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China's evolving green planning system: Are targets the answer?

by

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Abstract

China's national leaders have recently set ambitious goals to restructure and diversify the economy towards a more resource-efficient and sustainable growth path. To address the growing national environment and energy concerns, leaders introduced several binding environmental targets for government departments and large enterprises. The heavy reliance on a target-based implementation approach raises questions about the effectiveness of this strategy in the short and long run for environmental governance in China. Based on fieldwork in Jiangsu, Hunan, and Shandong provinces in 2012, this paper studies the desirable and undesirable outcomes of binding environmental targets in China's evolving green planning system. This paper argues that environmental targets have a signaling function that has resulted in ecological issues movement onto local governments' core policy agendas. However, in the nascent green planning system, classic planning problems have generated undesirable consequences such that that environmental targets are not always achieving their intended goals. Strategic and cyclical behavior by local government officials in leadership positions often lead to short-term maximization actions instead of long-term innovative environmental management. This analysis of local leaders' responses to top-down targets aims to generate a more realistic picture of what binding environmental targets can and cannot achieve.

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

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Content

1 Introduction

Mounting global environmental crises have fed debate about what types of policy instruments and strategies are most conducive to addressing resource scarcities and environmental degradation. Within this debate, the relative merits of command and control versus market-based approaches have attracted particular scrutiny. Analyses of both types of instrument have tended to focus on the requisite political scaffolding in democratic systems, especially legislators' choice of policy instruments as well as the character of legal structures necessary for effective environmental enforcement (e.g., Goulder and Parry, 2008, Keohane et al. 1998, Wiener, 1999). Authoritarian systems operate by different rules and, as yet, very little is known about how command and control and market-based instruments actually function (or do not) in authoritarian contexts.

Recent innovations in China's approach to environmental management make it a particularly relevant case to study how command and control mechanisms work in authoritarian regimes. China's two most recent national Five Year Plans (FYPs), the 11th (2006-2010) and 12th (2011-2015), outline China's ambitions to change lanes from a heavily polluting, growth-at-any-cost model to a resource-efficient and low carbon model.[1] China has employed a mix of top-down command and control and market-based mechanisms to propel the switch to a resource-efficient and low carbon growth path.[2] 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).

Since 1999, 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 eco-system services to improve water, air, forest, and soil management (Kostka and Shin, 2013; Liang and Mol, 2013; Shin, 2013). 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", 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 an 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.[3] 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 soft and hard 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. Given severe shortcomings in China's environmental litigation system (Lo, 2006; Stern, 2013), leaning on a legal approach to environmental enforcement was deemed not to be a realistic option (Shue, 2012). Instead, Beijing chose the path of least resistance and relied on the target-based approach to steer local leaders toward greener growth. 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 often 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. The fruition of such policies is out of sync with the cadre rotation system which strongly incentivizes local cadres to undertake initiatives which yield results in the short term (Eaton and Kostka, 2014). 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.

This research contributes to scholarly discussion by providing an empirically-grounded analysis of the desirable and undesirable consequences of binding environmental targets in China's evolving green planning system. Most existing 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. Previous works have analyzed implementation of one specific environmental target in one particular region or have taken a microscope to the implementation methods and

strategies in particular localities.[4] 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 targets in terms of measurability, verifiability and implications for economic and social issues. As well, a number of different aspects of the target system are considered, including the selection, allocation, implementation, and verification of environmental targets. While the elevation of environmental targets to binding status has been applauded (Fulton, 2011), the ultimate success of this system depends, of course, on whether or not binding environmental targets actually result in desirable policy outcomes at the local level.

