Eco-Cities in China: Ecological Urban Reality or Political Nightmare?

Silvio Ghiglione[1] & Martin Larbi[2]

[1] School of Social Development and Public Policy, Beijing Normal University, China

[2] Center for Energy Environment and Sustainable Development, Ghana

Correspondence: Martin Larbi, Center for Energy Environment and Sustainable Development, Ghana. E-mail: martinlarbi@yahoo.com

Abstract

The dual challenges and complexities of global climate change and rapid urbanization have prompted international engagement in the promotion of sustainable cities around the world. In recent years, China has shined on the international stage thanks to its commitment to ecological sustainability and the strategies it has deployed to ensure that this commitment would not only remain ink on a chapter of its latest (12th) Five Year Plan. Besides its insistence on subsidizing the national production of solar panels, China is particularly commended for its work on eco-cities. The Beijing Urban Planning Museum explains that eco-cities are a way for China to further its urban development whilst creating more ecological opportunities for its population, and helping out the country with its commitment to cleaning and restoring its environment and diminishing its global environmental footprint. Despite this, the eco-city in China still remains at an experimental stage, and displays weaknesses that may leave an observer doubtful of the future of urban ecology in China. In an attempt to contribute to the limited literature on Chinese eco-cities, this research investigates three eco-urban megastructures—Tianjin Eco-city, Dongtan Eco-city, and Qingdao Eco-park—and compares them in their successes and observable limitations in urban ecology. The study finds that although China's effort at promoting ecological urban development is commendable, there are major challenges that threaten the success of these projects which can be attributed to the particular relationship between China's political and bureaucratic systems and the practice of urban ecology.

Keywords: Eco-city, Chinese Politics, Tianjin Eco-city, Dongtan Eco-city, Qingdao Eco-park

1. Introduction

On August 14, 2011, CNN's Nadia Bilchik reported on American national television that "around a hundred miles outside of Beijing"the first eco-city "of its kind"was being built (Note 1). Embracing a safe and proactive green-friendly demeanor, she praised the "sustainability"of this Chinese construction, emphasized the energetic independence of this new city, and further motivated her audience by reminding them how General Motors—the leading American car company—had taken part in this project by furnishing the futuristic-looking electric cars that would be allowed to roam within the city's green walls.

These kinds of reports where China is praised for creating eco-cities and trying to combat global warming, the polluting of the ecosystem, and other human-caused phenomenon are mainstream on the web and international media. Eco-aware blogs such as Treehuggers.com, or more highbrow media such as the BBC, the New York Times, France 2, or ABC, to name a few, have all, in recent years, introduced their audience to the topic of the People's Republic's green urban revolution: "The gain for us is not monetary; it's about building a new socialist rural society." (Note 2) Both citizens and observers seem to respond rather well to such eco-projects, and China's popularity is soaring as a result: one observer commented "…excellent effort there China. Hopefully this project will create a chain effect for more green cities around the world." (Note 3)

Self-explanatorily, this change in China's approach to its development has caught many's attention, and put the country under the world media's spotlight; the Middle Kingdom has, in 2015, indeed surpassed the United States in terms of pollutionemotions, hence becoming the world's largest polluter (Note 4). Where some would want to blame the People's Republic industry for recklessly dumping pollutants into nearby rivers, or for not filtering the toxic gases that emanate out of their production chains, other scholars focus on a more unexpected actor: the city. In 2009, the World Bank estimated that "urbanization is projected to rise to about 64 percent by 2025,

which translates to slightly over 350 million more people living in urban areas. The annual population increase in China's cities over the next 20 years is forecasted to be about 17.7 million—the equivalent of adding one global megacity, such as New York City, each year." (Note 5) Beyond the heart-lifting promise that this transition may translate into continuous economic development and poverty alleviation stands the cruel reality of the stress that this gigantic influx of people into China's urban centers will bring on the country's urban development and, more importantly, on the country's environment.

Why blame the city for environmental degradation, though? Indeed, it seems more pragmatic to blame big polluting companies, incinerators whose owners refuse to change the filters of, or maybe to focus on what the world's media like to report the most: the aggressive oil lobbyists who oppose a switch to more eco-friendly means of transportation and are backed up in their crusade by greedy officials. Far from saying that all the actors listed here above should not be regarded as important problems that China should restrain sooner rather than later, the city has to be given particular attention as it accommodates, causes, channels, and aggravates the destruction caused by these very actors.

A city such as Beijing stands a paroxysmal example of this situation. After the opening reforms of 1979, the capital grew and modernized its urban landscape erratically: the old, traditional, and insalubrious hutongs (traditional neighborhoods) were destroyed, their communities displaced to far-off and newly built areas, and skyscrapers mushroomed on the ashes of the northern capital's urban history. Beijing however quickly realized that this exponential urban revolution had a price that no one had envisioned: the more the city grew, the more polluted and polluting it became. The story within this causal relationship follows one simple, yet deadly, vicious circle: the more economically powerful Beijing became, the more it attracted people; the more it attracted people, the more it had to spread its urban footprint and ask for more energy to accommodate all those new urban dwellers, and the greater the pressure on the environment.

