This is a pre-print version of the paper.

The published version is available at:
http://onlinelibrary.wiley.com/doi/10.1111/rego.12082/full

Cite article as:
Kostka, Genia (2016), Command without control: The case of China's environmental target system, *Regulation & Governance*, Vol. 10, 58–74.

Command without control: The case of China's environmental target system

Genia Kostka

Hertie School of Governance, Berlin, Germany

Regulation & Governance

In the existing literature there is general agreement that the effectiveness and efficiency of command and control instruments versus market-based instruments is highly context specific. A country's particular regulatory environment and state capacity, as well as the features of given environmental problems, play an important role in ascertaining what the "right" set of policy instruments for environmental management might be. This article examines how command and control instruments are used as an environmental enforcement mechanism in China's authoritarian state. Based on extensive fieldwork, this paper shows that the reliance on binding environmental targets as the main domestic policy instrument in China has generated numerous undesirable consequences. While China's target-based approach to implementation has incentivized local officials to strictly enforce environmental mandates, there are numerous shortcomings in the system. In particular, target rigidity, cyclical behaviour, poor data quality, and the absence of an independent monitoring agency have generated adverse effects and contribute to a yawning gap between regulatory goals and outcomes. The paper concludes that binding environmental targets as the main command–control instrument in China can be more accurately described as "command without control" as the target-setting central government does not exercise a high degree of control over implementation and monitoring processes. But command and control instruments can be suited for managing "first-generation" environmental problems and addressing environmental issues that have easily identifiable pollution sources and which are easy to verify.

Key words: authoritarian environmentalism, China, command and control instruments, environmental policy implementation, regulation, targets

Acknowledgements: The author is grateful to Sarah Eaton, Kathryn Hochstetler, Thomas Johnson, Andrew Kipnis, Ran Ran, Benjamin van Rooji, and Ji Xi for helpful comments. Special thanks also to Li Bo and Yu Hang for excellent research assistance. The paper benefited from feedback generated in workshops at the University of Amsterdam's China Law Centre, the German Association for Social Science Research in China, and at the Balsillie School of International Affairs. Funding from the Dr. Werner Jackstädt Foundation is gratefully acknowledged. I also thank the editors, David Levi-Faur and Walter Mattli, and the four anonymous reviewers for their constructive comments on a previous draft.

Introduction

Mounting global environmental crises have fed debate about what types of policy regimes are most conducive to addressing resource scarcities and environmental degradation. Within this debate, existing studies on environmental outcomes suggest that higher citizen participation, a freer media environment and access to information lead to better environmental outcomes in democratic systems (e.g., Scruggs, 2003; Lipscy, 2011). By contrast, authoritarian states tend to produce worse environmental outcomes, because state capacity is used to secure power via promoting economic growth (e.g., Ward et al., 2014). In recent years, proponents of "environmental authoritarianism" have challenged this view and argue that authoritarian leaders have sharper tools at hand for environmental management (e.g. Beeson, 2010) since their greater insulation from interest groups and public opinion confer a degree of policy autonomy. Arguments about the "authoritarian advantage" have often been fairly broad brush. Noticeably absent is fine-grained analysis of how regulatory instruments and enforcement mechanisms shape outcomes in non-democracies. Taking the People's Republic of China as a case study, this paper shines light on how command and control instruments of environmental governance actually work (or fail to) in a one-Party regime.

Recent innovations in China's approach to environmental management make it a particularly relevant case to examine this issue. China's Premier Li Keqiang declared a "war on pollution" as part of the top leadership commitment to change lanes from a heavily polluting, growth-at-any-cost model to a resource-efficient and low carbon model (Xinhua, 2014). And the country's two most recent national Five Year Plans (FYPs), the 11th (2006-2010) and 12th (2011-2015), outline the "weapons" for battle. China has employed a mix of top-down command and control measures with market-based mechanisms to propel the switch to a resource-efficient and low carbon growth path. This paper focuses on the former since experiments with market-based tools remain in their infancy (Lo, 2013) and China's environmental governance system continues to rely primarily on top down command and control instruments.

We have fairly limited knowledge of how command and control instruments actually work in authoritarian China. Within the category of command and control measures, binding environmental targets are the key environmental management tool in

China. These binding environmental targets are incorporated into the target responsibility system (*mubiao zeren zhi*), wherein the central government sets a national goal for a policy or program and then assigns specific targets for particular areas. Given the heavy reliance on mandatory targets for implementation, a better understanding of how they work (or not) is key to evaluation of China's recent efforts to green growth.

Previous studies of China's target-based approach to implementation of environmental policy have zeroed in on one particular aspect of the system and, as yet, there has been little analysis of the merits of the system as a whole. Scholars have analyzed implementation of one specific environmental target in one particular region or taken a microscope to the implementation methods and strategies in particular localities. For example, Schreifels et al. (2012) studied target implementation for air quality, Golding (2011) for water quality, Kostka and Hobbs (2012) for energy intensity, and Santalco (2012) for hydro, wind and solar. A notable exception is an insightful paper by Wang (2013), which examined China's target system from a wider perspective.

This paper expands upon Wang's work in numerous ways. First, while Wang concentrates on energy saving and emission reduction targets, this paper casts a comparatively wider net by analyzing implementation of all nine binding environmental targets in the 12th FYP. This allows for delineation of differences and similarities among environmental targets in terms of measurability, verifiability and implications for economic and social issues. Second, by examining the process through which targets are selected, this paper brings attention to the difficulties local bureaucrats face in picking the right level and unit of environmental target. It also shows that the selection of some targets can result in the sidelining of others and, consequently, to the neglect of equally important local environmental issues.

The analysis is drawn from 58 interviews conducted in three municipalities Chenzhou (Hunan province), Yancheng (Jiangsu province), and Weifang (Shandong province) in 2012. These three municipalities differ in terms of economic structure and economic development, two factors which previous research showed to be important in shaping environmental regulatory responses and implementation preferences (e.g., Harrison and Kostka, 2014). Chenzhou (Hunan) is a resource-rich municipality in central China with mining and smelting activities accounting for the major share of local GDP. Yancheng (Jiangsu) and Weifang (Shandong) are predominantly agricultural municipalities located on the middle and northern coasts, respectively. In each of the three municipalities, interviews were conducted with officials in municipal bureaucracies in charge of China's nine binding targets. These meetings were followed up with interviews with officials one administrative layer down, in counties or districts located within each municipality. Collecting data from multiple administrative levels was helpful in shedding light on how targets "trickle down" from the national level to the county and district levels and in differentiating between varying responsibilities of county and municipal cadres. Interviews were semi-structured and provided an understanding of how local bureaucrats responded to the nine different binding targets. Interviews also highlighted the discrepancy between assigned targets and realized outcomes, the continuing significance of growth vs. environment trade-offs, and the frequent occurrence of undesirable unintended consequences. In addition to interviews, the analysis draws from government policy documents and reports and available secondary sources.