The analysis is drawn from 58 interviews conducted in Hunan, Jiangsu, and Shandong in 2012.[5] In each of the three provinces, interviews were conducted with municipal bureaucracies in charge of China's nine binding targets, followed by interviews in one to three counties or districts within that 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. The majority of interviewees were conducted with local officials from Development and Reform Commissions (DRC), Environmental Protection Bureaus (EPB), Economic Commissions, Construction Bureaus, Forestry Bureaus, Water Resource Bureaus, Finance Bureaus, and Statistical Bureaus, as well as a small number of enterprise managers. 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 non-desirable unintended consequences. In addition to interviews, the analysis draws from government policy documents and reports and available secondary sources.

2 Environmental Green Planning, State Capacity, and Policy Outcomes

The environmental politics literature generally notes that while market-based instruments in principle have an edge over command and control mechanisms in terms of their flexibility and their efficiency, this does not always hold in practice. Market imperfections can be so substantial, that command and control tools often become the main instruments to improve environmental governance (Baumol and Oates, 1975; Gunningham, 2012).

Among different command and control instruments discussed in the literature, the most common instruments are performance-based and technology-based 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). The advantage of standards is that they can be simple and direct, and that they can be set on different bases. For example, 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, while 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 SO2 emissions) (Stavins, 2003). 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 can

be a complex decision. The more that standards are fitted to a particular situation, the more impact they can be expected to have, but this also implies significant information-gathering costs for planners. As a result, authorities often tend to apply more 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 (Ma and Ortolano, 2000). 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).

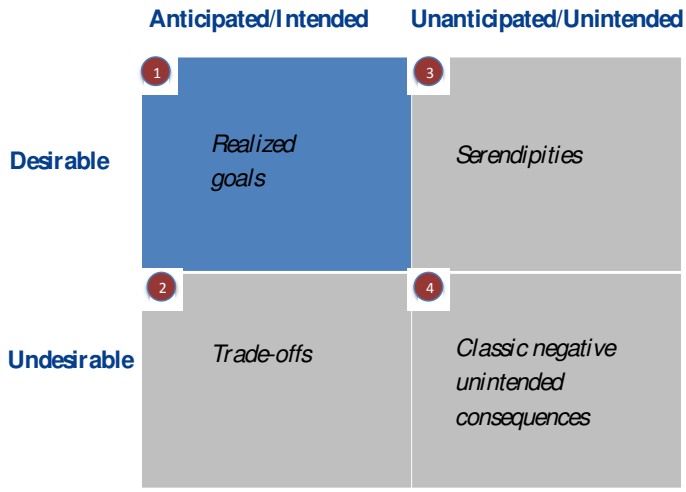
The existing literature on standards has focused primarily on the functioning of standards in western democracies. Yet, traditional standards set in western democracies and top-down binding environmental targets in China differ in term of the selection, allocation, implementation, and verification processes. 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 more advanced 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. It differentiates between policy outcomes that are intended or anticipated and those that are not. There is a further distinction made between outcomes that are desirable and others that are not.[6] The upper left quadrant, "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. Outcomes in this category might call for central planners to search for ways to mitigate those undesirable consequences (Stone, 1989).

Figure 1: Policy Outcomes Framework



Source: Adopted from Stone (1989) and Bloomrosen (2011)

The mismatch between desired and actual outcomes is the combined result of weak state capacity and the inherent downsides of target-based implement approaches. As targets get pushed down from the top to the bottom, it is unavoidable that local behavior and agency influence outcomes, especially in a context where local leaders have room for maneuver in how to respond to central directives and targets. Local governments work under systemic constraints and existing financial, technical, or political capacity restrictions influence environmental policy outcomes (Van Rooij, 2006; Lo et al., 2012). Limited financial capacity can, for instance, lead to shortages of needed inspection vehicles, up-to-date testing equipment, and skilled staff. Political capacity constraints can result from the conflicting priorities of implementing agencies as well as coordination difficulties (Ran, 2013). Constraints in technical capacity can result from insufficiently-trained staff in implementing agencies.[7] At the same time, 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.

