

# China's war on air pollution: Can existing governance structures support new ambitions?

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## 1. Introduction

China's attention to environmental protection has evolved along with its development model. Over the past ten years, the government has emphasised a shift away from previous reliance on heavy industry, investment-driven growth toward a service sector-oriented, consumption-driven growth model, although only recently has this shift begun in earnest. Especially after an acute episode of bad air quality over Beijing in January 2013,<sup>1</sup> the government has shown increasing resolve to tackle the problem of air pollution, issuing a series of State Council edicts that call for sharp curbs on polluting industries.<sup>2</sup> These changes came largely in response to a recognition that past policies were not doing enough to curb activities contributing to air pollution, especially the formation of PM<sub>2.5</sub>, which carries the most severe health effects. These changes have attracted international attention and praise, both for their impacts on air pollution as well as their potential to reduce China's sizeable contribution to global greenhouse gas emissions, largely by displacing coal.<sup>3</sup> But these shifts beg an important question: are patterns of governance—which are in many respects highly decentralized—also evolving in ways that support implementation of these policies?

Conventional wisdom holds that when it comes to environmental protection, broadly speaking, Beijing sets the rules and the localities are expected to implement them with limited support from central authorities.<sup>4</sup> While in the past this system has succeeded in curbing pollution in

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<sup>1</sup> On January 13, 2013, the concentration of fine particulate matter (PM 2.5) reached an average of 755 per cubic meter in Beijing, more than 30 times the World Health Organization's upper limit for safe air, and double the average for bad days in Beijing. In fact, the pollution episode covered one-sixth of China's territory, and demonstrated that the pollutants from China's soaring energy consumption are increasing, and neither the laws nor the governmental actions taken so far have been effective to reduce air pollution (CNEMC (China National Environmental Monitoring Center) 2013).

<sup>2</sup> These edicts include the 12th Five Year Plan on Air Pollution Prevention and Control in Key Regions (Dec 2012), the Action Plan for Air Pollution Prevention and Control (Sept 2013), and the Provisional Measures to Inspect the Actual Implementation of the Action Plan on Air Pollution Prevention and Control (May 2014).

<sup>3</sup> For examples, see (Garnaut 2014) and (Green and Stern 2015).

<sup>4</sup> (Wong and Bird 2008; Wong 1991).

some areas, results were highly variable and enforcement was plagued by discord between local growth and environmental objectives.<sup>5</sup> Rhetoric suggests that this time the central government is more committed to ensuring results on the ground, given the magnitude of the challenge and perceived consequences of inaction. In comparison to his predecessors, President Xi Jinping has emphasized environmental progress as a central component of his overall policy platform. His government has embedded environmental sustainability within its broader policy priorities announced in the Third Plenum of the 18th Party Congress in November 2013. Indeed, in late February of 2014, President Xi went so far as to declare “war” on air pollution.<sup>6</sup> Typical of the Xi government, targets for air pollution are ambitious and time frames for implementation are short, requiring, by the end of 2017, a 15-33% reduction in PM2.5 concentrations in the areas most affected. Air pollution mitigation plans, which target coal, have played an important role in the formulation of China’s recent international commitment to reverse its rising CO<sub>2</sub> emissions trajectory by 2030. The incorporation of environmental policy as an important element of the country’s broader foreign policy agenda was cemented with the US-China Joint Announcement on Climate Change and Clean Energy Cooperation in the APEC summit with President Obama in November 2014.

Here we examine how a specific dimension of the Chinese institutional setting—fiscal relationships between central and local authorities—enable or constrain progress in China’s “war” on air pollution. We focus specifically on implementation of policies in the region comprised of Beijing, Tianjin, and Hebei, referred to as Jing-Jin-Ji (JJJ).<sup>7</sup> We focus on Hebei Province in particular as a case study, given its large size and contribution to pollution within and beyond its borders. As a major center of iron and steel production among other industrial activities, and given its close proximity to Beijing, Hebei Province has quickly responded to—or even preempted with more aggressive actions—national initiatives aimed at addressing air pollution (TCBH, 2015).

This paper is organized as follows. Section 2 provides a brief review of the evolution and rollout of policies, placing in historical context the magnitude and significance of China’s presently proposed effort. The constituent policies are discussed—the industries and geographies they target, implementation timelines, and the mechanisms that will be used to enforce them. Section 3 assesses how systems of governance, including the fiscal system, are being called upon to support policy implementation. Section 4 concludes by asking whether or not systems of governance are capable of implementing the new policy directions.

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<sup>5</sup> (Economy 2010)

<sup>6</sup> (Tatlow 2014)

<sup>7</sup> Jing-Jin-Ji is the transliteration of the three character abbreviation referring to the Beijing, Tianjin, and Hebei.

## 2. Air pollution in China's environmental policy agenda

### 2.1 Recent developments in China's energy, climate and air quality policies

While China has long had environmental policies on the books, implementation challenges have limited real progress.<sup>8</sup> The Eleventh Five-Year Plan (FYP) (2006-2010) represented a step change in the attention paid to both environmental policy and its enforcement. The Eleventh FYP included a national energy intensity reduction goal of 20% for the first time, endowed with legally binding strength (Naughton, 2005). The emergence of China as the world's largest energy user and CO<sub>2</sub> emitter drew attention to China's impact on global climate change, and prompted the first countermeasures: in 2007, a National Leading Group on Climate Change was created, and China became the first developing country to publish a National Climate Change program calling for the use of non-fossil fuels to be raised to 15% of primary energy by 2020. (Zhang 2015) In November 2009 leading up to international negotiations in Copenhagen on climate change action, the State Council announced the target to lower the economy's carbon intensity by 40-45% by 2020 (from the 2005 level), and called for the goal to be integrated into long and medium term domestic policy plans.