Environmental Green Planning, State Capacity, and Policy Outcomes

The existing literature on command and control instruments has focused primarily on how they function in western democracies. Among different command and control instruments discussed, the most common instruments are environmental standards and regulations. In the environmental economics literature, a standard is defined as "a mandated level of performance that is enforced in law" (Field, 1994, p. 206). Environmental standards can be differentiated into performance-based, technology-based, and process/management-based standards. Performance-based standards define the final level of pollution that is meant to be achieved (e.g., the annual amount of permissible emission of COD in waste water), but give polluters discretion in terms of how to meet a particular standard. Technology-based standards specify particular techniques or equipment that firms must use to comply with a particular regulation (e.g., the requirement to use a stack-gas device to reduce SO_2 emissions), while management-based standards require firms to implement a particular management practice or industrial production process (e.g., the requirement to track the use of regulated toxic chemicals through all stages of their production process).

The advantage of standards is that they can be simple and direct, and that they can be set on different bases. Yet, setting the "right" level of a standard and deciding whether a standard should be applied uniformly to all situations or tailored according to heterogeneous circumstances is a complex matter. The more that standards are fitted to particularities, the more impact they can be expected to have. But this also implies significant information-gathering costs for planners. As a result, authorities tend to lean towards uniform standards because "it makes their regulatory lives much simpler, and gives the impression of being fair to everyone, since all are apparently being treated alike" (Field, 1994, p. 215). In addition to the difficulty of setting the right level of standards, environmental standards also need to be enforceable and verifiable in order to provide local implementers with sufficient incentives for implementation. If penalties are set too low or if insufficient resources are devoted to verification and monitoring, then there is little prospect of reducing pollution (Field, 1994).

While western democracies use voluntary environmental standards as an important regulatory instrument, the Chinese Communist Party relies on binding environmental targets. Binding targets are built into the cadre responsibility and evaluation system, an incentive system that monitors the performance of officials holding a position in the Party, government, or in a state-owned enterprise. Within this system, local cadres are required to meet targets decided on by their superiors as part of an annual performance assessment. Repeated non-implementation may be penalized through redeployment to a remote locality or, less frequently, outright expulsion from office (Eaton and Kostka, 2014).[1] The widening scope of binding environmental targets is the key weapon in Beijing's war on pollution: an original five binding environmental targets in the 11th FYP became nine in the 12th FYP. These binding 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. Table 1 lists environmental targets in the two most recent FYPs.

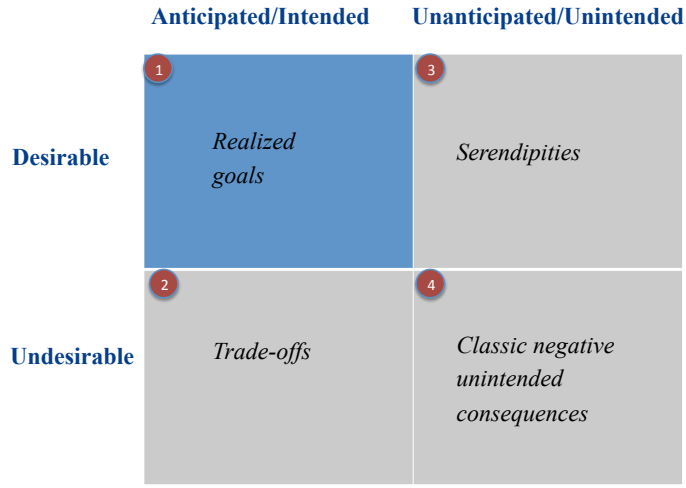
In comparison to environmental regimes in western democracies, China's target system is governed by quite different rules. For instance, while performance-based standards, the norm in many European countries, are often set uniformly nation-wide, in China, binding environmental targets are handed down sequentially from the national to

county levels. At each administrative level, the government has the authority to decide how to allocate targets among departments, subordinate governments, and enterprises. Moreover, while in western democracies standards are enforced by law, national leaders in Beijing rely on incentive mechanisms embedded in the cadre management system to steer implementation of targets.

In this context, a high degree of state capacity is needed to select, allocate, implement and verify environmental targets. Here state capacity refers to the state's institutional capacity to choose its own goals and to realize them in the face of opposition (Przeworski 1990, p. 31). In order to deliver desired environmental outcomes, state capacity requires certain levels of political and technical competency. This includes the abilities to select enforceable environmental instruments that fit with existing institutional structures and local circumstances. One could argue, for example, that in some cases, failed environmental outcomes are the fault of the target-based system itself rather than the implementing system. A degree of slippage is to be expected and is not necessarily undesirable, but when policies primarily result in outcomes that were unintended, this can hardly be viewed as an indication of state capacity (Harrison and Kostka, 2014).

The problem of unintended consequences is well-known to the public policy and development literatures. Two widely read studies in this vein are Ferguson's account of the unintended consequences of a development programme in Lesotho (Ferguson, 1990) and Stone's analysis of purposeful and unguided actions and their intended and unintended consequences to explain political behavior and policy outcomes (Stone, 1989). Drawing upon these works, Figure 1 serves as a framework to help categorize policy outcomes of China's binding environmental targets. Figure 1 differentiates between outcomes that are desirable and others that are not.[2] There is a further distinction made between policy outcomes that are intended or anticipated and their opposites. This study differentiates between anticipated/intended and unanticipated/unintended consequences using information provided by government officials. Interviewees were asked whether central planners had foreseen a particular outcome or not. We learned in interviews that central planners were sometimes aware of undesirable outcomes but accepted them as trade-offs, while certain other unplanned outcomes were entirely unexpected. Assessing the causes of such unplanned results has both theoretical and practical significance and will be critical to improving China's target system. The upper left quadrant in Figure 1, "realized goals", refers to desirable outcomes that are intended or anticipated. In the bottom left quadrant, "trade-offs" are outcomes that are intended or anticipated but undesirable. Policy planners anticipated these undesirable outcomes but willingly made trade-offs against other priorities leading to intended but mixed outcomes. The upper right quadrant, "serendipities", refers to unintended or unanticipated outcomes unforeseen by Beijing's central planners but which yielded desirable effects. And the bottom right quadrant, "classic negative unintended consequences", refers to undesirable outcomes that are unintended or unanticipated.

Figure 1: Policy Outcomes Framework



Source: Adopted from Stone (1989)

In China, the mismatch between desired and actual outcomes is the combined result of weak state capacity in the environment field and the inherent downsides of target-based implementation approaches. As targets get pushed down from Beijing, it is unavoidable that local officials exercise strong influence over outcomes, especially in a context where local leaders have significant flexibility in responding to central directives and targets (Harrison and Kostka, 2014). But this is room for maneuver within considerable financial, technical and political constraints (Van Rooij, 2006). Scarce finances can mean, for example, shortages of inspection vehicles, up-to-date testing equipment, and skilled staff. Political constraints result from the conflicting priorities of implementing agencies as well as coordination difficulties (Ran, 2013). This paper argues that the target system sometimes aims wide of the mark; by drawing resources to centrally-defined priorities, local environmental problems are sometimes left untouched by the target system.