3 Anticipated and desirable outcomes

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

Move environmental issues on the policy agenda

First, the incorporation of mandatory environmental targets into the national FYP in 2006 had the effect of sending important signals to local leaders. These binding environmental targets served as an indicator of how much emphasis local governments should place on environmental and energy efficiency policies as compared to other policy priorities (Harrison and Kostka, 2014). 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*), differentiated utility pricing, and cutting off utilities for non-cooperative enterprises (*duandian duanshui*).

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 us, including the City Management Bureau, Finance Bureau, Transportation Bureau and Water 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).

Interviews with other departments stressed that binding targets have increased pressure on local cadres and enterprise managers. As a result, environmental issues such as air and water pollution, energy efficiency, and forest coverage have quickly become a priority issue for local government officials. As an environmental management tool, binding environmental targets are therefore especially useful in early policy implementation stages, when it is important to move an issue quickly on to the priority list of local governments.

Scope for local adaptations and modifications to targets

A target-based environmental management approach also permits far more flexibility than one might assume. When targets are passed down the administrative hierarchy, they are often tailored to regional circumstances. In addition, the occurrence of crises or unforeseen problems can trigger adjustment of targets. Local governments were 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. [8] Tables A2-A4 in the Appendix summarizes the way in which different environmental targets have

"trickled down" from the provincial to the county levels in Shandong, Hunan and Jiangsu. 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.[9] 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. 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.42). 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. Target declined because local leaders believed that there would be less and less room to achieve additional energy savings (INT25052012)

The target-based system is also responsive to unexpected events or disasters. For example, because of a freezing rain disaster in 2008, Chenzhou municipality only achieved a forest coverage rate of 63.6% at the end of the 11th FYP, which fell short of their assigned target of 65%. However, because the disaster was large and affected many localities in southern China, 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).

In sum, by giving localities the discretion to allocate targets in their localities as they see fit, the target-based system allows for local adaptations, which is crucial in a country as diverse as China. Even if the fulfillment of targets fails, the up-and down processes of feedback and consultation involved in the process of planning and allocation of targets may be indispensable for coordinating action between different administrative government levels (Heilmann and Melton, 2013).

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".[10] 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 used to show that Beijing is taking actions to address China's environmental crisis. For example, at the end of the 11th FYP, Beijing announced that the national SO2 and

COD targets were over-fulfilled and energy intensity targets were "almost" met. 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 is doing everything possible to realize announced goals 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 create the appearance of effective governance, thus ultimately furthering the Party's legitimacy.

4 Anticipated but undesirable outcomes

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

Sidelining of other targets

Picking nine binding environmental targets also means neglecting other environmental targets and issues. For instance, there are no binding targets for water efficiency in the agricultural sector, despite serious water mismanagement problems reported in agricultural irrigation practices (INT08052012). Another example is fine particulate (PM 2.5) pollution targets, which mainly comes from automobile usage or burning plants. PM 2.5 targets were absent until 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". Most officials admitted that they would only take it seriously if the central government would start taking it seriously. In late 2012 the Ministry of Environmental Protection finally ordered 74 cities to publish daily records on PM2.5 levels. The decision came after, intense external pressure from the US Embassy in China - which began reporting PM2.5 levels in Beijing – and the subsequent increase of open public complaints about unacceptable PM2.5 levels (China Daily, 2012). Focusing attention 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 will engage in "selective policy implementation" (O'Brien and Li, 1999). 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, China's local officials face many pressing local issues, including the need to increase employment, reduce the urban-rural income gap, reform rural land ownership, and improve the provision of affordable housing and health care services. Many of these priorities are of crucial importance as failing to address them could imperil domestic social and political stability.

Fieldwork provided also multiple examples in which ill-fitting targets resulted in non-compliance by local governments. For example, in one county in Hunan, local officials received simultaneously an annual GDP growth target of 15% and a strict zoning target of 76%, prescribing that three quarters of the local land is "development restricted" and therefore not usable for economic purposes. As a result, conflicts might arise between ambitious local growth targets and binding environmental targets.

