



Financing eco cities and low carbon cities: The case of Shenzhen International Low Carbon City

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ABSTRACT

Financing sustainable urban development has become a major issue, especially in Asian countries where the size and scale of construction efforts are vast. Shenzhen International Low Carbon City (ILCC) is a demonstration project of the China-EU Partnership on Sustainable Urbanization (CEUPSU) and an intriguing example for understanding innovative forms of funding with the specific aim to do this in environmentally, socially and economically sustainable ways. This article examines which financial vehicles are utilized in ILCC, in what way these contribute to sustainability and which implications the lessons drawn from it have for other eco and low carbon cities in China and elsewhere. The authors find that Urban Investment and Finance Platforms and Public-Private-Partnerships (PPPs) in a broader context are the two financial vehicles ILCC uses. A broad approach to PPPs is chosen in which stakeholder involvement is key and social conflicts are avoided by balancing the interests of various stakeholders. In particular, planning the village area as a whole and arranging finance through 'metro + property' provide a replicable and operable example for other cities in funding urban renewal and community transformation and dealing with the issue how residents can share the benefits of urban development with developers. The combination of these financial arrangements facilitates ILCC to achieve the triple bottom line in sustainable urbanization. ILCC is environmentally sustainable by promoting low carbon transition, socially sustainable through resident and villager involvement, and financially sustainable through diversification of funding sources. The financing experience gained from ILCC provides practical lessons for other cities and has significant implications in adapting institutional and organizational arrangements to create enabling conditions for innovative financing activities.

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1. Introduction

Shenzhen International Low Carbon City (ILCC) was launched in 2012 with the support of China's National Development and Reform Commission (NDRC). Although ILCC was only initiated four years ago, it has attracted attention from all over the world because of its role as a critical example and potential international model in the development of eco and low carbon cities. A great deal of research has already been conducted on ILCC in the domain of its conceptual underpinnings and governance (de Jong et al., 2015; de Jong et al., 2013), its use of sustainable energy (Ye et al., 2015; Zhang et al., 2016), and its planning (Cales, 2014; Wu et al., 2014). However, little research has been done on eco and low carbon city development from a financial perspective. The construction of

sustainable cities involves large investment sums, an enormous challenge for local governments. It is estimated that the investments in green projects (e.g. eco and low carbon cities and renewable energy projects) in China amount to about CNY 2900 billion (roughly US\$ 460 billion by using the exchange rate of US\$:CNY at 1:6.3, hereinafter) each year from 2015 to 2020 (Research Group of Research Institute for Fiscal Science Ministry of Finance, 2015). Considering fiscal limitations and the need for priority expenditure in other policy areas, it is estimated that two-thirds of this amount (approximately US\$ 300 billion) need to be covered by funds from the domestic and international capital markets (RGRIFS, 2015). Traditionally, the financial vehicles China employs to finance infrastructure include public funding (including the annual budget, treasury bonds and other financial capital), debt financing (funds raised through banks and other financial institutions and bonds), inner accumulation (undistributed profits), Foreign Direct Investment and private capital

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(NationalBureauofStatistics, 2016). Zhan, de Jong, and de Bruijn (2017) have presented a financial history of urban infrastructure development in China and find that domestic loans and self-raising funds are playing an increasingly important role. Liu and Salzberg (2012) explore the influence of local governance, municipal finance, and land-use planning on the development of low carbon cities in China. These three factors come together the development of eco and low carbon cities in China. Liu and Salzberg (2012) argue that local authorities predominantly employ Public Private Partnership (PPP), land concessions, and urban development and investment corporations (UDICs) to fill the gap between fiscal revenue and expenditure. However, they show that the current financial practices complicate efforts to promote low carbon development, requiring researchers and practitioners to seek more appropriate financing mechanisms. Since 1994, land concessions and UDICs have been used by local governments to support infrastructure development (Cao et al., 2008; Xu, 2011; Zhan et al., 2017), which have also been applied to the development of eco and low carbon cities. However, they are generally regarded as unsustainable since they tend to lead to high indebtedness (NationalAuditOfficeofPRC, 2013) and limited availability of land concessions due to growing scarcity of land (Zhan et al., 2017). In most cases, local governments opt for cheap solutions and lease out land to earn income thus wasting valuable space, which is far from sustainable. Zhan and de Jong (2017) point out that sometimes significant foreign sources for financing green projects is provided, as in Sino-Singapore Tianjin Eco-city, offering new insights into how funding sustainable city projects can be arranged. Yet this solution cannot always be chosen since the central government does not help other urban development projects in the same way as it does for Tianjin. After experiencing a rise (1993–2007) and then a fall (2007–2010) in the application of Public-Private Partnerships (PPPs) in China (Mu et al., 2011), local authorities have regained their faith in the application of PPPs since they believe that these can help to relieve their financial burden. Kameyama, Morita, and Kubota (2016) also argue that private sector investment plays an instrumental role in meeting the long-term investment needs for low-carbon development in Asia. However, using PPP is not entirely unproblematic. Sullivan, Gouldson, and Webber (2013) focus on the risks and opportunities for funding low carbon cities. They argue that the low carbon agenda is disconnected from the needs and interests of private sector investors, which has made it hard to carry out PPPs in urban development projects in the UK. In addition, the long-term cost recovery periods make it difficult to find private investors for low-carbon cities (Kościelniaka and Górkab, 2016). In the long-term, it is inevitable that local authorities come to understand the view of the private sector on finance-related risks (Sullivan et al., 2013). The experience from the UK offers important lessons for China on how to develop low carbon cities through PPPs, requiring Chinese authorities consciously to balance the risks and interests between public and private parties and create beneficial conditions for implementation.

