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LOW CARBON COMMUNITY PILOT INITIATIVE IN CHINA

OPPORTUNITIES AND BARRIERS OF IMPLEMENTATION

Freie Universität Berlin
University Alliance for Sustainability (UAS)
Working Paper Series No. 1 • 2019

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University Alliance for Sustainability

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University Alliance for Sustainability
Unit for Sustainability and Energy Management
Freie Universität Berlin

ISSN: 2568-1656

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INTRODUCTION

As the largest greenhouse gas emitter in the world, China is facing increasing international pressure and domestic urgency to mitigate greenhouse gas emissions. In 2006, China declared an energy intensity reduction target of 20% by 2010, compared to 2005, in its 11th Five Year Plan (hereinafter referred as FYP) (2006-2010), the national economic and social development plan. It is the first time that China set an energy intensity reduction target in its FYP. In 2011, China included both a carbon intensity reduction target of 17% and an energy intensity reduction target of 16% by 2015 in its 12th FYP (2011-2015). China also set a target to improve non-fossil fuel energy consumption to 11.4% by 2015. The latest 13th FYP (2016-2020) fixed the carbon intensity reduction target to 18% and the energy intensity target to 15% by 2020, and the non-fossil fuel energy consumption target is 15% by 2020. These national targets are distributed to subnational governments and state owned enterprises according to Target Responsibility System (TRS)[1] for implementation.

Beyond declaring mandatory targets, China also initiated several climate pilot programs, such as the Low Carbon City Pilot Initiative (initiated by National Development and Reform Commission, hereinafter referred as NDRC, in 2010, 2012, and 2017), Emission Trading Scheme Pilot Initiative (initiated by NDRC in 2011), Low Carbon Transportation Pilot Initiative (initiated by Ministry of Transportation in 2011, 2012, and 2013), Low Carbon Industry Park Pilot Initiative (initiated by NDRC in 2013 and 2015), Low Carbon Community Pilot Initiative (initiated by NDRC in 2014) and Climate Adaptation Pilot Initiative (initiated by NDRC and Ministry of Housing and Urban-Rural Development in 2017).

The aims of these pilot programs, which were initiated by the central government and implemented by local governments, were to encourage local political ambitions and explore indigenous approaches to greenhouse gas mitigation and adaptation. Compared to the Target Responsibility System (TRS), which introduced a compulsory energy intensity reduction target and carbon intensity reduction target for local governments and enterprises, the climate pilot initiatives entitled the local

[1] Target Responsibility System is widely used to mobilize local government officials and enterprises to implement central government designed environment and energy policies in China. The national targets are distributed by the TRS. The TRS is generally effective for altering the behaviors of policy makers and public administrators because of the tight relationship between target performance and cadre evaluation/promotion (Mu & De Jong, 2018). Chinese Energy Saving Law (2007, article 6&25) and Environment Protection Law (2014, article 24) have both claimed various government departments and officials should be evaluated through their performance in achieving relevant energy saving and environmental protection targets.

governments to more discretion in designing and applying climate pilots according to local conditions. It is argued that subnational low carbon initiatives based on local economic, industrial, and land use characteristics allow for more innovation and flexibility than "one size fits all" national programs (Karlenzig & Zhu, 2012/2013). For example, in the NDRC-led Low Carbon City Pilot Program, various policy instruments including command and control tools, market mechanisms, financial incentives and voluntary tools, were widely used by local governments to increase energy efficiency, increase the proportion of renewable energy in the energy mix, reform the industrial structure, and increase carbon sequestration capacity (Wang, Song, He & Qi, 2015).

The implementation of these climate pilots and their effectiveness in mitigating greenhouse gas emissions or adapting to climate change has, however, been uneven. There are various reasons for this, including an unclear definition of what is understood as low carbon (Khanna, Fridley & Hong, 2014), different levels of local political leadership (Gilley, 2017), and different financial resources (Amin, Ng & Holmes, 2014). In some cases, lack of financial support can impede the implementation of climate pilots; in others, pilots just remain a paper plan (Li & Ma, 2013).

This article examines how the NDRC promoted the low-carbon programs in local communities. After China set a carbon intensity reduction target of 17% in its national 12th FYP, the State Council published a Working Plan to Manage Greenhouse Gas Emissions during its 12th FYP[2] in December 2011. One of the measures it announced was the plan to conduct pilot projects in cities, towns, industry parks and residential communities. Accordingly, the NDRC launched the Low Carbon Community Pilot Initiative in March 2014. The Initiative sets the target of constructing 1000 low carbon community models nationwide by the end of the 12th FYP in 2015. During the 13th FYP, the Low Carbon Community Pilot Initiative, part of the Working Plan to manage Greenhouse Gas Emissions[3], aims to designate 100 national level low carbon community models by 2020.

