

Barriers to the Implementation of Environmental Policies at the Local Level in China

Genia Kostka



WORLD BANK GROUP

Development Research Group
Environment and Energy Team
August 2014

Abstract

China's national leaders have recently made a priority of changing lanes from a pollution-intensive, growth-at-any-cost model to a resource-efficient and sustainable one. The immense challenges of rapid urbanization are one aspect of the problem. Central-local government relations are another source of challenges, since the central government's green agenda does not always find willing followers at lower levels. This paper identifies barriers to a more comprehensive implementation of environmental policies at the local level in China's urban areas and suggests ways to reduce or remove them. The research focuses particularly on the reasons for the gap between national

plans and policy outcomes. Although environmental goals and policies at the national level are quite ambitious and comprehensive, insufficient and inconsistent local level implementation can hold back significant improvements in urban environmental quality. By analyzing local institutional and behavioral obstacles and by highlighting best-practice examples from China and elsewhere, the paper outlines options that can be used at the national and local levels to close the local "environmental implementation gap." The findings emphasize the need to create additional incentives and increase local implementation capacities.

This paper is a product of the Environment and Energy Team, Development Research Group. It is part of a larger effort by the World Bank to provide open access to its research and make a contribution to development policy discussions around the world. Policy Research Working Papers are also posted on the Web at <http://econ.worldbank.org>. The author may be contacted at geniakostka@gmail.com.

The Policy Research Working Paper Series disseminates the findings of work in progress to encourage the exchange of ideas about development issues. An objective of the series is to get the findings out quickly, even if the presentations are less than fully polished. The papers carry the names of the authors and should be cited accordingly. The findings, interpretations, and conclusions expressed in this paper are entirely those of the authors. They do not necessarily represent the views of the International Bank for Reconstruction and Development/World Bank and its affiliated organizations, or those of the Executive Directors of the World Bank or the governments they represent.

Barriers to the Implementation of Environmental Policies at the Local Level in China

Genia Kostka*

JEL: R58, Q56, O18

Key words: China. Urbanization. Urban environment. Central-local government.

Sectors: Urban. Environment.

* Professor of Governance of Energy and Infrastructure, Hertie School of Governance, Berlin, geniakostka@gmail.com. This paper was prepared for the World Bank's publication *Urban China: Toward Efficient, Inclusive and Sustainable Urbanization*. The author is grateful to Uwe Deichmann, Gailius Draugelis, Sarah Eaton, and Chris Sall for feedback on the paper, and to the World Bank China Office for financial support. The views expressed in the paper are the author's alone and should not be attributed to the World Bank Group or any of its member countries.

Table of Contents

1. INTRODUCTION.....	3
1.1 RESEARCH OBJECTIVES.....	3
1.2 RESEARCH METHODOLOGY.....	3
1.3 ANALYTICAL FRAMEWORK.....	4
2. NATIONAL GOALS AND INSTITUTIONAL ARRANGEMENTS.....	5
2.1 NATIONAL AMBITIONS.....	5
2.2 LOCAL REALITIES.....	6
3. LOCAL INSTITUTIONAL BARRIERS.....	7
3.1 SHORTCOMINGS IN CHINA’S GREEN PLANNING SYSTEM AND POLICY INSTRUMENTS.....	7
3.2 (DIS)INCENTIVES FOR LOCAL POLICY IMPLEMENTERS.....	13
3.3 CAPACITY CONSTRAINTS.....	22
3.4 LIMITS ON PUBLIC AND PRIVATE PARTICIPATION.....	29
4. BEHAVIORAL AND SOCIOCULTURAL BARRIERS.....	33
5. STRATEGIES TO OVERCOME BARRIERS.....	34
5.1 LOCAL INNOVATIONS AND EXPERIMENTS IN CHINA.....	34
5.2 INTERNATIONAL BEST-PRACTICE EXAMPLES.....	40
5.3 POLICY OPTIONS.....	41
6. CONCLUSION.....	43
7. APPENDIX.....	44
8. REFERENCES.....	45

Barriers to the Implementation of Environmental Policies at the Local Level in China

1. Introduction

China's national leaders have recently made a priority of changing lanes from a pollution-intensive, growth-at-any-cost model to a resource-efficient and sustainable one. There is strong reasoning behind this shift in emphasis: China's leaders see political risks in the rising tide of domestic environmental protests and they worry about energy and resource security. Beijing's determination to steer China toward greater resource efficiency and lower carbon emissions is beyond dispute. Yet creating green and livable urban cities remains an uphill battle for national policy makers. The immense challenges of rapid urbanization are one aspect of the problem. An estimated 300 million people will be added to Chinese cities by 2030 (OECD, 2009), adding further pressure to urban cities that already struggle with serious air and water pollution. Central-local relations are another source of difficulty since Beijing's green agenda also does not always find willing followers at lower levels. Indeed, many of Beijing's low carbon and green initiatives are implemented only selectively across China, when subnational leaders take the lead.

1.1 Research objectives

The objective of this paper is to identify barriers to a more comprehensive implementation of environmental policies at the local level in urban cities in China and suggest ways to reduce or remove them. The research focuses particularly on the reasons for the gap between national plans and policy outcomes. While environmental goals and policies at the national level are quite ambitious and comprehensive, it is insufficient and inconsistent implementation at the local level that holds back significant improvements in urban environmental quality. By analyzing local institutional and behavioral obstacles and by highlighting best-practice examples from China and elsewhere, this paper outlines possible options that can be used at the national and local levels to close the local "environmental implementation gap". These findings contribute to the ongoing debate regarding how China can switch to a greener urban growth path and emphasize the need to create additional incentives and increase local implementation capacities.

1.2 Research Methodology

The analysis is based on extensive fieldwork between 2010 and 2012. Fieldwork was conducted at the provincial, municipal and county/district levels in Hunan, Shandong, Jiangsu, Inner Mongolia, and Shanxi. In Hunan, the research focused on Chenzhou, a ferrous metal-rich municipality in central China with mining and smelting activities contributing the major share of local GDP. In Jiangsu and Shandong, the analysis concentrated predominantly on two agricultural municipalities in coastal regions - Yancheng in Jiangsu and Weifang in Shandong. In Shanxi and Inner Mongolia, the focus was on seven coal-mining municipalities. Conducting fieldwork in a range of localities provided an understanding of how local bureaucrats working in municipalities and counties with different economic structures and levels of economic development responded to national environmental mandates and directives.

In total, the author conducted more than 190 interviews with government officials, business managers, and civil society representatives. Collecting data from multiple administrative levels

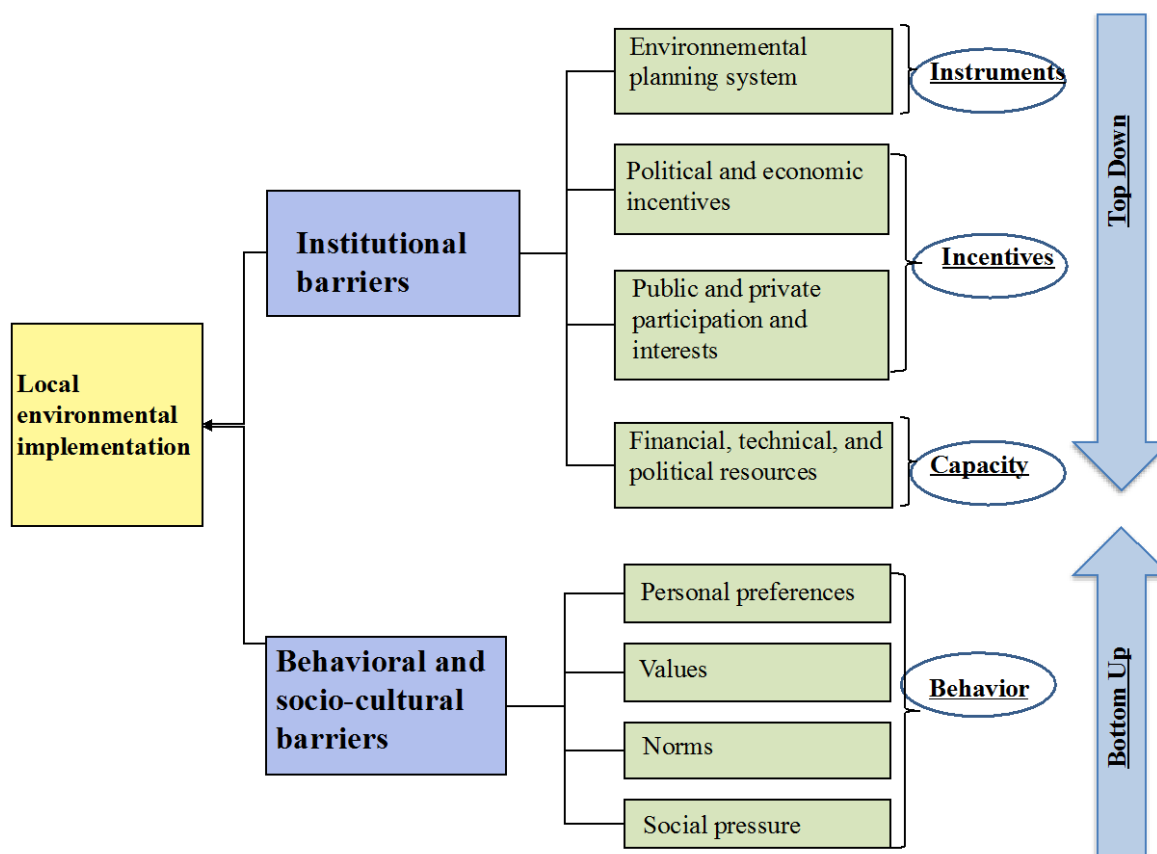
was helpful in shedding light on how environmental policies “trickle-down” from the national level to the county and district levels. The majority of interviews were conducted with local officials from Development and Reform Commissions (DRC), Environmental Protection Bureaus (EPB), Economic Commissions, Construction Bureaus, Forestry/Gardening Bureaus, Water Resource Bureaus, Finance Bureaus, and Statistical Bureaus, as well as a small number of enterprise managers. Interviews were semi-structured and highlighted the discrepancy between assigned green targets and realized outcomes at the local level and the continuing significance of growth vs. environment trade-offs. In addition to interviews, the analysis draws from government policy documents and media reports and available secondary sources.

1.3 Analytical Framework

While national policy makers have started impressive efforts to switch to a more green and low carbon growth path, many elements of Beijing’s green agenda fall to local governments for delivery. Despite numerous incentives for local cadres to abide by Beijing’s directives woven into the cadre management system and provision of additional resources for green projects, a substantial environmental policy implementation gap exists.

Figure 1 gives an overview of the analytical framework, which aims to explain the main reasons for the persisting environmental implementation gap at the local level. Section 3 of this paper will look at institutional barriers at the local level and can be divided into four subcategories: the Chinese environmental planning system, the economic and political incentives provided to local implementers, public and private participation and interests, as well as financial, technical, and political capacities of implementing agencies. In addition to institutional factors, behavioral and sociocultural factors also help to explain why there is often insufficient motivation for effective environmental governance at the local level in China (Section 4). The analysis from the behavioral and sociocultural perspective will analyze how personal preferences, values, norms, and social pressures influence individual behavior and thus contribute to the environmental implementation gap.

Figure 1: Analytical Framework



Source: Author; Kaufman, 2012.

2. National Goals and Institutional Arrangements

2.1 National Ambitions

Among national leaders in Beijing, there is a shared understanding of the need to move towards a greener growth model. Outgoing Premier Wen Jiabao described the sharpening contradictions between economic development, resources and the environment as a “key challenge” for the new Xi Jinping-Li Keqiang administration (Wen Jiabao’s address to the National People’s Congress on 5 March 2013, Report on the Work of the Government, 2013). Early signals from the new administration have also expressed a strong commitment to steer China towards a sustainable development path. During one of his first press conferences as the new Premier, in March 2013, Li Keqiang called for a more transparent government and increased public supervision to improve environmental compliance and warned that economic growth at the expense of the environment “won’t satisfy the people” (China Daily, 2013f). General Secretary Xi Jinping recently further suggested that “lifetime accountability” for cadres and inclusion of additional green criteria into cadre evaluations are needed in order to hold cadres responsible for environmental damage (South China Morning Post, 2013).

Under the previous Hu Jintao-Wen Jiabao administration, a mix of laws, regulations, taxes, and industrial policies were formulated in Beijing to add teeth to national green growth ambitions.¹

¹ Regulations to further the transition towards a more energy-efficient growth path include a revised Energy Conservation Law (2007), Promotion of Recycling Economy Law (2009), and a revised Renewable Energy Law (2009). For a more detailed summary of existing laws, regulations, taxes, and industrial policies, see He et al. (2012).

In parallel to new nation-wide laws and regulations, various mandatory binding environmental targets were included in the two most recent national Five Year Plans (FYPs), the 11th (2006-2010) and 12th (2011-2015). This target-based implementation approach relies heavily on linking environmental targets with the annual cadre evaluation system. Meeting binding environmental targets is an important requirement for career promotion and local leaders face strict punishments through denial of promotion and formal censure if they fail to meet them. This personalized incentive setting system ensures that local officials do not misuse the flexibility granted to them under China's decentralized structure. However, while national policy makers have skillfully embedded incentives in cadres' evaluation system, the formal system does not always succeed in making faithful followers out of local leaders. In spite of national policy makers' careful efforts to align cadres' interests with those of Beijing, local leaders often engage in "selective policy implementation" (O'Brien and Li, 1999) and significant gaps exist between the central government's national ambitions and policy outcomes at the local level.

2.2 Local Realities

Despite national ambitions and numerous new initiatives and incentives, a substantial environmental policy implementation gap exists. In the 11th FYP period, several environmental targets went unfulfilled. Officially, the only hard target not met was reducing energy intensity per unit of GDP by 20% against 2005 levels (the actual recorded reduction for the period was 19.1%). Among the softer targets related to economic restructuring in the 11th FYP, fully three were unmet: (1) increasing service sector as a percentage of GDP, (2) service sector as a percentage of employment, and (3) R&D as a percentage of GDP (Eaton and Kostka, 2013, 2014). Disappointing results on these targets reflect the fact that many local cadres have actually put off the difficult business of switching to more energy-efficient and low-emission production and restructuring their localities.

At the local level, despite the addition of green targets to the national plan, leading officials have often continued to focus on satisfying economic growth targets, and this is one reason why environmental pollution continues to get worse in many Chinese cities. For instance, although the national 12th FYP targets an annual average GDP growth of 7%, 26 of the 31 provinces have initially set growth rate targets above 10% in provincial FYPs, indicating that local governments continue to place high priority on growth-focused development (Kostka and Mol, 2013). The annual GDP growth targets in the local 12th FYPs for the second- and third-tier cities I visited in Hunan, Shandong, and Jiangsu further underline this reality; all the cities had incorporated annual growth rates of 12% to 17%, double the national growth rate target.

Environmental pressures have drastically increased in China's urban cities.² A recent report by the Chinese Academy of Social Sciences described most Chinese first-tier cities, including Beijing, Shanghai and Guangzhou, as "barely suitable for living", with poor air quality and traffic congestion lowering cities' attractiveness for top talent (China Daily, 2013c). Air and water quality standards are especially grim. Recent rises in PM 2.5 levels have posed serious health risks to urban citizens (Greenpeace, 2012). In addition, the quantity and quality of water has deteriorated in many Chinese cities. According to a report by the Ministry of Environmental Protection (MEP), 57% of the groundwater in 198 cities in 2012 was rated as "bad" or "extremely bad", while more than 30% of the country's major rivers were found to be "polluted" or "seriously polluted" (China Daily, 2013d; Guardian, 2013). Moreover, the rapid

² For a more detailed summary of environmental challenges in urban China, see e.g., OECD (2009, Section 6.2).

growth of the middle class has contributed to the fast rise in solid waste, a trend which is likely to increase with the arrival of approximately 16 million new urban residents per year (OECD, 2009). Land use patterns and urban design in Chinese urban Cities have often been evaluated as inefficient and unsustainable (Wei and Zhao, 2009; Lichtenberg and Ding, 2000; Ding, 2009). The poor environmental conditions in urban cities have spurred debate about barriers that give rise to the local environmental implementation gap.

3. Local Institutional Barriers

Institutional factors are one particularly significant reason why national environmental policies are often not well implemented at the local level. (e.g., World Bank China 2030 Report). While it is not possible to analyze all dimensions of these institutional challenges here, the following pages analyze the principal aspects: shortcomings in China's planning system and policy instruments; weak economic and political incentives for local implementers; low levels of public participation and private sector involvement; and insufficient implementation capacities of local agencies in charge of policy implementation.

3.1 Shortcomings in China's Green Planning System and Policy Instruments³

China has employed a mix of top-down command and control methods and market-based mechanisms to propel the switch to a resource-efficient and low carbon growth path.⁴ Since 1972, the central government has very noticeably deployed more and more administrative instruments to enhance compliance with national environmental rules and standards. In the last four decades, more than 28 environmental and resource laws, 150 national administrative environmental regulations, 1300 national environmental standards, and 200 departmental administrative regulations have been issued (Chang, 2008 quoted in He et al., 2012, p.31).

