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The evolution of Chinese policies and governance structures on environment, energy and climate

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Abstract

Although a successor to the 1997 Kyoto Protocol has not materialised yet, the 2009 Copenhagen meeting underlined the importance of China in international debates on climate and energy. This is not only based on China's current climate emissions, but also on its expected energy use and economic growth. Within China, climate issues have, like environmental pollution more generally, received increasing government and societal attention, but so has energy – topics that relate to one other but also have different priorities and actor interests behind them. However, while climate change has become more prominent, as shown in the targets included in the current five-year plan, its institutional embeddedness in relation to particularly energy issues has received limited attention. This paper aims to help shed some light on how Chinese policies and governance structures on energy, climate and environment have evolved, particularly considering the roles of national and provincial authorities. Administrative structures and policy-making processes turn out to be very complex, with a range of units and bodies at different levels with distinct responsibilities as well as inter-linkages. Moreover, tensions and conflicts can be found regarding climate change and environmental policies on the one hand, and prevailing objectives to further economic development, on the other. Energy policies serve the same goals, with climate change being most often operationalized in terms of energy conservation.

The evolution of Chinese policies and governance structures on environment, energy and climate

Introduction

In the international debate on climate change, China has become a crucial player. The Copenhagen meeting in December 2009 witnessed China, and other emerging economies such as India, Brazil and South Africa, playing a more prominent role in shaping future policy. This most explicitly came to the fore in the final stage of the negotiations, when President Obama joined a meeting of the heads of state of these emerging countries that laid the foundations for the Copenhagen Accord. Although a successor to the 1997 Kyoto Protocol has not materialised at all yet, Copenhagen underlined the importance of China in setting the stage for economic as well as energy and climate issues. This is not only based on China's current emissions (its 2007 share of world emissions was already 20.7%, compared to 17.9% for the US and 12.8% for the EU-27, Hagemann et al., 2009), but also, and perhaps even more importantly, on its energy use and economic growth expected for future years. For 2020, China's emissions are estimated to grow by 42.6% compared to 2007 (which means 244.4% compared to 1990, Hagemann et al., 2009) to account, by 2030, for 29.0% of global emissions (and the US for 15.9%, Crooks & Romei, 2009).

These developments point at the importance of understanding how China's policies on energy, climate and environment are evolving, and how they are being governed at different levels, involving both state and provincial authorities. Chinese administrative structures and policy-making processes are very complex, with a range of units and bodies with distinct responsibilities as well as inter-linkages. Climate issues have, like environmental pollution more generally, received increasing government and societal attention, but so has energy – topics that relate to one other but also have different priorities and actor interests behind them. And while climate change has risen to prominence, as shown in the targets included in the current Five-year plan (which is expected to be extended in the forthcoming, 12th Five-year plan), its institutional embeddedness in relation to particularly energy issues has received limited attention, while its importance, for both national and international developments, seems crucial.

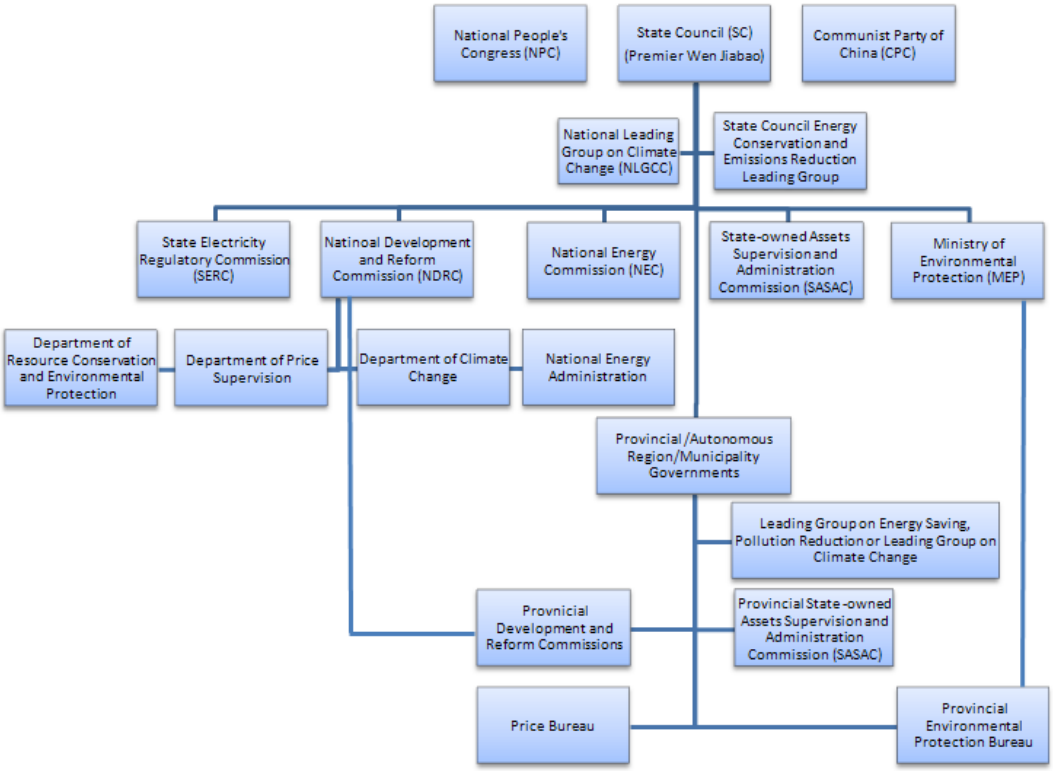
This paper aims to help shed some light on how Chinese policies and governance structures have evolved, particularly considering the roles played by national and provincial authorities, which may be relevant as input for both policy-making and further research. To this end, we will first explain some of the basics of the Chinese government structure in general terms. Subsequent sections focus on environmental, energy and climate policies, outlining the evolution of different policies and the relationship between them. As the development of the economy affects and is intertwined with these three policy areas, key economic dimensions will also be discussed to give a broad picture of environmental, energy and climate policies in the context of a rapidly developing Chinese economy.

Chinese Governmental Structures

Key actors in the policy-making processes at the highest level in China are the National People's Congress (NPC), the State Council, and the Communist Party of China (CPC) (See Figure 1). The

NPC is the nation's top legislative body with the highest authority. The State Council, i.e. the Central People's Government (referred as *the central government* hereafter), is the leading administrative unit responsible for implementing laws and policies of the NPC. The CPC influences the law-making process by controlling appointments to NPC's Standing Committee and top positions in ministries and commissions (Ma and Ortolano, 2000: 14).

