Governing people, governing places: advancing the Protean Environmental State in China

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Abstract

Since the 1990s, the unprecedented rate of economic change in China has created a series of critical policy challenges for both the central and subnational state. How these policy challenges are conceived will determine how and when they can be solved. There is a growing interest, in particular, in the problematic issues of welfare, resource management and environmental pollution and how those are managed by the local state. In this study, we analyse the ongoing development of the Sino-Singapore Tianjin Eco-City (SSTEC) using the lens of the 'Protean Environmental State'. This multi-faceted perspective on development is one that we have further progressed after more than a decade's research on China's multi-level environmental governance. In this paper, we concentrate on regulatory and enhancement activities. Our work draws upon fieldwork in and around the SSTEC and highlights the problematic nature of reforms to the environmental state. Ultimately, we explore the inherent and ever-shifting tensions between economic and environmental imperatives in relation to the emerging governance of people and of economic development in present-day China.

Keywords: Environmental state; Tianjin Eco-City; Governance; China; Sustainability

1.0 Introduction

Ever since Mao's death in 1978, economic and social changes witnessed in China have provoked a series of enormous challenges. Greater prosperity for some parts of Chinese society has become linked to concerns about rising inequalities and the uneven nature of development. Distinctions between the urbanised East and the more rural West of the country are also ever more in evidence. Similarly, high levels of environmental degradation reflect the country's need to continue reducing unchecked pollution after decades of policies marginalising resource management. The unprecedented rate of economic change in China, chiefly since the 1990s, has therefore created a series of critical policy challenges for both the central and the subnational state[1] (e.g. at city-level) and how they are conceived. Most academic attention is paid to the nature of the economic challenges facing the Chinese central state (Chen, 2016; Makhlouf, 2016). However, there is growing interest in the problematic issues of welfare, resource management and environmental pollution issues as well (Liu and Diamond, 2005; Ringen and Ngok, 2013). Such research can provide a compelling picture of the content of national policy formulation. It can also give a sense of the changing national policy agenda as a 'new normal' model of economic growth prevails. What is often overlooked is the fact that the activities of the Chinese central state are inextricably bound up with the country's less-well-researched local state. It is therefore timely to analyse how the Chinese local state is both implicated in national policy challenges and how central state policymakers can use it to respond to them.

The local state is key to Chinese governance. As Xu (2012) points out, subnational governments provide 90% of public goods. Most services are provided by governments at the municipal and county level and not at the provincial level. Xu (2012) states that the local state in China cannot be understood or analysed in isolation. Rather, there needs to be an appreciation of the broader institutional picture. There is "a highly centralized political and personnel control at the national level and a decentralized administrative and economic system at the regional level" (Xu, 2012, 279). This dual structure determines the nature of reform and potential developmental trajectories. Such institutional arrangements have worked well to promote economic growth in the past three decades but seem incapable of solving emergent policy issues such as pollution, the inequalities between regions and social injustice. Gabusi (2016, 12) points out that, in the early years of China's economic growth in the 1990s, market and state operated in tandem. Today, when trying

[1] Apart from the SSTEC other key local institutions are Tianjin-Binhai (which can be considered as akin to local government in the West) and Tianjin government which is a provincial-level government of a mega city.

to cope with a wider range of social and environmental issues, they are in tension. Currently, the stability of central government:

> "depends on growth at the local level, where localities respond to market incentives that have been supporting the very pattern of growth that … [central government] wishes to correct." (Gabusi, 2016, 12)

Central government has historically advocated high levels of economic growth in its development plans and policies. The local state, especially in the coastal and Eastern areas of the country has proven to be remarkably successful in delivering rapid economic growth. However, the move towards a 'new normal model' of slower but more sustainable economic growth in the last decade or so (Zhang and Chen, 2017), allied to increasing interest in the promotion of an environmental agenda, are placing constraints on untrammeled development. The central state's reorientation has been relatively swift and prescriptive.

At the national level, the formulation of policy can reconcile economic and environmental imperatives, because they are conceived in a more abstract way. At the local level, moving to concrete actions is particularly challenging (Economy, 2011; Ran, 2013). Cities are experiencing related policy challenges and moving in a similar direction and thus find themselves competing with one another for investments (Head et al., 1996). The competitive advantage that cities have in resource terms are unevenly distributed producing for some a race to the top in terms of emphasizing environmental quality, but, for others, a race to the bottom as they seek to highlight their attractiveness for internal and external investment (Chien, 2008). For those racing to the bottom, environmental standards may not be ratcheted upwards but rather they can be more flexible in their interpretation at the local level. Efforts to restructure employment at a local level, for example, through encouraging less carbon-intensive industries or more stringent environmental regulation of companies, is therefore slower, more problematic and certainly more uneven than expected (Wu et al., 2019). Consequently, there is a generally recognized "implementation gap" at the local level in terms of the ambitious national environmental targets and goals in China (Ran, 2013; Kostka and Mol, 2013).

In this context, a more nuanced perspective on the local environmental state needs to be advanced. Li et al (2011) recognise the weakness of concentrating analysis of the local state on an environment-economy dualism. It is less clear, however, where theory should go in formulating

more sophisticated accounts. In our analysis, we suggest a multi-faceted local environmental state that we term the Protean Environmental State (PES). This term recognises the breadth of local environmental activities that the state undertakes, how those vary across space, and offers sensitivity to hierarchical governance. Our notion of the environmental state (Mol and Buttel, 2002; Mol, 2007) is, therefore broader than that which typically prevails as we go beyond "that part of the state system involved in and focused on environmental protection" (Mol, 2006, 214). Instead, we depict an environmental state that is interacting with a host of complex environmental problems, where it can call upon a wide range of state interventions and engages with a variety of other state and non-state actors. This is the emergence of this multi-faceted local environmental state.

Ultimately, our contribution is to unpick the variable way in which hierarchical governance plays out in different spatial and policy settings. We show how, on the one hand, the increasing prominence of environmental issues has created more space for local autonomy, and, on the other hand, discretion has in fact been reduced. By using the framework of the PES, we can analyse the layering of eco-spaces, for example, regulatory, enhancement, and recovery, and how these provide points of contestation or opportunity for a local environmental state. We are concerned to better understand the governance of eco-space. We take as our focus of analysis the Sino-Singapore Tianjin Eco-City (SSTEC) since it is to the fore in promoting a more environmentally sensitive form of urban development. This provides insights into variable constructions of the 'eco' and how they interact with development goals. We do this by examining how the development ambitions of the SSTEC are unfolding and what that means for the dynamics of eco-development in the wider Tianjin-Binhai area (see also Chang et al., 2016). Our contribution to analyses of eco-governance in China are therefore two-fold. First, we significantly develop a model of the local environmental state, PES, in China that is sensitive to the varied contexts in which government operates. We do this by examining how notions of the environment are constructed and play out in practice. Second, we draw out the scalar and policy tensions that confront the environmental state in Tianjin as it seeks to deliver on its key performance indicators.

This paper is organised into six sections. In Section 2 below we outline how environmental governance in China is unfolding. We argue that national commitments to environmental issues can be problematic at the local level and require a more spatially sensitive model of the local environmental state. Section 3 outlines a revised model of the local environmental state that highlights its multi-faceted nature. We draw out key features related to environmental recovery,

environmental regulation and environmental enhancement: what we have termed the Protean Environmental State (PES). In Section 4, we briefly outline our approach to data collection in the Sino-Singapore Tianjin Eco-City (SSTEC). We select the SSTEC for scrutiny because, as the exemplar of an alternative urban development, it highlights the constraints and opportunities faced by the local environmental state. In Section 5, we analyse how the SSTEC seeks to govern people and economic activities. We concentrate on the local state's ongoing regulatory and enhancement activities and show how environmental imperatives confront economic development imperatives that force ongoing revisions to the nature of environmental activities. In Section 6, in our Conclusions, we reflect upon what our findings mean for the local environmental state in China.

