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FOR AN URBAN POLITICS OF LOOKING ELSEWHERE: CLIMATE ACTION IN RAPIDLY GROWING CHINESE CITIES

Abstract

Urban areas mediate climate transformations and generate new forms of climate urbanism. Looking at climate action in the twelve fastest-growing cities in China with under one million people, this paper proposes a perspective on urban climate politics 'from elsewhere' that foregrounds the potential role of smaller urban areas in mediating climate transformations. The analysis reveals three climate action strategies that reflect practical, institutional, and personal spheres of climate transformations. Planning action in the personal sphere provides opportunities for urban transformations. A perspective ‘from elsewhere’ calls for greater attention to planning for diverse change strategies for climate transformation.

Introduction

Climate change has become a central concern for urban planning. The need to move 'from words to action' animates social movements- many of them urban- demanding transformative responses (e.g., Spratt and Sutton 2008, Hügel and Davies 2020). Climate transformation entails a realignment of society and the economy (Nightingale, Eriksen et al. 2020) and social changes distinct from incremental climate action (Park, Marshall et al. 2012). Transformation is a complex process occurring at multiple levels: it is never entirely clear what is transformed and how (O'Brien and Sygna 2013). Efforts to systematize climate action in cities seem to evacuate political action from transformation efforts (Hurlimann, Moosavi et al. 2021). There are concerns about the extent to which climate action will exacerbate, rather than address, existing inequalities (Anguelovski, Shi et al. 2016).

These concerns relate closely to debates on climate urbanism, which regard the current urban focus on climate policy as a new epoch for cities (Long and Rice 2019, Castán Broto, Robin et al. 2020, Long and Rice 2020, Robin and Castán Broto 2020). A new generation of urban policy has followed an increasing engagement with climate change concerns and responses (Castán Broto and Robin 2020). Climate urbanism also raises questions about the price to pay for putting cities and settlements at the center of climate change responses. Neoliberal practices of market-oriented governance, enhanced privatization, and entrepreneurial environmentalism frame climate action in a new reincarnation of the sustainable entrepreneurial city (Whitehead 2013). Future alternatives justify policies that, at best, move little from existing practice and, at worst, reproduce or amplify existing inequalities (Eriksen, Schipper et al. 2021). Neoliberal eco-fantasies emerge alongside citizen-led innovation and grassroots initiatives that reimagine a liveable city (Lin and Kao 2020). Such alternatives point toward a different understanding of what kind of climate urbanism can deliver urban transformations, for example, by broadening participation in urban climate politics and integrating social justice concerns into urban design and planning (Shi, Chu et al. 2016).

This article proposes examining climate urbanism strategies 'from elsewhere.' Elsewhere refers to the 'other' place, those places that, at the moment, do not influence dominant discourses of climate action. In the same way in which processes of 'othering' people have been central to organizing urban society, 'othering' places is a strategy to organize space (see examples in: Brons 2015, Jakimów and Barabantseva 2016, Acuto, Dinardi et al. 2019, Udah 2019). As climate urbanism proponents seek to re-organize socio-ecological relations, they do so by engaging with some places and othering others. Flagship projects, eco-cities, and urban labs concentrate in the limelight, while modest projects in provincial cities disappear in the shadows. The question is, what are we missing by overlooking such elsewhere spaces?

Climate action is increasingly led by a wide array of actors with multiple interests, rationalities, and capacities (Van Der Heijden, Bulkeley et al. 2019). Experimentation is frequently regarded as an element of effective climate action at the city level (Fitzgerald, 2020), but systemic change cannot rely on experimentation alone (Kivimaa et al, 2018). While every action directed towards realigning human relationships with the environment will likely support some form of enrolment in wider economic structures, climate action is also sustained by creative-infused methods to reimagine futures in overlooked spaces. Recent literature, for example, highlights the role of local governments and allied institutions (transnational municipal networks, public-private partnerships, local communities) in activating climate action at the local level (Kona et al, 2018). Actors intervening in local governance, particularly, have been effective in reducing carbon emissions in cities (Leffel 2021). Local governance actors such as municipalities, particularly, may find greater room for manoeuvre and autonomy in overlooked cities, hence creating greater opportunities for

experimentation. Sub-national action appears to have significant potential for carbon reductions (Hsu, 2020), adding to existing efforts at the national and international levels.

In China, technocratic principles and models shape climate action (Westman and Castán Broto, 2019). Climate urbanism has taken hold alongside the transition to a market economy, and the country seems to have adapted green urbanism discourses to expand the urban economy (Caprotti 2014). Green policies are mobilized in rapidly growing cities as a means to overcome the constraints of a land-hungry and resource-intense model of development (Ng 2019). The modes of green urbanization visible in China generate and reproduce ecological aspirations that ultimately enrol citizens into capitalism (Sze 2015). Research in large cities and state-led urban projects where dramatic changes have taken place (for example, in Shanghai, Shenzhen, or Tianjin) presents a somewhat homogeneous account of climate urbanism in China that obscures changes taking place elsewhere in the country (Huang et al, 2021). This paper aims to move beyond such a homogeneous account by examining climate action in Chinese cities that do not often come into view.

This paper examines climate urbanism as a heterogeneous phenomenon by deliberately engaging with 'the elsewhere' of urban China. The first part of the paper explores urban climate transformations and introduces the idea of 'the elsewhere' as a site of climate action. The second part of the paper reviews the debates related to climate urbanism in China, showing how particular strategies of analysis limit our understanding of how transitions are happening. The third part presents a qualitative analysis of China's current map of climate action focused on smaller urban centers whose populations are growing rapidly. The analysis reveals three different climate action strategies that resonate with the practical, institutional, and personal spheres in climate transformations literature. Ephemeral events that target the personal sphere emerge as possible entry points for planning. Moving away from the spectacle of urban climate governance in megacities, a perspective from elsewhere calls for greater attention to planning a diversity of practical, institutional, and cultural change strategies for climate transformations.

Urban climate transformations

Current socio-ecological conditions have become untenable under climate change. They call for a fundamental restructuring of system functions in climate transformations (following Walker, Holling et al. 2004). Climate transformations raise questions about equality, justice, inclusion, and the well-being of people and nature (Chu, Brown et al. 2019). They entail processes of change that challenge uneven power relations, dominant development paradigms, and the political-economic structures that produce and maintain vulnerability (Pelling, O'Brien et al. 2015).

Spatially distributed impacts of climate change, such as urban heat island, call for place-based planning responses (Wheeler, Abunnasr et al. 2019). Planning also has a role in designing spatial measures to address vulnerability and conditions that constrain climate action (Rosen 2016). However, the extent to which planning can deliver urban climate transformations is under question. Phelps (2021; p. 345) notes that "*place remains important regardless of whether theorists concentrate on a single process constituting the urban*." In urban governance and planning, neither process nor place can be dispensed with: both play a crucial role in urban climate transformations (Wolfram, Borgström et al. 2019).

The question of transformation relates to who has the agency and capacity to deliver change (Romero-Lankao and Gnatz 2013). Transformative capacity refers to the ability of a complex system to respond to untenable socio-ecological conditions by generating an entirely new system (Walker, Holling et al. 2004). In urban areas, transformative capacity is strongly shaped by the spatial and material dimensions of urban change as well as the micro-politics of urban action (Wolfram 2016). Planning for transformations must embrace uncertainty, create the conditions for change and facilitate positive visioning (McPhearson, Iwaniec et al. 2016, Rauws 2017). Including multiple perspectives in the planning process encourages capacities that support transformative change in local governments and allied institutions (Wolfram, Borgström et al. 2019). Urban design focuses on the built environment as a place of intervention for transformative change (Bentley 2004).