Aware of the challenges associated with rapid economic growth without proper recourse to sustainability protocols, the Chinese government put in place institutions and measures to address the country's sustainable development needs. The following table highlights the various institutions and policies enacted by the Chinese government to ensure environmental protection and sustainability (Note 6).

Table 1. Chinese government's institutions and policies for environmental protection

Year	Institutions and Policies
1979	State Environmental Protection Law
1980-1990s	Fundamental pollution-regulating policies
1998	State Environmental Protection Agency of China (SEPA)
2003	SEPA issued "The Constructing Indices of Eco-county, Eco-City and Eco-province"
2006	The Eleventh Five Year Plan's Energy Efficiency Goal + The Renewable Energy Medium-Long Term Plan
2007	China Climate Change Program
2008	China's Policies and Actions for Addressing Climate Change (White Paper) + National Land Use Master Plan
2012	The Twelfth Five Year Plan's Sustainable Development Goal

Reportedly, one of the most important sustainability decisions taken by China, in recent times, was to embed at the very core of its Twelfth Five Year Plan (12th FYP) an entire section that sets guidelines for sustainable development. Among the tools suggested by the Plan is the eco-city development agenda. Indeed, the eco-city, and its green spaces, resilient architecture, small-scale urban development agenda, and ecological approach to urbanism, is envisioned by China as a "pioneering"enterprise that may help the country solve its environmental issues. To date, more than 230 projects (Note 7) have been initiated and strive to create cleaner and greener cities that respond to the exigencies of the 11th and 12th FYP, and to the quantitative and qualitative national standards set by the Ministry of Environmental Protection (MEP) and the Ministry of Housing and Urban-Rural Development (MoHURD).

The general response of the public has been quite positive (Lee and Chen, 2012), and the eco-projects launched by China seem so promising that they attract a quantitatively appreciable amount of foreign investments (Note 8&9). Reports from the world media are all encouraging and hopeful, and present China as one of the countries whose green (urban) revolution should be followed closely, as it appears to hold the keys to "the city of the future" (Moore, 2012). However, in 2010, a cloud appeared in this perfect blue sky: the Dongtan Eco-City project, one of the most talked about eco-enterprises in China went through a rough patch when its project coordinator (in the Chinese Communist Party) was charged with corruption and subsequently incarcerated. The

celebrated foreign consulting firm, Arup, was also criticized for engaging in projects whose ecological stance was questionable. This allowed for more arrows to be fired into Dongtan's heart. In fact, the Dongtan Eco-City project has not been touched since 2006 (Note 10).

Less talked about but equally illuminating is the case of HuangbaiyuEcovillage, which highlights another aspect of eco-cities in China that leaves doubt regarding the success of these projects. This ecovillage was built in Liaonang (northeast China) as part of a project launched by Deng Xiaoping's daughter to reshape a farming village into a more sustainable community. However, major conceptual problems that reportedly emanated out of a lack of concern for local economic realities (e.g., houses were built with garages, but farmers in this area didn't own any cars) brought the project down.

In the light of these emerges a puzzle: how can it be that, in a country where the government seems so committed to promoting a global agenda for sustainability, so many eco-projects present such a disturbing amount of cracks, imperfections, and a visibly high rate of failure? As Dongtan seems to epitomize, there may be a correlation between China's political system and the lack of success in eco-cities projects. Huangbaiyu, on the other hand, tends to show us a more economic side of the coin, and forces us to wonder whether the premier objective of eco-city projects is not, in fact, the promotion of economic development.

In short, we need to ask how the lack of connection between the goals championed by the Twelfth Five-Year Plan in terms of ecological growth, and the results achieved by eco-cities (one of the tools that local officials are strongly advised to use) can be explained by the interaction between the eco-city and local political and economic factors. This paper seeks to answer these questions (via the use of three case studies) by providing the reader with a clear understanding of the way Chinese eco-cities come to life, the challenges they face, and the solutions that one may want to consider to make the eco-city an agent of change for China's sustainable development.

2. Interaction between Chinese Political System and Urban Ecological Aspirations

Several commentators have pointed out the notable failures among China's eco-city efforts. Among many, one will find Austin Williams'"Dongtan: the Eco-city that Never Was" (Note 11), Hilary Brenhouse's"Plans Shrivel for Chinese Eco-City" (Note 12), Christiana Larson's "China's Grand Plans for Eco-Cities Now Lie Abandoned" (Note 13), or MarliesUken's"Grüne Geschäfte: Warum Prestige-Ökocitysnicht Chinas Zukunftsind [Green Business: Why Prestigious Eco-Cities are Not Part of China's Future]" (Note 14). According to these articles, the failure of these projects is to be blamed on either the local officials who push for projects that cannot actually be implemented in their particular district because of economic or social conditions, or on the local leader who cannot see the project to completion because he is removed from office or rotated to another location after a corruption scandal.