2.0 Environmental governance in China and the local state

Much of the thinking on the environmental state tends to underplay the unfolding nature of central-local relations. Post-socialist Chinese political governance system can be understood as fragmented authoritarianism (Lieberthal and Oksenberg, 1998; Lieberthal, 1992). On the one hand, due to one-party control, China remains necessarily authoritarian (as manifested in the party-controlled cadre personnel appointment and management), compared with most Western countries. On the other hand, power and responsibility are delegated horizontally between state ministries with different, often competing functional responsibilities, as well as downward to provincial and local levels of government (Xie and Van Der Heijden, 2010). This is often referred as *tiao-kuai* matrix of authority within the Chinese party-state with ministerial bureaucracies as *tiao* [strips] and territorial jurisdictions as *kuai* [chunks].

As a result, Benewick (1998, p. 459) observes a political "power drift" occurring "from the party to state institutions and from the centre to the regions and localities." In considering the impacts on eco-development at the national level, different central government Ministries stipulate various related but different eco policies. This process creates greater political space for subnational local governments to apply or compete (De Jong et al, 2016; Tan-Mullins et al, 2017). For instance, the Ministry of Environmental Protection (MEP) initiated an 'eco cities' program; the National Development and Reform Committee (NDRC) one for 'low carbon cities'; and the Ministry of Housing and Urban-Rural Development (MOHURD) one for 'low carbon eco cities' (De Jong et al., 2016; Yu, 2014). In doing so, they have assumed the role of patrons of provinces, cities, districts and counties across the country in supporting sustainable urbanisation and have stimulated hundreds of various eco-initiatives.

At the provincial/municipal level, the decentralization of planning power due to the fragmented authoritarian system has created considerable space for local autonomy. Central policies have become general “directives” which are articulated with increasing detail as they travel down China’s hierarchical bureaucratic structure to regional and local governments (Jiang, 2006). Increasingly, environmental strategies and the execution of specific policies occur at the local level (Liang and Mol, 2014). Consequently, local authorities have been endowed with considerable space of flexible discretion (especially in local land management) in creating local eco-development plans (Chien, 2013) to pursue their perceived local interests (Wu, 2002; Xu and Yeh, 2005; Tan-Mullins et al., 2017). Some even selectively implement the central government’s environmental regulations and policy mandates (Kostka and Mol, 2013). Such fragmented authoritarian governance, which is marked by top-down policy delegation with decentralization of planning power, has resulted in the diversification of Chinese eco-projects in terms of their development emphasis, approaches, and results (Xie et al., 2019b).

The extent and nature of local state autonomy is important in understanding how an emerging national environmental policy agenda may be delivered at the local level, and of the way in which environmentally innovative local states may be able to upscale their approaches to give them wider credence (Kostka and Nahm, 2017). In seeking out distinctive local development strategies to realise future development opportunities (Harvey 1989, 15), local governments and the coalition of actors around them will be paying increasing interest to the environment. For some local states, the environment will become a competitive opportunity in which they seek to raise standards to promote a cleaner, growth trajectory, while for others it may mean a dilution of regulations to attract and retain ‘dirtier’ industries. But how local development opportunities are perceived and the opportunity to realise them will be in a constant state of flux. Similarly, local autonomy and central control will be subject to constant revision as national government seeks to impose its agenda or moves its gaze to new issues and policy instruments.

As the environment and economy become increasingly intertwined in development strategies, so a new phase in central-local relations opens. Increased efforts to regulate the polluting activities of companies are part of local economic restructuring activities, since more polluting companies are punished and cleaner companies favoured. This form of regulatory activity helps to provide further legitimation to accelerate and deepen economic reform that is sympathetic to a resource efficient transition. New growth coalitions are formed around the promotion of low-carbon

industries, services and tourism, for example. As a result, environmental regulation becomes increasingly spatialized and reinforces distinctive local development strategies (Brehm and Svensson, 2017).

One of the strengths of our more nuanced approach to environmental protection is that we recognise that there are processes of decentralisation and recentralisation at work. In relation to environmental protection these processes of are not operating in a uniform way. So, where there is decentralisation, analysts tend to underplay the potential to reshape governance from below. For instance, in our model of the local environmental state we would suggest that recovery and enhancement activities owe much to local perceptions of local development opportunities. Enhancement activities are expressions of the flexibility that arises from decentralisation. Here local states can engage with businesses and citizens interests. Enhancement activities have the potential to be increasingly ecological if PES has the authority and legitimacy to challenge economic development models. Meanwhile, recentralisation can be observed in the regulatory face (e.g. inspections, curbs on construction activity and so on).

The spatialization of regulation matters in two ways. First, it subverts a traditional approach to regulation in which central government seeks to ensure that regulation plays out in a relatively even way across space - this ensures greater certainty for capital and fairness in market spaces. This process will matter for central government because it can either support such variability to encourage competition between cities and provinces or discourage them to ensure greater uniformity in the implementation of national standards. This then becomes a new tension between national and local governments. Second, with greater interest in local pollution regulation activities, more and more data are being collected. Improved data quality and a wider range of data are being used by central government to exercise control over particular spheres of local environmental governance. Reports of central government inspection teams taking a highly interventionist approach to local regulatory deficiencies are widespread (Zhang, 2017).

3.0 Rethinking the local environmental state

As central government seeks to exercise greater control over local government pollution enforcement activities, it suggests that the traditional decentralised approach to local environmental governance is being usurped. However, it is not quite so straightforward: environmental governance takes place in a variety of settings and policy spheres. We can no

longer assume simple binary notions of central versus local (based around a zero-sum game) but rather we need to encapsulate broader notions in which central and (some) local governments share perspectives on environmental problems and their solutions. But such alliances that emerge at national and local levels will inevitably be temporary as 'solutions' to environmental and developmental problems themselves create new opportunities.

Temporally and spatially, national policies to promote 'Ecological Civilisation' are unlikely to be interpreted or delivered in a uniform manner. Ecological Civilisation is a policy agenda that interacts with local developmental and social opportunities and constraints. For example, efforts to boost the green economy are spatially variable with local state bodies actively seeking competitive advantages (Yi and Liu, 2015). As Yi and Liu (2015, 18) comment: "the development of the green economy in China is very unbalanced, with coastal and Eastern regions having more green jobs and green firms". Complementing the competitive dynamic surrounding the green economy is that of social attitudes towards environmental protection. Whilst the environment is not a priority issue, for citizens in urban areas and in the East and coastal areas, environmental protection is a more important issue than in the rest of the country (Liu and Mu, 2016). By linking economic development opportunities and social context with their public opinion data, Liu and Mu (2016, 125) argue that local environmental management policies will be spatially variable with an Ecological Modernisation agenda emerging in the East, whilst in the West of the country, the "lack of concern over environmental issues among the public in this region may seriously constrain further effective measures for environmental protection."