Data faking

There is also widespread awareness that environmental data collection and monitoring are often imprecise or manipulated (Hsu et al., 2012; Wang, 2013; Chen et al., 2013). Local governments have no incentives to uncover and report subordinate governments' implementation failures upwards since revealing these implementation failings could tarnish their own record of achievements. This is so because when in a locality one level does not meet their targets (e.g. county), it will, in theory, be reflected in the aggregated data the next administrative level up (e.g. municipality). Thus, given these perverse incentives, local governments frequently "wave through the data" or report that they "almost met the targets" or "just met them". 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 falsifications in Chinese environmental statistics are also widely acknowledged, and are openly discussed among Chinese government agencies and in the official Chinese media (e.g., China Daily, 2003; Caijing, 2010; Xinlang News, 2011). By elevating many onerous environmental targets to a binding status with veto power, this provides local officials with additional incentives to be "creative" with reporting their performance. For example, local officials have a certain amount of discretion when it comes to verifying targets, including which enterprises to inspect or on which day to visit a lake to test its water quality (Shin, 2013). There are also many examples where local governments fabricated data in last minute attempts to fulfill their targets. One locality, for example, reported energy savings from already bankrupt companies (INT22052012). The combination of varied verification methods for targets and weak monitoring capacity leaves substantial room for cadres to play the "numbers game" (*shuzi youxi)* with their superiors.

5 Unanticipated but desirables 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.

Bundling of different targets

Perhaps most surprising is how environmental targets have been reconciled with other equally pressing targets at the local level. Local leaders devised various strategies to make the implementation of environmental policies more attractive, or less unattractive, in order to bring different local interest groups on board. Officials "bundled" costly environmental policies with other local priorities in order to facilitate the implementation of some or all of the

policies in the composite bundle (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. 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). In summary, the introduction of binding targets increased pressure on local cadres, bringing forth creativity and policy innovation during the implementation process.

6 Unanticipated but undesirables outcomes

While, to some degree, non-compliance is to be expected, there are also negative unintended consequences that are themselves products of the system in ways unforeseen by planners. Picking the "right target" is difficult as targets can be inappropriate, rigid, and can get inflated as they get passed down the administrative hierarchy. Moreover, the target-based system can trigger cyclical behavior among cadres in charge of target implementation, leading to suboptimal policy outcomes.

Inappropriate 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 might also not fully represent local conditions, and, as a result, the most urgent local environmental protection priorities might be untouched by the target system. For example, Chenzhou's heavy non-ferrous mining industries caused heavy metal 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 pollution issue in this locality was tackled much later than it might have been in the absence of binding targets (INT23052012). Some targets might even end up being very inappropriate to local circumstances. In one county in Yancheng, Jiangsu, one 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 and we only achieved 15.9%. Our county is located in a coastal wetland area with high soil salinity, which makes this takes 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 "*linmu* coverage rate". Using the "*linmu* 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 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".[11] 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 to differentiate targets (INT29052012), targets might not be allocated in the most optimal way reflecting the implementation capacity of local enterprises and subordinate governments.

In addition, as binding environmental targets get passed down to lower tiers of government and bureaus, sometimes unrealistic or unreachable targets are allocated to subordinate governments. Provincial and municipal government officials often inflate environmental targets when passing them down 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. 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 in Chenzhou showed that sometimes targets can be 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 notes:

> 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 authority over them despite these SOEs operating in their locality.

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 task, since giving some localities higher targets than others can be perceived as "unfair" and give rise to local debates about "common but differentiated responsibilities".[12] Often local 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 SO2 and COD emission targets are the same as ours. This is not reasonable because our industrial sector is small and need some room for 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 heavily 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 rare cases, targets also got 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 that because the county has a small industrial foundation, -16% was more "suitable" and the county should leave room for the 13th FYP (INT25052012).