Figure 1. Key Chinese Government Units and Structures for Environment, Energy and Climate Change



Source: Adapted from Mah and Hills (2008)

Under the State Council, there are a number of major institutions implementing China's environmental, energy and climate laws and policies: the National Development and Reform Commission (NDRC), the National Energy Commission (NEC), the Ministry of Environmental Protection (MEP), the State Electricity Regulatory Commission (SERC), the National Leading Group on Climate Change (NLGCC) and the Sate Council Energy Conservation and Emissions Reduction Leading Group. MEP was formed in 2008 to replace the former State Environmental Protection Administration (SEPA), and it aims to prevent and control environmental pollution, protect nature and ecology, supervise nuclear safety, safeguard public health and environmental safety, and promote harmony between humans and nature. SERC is a statutory institution established directly under the State Council, which acts in accordance with laws and regulations as a market regulator (SERC, n.d.).

NDRC is a macroeconomic management agency under the State Council. NDRC studies and formulates policies for economic and social development, maintains a balance of economic aggregates and guides the overall economic system restructuring. One of the key functions of

NDRC is to "*promote the strategy of sustainable development; to undertake comprehensive coordination of energy saving and emission reduction; to organize the formulation and coordinate the implementation of plans and policy measures for recycling economy, national energy and resource conservation and comprehensive utilization; to participate in the formulation of plans for ecological improvement and environmental protection; to coordinate the solution of major issues concerning ecological building, energy and resource conservation and comprehensive utilization; to coordinate relevant work concerning environment-friendly industries and clean production promotion"* (NDRC, n.d.-b). Units within NDRC that are directly related to environment, energy and climate change include the Department of Resource Conservation and Environmental Protection, the Department of Climate Change and the National Energy Administration (see below).

The National Energy Commission (NEC) is a high-level discussion body or think-tank with ministerial rank. It is responsible for drafting the energy development strategy, consider energy security and development issues and monitor implementation. Whilst NEC, chaired by Premier Wen Jiabao, is the highest authority overseeing energy issues, the general price-setting power for electricity resides with the NDRC. Through its National Energy Administration, the Department of Price and the Department of Price Supervision, NDRC is not only responsible for formulating policy measures for energy development, but also the administration and regulation of pricing policies (NDRC, n.d.-b). Provincial governments can implement local pricing policies as there are regional sub-divisions holding local power delegated to them from the central government (Hendrischke, 1999). Development and Reform Commissions at the provincial level are the key units responsible for formulating and implementing pricing policies for energy.

Considering the bodies that fall under NDRC, the Department of Resource Conservation and Environmental Protection coordinates the development of economy, society, environment and resources. It formulates and implements plans, policies concerning the conservation and comprehensive utilization of energy and resources, promotes the so-called circular economy, environmental protection industry, clean production and application of new products, technologies and equipments. It also undertakes work assigned by the National Leading Group on Climate Change and the State Council Energy Conservation and Emission Reduction Leading Group.

The Department of Climate Change is a department in turn is supposed to comprehensively analyze the impact of climate change on social-economic development. It formulates key strategies, plans and policies on climate change, is responsible for international climate change negotiations and international cooperation in response to climate change and related capacity building, takes the lead in the implementation of United Nations Framework Convention on Climate Change (UNFCCC) and the work in relation to the Clean Development Mechanism (CDM). It undertakes work assigned by the National Leading Group on Climate Change and the State Council Energy Conservation and Emission Reduction Leading Group (NDRC, n.d.-a).

The final NDRC unit is the National Energy Administration (NEA), which is responsible for formulating and implementing energy development plans and industrial policies; promoting institutional reform in the energy sector; administering energy sectors including coal, oil, natural gas, power (including nuclear power), new and renewable energy; taking charge of energy conservation, comprehensive utilization of resources in the energy sector; R&D and key energy-related demonstration projects; approving, reviewing, fixed asset investment projects of the energy sector within national plans and the scale of annual plans in accordance with the authority stipulated by the State Council; and undertaking the daily work of the National Energy Commission (NDRC, n.d.-c).

The State-owned Assets Supervision and Administration Commission (SASAC) is a special organization directly under the State Council. SASAC was established as the representative of the state to exercise ownership of state-owned enterprises (SOEs). The two monopoly state-owned grid companies and five state-owned power generation companies result from the 2002 power market reform and they were formed as the current incarnation of the State Power Corporation of China. The two grid companies are the State Grid and the China Southern Power Grid. The five power companies are commonly known as the Big Five (China Guodian Corporation, China Huaneng Group, China Datang Corporation, Huadian Corporation, and China Power Investment Corporation).

Similar to the central SASAC, local SASACs were set up by provincial and city governments to exercise all powers of ownerships on SOEs under their jurisdictions. The central SASAC has no direct hierarchical authority over local SASACs because the authority of local SASAC derives from their local governments, while that of the central SASAC derives from the State Council. According to regulation, central SASAC can "provide guidance and supervision" to local SASACs. However, as there is no formal relationship between central and local SASACs, this influence only materializes if it is supported implicitly by the central government (Naughton, 2006).

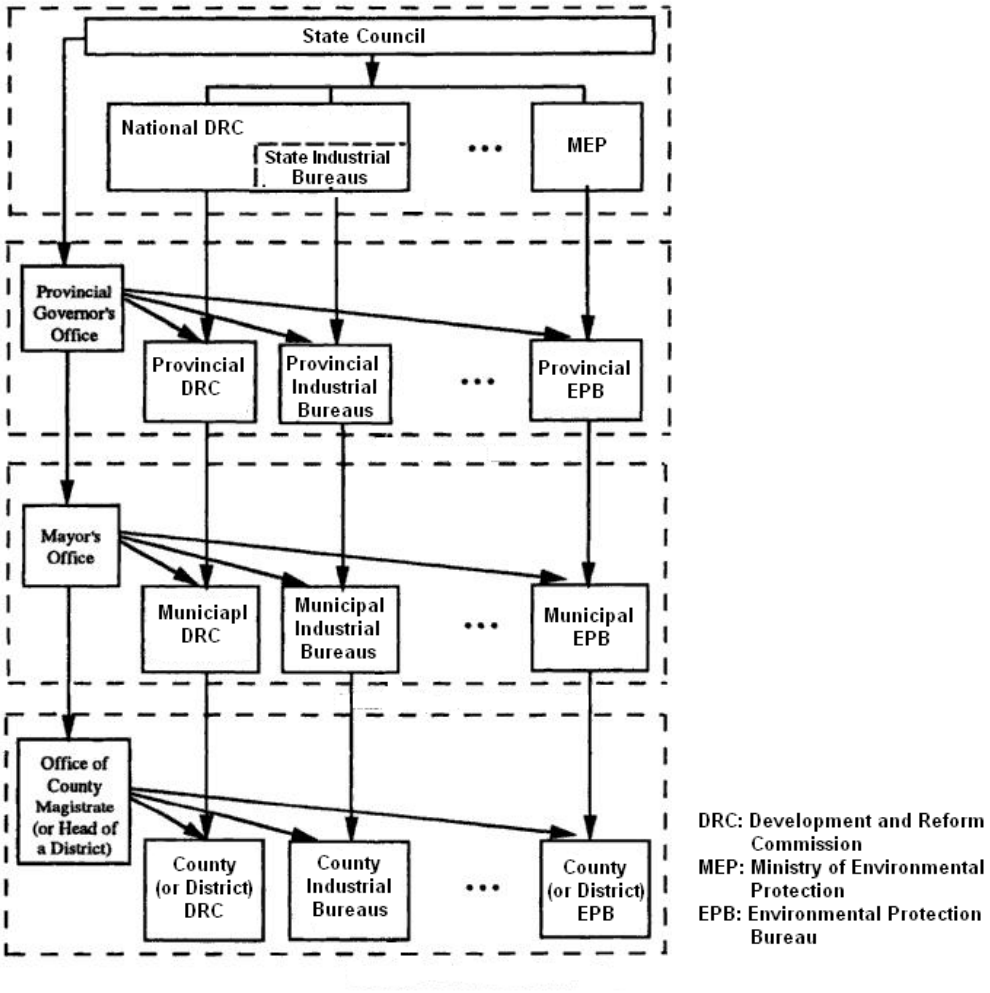
Administrative Ranks of Governmental Units