The Low Carbon Community Pilot Initiative (hereafter referred to as 'Initiative') was the first national initiative to draw attention to greenhouse gas emission reductions in local communities. This Initiative stimulated low carbon planning and climate mitigation infrastructure projects in local communities. How was the Initiative implemented in local communities? What factors facilitated its implementation and what were the barriers it faced? This article addresses these questions through an empirical analysis of the low carbon community pilots in four Chinese cities: Beijing, Chongqing, Hangzhou and Wuxi. The analysis covers the period from the programs' beginning in March 2014 to

[2] In Chinese: 国发 (2011) 41 号， "十二五"控制温室气体排放工作方案.

[3] In Chinese: 国发 (2016) 61 号，"十三五"控制温室气体排放工作方案.

the end of 2017, before climate duties were passed from NDRC to Ministry of Ecology and Environment.

1. CHINESE GOVERNMENT STRUCTURE AND CLIMATE POLICY-MAKING

China is a unitary state; the central government is entitled to "lead" (zhi'dao,指导) local governments (Article 3, People's Republic of China Constitution, 1949/2018 REVN). The term "lead" is complicated as its meaning is somewhat ambiguous, but it generally means that local governments, which are part of a tiered governmental structure, are subordinate to their superiors (Article 108 & 110, People's Republic of China Constitution, 1949/2018 REVN). Below the national government, the Constitution enumerates four levels of governments: provinces, prefectures, counties, and townships (Article 105 & 107, People's Republic of China Constitution, 1949/2018 REVN). The first level includes 23 provinces, 4 municipalities under direct authorities of central government (Beijing, Chongqing, Shanghai and Tianjin), 2 special administrative regions (Hong Kong and Macau), and 5 autonomous minority regions. The second level includes municipalities or the prefectures. The third level includes districts in urban areas and counties that contain rural areas. And the fourth level includes municipal blocks in urban areas and townships that contain rural areas. The four special municipalities enjoy the same level of authority as the twenty-three provinces. This hierarchical governmental system is illustrated in figure 1.

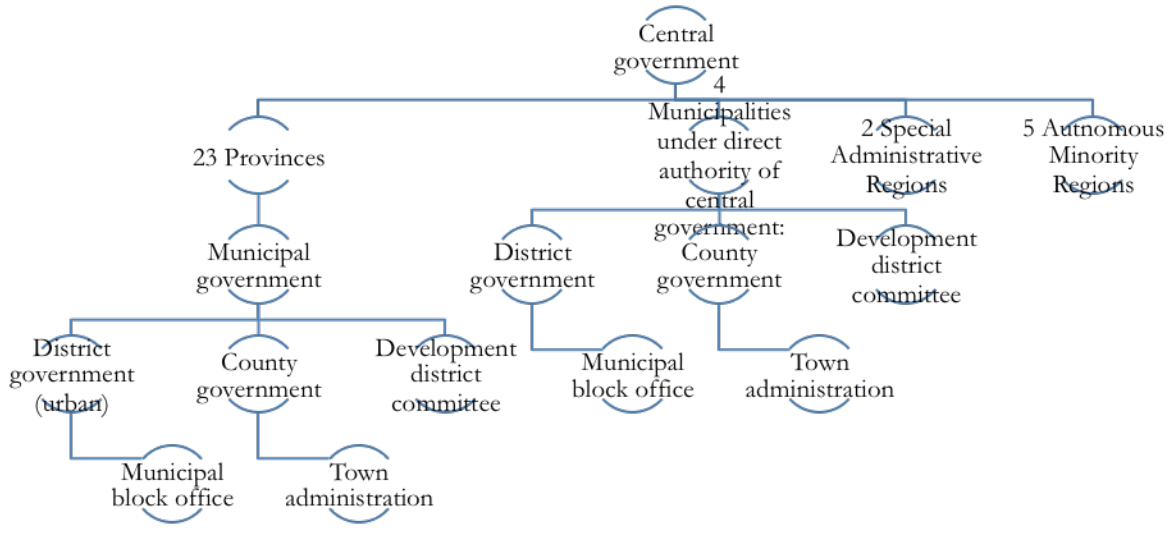

Figure 1. Chinese Hierarchical Government System
Source: Compiled by the author.

In most communities or neighborhoods where people reside, there is a community committee. According to the Organization Law on Urban Community Committee[4] and the Organization Law on Village Committee[5], an urban community/village committee is a local autonomous organization established by urban community/village residents for the purpose of "self-organizing, self-educating and self-service". Their budget comes from the government. They are expected to support government work when necessary, and in practice, they have a dual function of maintaining social control and providing social services to resident populations (Luigi 2014, p. 8).