More recently, China has also experimented with a variety of market-based instruments to supplement existing command and control tools, including piloting a dozen sub-national voluntary emission cap-and-trade schemes, rolling out a three-tiered electricity pricing system, promoting energy service companies (ESCO) and introducing numerous payment for ecosystem services to improve water, air, forest, and soil management (Kostka and Shin, 2013; Liang and Mol, 2013; Shin, 2013; see also Section 5.1 of this report). Yet the majority of these market-based instruments have not scaled up to nation-wide programs due to the lack of market preconditions and excessive state intervention in emission trading formats, allocation methods, and pricing approaches (Lo, 2013; Shin, 2013). With market-based instruments still in their infancy, China's environmental governance system continues to rely primarily on top down command and control instruments.

Among the many different command and control instruments, setting binding environmental targets has become the key environmental management tool in China. Environmental targets are incorporated into the target responsibility system (*mubiao zeren zhi*), wherein the central government sets a national target for a policy or program and then assigns specific targets for particular areas. Central leaders' priorities are communicated by differentiating between "soft",

³ This section draws on Kostka (2014).

⁴ For a list of various top-down regulatory and market-based environmental management instruments used in China since 1972, see He et al. (2012, p. 31).

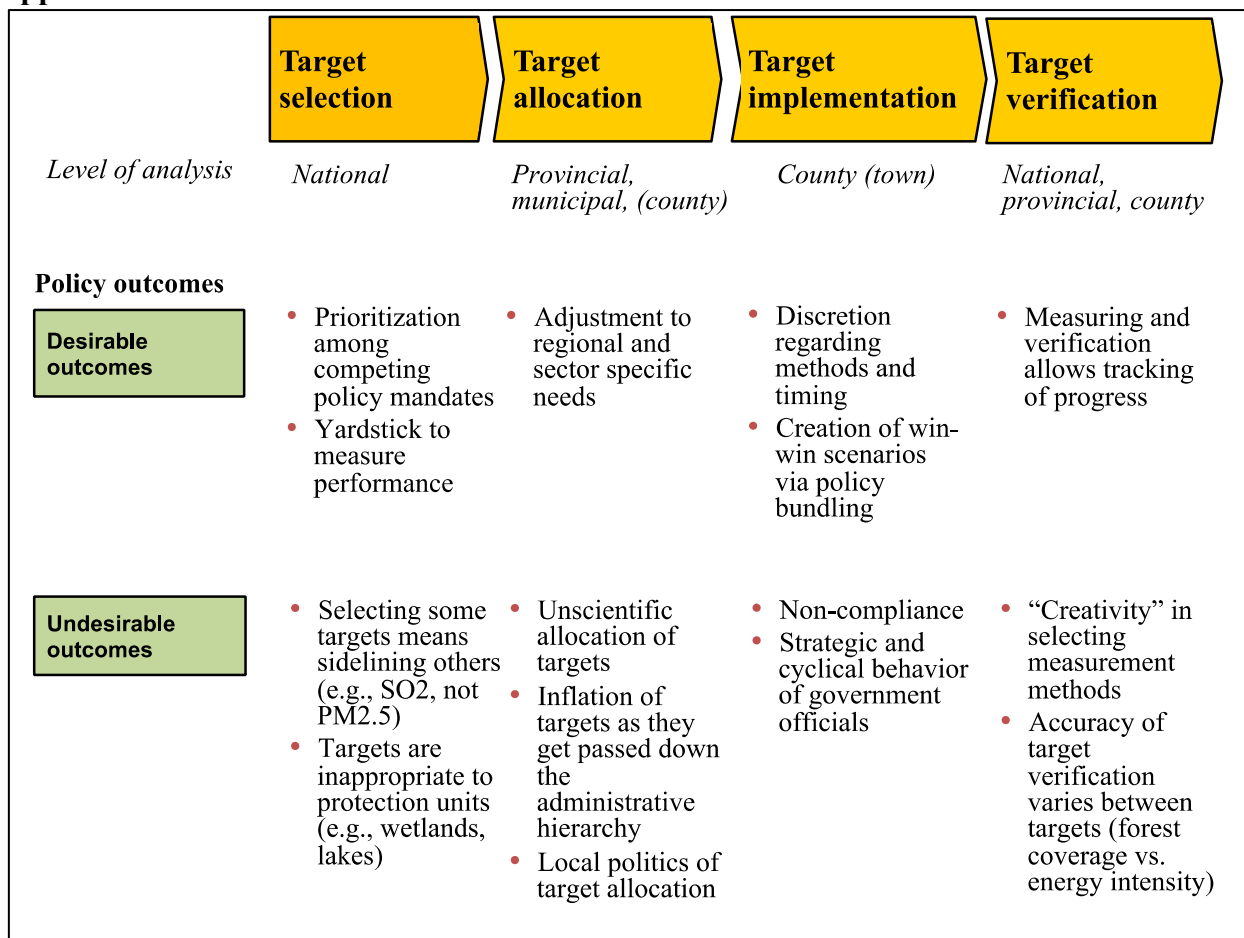
expected (*yuqixing*), and “hard”, literally restricted (*yueshuxing*) binding environmental targets in the national FYPs. The majority of these “hard” binding targets have been accorded “veto power” (*yipiao foujue*) status, meaning that, if these targets are not met, all other achievements of a local leader will be rendered null and void. This is a powerful incentive in the context of stiff competition between local cadres for promotion to upper-level positions.

Although environmental targets had been incorporated into national FYPs as of the late 1990s, they were accorded fairly low priority in the context of the overriding emphasis on national economic growth and the “soft” nature of these targets (Wang, 2013). In 2006, at the beginning of the 11th FYP, central planners in Beijing upgraded a number of environmental targets from “expected” to “binding” status. Binding environmental targets were thereafter written into local leading cadres’ annual responsibility contracts and became important criteria in cadre promotion decisions. The intent was to incentivize officials at each layer of government administration to fulfill Beijing’s environmental mandates (Heberer and Senz, 2011; Ran, 2013). In addition, the scope of binding environmental targets widened from the original three binding environmental targets in the 11th FYP to a total of nine binding targets in the 12th FYP.⁵ These targets touch on air quality (sulfur dioxide and nitrogen oxide), water quality (chemical oxygen demand and ammonium), energy efficiency, carbon efficiency, non-fossil fuels, water consumption intensity, and forest coverage (see *Table A1* in the Appendix for a list of expected and binding environmental targets in the 11th and 12th FYPs). By adding new environmental targets to the two most recent national FYPs, and making them binding, Beijing has added teeth to its green growth ambitions.

The heavy reliance on binding environmental targets reflects Chinese leaders’ pragmatic judgments about how best to fit new policies to existing implementation structures. Indeed, the target-based approach has delivered on intended policy outcomes in the past. Two notable examples are the family planning targets used to implement China’s one-child policy and investment growth targets that set limits on local investment growth in order to curb China’s inflation (Huang, 1996). Environmental targets are, however, unlike family planning and investment targets in several important ways. For example, in comparison to family planning, allocating environmental targets can be a much more contentious political process since environmental targets frequently impose high costs on local businesses and local employment. In addition, the implementation of environmental targets is often characterized by a time lag such that costs are incurred in the short term but benefits only materialize in the long term. This is problematic since the realization of such policies is out of sync with the rhythms of the cadre rotation system with the result that local cadres are strongly incentivized to undertake initiatives which yield results in the short term (see further discussion in Section 3.2). With respect to the matter of target verification, local deviation from the one-child policy is relatively easy to detect, whereas non-compliance with energy intensity targets is not as readily apparent since measurement standards for energy efficiency are complicated and outcomes are not visible (Rietbergen and Blok, 2010). Given these distinctive characteristics of environmental targets, a critical analysis of leaders’ responses to top-down targets helps to generate a realistic picture of what binding environmental targets can and cannot achieve. *Figure 2* summarizes desirable and undesirable outcome of China’s target-based implementation approach.

⁵ The pressure to address environmental and energy issues increased by 2002, when a trend of continuous energy efficiency improvements was reversed and China’s energy intensity actually increased on average 5% per year during 2002-2005 (Price et al., 2011). Moreover, the growing number of environmental protests increasingly threatened social stability, with more than 51,000 pollution-related public disputes occurring in 2005 alone (China Daily, 2006).

Figure 2: Desirable and undesirable outcomes of China’s target-based implementation approach



Source: Author

The heavy reliance on a target-based implementation approach has so far yielded a number of *desirable* results. First, environmental issues have moved quickly onto the policy agenda of many city mayors and Party secretaries. Second, the target-based system allows for some flexibility in factoring in local circumstances. Environmental targets can be allocated either through a “one size fits all” or a “differentiated” approach.⁶ In Jiangsu, for instance, all municipalities received a uniform forest coverage target of -20%, while forest coverage targets in Shandong and Hunan were differentiated for municipalities. In addition to the question of how to allocate targets to subordinate governments and enterprises, local governments are also given flexibility as to *when* to implement binding targets during the five-year planning period. For instance, in one county in Hunan, leaders set the same annual energy intensity targets of -3.43% per year over the entire planning period, while in the neighboring county, energy intensity targets started high with -5% for the first year and declined to -3.5% over time. Leaders selected this descending method since they believed that there would be less and less room to achieve additional energy savings.

⁶ *Differentiated* targets take into account a locality’s implementation capacity (both possible environmental damage and actual room for implementation), but obtaining the required information for target differentiation can be costly. The *one-size-fits-all* approach allocates uniform targets, which is simpler and which tends to give the impression to the bureau in charge of target allocation as being more impartial. However, uniform targets might be also perceived as unfair by some localities as they do not take into account localities’ implementation capacity.

Another desirable aspect of the system is that frequent reporting on environmental target fulfillment strengthens the Party's performance legitimacy. At the end of the 11th FYP, frequent announcements on environmental targets communicated to the Chinese public that the central government is doing everything possible to realize announced goals. For example, when, during the last months leading up to the end of the 11th FYP, it became clear that China was not on track to meet its national energy intensity target of 20%, former Chinese Premier Wen Jiabao publicly called for local officials to use an "iron hand" when implementing the energy intensity targets. Such announcements communicate to the Chinese public that the central government takes the implementation of environmental policies very seriously and if targets are not met, it is likely because of policy shirking by local governments. Therefore, authoritarian regimes can exploit binding environmental targets to enhance trust in central authorities and enhance the appearance of effective governance, thus ultimately furthering the Party's legitimacy.

While the introduction of binding environmental targets has, to date, resulted in a number of positive outcomes, the target system also generates multiple *undesirable* (and often unanticipated) results. Heavy reliance on binding environmental targets can also be problematic as allocated targets can be (a) inappropriate to local circumstances and units of protection, (b) unscientific, (c) rigid, (d) arbitrarily inflated as they get passed down the administrative hierarchy, and (e) difficult to verify.

(a) Inappropriate to local circumstances and units of protection

Box 1: Inappropriateness of targets to protection units

After targets are set at the national level, provinces allocate environmental targets to different departments within administrative boundaries of a province, municipality or county. These departments are responsible for just one section of the units in need of protection. However, lakes, rivers or wetlands are complete ecosystems that should be managed as single entities rather than parceled out to different administrative units.

- For example, governance of **Dongjiang Lake in Chenzhou** is shared between four counties, one of which is poor and cannot afford to close mining enterprises at the lake. The remaining three counties have committed to limiting pollution since they perceive the lake as an asset for tourist promotion. In the context of this common pool resource problem, a lake commission using a process of ecological compensation mechanisms would be more effective than targets tied to county governments (see discussion in Section 5).
- Another example is recent **PM 2.5 pollution in Beijing**. Beijing's air pollution results partly from coal burning in Beijing's neighboring provinces, especially Hebei province which burns 200 million tons of coal every year. Without cross-provincial joint efforts in the greater Beijing area, Beijing's municipal government can do little to stem local pollution.

Aside from cross-administrative coordination problems, allocating binding targets to administrative units gives rise to "**gerrymandering**" practices, wherein local governments manipulate jurisdictional boundaries for their own ends. For example, in one municipality in Shanxi, the municipal Mayor relocated polluting factories to a nearby county and then cut a deal in order to obtain part of the tax income without having the pollution show up on the municipality's environmental record.

First, picking nine binding environmental targets in the 12th FYP also means neglecting other important environmental targets and issues, such as binding targets for PM 2.5 or water efficiency in the agricultural sector. As binding environmental targets cascade downward through the administrative hierarchy, targets set by upper level governments might not fully represent local conditions or local environmental priorities. As a result, the most urgent local environmental protection challenges might be untouched by the target system. For example, heavy non-ferrous mining industries in Chenzhou municipality (Hunan), caused severe pollution in multiple counties over the last two decades. Yet because there was no binding target addressing non-ferrous metal pollution until the most current 12th FYP, the most pressing local pollution issue was not tackled until recently (Kostka, 2014). Moreover, targets can be inappropriate since targets are usually distributed based on administrative boundaries, which do not necessarily match the unit of protection (see *Box 1*).

(b) Unscientific targets

As targets get distributed at each level, bureaucrats need to make decisions as to how to share the burden of implementation. Yet, this decision-making process requires a constant flow of high quality information in order to identify the “right” target level for subordinate governments and enterprises. In the absence of such information, the use of one-size-fits-all targets can distribute the implementation burden very unequally between different reporting units. For example, within the same municipality in Hunan, one EPB reported that air pollution targets were “easy” to achieve while two neighboring counties felt they were “difficult.” Such scenarios can generate resentment and supply incentives for heavily-burdened localities to misreport data on difficult targets.

Setting appropriate targets that factor in localities’ capabilities and implementation burden is a time and information-intensive process and can be a very politicized task (see *Box 2*). A government official at a municipal Water Resource Bureau notes how shortages in staffing and lack of department coordination frustrates the process of setting scientific and differentiated targets:

In our bureau, I am the only person in charge of water management, and I do not have time to go to enterprises and counties to do checks. I also cannot get enterprise data on industrial value added figures from the Statistical Bureau, hence it is very difficult for me to estimate scientifically how much water is consumed by enterprises at the county level. While the provincial government gives differentiated targets to the bureaus, our bureau cannot give differentiated targets for the counties and instead all the counties get the same target for water consumption. [Given our constraints] my main job is to sit in my office and write documents, or, you can also call it, I “play with words” (*wan wenzi*) (INT29052012).

With many local governments lacking in the technical know-how and resources needed to decide on differentiated targets, they are often not allocated in the most optimal way.

Box 2: The politics of target allocation

Another unintended consequence of the target-based implementation system is that local politics tend to shape target allocation. The distribution of targets can become a **politicized and sensitive task**, since giving some localities higher targets than others can be perceived as “unfair”. The scope for negotiation of targets seems to vary from region to region.

Target allocation often gives rise to local debates about “common but differentiated responsibilities” and fairness. For example, in Weifang municipality, Shandong province, county leaders used different arguments to bargain for advantageous energy intensity targets during the joint committee (*lianxi huiyi*) meeting at the municipal level, which is in charge of distributing energy intensity targets to counties and districts in Weifang:

- Shouguang, an **industry-heavy county** argued that it has a larger industrial base and it should not receive the same percentage-target as agricultural counties, because that would mean the county’s workload is much larger and becomes unrealistic.
- Leaders from **agricultural counties** like Fangzi on the other hand argue that for them there is very little room and scope for improvement. This is because their industrial base is small, the economy is not well diversified and it is therefore difficult to restructure, and because they have a more difficult time to attract new energy efficient enterprises from the outside.

In the end, the joint committee decided on only slightly differentiated targets for their counties.

Source: Kostka (2014)

(c) Rigid targets

Targets also remain rigid. For example, one urban district in Hunan failed to meet its 11th FYP energy intensity target because a large-sized, central state-owned power enterprise moved into the district. District leaders escaped punishment only because the municipality still managed to meet its overall target despite the shortfall in the district.

(d) Inflated targets

Moreover, as binding environmental targets get passed down to lower tiers of government and bureaus, sometimes unattainable targets are allocated to subordinate governments. Provincial and municipal government officials often inflate environmental targets when passing them down the administrative hierarchy in order to allow for slippage as they anticipate that some environmental projects and efforts will fail or that the results will be questioned by national inspection teams. For example, in one municipality in Shanxi, energy intensity targets among counties generally ranged from 27% to 30%, despite a municipal overall target of only 25% (Kostka and Hobbs, 2012). Receiving unattainable targets demotivates local leaders in charge of implementation and, in extreme cases, can trigger non-cooperation by local leaders.

(e) Verification difficulties

In addition, because targets differ widely in terms of their ease of measurability, verifiability, and the extent to which they are tied to vital economic and social issues, the effectiveness and efficiency of binding environmental targets can vary widely. For example, forest coverage targets are easier to measure and verify due to existing GPS technologies, while energy intensity is more difficult to measure and verify since there are multiple ways to calculate

energy and GDP data and no sophisticated technical equipment exists to monitor performance. Some localities measured energy intensity per GDP or per value added in large-scale (*guimo yi shang*) enterprises. This measure can be problematic because GDP data for the third sector is often not reliable, especially when it gets down to county-level data.