INSERT HERE: Figure 1: The three spheres of transformation (redraw from: O'Brien and Sygna 2013; originally adapted from Sharma 2007)

O'Brien and Sygna (2013) have proposed a framework consisting of three spheres of action that interact to facilitate transformations (Figure 1). The first sphere ('practical') refers to immediate responses to climate change that are already available, particularly those involving easily computable outcomes and technological responses. The second sphere ('political') involves the range of systems and structures that condition responses (e.g., enabling some while disabling others). Third, the sphere of the 'personal' entails radical changes in beliefs, values, worldviews, and paradigms- the kind of change that affects us individually and collectively. The hierarchical arrangement of these spheres mirrors Donella Meadows' (1999) influential essay on intervention points, involving actions that alter the operation of a system, later absorbed in theories on intervention points to trigger transformations towards sustainability (Abson, Fischer et al. 2017). Goals, rules, or power relations that structure all system interactions are vital to maintaining system stability and are difficult to change. Adjusting the intensity of flows or material stocks in a system may facilitate accessing other intervention points.

Planning often focuses on material elements in the practical sphere of action. Political structures condition planning but often are external to planning decisions. However, the reconfiguration of planning processes may shape the political sphere. The personal sphere, however, is often beyond the area of influence of urban climate interventions and has been routinely overlooked in research

on urban climate governance (Castán Broto and Westman 2020). When the personal is considered, it tends to focus on behavioural change (Shove 2010) and rarely supports cultural or lifestyle changes (Capstick, Lorenzoni et al. 2014). The framework has direct relevance to understanding the role of planning in urban climate transformations.

However, there is still an unanswered question about the extent to which the focus on overlooked sites of climate action may change what counts as an urban transformation. The question of "which city" has been underplayed in dominant theories of urban change that emphasize a city made of processes (economic transactions, activities, labour) (Phelps 2021). The focus on exemplary, large, capital cities connects urban development with national and global economic growth agendas but hides urbanization processes unfolding in less visible in smaller and regional cities (Shin, 2021). The stylized figure of the global city forecloses debates and closes the map of interventions (Sheppard, Leitner et al. 2013). Academic interest in forerunner actions and leading networks with a global impact has prioritized visible actions in global and strongly branded cities. Small and medium urban areas are largely overlooked in debates on urban governance and climate action despite the drastic changes taking place in them (Chen and Kanna 2012). This is reinforced in rapidly urbanizing regions because low carbon urban development has not been seen as a priority for less developed areas (Birkmann, Welle et al. 2016), notwithstanding the infrastructure gaps associated with rapid urbanization and the social and environmental benefits associated with low-carbon urban development (Swilling, Hajer et al. 2018). In industrialised countries such as the US, smallish cities could be ideally suited to advance models of urban resilience while simultaneously gaining from a green transition, increasing employment and improving quality of life (Tumber, 2011).

Yet, the dynamics of overlooked cities challenge received wisdom on urban change (Müller and Trubina 2020, Ruszczyk, Nugraha et al. 2020). An urban theory that focuses on the experiences of global, wealthy cities casts them as leading innovators in contrast to an indistinct mass of ordinary, 'under developed' cities (Robinson 2002, Robinson 2006). Amin and Graham (1997) argued that ordinary cities provide a different angle on the set of relations that constitute 'the multiplex' city in in-between spaces, in interstices not necessarily reached by dominant ideologies. The radical change that could deliver a climate transformation becomes possible in these interstitial, ordinary spaces. This critique remains relevant in debates on climate change governance and planning.

The idea of 'ordinary cities' relates the production of urban space to how space is lived. Engaging with ordinary cities requires rethinking engagement's theoretical and methodological tools from a postcolonial perspective (Robinson 2006). Doing so also requires decentring urban studies and engaging with new locations and assumptions. In part, this constitutes a critique of who can produce knowledge about cities and how that is done (McFarlane 2010). Opening up the process of knowledge production to incorporate multiple perspectives also portrays a different city: one where heterogeneous infrastructures play crucial roles alongside networked ones, one that demands a radically different engagement to foster climate action. This is ‘the elsewhere’ of climate action.

Climate urbanism in China

The debate on climate urbanism is gaining salience in China. Current interpretations of climate politics in China have largely followed the paradigms of the growth machine, state entrepreneurialism, and neoliberalism, emphasizing economic processes of capital accumulation (by dispossession), the reproduction of labor, land financialization, and state-led projects. For instance, eco-city initiatives are widely seen as a means of city branding for local governments, exhibiting typical features of eco-urbanism such as grand environmental-economic visions, a strong international presence in architectural and urban design, and the attraction of green capital and

urban elites (Joss and Molella 2013, Caprotti, Springer et al. 2015). The construction of new towns is considered a manifestation of urban entrepreneurialism driven by pro-growth ideologies (Wu 2015, Song, Stead et al. 2020). Similarly, ecological conservation planning in cities such as Shenzhen appears as a form of green grabbing to mobilize ecological resources for capital accumulation (Lin 2019). The appropriation of sustainable urban development objectives by dominant political-economic interests is a global phenomenon (Castán Broto and Westman 2019). While models of climate urbanism in China will be shaped by social and political structures and relations unique to this setting, the deployment of environmental narratives as a strategy to advance neoliberal agendas reflects the embeddedness of Chinese development discourses in international policy paradigms (as described, for example in: Saiu 2017).

The national government influences climate action at the local level. As Tyfield (2018, p.75) argues, in China, "environmental challenges are experienced as political ones – to the existing Party-state constitution, and not just to the tenure of a particular leader or party in office". The Chinese government has emerged as a complexity-aware entrepreneurial state that fosters innovation at different levels (Tyfield 2018). In March 2021, the National People's Congress approved the 'Outline for the 14th Five Year Plan (2021-2025) and Long-term Targets for 2035'. The plan foresees a reorientation towards the domestic economy (called 'internal circulation' in the 'dual circulation' strategy) and a focus on energy and climate targets. The plan sets an 18% reduction target for CO_2 intensity and a 13.5% reduction target for energy intensity from 2021 to 2025. To align with national goals, highly industrialized cities such as Beijing and Shanghai have included emissions peaks in their proposed Five-Year Plans (FYPs). In addition, the narrative of ecological civilization has institutionalized the goals of a deep environmental transition in both national and municipal agendas. However, state-led ambitions emphasize technological development at the expense of addressing the models of growth, investment, and consumption that drive emissions (Hansen, Li et al. 2018, Westman, Castán Broto et al. 2019)

China has developed a specific model of environmental authoritarianism in the context of deep uncertainty (Li and Shapiro 2020), referred to as experimentation under hierarchy (Tsai and Dean 2014, Miao and Lang 2015). This experimental orientation builds upon a policy paradigm of 'learning by doing' (Li 2021). Central to the experimental approach is the establishment of pilot cities and provinces where innovation policies are unrolled. Green urban design ideas, such as sponge cities and ecological cities, are deployed to demonstrate China's leading thought in urban responses to climate change (Jiang, Zevenbergen et al. 2018). Related policies focus on the development of the green economy, including through circular economy schemes, the digitalization of urban management systems, and flagship programs, such as photovoltaic poverty alleviation (Wang, Lee et al. 2018, Wang, Ren et al. 2019).