The Twelfth Five-Year Plan largely built on this momentum, continuing the energy and climate change policy directions set out in the Eleventh Five-Year Plan. Broadly, the plan included more language focused on *jienerg jianpai* ("energy saving and emissions reduction") and *ditan* ("low-carbon"). The plan also included a binding target to reduce CO<sub>2</sub> intensity by 17% during the plan period of 2011-2015, which was supported by an energy intensity reduction target of 16% and a non-fossil primary energy target of 11.4%. A redoubled focus on air pollution clean-up entered the policy mix after a series of very polluted days in January of 2013 (the aforementioned "airpocalypse") prompted widespread outcry. The outcry has persisted, stoked by an increasingly prolific media attention on air pollution's causes and consequences. A prominent example is the *Under The Dome* documentary by journalist Chai Jing that blended facts about the effects of degraded air with personal stories and concerns that resonated with many urban Chinese, prompting over 100 million views in the days follow its release.<sup>9</sup>

More than ever before, air pollution has shared, even monopolized, the policy spotlight in recent years. Much of China's energy and climate policy agenda has been recast in terms of the co-benefits for energy security and CO<sub>2</sub> emissions mitigation that will accrue to air pollution control efforts. Intentions have been codified in a series of government documents released since 2012. Starting

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<sup>8</sup> (Ma and Ortolano 2000)

<sup>9</sup> (Buckley 2015)

with the *Twelfth Five Year Plan on Air Pollution Prevention and Control in Key Regions* in October 2012, a series of State Council edicts followed: the *Action Plan on Air Pollution Prevention and Control* (September 2013) and the *Provisional Measures to Inspect the Actual Implementation of the Action Plan on Air Pollution Prevention and Control* (May 2014). Indeed, this redoubled policy effort to improve air quality has helped to inform China's climate policy targets, which target a peak in CO<sub>2</sub> emissions, the main greenhouse gas, by 2030 or earlier.<sup>10</sup>

## 2.2 The Twelfth Five Year Plan on Air Pollution Prevention and Control in Key Regions

In October 2012, on behalf of the Ministry of Environmental Protection, the National Development and Reform Commission, and the Ministry of Finance, the State Council released the *Twelfth Five Year Plan on Air Pollution Prevention and Control in Key Regions* (APPC), which targets air quality improvement in 13 regions, in particular, via PM<sub>2.5</sub> reduction.<sup>11</sup> Among the regions, the Beijing-Tianjin-Hebei area (JJJ), the Yangtze River Delta (YRD), and the Pearl River Delta (PRD) were assigned PM<sub>2.5</sub> reduction targets of 6% by 2015, compared to 5% for the other regions. To facilitate target achievement, the plan identified 13,369 enterprises for the installation of sulfur dioxide (SO<sub>2</sub>) and nitrogen oxide (NO<sub>x</sub>) removal equipment, representing a sum total of CNY 350 billion in investments. Following the APPC, the Ministry of Environmental Protection (MEP) issued the *Notice on Emission Limits for Special Atmospheric Pollutants* (MEP Notice) in February 2013.<sup>12</sup> The Notice specifies “three regions and ten clusters” for special measures—aside from the JJJ region, the YRD, the PRD, the 10 urban “clusters” include 47 prefectural cities in 19 provinces. The emission limits target enterprises in six industries: thermal power, steel, petrochemical, cement, nonferrous metals, and chemicals. All new thermal power plants and steel mills coming on-stream from April 1, 2013, are subject to the new emissions limits, and existing operations are to be brought in compliance.

## 2.3 The State Council Action Plan for Air Pollution Prevention and Control

Released eight months after the severe air pollution episode in January 2013, the *State Council Action Plan for Air Pollution Prevention and Control* (APAP) set the road map for national air

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<sup>10</sup> (NDRC (National Development and Reform Commission) 2015)

<sup>11</sup> The 13 regions include: the Beijing-Tianjin-Hebei area, the Yangtze River Delta, the Pearl River Delta, central Liaoning, Shandong province, Wuhan and its surrounding area, Changsha-Zhuzhou-Xiangtan, Chengdu, Fujian province, north-central Shanxi, central Shaanxi, Gansu province and Ningxia Autonomous Region, and Urumqi. As described by this document, the 13 regions have a high concentration of both economic activity and associated environmental pollution. Together, the regions account for 14% of the national territory, 48% of the national population, 71% of the economy, 52% of coal consumption, 48% of SO<sub>2</sub> emissions, 51% of NO<sub>x</sub> emissions, 42% of total smoke and dust, and 50% of volatile organic compounds. (MEP (Ministry of Environmental Protection) 2012)

<sup>12</sup> (MEP (Ministry of Environmental Protection) 2013a)

pollution control for the next five years and beyond. The plan aimed to improve air quality in China through a comprehensive reduction of emissions of a range of pollutants. It depends heavily on reducing, displacing, relocating, or scrubbing emissions from the use of coal. Superseding the Twelfth Five-Year Plan targets, the APAP calls for a 10 percent reduction in inhalable particulate matter (PM<sub>10</sub>) levels by 2017 relative to 2012 across all regions, with tougher targets for reductions in PM<sub>2.5</sub> concentrations in many cities located in JJJ (25% is the regional reduction target, see Table 1 for the full list). Beijing was further assigned a specific target to keep the annual average concentration of PM<sub>2.5</sub> at or below 60µg/cubic meter.<sup>13</sup> The APAP was further designed to be consistent with existing efforts to reduce energy intensity, as the plan calls for a 20% reduction in energy intensity between 2012 and 2017, limits coal to 65 percent of primary energy used, and prohibits any increase in coal use in the three regions of JJJ, YRD and PRD.<sup>14</sup>

In addition to these targets, the ten-point action plan includes specific measures for limiting emissions by mandating a shift to larger scale facilities, eliminating outdated and substandard furnaces, and installing pollution control equipment. Centralized district heating systems are targeted for retrofits to use cleaner fuels such as electricity or natural gas. Installation and operation of desulfurization, denitrification, and dust removal equipment is required for industrial boilers and furnaces.

Much of the Action Plan is a reworking of measures earlier introduced in the Twelfth FYP APPC, but there are new elements. The APAP calls for creating a new air pollution prevention and control mechanism in which the government takes the leading role but invites participation from enterprises and the public, and incorporates market incentives. This mechanism also calls for regional collaboration, and establishes monitoring, alert and emergency response systems for air pollution episodes.<sup>15</sup> In a departure from the traditional focus on production units, the APAP also targets pollution from vehicles, calling for an increase in the share of public transportation, mandating phase out of older automobiles not meeting pollution standards (“yellow label” vehicles), and other measures.<sup>16</sup>

Details of how the APAP was to be implemented in some regions came thick and fast. A week after it was released, on September 17, 2013, the *Detailed Rules for the Implementation of the Action Plan for Preventing and Controlling Air Pollution in Beijing, Tianjin, Hebei and the Surrounding*

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<sup>13</sup> (State Council (People’s Republic of China) 2013)

<sup>14</sup> Ibid.