3.2 (Dis)Incentives for Local Policy Implementers

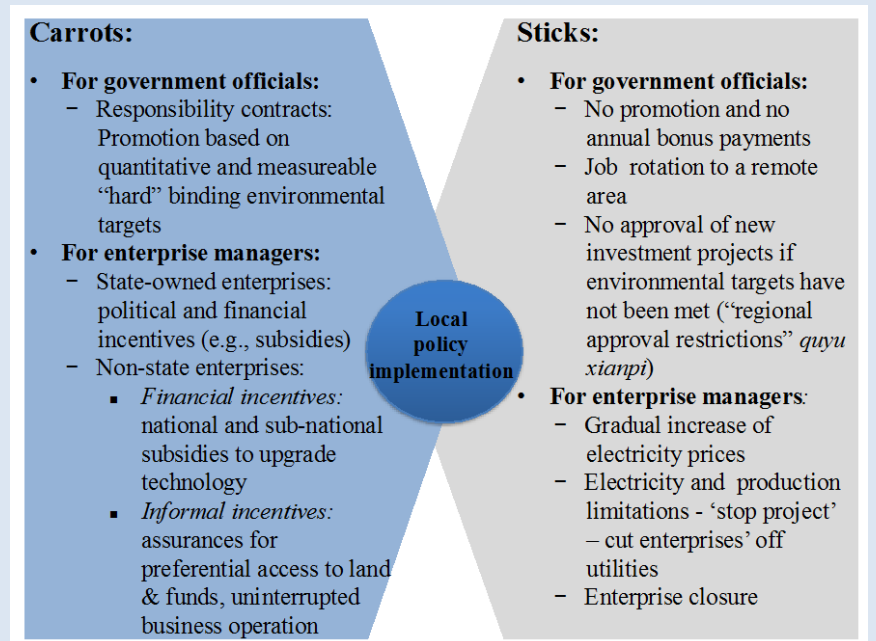
As described in the analytical framework, besides the green planning system, the incentives provided to local actors via the cadre management system play a crucial steering function in local policy implementation. One can differentiate between political incentives, meaning political awards local bureaucrats can expect, and economic incentives, referring to the economic payoffs different actions are likely to produce for both political leaders and private actors (Kaufman, 2012).

Political and economic incentives in the cadre promotion and evaluation system

Incentives play a central role in motivating local cadres to fulfill national green mandates and targets. Like other mandatory targets, binding environmental targets have been linked with the annual cadre promotion and evaluation system. Outstanding performances in the annual cadre evaluation are rewarded through promotions (in rank or position), additional wage or bonus payments, or other material benefits, including administrative benefits (e.g., free transport, entertainment, training, and travel), and other allowances for cadres (e.g., subsidized housing, health care, and opportunities for further education). If local leaders fail to meet binding targets, they can face punishments through, for example, denial of promotion and formal censure, such as redeployment to a remote region or, in rare cases, expulsion from office. *Box 3* summarizes rewards and punishments used to encourage local cadre to not misuse the flexibility granted to them under China's highly decentralized structure. Local leaders (e.g., the Party secretary and mayor of a province, municipality, or county) also sign individual responsibility contracts that include specific annual energy or emission reduction requirements for their locality. The signing of personal responsibility contracts helps to ensure that government officials at each layer of government administration are motivated to at least partially fulfill upper level government directives.

Managers of state-owned enterprises are also embedded within the same system of annual cadre evaluation, meaning that they are more easily incentivized to comply with environmental standards than managers of private enterprises (Kostka and Hobbs, 2012; Harrison and Kostka, 2014). SOE managers who fall short of their annual goals can be excluded from year-end bonuses and be subject to other political punishments. Managers of certain large SOEs who significantly increase energy efficiency and reduce emissions may yield political benefits including promotions. For example, it is common knowledge among Shanxi enterprise managers that the former head of the largest iron and steel plant in Shanxi, Taiyuan Iron and Steel (*Taigang*), was promoted to deputy governor of the province after increasing energy efficiency and raising production standards at the company (Kostka and Hobbs, 2012). State-owned enterprises have a reputation for shirking regulations and getting away with worse environmental practices (Lo and Tang, 2006: 204), but the above example suggests that the government can sometimes effectively leverage links to SOE managers to achieve environmental gains. Informants also reported that state-owned enterprises are more easily regulated because local government officials have better information access to them as compared to private enterprises.

Box 3: Formal and informal incentives for local government officials and enterprise managers



Source: Author

Shortcomings of the cadre incentive system

In spite of political and economic incentives woven into the cadre management system, the incentive system does not always work effectively.

Leading cadres’ pressures for target fulfillment can lead to short-term maximization behavior instead of long-term innovative environmental management. Many of the environmental and energy intensity targets in the 11th FYP were implemented at the eleventh hour and implementation measures did not yield lasting change (see *Box 4*). In some localities, binding energy intensity targets were fulfilled at the very end of the planning period using extreme and sometimes socially harmful measures. These included cutting electricity to hospitals, homes and rural villages. Local governments also temporarily shut down energy-intensive companies for a given period of time only to allow the same enterprises to later reopen, a method known as “sleeping management” (*xiumian guanli* 休眠管理) (Kostka and Hobbs, 2012). These low quality implementation approaches ensured that leading cadres met their energy intensity target

outlined in their individual responsibility contracts but effectively put off the difficult matter of economic restructuring (Eaton and Kostka, 2014).

Local cadres also behave very strategically in terms of how to fulfill binding environmental targets. For example, in one municipality in Hebei province, municipal government officials gave leaders in the municipal Bureau of Garden and Green Management the task of planting ginkgo trees despite the fact that these type of trees are unsuitable to the municipality's climatic and soil conditions (Shin, 2014). According to municipal leaders, the trees "looked good" and "greenifying" (*lvhua*) the city landscape would help with fulfilling the forest coverage targets. Other local governments purposively did not implement or report all possible energy savings and emission reduction (ESER) measures in order to "leave room for next FYP". For example, one locality in Hunan had actually over-fulfilled its COD reduction targets

Box 4: Strategic and cyclical behavior of local leaders

Incentives embedded in the cadre evaluation system can aggravate cyclical behaviors among cadres in charge of policy implementation, leading to suboptimal policy outcomes. As the end of the evaluation period approaches, this generally intensifies the pressure on local cadres, which may lead to manipulated statistics or short-sighted responses. This can be illustrated with the example of **last-minute implementation approaches** to meet energy intensity targets at the end of the 11th FYP. By the end of 2009, national energy intensity levels had been reduced by merely 14.4%, far short of the expected progress and with only one year left to meet the national FYP target of 20%. As a response, many sub-national governments undertook drastic measures to meet their energy intensity goals in ways harmful to the public interest. For example:

- In one county in **Hebei** province, the local government cut off electricity to homes and rural villages, even to the extent that one hospital was forced to close once every four days.
- In Wenzhou in **Zhejiang**, one district government implemented a "work-5-stop-10" power rationing practice for large enterprises, which was equivalent to working only 10 days per month. This power rationing reduced the production for local entrepreneurs and local employees could earn only a third of their usual wages.

To make matters worst, some companies facing electricity rationing switched to diesel-operated generators, which actually increased pollution. These short-sighted implementation methods in Hebei, Zhejiang and other regions forced the NDRC to issue an emergency note in September 2010 which banned short-term electricity cuts and production limitation methods that affect residential areas and public services. In contrast, after the completion of the 11th FYP targets in 2010, many localities went back to "business as usual" and, at the beginning of the 12th FYP in 2011, they thought of creative ways of easing their new burden. For example, they worked to attract outside companies in the hopes of boosting local growth as a means of manipulating the energy intensity ratio since energy intensity = energy consumed/GDP.

Source: Kostka and Hobbs (2012); Kostka (2014)

for the 11th FYP but only reported the minimum COD reductions necessary in order to save the remaining reductions for the 12th FYP (Kostka, 2014).

The existing cadre incentive system is also somewhat problematic as tensions between environmental and competing targets result from the different weights allocated to targets in the cadre evaluation forms (*kaohetiao*). Generally, economic targets significantly outweigh social and environmental targets. For example, in one county in Shanxi province, government officials could obtain a maximum of 28 points for meeting economic targets in the 2011 evaluation forms, while just 14 points were allocated to resources and environment targets (Eaton and Kostka, 2013).

Overall, it is clear that environmental targets, while substantially more important now than previously, compete for space on the crowded agenda of local officials. In these circumstances, most local officials have adopted the attitude of doing the very minimum required.⁷ One official in a county in Shandong said:

The targets that we pay most attention to are GDP growth rate, fiscal income, value added, exports, and foreign direct investments. But these targets are not binding targets with veto-power (*yipiao foujue*). Environmental and energy consumption targets are veto-power targets and we have to fulfill them, otherwise the Mayor, Party Secretary and the leaders of the bureaus cannot pass the end-of-year check. It is like a constraint maximization problem (*youyue shue de jidahua*): We try to maximize GDP and fiscal income, but we meet only the bare minimum of environmental standards. This is of course not always efficient for the environment (INT08052012).

A leading EPB official further reflects: “Environmental and energy targets are binding targets but they are not our ultimate targets. No leader will be promoted because of their better achievements in environmental protection and energy savings. GDP growth is still the target that we work hardest to achieve” (INT14052012).⁸ This attitude explains why all the three municipalities and six counties visited during fieldwork in 2012 set an annual GDP growth rate between 12% to 17% in the local 12th FYP, twice as high than the national 12th FYP growth rate of 7%. A local EPB official notes “in theory, all local departments should together decide about local GDP growth rates, but in practice it is finally decided by the local Development and Reform Commission (DRC), while the EPB does not have much say in this” (INT23052012). When asked why they selected such high growth targets, local DRC officials often replied that national or provincial figures are “average” figures and some regions will have higher growth and some regions will have lower growth (INT23052012). Naturally, no locality wants to “sacrifice” their economic development and have average or below-average growth.

The pressure to deliver “political achievements” might also result in the selection of sub-optimal projects to fulfill particular environmental targets. Presented with a long list of central directives, promotion-hopeful officials tend to devote their energy and resources to select projects that they expect will most enhance their careers. So-called “political accomplishment projects” (*zhengji gongcheng*), often in the form of extravagant construction initiatives, are at the top of local agendas. Such political accomplishment projects include large public squares, highways, industrial parks, and (oversized) government buildings. For example, in order to further reduce COD in the 12th FYP, one county in Shandong is planning to build one sewage treatment plant for each town and one official notes:

Personally, I do not think that this is a good idea. It would be better to expand the existing sewage plant and build a better pipe network to collect wastewater rather than build many small plants in each town. This would be less expensive. For some towns, it is also financially infeasible to build their own treatment plant and their township government will face severe financial burdens in the future. But this is a political problem. Some leaders think that building a sewage treatment plant for each town sounds better and provides more “political accomplishment” value. In the short term, the plans sound impressive to their superiors but the next leaders inherit these financial burdens and have

⁷ The next three paragraphs draw from Kostka (2014).

⁸ Local officials do maintain minimum levels of environmental standards in order to avoid environmental-related mass protests and collective petitions. Keeping stability in their jurisdiction is still the highest ranked binding target on the cadre evaluation sheet and the occurrence of mass protests would certainly hinder a cadres’ career advancement (Wu et al., 2013: 23).

to deal with failures as not every town will be able to complete the constructions (INT14052012).

The above statement illustrates that promotion-seeking cadres will look for projects with high “political accomplishment value” to impress their superiors but these actions can lead to less optimal outcomes for the locality in the long term.⁹

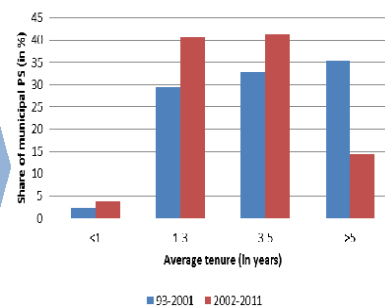
Compared to many environmental policies, political accomplishment projects (*zhengji gongcheng*) such as investments in large infrastructure projects have the advantage that policy outcomes are always visible, quick, and easily measurable. A recent study by Wu et al. (2013) finds that city-level cadres’ probability of getting promoted is positively correlated with local GDP growth and negatively correlated with spending on environmental improvements.¹⁰ This induces local leaders to invest more in local infrastructure projects that raise both local GDP and future land prices, which in turn boost local governments’ land sale revenues and loosens local government’s budget constraints, allowing for even more infrastructure investments and faster local GDP growth (see *Box 6*). In addition, large-scale infrastructure investments have an immediate positive effect on local employment, another important target in the annual evaluation. By contrast, environmental policy outcomes are not always visible and easily measurable and can involve stark tradeoffs against economic growth. Many environmental policies are also characterized by a time lag such that costs are incurred in the short term but benefits only materialize in the long run.

Cadre rotation system and local leaders’ short time horizon

Implementation of environmental targets is made harder through the institutionalized cadre rotation system that switches leading cadres to a new position or locality every three to four years (Eaton and Kostka, 2013, 2014). Available data suggest that leading local cadres do not stay long in their positions.¹¹ Party secretaries and mayors, the two pillars of a city’s leadership group (*lingdao banzi*), are typically whisked off to a new locale well before the recommended five-year term for civil servants and Party

Box 5: Tenure times of municipal Party secretaries

- Analysis of 898 biographies of municipal Party secretaries
- Average tenure times of cadres (1993-2011): **3.8 yrs**
- PS 1993-01: **4.2 yrs**
- PS 2002-11: **3.3 yrs**



Source: Kostka and Yu (2013)

⁹It is also important to stress that not all cadres are responsive to political incentives outlined in the cadre evaluation system. A recent study based on 898 local Party secretaries’ biographies shows that county-level cadres face only a slim possibility of being promoted upwards to the municipal government. Among the many obstacles hindering county cadres’ promotion to the upper ranks of the municipal apparatus, age and education restrictions, limited availability of spots at the municipal level, and information disadvantages seem to be of particular importance (Kostka and Yu, 2013). With limited career promotion prospects, county cadres might lack motivation to faithfully implement national environmental targets and instead have more incentives to maximize income and financial rewards that come along with being a leading cadre in a county. If so, the importance of political incentives in the cadre evaluation system might be overestimated.

¹⁰ According to their analysis, one standard deviation increase in average GDP scaled environmental improvement investment lowers cadres’ promotion odds by 8.5 percentage points for city-level Party secretaries and 6.3 percentage points for city-level mayors (Wu et al., 2013: 23).

¹¹ This section draws on Eaton and Kostka (2013, 2014).

cadres in leadership positions.¹² On average, mayors and Party secretaries at county and municipal levels tend to serve between three and four years before moving on to their next assignment (Seckington, 2007; Mei, 2009; Eaton and Kostka, 2014). For instance, data on 898 former municipal Party secretaries appointed across China between 1993 and 2011 reveal that the average time in office was 3.8 years, 1.2 years shorter than the recommended tenure time for cadres in leadership positions (see *Box 5*). Beyond the leadership group, departmental heads with a key role in environmental policy implementation also rotate on average every four years. For instance, the average time served as head of a provincial DRC, the head of a provincial EPB, and the head of a provincial Construction Bureau was 3.6 years, 4.0 years, and 4.6 years, respectively (Kostka, 2013).

Table 1 summarizes the pros and cons of the cadre turnover system and its effects on environmental policy implementation. Frequent post-shuffling among local cadres can help to bridge departmental gulfs, an eternal problem in China's huge and fragmented bureaucracy. Circulating cadres between different administrative levels can also enhance communication across administrative levels and improve cadres' knowledge of upper or lower governments' daily tasks. Job rotations through state-owned enterprises can also aid effective environmental governance; cadres with previous work experience in state-owned enterprises can draw from their knowledge of enterprises' decision-making processes and internal politics and thus negotiate more effectively with enterprise managers on implementation of onerous environmental regulations (Eaton and Kostka, 2014).

Although cadre rotation has some benefits for environmental policy implementation, there are also significant downsides to the rotation system. Short tenure cycles incentivize cadres to prioritize short-term over long-term gains. For instance, a series of short-staying mayors and Party-secretaries in Datong City, Shanxi province, had reputations for extracting rents from local industries while avoiding the painful restructuring Datong urgently needed (Eaton and Kostka, 2013). In addition, frequent rotation of leading cadres can be disruptive to local development planning. Newly-posted cadres frequently stop existing initiatives, regardless of their merits, in order to place their own stamp on a locality. Finally, in the space of a three- or four- year tenure, circulating officials spend much of their time simply getting up to speed in their new localities and their limited knowledge of local circumstances can result in suboptimal environmental policy outcomes (Eaton and Kostka, 2014). Once leading cadres move on to a new post, they are also no longer held responsible for environmental outcomes of their previous actions. This inability to hold cadres responsible for environmental damage after they leave a post prompted Xi Jinping's recent call for "lifetime accountability" for cadres (South China Morning Post, 2013).

¹² The five-year tenure limit is, in reality, a firm recommendation rather than a hard and fast rule. A 1999 CCP Organization Department document set ten years as the absolute limit for cadres in leading position but rules stating that cadres change positions at five year intervals is phrased in the language of "should" (*yinggai*) rather than "must" (*bixu*). This flexibility explains why some cadres have tenures longer than five years.