Strategic and cyclical behavior

Unanticipated and undesirable outcomes also include strategic behaviors by local government officials. Given that targets are time-bound, this triggers frequent cyclical behavior among cadres. As the "deadline" approaches, this generally intensifies the pressure on local cadres, which may lead to manipulated statistics or, worse, drastic and 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 last minute 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, one district government implemented a

"work-5-stop-10" power rationing practices for large businesses, which was equivalent to working 10 days per month. This power rationing reduced the production for local entrepreneurs and local employees only could earn a third of their usual wages. To make matters worst, some companies switched to diesel-operated generators, which actually increased pollution (Finance Sina, 2010). Such 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 (Shanghai Zhangquan Bao, 2010). 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 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 by municipal to plant gingko trees despite these type of trees not being suitable to Baoding's climatic and soil conditions (Shin, 2013). Leader's thought the trees "look good" and greenifying (*lvhua*) 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 "low-hanging-fruits". Moreover, some local counties purposively 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. The above statement also shows that environmental data is often political in nature. Overall, it is clear that environmental targets continue to be a few among many disparate targets, and as a result, most local officials have adopted a general attitude to only fulfill the minimum required. 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 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). 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.

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.

For some targets, there are 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 (*guimo yi shang*) enterprises. The measure can be problematic because GDP data for the third sector is often not reliable, especially when it gets down to county-level data. Moreover, the energy data used to calculate the measure stems from online reporting systems, where enterprises input their data. Close up examination of such online data systems showed that the majority of enterprises do not take the time to calculate total energy consumed and often just report electricity. For calculating SO2 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).[13] But even if using more advanced calculation methods, local leaders can often pick among different measurement methods.

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) as these latest technologies can serve as "the central state's eyes in the sky"(Shue, 2012, p.24). Yet, even GPS technologies have limits as 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. Self-reported online data gets sent to the local statistical bureau, which then collates all these sheets. Only data from very large enterprises is shared directly with the provincial and national statistic bureaus (INT24052012). A government officials 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 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).

For other environmental targets, reported results can be verified through various forms of monitoring systems. For COD and SO2 targets, monitors are installed in larger companies. This monitoring equipment is reported to be not very technically advanced, unreliable and too few in number (INT10052012). For some environmental targets, monitoring equipment is also sometimes 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). For most of these targets, there can also be local interference with monitoring and verification processes. For example, one county official noted that energy consumption data from different bureaus are discussed during a county joint committee (*lianxi huiyi*) and that the Mayor has some say on the final reported figures (INTanonymous). Overall, these collected COD and SO2 data from monitors can only serve as a reference (*can kao*) and many counties continue to rely on monthly or quarterly inspection visits to larger companies (INT10052012). Although very onerous on staffing requirements as well as time consuming, 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).

7 Conclusion

Over the last decade, Beijing has presided over ambitious efforts to change lanes from a heavily polluting, growth-at-any-cost model to a resource-efficient and low carbon one. To support this switch to a new growth pattern, China has introduced and widened the scope of binding environmental targets as the main environmental management instrument. The heavy reliance on a target-based approach yielded a number of desirable results. First, environmental issues have moved quickly onto the policy agenda of local governments. Second, the target-based system allowed for some flexibility in factoring in local circumstances. Third, the frequent reporting of environmental target fulfillment strengthened the Party's performance legitimacy. Binding environmental targets also came along with a number of anticipated but undesirable outcomes, including some degree of local non-compliance and the "doctoring" of data as targets were pushed through the administrative hierarchy.

While the introduction of binding environmental targets achieved encouraging initial results after completion of the 11th FYP, 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. 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 exist to monitor performance.