China’s current model for experimenting with climate action in cities follows a history of employing environmental city standards to draw lessons from practical experiences on the ground. This includes experiences such as Garden Cities, Environmental Protection Model Cities, and Eco-cities, which integrated multiple aspects of sustainable urbanization (e.g., resource conservation, economic development approach, ecosystem protection) (Liu, Zhou et al. 2014). This approach was explicitly extended to climate innovation through the adoption of a national low-carbon pilot scheme adopted in 2010, originally encompassing eight cities across China and later extended into nearly ninety urban areas (Khanna, Fridley et al. 2014, Cheng, Yi et al. 2019). More recently, ecological civilization pilot zones (including provinces, cities, and counties) have been designated in parallel with comprehensive evaluation systems to monitor progress (Wang 2016). Lessons learned from pilot experiences diffuse through horizontal competition between jurisdictions (Liu, Wang et al. 2021), or

shape central government policy (Lo and Castán Broto 2019). Pilot cities are also well integrated into international circuits of knowledge production, where their achievements are celebrated as pioneering (Li 2021). As a result, much research on urban climate governance in China in the Anglophone literature has focused on megacities, such as Beijing, Shanghai, Tianjin, Shenzhen, or Guangzhou (Baeumler, Ijjasz-Vasquez et al. 2012, Ying and Yue 2017, Jia, Li et al. 2018).

Three observations complicate this relatively straightforward narrative of urban change. First, the rationale for focusing on pioneering cities has emerged hand in hand with policies that effectively materialized this rationale on the ground. In 2008, pilot low-carbon cities were established in Shanghai and Baoding. The national government followed this experimentation with further pilots in 2010, 2012, and 2017. Low carbon development plans, administrative tools, and quantitative targets for resource conservation (e.g., energy efficiency in industry and the built environment) dominate approaches to climate action in these pilot cities (Khanna, Fridley et al. 2014, Wang, Song et al. 2015). Such experiences have influenced climate policy, effectively benchmarking what it means to be a pioneering, low carbon, resilient city in China. Second, there is a limited sense of other actors' role in low carbon, resilient development beyond the state (Castán Broto, Mah et al. 2020). The urgency of climate change and the change of discourses has created even greater awareness of the involvement of multiple actors in environmental governance in China (Carter and Mol 2013, Mai and Francesch-Huidobro 2015, Guttman, Young et al. 2018). Networked governance approaches are employed in pilot schemes, reflecting how multiple non-state actors, in particular professional groups and other organizations representing scientific expertise, shape local experimentation in China (Shin 2017). However, participation of the private sector and NGOs in the low carbon pilot schemes is still relatively limited (Ma, de Jong et al. 2021). Beyond a superficial engagement with low carbon lifestyles and low carbon communities (Wang et al, 2015), the role of individuals, households, and grassroots organizations in these pilot schemes is unspecified and ambiguous. Third, environmental politics in China are not exempt from complexity. Intricacy and contradictions arise from the difficulties in homogenizing a highly complex system of governance and because the dominant brand of Anglophone political theory is wholly inadequate to explain how environmental governance works in China (Huang, Westman et al. 2021). The state's drive alone does not explain the unfolding of environmental policy in China: environmental governance cannot be understood as the seamless result of FYPs.

Current literature on climate urbanism in China focuses on wider change processes rather than explaining the constraints and potentialities in specific places (cf. Phelps 2021). Understanding Chinese urbanism requires re-theorizing urban change (Wu 2015). This article embraces this challenge, focusing on climate change action in smaller but rapidly growing Chinese cities. If a climate transformation is possible in urban China, it will depend on a wider range of actors beyond the state to deliver alternative paradigms of low carbon, climate resilient development in overlooked cities.

Methodology

This paper focuses on twelve cities that exhibit rapid population growth in China. The data in the 2018 World Urbanization Prospects produced by UNDESA suggests that the cities of Luohe, Hejian, Lu'an, Liling, Enshi, Dengfeng, Anqiu, Miluo, Liuyang, Yichun, Bazhong, and Xiongan all are growing rapidly, adding over 4% of the population every year (Figure 2). More precise data for each city shows that they had populations of nearly one million people in the decade up to 2020 but remain small urban areas by Chinese standards. Table 1 summarises the cities selected.

INSERT HERE: Figure 2: Sample of cities studied and their provincial capitals (drawn by Dr. Hita Unnikrishnan)

A common feature of these cities is that most are geographically adjacent to or near the provincial capital (except for Bazhong and Anqiu). A factor driving the rapid urbanization of these cities might be the accumulation effect of regional hub cities. For instance, the sample includes three cities whose urbanized areas touch each other: Liling, Liyuang, and Yichung. The three cities are located between two provincial capital cities - Changsha (Hunan Province) and Nanchang (Jiangxi Province), both recorded a high GDP growth rate of more than 8% in 2019 (Zhenghou Government 2019). In China, because provincial capitals shoulder both political and economic functions, they often exhibit a significant agglomeration effect surrounding smaller cities.

In terms of local industries, the majority of cities in the sample are based on traditional pillar industries, such as fireworks and flower seedlings in Liuyang; traditional Chinese medicine and selenium-rich agriculture in Yichun; ceramics and fireworks in Liling; green tea and white goose breeding industry in Lu'an; ginger and onion planting and food processing in Anqiu; and remanufacturing industry in Miluo and Hejian. Local development strategies focus on industrial development and upgrading, encouraging characteristic and emerging industries. Notably, the selection of emerging industries is closely related to the industrial structure of corresponding provincial capital cities. For instance, Liuyang aims to develop an 'intelligent' manufacturing industry, already well developed in the nearby capital city Changsha, while Yichun targets the new energy industry, a strategic industry in the nearby capital city Nanchang.

Instead of focusing on industrial development, a different development strategy is deployed in cities such as Luohe, Bazhong, and Enshi. These cities rely on local natural resources (mountains, rivers, forests, fields, lakes, and grasses) to develop ‘greener’ economic activities such as cultural tourism and health. The liveability and sustainability of the city are thus central to urban development strategies.

Dengfeng City embodies the characteristics of both strategies. It emphasizes developing emerging industries, such as new materials and biomedicine, and pledges to develop the cultural tourism industry relying primarily on the Shaolin Temple cultural heritage.

Of the 12 cities, Xiongan is the only one that has been newly created. Hand-picked by Chinese President Xi Jinping, Xiongan is a state-led urban development project to decentralize Beijing's non-capital functions. Xiongan development strategies build on a high-level socialist modern city vision featuring green, smart, and innovative development.

INSERT HERE: Table 1: Summary information for the 12 cities (Source: own elaboration from multiple data sources)

The analysis focused on a unique dataset of initiatives compiled by the authors. Focusing on each city, we did searches of initiatives that addressed climate change explicitly. We used a variety of sources including policy documents, government websites, local newspapers, local news websites, and social media (Weibo and Zhihu) and internet searchers combining the name of the city with the following keywords: climate change, low carbon, sustainability, green development, eco development, resilience and smart cities. We focused on initiatives implemented since 2009, a year which is generally considered as the year where urban-based climate action jumped into international agendas. We triangulated the information for each initiative from multiple sources. Data was compiled by one of the authors, and the other two verified the initiatives by examining the

sources of the information. The final sample contained 82 initiatives in different sector, and a quarter of them being cross-sectoral (Figure 3).