Table 1: Effects of cadre rotation on local environmental policy implementation

Pros of the cadre turnover system	Cons of the cadre turnover system
<ul style="list-style-type: none"> • Bridges horizontal gaps: Improved coordination among departments → <i>E.g., an EPB director's prior work experience in the local coal management bureau can help to identify common interests between both departments and thus aid the formation of green coalitions.</i> • Bridges vertical gaps: transfer of resources, knowledge, and policy support → <i>E.g., a cadre exchange program between county and municipal EPB officials in Wenshan (Yunnan) enhances communication across administrative levels and improves cadres' knowledge of upper or lower governments' daily environmental tasks.</i> • Builds government-enterprise alliances: → <i>E.g., local cadres' insider knowledge can reduce information asymmetries between the regulator and the regulated. Officials who previously worked in state-owned enterprises have a better understanding of SOEs' internal processes and politics and can use this knowledge to better regulate them or persuade them to join green growth initiatives.</i> 	<ul style="list-style-type: none"> • Incentivizes self-maximizing and rent-seeking cadre behavior → <i>E.g., short-term staying mayors and Party-secretaries in Datong City (Shanxi) extracted rents from local industries but did not undertake economic restructuring Datong City urgently needed.</i> • Encourages cadres to prioritize short-term, visible results over long-term gains. → <i>E.g., many leaders invested significant resources in planting trees in city centers, an initiative that produces quick and visible results, but delayed economic restructuring, as this process is more difficult and complex and can take years to bear fruit.</i> • Results in damaging discontinuity in local green initiatives ("new lords, new laws") → <i>E.g., newly-posted cadres often stop existing initiatives, regardless of their merits, in order to place their own stamp on a locality. This frequently comes along with policy uncertainty as local departments "wait and see" whether the next leader will select a different focus.</i> • Constrains implementation capacity: limited local knowledge and networks → <i>E.g., in an average tenure period of three to four years, more than half of a leaders' time could be taken to familiarize themselves with the locality and establish trust of subordinates.</i>

Source: Eaton and Kostka (2013, 2014)

The incentives local cadres face to secure particular goals during short tenure terms are sometimes starkly at odds with the center's long-term plans for green and low-carbon urbanization. *Figure 3* suggests how the personal political incentives of promotion-hopeful cadres might affect their prioritization of different green growth policies. While there are likely to be many factors involved in the selective implementation of greening growth, the "political accomplishment value" (*zhengji*) along with the time frame of a given initiative are particularly important in steering cadres toward some policies and away from others. In the context of the recent green FYPs, binding environmental targets (e.g. energy intensity targets) would tend to be assigned a higher "political accomplishment" value than non-binding soft targets (e.g. increasing service sector as a proportion of GDP). The "project time to maturity" axis implies that projects which deliver tangible results within the leaders' tenure (i.e., within three to four years) will tend to be selected over projects with a longer time-frame. The matrix shows how these political accomplishment and time considerations interact in the process of selective policy implementation. It suggests that, in allocating their energy and scarce resources to competing projects and fulfilling environmental policy mandates, leading officials are likely to pick green projects with both high political accomplishment value and a high probability of producing results within their own tenure cycle (quadrant 3). By contrast, projects which are not seen to enhance a cadre's chances of promotion and which take a long time to produce results will tend to be ranked at the bottom of the prioritization list (quadrant 1). Projects that make cadres stand out in their peer group (high political accomplishment value) but without deliverables at the end of the tenure period might also be sidelined, depending on how much

credit he or she can expect to gain from the long-term initiative (quadrant 2). Finally, projects with low perceived value for cadre evaluations but with realizable results in the short term might be picked to highlight the wide range of activities undertaken in a particular cycle (quadrant 4) (Eaton and Kostka, 2013).

Figure 3: Project prioritization matrix: The view of a promotion-seeking official*

Project Time to Maturity 	Long	Lowest Priority 1 <ul style="list-style-type: none"> • Low perceived value for cadre evaluation • Project results <i>not</i> exhibited within tenure cycle <i>Example: Increase proportion of service sector</i>	Medium Priority 2 <ul style="list-style-type: none"> • High perceived value for cadre evaluation • Project results <i>not</i> exhibited within tenure cycle <i>Example: Increase non-fossil fuels (e.g., power plant) in primary energy mix</i>
		Short	Medium Priority 4 <ul style="list-style-type: none"> • Low perceived value for cadre evaluation • Project results exhibited within tenure cycle <i>Examples: Introduce green government procurement measures</i>
		Low	High
Expected "Political Accomplishment (Zhengji)" value			

Source: Eaton and Kostka, 2013

Economic incentives for local governments

Next to personal political incentives, local cadre behavior is also determined by economic incentives. Local governments increasingly face pressure to enhance local income since local governments are assigned the main responsibilities for delivering public services and infrastructure provision, yet revenues based on tax revenue sharing and intergovernmental fiscal transfers are insufficient to cover these costs (Wu et al., 2013; Wong, 2010, 2013; World Bank China 2030 Report). The revenues received from the sale of land use rights and urban construction projects have become a particularly important source of extra-budgetary income for local governments, but this often has led to urban sprawl and wasteful land use (see Box 6).

Box 6: Economic incentives for local governments to sell land use rights and initiate urban construction projects

Economic incentives – here referring to financial payoffs received from certain activities – also play an important role in incentivizing cadres and private actors. Urban planning and development in China have been influenced by two important factors: fiscal re-centralization and the land use rights system.

- *Fiscal re-centralization:* Under the tax sharing system (TSS) introduced in 1994, subnational governments receive approximately half of all collected taxes but they account for approximately 80% of total budgetary government expenditures (Wong, 2013a; World Bank, China 2030 Report: 55).
- *Land use rights system:* With the 1988 amendment of the Land Administrative Law, state-owned and collective-owned land use rights can be transferred for the payment of a conveyance fee (Lichtenberg and Ding, 2009: 58). If urban development requires the use of collectively owned land, it has to be first converted to state-owned land through requisition and a compensation has to be paid, including subsidies for resettlements. As there are no markets for rural land, this amount is determined by an administrative formula (Lichtenberg and Ding 2009:58). The land use rights for the area converted can then be transferred again, for example to private developers (Kaufman, 2012: 42).

The interaction between fiscal re-centralization and land use rights system has substantially affected top city-level cadres' investment and revenue raising decisions. Facing growing expenditure needs and insufficient resources from the formal fiscal system, **local governments have significant economic incentives to sell land use rights and initiate urban construction projects:**

- The revenues received from the sale of land use rights have become the most **important source of extra-budgetary income** for local governments (Man, 2011: 12). While the sale of land use rights accounted for only 9.3% of local budgetary revenues in 1999, this number has risen to an average of 30% (McKinsey Global Institute 2009: 87; Kaufman 2012: 42).
- The institutional structure of the land transfer process also enables local governments to **make significant profits**. The compensation required for requisitioned agricultural land, based on the administrative formula, is usually much lower than the conveyance fees governments receive from private developments (Lichtenberg and Ding, 2009: 58). Estimates and anecdotal evidence suggest, conveyance fees are approximately 10 to 20 times the value of compensations (Tian and Ma, 2009: 603; Lichtenberg and Ding, 2009: 58). In addition, prior to the transfer, the price for the land sale is often intentionally driven up by increasing values through infrastructure construction such as investments in highways, metro stations, or even airports (Wei and Zhao, 2009: 1034).

Given these economic incentives, city expansion “always pays off, whether people end up living there or not” (Kaufman, 2012: 43). At its most extreme, these economic incentives can lead to the emergence of ghost cities such as Ordos City in Inner Mongolia.

Environmental impact: As the institutional structures encourage especially the development of land at the urban fringes, this increases the risk of **urban sprawl and wasteful land use**. Due to the need to compensate and relocate residents, it is much easier and more profitable for the government to develop new areas at the city's periphery than available land within the city. In order to curb such excessive behavior at the local level, the central government should decrease its strong focus on GDP growth and allocate more funds to the local level.

Source: Kaufman (2012)

In summary, insufficient political incentives and severe budget constraints at the local level disincentivize local cadres to faithfully implement national environmental mandates. As a

result, cadres quite rationally invest the majority of time and funds in projects that produce tangible evidence of economic growth within their own tenure.

3.3 Capacity Constraints

State capacity is of key importance to the enforcement of environmental policies at the local level as well as the effective use of environmental policy instruments (Schwartz, 2003).¹³ Local governments work under certain political, technical, or financial capacity constraints that influence environmental policy outcomes.

Political capacity: Fragmented and weak environmental bureaucracies

Political capacity constraints can result from (1) coordination difficulties due to a fragmented environmental bureaucracy, (2) conflicting priorities *within* implementing agencies, and (3) low bureaucratic status and authority granted to environmental bureaucracies.

1) Fragmented environmental bureaucracy

The implementation and enforcement of environmental mandates at the local level is partly hindered by the fragmented and ambiguous allocation of environmental responsibilities. Usually, numerous government agencies are responsible for the implementation of a single environmental issue but sometimes without a clear division of labor, which in practice ultimately leads to a lack of accountability (Ran, 2013). For example, more than five departments have a role to play in energy efficiency implementation at subnational levels: the local Development and Reform Commission (DRC), the Economic Commission, the Construction Department, the Transportation Department, and the Environmental Protection Bureau (EPB).

Fragmented bureaucratic structures lead to various coordination problems that have adversely affected city leaders' efforts to develop comprehensive, sustainable urban plans. At the city level, local five-year plans, urban master plans and land use plans all follow a different time horizon, which makes coordination very difficult (Ding, 2009: 404). Actors involved in the planning process also follow their own interests and compete for power, making the construction of comprehensive urban planning yet more difficult. For example, urban design companies complain that the planning of roads and other infrastructure projects is often already underway when they are invited to submit their urban design, making it difficult for them to integrate buildings and streets into a unified system (Kaufman, 2012: 39). This fragmented institutional landscape helps to explain why the majority of the 200 self-acclaimed low-carbon cities in China are not truly green and lack comprehensive sustainable urban plans (Xu, 2011). In many of these cities, early euphoria about embracing a low carbon model has stalled as the development of concrete and actionable plans poses a real challenge. *Box 7* describes how in one such city, Baoding, early efforts to become a leading "low-carbon city" in China have stalled in recent years.

¹³ The term state capacity here refers to local agencies' abilities to ascertain accurate information, to enforce rewards and punishments for effective environmental policy enforcement, and to evaluate performance.

Box 7: Baoding City, Hebei – The rise and fall of a low-carbon city

Promote a “clean energy city” or “low-carbon city” in Baoding, a municipality in Hebei Province – how did the initiative take shape and why has it begun to stagnate?

2001-2010: The rise of a “low-carbon city” project

- Low-carbon initiatives were initially projects under the *High-Tech Administrative Committee*, a small, low-key agency which pushed this agenda since 2001 despite strong opposition from the Baoding city government and other departments
- With the help of the high-tech administrative committee, clean energy technology firms started to flourish in the high-tech zone (e.g., adoption of various solar PV and LED projects within the zone)
- Only in 2006, after some early successes and national policy shifts, did the Baoding city government become interested and begin to legitimize these projects and diffuse the initiatives across the city
- Main reason for early successes: as a “sidelined local agency”, the *High-Tech Administrative Committee* had strong organizational interest and motivation to ensure consistent progress of low-carbon projects (it *de facto* owned the low carbon projects and could experiment around and operate “outside of local political rules”); also lobbied higher level political units

Since 2010: Stagnation of “low-carbon city” project

- In 2010, transfer of low-carbon city project from the High-Tech Administrative Committee to the more powerful city government (i.e., DRC and other departments such as EPB, Bureau of Science and Technology)
- Since 2010, the city government has been passive about further carrying out the low-carbon city agenda in Baoding. For example, only few residential areas were renovated with solar PV panels and LED lamps since 2010 and some earlier renovated projects were in fact replaced again with traditional technologies.
- The city government allocated the specific tasks to build a low carbon city to lower levels of government, but do not check rigorously progress made
- Baoding city government also did not have the capacity and knowledge to ensure maintenance of solar PV and LED projects – instead the city blames the inherent instability and immaturity of the technologies for the non-functioning panels across the city.
- Main reason for stagnation: low-carbon initiatives are but one of many projects under the city government, limited personal motivation and organizational interest of city government officials; limited internal competence

Source: Shin (2013)

2) Conflicting priorities

Implementing agencies also face multiple and sometimes conflicting goals within an organization, as summarized in *Table 2*. For example, the local Development and Reform Commission (DRC) is in charge of multiple functions; its main interest lies in economic overseeing planning and investment management, while at the same time it is also responsible for overseeing energy efficiency and climate change issues.

Table 2: Agencies’ environmental responsibility, non-environmental responsibility, and top priorities

	Environmental responsibility	Non-environmental responsibility	Top priorities
Development and Reform Commission (DRC)	Energy efficiency, climate change, low carbon city, master planning for ecological improvement and environmental protection	Overall social and economic planning, market regulation, implementation of fiscal, financial, industrial, land, and social policies, investment attraction	Industry development and investment in public infrastructure development
Environmental Protection Bureau (EPB)	Pollution control, environmental monitoring, and ecological conservation		Environmental protection
Water Resource Bureau	Water resource protection and water quality control	Water infrastructure planning and construction, reservoir and dam construction and management, flood and drought prevention	Water infrastructure construction, especially dams and reservoirs, collecting water resource fees
Land Resource Bureau	Land, mineral, and marine resource protection, natural disaster prevention	Land sale, collecting land and mineral resource fees, land requisition in rural areas, and demolition projects in urban areas	Collecting land and mineral resources fees
Economic Commission	Industrial energy efficiency (11 th FYP), elimination of outdated technologies	Industrial restructuring, enterprise regulation, technology upgrades, management training	Enterprise management and development
Transportation Bureau	Energy-efficient public transportation, methanol fuel pilot projects	Railway, road, air, and water transport infrastructure improvements and regulation	Highway infrastructure improvements; management of transport regulation
Construction Department	Energy-efficient building projects (building codes)	Management of urban construction (e.g., usage, demolishing, renovation and relocation); public utility construction	Real estate industry development

Source: Adapted from Ran (2013)

3) Low bureaucratic status and authority

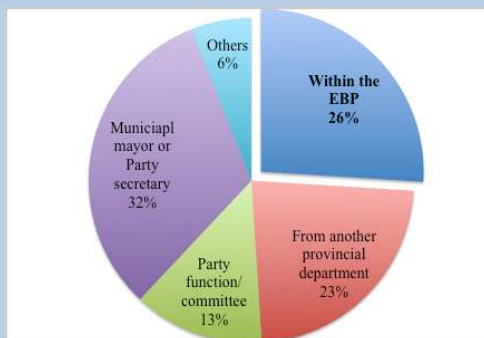
The implementation capacity of local departments in charge of environmental mandates is further constrained by their low bureaucratic status and rank within the local political hierarchy. Local agencies in charge of enforcing China's binding environmental targets vary in their political status within the locality. For example, as the agency in charge of energy efficiency issues, the local DRC holds a wider net of bureaucratic links and access to finance than, for instance, the EPB. The EPB, on the other hand, has the authority to impose "regional investment restrictions", an enforcement practice that can restrict the environmental approvals of all new projects. By contrast, local Water and Resource Bureaus do not have the same range of enforcement tools available to enforce water consumption targets. An official with the municipal Water and Resource Bureau in Hunan, for example, reported that his bureau had no enforcement authority to punish enterprises that violated water consumption rules. The Water and Resource Bureau even lacked the authority to collect industrial value-added figures on local enterprises from the Statistical Bureau, thereby strongly limiting their ability to estimate how much water local enterprises actually consume (Kostka, 2014).

The importance of providing local bureaucracies with an adequate independent status to enforce environmental policies can be illustrated with the example of local EPBs. Although the total number of employees working in local EPBs increased from 105,900 in 1998 to 166,800 in 2005 (Li and Higgins, 2013: 412), EPB officials frequently complained that they have only limited enforcement authority. For example, government officials in state-owned enterprises

Box 8: Career backgrounds of leading government officials in provincial EPBs

The analysis of provincial EPB heads' career backgrounds shows that only one fourth of provincial EPB heads were promoted within the EPB, while the remaining three-fourths built their careers in political positions at the provincial governments or Party Committees, provincial non-economic departments, or municipal governments. Leaders who spent nearly their entire career at the provincial level or in a business department may have limited awareness of local environmental implementation difficulties and practical concerns. By contrast, EPB directors who rose within the EPB ranks may have accumulated in-depth environmental knowledge and expertise.

Position prior to appointment as EPB director



Source: Kostka (2013)

(SOEs) are often senior in rank to directors of local EPBs, making it difficult for local EPBs to assert bureaucratic authority to compel compliance to minimum environmental standards (Ma and Ortolano, 2000). EPB officials frequently mentioned the "central SOE problem" and noted that nothing could be done to prevent central SOEs (*yangqi*) from polluting their localities except bringing this problem to the attention of their superiors at the next administrative level (see also *Box 12*).

Moreover, leadership appointments of local EPBs are subject to the preferences of local Party secretaries and mayors as well as leaders in the local organization departments and Party committees. Together, they have control over who gets appointed as a local EPB director. Among all 31 provincial EPB directors, only 25% of appointed directors were promoted within the ranks of the EPB bureaucracy, while the remaining three-quarters came from other government or Party positions (see *Box 8*). When selecting bureaucrats for promotion to EPB head, local leaders will balance considerations on the need for economic development, the complexity of environmental pollution, required implementation practices, as well as

their own political career concerns (Kostka 2013). For example, while Shanxi, a province under heavy external pressure to improve air pollution in 2006, selected a candidate with the skills and credentials to effectively implement air pollution targets to head the provincial EPB, the still-developing Inner Mongolia appointed a candidate with the experience needed to balance economic growth and environmental protection concerns. The power to select local EPB directors gives local authorities significant scope to influence the local path of environmental policy enforcement. Given these appointment procedures, EPB directors might feel sometimes more beholden to local leaders than to their duty to pursue environmental protection goals.