Given these numerous unintended and undesirable consequences highlighted in this piece, it would be easy to reach the conclusion that China ought to increasingly promote market-based instruments and shift away from reliance on the planning system to carry through environmental objectives. Yet, recent pilots with emission trading schemes at local levels have often ended in a situation of "market with no business" (*you chang wu shi*) (INT14052012) and failed to be scaled up nation-wide (Shin, 2013). Given that existing experiments with market-based mechanisms are also encountering problems, in the short term it might be more prudent for policymakers to focus on improved the target-based governance system. Simply widening the number of environmental targets, as has been done recently, is, in itself, not a guarantee of continued progress. Instead, it is important to directly address some of these unanticipated and undesirable consequences. In order for the system to gain credibility, central and local governments should build up data monitoring and verification systems. Without efforts to upgrade these checks, the Chinese state is sending mixed signals by allowing non-compliance to pass through undetected.

Chinese planners have recently taken a few steps in this direction. In order to avoid 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. The Jiangsu wetland example further illustrates that negotiations among bureaucrats are ongoing throughout the planning cycle to correct inappropriate targets that are mismatched with local circumstances. 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 cadres as well as the public.

While these are promising changes, in order to tap the real benefits of using an environmental target-based approach, incorporating further flexibility into the system would be beneficial. Many localities expressed the view that the selection and allocation of environmental targets was too rigid and in some cases even wildly ill-suited to local conditions. To address some of these shortcomings, more decision-making power could be delegated to localities. Finally, at the moment, the target system works best for relatively simple and verifiable environmental objectives and outcomes (e.g. forest coverage), but less well for environmental areas with multifaceted, objectives, where outcomes are not easily measured and compared across localities (e.g., energy intensity). To address these problems, planners could perhaps explore differentiated responses for different targets.

Appendix

Table A1: Major Environmental Targets in the 11tn FYP and 12tn FYP

Environmental Targets	Sub-national Implementing Agency	11th FYP Target		11th FYP Actual	12th FYP Target	
Reduction in energy intensity per unit of GDP	DRC, Economic Commission, Construction Bureau, Transport Bureau	-20%	R	-19.1% *(not met)*	-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 value-added of industrial output	Water Resource Bureau	-30%	R	-36.7%	-30%	R
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 (or binding) target; (E) refers to expected target. N/A indicates that no target was stated in the respective FYP.
Source: Adapted from Appendix 2 from Casey and Koleski, 2011.

Table A2: Targets Trickling Down From Provincial to County Level: Shandong

Environmental targets		National	Shandong Province	Weifang Municipality	Fangzi County	Zucheng County
Energy intensity (%)	*11 FYP Target*	-20	-22	-22.5	-20	No target
	11 FYP Actual	-19.1	-22.1	-23.06	-23.06	N/A
	12 FYP Target	-16	-17	-17	-16.5	-14.5
Water: COD (%)	*11 FYP Target*	-10	-14.9*	-18	-18	-18
	11 FYP Actual	-12.45	-19.4	-19.20	-20.27	-23.30
	12 FYP Target	-8	-12	-13.3	-13.3	-13.8
Air: SO2 (%)	*11 FYP Target*	-10	-20	-8.54	-8.54	-8.54
	11 FYP Actual	-14.29	-23.2	-11.85	-9.80	-11.98
	12 FYP Target	-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	-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	-10	-13.3	-16.7	-17.8	-19.6
Forestry coverage (%)	*11 FYP Target*	20	22	N/A	23	35
	11 FYP Actual	20.36	22.8	35.2	23.6	33.5
	12 FYP Target	21.66	25	35	28	38.5
Water consumption per unit of industrial value added （%）	*11 FYP Target*	-30	N/A	N/A	-30	N/A
	11 FYP Actual	-36.7	N/A	-40.09**	-40.04	N/A
	12 FYP Target	-30	N/A	N/A	-30	N/A

Note: N/A = refers to data not available. * The central COD target for Shandong province was -14.9%, but Shandong province set itself a higher target of -18.0%. ** Target for large-scale enterprises.