The administrative rank of each government unit reflects its power and status. The highest ranking units under the State Council are the comprehensive commissions, such as the National Development and Reform Commission. These units formulate policies that cut across economic sectors and geographic regions. Ministries are outranked by commissions. A provincial government has the same administrative rank (buji) as a ministry. Following the ministry rank are, in descending order, the vice-ministry (fubuji) and bureau (juji). A bureau is equivalent to the rank of a department within a provincial government. Ranks are significant because governmental unit with the same ranks cannot issue binding orders to each other. Operationally, this means that no ministry (e.g. MEP) can issue binding order to provincial governments. State-owned enterprises (SOE) also have an administrative rank. An SOE supervised by a state industrial bureau will generally outrank one supervised by a provincial industrial bureau. The rank of an SOE reflects the political and social status of its managers and workers, and is also related to the salary and fringe benefits it offers. A higher rank of an SOE also means greater bargaining power with other governmental units, e.g. for tax reductions and subsidies (Ma and Ortolano, 2000: 34-35).

Figure 1 shows that the provincial Environmental Protection Bureau is part of the provincial government while concurrently being hierarchically subordinate to MEP. This dual and fairly complex relationship, which is key to the understanding of the formulation and implementation of laws and policies in China, is depicted in Figure 2 (SOEs are not included in the figure). Governmental units above township level are interconnected both vertically (*tiao*) and horizontally (*kuai*). The *tiao* relationship refers to the vertical (functional) lines of authority from ministries of the central government reaching down to various provincial and local agencies. The *kuai* relationship refers to the horizontal (geographical) level of authority exercised by territorial government on agencies of various functions within their area of jurisdiction. Therefore, each work unit (danwei) within the administrative systems has to report both to an upper-level department of the same function as well as the government of a geographical area (Ma and Ortolano, 2000: 36). For instance, the Guangdong Environmental Protection Bureau (EPB), on one hand, reports to its upper-level functional department, MEP, and supervises the work of EPBs of counties and districts within the Guangdong province. On the other hand,

Guangdong EPB is part of the People's Government of Guangdong Province and thus falls under the jurisdiction of the provincial government.

Fig 2. Partial Structure of China's administrative system.



Source: Adapted from Ma and Ortolano (2000), 39

These two-dimensional arrangements inevitably create conflicts. The *tiao* coordinates according to function and the *kuai* coordinates according to the needs of the locality that it governs. Economic reforms since 1978 have allocated more authority and responsibilities on resource allocation to local governments, thus resulting in higher priority for area controls over line/functional controls. While the territorial governments have become more powerful, the central-level functional units have had their wings clipped (Lieberthal, 1997). Nevertheless, it is a very complex structure and web of authorities and responsibilities overall, which leaves much room for political interference as conflict and divergent views seem built into it. The conflicts commonly seen between central and local authorities are vividly shown in Chinese sayings, one of which is "There are policies from above and countermeasures from below". Another saying, "a regular slippage between policy and practice", hints at the complexity of monitoring and implementing central policies at local levels (McBeath, 2007). The complexity extends to the

structures for issues concerning the environment and climate change, with concomitant implications for lack of clarity in terms of decision-making structures, especially since energy and economic growth are dominant concerns as well. This does not mean, however, that we cannot see a development and evolution of policies over time, which includes the emergence of climate change as a priority area, as will be analyzed in some more detail below.

Environmental Policies

Before Reform and Opening-up

Since the establishment of the Chinese communist government in 1949, Chinese leaders have shown awareness of the importance of environmental protection. However, it was not until the 1970s that China started to pay serious attention to the environment (Dwivedi and Vajpeyi, 1995: 74). This began in 1972 when delegates from China attended the United Nations Conference on Human Environment held in Stockholm, which is the first multilateral conference that China attended after returning to the United Nations. Subsequently, in 1973, the Chinese Government held the first National Conference on Environmental Protection, initiating the process of environmental protection in China (Yong and Gang, 2008). In 1974, the Leading Group of Environmental Protection was set up by the State Council to study environmental protection issues. However, the Group only met twice a year in the following nine years.

At local levels, organizations for environmental control, research and monitoring were established within all provinces, municipalities and autonomous regions. Local governments also formed "waste offices" with limited bureaucratic authority and a few steps were taken to improve the environmental situation, including environmental investigations by local officials. Yet, progress in environmental protection was largely hindered by the political instability as a result of the Cultural Revolution (Economy, 2004: 95). Recognizing that economic development was having a ruinous effect on the environment, Chinese leaders incorporated the concern for the environment into the Chinese constitution in 1978, at the time when the Reform and Opening-up Policy was announced. It was laid down in the constitution that the state has to protect the environment as well as prevent pollution and other hazards.

The First Decade of Reform and Opening-up (1979-1988)

The incorporation of environmental concerns in the constitution in 1978 accelerated the development of nationwide environmental protection efforts. China's environmental legal framework started with the passage of the first Environmental Protection Law (for trial implementation) on 13 September 1979, a law that was formally promulgated and implemented in 1989. Ten years after the first National Conference on Environmental Protection, the second conference was held in 1983, stipulating for the first time that environmental protection was a basic national policy (Yong and Gang, 2008). Subsequently, the State Council established an Environmental Protection Commission composed of representatives from more than 30 ministries and bureaus. The commission was to review environmental policies, initiate new plans, and organize environmental activities such as inspections into local implementation of environmental laws. In 1984, the State Council raised the status of the Commission to National Environmental Protection Bureau (NEPB, also referred as National Environmental Protection Agency - NEPA) under the Ministry of Urban-Rural Construction and Environmental Protection, doubling its manpower and increasing its authority. After five years, NEPB finally achieved independent status from the Ministry of Urban-Rural Construction in March 1988 and reported

directly to the State Council (Economy, 2004: 97).