How environmental issues play out at the local level in China is complex. The environment is not a single issue but rather multiple issues that overlay one another, sometimes acting to support one another and sometimes in competition with one another (Change et al., 2016). For example, Yeh (2009) has shown how, in the West of the country, the delivery of environmental infrastructure is also a distinctly political project which can assist in the governance of minority populations. Meanwhile, in the East, where environmental issues have gained traction with some local communities, the dynamics of power between actors have played out in a variety of ways which have progressively challenged local states (and Beijing in some cases) over time. Capturing the dynamics at play in the local environmental state means that we need to move beyond approaches characterised by Ecological Modernisation as these underplay local specificities (Xie et al., 2019a) – which we argue are an object of analysis – and those that overplay the role of capital and markets because they fail to sufficiently recognise the deep-rooted nature of

environmental imperatives. We need to understand how local states may seek to resolve or displace the tension between their economic development strategies and environmental protection. For example, simply in relation to promoting a more positive perspective on environmental management, we can characterise a local state as acting as:

- a *regulatory* state when it acts to curb pollution problems such as seeking to relocate polluting firms through incentives, or penalties or closing companies that cannot meet environmental standards, or the use of key performance indicators (KPIs) to control development (which has been a feature of the SSTEC);
- a *recovery* state when it seeks to recover lost environmental features, such as cleaning up polluted waterways or landscapes, or setting targets for environmental improvement;
- an *enhancement* state when low-carbon industries, including education and tourism, are encouraged and there is sympathetic treatment of renewable energy industries as part of a green economy programme (Yi and Liu, 2015, Chen and Lees, 2016). Green buildings are regarded as an essential part of urban development rather than an optional extra (Zhou, 2015). While the local state is used to nurture a market in ecological services, this approach also encourages a low carbon lifestyle (e.g. promoting active travel and green transport. And so is much broader than the other 'faces' of the local state since it encompasses economic, social and environmental enhancement; and,
- a *resource* state when it seeks to link natural resources, such as forests, or materials, for example in the Circular Economy, to economic development opportunities.

Below we explain in further detail our approach to the PES, and also why we are most interested in the regulatory and enhancement features when analysing the SSTEC.

3.1 The Protean Environmental State

The developing Chinese state has pragmatically adapted and evolved its mode of environmental governance over time. We recognise this shift as being at the heart of another new approach called the 'Protean Environmental State' (PES) (Flynn and Yu, 2019) which draws on Harvey's (1989) focus on place and individuals. In China, subnational and local governments now have some capacity to act to improve local environmental conditions. Moreover, municipal governments are being assisted, to some extent, in their rethinking of environment–economy relations by a central government policy agenda that is moving from an overwhelming

preoccupation with development to taking on board welfare and environmental concerns. This is demanding a reconceptualisation of the local state from being one that is almost wholly development oriented to one that recognises environmental imperative The PES is therefore a “more nuanced analysis of the multi-faceted nature of environmental governance” than that envisaged by Ecological Modernisation (Flynn and Yu, 2019).

At the level of localised development initiatives, the concern for place reveals the nature and impacts that growth has. This includes an appreciation of the enablers of, and constraints to, economic and environmental possibilities. Individuals, meanwhile, can readily shape the nature of development (Harvey, 1989). In the Chinese context, Flynn and Yu (2019) point to city and/or provincial leaders who can knit together a wide-ranging state apparatus to direct and deliver change. In addition, the links between state and market actors are much closer in China than those of liberal market economies providing a further mechanism to steer change.

The complex nature of environmental problems allied to the breadth of state interventions in China enables the emergence of a multi-faceted local environmental state. One long-standing state activity is the regulation of pollution by companies. There are, though, a set of other local state activities that are part of environmental governance. These include state-led initiatives to recover the environment by improving degraded spaces. This might be cleaning up waterways or tackling spoilt landscapes. In addition, the state can act to enhance the environment by seeking to replace ‘dirty’ industries with cleaner ones. Another area of local state environmental activity is in relation to resource management (such as forests). Importantly, the nature of the environmental state is connected to development opportunities and environmental challenges. So, for example, in relation to the Sino-Singapore Tianjin Eco-City its location enabled the recovery of a formerly degraded environment and was intended to enhance local economy, environment and society by bringing low-carbon technologies and expertise into the Tianjin-Binhai economic zone. Commitments to a cleaner environment, enable investment in environmental enhancements and increase the potential to attract low-carbon and high-tech firms. This can further accelerate the transformation of the local economy.

For both regulatory and land development activities, the state is to the fore (Chang 2016). For instance, the regulation of polluting industries became much more rigorous because it supported government policy to transform the industrial base to one founded on lower carbon use. We have termed these different facets – regulatory, recovery enhancement and resource – of the Protean

Environmental State. This term reflects the multi-faceted, multi-dimensional nature of state Environmental activity and how it is in a constant state of flux. At any point in time, the Protean Environmental State can present one or more feature to different audiences. Moreover, these are not hard-edged features but blur into one another.

By conceptualising the state in this more flexible way, we can begin to better understand how particular spaces are governed (e.g. in a regulatory or a recovery manner or a mix of both). It also helps to appreciate which of the different facets of the environmental state might be to the fore (or marginalised) and why. This takes us beyond notions of the fragmentation of environmental governance (Chang et al 2016) towards better understanding the ways in which governance is organised. While environmental policy instruments, policies and agencies may not act in a coherent way they are coalescing around the themes or facets of the PES. This matters because by organising itself in this way the environmental state is structuring how the environment is understood and problematised. For instance, different facets of the PES may complement or be in tension with one another (for example, efforts to recover polluted waterways might be undermined if the regulation of waterside firms is lax) (see also Walker, 1989, 32).

These insights are helpful in suggesting how theorization of the local environmental state needs to be further developed. Two issues stand out: shifting social constructions of the environment (see Greider and Garkovich, 1994; Demeritt, 2002), and how the local environmental state legitimates itself as it confronts competing ecological and developmental agendas. We consider each of these points in turn. Again, the SSTEC makes for a helpful case study because in the design stage and early development – which were the focus of much attention – we would expect its environmental ambitions to be at their height. As development progresses, which is where our interests lie, environmental imperatives will increasingly run into development pressures. How those pressures are resolved will provide insights into the legitimacy of the environmental state and of shifting constructions of the environment (Ho, 2006).

Typically, we would expect the PES to take its form because of the need for policy innovation being framed as one of economic necessity rather than ecological crisis. Despite moves to promote more environmentally sympathetic forms of growth an overt development agenda is to the fore in China. At a local level, the environment is socially constructed as a means to help deliver on a national low carbon growth agenda. The environment is to be managed and controlled by public and private interests. Government, state-owned enterprises and the private sector are

able to work individually and together to deliver on projects that can to a greater or lesser extent have an environmental theme. Such projects can range from major infrastructure, such as rail lines connecting urban areas, to small city parks that are part of a green infrastructure network, from the promotion of low-carbon sectors to protecting green space. The anthropocentric nature of development is captured by Chang et al (2016, 939) in their description of the early work on the SSTEC:

> "['N]aturalness' is manufactured using green technologies: ecological engineering, man-made material flows and circulation systems, and landscaping with non-native plant species. Everything 'natural' is artificial or imported … [creating] a desirable environment for human settlement."

The dominant social construction of the environment matters for our understanding of the environmental state (cf. Flynn and Yu, 2019). This is because, first, it is highly anthropocentric, and therefore likely to be supportive of economic development. Private property developers, for instance, will be well able to use a language that links green and construction. As a result, the local environmental state is part of economic development activities. More eccentric conceptualisations of the environment would be better placed to challenge dominant develop models and would enable the PES to be to some degree independent of economic interests. Second, it illustrates how environmental actions are likely to be legitimated for the benefits to people. For example, air quality regulation is likely to be justified for its benefits to human health – which undoubtedly matters – but marginalizes wider concerns for ecosystem health. Similarly, in undertaking enhancement activities the ways in which people can benefit from green or blue spaces are likely to be prioritized over biodiversity. In our work, we are concerned to better understand to what extent this anthropocentric notion of the environment show continuity or change as the SSTEC develops, and particularly whether it is shared by those who live and work in and around the SSTEC.