Economic target		National	Shandong Province	Weifang Municipality	Fangzi County	Zucheng County
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

Table A3: Targets Trickling Down From Provincial to County Level – Hunan

Environmental targets		National	Hunan Province	Chenzhou Municipality	Rucheng County	Suxian County	Zixing County
Energy intensity (%)	*11 FYP Target*	-20	-20	-20	-20	-20(-18)	-20
	11 FYP Actual	-19.1	-20.43	-21	-20.2	-7**	N/A
	12 FYP Target	-16	-16	-18	-16*	-18	-22
Water: COD (%)	*11 FYP Target*	-10	-10	-10	N/A	N/A	-40.1
	11 FYP Actual	N/A	N/A	N/A	N/A	-7	-40.1
	12 FYP Target	-8	-8	-8.5	-8.5	-10	-10
Air: SO2 (%)	*11 FYP Target*	-10	-10	-10	N/A	N/A	-10.3
	11 FYP Actual	N/A	N/A	N/A	N/A	-8	-10.3
	12 FYP Target	-8	-8	-8.3	-8	-8.7	-10
Air: NOx (%)	*11 FYP Target*	No target	No target	No target	No target	No target	No target
	11 FYP Actual	No target	No target	No target	No target	No target	No target
	12 FYP Target	-10	-10	-10	+15	-18	-10
Water: NH4 (%)	*11 FYP Target*	No target	No target	No target	No target	No target	No target
	11 FYP Actual	No target	No target	No target	No target	No target	No target
	12 FYP Target	-10	-10	-9	-8.5	-8	-10
Forestry coverage (%)	*11 FYP Target*	20	55	65	70	N/A	75
	11 FYP Actual	20.36	57	63.65	73.69	66.1	67.3****
	12 FYP Target	21.66	>57	65	75	67.5	72
Water consumption per unit of industrial value added （%）	*11 FYP Target*	-30	N/A	-44	N/A	N/A	-2% per year
	11 FYP Actual	-36.7	N/A	-44.47	N/A	N/A	N/A
	12 FYP Target	-30	-30	-30	-30	-30	-3% pear year

Note: "N/A" = refers to data not was collected but data might be available. "No target" shows that no target was set. * Target for large-scale enterprises. **A new company, Huaren, moved into the county in 2007. After Suxian complained, their energy intensity target was lowered from -20% to -18%. **** Target was not fulfilled because of a freezing rain disaster in 2008.

Economic target		National	Hunan Province	Chenzhou Municipality	Rucheng County	Suxian County	Zixing County
GDP growth rate (%)	*11 FYP Target*	7.5	10	12	12	13	12.5
	11 FYP Actual	11.2	14	11.6	-3.5	-14.2	15.5
	12 FYP Target	7	>10	13	15	17*	>15

Note: *GDP growth target was initially set even higher but the municipality lowered it.

Table A4: Targets Trickling Down From Provincial to County Level – Jiangsu

Environmental targets		National	Jiangsu Province	Yancheng Municipality	Dafeng County
Energy intensity (%)	*11 FYP Target*	-20	-20	-20	-20
	11 FYP Actual	-19.1	>-20	-17.9	-19.89
	12 FYP Target	-16	-16	-17	-18
Water: COD (%)	*11 FYP Target*	-10	-10	-10	-10
	11 FYP Actual	-12.45	-12.8	-11	-10.5
	12 FYP Target	-8	-11.9	-9.56	-11
Air: SO2 (%)	*11 FYP Target*	-10	N/A	N/A	N/A
	11 FYP Actual	-14.29	N/A	N/A	N/A
	12 FYP Target	-8	-13.3	-6.47	-7
Air: NOx (%)	*11 FYP Target*	No target	No target	No target	No target
	11 FYP Actual	No target	No target	No target	No target
	12 FYP Target	-10	-17.5	-6.3	-7
Water: NH4 (%)	*11 FYP Target*	No target	No target	No target	No target
	11 FYP Actual	No target	No target	No target	No target
	12 FYP Target	-10	-12.9	-10.78	-11
Forestry coverage (%)	*11 FYP Target*	20	20	20	20
	11 FYP Actual	20.36	20.6	19	15.9
	12 FYP Target	21.66	22	23	23
Water consumption per unit of industrial value added (%)	*11 FYP Target*	-30	N/A	N/A	N/A
	11 FYP Actual	-36.7	N/A	N/A	N/A
	12 FYP Target	-30	-25	N/A	N/A

Note: N/A = refers to data not available.