Unlike federal states like Germany, where local self-government is guaranteed by The Basic Law (Grundgesetz) and local authorities are regulated by federal law as well as state law (Bulkeley & Kern, 2006). The most important governance mechanism in China is the Tiao-Kuai relationship (tiao'kuai guan'xi). The Chinese characters transliterate literally as "vertical-horizontal relations". "Tiao" refers to the party-state apparatus that reaches down vertically from the central to local governments. Kuai means various levels of local governments (Zhou, 2009). In general, lower levels are subordinate to higher levels along the "Tiao", but also coordinate with other departments of the same level "Kuai". Since the Chinese State Council created the National Leading Group on Climate Change (NLGCC) in 2007, the NDRC and its subnational counterparts, which include provincial DRCs, prefectural DRCs, district or county DRCs, and municipal block office or town administrations have been in charge of Chinese domestic climate policy-making. These institutions were jointly responsible for implementing climate policy (Qi et al. 2008). In March 2018, the National People's Congress announced a reshuffling of cabinet ministries and duties. The management of greenhouse gases was passed on to the new Ministry of Ecology and Environment. This reshuffling is still ongoing.

2. RESEARCH AIM AND METHODOLOGY

The climate pilot programs, especially the Low Carbon Community Pilot Initiative, were initiated and implemented when the NDRC was still in charge of climate affairs. There has been no national evaluation of the pilot community performance to date. This article does not intend to compare the final climate mitigation performance of pilot communities, which is still too early to tell,

[4] In Chinese: 中华人民共和国城市居民委员会组织法，第二条， 居民委员会是居民自我管理、自我教育、自我服务的基层群众性自治组织。 Retrieved from: http://www.npc.gov.cn/wxzl/gongbao/1989-12/26/content_1481131.htm, accessed in February 2019.

[5] In Chinese: 中华人民共和国村民委员会组织法，第二条，村民委员会是村民自我管理、自我教育、自我服务的基层群众性自治组织，实行民主选举、民主决策、民主管理、民主监督。 Retrieved from: http://www.gov.cn/flfg/2010-10/28/content_1732986.htm, accessed in February 2019.

but to analyze the implementation of this Initiative in four municipalities and discuss the factors that facilitated the implementation in terms of stakeholders' mobilization and capacity building, as well as the financial difficulties that local governments face.

A range of prefectures and provincial-level cities are selected to represent the socio-economic, demographic and geographic diversity in China. Beijing, located in the northeast of China, is under the direct authority of the central government. Chongqing is located in the south west of China and is also under the direct authority of the central government. The authority of the Beijing and Chongqing governments is equal to the authority of the provincial government. Hangzhou is the provincial capital of Zhejiang Province and is located on the eastern coast of China. Wuxi is located in Jiangsu Province, the northern neighbor of Zhejiang. Wuxi is an economically developed city in southern Jiangsu, which is traditionally a prosperous industrial region.

The research methodology combined document analysis and expert interviews. First, the different steps involved in introducing this Initiative and the stakeholders who were involved were carefully traced through analyzing relevant policy documents, media reports and research institute reports. Second, semi-structured interviews with local municipal government officials, research institutes, think tanks and local communities were conducted to shed light on the black box of local implementation of this Initiative. Fieldwork in local cities was conducted in the end of 2015 in Beijing and Wuxi and from October to December 2016 in Beijing, Chongqing, Hangzhou, Wuxi, and from October 2017 to March 2018 in Beijing, Chongqing and Wuxi. Interviews and participatory observation on the ground helped identify stakeholders in implementing the Low Carbon Community Pilot Initiative and the dynamics between municipal government, lower level officials and local communities.

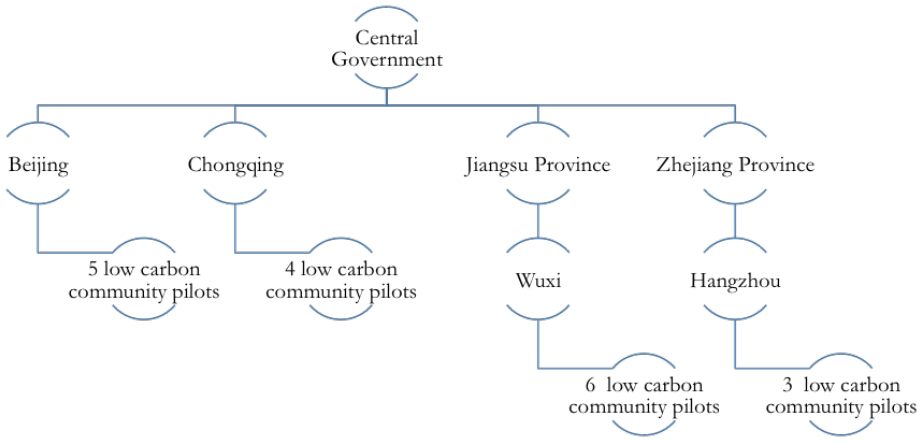

Figure 2. Low Carbon Community Pilots in Beijing, Chongqing, Hangzhou and Wuxi
Source: Compiled by the author. Information of low carbon community pilots is collected from government website of these municipalities and media reports.