Anticipated and desirable outcomes

The introduction of binding environmental targets in 2006 has achieved a number of intended and desirable goals.

Environmental issues climb up the policy agenda

First, the incorporation of mandatory environmental targets into the national FYP in 2006 signaled to local leaders the new importance Beijing attached to the war on pollution. To bolster these signals, numerous "carrots and sticks" have been incorporated into the administrative system. These include linking environmental targets to local officials' annual cadre evaluation and introducing new punishments for non-compliance, such as imposing "regional investment restrictions" (*quyu xianpi*) on non-compliant districts, differentiated utility pricing, and cutting off utilities for non-cooperative enterprises.

As a government official from a municipal Forest Bureau notes, targets can also motivate local cadres and increase local leaders' attention to environmental issues:

> Our tasks and responsibilities in the Forest Bureau have increased over the last years because meeting the forest coverage targets has become such an important goal for our municipal leaders. The original target for forest coverage in the 12th Five-Year Plan was 65%, but our new Party Secretary increased the rate by another percent after being promoted to office, which gives us a lot of pressure. He even included municipal forest coverage goals into the evaluation of the Finance Bureau and they now have to ensure that every year they can provide 30 to 50 million RMB to us. Because the leaders stress forest coverage so much, other departments have started to cooperate with our bureau. … Overall, the leaders pay a lot of attention to us now and we think we can fulfill our targets in a short time. This is very motivating and we are happy about the recent changes, even though we became extremely busy and do not even have weekends anymore (INT29052012).

These themes were echoed by officials in many other departments. As a result, for local government officials, environmental issues such as air and water pollution, energy efficiency, and forest coverage moved very rapidly from low to high importance. A broader conclusion to draw is that binding environmental targets serve an especially important function in the early phases of greening growth, when mobilizing resources and political support are the key tasks.

Scope for local adaptations to targets

China's target-based environmental management approach also permits far more flexibility during the target allocation process than one might assume. When targets are passed down the administrative hierarchy, local bureaucrats often tailor them to regional circumstances. In addition, the occurrence of crises or unforeseen problems can trigger adjustment of targets. Local governments were also given considerable discretion in *how* to allocate targets within their governance areas. For instance, environmental targets could be allocated either through a "one size fits all" or a "differentiated" approach. Table 1 illustrates the way in which different environmental targets have "trickled down" from the provincial to the county levels in Shandong province. In Jiangsu province, for instance, all municipalities received a uniform forest coverage target of 20%, while forest coverage targets in Shandong and Hunan were differentiated for municipalities. Moreover, local governments also had the flexibility to assign environmental targets to just a few key counties or large enterprises or to assign targets equally to all planning units. Hebei province, for example, concentrated provincial emission savings and energy reduction (ESER) efforts on 30 counties and 30 key enterprises in 2007 and only expanded the scope of this program in 2009 (Wang, 2013, p.400). In Shanxi province, by contrast, every county received an ESER target in 2006 and 2007.

In addition to the question of how to allocate targets to subordinate governments and enterprises, local governments were also given flexibility as to *when* to implement mandatory targets during the five-year period. For instance, during the 11th FYP period (2006-2010), some local governments distributed forest coverage targets evenly for each year, while others set higher targets for the first or last year of the five-year period. Similarly, in one county in Hunan, leaders set the same annual energy intensity targets of -3.43% per year, while in the neighboring county energy intensity targets started high with -5% for the first year and declined to -3.5% over time. Targets declined because

local leaders believed that the low-hanging fruit would be eaten up quickly and there would be less and less room to achieve additional energy savings (INT25052012).

Interviews showed that the target-based system is also responsive to unexpected events or disasters. For example, a freezing rain disaster in 2008 meant that Chenzhou municipality only achieved a forest coverage rate of 63.6% at the end of the 11th FYP, falling short of their assigned target of 65%. Because the disaster was large and affected many localities in southern China, however, no punishments were given. A local officials notes that "the fact that this disaster was reported all over TV and high-ranking leaders from Beijing came to Chenzhou, this surely helped us to ensure that we won't get punished and that for us forest coverage targets were adjusted" (INT29052012).

Table 1: 11th and 12th Five Year Plans (FYPs) – Environmental and Economic Targets Trickling Down From National to County Level in Shandong Province

		National	Shandong Province	Weifang Municipality	Fangzi County	Zucheng County
Environmental targets*						
Reduction in energy intensity per unit of GDP (%)	*11 FYP Target (B)*	-20	-22	-22.5	-20	No target
	11 FYP Actual	-19.1	-22.1	-23.06	-23.06	N/A
	12 FYP Target (B)	-16	-17	-17	-16.5	-14.5
Reduction in carbon intensity per unit of GDP(%)	*11 FYP Target (-)*	No target	No target	No target	No target	No target
	11 FYP Actual	No target	No target	No target	No target	No target
	12 FYP Target (B)	-17	N/A	N/A	N/A	N/A
Water: chemical oxygen demand (COD) (%)	*11 FYP Target (E)*	-10	-14.9**	-18	-18	-18
	11 FYP Actual	-12.45	-19.4	-19.20	-20.27	-23.30
	12 FYP Target (B)	-8	-12	-13.3	-13.3	-13.8
Air: SO2 (%)	*11 FYP Target (E)*	-10	-20	-8.54	-8.54	-8.54
	11 FYP Actual	-14.29	-23.2	-11.85	-9.80	-11.98
	12 FYP Target (B)	-8	-14.9	-18.1	-19.2	-23.0
Air: NOx (%)	*11 FYP Target (-)*	No target	No target	No target	No target	No target
	11 FYP Actual	No target	No target	No target	No target	No target
	12 FYP Target (B)	-10	-16.1	-17.9	-18.4	-21.1
Water: NH4 (%)	*11 FYP Target (-)*	No target	No target	No target	No target	No target
	11 FYP Actual	No target	No target	No target	No target	No target
	12 FYP Target (B)	-10	-13.3	-16.7	-17.8	-19.6
Forestry coverage (%)	*11 FYP Target (B)*	20	22	N/A	23	35
	11 FYP Actual	20.36	22.8	35.2	23.6	33.5
	12 FYP Target (B)	21.66	25	35	28	38.5
Reduction of water consumption per unit of value added of industrial output（%）	*11 FYP Target (B)*	-30	N/A	N/A	-30	N/A
	11 FYP Actual	-36.7	N/A	-40.09***	-40.04	N/A
	12 FYP Target (B)	-30	N/A	N/A	-30	N/A
Economic growth targets						
GDP growth rate (%)	*11 FYP Target*	7.5	10	12	16	16
	11 FYP Actual	11.2	13.1	14.2	12.5	15.1
	12 FYP Target	7	9	12	13	15

Note: (B) refers to binding (or restricted) target which have an impact on the career progression of government officials.; E refers to expected target, which are not strictly required for a promotion. N/A = refers to data not available. *Environmental targets not included in the table are non-fossil fuel in primary energy mix, increase of water efficiency coefficient in agricultural irrigation, farmland reserves, and comprehensive utilization rate of industrial solid waste. **The central COD target for Shandong province was -14.9%, but Shandong province set itself a higher target of -18%. *** Target for large-scale enterprises.