INSERT HERE: Figure 3: Distribution by sector of the initiatives analysed

A coding guide was developed raising key questions on urban governance (what, who, when and where). Categories of sectors and actors were derived from existing literature (specially UN-Habitat 2011), with minor adjustments to reflect the empirical material accurately. In the case of the question 'what action' the coding guide was revised during the coding process increasing the number of categories to reflect the variety of initiatives that are delivered as climate action. Table 2 provides a list of the codes used to understand each initiative.

INSERT HERE: Table 2: Coding categories to understand climate action in rapidly growing urban areas in China

The first iteration of coding was conducted by the first author. Another author verified the coding by revising each initiative and the third author took a sample to confirm the conclusions of the two previous iterations.

The largest group of initiatives includes those that deliver new or retrofitted facilities. Most of the actions are led by local authorities, in line with current literature highlighting the role of local governments in implementing action on the ground (43% of initiatives) (Castán Broto and Westman 2020). Additional coding characterized the timing of the initiatives (whether they generate a one-off event, create a permanent change in the urban fabric, or result in ongoing changes) and their location (whether they take place in a particular location, generate action across the city, relate to the urban hinterland or wider region, or take place at a national scale).

Cluster analysis is a statistical technique for classification that uses a distance function to assess the similarities between objects. We used SPSS's two-step cluster algorithm to cluster the initiatives.[1] The classification results were then be interpreted in the light of qualitative data about individual initiatives, and geographical data for each city. We compared the clusters with the transformations framework presented above.

The results are presented as follows. First, we describe the three types of action that emerge in ordinary cities in China and its source data. Second, we situate this classification in relation to the geographical conditions of the cities in our sample, seeking to understand the value of examining overlooked cities in China. Third, we evaluate whether or not different types of climate action in overlooked cities in China may be delivering urban transformations.

Three types of climate action in ordinary cities in China

The cluster analysis grouped the initiatives into three clusters: cluster 1 with 22 initiatives, cluster 2 with 36 initiatives, and cluster 3 with 24 initiatives.

The first cluster of 22 initiatives includes projects that leave a material imprint in the physical environment. All the initiatives in this cluster are sectoral, including actions in energy (3), housing (6), industrial development (4), transport (1), and waste (8). They include a range of projects

[1] According to the SPSS User's manual "the TwoStep Cluster Analysis procedure uses a likelihood distance measure which assumes that variables in the cluster model are independent. Further, each continuous variable is assumed to have a normal (Gaussian) distribution and each categorical variable is assumed to have a multinomial distribution." Available online at: https://www.ibm.com/docs/en/spss-statistics/27.0.0?topic=analysis-clustering-principles#twostep_methodology

delivering new infrastructures and facilities, retrofitting, or providing enabling infrastructures to support environmental action by other actors. They all involve a permanent change in the material fabric of the city. Most of them take place in one or more concrete locations within the urban area.

All actors intervene in this cluster of initiatives, except local groups and civil society. For example, cluster 1 includes a range of national-level initiatives, including the development of 'a smart and low-carbon industry-city merger demonstration area' in Liuyang and the 'national industrial demonstration center for remanufacturing' in Hejian, alongside initiatives led by the local government, such as a program to develop low carbon infrastructures in Lu'an and a solid waste generation facility in Bazhong. The private sector is also most visible in cluster 1. There are only two public-private initiatives in the database, both in cluster 1: a solid waste generation project in Yichun and a low carbon industrial park in Anqiu.

There is something common to all the projects in cluster 1. They are all projects whose benefits for low carbon and resilient development are well established. They are all sectoral, and none of them is very original. They are all projects that are not specific to the characteristics of the city and do not reflect its ecological contexts or the particularities of its institutions or culture, except for some projects closely linked to national development projects (such as in the case of the remanufacturing emphasis in Hejian). All these projects represent a practical approach to climate action, in line with the first sphere of transformation emphasized by O'Brien and Sygna (2012). These initiatives all emerge in a blurred area where the promise of transformation does not dispel a business-as-usual smell.

The second cluster of 36 initiatives includes various projects that have institutional change as a core process. While some of these initiatives are sectoral, most of them present cross-cutting features. For example, waste-related initiatives are also housing initiatives (such as household waste sorting in Enshi), and water-related initiatives are broader attempts to facilitate nature conservation (such as adopting the 'river chief' water management strategy in both Bazhong and Liuyang). They include a wide range of projects directed at creating new social infrastructures, changing operating processes and structures of governance, mobilizing local resources, facilitating urban visions, and developing a series of initiatives to enable more comprehensive changes. A vital aspect of these initiatives is that most of them involve not a delimited change in the urban environment but a commitment to ongoing change – of forms of operation, of institutional arrangements – that permeates interventions of multiple actors across the city. Geographically, these are initiatives in multiple locations across the city and sometimes reaching their hinterland (as in the case of water basin management initiatives in Bazhong and Liuyang mentioned above).

While many actors intervene in these initiatives, this is the cluster in which the local government plays a definitive mediating role. About 70% of the initiatives in this cluster are led by the local government or show strong involvement of some form of local authority. The participation of the local government in these initiatives is linked to two critical functions that local governments play in climate governance: as a provider of services and as an enabler of action by other actors (as it has been long recognized on the work on modes of governance: Bulkeley and Kern 2006). However, in those initiatives in which the local government collaborates with a wide range of actors, forms of social innovation suited to the location emerge. For example, in Enshi, an initiative to support green tourism for poverty alleviation is called "Poverty Alleviation through Tourism: Every Family Builds a Hotel." The initiative seeks to mobilize the cultural capital of Yingshang Village, a *Fengxiangpo Qiang ethnic style* village, providing food and entertainment for visitors who can experience 'a real farmer's house.' The initiative involves rethinking the structural conditions of the village and encourages migrants to return to the village, building or renewing farmhouses. A range of local actors, including

those migrants, have facilitated a multi-functional view of the village landscape. Some sources suggest that the program has increased the income per capita of migrants from 3,000 to 5,300 yuan in three years (Hubei Government 2014).

All the initiatives in cluster 2 have something in common: they are directed towards changing the structural and institutional factors that shape current economic and social practices, sometimes simply by revaluing existing resources. They are aligned with what O'Brien and Sygna (2013) define as 'the political sphere.' However, few or none of this set of initiatives can be said to involve the kind of political action implied here. Instead, they are all modest actions of institutional change directed to articulate a micropolitics of re-coordination alongside more sustainable action patterns.

Finally, **the third cluster** includes 24 initiatives directed towards shifting the dominant cultural systems that shape collective practices. How do you change cultures? In this case, most initiatives in this cluster are cross-cutting initiatives, including a range of awards, joint celebrations, and festivals, and attempts to shift the boundary of acceptability in consumption practices and lifestyle orientations. As such, the initiatives in this set are all modest, one-off events that extend across the city and nationally.

A variety of actors may lead initiatives in this cluster, but they always involve multiple actors within the city, especially those who 'receive' the cultural change (e.g., citizens, consumers). The purpose is to shift the boundaries of what is acceptable in a low-carbon, resilient society. Public demonstrations of acceptability is central to all these initiatives. Many are inspired by discourses of ecological civilization and are presented as one-day celebrations of a future together. Some create new normative boundaries for consumers and citizens. For example, in Luohe, there has been a craze with 'low carbon weddings.' An article on this craze explains the emphasis on actions signalling environmental virtues such as eliminating wasteful decorations, wearing an environmentally-friendly cotton t-shirt, or riding a bike to a celebration venue instead of a luxurious car (Dahe Net 2019). There is something incongruous in the celebration of this wedding and the anecdotal image of the couple riding away into the sunset on a bike. Nevertheless, the market size of the wedding industry in China in 2020 amounted to $26bn, supporting 14,887 companies and over 165,000 workers (IBIS World 2022). The impact of a shift of practices in this industry could be transformative, particularly if linked to other lifestyle changes, shifting the boundaries of what is acceptable or desirable. In other cases, diverse actors attempt to reimagine sustainability practices. For example, outdoor waste collection and sorting is reimagined as collective forms of 'low-carbon aerobic walking' in Yichun.