3. LOW CARBON COMMUNITY PILOT INITIATIVE: CENTRAL GOVERNMENT DESIGN

The NDRC delivered the Low Carbon Community Pilot Construction Plan[6] in March 2014, followed by the Guideline of Low Carbon Community Pilot Construction[7] in February 2015. The guideline sets concrete plans to implement low carbon communities. It designates stakeholders, outlines in detail their responsibilities and categorizes three different kinds of communities: urban communities, sub-urban communities and rural communities. Each community uses a different index system for its low carbon actions. Figure 3 outlines timelines and relevant policy documents of this Initiative.

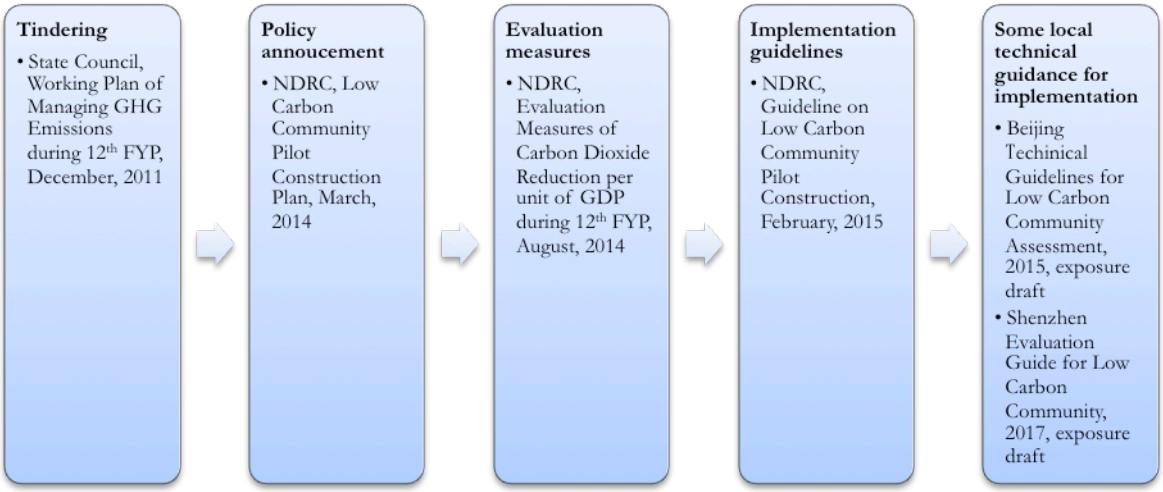

Figure 3. Low Carbon Community Pilot Initiative: Timeline and Policy Documents
Source: Compiled by the author.

3.1. Institutional structure for implementation

The second chapter of the Guideline of Low Carbon Community Pilot Construction (hereinafter referred to as "Guideline") outlines five different levels for promotion of low carbon community pilots by the DRCs. The NDRC initiated the national low carbon community pilot program and set the Guideline for implementation. The provincial DRC was responsible for compiling provincial working plans on low carbon community pilots. The provincial DRCs also selected communities to participate.

[6] National Development and Reform Commission, Low Carbon Community Pilot Construction Plan, 2014. (in Chinese: 国家发展改革委，国家发展改革委关于开展低碳社区试点工作的通知，发改气候[2014]489 号).

[7] National Development and Reform Commission, Guideline of Low Carbon Community Pilot Construction, 2015. (in Chinese: 国家发展改革委，国家发展改革委低碳社区试点建设指南，发改办气候[2015] 362 号).

The municipal and county level DRCs were responsible for organizing local communities to apply to become pilots. At the forth level, the municipal block offices (in urban areas) and town administrations (in rural areas) were responsible for compiling and reviewing the implementation plans submitted by local community committees. Finally, local community committees supported the implementation of the working plans in a timeframe of three years (2015-2017) (Guideline, p. 4-7).

Though DRCs at the subnational level were mainly responsible for the implementation of the Initiative, the Guideline also urged the DRCs to cooperate with other relevant departments to make supporting policies for effective implementation of the Initiative (Guideline, p. 4). To further mobilize expertise and other resources, the Initiative encouraged the participation of non-governmental actors, like real estate companies, collective enterprises, property owner committees, social organizations, research institutes, consultancy companies, financial organizations and private actors (Guideline, p. 5).

3.2. Incentives for local stakeholders

The Guideline encouraged communities "with advanced conditions" to apply for pilot projects, which were selected by the local DRC department according to how well suited they were for a low carbon transition trial (Guideline, p. 10, p. 22, p. 32). The Initiative also encouraged local stakeholders to explore innovative low carbon transition approaches through political and economic incentives and honorable awards.