<sup>15</sup> Ibid.

<sup>16</sup> All “yellow label” vehicles registered before the end of 2005 are to be phased out in the three key regions by 2015, and nationwide by 2017.

*Regions*<sup>17</sup> (*Rules*) were issued jointly by the MEP, the NDRC, the MOF, and other agencies, to emphasize the urgency of controlling air pollution in the JJJ area and to spell out the tasks facing local governments. The *Rules* set targets—in many cases, highly-specific technology-related targets—for reducing PM<sub>2.5</sub> concentrations, eliminating and upgrading generators, boilers and equipment in the major polluting industries, and switching to cleaner energy. The *Rules* also provided a road map for industrial restructuring in the region, including the elimination of excess capacity in several polluting industries and raising energy efficiency in existing installations in the covered industries.

While some of the targets apply universally to all six provinces and municipalities, Hebei was given significantly more stringent targets for cutting coal consumption and eliminating obsolete production capacity. Tables 1 and 2 show the specific targets for the six provinces and municipalities. Hebei's target of 40 million tons is nearly half of the total net coal reduction assigned to the region. Excess capacity cuts in Hebei's targeted industries are also significantly larger than those assigned to neighbouring provinces. Part of the reason for the focus on Hebei is its proximity to Beijing, and the resulting impact on air quality in the capital.

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<sup>17</sup> (MEP (Ministry of Environmental Protection) 2013b)

**Table 1. Reduction Targets for PM<sub>2.5</sub> and Net Coal Consumption, by year-end 2017**

	Targeted Reduction in PM <sub>2.5</sub> concentrations (from 2012 level)	Net Reduction of Coal Consumption (million tons)
Beijing	25%, annual average concentration of PM <sub>2.5</sub> < 60 µg/m <sup>3</sup>	13
Tianjin	25%	10
Hebei	25%	40
Shanxi	20%	20
Shandong	20%	-
Inner Mongolia	10%	-

Source: (MEP (Ministry of Environmental Protection) 2013b)

**Table 2. Elimination of Obsolete Production Capacity, by year-end 2017**

Area	Targets and Responsibility to Eliminate Obsolete Production Capacity
Beijing	Upgrade or relocate 1200 high-emitting enterprises
Tianjin	Limit production capacity to: <ul style="list-style-type: none"> <li>• 20 million tons in iron and steel</li> <li>• 5 million tons of cement clinker</li> <li>• 14 million kwh in coal-fired generators</li> </ul>
Hebei	Eliminate: <ul style="list-style-type: none"> <li>• 60 million tons of iron and steel capacity</li> <li>• all non-combined heat and power (CHP) coal-fired generators below 100,000 kWh; and gradually eliminate all non-combined heat and power (CHP) coal-fired generators below 200,000 kWh</li> <li>• 61 million tons of cement production capacity</li> <li>• 36 million weight cases of plate glass production capacity</li> </ul> Relocate or upgrade polluting industries (iron and steel, cement, plate glass, chemical, petrochemical and non-ferrous metal industries) Relocate Shijiazhuang Steel Company Limited and the Tangshan Fengnan Bohai Steel Group
Shanxi	Eliminate: <ul style="list-style-type: none"> <li>• 6.7 million tons of iron and steel capacity</li> <li>• 18 million tons of coke production capacity</li> </ul> Relocate or upgrade polluting industries
Shandong	By 2015 eliminate: <ul style="list-style-type: none"> <li>• 21.1 million tons of steel production capacity</li> <li>• 22.6 million tons of iron production capacity</li> </ul> By 2017: <ul style="list-style-type: none"> <li>• limit coke production capacity to 40 million tons</li> <li>• Relocate or upgrade polluting industries</li> <li>• Relocate Qingdao Iron and Steel Group</li> </ul>
Inner Mongolia	Eliminate 4.6 million tons of obsolete cement production capacity

Source: (MEP (Ministry of Environmental Protection) 2013b)

To ensure implementation, the central government has made clear that senior officials of the provinces would be held accountable for meeting the targets. Lest there be doubt, in April 2014, the State Council issued *Measures to Evaluate the Actual Implementation of the Action Plan on Air Pollution Prevention and Control* (“the Measures”).<sup>18</sup> The Measures introduce a scoring system to evaluate local government performance in the key areas of work listed in the Action Plan. In addition, achievement in reducing particulate matter will be included in performance evaluations of senior and mid-level officials, with the possibility that senior provincial officials could be summoned by the central government to explain failure to deliver progress. To ram home this message, provincial party secretaries and governors of all the provinces and municipalities covered by this document have been asked to sign letters of target responsibility for curbing air pollution in their localities.

So far, the central government’s pattern of setting new air pollution policy and taking steps to ensure its implementation seems to be a more intensive version of past practices. Its contours largely reflect the campaign model of advancing environmental goals (van Rooij 2006)—that is, announcing a new policy direction and repeatedly emphasizing its importance, until a new priority displaces it. Under this model, compliance measures are laid out—and in this, the Action Plan is particularly detailed—and handed down to the respective levels of government, which are in principle obliged to implement them. In the case of air pollution control, large changes to the energy system may be needed—installation and operation of pollution removal equipment at plants is often costly, and in some cases a full rework or rebuild of plant systems are required. As a last resort, plants are shut down. Table 2 shows each province’s mandated compliance strategy, which for each province includes a mixture of upgrades and relocations for firms in pollution-intensive industries.