In this cluster of initiatives, the objective of the action is directed towards creating a profound change of culture and understanding of urban life, what O'Brien and Sygna (2013) call 'the personal sphere.' While these initiatives are modest in their deployment, they are all profoundly ambitious in their rationality. Common to all the initiatives in this cluster is that they all emphasize the collective event to model shared values for a low carbon future.

How urban geographies shape the context of climate action

Narratives of low carbon and climate-resilient development are as ubiquitous in rapidly growing, smaller cities as those designated as pilots or those inserted in global circuits of knowledge and international partnerships. Climate change is now a universal narrative established in urban planning, which has become reinforced in China with the national promotion of discourses of ecological civilization. Cities do differ in the practices and style of climate governance, as the patterns of clustering show. For instance, Miluo exhibits a significant preference for practical initiatives that focus on technological and industrial development. Cities like Enshi, Bazhong, and

particularly Xiongan focus on institutional transformations instead of physical or cultural ones. For Enshi and Bazhong, natural resources provide a distinct advantage. They are less attractive to capital, but this opens up alternative paths for ecological civilization construction and green development, with relatively fewer obstacles for institutional transformations.

In contrast, the newly created city Xiongan reflects the CCP's ambition to build a role model socialist city for smart and low-carbon development. The climate initiatives in this city are institution-oriented, laying the foundations for transformations in other areas. Cultural elements are particularly evident in climate governance in cities like Luohe and Lu'an, where action focuses on transforming personal habits, social norms, and value orientations. Even one-off events reflect the emerging dynamics of a quest for ecological and sustainable lifestyles.

The data demonstrate that climate urbanism in China manifests in a highly heterogeneous set of initiatives. Many action possibilities move beyond large infrastructure, high investment models, and focus on achieving local objectives. The analysis suggests that cities resort to different strategies to deal with environmental and climate problems, determined by urban histories, industrial base, natural endowments, societal demands, and local politics. Thus, the forms of action associated with the literature on climate urbanism are not the only available model on display. The focus on 'ordinary' cities draws attention to aspects overlooked in analyses of shiny megacity projects, with planning strategies emphasizing institutional change, citizen needs, and cultural change rather than capital accumulation and technocratic entrepreneurship.

The second insight is that local authorities play a crucial role in mediating action, whether they initiate it or facilitate it via partnerships and service provision. The influence of the local government is visible across the three clusters. Institutions at the level of the township and residential and village committees also mobilize local resources to foster action. The mediation of local governance structures engages multiple actors, and distributed action is more apparent than in larger cities. While in larger cities, residents may resort to models of defensive participation to make themselves heard in environmental governance (Huang, Castán Broto et al. 2020), citizens appear as active agents of change in smaller cities. Whether this is by reimagining the position of the household within the local economy (e.g., in the case of Enshi) or reconceptualizing notions of the good life (e.g., Luohe), most radical initiatives engage citizens directly. As above, the focus on 'ordinary' action highlights invisible dynamics both in narratives on climate urbanism (in which citizens primarily tend to be at the receiving end of risks) and in assumptions of state-led change in the context of China (which renders citizens nearly irrelevant). The engagement with everyday forms of action reveals a complex reality. State-led discourses certainly exert pressure for change, but urban residents also seem to participate materially and formulate collective goals.

Activating urban transformation pathways

Back to the question posed by Phelps (2021) above about the distinction between place and process in planning, we can differentiate the three clusters as follows: cluster 1 of practical initiatives delivers mostly place-based work, often associated with co-benefits and local development strategies. Local businesses may find practically oriented initiatives very attractive. Tiny changes fit neatly within existing paradigms in action and do not challenge modes of economic and social organization. The initiatives in this cluster provide ready-made models of solutions and technologies that are easily transferable across contexts. They may have a significant impact on the flows of materials in the city. Cluster 1 involves what traditionally has been considered easily replicable initiatives, which can reach action at scale.

The second cluster, in contrast, refers to initiatives that achieve impact not through scale but through cross-cutting interventions across sectors. Here is where local governments and planning institutions take centre stage- mainly through forms of planning that commit to developing a collective, relational urban project. Overlooked cities such as the ones in our sample appear to offer opportunities to develop tailored, cross-cutting interventions such as the ones in cluster 2. In this case, many initiatives are directed towards engaging with the processes that shape the city and reimagining them- from reimagining the constitution of the local economy to redefining the role of local institutions. China's urban planning in the post-reform era has been a political tool to legitimize land financialization and space commodification, strongly linked to the paradigm of "planning for growth" (Wu 2002, Wu, Xu et al. 2006, Wu 2015). Although recent years have seen an increasing role of environmental elements in Chinese urban politics (Xu 2017), evaluations of planning practices such as eco-city planning and low-carbon city planning have mainly followed this narrative (Pow and Neo 2013). Many initiatives in the second cluster result in ongoing, long-term changes. China's planning cultures are central to understanding the extent to which a transformation is possible.

The third cluster relates to bigger transformative changes that facilitate climate adaptation (O'Brien 2018). Many of these initiatives can be deployed at large scales, but their impact is ephemeral. Nevertheless, these initiatives both recognize the broader processes of change that shape the city (for example, the changing lifestyles of people and their dependence on development strategies) and the places where people live. They are deeply embedded in the culture and specificity of 'the elsewhere' cities in our sample. Examples of practical projects (cluster 1) and institutional changes (cluster 2) routinely occur in these cities. However, the examples in cluster 3 engage with something different- building collective solidarities across cities. They mainly involve cultural activities and celebrations that create a collective sense of responsibility and mutual engagement. In doing so, these initiatives reimagine social relations- guanxi- in ways that can activate a different mode of profound change (Huang, Westman et al. 2021). While the need for action that supports broader social changes is recognized in interdisciplinary commentary (e.g., Gillard, Gouldson et al. 2016, O'Brien 2016), such initiatives are still not well established in planning. However, they resonate with a communist legacy of realizing action through campaigns and demonstrate the increasing integration of ecological civilization in discourses of socialist modernization (Schmalzer 2016).

Real changes in these cities will include changes in one of the three spheres and across the three levels. The most riveting cases in the sample, such as green tourism or valuation of local resources in several cities, show impact across the three spheres. In Enshi, the shift of narratives about economic development has revalued local ecosystems. Changes in belief systems (the 'personal' sphere of change) have an impact because they interact with shifts in the other two spheres, including material interventions in homes (alteration of material structures in the 'practical' sphere) and a reorientation of the economy (a change in the 'political' sphere). What is missing from this heuristic is that the process of transformation also is linked to place. If planning is a tool to target both process and place, we may have to accept that transformations are contingent on place. Planning lessons can perhaps not be easily scaled, diffused, or replicated across locations. Processes of change link collective aspirations to people's emotional attachments and the history of the place. In engaging with different spheres of transformation, different actors generate transformative capacities in the city (Wolfram et al, 2019). Rather than following transferable practical projects or institutional reform, transformations may depend on multiple, differentiated interventions that shift the practical, the institutional, and the personal in unexpected, heterogeneous ways.