Incentives for provincial governments were provided through the NDRC's Evaluation Measures of Carbon Dioxide Reduction per unit of GDP, which were published during the 12th FYP period.[8] The evaluation measures outlined a grading system of a total of 100 marks, with 50 marks allocated for annual carbon intensity reduction performance and accumulated carbon intensity reduction performance from 2011 to 2015, 24 marks for tasks such as industrial upgrading, energy restructuration, and low carbon pilots, 26 marks for capacity building, and 6 extra marks for other innovative work. The measures specified that provinces that have introduced low carbon pilots should receive 8 marks, including 2 marks for low carbon city pilots, 2 marks for low carbon transportation or low carbon building pilots, 2 marks for low carbon community or low carbon industry park pilots, and 2 marks for provincial low carbon planning or provincial climate planning.

In the Chinese government system, the binding carbon dioxide reduction per unit of GDP targets and other tasks listed are linked with the annual cadre promotion and evaluation system

[8] National Development and Reform Commission, Evaluation Measures of Carbon Dioxide Emission Reduction per unit of GDP during 12th Five-Year Plan, 2014. (in Chinese:国家发展改革委，国家发展改革委关于印发《单位国内生产总值二氧化碳排放降低目标责任考核评估办法》的通知，发改气候[2014]1828 号).

(Kostka, 2017).[9] According to Article 8 of the NDRC's evaluation measures on carbon dioxide reduction per unit of GDP during the 12th FYP, evaluation results were to be examined by the State Council and then delivered to the department that manages the cadres. The evaluations were to be used as part of the provincial government leadership's performance review. This grading system also applied to lower tiers of the government and provided incentives for local implementation. The low carbon pilot initiatives contributed to the performance evaluation and were used to motivate local leaders to pay more attention to innovative pilot work. Carbon dioxide emission levels were only one objective they had to obtain and thus, only one factor they focused their attention on.

The pilot communities also qualified to apply for fiscal support to implement low carbon projects in local communities as detailed in the implementation plans submitted by local communities. However, the granting and amount of the fiscal funding depended on the local fiscal budget and the decisions of multiple departments. Pilot communities would receive a "Low Carbon Community Award" if they successfully implemented the Initiative. Basically, local community committees were encouraged with political and economic incentives to take explorative steps and to strive to perform well. There is however no punishment for non-implementation or failure.

3.3. Low carbon comprehensive planning

The NDRC Low Carbon Community Pilot Initiative defined the low carbon community in general terms. It referred to communities with programs that save resources and protect the environment. The Initiative set a carbon emission intensity reduction target, rather than the absolute emission reduction target of greenhouse gases for local communities. Suburban communities are provided with the most ambitious carbon intensity reduction target of 20%. Urban and rural communities have a lower emission reduction target of 10% and 8%, respectively (Guideline, p. 10, p. 22, p. 32). The national carbon intensity reduction target is 17% in the 12th FYP and 18% in the 13th FYP.

The "Low carbon community pilot construction plan" published in March 2014 defined low carbon community as the community that aimed to achieve energy saving and emission reduction goals through constructing a climate friendly environment, buildings, facilities, lifestyle and management model (Guideline, p. 1). As a result, the low carbon plans submitted by local community committees covered various sectors, which would be elaborated upon in the next section.

[9] One of the approaches Chinese superior governments conform its inferiors is through nomenclature system, which entitles the higher-level government office to promote or demote local officials across the government hierarchical ladders according to local performance of policy implementation.

3.4. Index systems to guide implementation

The Low Carbon Community Pilot Initiative standardized procedures for implementation of low carbon community programs. The Guideline outlines a national index system (Table 1) for the implementers and evaluators. Recognizing the differences between urban and rural areas in China, the guideline categorizes three kinds of communities, including urban, sub-urban and rural communities, and designs three different index systems accordingly (Guideline, p. 7-8). There are both binding targets, which the pilot communities must achieve, and optional targets that encourage the pilot communities to pursue. When implemented in the local level, working plans are adapted to specific local conditions.[10]

Table 1. Index System for Low Carbon Community Pilot[11]

Community Type	Urban established community	Sub urban community	Rural community (Village)
Primary index system	Carbon intensity reduction >=10%	Carbon intensity reduction >=20%	Carbon intensity reduction >=8%
	N/A, because urban communities have established space layout.	Space layout planning	Space layout planning
	Energy saving and green building	Green building	Green housing
	Transportation system	Transportation system	Transportation system
	Energy system	Energy system	Energy system
	Water usage	Water usage	Water facilities
	Solid waste disposal	Solid waste disposal	Environment improving
	Green space	Green space	N/A, because rural areas are covered with arable land.
	Operation and management	Operation and management	Operation and management
Low carbon life		Low carbon life	Low carbon life

Source: Guideline of Low Carbon Community Pilot Construction

[10] For example, Chongqing selected to implement low carbon pilot programs in urban communities, rural communities and public housing communities, rather than urban communities, suburban communities and rural communities as set in the NDRC Guideline. Guangxi Zhuang Autonomous Region also has different index systems compared to the NDRC Guideline.