### 3. Policy Implementation: Governance Structures

#### 3.1 Administrative divisions and staffing

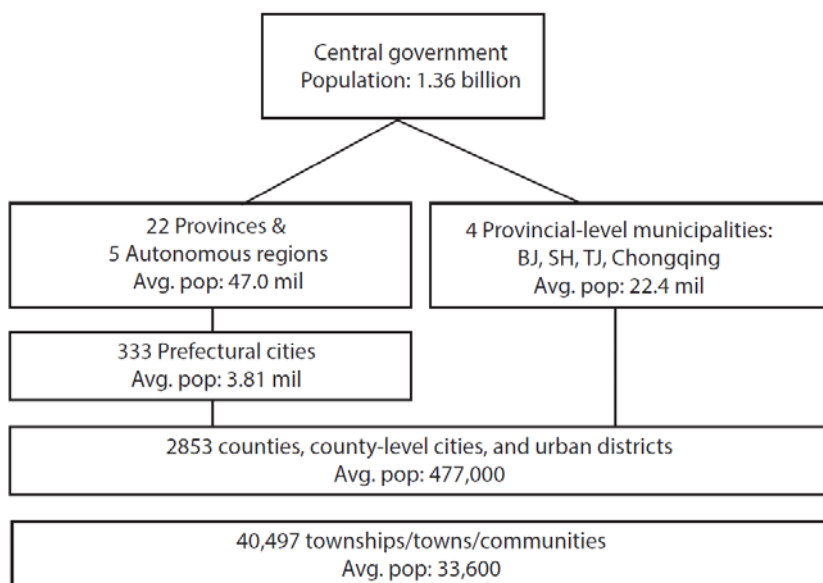
Although China is a unitary country, the central government is small, and the administration is highly decentralized. Staffing at the central level accounts for less than 5 percent of the total civilian administration, both for core government (59,000 out of 12.4 million) and for the broader public sector, which includes service providers such as schools, hospitals and clinics (around 1.9 million out of 41 million). Under the central government, there are 43,000 subnational (or local) governments distributed over four levels—the provincial, prefectural/municipal, county, and township levels (Figure 1).

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<sup>18</sup> (State Council (People’s Republic of China) 2014)



**Figure 1. The five levels of government in China, and the size of the population governed at each level.**



China’s central government implements policies through an extensive system of delegation. The process begins with delegating authority to provinces and depending on each of them to carry out their responsibilities within their territory. The provinces in turn delegate to their municipalities and depend on them to deliver on their assigned responsibilities, and so on down through the hierarchy. At each step, the relationship is bilateral, and each level manages only the next layer of subordinate units and holds them accountable for performance. The resulting structure is a nested, hierarchical pyramid, where policies and resources are transmitted downward level by level, to where the services are delivered. The Chinese Communist Party plays a vital role in bolstering the central government’s capacity to hold lower levels accountable, mostly through controlling the system of personnel appointment and promotion. While some studies have found these systems effective, others have shown that in practice cadres are evaluated on multiple metrics, diluting attention and accountability. This system relies on the ability of local leaders to persuade local actors to comply, for example, by bundling energy efficiency objectives with the objectives of politically-influential groups.<sup>19</sup>

In this bottom-heavy administrative structure, almost all public services are delivered by local governments at the third and fourth levels—by municipalities/prefectures and counties and urban districts.<sup>20</sup> This is reflected in the distribution of budgetary expenditures across the levels of government. By far the largest share is spent by counties and districts, which has grown to account

<sup>19</sup> (Kostka and Hobbs 2012)

<sup>20</sup> Townships used to deliver most of the services in the rural sector, but these have been moved upward to the county level in most provinces since the early 2000s (Fock and Wong 2008).

for nearly half of total spending nationwide. Prefectures and municipalities spend about one-quarter, and the remainder is split between the central and provincial governments, with the central government's share falling just short of 15 percent.<sup>21</sup>

The degree of decentralization in China has varied over time, and the fiscal system is no exception. Historically, revenues were collected locally. Revenue collection was centralized in the 1994 fiscal reforms but expenditures remained highly concentrated at the lower levels. As a result, a significant share of collected revenues at the central level is returned to the provinces as transfers.<sup>22</sup> In addition to funding local government budgets, these transfers have strengthened—at least nominally—central control over expenditures. This control is attenuated, however, by the fact that each level of government can only enforce policy at the level directly below it. To strengthen central government control, in the late 1990s and early 2000s, an attempt was made to recentralize the management of some functions of sub-provincial governments to the provincial level—for example, the local tax bureaus and agricultural extension bureaus were placed under “vertical management” by their provincial counterparts.<sup>23</sup> This process has been referred to as “soft recentralization”.<sup>24</sup>

In more recent years, with the rapid growth of central transfers, the Ministry of Finance has called for provinces to play a bigger role in overseeing the implementation of policies, including redistributive policies. Since the turn of the century, a number of administrative reforms have been introduced, including the Province-Managing-County (省管县) reforms that give provinces direct management of the counties, bypassing the prefectural level and reducing the “long chain of accountability” by one link.

An interesting question is whether these attempts at recentralization—both hard and “soft”—have made localities more responsive to central environmental policy via the role of the provincial government as an intermediary. Taking Hebei Province as a case study in Section 3.3, we compare what the province has been asked to do with the fiscal resources that have been allocated to implement air pollution controls.

### 3.2 Spending on environmental protection and clean up

While the central government sets environmental policy, its direct expenditure in the broad category of “energy saving and environmental protection” (*jienerg huanbao*) was only 2.4 percent of the national total in the 2013 budget (Table 3). In the subcategory of pollution prevention, the

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<sup>21</sup> Calculated from . (MOF (Ministry of Finance) 2014)

<sup>22</sup> (Wong and Bird 2008; Wong 2012)

<sup>23</sup> (Fock and Wong 2008)

<sup>24</sup> (Mertha 2005)

central government input was only 0.6 percent (see Table 3). On the face of it, this looks much like the past pattern in which policy pressure comes from above, while the resources to implement the new directives are largely expected to be supplied by local governments. The reality, however, is far more complex after the growth and expansion of transfer programs over the past 15 years. As shown in Table 3, earmarked transfers to local governments for energy saving and environmental protection were CNY 170 billion, equal to 50% of total national budgetary expenditure in that category. In other words, even though its own direct expenditures account for only a tiny share of the expenditure in energy saving and environmental protection, the central government is financing half of the total through transfers. The expansion of the transfer program will be further discussed below for the case of Hebei.