Technical capacity: Lack of equipment and know-how

Technical capacity constraints can further hinder the implementation of national environmental mandates. Two pertinent technical constraints commonly cited in the literature are: 1) a lack of technical equipment and 2) insufficiently trained local staff (Mol and Carter, 2006).

1) Lack of technology

The verification of environmental outcomes, a key component of effective environmental management, is a difficulty faced in many localities due to a shortage of advanced monitoring equipment. The available technologies and forms of monitoring systems differ for the verification of environmental targets. For the verification of forest targets, recent Global Positioning System (GPS) technologies make it somewhat easier to independently confirm reported forest coverage rates as these latest technologies can serve as “the central state’s eyes in the sky” (Shue, 2012: 24; INT09052012).¹⁴ For COD and SO₂ targets, real-time monitors are usually installed in larger companies. This monitoring equipment is reported to be not very technically advanced, unreliable and too few in number (Kostka, 2014). Overall, the COD and SO₂ data collected from monitors can only serve as a reference (*can kao*) and many counties continue to rely more strongly on monthly or quarterly inspection visits to larger companies (INT10052012). Although it is very taxing in terms of staffing requirements and time consumption, sending frequent inspection teams is seen to be quite necessary. For example, inspection teams sent from the national Ministry of Environmental Protection to the provinces sometimes rejected 30% to 50% of claimed SO₂ reductions by some provinces (Schreifels et al., 2012). Heavy reliance on inspection visits gives local officials a certain amount of discretion when it comes to verifying targets, including the decision about which enterprises to inspect or on which day to visit a lake to test its water quality (Shin, 2014).

For energy intensity targets, there is no purpose-built monitoring equipment in place and reported data rely on self-reported figures from enterprises. Self-reported online data get sent to the local statistical bureau, which then collates all these sheets. Only data from very large enterprises are shared directly with the provincial and national statistic bureaus. A government official explains:

Enterprises report their energy consumption through an online reporting system. Self-reporting by enterprises is problematic, because there are three “baos”. There is *luanbao*, which refers to messy data that lacks logic. Often accountants enter the data into the online sheets but they lack training on energy bookkeeping, so they often make mistakes. There is *manbao*, which refers to companies underreporting production figures because they fear that this information is shared with the local

¹⁴ Yet, even advanced GPS technologies have their limitations, as the technology cannot differentiate between first-growth and second-growth forests. To correct for this shortcoming, national forest inventories take place every five to ten years to check local field sketches of forests (INT24052012).

taxation bureau. Because they are afraid that they would have to pay more taxes, companies do not report real production numbers. Finally, there is *tuobao*, where companies simply delay reports (INT24052012).

Because the self-reported data from enterprises collected by the statistical bureau are so poor, one official admitted that he collects his own data from the town level, including data for both large and smaller enterprises. According to him, his independently collected data are more accurate, but for official purposes he still has to use the data from the statistical bureau (INT25052012).

For some environmental targets, monitoring equipment is also sometimes entirely absent. The EPB in one county in Shandong, for example, lacked monitors to keep an eye on electroplating factories that emitted high concentrations of heavy metals (e.g., Cd and Pb) (Kostka, 2014). In sum, the difficulties in measuring certain environmental policies make them easier to sidestep. In China, as in many political systems, there is a structural bias toward policy implementation of readily measurable goals. While assessment of a locality's performance in raising forest coverage rates is relatively straightforward, technological and organizational challenges make accurate measurement of energy and carbon expenditure extremely difficult.

2) *Lack of technical staff*

The environmental bureaucracy is also in chronic need of well-trained staff to strictly monitor the accuracy of reported figures and targets. Such skills are needed, for example, in deciding which method is appropriate to the estimation of energy intensity levels, defined as energy consumption per unit of GDP. Interviewees working in local EPBs frequently admitted that sector-specific technical knowledge is needed to be able to critically check enterprises' self-reported energy consumption reports. A county-level EPB head in Shanxi complained about the lack of trained staff in the local EPB:

For the past ten years, our bureau did not receive any additional staff despite rising environmental regulations and new responsibilities. We have continuously requested new staff trained as environmental specialists but the upper government did not send us any. It is frustrating because without qualified personnel we cannot do our work well (Interview, September 2011, Shanxi).

The lack of formal and informal training of EPB staff in environmental sciences is also visible among the top leaders in the EPB bureaucracy. Among all 31 provincial EPB heads as of 2010, only one director has undergone university training in environmental sciences and only 25% were promoted to their leadership position from within the EPB (Kostka, 2013).

In summary, the combination of shortages in advanced technical equipment and officials' limited technological know-how leaves ample room for business managers to play the "game about numbers" with the local environmental bureaucracy (Ran, 2013).

Financial capacity: Insufficient funding

At the national level, China has recently increased funding for environmental protection and is planning major future investments. According to the China Daily (2013a), the total government spending on environmental protection in 2011 was 419 billion RMB, or about 0.9% of GDP. Although this figure is a significant step up from previous years, it is still below the 2% to 4% of GDP that is estimated as necessary to tackling environmental damage (China Daily, 2013). Further investments are planned at the national level. For instance, the Ministry of Environmental Protection budgeted a further 200 billion RMB for cleanup projects and 350

billion RMB for more than 13,300 projects to control emissions and reduce PM2.5 between 2011 and 2020.

Despite the significant increase in funding for environmental protection from Beijing, local branches of the EPB tend to be seriously underfunded as their responsibilities and tasks have multiplied over the past decade. The financial capacity of local EPBs is further constrained by fiscal and administrative interdependence between the local EPB and other local government agencies and leaders. As the *de facto* first-in-charge, local Party secretaries and mayors have substantial influence over local EPBs through the allocation of resources. From their leadership positions, they can exercise influence over the comprehensive budget set by the local finance bureau, which includes the annual budget for local EPBs. This makes EPBs dependent on local finance bureaus for their funding needs; thus, EPB officials often worry that their budgets are dependent on the good graces of local leaders.

During fieldwork, we discovered that the allocated budget for local EPBs ranged from 0.5% to 2.5% of local GDP. Typically, more advanced localities in coastal provinces spend proportionally more on environmental protection than less advanced localities in central and western provinces. The fact that economically advanced localities have more financial resources available for environmental protection is a mismatch to environmental needs since less developed localities often face higher environmental pollution (Li and Higgins, 2013). While EPBs report having sufficient funding for smaller projects, fiscal pressures on local governments make large-scale environmental projects or restructuring programs very difficult to fund. The challenging of funding such larger projects often reinforces the need to generate revenues from local land sales. For example, Datong city in Shanxi could only pay for costly economic restructuring programs through local debt and land sales (Eaton and Kostka, 2013).

In addition, EPBs in fast-growing areas often feel overburdened. Some urban areas have experienced particularly fast economic and population growth over the past decade, but this growth was not matched by an increase in their administrative status. For instance, Kunshan City in Suzhou municipality in Jiangsu had a level of economic development in 2011 that was much higher than that of several of the poorer provinces in China, yet Kunshan administrative status remained that of a county level (Chien, 2013). This “big foot in a small shoe” (*dajiao chuan xiaoxie*) problem has sometimes adversely affected the work of the EPB. EPBs in these fast-growing urban areas complained that allocated resources and their rank did not match the higher workload.

To overcome funding shortages, local EPBs can apply for project funding and staff expansion from the municipal, provincial, and national government, but these funding applications are often lengthy and require sustained effort by the local leadership over several years (Lo and Tang, 2006; Eaton and Kostka, 2013). A county-level EPB head in Shanxi describes how funding pressures have constrained environmental protection efforts:

In 2011, we could not expand the local central heating area as planned because our municipality faced severe financial pressure this year and the limited financial resources went to other projects. We will apply for national and provincial subsidies but even if we get the money, we need to match it with municipal funding, which is difficult to get at the moment. (Interview, September 2011, Shanxi, county EPB head, quoted in Kostka (2013)).

Limited financial capacity can lead to shortages of needed inspection vehicles, up-to-date testing equipment, and skilled staff. For instance, a single city air monitoring station costs on average approximately 200,000 RMB and a city would need multiple stations for effective pollution control. Most EPB leaders interviewed admitted that they could control air and water

pollution better if they had multiple air monitoring stations and monitoring equipment. An EPB head notes:

We would like to control heavy metal pollution in waste water as we know that some companies pollute it but we simply cannot afford the monitoring equipment. We have pointed this out to the provincial leaders for many years but only got approval for it this year. (Interview, September 2011, Shanxi, municipality EPB head, quoted in Kostka (2013)).

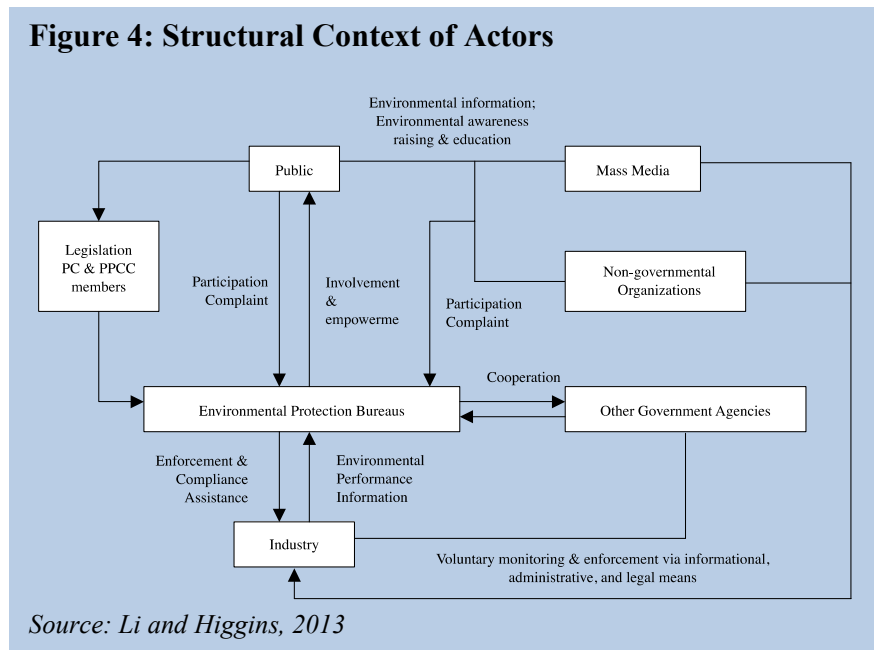
In summary, local EPB leaders receive mixed signals: they are asked to fully implement binding environmental targets but these demands by upper-level governments are not always matched with a corresponding increase in financial resources.

3.4 Limits on Public and Private Participation

Another barrier at the local level is the limited opportunities that exist for participation of local non-state actors to improve environmental management. In the following, this problem is referred to as the “participation gap” (Kostka and Mol, 2013). Although there is thin evidence that participation of non-state actors leads directly to better environmental outcomes (Bulkeley & Mol, 2003; Newig & Fritsch, 2009), there are many other benefits of participation to environmental policy (Beierle, 1999). A high degree of participation by non-state actors is seen to be important in educating the public; it incorporates both public values and preferences into decision-making; it fosters trust in institutions; it reduces conflict; and it makes decisions more cost-effective (Beierle, 1999; Kostka and Mol, 2013). Public participation in environmental policy-making and implementation can also enhance the legitimacy of these policies (Kostka and Mol, 2013).

Participation in China’s environmental policy-making has traditionally been structured and institutionalized within the state and party systems, for instance, through the China People’s Political Consultative Conference (PPCC) at various levels (Kostka and Mol, 2013). These mechanisms of participation – characterized by restricted opportunities for participation and limited access to decision makers – continue to define Chinese environmental policy-making (Kostka and Mol, 2013).

Figure 4: Structural Context of Actors



Source: Li and Higgins, 2013

Environmental guidelines and measures are initiated, driven, and executed by the government. *Figure 4* summarizes how government officials from the EPB and other government agencies interact with and respond to pressures from industry, public, non-governmental organizations, and the mass media.

Vested interests of the business sector

Despite the central government's push for tighter environmental regulations and restrictions, industry has various means of countering costly environmental measures. Many larger companies – especially oil and power companies – have continued to prioritize profit-making over fulfilling environmental standards. For instance, China's oil companies have held up an improvement in diesel fuel for years.¹⁵ As a result, the sulfur levels of diesel in China are at least 23 times that of the United States (Wong, 2013b). Power companies are also reported to violate government regulations on emissions from coal-burning plants and regularly ignore guidelines to upgrade coal-burning electricity plans (Wong, 2013b).

Vested business interests also hinder environmental efforts at local levels. Many local branches of central SOEs in central and western China violate environmental standards and local governments have few tools to compel them to comply. Moreover, in cities where only a small number of companies contribute the major share of tax revenue or employment, these few companies wield great bargaining power, making it particularly difficult for government officials to enforce unwelcome environmental regulation on them. In addition, pollution fines are still relatively low and are capped at around 100,000 RMB, failing to act as a real deterrent to polluting enterprises (Wang, 2013b).

Finally, local governments also have more authority to control (local-level) state-owned enterprises, since SOE managers are also part of the cadre evaluation system. However, enforcing compliance from private enterprises and SMEs has proven to be more difficult. For example, under the Top-1,000 Energy-Consuming Enterprises program, large energy-intensive enterprises have started to undertake substantial efficiency improvements, but the program needs to broaden its scope beyond targeting larger, predominantly state-owned, enterprises.¹⁶ For instance, China's industrial SME sector – which is largely privately owned – is one of the main energy-consuming segments of the economy (Kostka et al., 2013). According to a recent study by the IFC (2012), industrial SMEs account for 41% of the total energy consumption, followed by non-industrial enterprises (29%) and large industrial enterprises (17%) (IFC, 2012: 20). SMEs consume about 2.5 times the amount of energy in total as compared to large enterprises (IFC, 2012: 28). The SME sector is also not unimportant in terms of overall emissions and can have a particular damaging effect on health (Holloway, 2013: 7).

Limited role of the public and media

The public has numerous ways to participate in environmental governance, but the scope and effectiveness of these practices have their limits.¹⁷ By the early 1990s, China had already set up a complaints systems (the so-called letters and visits system) to assist in government accountability and in setting priorities in the field of environmental pollution mitigation. Public participation in these systems, and hence the number of visits and letters addressed to governmental authorities, has grown over the years. More recently, hotlines and digital complaint systems have further enhanced public participation in environmental enforcement of governmental agencies (Wu, 2013). Urban citizens also increasingly use social media like Weibo and online chat rooms to exchange opinions and alert fellow citizens to environmental

¹⁵ Over the past year, national oil companies (NOCs) have delayed issuing upgraded China IV diesel standards that are on par with European standards. Only in February 2013, after China reached hazardous levels of air pollution, did the State Council issue new guidelines that called for a nationwide adoption of the new China IV diesel standards by the end of 2014 (Wong, 2013b). It is yet to be seen whether NOCs will comply with these standards.

¹⁶ The scope of this program was recently expanded to a Top-10,000 program.

¹⁷ This section draws from Kostka and Mol (2013).

problems. Although there are clear indications that these complaint systems do have an impact on priority setting and control and enforcement activities of local environmental officials (Kostka and Mol, 2013), such bottom up pressure still plays only a very minimal role.

Public hearings form a more institutionalized arrangement for participation in China's environmental policy-making. The best-known example concerns public hearings in the Environmental Impact Assessment (EIA) procedure, as formalized in the 2002 EIA law and its implementation measures. Zhao's (2010) study of a public hearing concerning renovations to the Imperial Summer Palace (Yuan Ming Yuan Park) and Johnson's (2013) study on the siting of waste incinerators illustrate that such a legal obligation to organize consultation with citizens does not mean that it always takes place in a meaningful way. Another example of participation through public hearings takes place in the field of setting tariffs for drinking water and wastewater (Zhong and Mol, 2008). Here, various interest groups as well as citizens participate in a public hearing on plans to increase drinking water tariffs and wastewater fees. Any government proposal needs to have at least two-third majority of the votes in the public hearings in order to be able to be implemented.

Citizens also put pressure on local governments to enforce pollution standards by exposing local polluters through the media. The media is influential in shaping both public and government officials' perceptions of environmental issues, but particular attention is placed on issues that have immediate implications for citizens' lives. For instance, the media heavily covers PM 2.5 pollution issues but pays much less attention to less visible pollution issues such as heavy metal pollution. Media reports also tend to focus more on specific events (e.g., a new polluting enterprise moving to a particular regions) than they do on pollution problems that develop gradually. As a result, local government agencies increasingly feel pressure to immediately respond to media reports and might sideline other equally pressing but less publically reported environmental problems (see Lora-Wainright, 2013).

Organized protests in cities have also recently helped to oust polluting factories and, in some cases, have succeeded in putting a stop to polluting projects and closing down polluting enterprises. However, the NIMBYist nature of many of these protests leaves the door open for offending enterprises to simply relocate to another locality. Recent research also suggests that most urban protests are oriented toward enterprises which come from other regions or other countries, while less attention is paid to polluting enterprises run by locals (Deng and Yang, 2013). One possible explanation is that urban citizens are not opposing pollution as such but only pollution from which they do not receive any benefits (Lora-Wainright, 2013; Deng and Yang, 2013). In summary, there is no linear relationship between the intensity of pollution and protest, whether citizens organize collectively depends on received benefits for locals, measurability, visibility, and many other circumstances.