[11] This table is translated from index system in National Development and Reform Commission's Guideline of Low Carbon Community Pilot Construction. (in Chinese: 国家发展改革委，国家发展改革委低碳社区试点建设指南，发改办气候[2015] 362 号). The index system is designed for local stakeholders to implement the low carbon communities. Urban, sub-urban and rural communities have different carbon intensity reduction targets, but very similar categories of indexes.

4. OPPORTUNITIES AND BARRIERS OF LOCAL IMPLEMENTATION

Low carbon projects implemented in local communities as part of the Low Carbon Community Pilot Initiative included installation of solar photovoltaic and solar water heaters on the roof, introducing bicycle-sharing and electrical vehicles as part of the public transport, installation of energy saving lamps and water saving facilities, and public communication on energy saving, low carbon lifestyles, and so forth. The implementation progress was however uneven. In some communities, pilot projects proceeded well, while in other cases progress was slow.

The Initiative did encourage the participation of multiple stakeholders and the NDRC also provided capacity building for local actors to implement low carbon communities. However, due to different local fiscal resources and diverse levels of engagement of multiple stakeholders, local implementation presented different outcomes.

4.1. Mobilization of local stakeholders

Following the index system set by the Guideline, community applicants submitted their low carbon community construction plan covering several sectors, which requires collaboration of several departments. When implementing low carbon programs in local communities, the DRCs relied on support from other departments, for example, the department of housing and urban-rural development for green buildings, the department of environmental protection and department of urban management for waste and sanitation management, and the department of civil affairs for the promotion of low carbon lifestyles in local communities. As comprehensive low carbon planning for local communities, low carbon community programs involved different sectors, and required the participation of various stakeholders, such as government agencies, community committees, property management companies, utilities and residents.

Table 2 depicts a stakeholder map of the low carbon community pilots in Beijing, Chongqing, Hangzhou and Wuxi. In all four municipalities, the department responsible for resource saving and environmental protection and department for climate change in the municipal development and reform committee led the low carbon community pilot projects. They also engaged with other government agencies and various stakeholders including carbon consultancy companies, waste management companies, research institutes and NGOs to promote low carbon programs in local communities.

In the case of Chongqing and Wuxi, there were intermediary organizations, which coordinated the various stakeholders. Chongqing Municipal DRC appointed Chongqing Low Carbon Association, a local NGO, to coordinate the low carbon community pilots in Chongqing. Wuxi Municipal DRC and Wuxi

Information Center hired PeaceCarbon Consultancy Company to conduct research, draft implementation plans and coordinate six low carbon community pilots in Wuxi. These intermediary organizations played an important role to facilitate low carbon programs in local communities, including leveraging resources and expertise, connecting researchers with government agencies for low carbon planning, providing training for local staff and convening meetings, mediating negotiations between government agencies and private sectors or utilities, and reporting on progress and increasing information sharing.[12] These intermediary organizations also facilitated the promotion of low carbon programs at the local level.

Carbon intensity reduction in local communities depends on the implementation of low carbon projects, such as the installation of waste sorting as well as reduction facilities, public transportation, and solar PV installations. According to informants, previous funding for environment protection projects in local communities was only in the thousands of RMB, but now low carbon infrastructure project budgets for low carbon community pilots can amount to millions of RMB. These infrastructural programs require funding, staff and other resources, which largely depend on the agenda and input of government departments other than the DRCs. This proved challenging in practice.

Table 2. Stakeholder Map of Low Carbon Community Pilots in Beijing, Chongqing, Hangzhou and Wuxi

Municipality	Beijing	Chongqing	Hangzhou	Wuxi
Number of community pilots	5	4	3	6
Chief City Gov. Dep.	Beijing Municipal DRC	Chongqing Municipal DRC	Hangzhou Municipal DRC	Wuxi Municipal DRC
Other City Gov. Dep. and supporting institutions	Commission on Municipal Management	Environment and Sanitation Bureau	Commission on Municipal Management	Wuxi Information Center
Coordinating agency	/	Chongqing Low Carbon Development Association	/	Wuxi Information Center and PeaceCarbon Consultancy Ltd.
Other local stakeholders	Vantone Foundation; Yonglong Property Management Company	Chongqing University Researcher, Chongqing International Investment Consulting Group, Low Carbon Research Center of Chongqing Academy of Science and Technology	Jiucang Recycling Ltd.	/
Other actors	Environmental Defense Fund supported policy research financially and provides training for local community committee staff			

Source: Compiled by the author. The map is based on media reports, think tank reports and interview results conducted between 2015 and 2017. It does not necessarily include all stakeholders but suggests how many players are involved in low carbon community pilots.