Our interest in better understanding local people's perceptions of their environment is because these have for too long been ignored (and our explanation of how we will do this is in the section below). As voiced by political ecologists, different stakeholders often have distinct perceptions of natural resources and environment, yet their abilities to effect change on the environment vary, depending on their uneven power (Bryant and Bailey, 1997; Neumann, 2005; Robbins, 2012). Within a system of authoritarian environmental governance that favour a narrow ecologically

modern type of thinking (Tan-Mullins et al., 2017a; Tilt, 2007), grassroots voices are rarely listened to and are all too easily ignored in China's eco-developments. While much work on the Chinese environmental state emphasizes state power and technocratic solutions, Political Ecology harbours an ethnographic component and privileges the rights and concerns of marginalized groups and a marginalized environment. Political Ecology challenges mainstream environmental management approaches that are commonly dominated by powerful political and economic elites (Bryant and Jarosz, 2004), and that typify the development of the SSTEC. By drawing attention to communities' perceptions of their environment, a more nuanced perspective emerges of the way in which the local state is engaged in a wider network – beyond relationships with other state actors and the private sector – that provide a richer context for analysing the socio-political, economic and ecological dynamics involved in eco-developments.

It is our contention that the PES is not and cannot be simply a tool of market forces. Rather it is engaged in actively promoting an environmental agenda but does so in a highly contested and circumscribed context, notably hierarchical governance and the primacy of economic goals. Part of the agency within the PES will be drawn from its need to legitimize its actions with local citizens. Bottom-up demands for greater environmental safeguards and accountability cannot be dismissed. It is, therefore, important to be able to better understand citizens perceptions of the environment in and around SSTEC. In our methods section below, we explain further the importance of collecting information on people's perceptions of their environment and how we have collected the data. In SSTEC people's experiences of their environment will be mediated through the activities of developers, private business and state actions. For the latter, key tasks will be the enforcement of environmental regulations, such as for air and water pollution, and the ongoing development of the SSTEC through enhancement actions, for instance, promoting the tourism industry. The section below also explains how we collect data to examine regulatory aspects of the PES. In Section 5, we analyse the PES in action and organize the data around two themes: governing the environment and governing the economy. By using the PES framework, we can bring out tensions between the environment and economy, and can highlight the disparity between the vision and reality as the SSTEC project evolves.

4.0 Methods and Research Design

In this research, we examine the multi-faceted local environmental state in China via a case study of SSTEC. As a government-to-government project between Singapore and China, SSTEC is the

most renowned Chinese Eco-city initiative underwritten by a high level of political-economic patronage. Although it is a national flagship project, the role played by the local state in shaping and reshaping of the development of SSTEC is significant and has become increasingly apparent as the project has progressed (Xie et al., 2019b). In SSTEC, the Sino-Singapore Tianjin Eco-City Investment and Development Co. (the SSTECID), which was co-established by China and Singapore as a 50-50 joint venture, serves as the lead master planner and developer (Chien et al., 2015; Zhang and de Jong, 2018; Pow, 2018). However, the Administrative Committee of SSTEC, although guided by a joint Working Committee formed by the governments of Singapore and China, is solely established by the Chinese local state, namely the Tianjin Municipal Government (at the provincial level) and its subordinated Tianjin Binhai New Area (TBNA) Government (sub-provincial level). The Administrative Committee is responsible for the overall development guidelines, which thus enables the local state to play a prominent role in steering the SSTEC project. As the TBNA government is the most basic level government that place direct administration on the SSTEC, the interrelationship between the SSTEC and the TBNA development is especially evident as we will present in the following sections.

Since the early 2010s, we have been involved in environmental and economic transition research in rural and urban China. Our field work has involved key person interviews with government and Party officials responsible for land development and environmental/resource, businesses and farmers (see for example, Flynn et al 2016, Chan and Flynn 2018; Flynn and Chan 2017; Xie et al 2019b, Flynn and Yu 2019). Over time we have noticed that our key person interviews have become more circumspect and have rarely been one-to-one. More often, senior figures have been accompanied by other officials (similar challenges in gaining access to interviewees has been reported by Lim (2018). Interviewees will often read from a prepared statement, generally a repetition of publicly available policy. This has resulted in a more formal and less open form of data collection. In addition, we have had informal conversations with officials, such as during guided site visits. The nature of the conversations meant that it was not possible to record them or make contemporaneous notes. However, we did compile our recollections at the end of such sessions and use them to inform our understanding of development and environmental governance. We have also experienced similar challenges in seeking to gather data from citizens. We have found that people have become more reluctant to share their thoughts and when they do have tended to be more cautious in their comments.

To overcome these difficulties with our study of the SSTEC and the wider Tianjin-Binhai New Area (TBNA), we pursue a 'sociology of knowledge' perspective (Schutz, 1932/1974; Cicourel, 1964; Berger and Luckmann, 1966). This social constructionist ontology helps us in three ways by suggesting: 1) notions of agency, 2) social constructions of ideas, and 3) how the evolution of economic narratives should be characterized. The sociology of knowledge involves the analysis of the social construction of reality, i.e. the "relationship between human thought and the social context within which it arises." (Berger and Luckmann, 1966, 16). The object of thought, in this case the SSTEC, becomes "progressively clearer with [the] accumulation of different perspectives on it … [and so the sociology of knowledge becomes] an important aid in the quest of any current understanding of human events" (Berger and Luckmann, 1966, 22). Inevitably, different views of different objects of thought, such as the SSTEC, can create distinct contestations between individuals and groups. Power relations underpin the sociology of knowledge's approach to agency: "the success of particular conceptual machineries is related to the power possessed by those who operate them … which of the conflicting definitions of reality will be 'made to stick' in the society[?] … [Ultimately,] he who has the bigger stick has the better chance of imposing his definitions of reality." (Berger and Luckmann, 1966, 126-7)

For our study, pursuing a sociology of knowledge approach means that our epistemology, or valid evidence, comprises the competing perceptions of the SSTEC garnered from our interviews, our field notes and a review of secondary source material. To overcome the access difficulties described above, we deliberately sought to collect qualitative interview data from two key constituencies: taxi drivers and online netizens in SSTEC fora. First, the taxi drivers who took us from the centre of Tianjin to the SSTEC - a one-hour journey - and who drove us around the SSTEC as well as the wider TBNA, proved to be an invaluable source of local expertise. Second, we interacted with netizens on fora dedicated to the SSTEC. The perceptions of these individuals provided further helpful insights into citizens' opinions of the SSTEC. Third, we extended the time we spent on site visits to allow for the greater development of opportunities for observation and field notes. The data that we report on here was collected in the autumn of 2017.

We have also made extensive use of key national government policy statements. This is because we are interested in the ways in which government perceives public policy challenges and how its thinking shapes practices and expectations at the local level (Li and Wu, 2012). Drawing upon policy and official documents in this way enables us to identify those areas where government seeks to speak with a unified voice (e.g. promoting 'Ecological Citizenship') and those occasions

where sectoral or interest-based actors, that typify the silo-based approach to policy making, are to the fore (e.g. tackling environmental degradation).

Throughout, we have made efforts to contextualise our more recent data collection with material that has been collected over several years and from a variety of sources. These include key person interviews with officials working in municipal governments, professional organisations such as the China Academy for Urban Planning and Design (CAUPD) and China Society for Urban Studies (CSUS), and site visits to ecological development and regeneration projects.

5.0 Governing spaces: environmental and economic practices

The SSTEC is located in the TBNA in north China. It is the country's third comprehensive national reform pilot zone, following the Shenzhen Special Economic Zone founded in south China in the 1980s and the Pudong New Area formed in east China in the 1990s. TBNA is located in the eastern coastal area about 40 kilometres away from Tianjin city centre and it is a centre point for Tianjin's economic growth, contributing to more than half of the city's US$320 billion GDP, home to over 285 Fortune Global 500 companies, and the world's fourth largest port by throughput tonnage (it is ninth in terms of container throughput). In April 2006, approved by the State Council, TNBA started heading towards a high-end modern manufacturing and research and development (R&D) base and an international shipping and logistics centre for the Bohai-sea region. Being situated in the TBNA provides SSTEC access to preferential central government policies, including substantial tax re-investment, and inclusion in the preferential 'voluntary forex settlement policy' for income repatriation under the State Administration of Foreign Exchange. These policies are deemed as crucial for attracting foreign companies to the SSTEC (Chien et al., 2015).