Conclusion

Cities in China will play a key role in climate transformations, given the scale of the changes in urban China and their innovation potential. Yet, how climate action takes place in urban China and with what consequences is not well understood. The focus on the leadership potential of mainly large and globally connected cities in China has distracted scholarly attention away from the sizeable challenge of delivering climate action in rapidly urbanizing areas beyond those large cities. This paper argues that transformations thinking requires analyzing the role and impact of climate action in overlooked cities in China, moving beyond documenting the pioneering role of a handful of cities (i.e., Li 2021). The empirical analysis in this paper shows a rich and heterogeneous landscape of climate action that mobilizes local governance actors, local resources, and local identities to develop both standard and original responses to the climate crisis.

The concept of pioneering cities differentiates climate transformations in terms of speed and depth. Yet, experiences in less prominent, rapidly urbanizing areas move beyond oft-repeated examples and suggest a complex landscape of urban transformations. Climate action is heterogeneous, and its consequences unpredictable. The transformative intent—across practical, institutional, and personal spheres—is visible in a collective reading of the initiatives. Such intent, however, does not directly challenge the structural drivers of carbon emissions and existing vulnerabilities to climate impacts. Successful initiatives depend on their insertion in quotidian contexts of action to activate transformations. Transformations will depend on the sustained interactions between the three spheres.

These observations can help to rethink the role of planning in climate transformations. Large-scale infrastructure investments based on risk assessment and protection of material assets characterize the majority of experiences of climate urbanism (Long and Rice 2020). Experiences in larger pilot cities in China highlight a fast model of climate action involving massive projects and investments. Risk assessments and carbon inventories dominate planning for climate urbanism (for examples in China, see: Zhou, Shan et al. 2018, Liu, Duan et al. 2019, Liang, Deng et al. 2020). These approaches spread as provinces seek to compete on the political map of China (Wu, Li et al. 2020, Liu, Wang et al. 2021). But the models of climate action emerging in overlooked cities provide a different insight. The sample here includes, for example, a few cases of initiatives that prioritize resource conservation in high-end real estate projects or industrial zones, but they are rare. Instead, the analysis of initiatives suggests that while national and international politics often motivate climate action, they are not the only drivers that shape climate urbanism in China. Instead, most examples identify more significant impacts from climate action emerging from the bottom-up, engaging the local government, and emphasizing place-led innovation.

The calls for urgency and scale blind us to transformations in terms of individual life stories. Instead of focusing on quick or radical changes, progressive climate urbanism calls for long-lasting changes that impact people's lives, institutions, and surrounding landscapes. A perspective ‘from elsewhere’ informs forms of planning that engage with the global climate challenge within the possibilities offered by a given place. Many of the initiatives in our sample fall short of challenging the root causes of environmental degradation. Still, they seem to make an enormous difference in individual lives and, in some cases, facilitate the inclusion of poorer communities or newly arriving migrants. This kind of change could generate the level of passion and involvement required for citizens to collectively reimagine their cities' futures. When looking at how it operates in practice, the transformative becomes mundane.

References

Abson, D. J., J. Fischer, J. Leventon, J. Newig, T. Schomerus, U. Vilsmaier, H. von Wehrden, P. Abernethy, C. D. Ives and N. W. Jager (2017). "Leverage points for sustainability transformation." Ambio **46**(1): 30-39.
Acuto, M., C. Dinardi and C. Marx (2019). "Transcending (in) formal urbanism." Urban studies **56**(3): 475-487.
Adaptation, G. C. o. (2019). Adapt now: a global call for leadership on climate resilience. Groningen, Global Center on Adaptation and World Resources Institute.
Amin, A. and S. Graham (1997). "The ordinary city." Transactions of the Institute of British Geographers **22**(4): 411-429.
Anguelovski, I., L. Shi, E. Chu, D. Gallagher, K. Goh, Z. Lamb, K. Reeve and H. Teicher (2016). "Equity Impacts of Urban Land Use Planning for Climate Adaptation: Critical Perspectives from the Global North and South." Journal of Planning Education and Research **36**(3): 333-348.
Baeumler, A., E. Ijjasz-Vasquez and S. Mehndiratta (2012). Sustainable low-carbon city development in China. Washington DC, World Bank.
Bentley, I. (2004). Urban transformations: Power, people and urban design, Routledge.
Birkmann, J., T. Welle, W. Solecki, S. Lwasa and M. Garschagen (2016). "Boost resilience of small and mid-sized cities." Nature News **537**(7622): 605.
Brons, L. L. (2015). "Othering, an analysis." Transcience, a Journal of Global Studies **6**(1).
Bulkeley, H. and K. Kern (2006). "Local government and the governing of climate change in Germany and the UK." Urban studies **43**(12): 2237-2259.
Caprotti, F. (2014). "Eco‐urbanism and the Eco‐city, or, Denying the Right to the City?" Antipode **46**(5): 1285-1303.
Caprotti, F., C. Springer and N. Harmer (2015). "'Eco' For Whom? Envisioning Eco‐urbanism in the Sino‐Singapore Tianjin Eco‐city, China." International Journal of Urban and Regional Research **39**(3): 495-517.
Capstick, S., I. Lorenzoni, A. Corner and L. Whitmarsh (2014). "Prospects for radical emissions reduction through behavior and lifestyle change." Carbon management **5**(4): 429-445.
Carter, N. and A. P. J. Mol (2013). Environmental governance in China, Routledge.
Castán Broto, V., D. Mah, F. Zhang, P. Huang, K. Lo and L. Westman (2020). "Spatiotemporal perspectives on urban energy transitions: a comparative study of three cities in China." Urban Transformations **2**(1): 1-23.
Castán Broto, V. and E. Robin (2020). "Climate urbanism as critical urban theory." Urban Geography: 1-6.
Castán Broto, V., E. Robin and A. While (2020). Climate urbanism: towards a critical research agenda. Cham, Palgrave MacMillan.
Castán Broto, V. and L. Westman (2019). Urban sustainability and justice: Just sustainabilities and environmental planning. London, Zed Books Ltd.
Castán Broto, V. and L. K. Westman (2020). "Ten years after Copenhagen: Reimagining climate change governance in urban areas." WIREs Climate Change **n/a**(n/a): e643.
Chen, X. and A. Kanna (2012). Rethinking global urbanism: comparative insights from secondary cities, Routledge.
Cheng, J., J. Yi, S. Dai and Y. Xiong (2019). "Can low-carbon city construction facilitate green growth? Evidence from China's pilot low-carbon city initiative." Journal of cleaner production **231**: 1158-1170.
Chu, E., A. Brown, K. Michael, J. Du, S. Lwasa and A. Mahendra (2019). "Unlocking the potential for transformative climate adaptation in cities." Background Paper prepared for the Global Commission on Adaptation, World Resources Institute, Washington, DC and Rotterdam.
Eriksen, S., E. L. F. Schipper, M. Scoville-Simonds, K. Vincent, H. N. Adam, N. Brooks, B. Harding, L. Lenaerts, D. Liverman and M. Mills-Novoa (2021). "Adaptation interventions and their effect on vulnerability in developing countries: Help, hindrance or irrelevance?" World Development **141**: 105383.