**Table 3. Budgetary expenditures in energy saving and environmental protection (2013).**

Expenditure category	National expenditure (billion yuan)	Central government share	Transfers (billion yuan)	Transfers (share)
<b>Budgetary expenditure on energy saving and environmental protection</b>	343.5	2.9%	170.4	49.6%
<b>Environmental protection administration</b>	16.6	2.4%	31.5	34.8%
<b>Environmental monitoring and supervision</b>	4.4	9.5%		
<b>Pollution prevention</b>	90.5	0.6%		
<b>Air</b>	6.9	0.1%		
<b>Water</b>	42.1	0.9%		
<b>Solid waste and chemicals</b>	7.6	1.6%		
<b>Expenditure on sewage fee receipts</b>	19.8	0.1%		
<b>Other pollution control expenditures</b>	14.1	0.1%		
<b>Energy conservation and utilization</b>	68.2	2.6%	44.7	65.5%
<b>Pollution reduction</b>	32.7	2.2%	17	51.9%
<b>Environmental monitoring and information</b>	3.6	9.9%		
<b>Environmental law enforcement supervision</b>	1.5	4.2%		
<b>Earmarked expenditure for pollution reduction</b>	23.8	1.0%		
<b>Renewable energy sources</b>	19.7	3.6%	13.4	67.9%
<b>Comprehensive utilization of resources</b>	8.8	0.5%	8.2	93.7%
<b>Other energy-saving and environmental protection expenditures</b>	27.2	12.3%		
	Share of budgetary expenditures		Share of transfers	
<b>Budgetary expenditure on energy saving and environmental protection</b>	2.4%		4.0%	

Source: MOF 2013 final accounts.

National estimates of the costs of the APAP are substantial. The Vice Minister of MEP, Wu Xiaoqing, announced at a press conference in March 2014 that CNY 5 trillion may be spent on the “War on Pollution” during the Twelfth FYP period. The cost of the APAP alone is estimated to be more than CNY 1.7 trillion during 2013-2017, with more than one-third of it used for retrofitting industrial enterprises (see Table 7).<sup>25</sup>

Table 4. Estimated Costs of Action Plan for Air Pollution Prevention and Control to 2017

<b>Actions</b>	<b>Investment (billion yuan)</b>	<b>Percentage (%)</b>
<b>Industrial pollution control</b>	640.8	36.7
<b>Clean energy deployment</b>	493	28.2
<b>Motor vehicles pollution control</b>	210	12.0
<b>Central heating improvement</b>	207.5	11.9
<b>Area and pollution source control</b>	60.5	3.5
<b>Environmental capacity-building</b>	27	1.5
<b>Clean coal utilization</b>	23.6	1.4
<b>Operational cost</b>	85	4.9
<b>Total</b>	1747.4	100

Source: Chinese Academy for Environmental Planning, MEP, 2013.

These estimates appear to include only the engineering costs of implementing the seven actions called for in the APAP (Table 4). In addition, the Deputy Director and Chief Engineer of the Chinese Academy for Environmental Planning (CAEP), a research institution affiliated with the Ministry of Environmental Protection, Wang Jinnan, explained that there will be indirect costs in the form of a reduction of GDP and employment levels, estimated at CNY 115 billion and 140,000 jobs over the duration of the APAP. At the same time he argued that the rise of new industries to deliver environmental protection measures will create an additional GDP of CNY 2 trillion and 2.6 million new jobs, which it is argued will more than make up for the losses.<sup>26</sup> A People’s Bank of China report in spring of 2015 estimated that CNY 2 trillion would be needed over the five years to meet pollution reduction targets, with government budgets covering about 15% of the total.<sup>27</sup>

How these costs will be divided up between public coffers, industries, and households is not fully clear, but a few observations are worth noting. The central government is very rich; in 2014 it had revenues of CNY 6.4 trillion, expenditures of CNY 2.2 trillion, and a “surplus” of CNY 4.2 trillion. Local governments also have far more fiscal resources than in the past—on average, a county/district had expenditures of RMB100 million in 1998. This had grown to RMB1.8 billion by 2012. Even deflated, they had grown by 14 fold. However, more than half of these expenditures

<sup>25</sup> (People’s Daily 2014)

<sup>26</sup> Ibid.

<sup>27</sup> (Hornby 2015)

were financed by transfers.<sup>28</sup> The reality, then, is that localities have limited bandwidth to increase environmental spending without additional support from the centre.

### 3.3 The Case of Hebei

Hebei allows a deeper look at how funding sources are combined in support of recent redoubled air pollution control efforts. Based on this case study, we argue that the central government has provided both direction—in many cases, highly detailed and technology-specific requirements—and significant funds. Yet this top-down approach is not supported by an alignment of personnel allocations and incentives across levels of governments to realize the central government's ambitions. So far at least, it appears that while the centre has put funding (in the form of transfers) behind its environmental ambitions, it has not yet strengthened staffing or accountability in ways that would ensure implementation. The fact that many of the detailed measures will reduce the size of Hebei's industrial sector and carry a hefty and localized price tag, will make measures tough for localities to swallow. The question essentially boils down to whether or not local authorities will carry out their delegated environmental responsibilities, especially when they prove to be at odds with short-term growth and economic stability.

#### 3.3.1 Hebei as a centre of pollution-intensive industry

Major urban centres in Hebei grew rapidly over the first decade of the 2000s (as shown in Figure 2), and in the lead up to the Beijing Olympics, which involved the relocation of many firms located in the capital, the composition of industry in many of its cities became increasingly energy intensive. Hebei is now a centre of China's steel and iron, cement and chemical industries. At year-end 2012, there were 148 enterprises in the iron and steel industry, with registered assets of iron and steel CNY 957 billion and directly employing 610,000 people, while value-added at CNY 386.5 billion accounted for 13.9% of Hebei's GDP.

The concentration of these highly polluting industries explains why Hebei's ambient pollution levels are 3 times higher than the national average, and PM<sub>2.5</sub> levels are consistently above 100 µg/m<sup>3</sup>. According to the Ministry of Environmental Protection (MEP), seven of the ten cities with the worst air quality in 2013 are located in Hebei (Table 5). Hebei produces the most nitric oxide (NO<sub>x</sub>) and particulate matter (PM) in China, and is a major emitter of sulfur dioxide (SO<sub>2</sub>).