The background to the SSTEC and its recent development are well documented in the literature (Neo and Pow, 2015; Chang et al., 2016; Chien et al., 2015; Flynn et al., 2016; Zhang and de Jong, 2017; Pow, 2018; Xie et al., 2019b). Work has highlighted how a formerly degraded environment has been recovered so that it is now a much more valuable environmental and economic resource (World Bank, 2009). As one interviewee explained:

> "The eco-city has changed a lot. The place was originally a mud flat. Two-three years ago, there are no trees. You can seldom spot a person on the street. It is much better now." (Taxi driver B in his 40s who lives in Tanggu District,).

Attention has also been given to the highly distinctive governance of the SSTEC (Chien et al., 2015) which are unlikely to be repeated elsewhere. We will, therefore, pay more attention to the regulatory and enhancement activities of the local state since these vividly illustrate the struggles to institutionalise an environmental state even in the promising circumstances of an eco-project. Studies show that the SSTEC has sought to manage long-standing market tensions between economic and environmental imperatives by widespread government interventions to make investments in environmental projects more financially attractive to developers or by regulating that higher environmental standards are required within the City (Chang et al., 2016; Chien et al., 2015; Neo and Pow, 2015). By utilizing the PES framework, we can now go a stage further to critically examine how these competing economic and environmental imperatives are governed in practice. Can the local environmental state through its enhancement activities govern to promote more sustainable lifestyles? How do central and local state regulatory activities seek to shape the environment? How do enhancement and regulatory activities interact to govern eco-space? We explore answers to these questions in the Sub-section below. Throughout we are concerned to better understand how the regulatory activities in the PES complement or constrain enhancement activities. To do this, we first analyse (in Section 5.1) how governance operates to socially construct the environment in the SSTEC and how that shapes local people's perceptions of the environment that they live and work in. This is followed in Section 5.2 by an analysis of the challenges that have emerged in developing low carbon economic activities and of one way in which those have been met by rescaling the Eco-City. Extending the boundaries of the SSTEC enables a wider range of economic activities, especially tourism and leisure, to be brought within its remit.

5.1 Governing the Environment: eco-making and eco-living

In Section 3.1 above, we have noted how the SSTEC adopts an anthropocentric view of nature. As Chang et al (2016, 939) reported "'naturalness' is manufactured" in the SSTEC. Technologies, landscaping and water management create an environment that is there to serve the needs of people. Once environmental recovery activities had established the space in which a carefully managed 'greenness' could be cultivated, then enhancement and regulatory actions became more prominent. One key regulatory measure in the SSTEC has been a set of 26 key performance indicators (KPIs) to guide its development. The KPIs are divided into four groups comprising: a good natural environment; a healthy balance in the man-made environment; good lifestyle habits;

and developing a dynamic and efficient economy (Pow and Neo, 2013). For those engaged in governing the SSTEC, the KPIs are shaping the way in which they conceptualise its environment and the relationship between the environment and the economy. In terms of wider governance arrangements, though, we need to know first to what extent this anthropocentric notion of the environment shows continuity or change as the SSTEC develops. At a formal level there is much to suggest continuity since, for example, the KPIs are largely unchanged over time. However, as we shall see, the way in which the project is being delivered means that we can detect different hues to the social construction of the environment. Second, we need to understand the voices of those who live and work in and around the SSTEC. We need to know to what extent they too share an anthropocentric notion of the environment and, if so, to what degree it coincides with that of the SSTEC. This matters because disconnections in perceptions of the environment between citizens and those governing the SSTEC have the potential to be destabilizing. For example, if citizens' views are more progressive they may make demands on the state which it is unwilling or unable to meet. Alternatively, if the thinking of the local state is significantly more advanced than that of citizens, it may mean that the latter question environmental protection measures and so the legitimacy of the local environmental state.

Now that the SSTEC is much more fully formed, we were keen to find out what it was like for residents to live there as this provides a key insight into perceptions of the environment. One typical exchange went as follows:

> *Are there any differences in living in the Eco-city?*
> Nothing special I think, other than the better living environment.
> *I heard that Eco-city has employed some advanced ecological technologies in waste management for example. Did you notice any of them?*
> Yes, you remind me that there is a vacuum waste transport system, which can stop the vehicle transportation of waste and thus reduce the pollution in the journey. The system does exist as all communities have installed the infrastructure. But nobody uses it since it is very costly. If we use the system, then the expense will be shared by both individual households and the Eco-city Committee. However, it still costs a few dozen yuan more per month.

The conversation continued to further explore how technologies in the home might be being used:

Are there any other things apart from the waste vacuum transportation system?

I cannot think of anything else, other than the better environment.

How about those solar panels on the roof? I saw many houses have installed the solar panels.

You are right that all housing in the Eco-city has installed the solar water heaters. However, in our community [which is mainly for resettled residents], those solar water heaters are just displays which have never operated. (Taxi driver C who is in his 40s and has lived in the Eco-City since 2013).

The sense of a 'better living environment' seems to principally mean well managed green spaces and high-quality landscaping. Residents are invariably positive about the quality of the physical environment. Residents in the Eco-City often share their living experience and their thoughts of the Eco-city development online. Most of them are very enthusiastic, praising the environment and the delightful changes happening (e.g. Zhihu.com (a) no date). People are expressing high levels of satisfaction with a manufactured environment (Chang et al 2016) and are aligned with an anthropocentric social construction of the environment.

One of the most striking features of our observations was how much more vibrant the SSTEC had become over time. This was partly because more community facilities were now accessible but also partly due to the significant burst of interest in housing. One unexpected feature of the land development process has been the way in which neighbouring governments have intervened in the SSTEC housing market and how their actions have helped to make it economically and socially more vibrant. One interviewee explained:

> "I moved into the Eco-City in 2013. My home village located in the Hangu District, near to the Eco-city was demolished, and the whole village is resettled by the government in a community in the Eco-city. At that time, there was no bus and no people in the Eco-City. It was very desolate and very inconvenient as you can hardly find a supermarket to buy daily goods. Now it has been much better. You cannot complain anymore (Taxi driver C who is in his 40s and has live in the Eco-City since 2013)."

Another boost to the local property market arose, by accident, from the disastrous explosion in the port area of the Binhai New Area of Tianjin (Tanggu district) in August 13, 2015. Since residents near the blast site were very concerned about the quality and safety of their blast-hit

apartments and were unwilling to return even after renovation, local government took measures to establish an alliance of state-owned property developers to purchase those apartment blocks damaged in the explosion from willing residents (Xinhuanet.com, 2015):

> "After the explosion, people who lived nearby to the blast site returned their houses to the government and come here [to the Eco-City] to buy houses." (Taxi driver B in his 40s who lives in Tanggu District).

The property-led nature of development in the SSTEC has been remarked upon by other researchers (Chien et al., 2015; Xie et al., 2019b). What has become increasingly apparent is the pernicious way in which property development exacerbates inequality. For example, in one real estate company (Daju Real Estate Co. Ltd) that we visited there was a clear sense of which apartment blocks/locations in the Eco-City were most attractive. There was a premium for properties inside the original start-up zone, where the service centre (previously the site's exhibition hall) and the second community centre are located. The agency is mainly working on second-hand housing transactions and renting. As the property market developed so there seemed to be a niche in which people only owned the apartment for a short period of time before seeking to sell it on at a profit. In one comment it was pointed out that most of the commercial residential buildings are sold out, and if a new project opens for sale, it is very difficult to purchase as prospective buyers need to pay a large sum of money to get a number to be on the waiting list (Taxi driver C who lives in the Eco-city from 2013, 40s).