Fitzgerald, J., 2020. Greenovation: Urban leadership on climate change. Oxford: Oxford University Press.
Gillard, R., A. Gouldson, J. Paavola and J. Van Alstine (2016). "Transformational responses to climate change: beyond a systems perspective of social change in mitigation and adaptation." Wiley Interdisciplinary Reviews: Climate Change **7**(2): 251-265.
Government, H. (2014). " Enzhi zuozu 'xi' wenzhang, change fupin yinling lvse jueqi [Hubei Province: Enshi makes the best use of 'selenium,' poverty alleviation by industrial development leading to a green rise], Hubei Government Website, http://www.cpad.gov.cn/art/2014/12/22/art_5_34875.html."
Government, Z. (2019). Statistical Bulletin, Zhenghou's Government Website, https://zhuanlan.zhihu.com/p/130417014.
Guttman, D., O. Young, Y. Jing, B. Bramble, M. Bu, C. Chen, K. Furst, T. Hu, Y. Li and K. Logan (2018). "Environmental governance in China: Interactions between the state and “nonstate actors”." Journal of environmental management **220**: 126-135.
Hansen, M. H., H. Li and R. Svarverud (2018). "Ecological civilization: Interpreting the Chinese past, projecting the global future." Global Environmental Change **53**: 195-203.
Hsu, A., Höhne, N., Kuramochi, T., Vilariño, V. and Sovacool, B.K., 2020. Beyond states: Harnessing sub-national actors for the deep decarbonisation of cities, regions, and businesses. Energy Research & Social Science, 70, p.101738.
Huang, P., V. Castán Broto and L. K. Westman (2020). "Emerging dynamics of public participation in climate governance: A case study of solar energy application in Shenzhen, China." Environmental Policy and Governance **30**(6).
Huang, P., L. Westman and V. Castán Broto (2021). "A culture‐led approach to understanding energy transitions in China: The correlative epistemology." Transactions of the Institute of British Geographers.
Hügel, S. and A. R. Davies (2020). "Public participation, engagement, and climate change adaptation: A review of the research literature." Wiley Interdisciplinary Reviews: Climate Change **11**(4): e645.
Hurlimann, A. C., S. Moosavi and G. R. Browne (2021). "Climate change transformation: A definition and typology to guide decision making in urban environments." Sustainable Cities and Society **70**: 102890.
Jakimów, M. and E. Barabantseva (2016). ‘Othering’in the construction of Chinese citizenship, Routledge.
Jia, P., K. Li and S. Shao (2018). "Choice of technological change for China's low-carbon development: evidence from three urban agglomerations." Journal of environmental management **206**: 1308-1319.
Jiang, Y., C. Zevenbergen and Y. Ma (2018). "Urban pluvial flooding and stormwater management: A contemporary review of China’s challenges and “sponge cities” strategy." Environmental Science & Policy **80**: 132-143.
Joss, S. and A. P. Molella (2013). "The eco-city as urban technology: Perspectives on Caofeidian international eco-city (China)." Journal of Urban Technology **20**(1): 115-137.
Khanna, N., D. Fridley and L. Hong (2014). "China's pilot low-carbon city initiative: A comparative assessment of national goals and local plans." Sustainable Cities and Society **12**: 110-121.
Kona, A., P. Bertoldi, F. Monforti-Ferrario, S. Rivas, and J.F. Dallemand. (2018). “Covenant of Mayors Signatories Leading the Way towards 1.5 Degree Global Warming Pathway.” Sustainable Cities and Society 41:568–75.
Leffel, B. (2021). “Toward Global Urban Climate Mitigation: Linking National and Polycentric Systems of Environmental Change.” Sociology of Development 1–27.
Li, X. (2021). China: emerging low carbon pioneers at the city level Climate governance across the globe: pioneers, leaders and followers. M. S. A. Rudiger K.W. Worzel, Paul Tobin. London, Routledge.
Li, Y. and J. Shapiro (2020). China goes Green: coercive environmentalism for a troubled planet. Cambridge, Polity Press.

Liang, L., X. Deng, P. Wang, Z. Wang and L. Wang (2020). "Assessment of the impact of climate change on cities livability in China." Science of the Total Environment **726**: 138339.
Lin, D. (2019). "Urban growth-oriented green accumulation: ecological conservation planning in the Shenzhen DaPeng Peninsula in Southern China." International journal of environmental research and public health **16**(1): 104.
Lin, G. C. and S. Y. Kao (2020). "Contesting Eco‐Urbanism from Below: The Construction of ‘Zero‐Waste Neighborhoods’ in Chinese Cities." International Journal of Urban and Regional Research **44**(1): 72-89.
Liu, H., G. Zhou, R. Wennersten and B. Frostell (2014). "Analysis of sustainable urban development approaches in China." Habitat international **41**: 24-32.
Liu, X., Z. Duan, Y. Shan, H. Duan, S. Wang and J. Song (2019). "Low-carbon developments in Northeast China: Evidence from cities." Applied Energy **236**: 1019-1033.
Liu, Z., J. Wang and C. W. Thomas (2021). "What Motivates Local Sustainability Policy Action in China? The Case of Low-Carbon City Pilot Program." Urban Affairs Review: 1078087421995241.
Lo, K. and V. Castán Broto (2019). "Co-benefits, contradictions, and multi-level governance of low-carbon experimentation: Leveraging solar energy for sustainable development in China." Global Environmental Change **59**: 101993.
Long, J. and J. L. Rice (2019). "From sustainable urbanism to climate urbanism." Urban Studies **56**(5): 992-1008.
Long, J. and J. L. Rice (2020). "Climate urbanism: crisis, capitalism, and intervention." Urban Geography: 1-7.
Ma, W., M. de Jong, M. de Bruijne and R. Mu (2021). "Mix and match: Configuring different types of policy instruments to develop successful low carbon cities in China." Journal of Cleaner Production **282**: 125399.
Mai, Q. and M. Francesch-Huidobro (2015). Climate Change Governance in Chinese Cities. London, Routledge.
McFarlane, C. (2010). "The comparative city: Knowledge, learning, urbanism." International journal of urban and regional research **34**(4): 725-742.
McPhearson, T., D. M. Iwaniec and X. Bai (2016). "Positive visions for guiding urban transformations toward sustainable futures." Current opinion in environmental sustainability **22**: 33-40.
Meadows, D. H. (1999). "Leverage points: Places to intervene in a system." The Sustainability Institute.
Miao, B. and G. Lang (2015). "A tale of two eco-cities: experimentation under hierarchy in Shanghai and Tianjin." Urban policy and research **33**(2): 247-263.
Müller, M. and E. Trubina (2020). "The Global Easts in global urbanism: views from beyond North and South." Eurasian Geography and Economics **61**(6).
Net, D. (2019). Luohe xinlang yong dianche he danche zucheng 'hunche chedui' [A bride make a car fleet for marriage by electric cars and bycicles], https://baijiahao.baidu.com/s?id=1648266609128777706&wfr=spider&for=pc.
Ng, M. K. (2019). "Governing green urbanism: The case of Shenzhen, China." Journal of Urban Affairs **41**(1): 64-82.
Nightingale, A. J., S. Eriksen, M. Taylor, T. Forsyth, M. Pelling, A. Newsham, E. Boyd, K. Brown, B. Harvey and L. Jones (2020). "Beyond Technical Fixes: climate solutions and the great derangement." Climate and Development **12**(4): 343-352.
O'Brien, K. (2016). "Climate change adaptation and social transformation." International Encyclopedia of Geography: People, the Earth, Environment and Technology: People, the Earth, Environment and Technology: 1-8.
O’Brien, K. (2018). "Is the 1.5°C target possible? Exploring the three spheres of transformation." Current Opinion in Environmental Sustainability **31**: 153-160.
O’Brien, K. and L. Sygna (2013). "Responding to climate change: the three spheres of transformation." Proceedings of transformation in a changing climate **16**: 23.