The second National Conference also formulated three basic policies for environmental protection: "Integration of pollution treatment and prevention with emphasis on prevention ", "polluters' responsibility in pollution treatment", and "strengthening environmental management". To strengthen environmental protection, the central government promulgated the "Decision on Environmental Protection Work" in 1984, which stipulated funding sources for environmental protection and announced that environmental protection was incorporated in national social and economic development and would become the key building-block of economic and social activities (National Bureau of Statistics of China, 2009).

The Second Decade of Reform and Opening-up (1989-1998)

In 1989, the standing committee of the National People's Congress formally promulgated China's first Environmental Protection Law. The Third National Conference on Environmental Protection was held in the same year, in which officials acknowledged some serious failures in implementing environmental regulations, but remained hopeful about efforts to improve the environment (Economy, 2004: 97). China's participation in the United Nation Conference on Environment and Development in Rio de Janeiro in 1992 triggered a number of changes domestically. First, China formulated "Ten Measures for Environment and Development" and took the lead to issue China's Agenda 21. Officials began to incorporate sustainable development into their planning process. Strengthening of environmental protection was listed as one of the top ten priorities for national development.

In 1996, the Chinese government released the first independent five-year plan for environmental protection with quantitative objectives (such as volume of emissions allowed). In 1998, in order to strengthen and expand the jurisdiction of NEPB, it was promoted from sub-ministry-level department to ministry-level agency and renamed as State Environmental Protection Administration (SEPA) (Yong and Gang, 2008). Despite the rise of environmental issues in the political agenda, however, the deteriorating state of the environment suggested that China's leaders were not yet ready to bridge the gap between recognizing the importance of protecting the environment and acting to respond to the challenges. The reality of environmental protection remained much the same as it was at the end of the 1980s.

The period from 1999 onwards

In 2000, the Chinese Government included environmental protection and sustainable development as objectives in its strategy for building a "moderately prosperous" society in the two decades to come. Three key development strategies have been promoted by the Chinese Government: Scientific Outlook of Development, Harmonious Society and Peaceful Development, with environmental protection apparently seen as being integrated within socio-economic in all three (Yong and Gang, 2008). In 2005, the State Council decided that environmental protection should be further strengthened and environmental protection targets for 2010 and 2020 were set: by 2010, environmental quality in key regions and cities should be improved and the trend of ecological deterioration be stopped; by 2020, environmental quality and the state of the ecology should be significantly improved (PRC, 2005). Moreover, the State Council issued the "Notification on the Immediate Priorities for Building a Conservation-oriented Society and Several Opinions on Accelerating the Development of Circular Economy" in 2005, and later in same year, the "Decision to Publish and Implement the Interim Provisions on Promoting Industrial Restructuring" and the "Decision to Strengthen Environmental Protection by Applying the Scientific Approach of Development". These were supposed to underline the serious political will of the central government to protect the environment.

In 2006, the Chinese Government for the first time set quantitative targets for population, resources and environment in the 11th Five-Year Plan. Some of the targets were mandatory, meaning legally binding. These included the reduction of energy consumption per unit of GDP by 20% and of SO_2 and COD by 10% compared to 2005 (Yong and Gang, 2008). "Measures on Open Environmental Information (for Trial Implementation)" were released by SEPA in April 2007 and became effective on 1 May 2008. They regulate environmental disclosure by both governments and enterprises, give rights to the public in accessing environmental information and promote public involvement in environmental protection (PRC, 2007a).

That the implementation of environmental policies in the context of a governance structure with concomitant implementation and monitoring complexities does not go smoothly was illustrated by a range of pollution incidents, which raised public awareness. To a considerable extent, this has to do with the underlying problem of how to combine rapid economic growth and environmental protection. This issue is receiving growing attention, not only in research (see for example a special issue of *Greener Management International*, Summer 2005, on this topic), but also by Chinese citizens and government agencies at the various levels. A 2007 report, the contents of which became subject of discussion between the collaborating parties (the World Bank and Chinese government ministries), pointed at the large number of premature deaths as a result of air and water pollution (World Bank/PRC, 2007). In spite of this sensitivity, however, combating pollution has become a priority in China, with the federal government and SEPA trying to impose these policies on lower governments, including attempts to punish the worst offenders, for example by threatening to close down factories. In most cases, however, companies are fined, but this amount is just a small proportion of corporate gains, so profits generated from pollution (or with pollution as major side effect) easily counterbalance the possible costs (Kolk et al., 2008).

While the environment is perceived as a serious problem, it still tends to be seen as a cost for companies at this stage of development (cf. Kolk et al., 2008). Government officials also show awareness of the trade off that may need to be made at the macro level. The party secretary of Jiangsu, for example, acknowledged that "The measures [to protect the environment] must be strictly implemented, even if they cause a 15 percent downturn in the province's gross domestic product" (Anderlini and McGregor, 2007). This quote captures both problems in one sentence: firstly, the dilemma of how to combine economic growth and environmental protection; and secondly, how to ensure implementation of the law. Even SEPA had difficulty ensuring environmental compliance – a 2007 case in which the agency accused a copper company of refusing access to its inspectors is just one illustration (Dickie and McGregor, 2007). The chairman of the European Union Chamber of Commerce in China noted that "In the environmental sector we see Chinese legislation that is even stricter than European law, yet implementation is sometimes non-existent" (Anderlini and Dyer, 2007).

SEPA was found to be handicapped in many situations due to its limited authority as the duties of environmental protection were spread among various ministries and departments, with overlapping responsibilities that were not clearly defined. To overcome this situation, SEPA was upgraded to the Ministry of Environmental Protection (MEP) in 2008 with a more prominent status and wider authorities. As MEP is now part of the State Council, it can directly participate in the decision-making and law-making process of the state. MEP is expected to be able to help increase the importance of the precautionary principle and preventive measures for the environment in China's development. This institutional change also signifies that environmental protection has moved somewhat higher on the political agenda. Whether this move will be able to address the monitoring and implementation problems remains to be seen.

Energy Policies in China

China's growing energy use is accompanied by energy shortages, which it cannot meet from its own domestic power generation, leading to imports of oil and even coal to a limited extent so far. This presents challenges for the country's energy strategy as supply-side policies have become insufficient: China needs to secure energy sources to address the shortfall of domestic oil production for growing domestic demand, and change the way existing energy sources are being used. Energy-use changes are promoted through new energy laws, specific conservation plans, implementation of new technologies, research and development, and policies that favour energy conservation, energy efficiency standards and labelling (Garrison, 2009: 112).

Energy Laws and Targets

In the 1980s, Chinese leaders already acknowledged that industry was highly energy inefficient and that this presented an obstacle for economic development. Since then, the Government has adopted the principle of "equal treatment to development and conservation with immediate emphasis on the latter", making conservation of strategic importance to energy policy (China.org.cn, 2007). Measures have been adopted to promote efficient energy use. The national energy law and regulation system consists of two parts: those adopted by NPC and those issued by the State Council and related ministries. Crucial energy laws include the Electricity Law (1995) and the Energy Conservation Law (1998) (Institute of Nuclear and New Energy Technology, 2006: 17).