Yardstick for performance measurement

Most importantly, binding environmental targets allow tracking and reporting of frequent progress and thereby help the Chinese Communist Party (CCP) to strengthen its "performance legitimacy" (Plattner, 2009). As Conrad (2012, p. 443) has argued:

> The formulation of quantifiable policy targets is one of the most central and most sensitive parts of the policy-making process. Targets are the yardsticks against which government performance is being measured. In the absence of other sources of legitimacy, achieving these targets is one of the pillars on which the CCP's power rests.

As yardsticks against which environmental performance is measured, binding targets are an important device showing that Beijing is taking action to address China's environmental crisis. At the end of the 11th FYP, Beijing announced that the national SO_2 and chemical oxygen demand (COD) targets were over-fulfilled and energy intensity targets were "almost" met. When, during the last months of the 11th FYP, it became clear that China was not on track to meet its national energy intensity target of 20%, former Premier Wen Jiabao publicly called for local officials to use an "iron hand" when implementing the energy intensity targets. Beyond their function in the planning system, such announcements are also public relations exercises: they communicate to the Chinese public that the central government is doing everything possible to realize announced goals. And if targets are not met, the fault lies with local governments not Beijing.

Anticipated but undesirable outcomes

Although binding environmental targets can be very effective in realizing numerous desirable goals, the system has generated a number of anticipated but undesirable outcomes.

Sidelining of other targets

The selection of nine binding environmental targets means the neglect of other environmental targets and issues. For instance, despite serious water mismanagement problems reported in agricultural irrigation practices, the 12th FYP lacks binding targets for water efficiency in the agricultural sector (INT08052012). Similarly, fine particulate (PM 2.5) air pollution targets were missing until quite recently, despite fine particulate pollution being at hazardous levels and leading to more than 8,500 premature deaths in four major Chinese cities in 2012 alone (Greenpeace, 2012). Interviews revealed that local officials were often aware of the PM2.5 pollution in their locality but lacked incentives to do something about it since it would only add "additional work". Some officials admitted that they would only take it seriously if the central government would make this a binding target. In late 2012, the Ministry of Environmental Protection finally ordered 74 cities to publish daily records on PM2.5 levels and started to rank the worst offenders. The decision came after mounting public complaints about unacceptable PM2.5 levels tracked by the US Embassy in Beijing (China Daily, 2012). Zeroing in on a few indicators means that other, perhaps equally important issues, are sidelined.

Local non-compliance

Central planners in Beijing are well aware that when pushing binding environmental targets from top to bottom, targets will not always deliver the intended outcomes as local leaders engage in "selective policy implementation" (O'Brien and Li, 1999; Kostka and Mol, 2013). Non-fulfillment of targets is not uncommon; for example, of the 74 major cities receiving a PM 2.5 target in 2013, only three met the standard (People Daily, 2014). In certain cases, such slippage can be desirable, as when local leaders opt to attend to local problems left off the list of official priorities. For instance,

heavy metal pollution caused by local mining industries is an acute environmental hazard in central Hunan, but until recently, an official environmental target addressing non-ferrous metal pollution was absent. In this particular context, prioritizing the clean up of local heavy metal pollution over fulfilling official PM2.5 targets make sense given the health hazards of severe heavy metal pollution.

Data faking

There is also widespread awareness that environmental data collection and monitoring are often imprecise or manipulated (Wang, 2013; Chen et al., 2013). Local governments have no incentives to uncover and report subordinate governments' implementation failures since such revelations would be a blemish on their own record. (When a lower-level administrative unit, a county for example, fails to meet it targets, it is reflected in the aggregated data the next administrative level up, e.g. in the data the municipality gives to the province.) Given these perverse incentives, local governments frequently "wave through the data" or report that they "almost met the targets." Some local leaders are even said to actively block data transparency by selecting favourable measurement methods or by holding back needed investments in monitoring equipment.

Data falsification in Chinese environmental statistics is also widely acknowledged, and this topic is openly discussed within government and in the mainland media (e.g., Caijing, 2010; People Daily, 2013). The pressure created by elevating many onerous environmental targets to binding status means that local officials have additional incentives to engage in "creative" reporting. We know, for example, that local officials make the most of their discretion in target verification, making careful decisions about when to inspect enterprises or test a lake's water quality (Shin, 2014). There are also many examples of local governments fabricating data in a last minute attempt to fulfill their targets. One locality, for example, reported energy savings from already bankrupt companies (INT22052012). The combination of local room to maneuver in verification methods with weak monitoring capacity in the environmental bureaucracy leaves substantial room for cadres to play the "numbers game" with their superiors.

Unanticipated but desirable outcomes

The introduction of binding targets has also generated many unanticipated outcomes, only few of which can be deemed desirable from the vantage of environmental protection.

Serendipities: Benefits for Environmental, Economic and Social Priorities

Perhaps most surprising is how environmental targets have been reconciled with other equally pressing targets at the local level. While central planners are aware that environmental goals receive more backing if they do not impede local GDP growth, they did not expect the creativity with which local officials effectively neutralized opposition to costly environmental regulations by re-framing them as matters of social or political urgency (Kostka and Hobbs, 2012). As a result, initially unpopular 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 both shut down scores of small mining operations in the name of promoting worker safety and established new large enterprises through administratively-guided mergers and acquisitions; in doing so, they achieved energy savings that were often an unstated objective of these campaigns. While the impact of these mergers on worker safety remains to be seen, past performance shows that the vast majority of China's coal miner deaths have occurred in illegal or small mining operations (Wang, 2006). Similarly, plan-induced replacement of outdated facilities in the name of energy savings had the added benefit of improving industry competitiveness, another key goal of the recent FYPs.

Unanticipated and undesirable outcomes

While central planners were conscious that the most onerous targets would be difficult for all localities to deliver on, they did not anticipate the many other bumps in the road since the introduction of binding environmental targets in 2006. Planners learned that picking the "right target" is difficult for a country as diverse and vast as China. Moreover, the target-based system triggered cyclical behavior among cadres in charge of target implementation, leading to unsavory policy tradeoffs at local levels.

