, and climate change (Anderson 2008). The quick adoption – at least at the rhetorical level – of low-carbon development together with rapid growth and strong momentum in renewable energy sectors such as wind and solar as well as green technologies clearly indicate that China's political ambition and determination is strongly in favour of alternative and more sustainable development paths. Such a path is also seen to be practically feasible (McKinsey and Company 2009).
- China has already developed an extensive set of energy efficiency policies and programs ranging from general national policy frameworks such as the Energy Conservation Law, the Renewable Energy Law, the Promotion Law of Clean Production, the Circular Economy Law, etc. to an array of more specific policy measures and programmes in all sectors, from industry, building, and transportation to electricity and renewables (Rommenney 2008).

However, there are serious concerns about China's institutional and administrative capacity to implement laws and regulation, and the barriers are many (OECD 2007). Some are closely related to the development and transitional stage that China is currently in, such as the inadequate overall monitoring and data collection capacity and the lack of information and technological supporting systems at the local level. Other obstacles are more deeply rooted in the Chinese political system: the administrative structure and the decision-making process, with the absence of effective and independent legal institutions and the lack of real opportunity for bottom-up initiatives.

Thus far, a majority of the implemented policy measures have been administrative by nature. Emission reduction targets are distributed down through the hierarchy from central to provincial to local levels combined with standards, subsidies, and investment programmes. The imbalance between administrative measures and more market-based

instruments reflects China's transitional stage from a strictly centrally planned to an increasingly more market-based economy. The effectiveness of the macro control, particularly in the energy sector, has been undermined by the lack of institutional capacity as well as by decentralization (Cunningham 2007; Downs 2006; Sheehan and Sun 2007). Conflicting priorities between central and local governments and inefficient and inadequate regulation have been the underlying causes of the lack of environmental performance in general (Williams and Kahrl 2008).

Thirty years of reform have increased the role of markets dramatically, yet establishing even clearer roles for government and markets remains a challenge (Wang 2008). While market reforms have made steady progress, the corresponding reforms of administrative systems have been lagging behind, and in many ways there still remains "too much government and too little market". The distorted energy price system is an acute example of this. China therefore needs not only to develop more economic and financial instruments and policies but also to strengthen investments in energy efficiency, which have been sliding since the beginning of the new century (Lin et al. 2008). In addition, rent-seeking behaviour and corruption in the public sector are widespread and serious concerns, particularly in the current context of massive public spending on economic recovery.

## Looking Ahead

It is clear that reaching the 20 per cent energy intensity goals in the remaining years of the eleventh five-year programme and making progress towards the grand goal of decoupling economic growth from energy consumption by 2020 will require continued reforms in the energy sector. Without strong incentives to support energy-efficient technology, discourage wasteful practices, and shift to less energy-intensive and more economically productive sectors, it is unlikely that those targets will be met (Lin et al. 2008).

At a more fundamental level, China today is in the midst of multiple demographic, economic, and societal transitions. Each of these constitutes a monumental challenge, and China will have to manage all simultaneously. Furthermore, with the looming concern of climate change, a robust new development path would demand that China stop treating climate mitigation only as a benign side effect of its energy and development strategy and instead place climate change at the core of its devel-

opment strategy. To that end, China faces the ultimate challenge of shaping a development path for low-carbon industrialization and urbanization, something which no country has ever done before.

The challenge is further complicated by the urgent need to curb the growth of global greenhouse gas emissions, and by the rapid economic growth that China is determined to maintain. While there are strong indications that such a new development path is earnestly sought in China, its potential success remains uncertain. Managing this critical uncertainty is therefore of utmost importance for both China and the world at large.

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