The Energy Conservation Law aims to strengthen energy conservation, particularly for key energy-using entities, promote rational utilization of energy and advancement of energy conservation technology (UNESCAP, 1999). This law has helped to regulate energy conservation activities, promote energy-saving efforts in society more broadly, increase energy efficiency and protect the environment. It also led to the formulation and implementation of over 164 state energy savings standards (Development Research Center of the State Council, 2005: 3). These new energy efficiency standards help to reduce carbon emissions. For instance, the new energy efficiency standard for room air conditioners is expected to yield cumulative carbon emission reductions of over 300 million tons by 2020, which is about the size of the European commitment under the Kyoto Protocol (World Bank, 2007). While the Energy Conservation Law has produced results, China has one of the highest energy-intensity levels in the world, and the index of energy consumption is two to three times the world average; for some key Chinese products, the energy intensity is 40% higher than that of developed countries (Institute of Nuclear and New Energy Technology, 2006: 17). There is thus still substantial potential in energy savings through eco-efficiency both in production (Kroeze et al., 2004) and end-use.

In 2004, the State Council approved the Medium and Long Term Energy Development Plan for 2004-2020, and NDRC launched the first China Medium and Long Term Energy Conservation Plan. In 2005, NPC adopted the Renewable Energy Law, which set out duties of the government, business and other users in renewable energy development and utilization. It also included a series of measures and goals, relating to mandatory grid connection, price management regulation, differentiated pricing, special funds and tax reliefs, and it set the goal to realize 15% of China's energy from renewable sources by 2020.

From 1980 to 2002, China was successful in reducing energy use per unit of GDP at an annual rate of 5%, but this changed completely in 2002, when it started to increase by 3.8% per year on average in the period 2002-2005 (National Bureau of Statistics, various years). Since

2005, policymakers have intensified efforts to curb the unbridled development of energy-intensive industries which have put pressure on the country's energy supply. The government used a mix of regulatory and policy tools to restructure energy intensive industries (Liu, 2009). In 2006, the State Council issued the "Decision to Strengthen Energy Conservation". In the same year, NDRC set two quantitative development goals in the 11th Five-Year Plan (2006-2010): to double per capita GDP of the country by 2010 (compared to 2000) and decrease the energy consumed per unit of GDP by 20%, targeting an annual savings rate of 4% (Garrison, 2009: 112). In line with this target, the government raised electricity prices for eight energy-intensive industries. In addition, from June 2007 onwards, different tariffs (from 5-10%) were imposed on 142 export goods classified as energy intensive and heavy polluting, including 80 steel/iron products, and tax rebates were abolished for 553 so-called "high energy-consumption, highly-polluting, resource based" products. The government has also financially supported energy conservation projects, and requires financial institutions to back them as well and encourage enterprises to seek funding from the market. However, state-led initiatives to increase energy efficiency have not received wide support from local governments and industry due to a lack of incentives. Annual energy efficiency targets are rather arbitrary and the time frame needed by industry to accommodate such changes has not been taken into consideration. Targets were missed for both 2006 and 2007 (Liu, 2009).

To achieve the 20% reduction goal set in the 11th Five-Year Plan, quotas have been allocated to all provinces and major SOEs. Provincial governments then distributed these quotas among their prefectural governments and provincial SOEs. To make the system effective, provincial governments developed performance evaluation systems and linked performance evaluation to the promotion of local government officials and SOE leaders. Quotas are also passed on to county-level governments. For example, the Shandong provincial government signed accountability contracts with 17 city governments and 103 energy-intensive enterprises in the province. Failure to reach the emission-reduction target means that city governments and enterprises would be vetoed from any awards and honours and that SOE leaders would not be entitled to any annual rewards (NDRC, 2007). The governors of Shandong and Gansu provinces were quoted as saying that they would resign if energy saving and pollutant reduction targets assigned by the central government could not be met (China Review News Agency, 2008). Under this system, there is high political pressure on government officials and it is in their personal interest to implement country-wide energy savings targets.

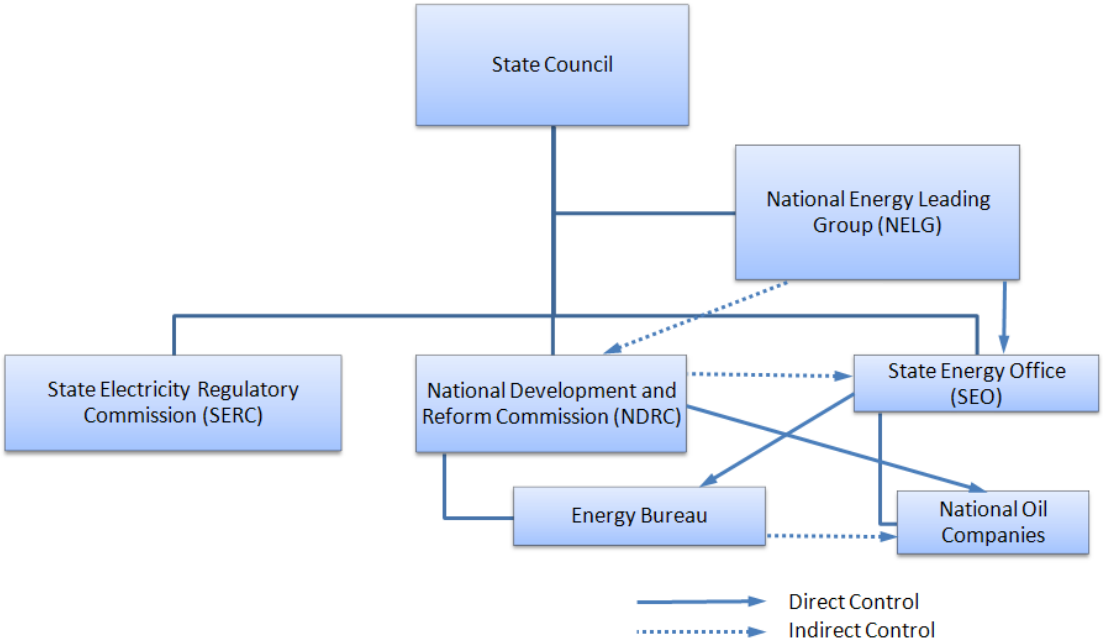
Energy Governance in China

In the early 1980s, China experienced acute energy shortages. To improve energy policy coordination and implementation, China created the State Energy Commission (SEC) (1980-1982) and subsequently the Ministry of Energy (MOE) in 1988. MOE consolidated the functions of a number of ministries including the Ministry of Nuclear Energy and the Ministry of Water Resources. However, it had overlapping authority with the State Development and Planning Committee (now the NDRC). Also, during the restructuring, the management and production functions of the previous industrial ministries were taken over by state-owned energy companies. Vested interests of key energy stakeholders were too strong for both the SEC and MOE to overcome. MOE failed to carry out its mandate and was abolished in 1993 (Garrison, 2009: 26).