Ill-fitted to protection units

After targets are set at the national level, provinces allocate targets to different departments within administrative boundaries of a municipality or county. These departments are often responsible for just one section of the units in need of protection. Lakes, rivers or wetlands, are complete ecosystems that should be managed as single entities rather than parceled out to different administrative units. For example, 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 countries have committed to limiting pollution since they perceive the lake as an asset for tourist promotion. In this context, a lake commission using a process of ecological compensation mechanisms would be more effective than targets tied to county governments. Another example is recent PM 2.5 pollution in Beijing. Beijing's air pollution results mainly from coal burning in Beijing's neighbouring provinces, especially Hebei 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 coordination problems, allocating binding targets to administrative units also gives rise to "gerrymandering" practices, wherein local governments manipulate jurisdictional boundaries for their own ends. For example, in Datong 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 Datong's environmental record.

Inappropriate to local circumstances

Targets set by upper level governments are also sometimes out of step with local conditions. For example, Chenzhou's heavy non-ferrous mining industries caused

pollution in multiple counties over the last two decades, but because there was no binding target addressing non-ferrous metal pollution until the most recent 12th FYP, the most pressing environmental problem in this locality was tackled much later than it might have been in the absence of binding targets (INT23052012). The diversity of China's ecosystems also creates problems for planners. In one county in Yancheng, Jiangsu, a Forestry Bureau official complained:

> Each county and municipality in Jiangsu received a forest coverage target of 20%, which is unscientific because targets should vary from place to place. During the 11th FYP, the target for our county was 20% but after very serious efforts we only achieved 15.9%. Our county is located in a coastal wetland area with high soil salinity, which makes this extremely difficult. To achieve the 15.9% coverage rate, our office even had to seek out special technology to help us grow trees in salty land. During the 12th FYP we are supposed to increase the forest coverage rate from 15.9% to the new binding 23%, which seems very unrealistic. We are currently discussing this with the provincial government, and hope that they will change the measurement method from the "forest coverage rate" to a revised coverage rate. Using the revised coverage rate is better for us because it does not include the areas of rivers, lakes, and intertidal zone. If the target gets changed, we will have a realistic chance in the 12th FYP to actually meet the target (INT12062012).

The above example is not uncommon and local officials in many counties reported struggling with one or a few targets that were an awkward fit with local circumstances.

Unscientific, inflated, and rigid targets

Allocating binding targets can also be problematic as allocated targets can be unscientific, rigid and can get inflated as they get passed down the administrative hierarchy. As targets get distributed, at each level, bureaucrats need to make decisions on how to share the burden of implementation. Yet, this decision-making process requires a vast amount of high quality information in order to identify the "right" target level for the subordinate government levels and enterprises. For example, within the same municipality of Chenzhou, the EPB in Rucheng County reported air pollution targets are "easy" to be achieved while Suxian District and Zixing County felt they were "difficult". A government official at a municipal Water Resource Bureau notes how shortages in staffing and lack of department coordination limits the setting of 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. Therefore, our bureau cannot give differentiated targets for the counties and instead all the counties get the same target for water consumption. However, the provincial government gives differentiated targets to the municipalities. But 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 sophisticated methods needed to differentiate targets (INT29052012), lower level units are sometimes presented with targets that are either too easy or too hard, the latter case inviting officials to play with both words and numbers.

The practice of inflating environmental targets as they pass down the administrative hierarchy to allow for anticipated slippage means that lower-level governments sometimes receive goals that are simply out of reach. Provincial energy

intensity targets assigned by the national government, for instance, were often raised for municipalities, counties, and enterprises to ensure completion of the overall provincial 11th FYP target. In one municipality in Shanxi, energy intensity targets among counties generally ranged from 27% to 30%, despite a municipal overall target of only 25% (INT072010). Occasionally targets are also raised because cadres make outsized promises to impress their leaders. In one municipality in Hunan, a local cadre complained: "Sometimes, local leaders do not do deep research about their localities. Instead, they set even higher targets compared to the ones received from the upper level in order to impress their superiors. But these targets are not suitable and not realistic for the locality" (INT28052012).

Targets also remain rigid. Although the earlier example of the freezing rain disaster shows that targets are sometimes adjusted to reflect larger unexpected events, this is more the exception than the rule. For example, one district in Chenzhou, Hunan, did not meet its FYP energy intensity target because a national state-owned power enterprise, Huaren, moved into the district. District leaders escaped punishment only because the municipality still managed to meet its target despite the shortfall in the district. One official in the Economic Commission in the district noted:

> Our district did not meet its energy intensity target of -20% during the 11th FYP because Huaren moved in. We achieved only -7%. But we did not get punished because Huaren was introduced by the municipality and the company pays local taxes mainly to the municipal government, so it was also their responsibility. Municipal leaders did not get penalized because overall they could still fulfill their FYP target. Overall, Huaren moving to our district was a real concern for us and we discussed a lot what to do. In the end, we had to take drastic steps in 2010 and close a lot of coke washing enterprises, which was harsh and resulted in GDP losses. Now another company wants to move into our district, Shenhua, also a coal-fired power plant, and we are currently negotiating with the municipality, because we do not want that Shenhua's energy consumption are included in our district's figures. We now report our monthly progress to the municipal government to ensure annual targets will be met. If one county is falling behind, the county Mayor and Party secretary will be asked for a "talk" with the municipal DRC (INT22052012).

The Huaren case also illustrates another problem with the target system. Huaren is a national-level SOE and county governments have very little regulatory authority since central SOEs answer to Beijing.

Politics of target allocation

Another unintended consequence of the target-based system is the local politics accompanying target allocation. The distribution of targets can become a politicized and sensitive issue, since localities tasked with heavier implementation burdens complain about "unfair" target-setting and local debates about "common but differentiated responsibilities" often take place. As a result, officials tend to set uniform or only slightly differentiated targets for subordinate governments, even though differentiated targets would actually be "fairer". An EPB official in an agricultural county in Northern Jiangsu notes:

> Southern Jiangsu is more developed and their industry structure is very good, but their SO_2 and COD emission targets are the same as ours. This is not reasonable because our industrial sector is small and needs further development. Emission targets are in absolute values and if we increase the number of industrial enterprises, this would also raise our

> emission figures. The targets are neither fair nor scientific; they should be set according to local conditions (INT11062012).

Another official complained "we had overachieved our targets in the 11th FYP and still got much higher targets for the 12th FYP, which seems unfair. We should get lower targets than the other counties" (INT05102012).

Local governments make frequent attempts to negotiate their targets, both before and after targets have been set by their upper tier government, a process that can be very time-consuming. The scope for (re)negotiation of targets seems to vary regionally. For example, one EPB official in one county in Hunan noted: "we can talk to the municipal government about getting some financial help for our targets, but the targets will remain the same" (INT121052012). By contrast, the DRC in a neighboring district was able to negotiate a reduction of energy intensity targets from -20% to -18% (INT23052012). In a few cases, targets were also adjusted downward. For example, one county in Hunan set a goal for the county to reduce energy intensity by -20%, but the municipality adjusted this figure to a reduction of only -16% because the municipal government felt the county's small industrial base justified a less onerous target, thereby also leaving room for future savings in the 13th FYP (INT25052012).