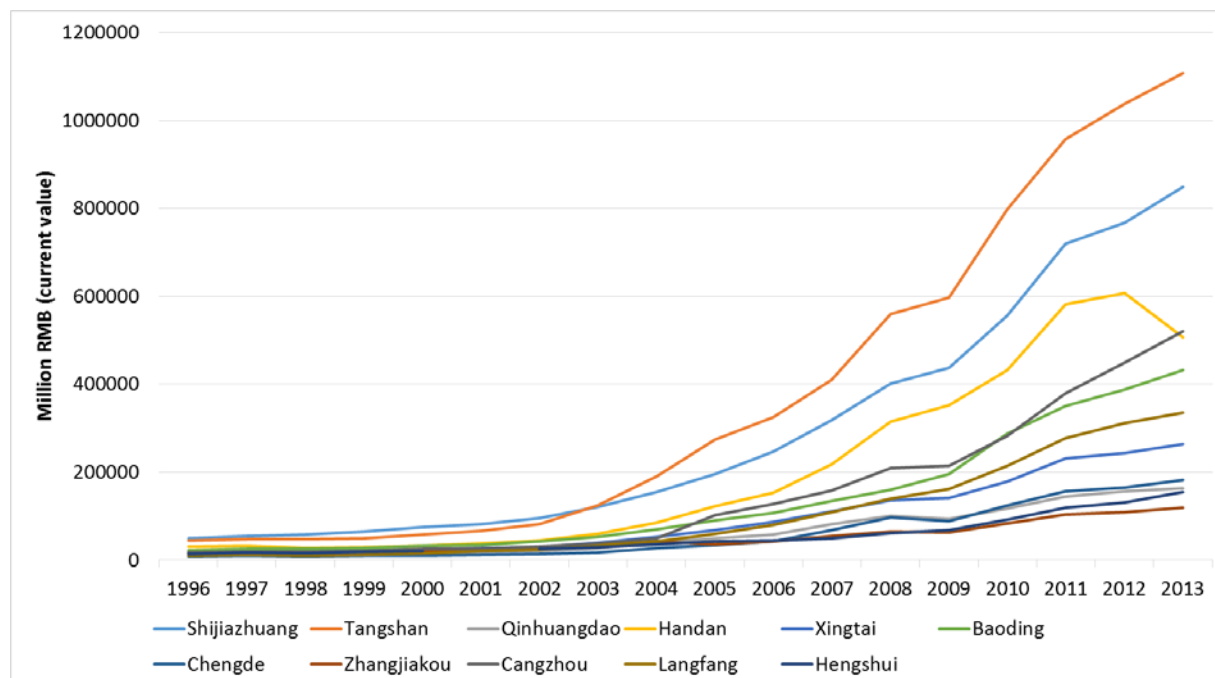
Given its high concentration of pollution-intensive industry, as well as its proximity to Beijing, it is no surprise that Hebei is a major target of national air pollution prevention and control efforts.

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<sup>28</sup> Wong (2011), and updated calculations based on Ministry of Finance data.

Tangshan, for example, is slated for significant cuts in pollution-intensive sectors—its reduction in steel production capacity of 40 million tons will reduce national steel capacity by around 27%, accounting for 67% of the capacity cut in Hebei.

**Figure 2.** Industrial sales in prefectural cities in Hebei province, 1996-2013.<sup>29</sup>



**Table 5. Top 10 cities with the worst air quality in 2013.**

1	Xingtai (Hebei)	6	Jinan (Shandong)
2	Shijiazhuang (Hebei)	7	Hengshui (Hebei)
3	Handan (Hebei)	8	Xi'an (Shaanxi)
4	Tangshan (Hebei)	9	Langfang (Hebei)
5	Baoding (Hebei)	10	Zhengzhou (Henan)

Source: PRC Ministry of Environmental Protection.<sup>30</sup>

### 3.3.2 Assigning target responsibility to Hebei municipalities

The case of Hebei illustrates how air pollution reduction targets were handed down from the top. Given the short timelines for meeting the targets, Hebei did not wait for the official release of the APAP by the State Council before rushing to issue its own documents to implement the national policies on curbing air pollution. On September 6, 2013, the provincial government issued the Hebei 50-point Action Plan, outlining 50 areas of work for air pollution prevention and control within the

<sup>29</sup> (ISI Emerging Markets 2015)

<sup>30</sup> The MEP began to release the air quality standard of 74 Chinese cities on a monthly basis since February 2013. This is the first phase of the government's campaign in monitoring air quality in the country. These 74 cities are the first to implement the government's new air quality standard and are required to report air quality data to the MEP. See (Xinhuanet 2014)

province.<sup>31</sup> The plan set specified targets for cutting coal consumption by 40 million tons and reducing iron and steel capacity by 60 million tons by 2017, with targets differentiated by locality and by industrial sector. The Hebei 50-Point Plan set a schedule for a mid-term assessment to be made in 2015, and a final assessment in 2017, with rewards and punishments for performance. It called for target responsibility contracts to be signed between the provincial government and municipal governments. Finally, in accordance with the spirit of the central government action plan, Point 50 of the Hebei 50-Point Plan calls for “...encouraging public participation, for environmental management is everyone’s responsibility.” In practice, however, many of the largest polluters in the region are industrial firms, not individuals. The main sub-provincial targets set out in the plan are presented in Tables 6 and 7. It is notable that targets are stated as ambient air pollution limits, complementing limits on direct emissions of industrial air pollutants, and for the first time targeting concentrations of PM<sub>2.5</sub>.

**Table 6. Reduction targets for PM2.5 in Hebei Municipalities (by end of 2017).**

Municipality (-followed by county level city if any)	Reduction from 2012 level
<b>Shijiazhuang</b>	33%
<i>Xinji</i>	33%
<b>Tangshan</b>	33%
<b>Langfang</b>	33%
<b>Baoding</b>	33%
<i>Dingzhou</i>	33%
<b>Xingtai</b>	30%
<b>Handan</b>	30%
<b>Qinhuangdao</b>	25% or more
<b>Cangzhou</b>	25% or more
<b>Hengshui</b>	25% or more
<b>Chengde</b>	20% or more
<b>Zhangjiakou</b>	20% or more

Source: Hebei Provincial Party Committee and People’s Government (2013).