Limited role of local NGOs

Over the last few years, non-governmental organizations working on environmental issues have considerably increased in number but their influence is limited as they are not integrated in policy formulation processes and play a "supplementary role" at best. The number of environmental non-governmental organizations (ENGOS) has been rapidly increasing in China, including both officially registered and unregistered groups.¹⁸ While reliable official numbers do not exist, estimates suggest that there are currently approximately 1,000 registered ENGOS,

¹⁸ This section draws from Kostka and Mol (2013).

as well as a similar number of unregistered NGOs.¹⁹ The majority of these NGOs are quite small and are not directly engaged in environmental policy-making and implementation, but instead focus on awareness-raising, education, study, and research. A number of those NGOs engaged in policy advocacy have close links to governmental organizations and institutes and are often referred to as government organized NGOs (GONGOs). Through closed networks with policy makers and their expert knowledge, these GONGOs articulate environmental interests and bring them into state institutions and decision-making processes. In doing so, GONGOs play a role in bridging the gap between NGOs and civil society on the one hand, and the state on the other but they are sometimes criticized for having achieved a place at the table at the expense of taking a softer stand on environmental issues than independent NGOs. Increasingly, we see also independent NGOs being incorporated into environmental policy-making and implementation processes, by sharing their knowledge with government agencies, writing petitions, using media outlets, discussing policy alternatives with officials and providing legal assistance to pollution victims. Several studies have detailed how such NGOs explore the boundaries of what is allowed in contemporary China in terms of NGO engagement, policy involvement and protest (Hildebrandt, 2011; Wu, 2013). Often local governments are not very enthusiastic about NGOs playing these watchdog roles.

In summary, the main barriers to meaningful participation of non-state actors can be summarized as follows:

- Most of the participatory practices relate to *implementation* practices and are helpful in strengthening the implementation, control and enforcement of existing regulations, plans, policies, and projects. New forms of environmental participation at the level of *designing* and *formulating* policies and practices are much rarer.
- Most of the current participation of non-state actors relate to policies of the Ministry of Environmental Protection or its subsidiaries at lower levels. New participatory arrangements hardly touch upon policies and projects of the more influential ministries, such as those of National Development and Reform Commission (NDRC) or of the industrial ministries.
- Participation of non-state actors is also much lower outside of China's largest and internationally connected cities such as Beijing, Shanghai, and Guangdong. In "peripheral" localities, local government and business leaders continue to make decisions behind closed doors and strongly suppress attempts to participate in environmental decision-making and implementation, either by concerned citizens, NGOs or the local media. Here, we still see many of the conventional Chinese reflexes towards democratic and participatory sprouts of environmental governance (Kostka and Mol, 2013).

The above analysis has shown that a wide range of institutional factors can influence environmental policy implementation at the local level in China. At the most basic level, environmental policy implementation is influenced by the planning system. Here, it is evident that the current planning system combined with the cadre management system has generated a number of unintended negative consequences. Economic and political incentives presented to local leaders constitute major disincentives in terms of encouraging them to implement environmental policies. Cadre behavior is driven by the need to increase local revenues through

¹⁹ According to existing laws, an organization needs to find an official government body (*danwei*) to supervise its affairs before it can register as an NGO with the civil affairs office. Many local government bureaus are, however, reluctant to play this role because in case of a misconduct of NGOs, they will be held responsible. Recently there are some efforts to simplify registration processes and four categories of NGO - industrial associations, charities, community services and organizations dedicated to the promotion of technology- are expected to be given the green light for direct registration without the need to find a government backer (China Daily, 2013b).

land sales as well as large, profitable projects to drive GDP growth in order to further political careers. Finally, the failure to implement environmental policy is also driven by public and private interests. Large local businesses typically put the bottom line above the public interest and can use their considerable leverage vis-à-vis local governments to shirk on costly regulations. Finally, the participation of NGOs and the public often remains ad hoc and limited in scope, especially in non-coastal, low profile cities.

4. Behavioral and Sociocultural Barriers

While the incentives of key players and implementation capacity of relevant institutions as well as civic participation are key barriers for environmental policy implementation, the available literature also suggests that sociocultural and behavioral factors may also stand in the way of positive change.²⁰ This section therefore follows a more bottom-up perspective at the level of the individual, evaluating how personal preferences, values, norms and social pressures drive individuals' behavior and thereby influence local environmental policy implementation at the local level.

A focus on behavioral and sociocultural factors helps us to understand how individuals' actions can be influenced by aspects of the environment in which they find themselves. Apart from a person's basic ability to perform a certain action – determined by the availability of resources, the cooperation of others etc. – behavior is influenced primarily by one's intentions. Intentions are in turn mediated by three factors: a) the person's attitude towards the behavior (i.e., if she or he wants to perform an action), b) an individual's subjective normative orientation, referring to the question of how much social pressure she or he feels to either perform an action or

Box 9: Sustainable urban planning – sociocultural and behavioral constraints

While people's attitudes may in practice vary, Kaufman (2012) identifies three patterns in terms of individuals' perceptions of a good city and the values and norms that shape these perceptions.

- (1) *The modern city utopia*: Although people are aware of what constitutes a sustainable city, they often prefer to live in a modern Chinese city that is characterized by open-spaces, wide roads, grand squares, superblocks, and a car-oriented infrastructure. In other words, the dominant Chinese vision of urban modernity is in fact quite contradictory to the small-scale, mixed-use, pedestrian-friendly image of a sustainable urban city.
- (2) *The Chinese consumer culture*: In many Chinese cities, the striving of individuals to lead a modern, comfortable life has led to a strong focus on consumption. This behavior is strongly shaped by sociocultural factors and the wish to signal a person's value, social status, and also individuality. The strong normative expectations of owning a car and living in an attractive, spacious apartment has driven the expansion and suburbanization of cities, the emergence of low-density apartment and villa communities, suburban shopping centers as well as the construction of large-scale car-oriented urban areas. The wish to demonstrate social status within a closed environment of like-minded neighbors has also intensified the focus on gated communities and thereby the fragmentation of the city landscape.
- (3) *Cosmopolitan city utopia*: Contemporary Chinese urban utopia is not only that of a modern city but also of an international city. Cities of various sizes are striving to upgrade their status by renewing core areas with modern, mono-functional business districts.

In sum, these beliefs and norms can lead local cadres and urban planners to promote an urban landscape which is not compatible with long-term sustainable urban planning.

Source: Kaufman (2012)

²⁰ This section draws from Kaufman (2012).

instead refrain from it, and c) the person's *perceived* behavioral control, meaning how easy or difficult she or he would find it to perform the behavior (Ajzen, 1991). Of course all individuals are different and the features of their viewpoints and attitudes cannot be easily generalized. Using the example of sustainable urban planning, previous research shows that personal preferences, norms, and values individuals perceive shape their behavior and the kind of environment they want to live in. While local leaders and urban planners might not personally hold the same preferences and beliefs, they face pressure to develop urban plans that fit with the dominant vision of a “desirable, modern city” (see *Box 9*).

5. Strategies to Overcome Barriers

This section reviews recent innovations and experiments that can provide a better understanding of how to address existing institutional and socio-cultural and behavioral barriers in China. First, past and ongoing experiments in China are reviewed followed by a brief introduction to some best-practice international examples. Finally, a number of policy options are summarized for general discussion.

5.1 Local innovations and experiments in China

(a) Experiments to improve China's green planning system and policy instruments

Chinese planners and local governments have recently begun to address some of the unanticipated and undesirable consequences of China's target-based green planning system. With the aim of selecting more appropriate planning targets, the Ministry of Environment ordered 74 cities to apply PM2.5 standard and publish daily records on PM2.5 by year-end 2012. Moreover, there are also increasing efforts to improve environmental governance across provincial borders to ensure complete ecosystems are protected. For example, in 2013 the EPBs in Shanghai, Zhejiang, Anhui and Jiangsu Provinces initiated the “Yangtze River Delta trans-boundary environmental pollution emergency response plan”. Under this new cross-border cooperation, provincial governments committed themselves to share environmental protection resources and jointly investigate and address cross-border pollution incidents (China Environment Org, 2013). While it is too early to tell whether signing such an agreement will actually result in measurable improvements, the new response plan signals the awareness among local leaders of the need to improve cooperation across cross-provincial borders.

There are also efforts underway to improve target allocation, implementation, and verification processes. For instance, in Jiangsu, negotiations between municipal governments and provincial authorities were initiated in order to change the existing “one size fits all” allocation method for forest coverage targets to a more differentiated target allocation approach. Some localities have also begun to incorporate feedback mechanisms in order to allocate targets more fairly by, for instance, posting preliminary targets on their website and inviting responses from subordinate cadres as well as the public. In order to avoid cyclical implementation behavior among cadres observed at the end of the 11th FYP period, in the 12th FYP more emphasis has been placed on achievement of annual targets instead of accumulated five-year targets. Finally, some progress is being made in improving target verification. For instance, in order to avoid local governments reporting energy savings from companies that have gone bankrupt, upper-level governments are required to present active business licenses for companies with reported energy savings.

In addition to addressing the shortcomings of the target-based implementation system, China has also experimented with small-scale market-based pilot projects to supplement existing command and control tools. Recent experiments with market-based instruments include rolling out a three-tiered electricity pricing system, promoting energy service companies (ESCO) (see *Box 10*) and introducing numerous payment for eco-system services to improve water, air, forest, and soil management (Kostka and Shin, 2013; Liang and Mol, 2013; Shin, 2013). In addition, numerous pilot projects at subnational levels aim to achieve lower carbon emissions:

- *13 low-carbon pilot projects* - In 2010, five provinces and eight cities were selected to develop low-carbon development plans and accelerate the establishment of low-carbon industrial, construction and transportation systems (Kostka and Mol, 2013). In 2012, another 29 cities were chosen to join the low-carbon pilot projects (Xie, 2013).
- *7 pilot emissions trading schemes* - New carbon emissions trial trading schemes are currently being set up in seven major cities and provinces. These include the cities of Beijing, Shanghai, Tianjin, and Chongqing, the provinces of Guangdong and Hubei and the Shenzhen Special Administrative Region. Shanghai and Shenzhen plan to start local trading schemes by mid 2013. Shanghai's trading scheme will start with 200 local companies (Shanghai Daily, 2013). In Shenzhen, the scheme will start with 635 companies, which together accounted for 38% of Shenzhen's total greenhouse gas emissions in 2010 (Greenbiz, 2013). The other five cities and provinces have announced that they will initiate their trial trading programs in fall 2013. It is expected that these pilots will pave the way for a national carbon-trading scheme to be introduced by 2015.

Yet, these efforts and pilot programs need to be interpreted with a cautious optimism. In years past, the majority of market-based pilot projects have not scaled up from regional to nation-wide programs due to the lack of market preconditions and excessive state intervention in emission trading formats, allocation methods, and pricing approaches (Lo, 2013; Shin, 2013). For example, previous pilots to establish local SO₂ permit trading schemes did not scale up. SO₂ emission trading schemes failed mainly because of the dominant role played by local governments that led to unfair allocation of permits and interference in the monitoring of emissions (World Bank China 2030). Without a unified supervision system overseen by an independent regulatory body, local governments can decide unilaterally on emissions quotas for companies in their jurisdiction. Excessive intervention by local governments may also feed rent-seeking such that local companies offer payments to bureaucrats for an increase in their allowable emission levels. In addition, local governments are not incentivized to set high quotas in order to protect local economic growth (Global Times, 2013).

Box 10: Policies to support the ESCO industry

Over the last few years, the NDRC and the Ministry of Finance (MoF) as well as local governments introduced financial and tax incentives to support the ESCO industry. For example, in 2008, Shanghai set up a special fund to promote ESCO projects. The NDRC and MoF offered 240 RMB for 1 tonne of standard coal equivalent as a financial incentive for using ESCOs services and exempted ESCOs from business tax for revenue generated from Energy Performance Contracting (EPC) projects. The NDRC and MoF also issued a list of 984 officially approved ESCOs.

Despite these numerous initiatives, ESCOs remain marginal players in delivering energy efficiency goals in China. The current list of 984 approved ESCOs lacks transparent and stringent selection criteria and provides neither information about ESCOs technical and financial capabilities nor data on the companies' previous success in implementing energy efficiency projects. A sophisticated accreditation system would be beneficial to ensure confidence in the published list of approved ESCOs. Such ESCO accreditation system has been successfully adopted in India and has helped to build trust and confidence in India's emerging ESCO industry. Moreover, China's commercial banks need to train their loan officers in developing and using internal energy efficiency saving measures and standards. An introduction of standardized measurements and verification protocols to verify energy savings at the national level would also be helpful.

Source: Kostka and Shin (2013)

(b) Experiments to increase incentives for local policy implementers

Some sub-national governments devised *additional incentives* to motivate local policy makers and enterprises to pursue green goals. *Box 11* summarizes the forward-looking efforts of the Shanxi provincial government in creating new financial incentives and punishments for local governments and enterprises. For example, Shanxi introduced a tax on provincial coal exports and used part of this money to fund economic restructuring and energy efficiency programs. The province also started a competition among the most polluted municipalities and offered price rewards to those localities that first got themselves off the national list of “most polluted cities.”

Box 11: Strengthening of Incentives in Shanxi

Shanxi province mounted a vigorous response to central energy efficiency policy during the 11th FYP. A rich array of implementation incentives were employed, including:

1. Allocation of voluntary targets and signing agreements with the largest industrial enterprises

→ Shanxi introduced a provincial Top-200 Enterprise Program modeled after the national Top-1000 Enterprise Program, which in 2009 was extended to include a provincial Top-1000 Enterprise Program. As at the national level, these enterprise programs are voluntary agreements between the largest industrial enterprises and government that commit firms to achieving a prescribed amount of energy savings.

2. Strengthening of financial incentives

→ Shanxi leaders created a **Coal Sustainable Development Fund** through taxation of all provincial coal exports and have used part of this money to fund energy-saving initiatives:

- Between 2007 and 2009, the fund reportedly collected over 43 billion RMB (China Financial Report 2010). By 2010, the fund had allocated 1.3 billion RMB to phasing out inefficient production facilities.
- The sizeable Coal Sustainable Development Fund has greatly enhanced Shanxi's provincial policy implementation capacity. The taxation of coal export helps Shanxi to soften the social and economic consequences of plant closure and eliminating outdated production facilities by providing a pool of funds for city greening initiatives and energy saving policy implementation.

→ In 2008, the Shanxi government began to devise a number of financial rewards for municipal governments and larger enterprises with the best record of energy conservation:

- *Enterprise reward*: A financial reward of 500,000 RMB was granted if enterprises scored 95 points or above and 200,000 RMB was given if enterprises scored between 80 and 95 points during an annual evaluation.
- *Government reward*: Municipal governments scoring 95 points or above were rewarded with 300,000 RMB and those attaining between 80 to 95 points received 200,000 RMB. A proportion of these rewards can be used to provide personal prizes for leaders.

3. Introduction of fines and penalties

→ Sanctions for non-responsive municipal and county governments/government officials:

- Localities that repeatedly fell short of energy intensity targets did not receive new land allocations for industrial purposes.
- In 2006, the Shanxi Environmental Protection Bureau revoked the right of disobedient localities to conduct environmental evaluations (*qiyu xianpi*). The suspension of this right effectively blocks a city's ability to approve industrial projects as all new projects are required to undergo an environmental evaluation.
- Government officials and enterprise leaders that did not fulfill energy intensity targets could be fined, excluded from annual provincial personal rewards programs, denied honorary titles, or even demoted or relocated to a remote area.

→ Provincial leaders have also used price controls and shut off access to utilities to discipline non-compliant enterprises.

- Shanxi implemented a differentiated electricity pricing policy by charging higher prices to non-compliant enterprises sorted into two categories:
 - 'Restricted' enterprises on the government's watch list saw their electricity prices rise to between 0.05 and 0.1 RMB/kWh.
 - Flagrant violators in the 'to-be-eliminated' category were charged between 0.2 and 0.3 RMB/kWh (Zhang et al. 2011: 4121).
- For severe cases, a policy called 'cut electricity, cut water' (*duandian duanshui*) has been used, whereby the Environmental Protection Bureau coordinates with state-owned electricity and water companies to cut off a company's access to utilities.

Source: Harrison and Kostka, 2012

(c) Experiments to overcome capacity constraints

As discussed previously in Section 3, local governments work under certain political, technical, and financial capacity constraints that influence environmental policy outcomes. One of the political constraints covered in the discussion is the “central SOE problem”, which refers to the fact that local governments can do very little to prevent central SOEs (*yangqi*) from polluting their localities. Recently, the local EPB in Anqing municipality in Anhui charged the central state-owned enterprise Sinopec with a 90,000 RMB fine for a local pollution accident. This was one of the first instances in China and could set a precedent for other local EPBs looking to exert stronger supervision of central SOEs (CNR Financial Review, 2013; *Box 12*).