Strategic and cyclical behavior

Unanticipated and undesirable outcomes also result from cadres' cyclical behavior. As the plan "deadline" approaches, pressure on local cadres is intensified, which may lead to manipulated statistics or, worse, drastic and short-sighted responses to meet targets. At the end of the 11th FYP, local governments employed drastic measures to meet energy intensity targets. By the end of 2009, national energy intensity levels had been reduced by just 14.4%, far short of the expected progress and with only one year left to meet the national FYP target of -20% some local officials made unsavory tradeoffs. For example, in one county in Hebei province, the local government cut off electricity to homes and rural villages, and one hospital was even forced to close once every four days. In Wenzhou, one district government implemented a "work-5-stop-10" power rationing practices for large businesses, which was equivalent to working 10 days per month. Power rationing imposed heavy costs on local entrepreneurs while workers earned a third of their usual wages. To make matters worst, some companies switched to diesel-operated generators, which actually increased pollution. Such methods in Hebei, Zhejiang and other regions forced the NDRC to issue an emergency note in September 2010 banning short-term electricity cuts and production limitation methods that affect residential areas and public services. In contrast, at the beginning of 12 FYP in 2011, many localities went back to "business as usual" and the new focus of energy intensity fell on attracting outside companies (i.e., GDP) in order to improve the energy intensity ratio (energy intensity = energy consumed/GDP). In 2013, three years into the 12th FYP, local governments were failing (again) to meet numerous environmental targets, including targets for energy intensity, carbon intensity, nitrogen oxide emissions, and non-fossil fuels (Xinhua, 2013). Given such sluggish implementation in the first half of the FYP, this risks a repeat of the last-minute implementation responses that occurred in 2010.

In addition to these "implementation cycles", local cadres also behave very strategically in terms of how to fulfill binding targets, which can lead to suboptimal outcomes. For example, in Baoding, Hebei, leaders in the municipal Bureau of Garden

and Green Management were given the task to plant gingko trees even though these type of trees not being suitable to Baoding's climatic and soil conditions (Shin, 2014). Leaders thought the trees "look good" and greenifying (*lühua*) the city landscape would help with meeting the forest coverage targets. Many local governments also delayed necessary but timely economic restructuring reforms for their locality and instead focused on eating up the low-hanging-fruit such as closing smaller enterprises. Moreover, some local counties purposely did not implement all possible energy efficiency reduction measures in order to leave room for next FYP.

These five-year cycles also influence reporting practices. For example, the EPB in one county in Chenzhou, actually overfulfilled its COD targets but only reported the minimum, as an EPB official notes:

> Our target for COD reduction in the 11th FYP was -40.1% and we reported to have achieved exactly– 40.1%. We actually had achieved more COD reduction than this, but we did not report it to upper government in order to leave some room for the 12th FYP. But I cannot tell you have much we actually achieved, this is sensitive information (INT21052012).

In other words, setting the target too low can also create inefficiencies, whereby local leaders do not try to maximize environmental protection. Overall, it is clear that most local officials have adopted the attitude of trying to fulfill the minimum required regardless of local capabilities. One official in a county in Shandong explains this as follows:

> The targets that we pay most attention to are GDP growth rate, fiscal income, value added, exports, and foreign direct investment. 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: 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). 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% (see Table A2-A4 in the Appendix). 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 Development Reform Commission, while the EPB does not have much say in this" (INT23052012). When asked why they selected such high growth targets, local cadres 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. For promotion-seeking officials, these are rational decisions since promotions are tied to GDP performance. The pressure to deliver "political achievements" might also result in the selection of sub-optimal projects to fulfill particular environmental targets. 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 to deal with failures as not every town will be able to complete the constructions (INT14052012).

Creativity for target measurement and verification

Government bureaus' ability to measure and verify localities' performance on environmental targets also varies among targets, giving ample opportunities for local cadres to doctor the data in some cases.

Certain targets offer different measurement options and local officials can select their preferred method. Measurement standards of energy intensity, for example, are very abstract and lack clear standards. Some localities measured energy intensity per GDP or per value added in large-scale enterprises. This measure can be problematic because GDP data for the third sector is often unreliable, especially at the county-level and below. For calculating SO_2 or COD emissions, some EPBs estimated savings based on a "per-project" method, while other EPBs adopted the more precise "sum-up" method, which adds up the total emissions of each enterprise (INT10052012).[3] But even EPBs using more advanced calculation methods experience political risk since local leaders may intervene to select the most friendly measurement method.

Targets also differ in terms of how easy it is to verify reported achievements. Recent Global Positioning System (GPS) technologies make it somewhat easier to confirm reported forest coverage rates (INT09052012) and can serve as "the central state's eyes in the sky" (Shue, 2012, p.24). Yet, even GPS has limitations as a monitoring instrument since the technology cannot differentiate between first- 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). For energy intensity targets, there are no purpose-built monitoring equipment in place and reported data relies on self-reported figures from enterprises. We know that many enterprises do not take the time to calculate total energy consumed and often just report electricity usage. The data is sent to the local statistical bureau and collated to provide an aggregate figure. Problems with the data provided by the enterprises is compounded by the fact that local statistical bureaus may be pressured by local leaders to "play with numbers." Only data from very large enterprises bypasses local bureaucracy and is shared directly with the provincial and national statistic bureaus (INT24052012). A government officials outlines the problems with self-reporting:

> 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 taxation bureau. Because companies are afraid

> that they would have to pay more taxes, they 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 is 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 is more accurate, but for official purposes, he still has to use the data from the statistical bureau (INT25052012).

Other environmental targets are much easier to monitor from a technical standpoint but still pose problems due to resource constraints. For COD and SO_2 targets, monitors are installed in larger companies. But this monitoring equipment is often not technically advanced, unreliable and too few in number (INT10052012). For some environmental targets, monitoring equipment is also entirely absent. The EPB in one county in Shandong, for example, lacked monitors to control electroplating factories that emitted high concentrations of heavy metals (e.g., Cd and Pb) (INT14052012).

Monitoring and verification of targets are also frustrated by local interference. For example, one county official noted that energy consumption data from different bureaus are discussed during a county joint committee and that the Mayor has some say on the final reported figures (INTanonymous). Overall, these collected COD and SO_2 data from monitors can only serve as a reference (*cankao*) and many counties continue to rely on monthly or quarterly inspection visits to larger companies (INT10052012). Although very onerous on staffing requirements, sending frequent inspection teams is seen to be quite necessary given the data problems. Inspection teams sent from the national Ministry of Environmental Protection to the provinces have rejected 30% to 50% of claimed SO_2 reductions by some provinces (Schreifels et al., 2012).

