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Low-carbon city initiatives in China: A review from the policy paradigm perspective

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ABSTRACT

Along with its high-speed urbanization process, China has begun to initiate various policies to reduce greenhouse gas (GHG) emissions since the end of the 1990s. Different from the extant studies most of which focus on how to make specific policies towards low-carbon city, this article, based on archival analysis on government documents and field interviews across ten cities, provides a systematic review on China's current low-carbon city policies. With a framework borrowed from public policy, this article decomposes the low-carbon city policies into three elements: goal, contents, and instruments, and focus on the three sectors – manufacturing, transportation and building which contribute to the largest share of GHG emissions in China. The sectoral policy contents and instruments for low-carbon cities in both urbanized and urbanizing areas are further analyzed. It finds that, despite problems in implementation, China has largely formed a multi-layer and multi-actor policy-making process for developing low-carbon cities, in which civil society should play a larger role in the future.

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1. Introduction

With the ongoing processes of industrialization and modernization, climate change has become a severe threat to human beings. Collective action has been initiated at both global and national levels to deal with this issue and China, one of the largest energy consumers and carbon emitters in the world, is no exception (Jiang & Tovey, 2009). Since the end of the 1990s, China has begun to implement various policies targeted at lowering the level of GHG emissions. Meanwhile, China continues its high-speed process of urbanization. The urbanization level measured by the share of urban population in the total increased from 36.2% in 2000 to 54.77% in 2014 (China Statistical Bureau (CSB), 2015). Thus cities have gradually become the centers of high population density, prosperous economic activities, and GHG emissions in China. Statistical data show that the 35 largest Chinese cities contain about 18% of the country's population and contribute 40% of the country's energy usage and GHG emission (Dhakal, 2013). Given this situation, the idea of "low-carbon" has become one of the core concerns of China's urbanization.

Low-carbon city policy now has become an important developmental strategy at the national and local levels. Recently in the guiding document of urbanization, the National Plan of New Urbanization

issued by the State Council in 2014, the central government also confirmed that the process of urbanization should follow the principle of being "intensive, smart, green, and low-carbon" (State Council, 2014). The National Development and Reform Commission (NDRC) launched a plan to develop 1000 low-carbon communities in March of 2014. Local governments followed the trend and enacted various low-carbon city policies. Qingdao Municipal Government, for instance, enacted *Qingdao Municipality Low Carbon Development Plan* in September of 2014.

This article systematically examines China's low-carbon initiatives against the background of this process of continuous urbanization from the perspective of public policy. We examine the low carbon city policies from a systematic and detailed perspective, adding to the work of scholars who have already reviewed China's low-carbon policy (Dhakal, 2013; Li, 2008; Li et al., 2012; Liu & Deng, 2011; Zhang, 2010). Compared with the extant literature, this review has two features. First, we exclusively focus on China's official low-carbon city initiatives. A large body of existing literature studies how to make policies for developing low-carbon city (e.g. Han, Green, & Wang, 2015), while this review will only incorporate those policy initiatives which have been implemented by governments with direct and practical influence on urban development. Second, we borrow an analytical approach from the discipline of public policy. This comprehensive framework helps us add into the extant reviews of low-carbon city policies in China, which are often detailed but fragmented. In addition to examining the goal of low-carbon city policy, we also review the policy contents and instruments in three sectors: manufacturing, transportation, and building. These sectors are chosen because they, combined together, emitted the largest amount of GHG in China's urban areas (Dhakal, 2013). All

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combined within such a framework of public policy, China's low-carbon city policy is reviewed in a holistic way while the policies' focus and specifications are also analyzed.

To present a systematic and detailed review of China's low-carbon city initiatives, the rest of this article will be deployed as follows. The second section examines the previous research/review on China's low-carbon policy and then brings in our framework, setting up the preparation for our analysis. In the third section, China's general policy goal in low-carbon city will be introduced. The fourth to sixth sections will focus on low-carbon city policies in manufacturing, transportation and building sectors, respectively. In each of these sections, the policy content in one specific sector will be presented, and the focus then shifts to the implementation of policy content, i.e. the policy instruments. The seventh section discusses and concludes.

2. Extant literature and analytical framework

As China started to promote low-carbon development, research of China's low-carbon economy began to thrive. Research to date has either examined China's overall transition to low-carbon economy (Qi & Wu, 2013; Wang & Watson, 2010; Zhang, 2010), or has reviewed China's low-carbon practice in specific areas such as energy consumption (Baeumler, Ijjasz-Vasquez, & Mehndiratta, 2011; Yuan & Zuo, 2011), electronic development (Kahri, Williams, Ding, & Hu, 2011), technological innovation (Zhou, Zhang, Zou, Bi, & Wang, 2012), or urban planning and infrastructure construction (Chen, 2015; Qin & Han, 2013). Low-carbon city policy has also received extensive scholarly attention. Scholars have examined the evolving concepts and practice of low-carbon cities in China (Li et al., 2012; Su, Chen, Xing, Chen, & Yang, 2012), or have conducted detailed case studies based on the policy of individual cities such as Beijing (Zhang, Feng, & Chen, 2012), Shenyang (Xi et al., 2011), Shenzhen (Jong, Wang, & Yu, 2013), Chongqing (Liu et al., 2012). Comprehensive study on China's low-carbon city policy is however limited, probably due to the lack of a holistic analytical framework. Nevertheless, these extant researches, either outlining a comprehensive low-carbon economy development strategy, or describing the detailed specific cases and sectors, provide solid foundation for our review.