At another real estate agency, The Tivoli, they were seeking to sell exclusive new build villas. Despite an eco-sounding name -ECO-HOME, this was not a low carbon/eco development. It was all about exclusivity: an appeal to an Eco-city middle class with houses that looked Western (semi-detached, three storeys, three bedrooms, three bathrooms, and a double garage). This was also marketed to help property owners who valued private transport as the location of the dwellings meant that there was no obvious links to public transport.

What we are witnessing in the SSTEC is citizen lifestyles that are shared by many across China. While the environment looms large in the promotion of the SSTEC, and in the marketing of some properties, it is a notion of the environment that is largely supporting development opportunities. It is an eco-state whose enhancement efforts help to create a manufactured environment that is sympathetic to land development interests and well received by residents. Indeed, rather than the

environment gaining traction as development progresses it seems to have been stifled and failed to move beyond something that needs to be measured and managed in the KPIs. Here, then, we can observe how the regulatory face of the PES as evidenced by the KPIs is helping to construct ideas of the environment that are then supported – and not challenged – by enhancement actions. Given these circumstances, it seems unlikely that citizens will be pressing the local state for a more proactive environmental programme.

Regulatory actions are producing and reproducing social inequity and, in turn, shaping perceptions of environmental protection. For poorer residents, or those with limited incomes who would like to move to the SSTEC, it is an increasingly difficult housing situation that they face. The buoyant private property market dominates accommodation in the SSTEC since affordable housing – a KPI - is planned to be merely 20% of the total stock. Access to a high-quality managed environment thus becomes inextricably linked to income and purchasing (or renting) property. In turn, property values in part depend on perceptions of a high-quality physical environment in the SSTEC. Property markets and a manufactured environment go together and reinforce one another.

Inequity is not confined to the housing market but is also found in perceptions of the ways in which environmental regulations can negatively affect more marginal groups. For example, during our most recent fieldtrip (September 2017), we noticed that almost all construction work within the Eco-City had stopped. A local real estate agent (Interview, September 2017) told us that Tianjin Government had released a policy that halts all kinds of construction project within Tianjin from October 2017 to March 2018. The area suffers from air pollution and this has become an increasingly important issue for national and local governments. “Tianjin’s Plan of Comprehensive Treatment of Air Pollution in Autumn and Winter of 2017-2018” (Tianjin Municipal Environmental Protection Bureau, TMEPB, 2017) was released in August 2017. The idea was to tackle air pollution problems – of which dust from construction can be an important element - to meet the demands of the “Plan of Comprehensive Treatment of Air Pollution in Autumn and Winter of 2017-2018 in the Beijing-Tianjin-Hebei Region and Surrounding Areas” (Ministry of Environmental Protection, MEP, 2017). There have been several previous bans on economic activity in Tianjin during environmental inspection periods (such as from December 7th – 9th in 2015, and several days in November 2016). However, what was significant about the construction ban of the autumn 2017 and through to the winter of 2018 was its length which was very unusual unless it was preparing for big events (e.g. Olympic Games). This was the first time for such a long construction

ban and its significance was recognised because it was called a “strict order”. While for many citizens cleaner air in the autumn and winter months would be a health and environmental benefit, for others, particularly more precarious groups, economic concerns remained their primary concern. One netizen (zhihu.com (b) no date) said that “Public power intervention in environmental protection is the exploitation of the poor by the rich”, asserting that such moves as the construction ban further drives lower-class people into the corner because they temporarily lose their jobs. Those most affected will be numerous, often migrant and marginal construction workers.

The construction ban provides a good example of the multi-scalar PES (see Section 2), where national regulations are delivered at the local level. It also vividly illustrates the tensions between environmental protection and economic development. In this case, a construction ban is to improve and ensure good air quality for the whole area around Beijing. The economy, especially the construction sector, suffers as governance of environmental protection is temporarily prioritized. Here we see a demonstration of the power of national regulation as it is inserted into local spaces. In terms of the governance of eco-space we are witnessing regulatory activities overlaying one another as wider regional and national concerns for air quality supplant the SSTEC’s air quality KPI. Interestingly none of our interviewees – from local citizens to estate agents – mentioned that the construction ban would have a positive impact on the property sector. Maintaining air quality in the SSTEC and therefore its green credentials was not seen as helpful for the property market. No awareness of the double dividend expected from Ecological Modernization was expressed. Rather, the concern was that fewer properties would be constructed which would reduce profits all round. Notions of environmental protection are constructed and understood in anthropocentric terms and state actions are justified along these lines. There is little or no challenge to this dominant perspective from citizens living and working in the SSTEC or from actors engaged in the governance of the SSTEC.

We have already touched briefly above on the way in which economic activities in the SSTEC may bring tensions between economic and environmental imperatives. In the Sub-section below we examine the economic activities that take place in the SSTEC.

5.2 Governing the Economy: low carbon ideas and Eco-city rescaling

An important part of the rationale for the SSTEC is that it can bring together economic and environmental imperatives through, for example, innovative low carbon activities. This is an important feature of the PES and its enhancement role because it helps to legitimize environmental activities to economic interests as well as to the wider community. Government has been able to steer development towards the SSTEC (e.g. the National Animation Industry Park (NAIP)), which is the first state-level animation industrial park in China. The NAIP is a collaboration between the PRC Ministry of Culture and the Tianjin Municipal Government. There are also important claims made that the number of companies registered in the Eco-city grew from 2,200 in 2014 to some 7,000 registered companies in September 2018 (Tianjin Eco-city, no date). This data would seem to suggest that the SSTEC has been successful in meeting its environmental and economic goals. There may, though, be something of a mismatch between companies registered and those that are active in the SSTEC. Our field notes record the following comments:

> Driving through the desolate industrial parks and crossing the Rainbow Bridge, illustrates the variability in the City. Residential areas of the Eco-City showed a vivid city life as we saw a crowd of people waiting at the bus stop and the road was busy with cars, bicycles, and pedestrians. However, whilst the business start-up area in the Eco-City has taken shape and become lively, other blocks outside the start-up area are still largely empty. We have visited the Eco-business Park (0.4 km^2), which is one of the five major parks planned in the Eco-city to accommodate pillar industries consisting of the internet + high technology and subsidiary industries of cultural creation and life-improving facilities. However, it is showed that the park is largely empty and deserted as the gate was locked and the ground floor of those office buildings were largely empty, although each office building has been attached with an enterprise's brand. We wonder whether industrial development has been effectively established in the Eco-city [see images 1 and 2].

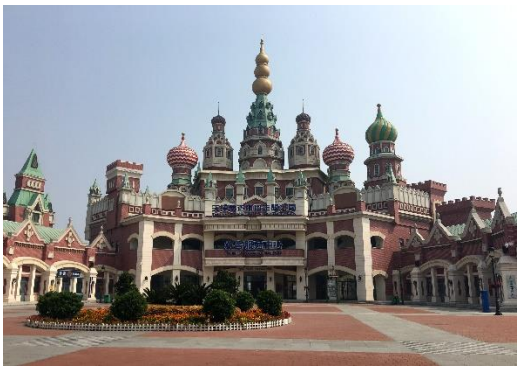
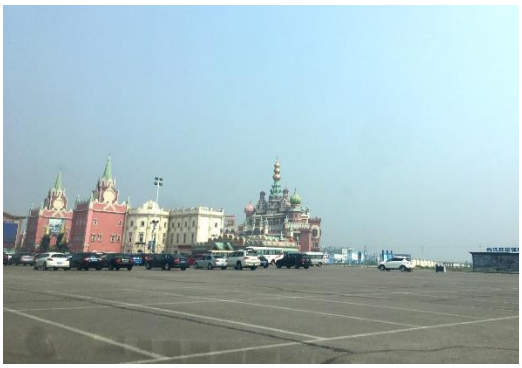
The images below illustrate the lack of activity in the Eco-City business park.