Discussion

The choice of binding environmental targets as the main environmental management instrument yields a number of desirable results. First, binding targets help the Chinese Communist Party to move environmental issues quickly onto the policy agenda of local governments and state-owned enterprises. Second, as targets are passed down the administrative hierarchy, discretion in target allocation allows for some flexibility in factoring in local circumstances. This flexibility is particularly important in a country as regionally diverse as China.

The results also show that this regulatory tool produces multiple unanticipated and undesirable results. As mandatory environmental targets cascade downward through the administrative hierarchy, targets can become inappropriate, rigid, and inflated. Officials in many localities also expressed the view that binding environmental targets aggravate cyclical behaviors among cadres and pressures for target fulfillment can result in eleventh-hour, short-sighted actions. Moreover, under the current system, the self-reported data by local governments is frequently incomplete, inaccurate, or outright false. In the absence of trustworthy monitoring and verification processes, binding targets as the main command-and control instrument in China can be more accurately described as “command without control”, since the target-setting central government does not exercise a high degree of control over implementation processes. By allowing non-compliance to pass through undetected, the central government

ultimately sends very mixed signals to local governments about the importance of environmental protection relative to other objectives.

Furthermore, the current target-based approach offers few opportunities for non-governmental agencies or citizens to provide input or feedback. Especially at the local level, there is an absence of dialogue between non-governmental agencies, citizens and local governments in how best to allocate, implement, or monitor targets and the local and central party-state continues to play the dominant role in environmental regulation and supervision in China. This finding echoes the results by Rooij, Stern, and Fürst (2014), who argue that while many non-governmental actors have entered the regulatory landscape, they are either co-opted or controlled by the larger party-state.

The findings reveal, too, that the effectiveness and efficiency of binding targets varies across environmental issues. Environmental targets might be more suitable for environmental issues that have a single identifiable source of pollution (point source pollution), such as local mining operations causing a particular non-ferrous metal pollution. By contrast, targets tend to be less effective regulatory instruments for environmental issues with diffuse sources of pollution. For example, in the case of water pollution, the many different sources of pollution (e.g., pollution caused by a mix of industrial discharge, road construction and polluted runoff from agriculture) make effective implementation harder as such problems require ongoing coordination and cooperation among multiple government departments and stakeholders. Targets differ widely in terms of their ease of measurability, verifiability, and the extent to which they are bound up with economic and social issues. At the moment, the target system works best for relatively simple and verifiable environmental objectives and outcomes, but less well for environmental areas where outcomes are not easily measured and compared across localities. While reported progress on increasing forest coverage is relatively easy to verify using GPS, 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.

These unintended and undesirable consequences of China's approach to green planning have a number of policy implications. First, it implies that simply widening the number of binding environmental targets, as was done in the transition from the 11th to the 12th FYP, is in itself not a guarantee of continued progress. Binding targets are not a magic bullet and, in order for the system to gain credibility, establishing reliable data monitoring and verification systems is a matter of key importance. While the political constraints of an authoritarian regime like China's makes the establishment of a truly independent regulatory agency unlikely, the central government could feasibly transfer more monitoring and verification authority to higher-level administrative agencies. Recentralizing data collection and monitoring capacities would narrow the scope for local interference in the reporting system, thereby creating a more trustworthy baseline from which to set targets and penalties. In addition, increased environmental transparency and strengthening of civic organizations' rights can increase societal supervision, a means of mobilizing additional pressure on local governments and enterprises to cut pollution.

Chinese planners have recently taken a few steps in this direction. In order to curb cyclical behavior observed at the end of the 11th FYP period, Beijing has put more emphasis on achievement of annual targets instead of accumulated five-year targets. Negotiations among bureaucrats are also being built into the planning process to correct inappropriate targets that are mismatched with local circumstances, as the Jiangsu wetland example illustrates. Some localities have also started to include feedback

mechanisms in order to allocate targets more fairly by, for instance, posting preliminary targets on their website and inviting open feedback from subordinate government officials as well as the public. In addition, since early 2014, 15,000 large enterprises are required to report real time data on water and air pollution. Access to emission data helps residents to identify local polluters and makes it harder for local governments to close an eye to local polluters. In April 2014 changes to China's Environmental Protection Law were introduced that bring sharper instruments to bear on non-compliant enterprises or local governments. The new law removes caps on pollution fees, introduces criminal punishments to those evading or manipulating pollution monitoring schemes, and strengthens the right for NGOs to sue local polluters under certain conditions. All of these measures add muscle to China's evolving target-based implementation approach but, as yet, it is too early to see if they can correct the numerous unintended or undesirable consequences.

Conclusion

These findings offer insights into a number of wider ongoing debates about environmental regulation in authoritarian and democratic regimes. In authoritarian and democratic systems alike, introducing binding environmental targets can quickly shift environmental issues up the political agenda. Moreover, the process of agreeing on and allocating binding targets is heavily politicized in all political systems and, in China as elsewhere, there is much debate around who should carry the main burden of policy implementation.

But despite these similarities, embedded as it is in a strong one-Party state, China's target-based implementation approach differs markedly from regulatory models in liberal democracies. In the PRC, the A to Z of the policy process is, ultimately, overseen by the Chinese Communist Party, leaving very little room for non-governmental organizations or independent regulatory agencies to provide outside input and feedback. In this context, environmental targets are decided in conjunction with the Party's ongoing priorities. On the one hand, this is a boon to the cause of environmental protection since the Leninist system structures goal consistency between local and central officials. The system also allows for the allocation of binding environmental targets to Party secretaries in charge of large state-owned enterprises, giving the system a much broader coverage of the economy as compared to western democracies. On the other hand, due to dominance of the Party-state, no independent regulatory agencies currently exist and it is difficult to imagine that they could.

While this analysis has identified features of environmental governance in China that one would find in other authoritarian regimes – for example, misinformation is a perennial problem for autocrats – the idiosyncratic features of "authoritarian environmentalism with Chinese characteristics" defy the easy application of policy lessons for other countries, authoritarian and not, in the Global South. China's highly unusual brand of "decentralized authoritarianism" (Landry, 2008) confers a high degree of state capacity in regulatory implementation across different administrative levels. Under such a decentralized structure, targets can be easily passed down the administrative levels, and each level has considerable capacity to devise strategies and projects to meet particular targets. Notwithstanding shortcomings in the environmental bureaucracy, the existence of high administrative capacity at sub-national levels sets China apart from most countries in the Global South. For example, India has been described as a "flailing state", whereby the national administration is increasingly

detached from the "limbs" at the local level (Pritchett, 2009). If other countries in the Global South were to follow China's lead in choosing binding environmental targets as a regulatory tool, considerable investments in building state capacity at subnational levels will likely be necessary.