Efforts to coordinate energy policy re-emerged in response to energy shortages and blackouts across China in 2003. A new Energy Bureau was established under the auspices of the NDRC to become the central player in energy policy-making. However, in terms of administrative rank, the NDRC Energy Bureau was lower than the ministry or vice-ministry-level

agencies and SOEs such as Sinopec that it was supposed to regulate. It thus lacked the authority to coordinate policy among various stakeholders and faced similar limitations as SEC and MOE. In 2005, the National Energy Leading Group (NELG), under the leadership of Premier Wen Jiabao, was established and a State Energy Office (SEO) was set up under the State Council to centralize energy policy making (Figure 3). With NDRC acting as "office director", it was hoped that the energy industry would be better managed. However, the fact that many administrative functions were still managed by a variety of ministries led to a lack of planning for energy exploration, consumption, savings and reserves. Coordination efforts still faced bureaucratic resistance from influential stakeholders, such as various energy and the foreign ministries, leaving NDRC in a weak position (Garrison, 2009: 28).

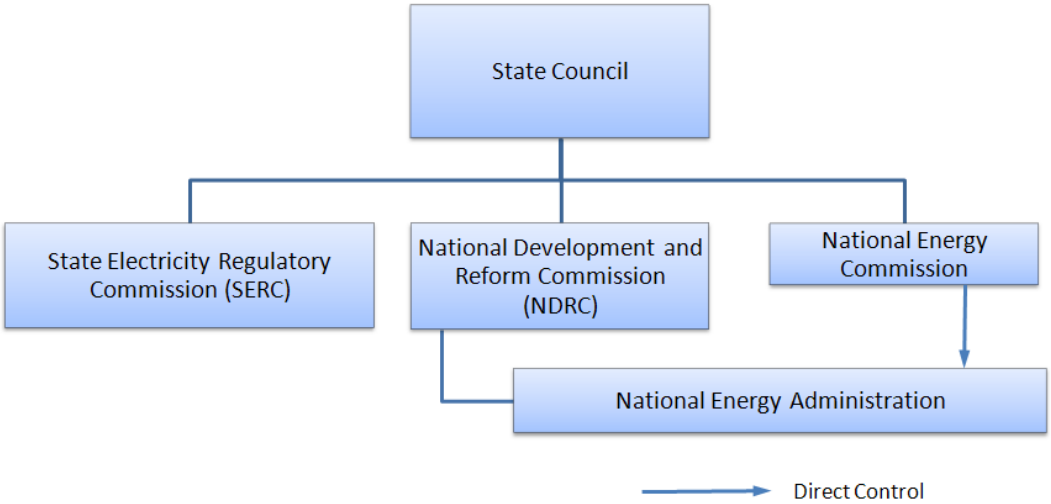
Figure 3. China's Energy Bureaucracy, 2005-March 2008



Source: Adapted from Downs (2006), 18

The most recent effort at integration of energy management in China took place in March 2008, when NEA and NEC were created (see Figure 4; cf. Figure 1). NEC replaced NELG, but contrary to NELG, it is a high-level discussion body (think tank) with ministerial rank. As mentioned in an earlier section, NEC is responsible for drafting energy development strategy while day-to-day work is handled by NEA. NEA replaced the NDRC Energy Bureau and absorbed other energy offices from NDRC, the Office of the NELG, the nuclear power administration of the Commission of Science, Technology, and Industry for National Defence. NEA's mandate is to manage the countries' energy industries, draft energy plans and policies, negotiate with international energy agencies and approve foreign energy investments. Though NEA's capabilities in each of these areas are greater than those of the former NDRC Energy Bureau, NEA, like its predecessor, struggles to fulfil its mandate because it lacks the authority, autonomy, manpower and tools (Downs, 2008).

Figure 4. China's Energy Bureaucracy after March 2008



Source: Adapted from Downs (2008), 44

NEC is considered as a compromise in the reorganization of the energy apparatus in China as the establishment of Ministry of Energy was strongly opposed by NDRC and SOEs. NDRC remains important in the energy industry since it approves major projects and controls the pricing bureau (including electricity pricing). If a new ministry was formed, the NDRC would be deprived of a large piece of its portfolio and control. Like NDRC, SOEs also opposed the set-up of a ministry because they saw this as limiting their direct access to China's top leaders and adding a new bureaucratic layer. SOEs' influence remains strong as top executives are members of the Central Committee of the Chinese Communist Party (Garrison, 2009: 30). In conclusion, the recent restructuring failed again and energy policy-making will remain fragmented, lacking a coherent strategy.

Climate Policies in China

Greenhouse gas mitigation issues have not been high on the political agenda in China as problems related to reducing common air pollutants such as SO_2, NO_x and PM10 were seen as more imminent (Cai et al., 2008). However, since China has surpassed the US and become the largest emitter of greenhouse gases (GHGs) (Levine and Aden, 2008), international pressure to tackle its carbon emissions has increased. As China has set the target to quadruple GDP from 2000 to 2020, and given that its energy system is largely coal-based, GHG emissions are expected to grow rapidly in the coming decades (IPCC, 2000). China's climate policies and its commitment are thus regarded as critical by many countries for the success of a post-Kyoto regime. Attention in China to climate change has evolved over the years.

China's position on climate change

When climate change developed into an important international issue attracting increasing attention from the public, media, scientists and policymakers in the late 1980s (Chayes and Kim, 1998: 507), China took institutional steps. Under the direct leadership of the Environmental

Protection Committee of the State Council, a National Coordination Group on Climate Change was set up in 1988, with its office in the China Meteorological Bureau. The Group was to facilitate the formulation of China's position for the upcoming international climate negotiations (Chayes and Kim, 1998: 514). One year after China's ratification of the Kyoto Protocol, the State Council approved the set-up of the National Coordination Committee on Climate Change (NCCCC) (2003), with an office in NDRC. It is composed of 13 vice ministers from inter alia Science and Technology, Foreign Affairs, Finance, Commerce, Agriculture, Construction, Communications, Water Resources, the State Forestry Bureau, Chinese Academy of Sciences, the State Oceanic Administration and the Civil Aviation Administration. As a coordination group, its policy making power was limited.

It is worth nothing that climate change has never been a standalone issue on the national policy agenda. In 1993, one year after the Rio Earth Summit where UNFCCC was conceived, a major decision was taken by the central government to include climate change as part of its national strategy on sustainable development. The government quickly recognized the close link of climate to issues of economic growth and environmental protection, particularly energy consumption. Consistency was found between controlling GHG emissions and energy-saving, for example, related to earlier nationwide efforts (started in the late 1970s) for the "four modernizations", which resulted in the doubling of energy efficiency in 1981-2000 (Qi et al., 2007).