Box 12: Addressing the “Central SOE problem”

In June 2013, the local EPB of Anqing Municipality in Anhui charged the central SOE Sinopec Anqing with a 90,000 RMB fine for polluting the local air. This was triggered by a production accident that occurred in May 2013, whereby black smoke was leaked from Sinopec’s production facilities, polluting the local air. This event was one of the first of its kind, as usually local EPBs have no authority to charge pollution fees to central SOEs. Often managers of local branches of central SOEs also hold concurrent posts within the locality; the general manager of Sinopec Anqing, for instance, is concurrently also a member of the Anqing Municipal Standing Committee, a powerful position in the locality. The Anqing case is the first precedent of this kind and could be a signal to other local EPBs to be more bold in addressing the “*yangqi* problem”. However, the fine of 90,000 RMB is relatively low for a central SOE and does not fully reflect the considerable local ecological and health damage resulting from Sinopec’s pollution.

Two factors help to explain why the municipal EPB in Anqing dared to fine the central SOE in their locality:

- a) *Public monitoring* was certainly an important stimulus: following the accident in May 2013, a lot of citizens in Anqing complained about the pollution and posted pictures to the Internet.
- b) *Strong EPB leadership*: In early 2013, Anqing Municipality assigned a high-ranked local leader – a former vice mayor – to be the leader of the municipal EPB. The newly appointed leader frequently visited the provincial EPB bureau and the national Ministry of Environmental Protection to gain upper level government support. A highly-ranked local leader as an EPB head together with the support from national level made charging the new fee possible.

Source: CNR Financial Review (央广财经评论), 2013; Banyuetan Network, 2013

(d) Experiments to increase public and private participation

Over the last decade, we have witnessed the flourishing of a variety of participatory experiments in the field of local environmental politics. The newly emerging institutional arrangements that allow for further participation in China’s environmental policy-making, such as increased environmental NGO activism, public hearings, and improved information disclosure, also contribute to enhance local environmental policy implementation, and sometimes even policy-making (Kostka and Mol, 2013).

Local governments have experimented with new methods to reach out to the public. For example, in 2013, the Chengdu EPB appointed six full-time staff to set up a microblog for citizen outreach. The microblog aims to act as a platform for citizens to interact with the local government in which they can hold discussions as well as distribute information to the public about environmental problems. Furthermore, the blog also offers functions to undertake surveys and register citizen complaints (China Daily, 2013e).

In addition, in Section 3 it was noted that vested local business or political interests can hinder the implementation of environmental initiatives at the local level. Recent research shows how local leaders in some localities have used various creative strategies to make the implementation of environmental policies more attractive, or less unattractive, in order to bring different local interest groups on board. In other words, officials “bundled” costly environmental policies with other equally pressing policy priorities (Kostka and Hobbs, 2012). As a result, less popular environmental policy initiatives benefited from their association with policies that carried wider political support. For example, in China’s 11th FYP period, local authorities in Shanxi shut down scores of small mining operations in the name of promoting worker safety; in doing so, they achieved energy savings that were often an unstated objective.

Local leaders also practiced “*interest-bundling*” which refers to deliberate efforts to bring together parties with distinct interests around a particular policy (Kostka and Hobbs, 2012). Examples include linking the implementation of a policy to specific economic or other benefits – such as preferential access to government resources, expedited project approvals or negotiated agreements of mutual support – in exchange for the implementation of one or more policies. For instance, an enterprise may agree to comply with tough energy efficiency standards in exchange for strict enforcement by government that company leaders expect will push competing enterprises out of business (Kostka and Hobbs, 2012).²¹ *Box 13* illustrates how Xiaoyi County in Northern Shanxi skillfully persuaded private coal enterprises to share the burdens of environmental policy implementation. The case of Xiaoyi also shows that in places with better environmental living conditions, capable government officials are more likely to stay permanently, enlarging the pool of capable local leaders and ensuring continuity in leadership.

Box 13: Persuading local businesses to aid greening growth in Xiaoyi

Xiaoyi County in Northern Shanxi effectively managed to persuade local businesses into sharing the burdens of green growth and economic restructuring. Xiaoyi is a resource-based economy with an undiversified, coal-dependent industrial structure in the midst of transformation. Leaders in Xiaoyi’s leadership group have effectively used their *guanxi* ties to induce local businesses to share the burden of reducing Xiaoyi’s coal dependence. Strikingly, local coal enterprises, many of which are privately-owned, have actually been given **soft targets in local plans for investment in economic transformation projects**: “Coal production enterprises should each launch non-coal projects of between one and two billion RMB; each coking enterprise should launch projects of one billion RMB or more in non-coal or downstream processing projects.” (Xiaoyi Government Work Report 2011: 20). In addition, Xiaoyi leaders have effectively bundled coal restructuring with the goal of developing non-coal industries by providing **incentives for former coal bosses** whose enterprises were eliminated as part of a 2006 industry clean-up to start greener businesses. For instance, with government backing, a former mine owner whose enterprise was shuttered brought a Walmart outlet to Xiaoyi and also has a new business marketing agricultural products.

Xiaoyi’s greening growth strategy has built up gradually with guidance from a **strong and locally-rooted leadership group**. Recent Party secretaries in Xiaoyi have served for an average of 8.3 years and mayors an average 6.2 years, much longer than the average tenure of local leaders of three to four years. A unique characteristic of Xiaoyi is that leaders from elsewhere put down roots in Xiaoyi: “Most of the Party secretaries, mayors and CCP Organization Department heads are from outside. But they all settle down here” (INT_20111121). The **attractiveness of Xiaoyi as a place to live** (e.g., good primary and secondary schools, high environmental quality, and developed entertainment industry) does seem to have contributed to its success. Living environment is often cited as an important factor in luring investors, but the example of Xiaoyi shows that **it may also be important in attracting and retaining able government leaders**.

This continuity helped Xiaoyi’s leadership group make very effective use of the relationships it has built over time with local industry. Leadership continuity likely contributed to the leaders’ success in securing investment because investors can be confident that plans will not shift radically with personnel changes in the leadership group.

Source: Eaton and Kostka (2013: 2014)

²¹ On *interest-bundling* and *policy-bundling*, see Kostka and Hobbs (2012) and Harrison and Kostka (2014).

Finally, Xiaoyi County also illustrates the importance of providing local EPBs with sufficient administrative rank. Xiaoyi city had grown so fast in the last decade that its local GDP is on par with other municipalities in Shanxi, but its administrative status has remained that of a county-level city. In the wake of worsening local pollution and a “yellow card” from the provincial EPB, local leaders worked to strengthen local environmental agencies. Most importantly, the administrative rank of EPB’s Environment Monitoring Team was upgraded to division (*ke*) level to increase their power vis-à-vis industry and thereby ease rule enforcement. Xiaoyi’s Monitoring Team is the only one to have such a high rank in Shanxi province and during interviews the importance of this was repeatedly stressed.

5.2 International Best-Practice Examples

In the search to overcome institutional barriers, China can also look to other countries for inspiration. In the following, transboundary inter-state agencies and horizontal fair exchange mechanisms are discussed to show how regional and administrative differences in local environmental and economic priorities can be overcome in China.

Transboundary environmental organizations

The example of cross-provincial PM 2.5 pollution in the Beijing area (see *Box 1*) illustrated how air pollution cannot be solved by one administrative unit alone but instead requires the cooperation of multiple units (e.g., provinces, municipalities, or counties). In fact, most ecosystems span multiple administrative units and often Transboundary Management Organizations (TMOs) are used to govern such Transboundary Protected Areas (TBPA). International well-known TMOs across sub-national entities or countries include the Great Lakes Commission (see *Box 14*), the International Commission for the Protection of Lake Geneva (France, Switzerland), the Mekong River Commission (Cambodia, Laos, Thailand, Vietnam), Zambezi River Authority (Zambia, Zimbabwe), and the Autonomous Bi-national

Box 14: The Great Lakes Commission – An example of an inter-state agency

Founding history: The Great Lake Commissions (GLC) was established as an inter-state public agency by the Great Lakes Basin Compact in 1955. At the time of its formation in the mid 1950s, there was a perceived need to address the serious threats to the Great Lakes ecosystem and for leadership regarding opportunities to expand the local economies through tourism and Great Lakes shipping (Crane in Grover and Krantzberg, 2012: 17).

Members: Members include eight US states (Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania and Wisconsin). Although the GLC is legally a U.S. institution, since 1999 the two Canadian provinces Ontario and Québec hold associate member status. Each jurisdiction appoints a delegation of three to five members comprised of senior state agency officials, legislators and governor’s appointees.

Legal status and work focus: the GLC holds the legal status of a compact, where states have quasi-sovereign status (Crane in Grover and Krantzberg, 2012: 22). The commission’s main goal is to help member states to protect “the orderly, integrated, and comprehensive development, use, and conservation of the water resources of the Great Lakes Basin” (Great Lake Commission, 2013). GLC’s work includes policy development, coordination of state and provincial positions on regional issues, advocacy, as well as communication and research services. In 1994, for instance, the GLC coordinated the signing of an agreement called the “Ecosystem Charter for the Great Lakes” that brought together important stakeholders from both the U.S. and Canada to develop a sustainability agenda for the region. The GLC illustrates how inter-state commissions can protect an ecosystem and shift attention from political boundaries to natural resource boundaries. However, despite its successes, the GLC continues to be dependent on the political will of the jurisdictions of its members (i.e., states and provinces).

Source: Great Lake Commission 2013 (<http://www.glc.org>); Grover and Krantzberg (2012)

Authority of the Basin of Lake Titicaca (Bolivia, Peru). Asian countries have also worked closely together to develop a regional approach to improve urban air quality (Schwela, 2006). Programs in Asia include, for instance, the Acid Deposition Monitoring Network in East Asia (EANET, 1999) and the ASEAN Agreement on Transboundary Haze (ASEAN, 2002). More detailed research on best governance structures of these organizations would be useful and could guide the establishment of similar organizations within China to better manage natural resources across administrative units.

Financing tool - Horizontal fair exchange mechanisms

Horizontal fair exchange mechanisms are another method to address different environmental priorities and interests of neighboring administrative units. To address transboundary pollution, localities could raise finances for transfer payments that can be allocated to those localities where higher environmental standards occur additional costs. Under such horizontal exchange mechanism, cities that benefit from cleaner air or other “ecological products” generated in neighboring localities make direct compensation payments to the people living and working in neighboring localities (Shue, 2012).

The example of the Dongjiang Lake in Chenzhou discussed previously (*Box 1*) showed that environmental protection priorities among counties can differ substantially. One county is poor and cannot afford to close mining enterprises at the Dongjiang Lake, while the remaining three counties have committed to limiting pollution since they perceive the lake as an asset for tourist promotion. One possible solution to incentivize the fourth county to cooperate would be to introduce a horizontal fair exchange mechanism. Under such a scheme, the three counties that benefit from the cleaner lake and the closing of mining enterprises would make direct compensation payments to the neighboring county, according to the principle of “the beneficiary pays”.

5.3 Policy Options

Table 3 summarizes a number of policy options to address existing institutional and socio-economic and behavioral barriers.

Table 3: Policy options to overcome obstacles

Barriers	Policy Options
Environmental planning system	<ul style="list-style-type: none"> • Address shortcomings of target-based implementation approach: <ul style="list-style-type: none"> - <i>Selection of targets</i>: give more flexibility to cities to pick own targets (type and level) to avoid rigid or inappropriate targets - <i>Allocation of targets</i>: formalize bargaining process and be more transparent in terms of how targets are allocated; discourage inflation of targets as they get passed down the administrative hierarchy - <i>Implementation of targets</i>: focus on annual targets rather five-year targets to minimize cyclical cadre behavior; address conflicts between contradictory targets and between environmental and non-environmental responsibilities of implementing agencies - <i>Verification of targets</i>: move away from self-reporting practice for difficult measureable environmental indicators such as energy efficiency - instead create triangulation of checks and balances, e.g., a mix of investigation teams;

	<p>advanced monitoring techniques and citizen surveys; expand scope of monitoring also to private enterprises and SMEs</p> <ul style="list-style-type: none"> • Tackle trans-jurisdictional environmental problems: <ul style="list-style-type: none"> - Promote cross-regional governance bodies and environmental commissions to solve cross-border environmental problems (e.g., cross-regional air commission, lake commission) - Encourage the set up of horizontal fair exchange mechanisms to finance environmental protection in particularly underdeveloped regions • Increase use of market-based instruments to reduce overreliance on administrative measures: <ul style="list-style-type: none"> - Enhance technical and financial abilities of ESCOs and help to stimulate additional market demand - Improve regulatory environment for local cap-and trade emission markets and ensure scaling up of local pilots: develop unified supervision and management standards by an independent regulatory body.
<p>Political and economic incentives</p>	<ul style="list-style-type: none"> • Inclusion of qualitative measures and comprehensive criteria in cadre evaluations: <ul style="list-style-type: none"> - Incorporate more comprehensive environmental criteria into evaluation system, such as measurements on the depletion of resources (e.g., depletion of energy, minerals, soil nutrition) and environmental degradation (e.g., PM10 health damage) - Enforce stricter punishments for local non-compliance: increase pollution fines for local governments and enterprises as current fines are not much of a deterrent; use stricter punishments, such as ban on new investment projects and temporarily production stops - Conduct surveys on local citizens' environmental satisfaction by independent, certified auditing companies and link results with annual cadre evaluation (i.e., introduce new binding target requiring a minimum citizen satisfaction rate of x%) • Adjust local cadres' time horizon and evaluation period: <ul style="list-style-type: none"> - Extend current average promotion cycles of 3-4 years to the recommended 5-year term for civil servants and Party cadres in leadership positions - Hold local cadres accountable even after they leave a locality (e.g., collect feedback from previous three posts when discussion a cadre's next promotion). • Ensure that environmental protection performance increase in weight when discussing cadre promotions • Economic incentives for urban sprawl: further tightening enforcement of existing guidelines and controls on land use
<p>Public and private participation</p>	<ul style="list-style-type: none"> • Increase feedback mechanisms and participatory elements: <ul style="list-style-type: none"> - Publish targets and actual achievements online for public comments - Advance feedback mechanisms for local citizens to report environmental non-compliance (e.g., blogs, surveys, online reporting system) - Promote local environmental litigation and courts • Increase participation and address opposition from the private and state-owned sector: <ul style="list-style-type: none"> - Devise incentives for private sector to share implementation burden (e.g., through creating win-win scenarios through bundling of policies and interests) - Work also with the SME sector since this sector is not unimportant in terms of overall emissions.
<p>Political, technical, and financial capacities</p>	<ul style="list-style-type: none"> • Increase capacities of implementation agencies: <ul style="list-style-type: none"> - <i>Political</i>: allow local EPBs to fine central SOEs in their jurisdiction; increase administrative rank of EPB's monitoring teams; more frequent use of inter-departmental ad-hoc working groups, e.g. for sustainable city planning - <i>Technical</i>: increase technical and sector-specific know-how of local EPB staff to spot non-compliance; invest in advanced monitoring technologies such as GPS, remote sensing monitoring equipment, e-laser technology, (e.g., to verify

	land use and forestation targets) - <i>Financial</i> : “find the money” at all levels of government to “purchase” compliance by local officials and businesses – e.g., increase vertical payments from higher level to lower level of government; introduce horizontal fair exchange schemes; provide funds for large-scale projects and long-term investments; need a mix of subsidies and transfers, preferential investments and tax breaks, compensatory payments and rewards, and other managed schemes.
Behavioral and socio-cultural barriers	<ul style="list-style-type: none"> • Increase public awareness for sustainable lifestyles and create “mental shift” (e.g., information and advocacy of sustainable forms of living) • Develop sustainable low-carbon cities to show local government officials and urban planners that sustainable forms of living are feasible in China.

Source: Author

6. Conclusion

The paper identified barriers to a more comprehensive implementation of environmental policies at the local level in urban cities in China and suggests ways to reduce or remove them. Key institutional barriers at the local level include shortcomings in the current environmental planning system, insufficient political and economic incentives provided to local implementers, limits to public and private participation, as well as financial, technical, and political capacity constraints of local implementing agencies.

In particular, the analysis showed that reliance on a target-based implementation system as the main environmental management instrument has yielded mixed results. Although environmental issues have moved quickly onto the policy agenda of local governments over the past decade, the target system itself produces multiple unanticipated and undesirable results. As binding environmental targets cascade downward through the administrative hierarchy, targets can become inappropriate, rigid, and are routinely inflated. Binding environmental targets also aggravate cyclical behaviors among cadres and pressures for target fulfillment can result in eleventh-hour, short-sighted actions. In addition, because targets differ widely in terms of their ease of measurability, verifiability, and the extent to which they are linked with economic and social issues, the effectiveness and efficiency of binding targets can vary among environmental issues.

Weak political and economic incentives for local policy makers further help to explain why there is often insufficient motivation for effective environmental governance at the local level in China. Environmental targets, while substantially more important now than previously, compete for space on the crowded agenda of local officials. In these circumstances, many local officials have adopted the attitude of doing the very minimum required to implement green targets while most attention continues to be placed on maximizing GDP growth rate and fiscal income. Among local leaders, the attitude prevails that “no leader will be promoted because of their better achievements in environmental protection and energy savings”.

In addition, the failure to implement environmental policy at the local level is also shaped by the preferences of powerful public and private interests. Large local businesses typically put the bottom line above the public interest and can use their considerable leverage vis-à-vis local governments to shirk on costly regulations. Moreover, the participation of NGOs and the public often remains ad hoc and limited in scope, especially in non-coastal, low profile cities. Current participation of non-state actors at the level of *designing* and *formulating* policies and practices are particularly rare.