ILCC is taken as an example to examine how financial arrangements for urban development can be made sustainable more than just in name and which lessons can be drawn from the financial arrangements selected in ILCC for the practice of financing other eco and low carbon cities. A thorough investigation of the funding practice in ILCC, coupled with the application of stakeholder involvement to explain the logic behind financing low carbon cities, contributes to the existing literature on the theory and practice of sustainable finance. In addition, the study echoes the topical theme regarding the role of finance playing in coping with climate change.

To carry out the study, data were collected from sources such as academic publications, ILCC's websites, other web-based reports (e.g. the NDRC Report, the national audit report issued by Chinese

National Audit Office), and nine interviews with officials, developers, and project managers. Content analysis of existing literature, research reports, and various reports issued by ILCC and the Shenzhen municipality is employed to extract relevant information. Interviews were used to investigate what financing vehicles were adopted to raise money as well as to map the roles of various stakeholders in the construction of ILCC.

This paper proceeds as follows. Section 2 presents the literature regarding funding sustainable development along with the theoretical foundations underlying financing eco and low carbon cities. Then Section 3 introduces the Shenzhen case, including the current status of ILCC and the players involved. Section 4 deals with the financial vehicles ILCC employs and the role of involved stakeholders in it. Section 5 presents the lessons learned from the Shenzhen case and puts them in a broader context.

2. Financing sustainable cities

The failure of existing financial structures and arrangements to address contemporary sustainability challenges, such as poverty and climate change. (Sandberg, 2015) has drawn attention to the topic of rethinking the role of finance in addressing these challenges. Baker and Nofsinger (2012) have studied socially responsible finance from the view of the corporate and investment world. However, the concept of sustainable finance has not been fully explored yet, particularly when it comes to social aspects in capital markets (Salzmann, 2013). Sandberg (2015) points out the flaws in the dominant view of finance, focusing merely on profits, and then proposes a two-level model (a model considering both the dominant view of finance and social responsibility) to approach the problems the dominant view of finance faces in taking sustainability into account. Emerson (2003) coins the term 'blended value,' arguing that all investment or finance activities should be understood as carrying out concurrent tasks in the social, economic and environmental realms. Similarly, Aguilera et al. (2007) argue that mixed motives should form the basis of corporate social initiatives. Both the two-level model and the blended value proposition emphasize the combination of financing activities with social sustainability, thus becoming the theoretical foundation of sustainable finance. As stated by Fullwiler (2015), the theory of sustainable finance is based on the idea that (1) investors have blended values and that (2) each investment activity has blended results, covering both financial and non-financial returns. It requires program initiators to consider the benefits of various stakeholders from financial, social, and environmental points of view (Fergus and Rowney, 2005; Soppe, 2008, 2009), much in line with the concept of the 'triple bottom line.' The triple bottom line was first coined by Elkington (1994), including profit, people, and the planet. It aims at gauging company performance on the financial, social, and environmental aspects. However, it should be noted that blended value is not simply the sum of the components of the triple-bottom-line analysis, all three requirements should be met separately (Bugg-Levine and Emerson, 2011). Although financial, social, and environmental aspects are critical to sustainable finance, this does not imply that the roles various stakeholders play in the decision-making process should be equal (Donaldson and Preston, 1995). Some analysts stress financial stability more by considering the financial sources. With the growing need for funding to develop sustainable infrastructures, it is pivotal to diversify the sources, which requires solid collaboration among the various involved public and private stakeholders (Z/YenGroup, 2015; Zhan and de Jong, 2017). Z/YenGroup (2015) and Meltzer (2016) argue that financing sustainable infrastructure, on the one hand, depends on the financial sources; on the other hand, it relies on the combination of sustainability and lending and investment strategies. Other

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