Although climate change is part of the national policy agenda, it has never been a priority issue. The word for climate change (*Qihou Bianhua*) or global change (*Quanqiu Bianhua*) was not mentioned in five-year plans; it only emerged in the most recent (11th) Five-Year Plan. Economic development is still the over-riding priority, as illustrated by President Hu Jintao in his speech to the UN in September 2009 (http://dk.china-embassy.org/eng/News/t605967.htm): "*Climate change is an environment issue, but also, and more importantly, a development issue … Without common development, particularly the development of developing countries, there cannot be a broad and solid basis in the long run for tackling climate change*". This highlights that expected economic consequences of emission reduction commitments have been crucial considerations in China's climate policy-making. While adverse climate change impacts are increasingly recognized as a threat, the negative impact on economic development is perceived as more pressing (Bjørkum, 2005).

Throughout the international climate negotiations, China persistently advocated different obligations for developed and developing countries, and the transfer of technological and financial resources in order to improve developing countries' capacity both for mitigation and adaptation purposes (Bjørkum, 2005). China has consistently refused to accept any reduction targets before industrialized countries took action first according to the principle of 'common, but differentiated responsibilities' stipulated in the 1992 UNFCCC. This stance was repeated in a recent statement by NDRC (2009). Although President Hu Jintao has recently pledged to reduce the rising rate of China's emissions, he did not specify any concrete reduction targets.

China's position has been summarized by MA Kai, the minister of NDRC, as follows (Yan and Yang, 2009): first, the country has low per-capita emissions; second, it contributes a small amount to cumulative emissions; third, limits on China's CO_2 emissions hamper economic development; and finally, the CO_2 emissions included in Chinese production for export should be taken into account, as they partly result from relocation of manufacturing to China. The latter point is noteworthy and receives attention, for example in a comparison of 2007 figures which show that US emissions created by manufacturing goods exported to China amounted to 39 million tons of CO_2, while China's emissions created by manufacturing goods exported to the US

was 1.4 billion tonnes of CO_2 (Crooks and Romei, 2009). To assess CO_2 emissions embodied in Chinese exports more broadly, several analyses have been done over the years.

Lin and Sun (2010) used I-O analysis and estimated that CO_2 from domestic production approximated 5,458 million tonnes, and consumption-based CO_2 emissions 4,434 million tonnes. Around 3,357 million tonnes of CO_2 emissions were embodied in China's exports and emissions avoided by imports amounted to 2,333 million tons, with net exports of China's emissions thus 1,024 million tonnes, accounting for 18.8% of domestic production. Similarly, Yan and Yang (2009) estimated the amount of CO_2 embodied in China's foreign trade during 1997-2007, and found that 10.03%-26.54% of China's CO_2 emissions was produced for export purposes, while CO_2 emissions in China's imports accounted for only 4.4% in 1997 and 9.05% in 2007. The rest of the world had avoided emissions of 150.18 Mt CO_2 in 1997 as a result of importing goods from China, rather than manufacturing the same type and quantity of goods domestically. This figure increased to 593 Mt in 2007.

Weber et al. (2008) found that China's emissions due to production for export had risen from 12% (230Mt) in 1987 to 21% (760 Mt) in 2002. However, this surged to 1700Mt in 2005, accounting for one-third of China's emissions. Weber et al. (2008) argued that consumption in the developed world has driven this trend, and that a majority of these emissions has largely escaped the scrutiny of the ''carbon leakage'' debate due to the narrow definition that has been used. Wang and Watson (2008), looking at the monetary value of trade (rather than I-O analysis), estimated that international trade accounted for 23% percent of China's total carbon emissions in 2004. This was due to China's large trade surplus as well as the relatively high level of carbon intensity within the Chinese economy.

Whichever approach is used, however, it is generally agreed that the net carbon emissions embodied in exports account for a significant portion of China's domestic emissions. This will continue to be used as key argument by Chinese negotiators to adhere to the country's stance of rejecting caps on emissions and to force developed countries to take up greater responsibilities in emissions reductions in the international climate change debate. At the same time, China has taken steps more recently as well, although embedded in an overarching energy conservation approach.

National Climate Change Programme

As part of China's attention to climate change, the National Leading Group on Climate Change (NLGCC), headed by premier Wen Jiabao, was established by the State Council in June 2007. NLGCC was to replace NCCCC and the number of member agencies increased from 13 to 27. NLGCC's role is to devise national climate change strategies, directions and measures, unify national actions on climate change, research international cooperation and negotiation processes, and coordinate solutions on key issues in responding to climate change (PRC, 2007a).

On 4 June 2007, NDRC issued China's National Climate Change Programme, the country's very first global warming policy initiative (China.org.cn, 2007). This indicated that the Chinese government acknowledged the importance of addressing climate change and the need to adopt measures, covering five aspects: GHG mitigation; adaptation; climate change science and technology; public awareness on climate change; and institutions and mechanisms (NDRC, 2007). Concerning mitigation, the focus is on energy production and transformation, energy efficiency improvement and energy conservation, industrial processes, agriculture, forestry and municipal waste. As to energy production and transformation, measures aim to strengthen the existing energy legal system, improve the national energy programme, implement the Renewable Energy Law, promote favourable conditions for renewable energy development and GHG mitigation, stimulate energy price reform, optimize the energy mix, promote innovation and efficiency

improvements in various power generating technologies, both renewable and non-renewable, including nuclear power. All these policies are expected to have a major influence on the energy and utilities sectors.

Policies related to energy efficiency improvement and energy conservation and industrial processes are expected to have implications for a wide range of industries. Measures include improving existing energy-saving rules and standards, strengthening the supervision and monitoring of energy conservation efforts, compelling the phase-out of energy intensive and backward processes, technologies and equipments, promoting energy-labelling, developing markets for energy-saving services, adjusting the industrial structure, formulating fiscal policies for energy-saving products, and strengthening the development and dissemination of energy conservation technologies in key sectors. Moreover, a continuation of 10 key energy conservation priority programmes within the Medium-and-Long-Term Energy Conservation Plan is also considered as part of the overall package.

As mentioned above, energy conservation is a key ingredient of the National Climate Change Programme. Institutionally, Chinese leaders essentially equate climate change with energy conservation. This is exemplified by the fact that members of NLGCC and the State Council Energy Conservation and Emissions Reduction Leading Group are identical, i.e. the same organization with two identities. How the group is identified depends on the situation and the needs. This organizational arrangement also explains why the National Climate Change Programme largely focuses on energy savings measures, as it covers two offices in NDRC to tackle these related but slightly different areas. It is worth nothing that NLGCC is a decision-making and coordinating group. The actual energy conservation is implemented by the NDRC while that of emissions reduction is left to MEP (PRC, 2007b).