At the most basic level, environmental policy implementation at the local level is also constrained by the political, technical, and financial capacities of implementing agencies. Political capacity constraints can result from coordination difficulties due to a fragmented environmental bureaucracy, conflicting priorities *within* implementing agencies, and low bureaucratic status and authority granted to environmental bureaucracies. The main pertinent technical constraints include the lack of advanced technical equipment and insufficiently trained local staff. Finally, greening growth demands by upper-level governments are also not always matched with a corresponding increase in financial resources, providing mixed signals to local leaders.

For each of these barriers, the paper outlined a number of policy options. These findings contribute to the ongoing debate regarding how China can switch to a greener urban growth path and particular emphasis is needed in the coming years to create additional incentives and increase local implementation capacities.

7. Appendix

Table A1: Major environmental targets in the 11th FYP and 12th FYP

Environmental Targets	Sub-national Implementing Agency	11 th FYP Target		11 th FYP Actual		12 th FYP Target	
Reduction in energy intensity per unit of GDP	DRC, Economic Commission, Construction Bureau, Transport Bureau	-20%	R	-19.1% (<i>not met</i>)	(<i>not</i>)	-16%	R
Reduction in carbon intensity per unit of GDP	TBD	N/A				-17%	R
Non-fossil fuel in primary energy mix	DRC	N/A		N/A		11.4%	R
Major pollutants	EPB	COD: -10% SO ₂ : -10% Ammonia: N/A Nit. oxide: N/A	E E	COD: 12.45% Co2: - 14.29%	-	COD: -8% SO ₂ : -8% Ammonia: -10% Nit. Oxide: 10%	R R R R
Forest coverage	Forestry Bureau	20%	R	20.36%		21.66% or 14.3 trillion cubic meters	R
Reduction of water consumption per unit of	Water Resource Bureau	-30%	R	-36.7%		-30%	R

value-added of industrial output						
Increase of water efficiency coefficient in agricultural irrigation	Water Resource Bureau	0.5	E	0.5	0.53	E
Farmland reserves	Land Bureau	120 million hectares	R	121.2 million hectares	121.2 million hectares (or 1.8 billion mu)	R
Comprehensive utilization rate of industrial solid waste	Planning and Construction/Urban Utility	60%	R	69%	N/A	

Note: Population targets are excluded. (R) refers to restricted target; (E) refers to expected target. N/A indicates that no target was stated in the respective FYP.

8. References

- Ajzen, I., 1991. The Theory of Planned Behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179-211.
- Banyuetan Network, 2013. 环保局处罚央企，何时不再是新闻? *Huanbao ju chufa yangqi, he shi bu zai shi xinwen?* EBP penalizes central SOE, when is it no longer news? http://www.gesep.com/Hot/show_183_339809.html, last accessed on June 14th, 2013.
- Bulkeley, H. and Mol, A. P. J., 2003, Participation and environmental governance: Consensus, ambivalence and debate, *Environmental Values*, 12(2), 143–154.
- China Daily, 2006. Unexpected' pollution comes as no shock. 16 October. http://www.chinadaily.com.cn/china/2006-10/16/content_708760.htm, last accessed on April 20th, 2013.
- China Daily, 2013a. Fixing the environment is in our hands. http://usa.chinadaily.com.cn/weekly/2013-04/26/content_16451383.htm, last accessed on May 17th, 2013.
- China Daily, 2013b, 'Spring' in the air for NGOs? http://usa.chinadaily.com.cn/china/2013-04/17/content_16413494.htm, last accessed on May 17th, 2013.
- China Daily, 2013c, First-tier Chinese cities barely livable, report says. <http://www.asianewsnet.net/First-tier-Chinese-cities-barely-livable-report-sa-46976.html>, last accessed on May 30th, 2013.
- China Daily, 2013d, Environment may be issue at two sessions, http://usa.chinadaily.com.cn/china/2013-02/26/content_16255385.htm, last accessed on May 30th, 2013.
- China Daily, 2013e, Environmental journalism campaign launched, http://usa.chinadaily.com.cn/china/2013-05/17/content_16507918.htm, last accessed on June 23rd, 2013.
- China Daily, 2013f, Promise of iron fist against pollution, http://www.chinadaily.com.cn/china/2013npc/2013-03/18/content_16314997.htm, last accessed on June 23rd, 2013.
- China Environment Org, 2013, 长三角结成应急联动联盟, 2013-05-24, http://www.cenews.com.cn/xwzx/hjyw/201305/t20130523_742130.html, last accessed on June 21st, 2013.

- Chien, Shiuh-Shen, 2013, New local state power through administrative restructuring – A case study of post-Mao China county-level urban entrepreneurialism in Kunshan, *Geoforum*, 46, 103–112.
- CNR Financial Review (央广财经评论) 2013, Anqing huanbao ju shouci xiang yangqi kai fadan ping: Jianli ti zhi quebao duli zhifa, 2013-06-11, http://finance.cnr.cn/jjpl/201306/t20130611_512797916.shtml, last accessed on June 14th, 2013.
- Deng, Yanhua and Yang, Guobin, 2013, Pollution and Protest: Environmental Mobilization in Context, *The China Quarterly*, *forthcoming*.
- Ding, C., 2009. Policy and Planning Challenges to Promote Efficient Urban Spatial Development during the Emerging Rapid Transformation in China. *Sustainability*, 1 (3), 384-408.
- Eaton, S. and Kostka, G., 2013. Does Cadre Turnover Help or Hinder China's Green Rise? Evidence from Shanxi Province, in edited book by Ren Bingqiang and Shou Shuisheng 'Chinese Environmental Policy: Dynamics, Challenges, and Prospects in a Changing Society', Palgrave Macmillan Publishers.
- Eaton, S. and Kostka, G., 2014. Authoritarian Environmentalism Undermined? Local Leaders' Time Horizons and Environmental Policy Implementation, *The China Quarterly*, 218, 359 - 380.
- Finance Sina, 2010. Real after-effects of power rationing in Wenzhou: increased costs, reduced production, and pollution (*Wenzhou xian dian zhenshi hou yi zheng: chengben zengjia gongren jian shou ji wuran*) <http://finance.sina.com.cn/roll/20101019/02538799931.shtml>, accessed on April 22nd, 2013.
- Guardian, 2013. China's environmental problems are grim, admits ministry report. <http://www.guardian.co.uk/environment/chinas-choice/2013/jun/07/chinas-environmental-problems-grim-ministry-report>, accessed on June 10th, 2013.
- Greenbiz, 2013. China to launch carbon trading scheme by mid-June. <http://www.greenbiz.com/news/2013/04/08/china-launch-carbon-trading-scheme-mid-june>
- Greenpeace, 2012. Dangerous breathing – PM 2.5: Measuring the human health and economic impacts of China's largest cities. <http://www.greenpeace.org/eastasia/publications/reports/climate-energy/2012/air-pollution-health-economic/>, accessed on May 30th, 2013.
- Grover, Velma I., and Gail Krantzberg (2012). *Great Lakes: Lessons in Participatory Governance*. Taylor and Francis Group, CRC Press.
- Harrison, Tom, and Genia Kostka, 2012. Manoeuvres for a Low Carbon State: The Local Politics of Climate Change in China and India, Development Leadership Program, Research Paper 22.
- Harrison, Tom, and Genia Kostka, 2014. Balancing Priorities, Aligning Interests: Developing Mitigation Capacity in China and India, *Comparative Political Studies*, 47(3-4), (forthcoming)
- He, Guizhen He, Lu Yonglong, Mol, Arthur P.J., Beckers, Theo, 2012. Changes and challenges: China's environmental management in transition, *Environmental Development*, 3, 5–38.
- Heberer, T. and Senz, A., 2011. Streamlining Local Behaviour Through Communication, Incentives and Control: A Case Study of Local Environmental Policies in China, *Journal of Current Chinese Affairs*, 40 (3), 77-112.
- Hildebrandt, T., 2011. The political economy of social organization registration in China, *The China Quarterly*, 208, 970–989.
- International Finance Corporation (IFC), 2012. Study on the potential of sustainable energy financing for small and medium enterprises in China, October 2012.
- Johnson, T., 2013. The politics of waste incineration in Beijing: The limits of a top-down approach? *Journal of Environmental Policy and Planning*, 15(1), 109 – 128.

- Kaufman, Billie, 2012. Drivers and Barriers for Sustainable Urban Form: The Case of China, Unpublished MA Thesis Frankfurt School of Finance and Management.
- Kostka, Genia and Sarah Eaton. 2012. China's Green Rise- Growing Ambition, Growing Challenges. Canadian International Council, <http://opencanada.org/features/the-think-tank/essays/chinas-green-rise-growing-ambition-growing-challenges-2/>, accessed on May 30th, 2013.
- Kostka, Genia and William Hobbs. 2012. "Local Energy Efficiency Policy Implementation in China: Bridging the Gap between National Priorities and Local Interests." *The China Quarterly* 211, 765-785.
- Kostka, Genia. 2013. "Environmental Protection Bureau Leadership at the Provincial Level in China: Examining Diverging Career Backgrounds and Appointment Patterns." *Journal of Environmental Policy and Planning*, 15(1), 41-63.
- Kostka, Genia. 2014. "China's evolving green planning system: Are targets the answer?", Regulation & Governance, *forthcoming* (see also Frankfurt School Working Paper No. 202, <http://www.frankfurt-school.de/content/en/research/workingpapers.html?year=2013>).
- Kostka, Genia and Mol, Arthur P.J. 2013. Implementation and Participation in China's Local Environmental Politics: Challenges and Innovations, *Journal of Environmental Policy & Planning*, 15 (1), 3-16.
- Kostka, G., Shin, K., 2013. Energy conservation through energy service companies: Empirical analysis from China, *Energy Policy*, 52, 748-759.
- Kostka, G. and Yu, X. 2013. Municipal Party Secretaries' Career Backgrounds: Tight Links to the Province and Limited County Level Experience, *Modern China*, forthcoming (doi: 10.1177/0097700414539628).
- Kostka, G., Moslener, U., and Andreas, J., 2013. Barriers to Increasing Energy Efficiency: Evidence from Small-and Medium-sized Enterprises in China, *Journal of Cleaner Production*, 57, 59-68.
- Lewis, J., 2011. Energy and Climate Goals of China's 12th Five-Year Plan, Pew Center on Global Climate Change, available at <http://www.pewclimate.org/docUploads/energy-climate-goals-china-twelfth-five-year-plan.pdf>, last accessed on 19 June 2013.
- Liang, D. and Mol, A. P. J., 2013. Political Modernisation in China's Forest Governance? Payment Schemes for Forest Ecological Services in Liaoning, *Journal of Environmental Policy and Planning*, 15 (1), 65-88.
- Li, Wanxin and Higgins, Paul, 2013. Controlling Local Environmental Performance: an analysis of three national environmental management programs in the context of regional disparities in China, *Journal of Contemporary China*, 22 (81), 409-427.
- Lichtenberg, E. and Ding C. (2000). Local Officials as Land Developers: Urban Spatial Expansion in China. *Journal of Urban Economic*, 66, 57-64.
- Lo, A. L., (2013), Carbon trading in a socialist market economy: Can China make a difference?, *Ecological Economics*, 87, 72-74.
- Lo, Wing-Hung Carlos, and Shui-Yan Tang., 2006. Institutional reform, economic changes, and local environmental management in China: The case of Guangdong Province. *Environmental Politics* 15 (02), 190-210.
- Lora-Wainwright, A., 2013. Introduction: Dying for development: pollution, illness and the limits of citizens' agency in China. *The China Quarterly*, 1-12.
- Ma, Xiaoying, and Leonard Ortolano., 2000. *Environmental regulation in China: Institutions, enforcement, and compliance*. Rowman & Littlefield.
- Mei, Ciqi, 2009. Bringing the Politics Back in: Political Incentives and Policy Distortion in China", unpublished Doctoral Dissertation, Department of Government and Politics, University of Maryland.
- Mol, Arthur PJ, and Neil T. Carter, 2006. China's environmental governance in transition. *Environmental Politics* 15 (02), 149-170.

- Newig, J. and Fritsch, O., 2009. Environmental governance: Participatory, multi-level—and effective? *Environmental Policy and Governance*, 19(3), 197–214.
- O’Brien, Kelvin J. and Lianjiang Li. 1999. “Selective Policy Implementation in Rural China.” *Comparative Politics* 31 (2): 167-86.
- OECD, 2009. Urban Trends and Policy in China, reported authored by Lamia Kamal-Chaoui, Edward Leman, Zhang Rufei, *OECD Regional Development Working Papers* 2009/1.
- Price, L., Levine, M., Zhou, N., Fridley, D., Aden, N., Lu, H., McNeil, M., Zheng, N., Qin, Y., Yowargana, P., 2011. Assessment of China’s Energy-Saving and Emission-Reduction Accomplishments and Opportunities During the 11th Five Year Plan. *Energy Policy*, 39 (4), 2165-2178.
- Rietbergen, M. G. and Blok, K., 2010. Setting SMART targets for industrial energy use and industrial energy efficiency, *Energy Policy*, 38, 4339-4354.
- Shanghai Daily, 2013.
<http://www.shanghaidaily.com/nsp/Business/2013/04/11/Shanghai%2Bto%2Btry%2Bcarbon%2Btrading/>) <https://www.energyfolks.com/announce/detail/672>
- Schreifels, J., Fu, Y., and Wilson, E., 2012. Sulfur Dioxide Control in China: Policy Evolution during the 10th and 11th Five-Year Plans and Lessons for the Future, *Energy Policy*, 28, 779-789.
- Schwartz, Jonathan, 2003. The impact of state capacity on enforcement of environmental policies: The case of China, *The Journal of Environment & Development*, 12 (1), 50-81.
- Schwela, Dieter (2006). *Urban air pollution in Asian cities: Status, challenges and management*. Routledge.
- Seckington, Ian, 2007 County Leadership in China: A Baseline Survey, *Nottingham China Policy Institute*, Discussion Paper 17, 2007, p. 19
- Shin, Kyoung. 2014. An Emerging Architecture of Local Experimentalist Governance in China: A Study of Local Innovations in Baoding, 1992-2012. Unpublished PhD dissertation, Massachusetts Institute of Technology.
- Shin, S., 2013. China's failure of policy innovation: the case of sulphur dioxide emission trading, *Environmental Politics*, forthcoming.
- South China Morning Post, 2013. Xi warns officials they'll be held responsible for pollution 'for life'
<http://www.scmp.com/news/china/article/1245558/xi-jinping-warns-officials-theyll-be-held-responsible-pollution-life>, last accessed on May 28th, 2013.
- Ran, R., 2013. Perverse Incentive Structure and Policy Implementation Gap in China’s Local Environmental Politics, *Journal of Environmental Policy and Planning*, 15 (1), 17–39.
- Wang, A. L., 2013. The Search For Sustainable Legitimacy: Environmental Law and Bureaucracy in China, *Harvard Environmental Law Review*, 37, forthcoming.
- Wei, Yaping and Zhao, Min 2009. Urban Spill Over Vs. Local Urban Sprawl: Entangling Land-use Regulations in the Urban Growth of China’s Megacities, *Land Use Policy*, 26 (4), 1031-1045.
- Wong, C., 2010. Fiscal Reform: Paying for the Harmonious Society, *China Economic Quarterly*, 14 (2), 20-25.
- Wong, C., 2013a. Paying for Urbanization: Challenges for China’s Municipal Finance in the 21st Century, in R. Bahl, J. Linn and D. Wetzel, eds., *Metropolitan Government Finances in Developing Countries*. Cambridge, MA: Lincoln Institute for Land Policy, forthcoming.
- Wong, E., 2013b. As Pollution Worsens in China, Solutions Succumb to Infighting, *The New York Times*, Asia Pacific, http://www.nytimes.com/2013/03/22/world/asia/as-chinas-environmental-woes-worsen-infighting-emerges-as-biggest-obstacle.html?pagewanted=all&_r=0, last accessed on June 19th, 2013.
- World Bank and the Development Research Center of the State Council, P. R., 2012. *China 2030: Building a Modern, Harmonious, and Creative Society*. Washington, DC: World Bank. DOI: 10.1596/978-0-8213-9545-5.

- www.worldbank.org/content/dam/Worldbank/.../China-2030-complete.pdf, last accessed on May 18th, 2013.
- Wu, F. (2013) Environmental Activism in Provincial China, *Journal of Environmental Policy and Planning*, 15(1), 89–108.
- Wu, Jing, Yongheng Deng, Jun Huang, Randall Morck, and Bernard Yeung, 2013. Incentives and Outcomes: China's Environmental Policy, NBER Working Paper No. 18754, February 2013
- Xinhua, 2013. China monitors air pollution with "eyes" in sky.
http://news.xinhuanet.com/english/china/2013-04/26/c_124637946.htm, last accessed on May 18th, 2013.
- Zhao, Y., 2010. Public participation in China's EIA regime: Rhetoric or reality? *Journal of Environmental Law*, 22(1), 89–123.
- Zhong, L. and Mol, A. P. J., 2008, Participatory environmental governance in China: Public hearings on urban water tariff setting, *Journal of Environmental Management*, 88(4), 899–913.