<sup>31</sup> (MEP (Ministry of Environmental Protection) 2013b)

**Table 7. Reduction of Excess Capacity in Iron and Steel Production and in Coal Consumption**

<b>Municipality (- district level city)</b>	<b>Iron production (million tons)</b>	<b>Steel Production (million tons)</b>	<b>Coal consumption (net in million tons)</b>
<b>Shijiazhuang</b>	3.74	4.82	15
<b>- Xinji</b>	1.17	0.6	1
<b>Chengde</b>	0.43	0.4	1.2
<b>Zhangjiakou</b>	4.16	3.4	3.8
<b>Qinhuangdao</b>	8.7	5.2	6
<b>Tangshan</b>	28	40	25.6
<b>Langfang</b>	4.12	1.7	4.5
<b>Baoding</b>	2.58	0.96	2.5
<b>- Dingzhou</b>	-	-	0.1
<b>Hengshui</b>	-	-	1
<b>Xingtai</b>	2.32	2.64	2.5
<b>Handan</b>	16.14	12.04	16.7

Source: Ibid.

By September 18, 2013, the “Letter of Target Responsibility for Air Pollution Prevention and Control for Hebei” between the MEP and the province was signed in Beijing and published. The Letter is laid out in four parts. Part one states that the provincial government has overall responsibility for achieving the goals of the program: to improve air quality in Hebei by reducing the number of “bad pollution” days and increase the number of good days, and reducing the concentration of PM<sub>2.5</sub> by 25 percent over the five years to 2017. Part 2 breaks down the key tasks: eliminating small coal-fired furnaces, accelerating the program to install pollution abatement equipment in the key industries, strengthening procedures for comprehensive dust control, strengthening control of motor vehicle pollution, and reducing total coal consumption. Part 3 of the *Letter* calls on “...the provincial government to establish the implementation details before the end of 2013, by step-by-step devolving the State targets for improving fine particulate concentrations and other key tasks to cities and counties, as well as to departments and key enterprises. This is to ensure a clear assignment of responsibilities for meeting the annual targets for the reduction of fine PM concentrations and other key tasks, and to lay out clear lines of accountability to ensure the year-by-year decline of PM concentrations.” Part 4 states that the MEP will undertake an annual



assessment of progress and report to the State Council, and the results will be announced to the public after State Council approval.<sup>32</sup>

The *Letter* commits the province to cutting coal consumption by 40 mts, reducing excess capacity in steel production by 60 mts, and eliminate capacity by 61 mts in cement production, and 36 million tons of plate glass production. Taken together, these tasks are referred to as the “6643 project.” It makes clear that even though the province was assigned the overall responsibility for meeting air pollution targets, the real work of reducing pollution is to be done by lower level governments and enterprises. Wasting no time, the province convened the Hebei Air Pollution Prevention and Control Mobilization Conference (河北省召开大气污染防治行动动员大会) on September 27, 2013, at which city governors were asked to sign Letters of Target Responsibility for Air Pollution Prevention and Control. On the same day, it issued the “Plan on Dividing up the Targets of Reducing Coal Consumption and Iron and Steel Production Capacity in Hebei,” setting out the tasks and responsibilities for the 11 municipal governments.<sup>33</sup> While the substance and ambition of targets was different, in many respects the implementation processes showed few signs of departing from the target responsibility system that has long faced implementation challenges.

### 3.3.3 Distribution of the costs of the Hebei Action Plan

It is difficult to get a clear reading of what is needed and what is being spent on air pollution prevention and control in Hebei, and the figures available are confusing. For Hebei, it appears that the central transfers have in recent years funded the vast majority of budgetary expenditures on environmental protection. For example, in 2013, the total public spending on air pollution was 2.8 billion yuan, of which 2.62 billion yuan was financed by the central government. Officials in the Hebei government’s finance department reported that the province would spend 7.02 billion yuan on air pollution control for 2014, of which 800 million yuan was from the local budget and 6.22 billion came from the central government earmarked funds for air pollution prevention.<sup>34</sup> This arrangement suggests that indeed central funds made available through transfers are filling the gap.

In addition to these direct expenditures on pollution control, Hebei has set up special funds to support industrial restructuring and upgrading. The Hebei government will allocate CNY 4.38 billion and CNY 1.6 billion to set up a key industries development fund and a priority industries development fund, respectively.<sup>35</sup> Recently, the government has committed to spend CNY 90 billion

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<sup>32</sup> (HPG (Hebei Provincial Government) 2013b)

<sup>33</sup> (HPG (Hebei Provincial Government) 2013a)

<sup>34</sup> ([New Capital Daily Online 2014](#))

<sup>35</sup> (Xingjing News 2014)

to curb air pollution through 2017, accounting for 20% of the total budget for curbing pollution in the province. The fiscal commitment of Hebei in curbing air pollution is significant, compared to other provinces, given the anticipated magnitude of the task (See Table 8).

Table 8. Financing for curbing air pollution: Hebei and the selected provinces

Hebei:

- CNY 2.8 billion spent on curbing air pollution in 2013, of which CNY 2.6 billion given by the central government
- allocate CNY 800 million on air pollution in 2014
- arrange CNY 4.38 billion and CNY 1.6 billion to set up a key industries development fund and a priority industries development fund respectively in 2014
- commit to spend CNY 90 billion to curb air pollution through 2017, accounting for 20% of the budget for curbing all forms of pollution in the province.

Beijing:

- CNY 2.8 billion special fund for energy conservation and air pollution set up in 2013
- allocate CNY 3 billion in the special fund for energy conservation and air pollution in 2014
- allocate CNY 2 billion to support the Beijing Clean Air Action Plan initiative
- divert CNY 1.24 billion from the special fund for technology, culture and tourism to use on Beijing's campaign for curbing air pollution in Beijing.
- commit to spend a total of CNY 760 billion to reduce PM2.5 pollutants through 2017.

Shandong:

- set up a CNY 1.2 billion special fund for environmental protection and curbing air pollution

Shenzhen:

- Allocate CNY 1.3 billion on curbing air pollution.