[12] Chongqing Low Carbon Association, Introduction of the Association, retrieved from: http://www.cqdt.org/detail.aspx?id=194, access in February 2019.

4.2. Capacity building

The Low Carbon Community Pilot Initiative encouraged communities to explore indigenous low carbon development and address carbon emissions in their planning and daily management. Only communities that submitted comprehensive plans and practical to-do lists were selected as pilots and qualified to apply for fiscal funding, technical support and training.

To promote low carbon projects in local communities, NDRC, in collaboration with the Environmental Defense Fund, an American NGO, provided training for local community committee staff across China in 2015.[13] At the same time, the city government convened experts to provide technical support for local community committees to draft plans and review the application documents. The Initiative also helped improve local capacity on carbon emission reduction. For example, Chongqing Low Carbon Association convened researchers from local universities and research institutes and helped identify carbon emission inventories, and measured carbon emissions in local communities.[14] Wuxi also hired PeaceCarbon Company to help make carbon inventories in local communities and draft implementation recommendations.[15] This technical and expert input helped pilot communities improve capacity and made their low carbon programs more robust.

Capacity building to reduce greenhouse gases was different across these four municipalities. The reason resulted in part from the different capacity and budget of local supporting agencies, like the local Quality Certification Center (zhi'liang ren'zheng zhong'xin, 质量认证中心), Standardization Administration (biao'zhun ju, 标准局) and Quality Supervision, Inspection and Quarantine Administration (zhi'liang jian'du jian'yan jian'yi ju, 质量监督检验检疫局). In the pilot communities where interviews were conducted, only some communities started to compile greenhouse gas

[13] Since 2015, National Development and Reform Commission, with Environmental Defense Fund, an American NGO, has provided training for local community stakeholders three times. The first time is on July 23-24, 2015, in Beijing, for North-East, and North China trainees; the second time on Oct. 19-20, 2015, in Hangzhou, for South and Central China trainees; and the third time on Oct.23-24, 2015, in Guiyang, for North West, and South East China trainees.

[14] Chongqing Low Carbon Association, Hailong village kicked off low carbon community pilot, Chongqing Low Carbon Website, September 20th, 2016. (In Chinese: 九龙坡区白市驿镇海龙村低碳社区（农村社区）试点正式启动) http://www.cqdt.org/Detail.aspx?id=3854, access in February 2019. Chongqing Low Carbon Association, Chongqing Low Carbon Association visits low carbon community pilots, January 22nd, 2016. (In Chinese: 重庆市低碳协会调研组实地考察低碳社区建设试点) http://cq.cqnews.net/cqqx/html/2016-01/22/content_36253551.htm, access in February 2019.

[15] PeaceCarbon, PeaceCarbon Jiangsu successfully finished the Wuxi low carbon community research project on December 31st, 2015. (In Chinese: 江苏和碳承接的无锡市低碳社区研究课题成果评审顺利完成) http://www.peacecarbon.com/cn/content/?309.html, access in February 2019.

inventories in pilot community prefectures and set benchmarks. For communities that did not compile greenhouse gas inventories, they faced difficulties of evaluating performance.

4.3. Financial challenges

National sustainable initiatives in Chinese local communities focused on environmental education and communication prior to this Low Carbon Community Pilot Initiative. For example, the Green Community Initiative run by the Ministry of Environment Protection, the National Energy Saving Communication Week initiated by the NDRC, and the National Low Carbon Day initiated by the State Council have been in operation since June 17th, 2013. The Low Carbon Community Pilot Initiative goes a step further than these previous programs in terms of budget and infrastructure setup. An important question is if these community infrastructure projects received adequate funding for successful implementation. Although the NDRC mobilized some local stakeholders with the Initiative, and provided some training for local implementers, the effective implementation of this Initiative depended on substantial funding input, which was uncertain.

There was no fiscal expenditure category on climate change (ying'dui qi'hou bian'hua guan'li shi'wu, 应对气候变化事物) in the Chinese fiscal expenditure system before 2015 and the direct fiscal expenditure on climate change under the broad category of development and reform issues (fazhan yu gaige shiwu, 发展与改革事务) was insignificant. In 2015, national fiscal expenditure for climate change was 74 million RMB, with 39 million RMB for local expenditures.[16] In 2016, the national climate change budget was 94 million RMB and the local, 59 million RMB.[17] Previously, funding for climate change and low carbon development was put under "energy saving and environment protection" (jienenghuanbao, 节能环保) category.[18]

The Initiative did not detail funding resources, but only indicated in the Guideline that DRC agencies would coordinate with other departments to produce supporting policies (Guideline, p. 4).