Economic target		National	Jiangsu Province	Yancheng Municipality	Dafeng County
GDP growth rate (%)	*11 FYP Target*	7.5	>10	N/A	N/A
	11 FYP Actual	11.2	13.5	13.9	14.5
	12 FYP Target	7	10	>13	>14

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Notes

[1] The 11th FYP established conservation, efficient use of resources and economic transformation in the interests of sustainable development as a "basic national policy" (*jiben guoce*). The 12th FYP has deepened Beijing's vision for upgrading and restructuring the economy by offering specific guidance on how to shift to higher value-added manufacturing, improve the conservation of energy and resources, and develop service industries.

[2] 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).

[3] 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 flaring up across China – pollution prompted 51,000 public disputes in 2005 alone (China Daily, 2006) – meant that environmental issues increasingly caused local disruptions and complains, threatening social stability.

[4] Previous studies analyze target implementation for air quality (Schreifels et al., 2012; Wang and Hao, 2012), water quality (Golding, 2011; Li et al., 2011), energy intensity and carbon intensity (Zhang, et al., 2011; Jun and Wang, 2012; Kostka and Hobbs, 2012), and hydro, wind and solar (Santalco, 2012). Wang (2013) studies China's target system more in general, but the analysis concentrates on energy saving and emission reduction targets only.

[5] Interviews for this research were conducted in the three municipalities Chenzhou (Hunan), Yancheng (Jiangsu), and Weifang (Shandong). The three municipalities were selected because they differ in terms of economic structure. Chenzhou in Hunan is a resource-rich municipality in central China with mining and smelting activities accounting for the major share of local GDP. Yancheng in Jiangsu and Weifang in Shandong are predominantly agricultural municipalities in coastal region. The localities nicely complement former fieldwork on energy policy implementation in coal-rich municipalities in Shanxi and Inner Mongolia in 2010 and 2011.

[6] 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".

[7] The severity of financial, political, and technical constraints varies largely between local government agencies in charge of enforcing China's binding environmental targets. For example, the Development and Reform Commission (DRC) as the agency in charge of energy intensity holds a wider net of bureaucratic links and access to investments and 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 restricts the environmental approvals of all new projects. By contrast, local Water and Resource Bureaus (WRB) do not have the same range of enforcement tools available to enforce water consumption targets. For example, in Chenzhou, the municipal WRB reported that they had no enforcement authority to punish enterprises which violated water consumption rules. The WRB even lacked the authority to get industrial value-added figures for local enterprises from the Statistical Bureau, therefore having little ability to estimate how much water local enterprises consume (INT29052012).

[8] *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.

[9] As a general trend, environmental targets seem to be more often differentiated at the provincial and municipal level, while uniform targets are more prevalent at the county and town level. The degree of differentiation of targets can also change over time. For example, in the 11th FYP, provincial targets for energy intensity ranged from 12% to 25%. During the 12th FYP, the differentiation between provincial targets was smaller, ranging from 10% to 18%. One possible explanation for imposing more uniform targets is that most energy-intensive provinces had already closed energy inefficient companies during the 11th FYP and improving energy efficiency increasingly becomes harder.

[10] "Performance legitimacy" refers to China's approach to derive political legitimacy from achieving particular goals, such as economic growth and social stability (Plattner, 2009).

[11] Rucheng is a national poverty county. Chenzhou municipality restricts investments in Rucheng to ensure it can keep its "poverty county" status.

[12] For example, county leaders in Weifang 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 deciding energy intensity targets. 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 (INT14052012).

[13] 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 SO2 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.

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