Actions at Provincial Levels

As noted in an earlier section, China's governance structure is a hierarchy, implying that local governments should implement decisions made by the central government. Yet, how far local governments go in this respect depends on their motivations, capacities and constraints. Local political leaders' performance is evaluated by higher levels of government. Economic growth of the region governed by these leaders is a key indicator, which means that boosting the local economy is a main route for being promoted to higher levels. As climate change mitigation efforts are mainly related to reducing energy use and this was believed to slow down economic growth, there is basically no incentive for local governments to reduce GHG emissions (Pan, 2003). However, there was a sudden turn-around in terms of climate-related initiatives by provincial and prefectural governments shortly after the creation of the NLGCC by the State Council and the adoption of China's National Climate Change Programme.

Before 2007, local governments, from provincial down to county and community level had shown little interest or awareness of the climate issue. Exceptions were some local governments that became interested in the potential economic benefits of the Clean Development Mechanism. From mid-2007 onwards, the central government has mandated all local provinces to establish special task forces to lead climate change efforts. Many provinces developed mitigation and adaptation plans, including Xinjiang, Hubei, Fujian, Beijing, Liaoning, Shandong and Jiangxi. Some (Guangdong, Qinghai, Sichuan, and five provinces in western China) initiated climate change research programmes. Gansu Province even invited Canadian scientists to conduct research on the impacts of climate change on the region's ecosystem (Qi et al., 2008).

Until March 2008, eight provinces and autonomous regions had formed leading groups on climate change adopting the model of the central government. Among these eight leading groups, seven are called Leading Group on Energy Saving, Pollution Reduction and Climate

Change. The exception is Qinghai, which set up a leading group on climate change but has none for energy saving and pollution reduction. For other provinces, either a Leading Group on Energy Saving or a Leading Group on Energy Saving and Pollution Reduction was set up after the creation of the NLGCC. Provinces that do not include the term “climate change” in the name of the leading group nevertheless stated that its responsibility includes climate change. Provincial governments also requested prefectures to establish their leading groups on climate change. Therefore, with just a few months, a sudden institutional development on climate change was seen in China, beginning from the central government and spreading to the provincial and prefectural levels.

GHG mitigations are also achieved in China through the use of the Clean Development Mechanism under the Kyoto Protocol. Currently, China is the largest supplier of CDM-based certified emissions reductions, although this has not been uncontroversial in terms of the overall mitigation impact and the degree of ‘additionality’ (Pinkse and Kolk, 2009). CDM provides strong incentives for local government, and provincial governments have acted likewise. While the national CDM office resides within the NDRC, provincial governments have their own offices within the Provincial Development and Reform Commissions and have developed regulations and guidelines for CDM project development. In 2006, Shanxi province set up a leading group on CDM, which has its secretariat in the Shanxi Development and Reform Commission and is led by the vice provincial governor. The Guizhou Provincial Government established a Joint Council, consisting of 11 provincial ministries, to lead and coordinate CDM projects (Guizhou Provincial People's Government, 2006). By September 2007, CDM promotion centres were established in 27 provinces by the provincial governments. The interest in CDM projects also extends beyond provincial governments to prefectural and county level governments.

Conclusions

Given China’s prominent, emerging role in international climate negotiations – a reflection of its economic growth and concomitant emissions patterns – as well as the importance attached domestically to the climate issue, this paper has examined the evolution of China’s policies and governance structures on environment, energy and climate. The analysis shows that institutional capacity for environmental governance has built up gradually over the years, with numerous laws, regulations and administrative measures being implemented and a Ministry of Environmental Protection having replaced the former state agency. While policies and institutional changes seem to demonstrate Chinese leaders’ recognition of the crucial impact of the environment on people’s lives and socio-economic development, rapid economic development appears to outpace environmental protection measures and administrative capacity. Although there appears to be a paradigm shift towards attaching greater importance to environmental protection in the development process, economic development is still considered most important.

Energy policies have been considered as part of economic development and national security rather than focused on the environment. High energy inefficiency has been considered an obstacle to economic development, and securing overseas energy sources to fuel economic development given declining domestic oil production is seen as a vital security matter. To slow down rising energy demand and prevent acute shortages, energy conservation and energy efficiency have been key government approaches. This has had some effect (as energy efficiency has doubled in 20 years’ time) but economic growth has largely undone it. Several attempts have

been made to reorganize the energy apparatus to improve energy policy coordination and implementation, but these have failed due to large opposition from strong energy stakeholders (such as state oil companies). As a result, energy management is still very fragmented.

Faced with the dilemma between the short-term impact of emissions reductions on economic development and employment, and the long-term climate change impacts, Chinese leaders consider the former more pressing. It explains why China consistently emphasizes the principle of "common but differentiated responsibilities". The country's ambition to reduce carbon emissions is undoubted given the scale of its fiscal measures to boost low-carbon investment. Yet, it is unlikely that climate change (or other environmental issues) will be given priority over economic development. This in a sense resembles Breslin's observation made more than ten years ago (1996, 107):

> "*… developing an effective environmental agenda is inextricably linked with (and ultimately dependent on the resolution of) overtly non-environmental issues … … The notion of a development environment dichotomy in China is too simplistic. It is not simply a case of balancing short-term development priorities with longer term environmental goals, but one of balancing short-term developmental priorities with even shorter term social and political concerns … environmentalism will remain subordinate to other goals until some fundamental issues are resolved*".

One of these fundamental issues is whether political leaders can reduce their dependency on short-term economic development as a source of legitimacy. On a local level, the emission reduction targets stipulated by the Eleventh Five-year Plan seem to have successfully shift at least some of this dependency from pure economic development to reducing emissions. This target-responsibility system 'internalizes' environmental objectives as part of the performance evaluation of political leaders. This partly overcomes potential conflicts due to the two dimensional (*tiao-kuai*) arrangements in China's administrative system.

The effect of global warming is already having an impact in different regions in China, particularly posing threats to food production and water availability. Although China, as well as other developing nations, will continue a high(er)-carbon economic development path, they should be expected to bear a greater cost in face of greater climate instability, resulting in more extreme weather conditions as well as natural disasters and catastrophes. For example, from September 2009 to March 2010, areas of south-western China such as Yunnan , Guizhou , Guangxi and Chongqing were hit by the worst drought in more than a century. This led to drinking water shortages for nearly 20 million people and sharply rising prices of agricultural products. At the same time, snowstorms, with a scale not seen in decades, hit northern China (Chan, 2010). As China is vulnerable to mounting impacts of global warming, it is likely to incur huge mitigation and adaptation costs, which might become a burden to its ambition to become a well-off society by 2050. Decision-making for climate policies should take into account that CO_2 reducing abatement options can simultaneously brings benefits to air quality and eventually citizens' health (Aunan et al., 2004; He et al., forthcoming), as well as having the potential to reduce costs and yield a competitive advantage. However, how these benefits can be integrated in the complex decision-making process in China seems to be a great challenge.

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