Images 1-2 SSTEC business park
Source: the authors

One of the challenges for the SSTEC has been a mismatch between the knowledge and expertise of companies integral to a low carbon economy and the likely workforce in the SSTEC. As we saw in Section 5.1 above the Eco-City is a popular property development and has good educational facilities. It is not, however, attracting low carbon entrepreneurs who want to live and work in the SSTEC or skilled staff who could work in a flourishing low carbon sector. As a result, there have been efforts to diversify the local economy to better match the skills base of citizens with likely economic opportunities. The enhancement activities of the PES have, therefore, shifted markedly from technology-based low carbon enterprises to low carbon services. A key development was the incorporation of the Binhai Tourist Area into the jurisdiction of the Eco-City. In September 2013, along with the deepening reform of the administrative system in Binhai New Area, the “Comprehensive Plan of Deepening the Reform of Binhai New Area’s Administrative Institution” was promulgated by the Tianjin Party Committee and the Tianjin municipal government, which incorporated the Binhai Tourism Area (100 km²) and the Central Fishing Port Economic Area (18 km²) into the jurisdiction of Sino-Singapore Tianjin Eco-city.

The fusion of new spaces and economic development activities suggest tensions within the development model: employment in tourism will be largely for unskilled labour, the Eco-city sought to promote a high skilled, knowledge-based workforce. As we shall see below, the tourist developments are poorly served by public transport and visitors use their car; for car users from outside of the SSTEC this will not adversely affect the Eco-City‘s performance indicators because the measure for use of low carbon transport is within the Eco-City. Moreover, the rescaling of the SSTEC to bring in new employment spaces shows how for key political actors the SSTEC had to be an economic success as well as a model of environmental innovation.

Within the Binhai Tourist Area, there are several residence projects and several tourist attractions, such as TEDA Aircraft Carrier Theme Park, Aqua Magic Cube, and the National Maritime Museum. The TEDA Aircraft Carrier Theme Park (see images 3-4 below) is one of the major tourist attractions and includes Russia Street, an attempt to recreate a Russian urban space with buildings that mimic the Kremlin and a street of shops (entry to the street of shops is through a turnstile and has to be paid for). The aircraft carrier arrived in 2000, while the theme park was started its development since 2006. It became a national 4A tourist attraction in 2010. The summer holiday season meant that when we visited in mid-September that the Park had closed at the beginning of the month. As a result, there were not many tourists when we visited. We found that there are no public transportation connections to the Theme Park, but there is a giant open car park that sits beside the entrance of the Theme Park (see image 4 below).

Images 3-4 The TEDA Aircraft Carrier Theme Park and its car park
Source: the authors

Similarly, the Fantawild Adventure amusement park (see Images 5 and 6) within the central area of the Eco-City also lacks public transportation. Instead, it is also equipped with a large car park. The Fantawild Adventure amusement park was opened in the summer of 2014 with an estimated annual number of 4 million trips. It is noteworthy that the 0.4km² Fantawild Advernture is built upon the planned land for the National Movie Industry Park (1 km²).

Shifts in SSTEC's economic development strategy can still be portrayed as sympathetic to the overall goal of the Eco-City of being a site for integrating economic and environmental imperatives in a mutually supportive manner. The successful sectors might not be those that were originally envisaged but leisure and tourism are still lower carbon activities than many of those in and around Tianjin. There is, though, an element of opportunism to more recent developments in the

SSTEC that somewhat undermine the efforts to be a pilot project that would lead on environmental innovation. Rather than environmental issues being in the forefront of development thinking, they appear to be relegated to a secondary status. When the difficulty of attracting high-tech low carbon forms seemed likely to challenge the achievement of KPIs for economic development, the relationship between the economy and the environment proved to be a rather malleable one: new activities were attracted and their negative environmental impacts (e.g. extensive car travel) fall outside the Eco-City's KPI measures. In a similar way to property development, the environment is manufactured to create economic opportunities.


Images 5 and 6 The Fantawild Adventure amusement park and its car park
Source: the authors

To better understand why the SSTEC has not been able to promote eco-industries, we need to broaden our gaze to examine the wider development context of the Tianjin Binhai New Area (TBNA). As a nationally important economic space, it is also the site of other urban development experiments, notably the Tianjin Future Science and Technology City (FSTC). The FSTC is one of only four in the country (the others are to be found in Beijing, Hangzhou and Wuhan) and is initiated jointly by the Organization Ministry of the Central Committee of the CPC (CCCPC) and the State-owned Assets Supervision and Administration Commission of the State Council (SASAC). It was founded in April 2011 to be a model to promote innovation and industrial restructuring as China sought to move away from resource intensive polluting industries. FSTC can exercise considerable political and economic leverage to steer industrial development within the TBNA. An interviewee argued that FSTC is:

> "an essential part of Tianjin Binhai New Area. its role is to attract high level research institutes and hi-tech enterprise and various talents [entrepreneurs and scientists] to

> establish a model of new development mode for Tianjin." (Key person interviewee in the FTSC, September 2017)

The SSTEC and the FSTC find themselves competing for investments. According to a key person interviewee in the FSTC:

> "There is really a competition among different areas [SSTEC and FSTC] due to the similar investment promoting targets. But there are also some ways to avoid tough competitions. First is the subdivision of target industries [between the two cities]. Secondly, the upper government will perform the role of judge when there is a dispute. It will consider which one will be a more proper area for the settlement of the project based on the benefit of the whole city. Third, the City to which an investor initially visits - First Come - is also a potential rule for the competition. Finally, above these, the willingness of the investors is the most important factor. For example, if a company wants to make an investment in a new energy car field, it will seriously consider the relevant industrial environment of different areas." (Key person interviewee in the FTSC, September 2017)

FSTC believes that it has a significant competitive advantage because it is focused on nurturing and supporting industrial development while SSTEC appears to be more interested in property and tourism.

A key role played by the local state is in resource management. Here the resource includes the financial and political support from upper level government. To optimize the spatial allocation of resources for the development of the region, the local state (i.e. the TBNA in this case) needs to coordinate the developments of two high-profile national experimental projects. It is because of this need for coordination that the enhancement activities enacted by the local state on the SSTEC demonstrate an adaptability; local state actors need to constantly adjust plans, policies and practices to meet the wider regional development agenda.

In the next Section, we reflect on what our approach and findings mean for the local environmental state in China. We draw out the roles and practices of the local environmental state in China. The SSTEC, highlights the useful perspectives provided by Protean Environment State (PES) in understanding the multi-faceted activities undertaken by the local state in complex and tension

riven development issues. It also draws to our attention the challenges under which a local state operates and the limitations that emerge in pursuing ecological imperatives.

6.0 Discussion and Conclusions

The empirical material on the SSTEC illustrates how helpful the PES can be in better understanding the multi-faceted nature of local environmental states (regulatory, recovery, and enhancement). By being sensitive to the ways in which the PES operates in particular spaces, we also gain insights into local autonomy in environmental governance: for local states there can be limited discretion due to scaled politics and practical constraints. In the case of SSTEC, we note that the recovery state has been important in underpinning development of formerly degraded land. The nature of the development model that has been pursued in Tianjin shows how the recovery, regulatory and enhancement state can simultaneously operate to complement one another (whilst also experiencing internal tensions). We explore these for the regulatory state and the enhancement state below.