[16] Ministry of Finance, National General Public Budget Expenditure, retrieved from: http://yss.mof.gov.cn/2015js/201607/t20160720_2365732.html, 2015, access in February 2019. Ministry of Finance, Local Governments' General Public Budget Expenditure, retrieved from: http://yss.mof.gov.cn/2015js/201607/t20160720_2365025.html, access in February 2019.

[17] Ministry of Finance, National General Public Budget Expenditure, 2016, retrieved from: http://yss.mof.gov.cn/2016js/201707/t20170713_2648981.html, access in February 2019. Ministry of Finance, Local Governments' General Public Budget Expenditure, 2016, retrieved from http://yss.mof.gov.cn/2016js/201707/t20170713_2648630.html, access in February 2019.

[18] Ministry of Finance, State Fiscal Balance, National General Public Budget Expenditure, 2014, retrieved from: http://yss.mof.gov.cn/2014czys/201507/t20150709_1269855.html, access in February 2019. And also previous national general public budget expenditure published by Ministry of Finance.

Thus low carbon projects in local communities had no specific funding resources. Instead they depended on the funding resources of "energy saving and environment protection" (jienenghuanbao, 节能环保), "urban and rural communities management" (chengxiang shequ, 城乡社区), "farming, forestry and water management" (nonglinshui, 农林水), which not only the DRC, but also other government administrations had authority to claim funding for, such as the department of environment protection, department of housing and urban-rural development and department of municipal management.

The low carbon community pilot in B Municipal Block, D District in Beijing can serve as an example. According to the financial statement of the municipal block office in 2015, 2016 and 2017, there were no specific expenditures for climate change. Environment protection and climate mitigation programs in local communities were divided in fiscal categories such as "energy saving and environment protection", "urban and rural communities management", "farming, forestry and water management" (B Municipal Block Office financial statement in 2015 and 2016 and B Municipal Block Office fiscal budget in 2017). The Environment Protection Bureau, Landscaping Bureau, and Urban Comprehensive Management Commission all had authority over funding for energy savings and environmental protection, urban and rural environmental issues, farming, and forestry and water issues in local communities. To implement the comprehensive low carbon plans for local communities, the municipal block office had to communicate with several district bureaus to sort funding for low carbon projects in its administrative area.

Furthermore, the fiscal budget was not enough to cover the cost of low carbon community pilots. The budget compiled for the low carbon community pilot in B Municipal Block Office was in the millions of RMB. In 2015, the "urban and rural community environment protection and sanitation" expenditure of B Municipal Block was 4.9271 million RMB and in 2016 it was 7.7336 million (B Municipal Block Office fiscal revenue and expenditure, 2015, p. 16; 2016, p. 18), which should cover all the expenditures on energy and environment protection, urban and rural community management and farming, forestry and water management. As a result, the fiscal budget alone could not cover low carbon community pilots. Fiscal funding challenges resulted in the slow or non-implementation of low carbon projects in some low carbon community pilots. There might be some sporadic funding from foundations or corporation social responsibility funding, but it was far from enough.

CONCLUSION

China is the largest carbon emitter in the world. The implementation of climate policy at the local level has far reaching effects for both China and the world. Unlike the Target Responsibility System, where the central government set policy targets at all levels of the governmental ladder, low carbon community applicants were entitled to more discretion in terms of designing their implementation plans and their applications. At the same time, they were subject to a comprehensive index system set by the NDRC.

Subnational governments, especially the DRCs were the main mobilizers to drive the local community projects. The DRCs encouraged participation of intermediary organizations to participate in coordinating between stakeholders at the local level. These intermediary organizations helped improve local communities' capacity on climate mitigation. However, these intermediary organizations are usually private consultancy companies or local NGOs. They had little interest or limited resources to fund low carbon infrastructure projects in local communities. Substantial input of resources depended on the local fiscal category and revenues. The DRCs alone did not have enough resources to promote low carbon programs in local communities. Thus it required the engagement of other departments, like the Municipal Administration Commission, Department of Environment Protection. This brought some challenges to implement low carbon projects in local communities by increasing coordination complexity.

Financial support for local pilot programs is key, but is often uncertain. Community applicants have to design their own financial mechanisms and leverage resources on their own. Pilot communities have shown their ambitions through their applications to become low carbon communities, but often they have problems financing implementation projects.

Climate policy in China has experienced a significant transformation since the National People's Congress announced a reshuffling of cabinet ministries and duties in early 2018. The newly established Ministry of Ecology and Environment took over climate duties and their website notes that climate pilots will become part of their work in the future. Currently, there is still no information about how the climate pilot programs initiated earlier by the NDRC will be continued into the future. Future research could investigate the institutional turn over of climate duties and the implication of this shift for the financing of subnational climate pilots.

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