Park, S. E., N. A. Marshall, E. Jakku, A. M. Dowd, S. M. Howden, E. Mendham and A. Fleming (2012). "Informing adaptation responses to climate change through theories of transformation." Global Environmental Change **22**(1): 115-126.
Pelling, M., K. O'Brien and D. Matyas (2015). "Adaptation and transformation." Climatic Change **133**(1): 113-127.
Phelps, N. A. (2021). "Which City? Grounding Contemporary Urban Theory." Journal of Planning Literature: 08854122211002758.
Pow, C. P. and H. Neo (2013). "Seeing red over green: Contesting urban sustainabilities in China." Urban Studies **50**(11): 2256-2274.
Rauws, W. (2017). "Embracing uncertainty without abandoning planning: Exploring an adaptive planning approach for guiding urban transformations." DisP-The Planning Review **53**(1): 32-45.
Robin, E. and V. Castán Broto (2020). "Towards a postcolonial perspective on climate urbanism." International Journal of Urban and Regional Research.
Robinson, J. (2002). "Global and world cities: a view from off the map." International journal of urban and regional research **26**(3): 531-554.
Robinson, J. (2006). Ordinary cities: between modernity and development, Psychology Press.
Robinson, J. (2006). Ordinary cities: between modernity and development. Routlegde, Oxon.
Romero-Lankao, P. and D. M. Gnatz (2013). "Exploring urban transformations in Latin America." Current Opinion in Environmental Sustainability **5**(3-4): 358-367.
Rosen, J. (2016). "Climate, Environmental Health Vulnerability, and Physical Planning:A Review of the Forecasting Literature." Journal of Planning Literature **31**(1): 3-22.
Ruszczyk, H. A., E. Nugraha and I. de Villiers (2020). Overlooked Cities: power, politics and knowledge beyond the urban South, Routledge.
Saiu, V. (2017). "The three pitfalls of sustainable city: A conceptual framework for evaluating the theory-practice gap." Sustainability **9**(12): 2311.
Schmalzer, S. (2016). Red revolution, green revolution, University of Chicago Press.
Sheppard, E., H. Leitner and A. Maringanti (2013). "Provincializing global urbanism: A manifesto." Urban Geography **34**(7): 893-900.
Shi, L., E. Chu, I. Anguelovski, A. Aylett, J. Debats, K. Goh, T. Schenk, K. C. Seto, D. Dodman, D. Roberts, J. T. Roberts and S. D. VanDeveer (2016). "Roadmap towards justice in urban climate adaptation research." Nature Climate Change **6**(2): 131-137.
Shin, K. (2017). "Neither centre nor local: community-driven experimentalist governance in China." The China Quarterly **231**: 607-633.
Shove, E. (2010). "Social theory and climate change." Theory, Culture & Society **27**(2-3): 277-288.
Song, Y., D. Stead and M. de Jong (2020). "New town development and sustainable transition under urban entrepreneurialism in China." Sustainability **12**(12): 5179.
Spratt, D. and P. Sutton (2008). Climate code red. Online, Friends of the Earth.
Swilling, M., M. Hajer, T. Baynes, J. Bergesen, F. Labbé, J. K. Musango, A. Ramaswami, B. Robinson, S. Salat and S. Suh (2018). The weight of cities: Resource requirements of future urbanization. IRP Reports, International Resource Panel, UNEP.
Sze, J. (2015). Fantasy Islands, University of California Press.
Tsai, W.-H. and N. Dean (2014). "Experimentation under hierarchy in local conditions: cases of political reform in Guangdong and Sichuan, China." The China Quarterly **218**: 339-358.
Tumber, C., 2011. Small, gritty, and green: The promise of America's smaller industrial cities in a low-carbon world. Cambridge, MA: MIT Press.
Tyfield, D. (2018). "Liberalism 2.0 And the Rise of China: Global Crisis." Innovation, Urban Mobility.
Udah, H. (2019). "Searching for a Place to Belong in a Time of Othering." Social Sciences **8**(11): 297.
UN-Habitat (2011). Global Report on Human Settlements: Cities and Climate Change. Nairobi, UN-Habitat.
Van Der Heijden, J., H. Bulkeley and C. Certomà (2019). Urban Climate Politics: Agency and Empowerment, Cambridge University Press.

Walker, B., C. S. Holling, S. Carpenter and A. Kinzig (2004). "Resilience, adaptability and transformability in social–ecological systems." Ecology and society **9**(2).
Wang, C. (2016). Reflections on China's Socialist Ecological Civilization Construction: Perspectives of Social-Ecological Transformation. 2016 Global Environmental Change "Transformative Global Climate Governance: Après Paris", Berlin, Germany, 23–24May 2016; pp. 1–16.
Wang, N., J. C. K. Lee, J. Zhang, H. Chen and H. Li (2018). "Evaluation of Urban circular economy development: An empirical research of 40 cities in China." Journal of Cleaner Production **180**: 876-887.
Wang, Y., H. Ren, L. Dong, H.-S. Park, Y. Zhang and Y. Xu (2019). "Smart solutions shape for sustainable low-carbon future: A review on smart cities and industrial parks in China." Technological Forecasting and Social Change **144**: 103-117.
Wang, Y., Q. Song, J. He and Y. Qi (2015). "Developing low-carbon cities through pilots." Climate Policy **15**(sup1): S81-S103.
Westman, L. K., V. Castán Broto and P. Huang (2019). "Revisiting multi-level governance theory: Politics and innovation in the urban climate transition in Rizhao, China." Political Geography **70**: 14-23.
Wheeler, S. M., Y. Abunnasr, J. Dialesandro, E. Assaf, S. Agopian and V. C. Gamberini (2019). "Mitigating Urban Heating in Dryland Cities: A Literature Review." Journal of Planning Literature **34**(4): 434-446.
Whitehead, M. (2013). "Neoliberal urban environmentalism and the adaptive city: Towards a critical urban theory and climate change." Urban Studies **50**(7): 1348-1367.
Wolfram, M. (2016). "Conceptualizing urban transformative capacity: A framework for research and policy." Cities **51**: 121-130.
Wolfram, M., S. Borgström and M. Farrelly (2019). "Urban transformative capacity: From concept to practice." Ambio **48**(5): 437-448.
World, I. (2022). " Wedding Services Industry in China - Market Research Report, https://www.ibisworld.com/china/market-research-reports/wedding-services-industry/."
Wu, F. (2002). "China's changing urban governance in the transition towards a more market-oriented economy." Urban studies **39**(7): 1071-1093.
Wu, F. (2015). Planning for growth: Urban and regional planning in China, Routledge.
Wu, F., J. Xu and A. G.-O. Yeh (2006). Urban development in post-reform China: state, market, and space, Routledge.
Wu, H., Y. Li, Y. Hao, S. Ren and P. Zhang (2020). "Environmental decentralization, local government competition, and regional green development: Evidence from China." Science of The Total Environment **708**: 135085.
Xu, J. (2017). "Bargaining for nature: treating the environment in China's urban planning practice." Urban Geography **38**(5): 687-707.
Ying, Q. and L. Yue (2017). "Evaluating the low-carbon development of urban China." Environment, Development and Sustainability **19**(3): 939-953.
Zhou, Y., Y. Shan, G. Liu and D. Guan (2018). "Emissions and low-carbon development in Guangdong-Hong Kong-Macao Greater Bay Area cities and their surroundings." Applied energy **228**: 1683-1692.