Source: Beijing News.<sup>36</sup>

Indeed, beyond iron and steel, energy-intensive industries across the board in Hebei will come under increasing pressure—as shown in Table 9, Hebei represents a large share of the nation's cement, plate glass, and crude steel production, as well as more than half of the nation's coal consumption. Nearly half of Hebei's cement capacity is scheduled to be phased out, while cuts in plate glass and crude steel hover just above 25%. These cuts will impose a huge burden on the work force and local economy. Hebei officials worry that the reduction in production capacity in these industries would lead to job losses that, if not handled properly, could affect social stability. Job

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<sup>36</sup> Ibid.

placement and retraining will be policy priorities. The Hebei party secretary estimated that social insurance and pension payouts will increase by CNY 13 billion per annum.<sup>37</sup>

Some localities will be hit very hard. In Tangshan, currently one of Hebei’s economic engines, steel production per ton employs 17 workers and produces CNY 142 in fiscal revenues on average.<sup>38</sup> These coefficients would translate the target cut of 40 mts into a loss of CNY 5.68 billion in tax revenues, against a tax base of CNY 32 bn. They would cut 68,000 jobs directly and affect another 340,000 indirectly, against a non-farm employment of 965,000 in the city in 2013.<sup>39</sup>

Table 9. APAP’s effects on Hebei economy

<b>unit: mts</b>	<b>Coal**</b>	<b>Cement</b>	<b>Plate Glass</b>	<b>Crude Steel</b>
<b>Output/consumption (2013)*</b>	300.0	126.8	118.4	220.0
<b>As share of national total</b>	62.6%	5.2%	15.2%	28.2%
<b>Target for cuts by 2017</b>	40.0	60.0	30.0	60.0
<b>As share of output/consumption</b>	13.3%	47.3%	25.3%	27.3%
<b>As share of national cuts</b>	50%			75%

\* Enterprises above designated NBS scale for counting.

\*\* Consumption.

### 3.3.4 Bottlenecks and Challenges

The case of Hebei reveals a significant misalignment of incentives and resources. The central government—which exercises direct control only at the provincial level—has outlined a program of actions unprecedented in the cuts, restructuring, or retrofits required. Ultimately, these actions will need to be accepted and implemented by officials at the lower levels of government. A critical question, therefore, is whether “soft recentralization” of authority at the provincial level is bridging the central-local gap and is capable of eliciting cooperation from local cadres and economic elites in the enforcement of action plan targets. Evidence of how local and central incentives diverge is widespread—for instance, directives by Beijing to shut down plants were enforced through the withdrawal of the equivalent of US \$177 million in loans, only to be reopened following a merger arranged by the city government (Wei and Davis, 2014). Indeed, the Xi government has indicated it will penalize polluters dearly—even by ruining their careers—as part of a “strike hard” campaign,

<sup>37</sup> (People’s Daily 2013)

<sup>38</sup> These estimates are from the “Proposal on establishing pilot cities for resolving the problem of overcapacity” that was submitted to the Second session of the CPPCC National Committee meeting in 2014 by CPPCC member and vice-chairman of the CPPCC Tangshan City, Shen Jin. Reported in (Ding 2014). Ibid., and (Hebei Statistical Yearbook 2014).

but this deterrent also seems to be one-size-fits-all, and without attention to the limited options many of these polluters face.

Many of the actions require significant capacity shutdowns within a few years—a move that creates high localized costs in service of accelerating the delivery of air quality benefits. Given the urgency of the task from Beijing’s perspective, slower implementation does not seem to be an option. However, there seems to be little attention paid to identifying the “low-hanging fruit”—in other words, low cost but high impact measures that could help to improve local air quality. While a market-based mechanism could help to surface these opportunities, for instance, by pricing pollution, it is not clear that such a system would be compatible with China’s broader institutional structure, which seems to be leaning even more heavily on detailed command-and-control style interventions that clearly assign responsibility.

Finally, the economic costs of cleanup actions and capacity phase-out will have concentrated impacts on local fiscal budgets, curbing an important source of local government revenue that could be used to fund the cleanup effort, among other government functions. Indeed, 45% of total fiscal expenditures occur at the county level and 22% at the prefectural level. Twelfth FYP and APAP actions will impact the local sources of these revenue streams, potentially making localities more dependent on transfers. Whether or not the central government, which has significant financial resources at its disposal, will help to fill the void is not clear from the plans. In fact, numbers presented above suggest exactly the opposite—that sub-national governments will be expected to pick up most of the tab.

#### 4. Will this time be different? Prospects for winning the war on air pollution

Getting the incentives right—thoughtful deployment of resources and design of enforcement mechanisms—will be critical to gaining ground in China’s war on air pollution. While the level of central ambition exceeds that of the past, and the volume of transfers it is providing to offset costs is substantial, it is not clear that implementation processes have changed, although it is ultimately the latter that will determine results on the ground. Specifically, will the resources, fiscal or otherwise, be made available and applied at the county and prefectural level to make lasting changes in the local economy, against the wishes of incumbent enterprises and industries that have previously relied on the state to foot the bill—or at least to help out—with energy saving and environmental protection?

Here we document how fiscal arrangements, along with enforcement mechanisms, are expected to work in support of the energy saving and environmental protection goals in China Twelfth FYP and APAP. There are some cautious signs that the link between the central government and the provinces is being strengthened and more transfer income is being allocated at the provincial level to support pollution prevention and control efforts in localities. However, several potential gaps remain: real implementation will have to be done at the municipal and enterprise level, so emphasis on provincial authority will not directly address this gap. Beijing may be less efficient in deploying funds where they are needed, relative to governments at provinces and below. Also, it does not solve the fundamental problem that the government—and not the enterprises themselves—is broadly expected to foot the bill for a highly scripted transition. In other countries, enterprises have typically had to pay the costs of complying with environmental laws, while the government set the standards and provided modest support. Current policies will make it also more difficult to move towards market-based instruments, since in fact the policy shift is largely a retrenchment towards command-and-control and micro-management, which in many ways is at odds with establishing functional markets for pollution control.

The new environmental policies have all the hallmarks of reform under Xi Jinping. They are a component of the ambitious, comprehensive program mapped out in the Decisions of the Third Plenum of the 18th Party Congress in November 2013, aimed to achieve the Chinese Dream that will provide citizens with a happy life with clean air, along with good schools, reliable health care, and a strong social safety net. Underpinning a step-change in the level of commitment China felt comfortable offering in advance of upcoming global climate change negotiations, these environmental policies are also part of Xi's program to claim a global leadership role for China. However, moving from ambition to results will require changes beyond central policy rhetoric that ensure incentive compatibility at the local levels through a reworking of political, fiscal, and organizational mechanisms that support implementation.

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