Another highly salient aspect of the Chinese approach is the embedding of environmental targets in the cadre management system, which comprises a strong incentive system. At each administrative level, binding environmental targets are linked to government officials' annual evaluations that are the basis for promotion and bonus decisions. Without such a strict human resource management system, local implementers would be unlikely to heed environmental targets so closely. However, there are considerable downsides to the ubiquity of the Leninist state for environmental protection. The comparative literature from Global South countries shows that regulation can be improved through giving courts and prosecutors larger roles. In Brazil, prosecutors were very effective in initiating civil litigation against polluters (Shi and Van Rooij, 2014). While prosecutorial civil litigation has served environmental objectives in other countries in the Global South, in China, prosecutors are themselves subject to the very same target-based incentive system described in this paper meaning that their capacity to push for change is limited. These differences highlight the importance of paying close attention to institutional settings when devising regulatory responses and looking to the opportunities offered by juridical tradition and local societal and political structures.

References

Caijing, 2010. Behind the absurd drama of emission reduction (*jian pai huangdan ju beihou*), http://magazine.caijing.com.cn/2010-09-26/110530293.html, accessed on May 28th, 2014.

Chen, Y., Jin, G.Z., Kumar, N., and Shi, G., 2013. Gaming in Air Pollution Data? Lessons from China, NBER Working Paper No. 18729.

China Daily, 2012. Air monitoring system comes under fire, by Zheng Xin, http://usa.chinadaily.com.cn/china/2012-10/07/content_15799217.htm, accessed on May 28th, 2014.

Conrad, B., 2012. China in Copenhagen: Reconciling the "Beijing Climate Revolution" and the "Copenhagen Climate Obstinacy", *The China Quarterly*, 210, 435-455.

Eaton, S. and Kostka, G., 2014. Authoritarian Environmentalism Undermined? Local Leaders' Time Horizons and Environmental Policy Implementation, *The China Quarterly,* 218, 359 - 380.

Field, B. C., 1994. *Environmental Economics- An Introduction.* New York: McGraw-Hill, Inc.

Ferguson, J., 1990. *The Anti-Politics Machine: 'Development', Depoliticization, and Bureaucratic Power in Lesotho*, Cambridge: Cambridge University Press.

Golding, W. F., 2011. Incentives for Change: China's Cadre System Applied to Water Quality, *Pacific Rim Law & Policy Journal*, 20 (2), 399-428.

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 28th, 2014.

Harrison, T. and Kostka, G., 2014. Balancing Priorities, Aligning Interests: Developing Mitigation Capacity in China and India, *Comparative Political Studies*, 47 (3), 449 - 479.

Hill, M. and Hupe, P., 2002. *Implementing Public Policy: Governance in Theory and in Practice*, London, UK: SAGE Publications Ltd.

Kostka, G. and Hobbs, W., 2012. Local Energy Efficiency Policy Implementation in China: Bridging the Gap between National Priorities and Local Interests, *The China Quarterly*, 211, 765-785.

Kostka, G. and Mol, A., 2013. Innovations and participation in China's local environmental politics: Challenges and Innovations, *Journal of Environmental Planning and Policy*, 15 (1), 3-16.

Landry, P. F., 2008. *Decentralized Authoritarianism in China: the Communist Party's Control of Local Elites in the Post-Mao Era*, Cambridge: Cambridge University Press.

Lo, A. L., (2013), Carbon trading in a socialist market economy: Can China make a difference?, *Ecological Economics*, 87, 72-74.

O'Brien, K. and Li, Li., 1999. Selective Policy Implementation in Rural China. *Comparative Politics*, 31, 167-186.

People Daily, 2013. NDRC: Energy conservation situation is grim in China, http://english.peopledaily.com.cn/90882/8324159.html, accessed on May 20th, 2014.

People Daily, 2014. Only 3 Chinese cities met AQI standard: Official http://english.peopledaily.com.cn/90882/8559674.html, accessed on May 20th, 2014.

Plattner, M. F., 2009. Democracy and the Economic Crisis, *Washington Post*, January 13.

Pritchett, L., 2009. Is India a Flailing State?: Detours on the Four Lane Highway to Modernization. HKS Faculty Research Working Paper Series RWP09-013, John F. Kennedy School of Government, Harvard University.

Przeworski, A., 1990. *The state and the economy under capitalism*, New York: Harwood Academic Publishers.

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.

Rietbergen, M. G. and Blok, K., 2010. Setting SMART targets for industrial energy use and industrial energy efficiency, *Energy Policy*, 38, 4339-4354.

Santalco, A., 2012. How and when China will exceed its renewable energy deployment targets, *Energy Policy*, 51, 652-661.

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.

Shi, Y. and Van Rooij, B., 2014 Prosecutorial Regulation in the Global South: Environmental Civil Litigation by Prosecutors in China compared to Brazil, paper under review at *Regulation & Governance*.

Shin, K., 2014. The City and the Agency: A Study of the Rise and Fall of Low-Carbon City in Baoding, China, 1992-2011, Unpublished PhD diss., Massachusetts Institute of Technology.

Shue, V., 2012. Governing by Design: A Strategic Plan to Re-Engineer the Chinese Nation-Space, Paper Presented at the Conference on "Power in the Making: Governing and Being Governed in Contemporary China", Oxford.

Stern, R., 2013. *Environmental Litigation in China- A Study in Political Ambivalence*, Cambridge: Cambridge University Press.

Stone, D. A., 1989. Causal Stories and the Formation of Policy Agendas, *Political Science Quarterly*, 104 (2), 281-300.

Van Rooij, B., 2006. Implementation of Chinese environmental law: regular enforcement and political campaigns, *Development and Change,* 37 (1), 57–74.

Van Rooij, B., Stern, R.E. and Fürst, K., 2014, The Authoritarian Logic of Regulatory Pluralism: Understanding China's New Environmental Actors, special issue under review at *Regulation & Governance*.

Wang, A. L., 2013. The Search For Sustainable Legitimacy: Environmental Law and Bureaucracy in China, *Harvard Environmental Law Review*, 37 (2), 365-440.

Wang, S., 2006. Regulating death at coalmines: changing mode of governance in China. *Journal of Contemporary China*, *15*(46), 1-30.

Xinhua, 2013. China gets tough on environmental targets, http://news.xinhuanet.com/english/china/2013-12/25/c_132996338.htm, accessed on May 30th, 2014.

Xinhua, 2014. China declares war against pollution, http://news.xinhuanet.com/english/special/2014-03/05/c_133163557.htm, accessed on May 30th, 2014.

Notes

[1] The majority of these binding environmental 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.

[2] The public policy literature is often interested in assessing the effectiveness of policy implementation, which requires a judgment or a qualification of "success" or "failure" (Hill and Hupe, 2002, p. 10). Along a similar logic, I use "desirable" and "undesirable".

[3] The "per project" calculation is very inaccurate as it takes the pollution emission from last year (say 100 tons), and then calculates savings from ongoing projects (e.g., two enterprises improving their COD and SO_2 standards and thereby saving 15 tons) and reports the difference (here it would be 100 tons-15 tons =85 tons). However, this calculation does not take into account changes in production, which, of course, also influences emission levels.