Regulatory state: A key driver in shaping the development model for the SSTEC was the introduction of the very first Eco-city Key Performance Indicator. These set up ambitious targets to curb pollution through planned low carbon industries, the introduction of green technologies for ecological living, and green transportation. Since achievement of these indicators would be used to demonstrate the success of the project, they helped steer development. Achieving indicator targets was also important for local officials when they were held to account for their performance by more senior figures. Many of the indicators related to urban living (such as the use of green transport, air quality, and green buildings) and were for the most part within the remit of the SSTEC. For example, all buildings had to meet high environmental standards. Since most economic activity in the SSTEC was property development, then regulation could be stringent. Other indicators, though, particularly those relating to low carbon economic development proved more problematic because they fell beyond the immediate scope of SSTEC. The Eco-City found itself competing with neighbouring and more distant urban areas to secure investments in low carbon companies.

Enhancement state: SSTEC like other local states in China is aiming for a thriving environment and economy, which can further lead to a harmonious society. Within the SSTEC, enhancement activities are noticeable. Environmentally, planners and developers of SSTEC has been

experimenting on nature-based solutions (e.g. the planning and construction of an 'eco-valley', an S-shaped green corridor that cut across the entire Eco-City[2]) and advanced green technologies (e.g. vacuum waste transportation system, household solar heating etc.). However, as we found, most of the advanced green technologies lay idle since residents are unwilling to pay for them. With regard to economic enhancement, the original plan sought to attract service industries (software, animation, etc), education, research and become a centre for green technologies. More broadly the aspiration was for SSTEC to develop a sustainable economy that would be a new pole of growth for the wider region (TBNA) by attracting investment and generating revenue (Xie et al., 2019b). Yet, the stagnant economic progress, as evidenced by the failure to attract low carbon industries and the lack of economic activities within the industrial park of SSTEC, forced the local government to revisit its approach. This led to further promotion of the property industry, and the nurturing of the tourism industry that has become established in the wider region.

The case of the SSTEC vividly demonstrates how local governments seek, with varying success, to play multiple roles in governing (environmental) development projects. They have to adjust policies and strategies and resort to different political instruments (e.g. regulations, plans, subsidies) at different stages to adapt to local and regional development conditions and needs. This is because under the hierarchical governance system in China, local governments are positioned in a crucial juncture that needs to both respond to higher level governments' political demands (e.g. environmental conservation) and meet the local needs of economic development for greater city competitiveness. Trying to reconcile the needs of environmental protection and economic growth entails trade-offs, which might compromise the initial ambitious environmental objectives and further exacerbate social inequality. Meanwhile, whilst most of government development plans fail to consider the human factor, it is evident that without effective engagement of residents, the advanced ideal of an Eco-city cannot be achieved. Even in a pilot project like the SSTEC where ecological concerns are prioritized, the environmental state struggles to develop a radically different development model. The nature of the environmental state is, therefore, one that is very much contested. Hence our sociology of knowledge approach enables an analysis of the competing perceptions of our contributors and institutional narratives.

[2] See: https://naturvation.eu/location/asia/cn/tianjin

While central government mainly plays a directive role in mapping and directing development, local states are endowed with considerable discretion to play a more influential role in designing and implementing on-the-ground developments. While the nature of hierarchical reporting and accountability can often provide an impression of concord between national and local governments detailed local analysis can show that processes and results may not go as expected. As shown in the SSTEC, under the general mission to construct a model Eco-city in China, developers and the SSTEC sought to promote 'eco' housing and low-carbon industries to bolster the economy while creating an ecological identity. In order to achieve the dual goals of ecological and economic development a wide range of activities have been undertaken. Regulatory measures have been mobilized, including the introduction of the very first Key Performance Indicators to normalise the social and environmental quality of an Eco-city. Meanwhile efforts to enhance the Eco-City have included supporting low-carbon industry (through tax and subsidy), nurturing social well-being (though the establishment of the community center), and the provision of premium educational resources. Nearby state actors have also helped shape development in the SSTEC through the deployment of resettlement programmes (both before and after the explosion) that bring people from neighboring region into the newly built Eco-city. However, materializing ideas and plans on the ground is often a twisting path full of unexpected changes and consequences. This is evidenced by the protracted efforts to attract low-carbon industrial development into the Eco-City. While amongst households there are reports of largely unused green technology (e.g. the vacuum waste transport system and the solar heating system) and, as for other cities, ongoing challenges in reducing car-dependent transportation within the Eco-City and its environs. In addition, the SSTEC aspires to be a site of social harmony. The reality, though, for some who live and work in the SSTEC is rather different with a set of forces intensifying social inequality. These drivers include the booming real estate industry that drives up housing prices and living costs; and the drastic pollution control measures that order a months-long closure of the construction industry on which the majority of the less-educated groups are dependent.

The development constraints encountered by the local state in implementing an eco-project could have multiple causes. We wish to highlight two. First is the scaled politics that takes place under the fragmented authoritarianism that typifies the Chinese state. In the case of SSTEC, for example, national intervention in local spaces plays a significant role as it encourages competition between two development projects (e.g. the FSTC and the SSTEC) that are initiated by different ministries. As a result, SSTEC experiences even further difficulties in attracting low-carbon industries. Nevertheless, it is through rescaling in the TBNA that the local state seeks to resolve emerging

economic problems. In the SSTEC, the initial planned service and research industries have been gradually diverted towards real estate and tourism-focused industries. The boundary extension of the SSTEC to incorporate the Tianjin Binhai Tourism Area and the Central Fishing Port Economic Zone clearly exhibits the intention to diversity the economy. As part of a wider process of industrial restructuring, the local strategy to develop real estate and the tourism industry can be portrayed as low carbon economic development.

Second is the overconfidence and overdependence on the power of state governance in directing local developments. This simultaneously marginalizes non-state actors who can contribute to positive ecological developments, and other courses of action that could also play crucial roles in transitioning towards more sustainable futures. One example is the failure to understand the needs and concerns of people due to a lack of engagement with residents in Eco-city planning and development. This resulted in the failure to better understand then steer the eco- or low-carbon behaviors of residents in the SSTEC. The good intentions for reconciling the environment and economy and for harmonizing society thus become hollow promises. The sobering lesson of the SSTEC is that whilst a local environmental state might perform multiple roles in enabling and promoting local environmental developments, such capability is bounded, and should be complemented by non-state actors and actions.

The work of Kostka and Mol (2013), along with others (e.g. Kostka, 2014; O'Brien and Li, 1999; Xu, 2011), highlights the importance of studying the local environmental state in China in its various forms. Their work shows that the local state can have a markedly different environmental agenda and practices from national environmental policies. There is, therefore, a vibrant research agenda that makes the local environmental state an important object of analysis. There are three themes that are particularly worthy of attention. First, we need to better understand how different facets of the local environmental state operate in different settings. We have seen from our own analysis that regulatory and enhancement activities can act in complementary ways and be mutually supportive of one another. In our study of the SSTEC, though, regulatory and enhancement activities were not of equal status. Air quality is accorded high political importance and the regulatory face of PES seems to be the dominant one. National regulation is privileged over local regulatory activities and over the pursuit of local environmental enhancement work. In different settings, though, such as afforestation or bamboo growing where resource management is to the fore, this may not be the case. Second, we need to know more about the scope for local agency in environmental actions and whether that may be becoming more constrained. As

environmental issues gain in legitimacy, does central government wish to continue to allow local discretion or will there be efforts to promote standards across the country? Third, the PES has gained a legitimacy. Even when new development thinking is undertaken (e.g. the extension of SSTEC and the promotion of leisure and tourism) the environment cannot be wholly ignored or marginalised. The environment is a legitimate topic within economic decision making. However, the PES remains a limited governance mechanism by which to promote a more radical and redistributive perspective on the environment. The enduring nature of an anthropocentric social construction of the environment is largely unchallenged. There is, though, a complex and tension-riven interaction between the state and the environment that means that alternative social constructions of nature can emerge. But how might the local PES engage with alternative social constructions of the environment? How might the local state seek to manage, nurture, or utilise these alternative notions of nature? We feel that to successfully answer such questions requires reorienting research agendas to reflect the subtler and more nuanced picture that exists on the ground across China

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