Our review approaches the subject from a different angle, borrowing a theoretical framework from the study of public policy. We use a systemic approach to an overall low-carbon city strategy including detailed analysis of policy instruments. Policy documents of Central Government and local governments and the secondary literature were collected for textual analysis. To better understand the policy-making process, we also collected first-hand data through field surveys and intensive interviews in Beijing, Tianjin, Shanghai, Hangzhou, Wuxi, Shenyang, Qingdao, Wuhan, Chengdu, and Shenzhen during the period of 2012 to 2014.

Public policy can be further decomposed, analyzed, and assessed. Hall (1993) conceptualized policy as the combination of policy goals, policy techniques or instruments, and policy settings. Bennett (1991) further distinguished policy goals, content, instruments, outcomes, and styles. Other elements and variables like policy concepts, policy attitudes (Dolowitz, 1997), administrative structures (Larmour, 2002), and techniques (Pierson, 1997) are also proposed. Using these elements, policy can be examined through a systematically structured lens. Among all these conceptions, three elements, policy goal, content, and instruments, are directly related to the process of policy-making. As our review and analysis of China's low-carbon city policy are standing on the perspective of "public policy maker", which in China ultimately is the different levels of governments, we choose to focus on these three "policy-making" elements: goal, content, and instruments.

The policy goal is the overarching goal guiding policy in an issue area; it reflects the grand strategy and basic orientation of a certain policy. The policy goal answers the question of what the problem is. If the policy goal points to the destination, the policy content then presents the routes for arriving there. It is the specific method for reaching the goal and addresses the question of what to do. A policy instrument is

more detailed and specific. It provides implementation guide and answers the question of how to do it. In one issue area, there is usually one general and broad policy goal, while there might be multiple policy contents that aim at the goal. Similarly, each policy content may have multiple policy instruments.

Under a politically centralized system like China, the policy goal, reflecting the grand strategy of the whole country, is usually determined by the Central Government, the highest authority within the hierarchy of policy-making. The policy goals appear in documents such as "Five-Year Plan" and "Long-Term Plan" issued by the State Council. The ministries or specialized bureaus/agencies of the Central Government, which sit near the top of the hierarchy but focus on specific areas, are in charge of making policy contents. Policy contents are an essential part of policy and are expected to drive policy implementation. They appear on "Notice", "Requirements", or "Standards" issued by specific ministries or bureaus/agencies of the Central Government. The policy instruments are usually made and issued by local governments and sometimes the subdivisions of the ministries. Following the basic orientation of policy goal and principle of policy content, policy instruments help local governments carry out the specific measures. They are more detailed and usually focus on one strictly-defined area. Therefore, under the unitary administrative structure of China, the comprehensive and macro-management ministries of the central government, the specialized bureaus/agencies of the central government and the local governments are in charge of making the policy goal, policy contents and policy instruments, respectively and in sequence. Table 1 shows a clearer summary.

Under these institutional arrangements, two points deserve mentioning. First, although China has a unitary and centralized system, local governments are granted enough autonomy to develop their local policy instruments to better fit their particular situations. Second, the policy goal, contents, and instruments follow, and must follow, internal logic. That is, policy contents should not contradict policy goals. Similarly, policy instruments must reflect the basic ideas and preferences of policy contents. This arrangement, on the one hand, provides local governments flexibility in dealing with local issues; on the other hand, ensures the overall control of central government.

In addition to the elements of public policy, the typology of urban areas, which is another dimension in our analysis, also deserves mention. Cities show diverse formations (Joss, 2011; Ma, 2005), especially under such a rapid process of urbanization as China's. Some urban areas, such as the central cities of Beijing and Shanghai, have existed for decades, if not centuries. The basic infrastructure and spatial layout of their urbanized areas are relatively stable. Some areas are relatively new and in the middle of a rapidly urbanizing process, either emerging through the expansion of the central city, or through leapfrog development in more remote countryside. To build low-carbon cities, the old and the new urban areas have different approaches: the former focus more on industrial upgrading and urban retrofit while the latter work more on construction and initial urban planning. To address this problem, we adopt a typology of urban areas: "urbanized areas" and "urbanizing areas".

3. The goal and process of China's low-carbon city policy

Policy goals represent the developmental strategy and include concrete targets. When the policy agenda of "environmental protection" was set, the Central Government has emphasized emission regulation in various occasions.

Starting from 2006, the Chinese government enacted a series of policies and acts, including the Law on Energy Conservation, the Renewable Energy Law, and the Cleaner Production Promotion Law, to build a social consensus and a legal foundation upon which the campaign of energy-conservation and emission-reduction can be further developed. In 2007, the National Leading Group for Climate Change, Energy Conservation and Emissions Reduction was formed and the National Plan for Coping with Climate Change was issued by the central government (State Council, 2008). China was the first developing country that made such

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