Unfortunately, there is no piece of literature that may explain this phenomenon more in depth, and one has to believe newspaper articles or blogposts on their claims that there is a causal relationship between the failure or success of eco-projects in China and the country's political bureaucracy in its handling of these projects. What the literature can teach us, on the other hand, is that this positive relationship between China's decentralized bureaucratic network and the failure or success of its ecological enterprises has been highlighted in other instances. The authors proffer that using these other pieces of academic writing is a valid way to understand what might be going wrong with China's eco-cities.

To begin with, one should start by using Kenneth Lieberthal's (1997) analysis of the relationship between China's governing system and environmental policy implementation to open up the conversation. In his piece, Lieberthal explains that the Chinese governing structure affects every action taken by any layer of the government on sustainability issues. Similar to any reflection on the Chinese tax system or health care system, for example, sustainability and environmental policy implementation must be understood through a decentralized and pyramidal prism. The core sends directives to the peripheries that, in turn, divide goals and quotas layer-of-governance by layer-of-governance (locality, township, village...) in a top-down fashion. Lieberthal argues that a crucial key point of this system is how "units of the same rank cannot issue binding orders to each other. Operationally, this means that no ministry can issue a binding order to a province, even though on an organizational chart it appears that the ministries (which are at the Center) sit above the thirty-one provinces"(Lieberthal, 1997, p. 3). This system, as suggested by Lieberthal, creates mistrust between each layer of governance, and is sometimes prone to engendering scenarios in which the core's wish for environmental sustainability appears to be met by the periphery but actually turns out to be a ruse whereby the periphery lies to the center in order to hide further environmental degradation.

Lieberthal's analysis can be furthered thanks to Jonathan Schwartz's (2003) piece "The Impact of State Capacity

on Enforcement of Environmental Policies: The Case of China". Schwartz explains that notwithstanding the over-layered essence of China's governing structure, state capacity enforcement is greatly injured by the structurally thin window of opportunity for transparency and accountability. One has to know how the Chinese legal network operates to understand this statement: when the Chinese political core wishes to set the country onto a legal path, it promulgates laws, as we could expect; however, these laws are not final and immutable: they are known as "falu"and, while being the highest level of legislation in China, remain extremely general and vague. This vagueness is explained by the fact that each falu is complemented by other sets of laws that are edited at lower political levels. Schwartz lists at least two other types of "laws"or regulations: (1) Fagui, which are edited by the State Council; and (2) Guizhang, which are edited at the ministry level (Schwartz, 2003, p. 8).

This division of the legal framework in China can be understood in the same way that one understands the fiscal structural segregation in China: the core sets goals, and gives the peripheries the choice to use whichever tools they wish to meet those goals: it does not matter which cat catches the mouse, as long as it does catch it. In the case of environmental protection, the core relies on the Ministry of Environmental Protection—MEP (formally known as State Environmental Protection Agency—SEPA) for the promulgation of rules. The MEP has been mandated by the core since 1978 to advise on the promulgation of rules and regulations regarding environmental protection, and disseminates the findings from mandated research centers which it supervises and manages (Qiu & Li, 2009). Everything the MEP does is done with one single idea in mind: finding the best way to promote and enforce environmental sustainability throughout the nation.

Similar to Leiberthal's formulation, Beyer (2006) points out the hard reality of China's decentralization: goals and achievements usually differ from one another by a few million light-years. Let's exemplify this statement with the tragically well-known case of Taihu Lake in Jiangsu Province. The lake was at the center of the Chinese and global media coverage in 2007 after a local industry, which had been spewing pollutants into its waters for years, turned the lake green (Note 15). The central government, backed up by the 1984 Water Pollution Prevention and Control Law (WPPCL—amended in 1996), instructed that the situation be solved immediately, and the culprits found out and punished in accordance with the WPPCL's noncompliance provisions. At the time, this case was pointed to as the epitome of China's profound care for the environment. To date, though, the waters of Lake Taihu are still green, and it's benthic and macro organisms are still dead (Note 16), little is known of the punishment meted out to the perpetrators.

The reason? Just as Lieberthal, Beyer, and Schwartz explain in their respective pieces, the structural segregation and lack of transparent accountability of China's governing network allowed the local government to bypass the core's wish to see polluting industries closed down or sanctioned, in order to protect the locality's economic sector. As expressed by Muldavin (2000), economic development and environmental sustainability are seen as two intrinsically different agenda in most parts of China (Note 17), and a locality will more often choose to focus on economic development rather than spend money for sustainability projects and/or close polluting industries that hire people and help the locality meet its taxation requirements and economic growth targets.

What is fascinating, on the other hand, is the extent to which local governments go out of their way to please the core and respond to its sustainability agenda. A summary of the previous scholars'analysis of the battleground between the different layers of the government that is created by China's decentralized system indeed clarifies a keystone element: the notion of compliance is often misunderstood and leads observers to an incomplete reading of China's sustainable enterprise and its consequences. As discussed by Muldavin and Schwartz in their respective pieces, the notion of compliance refers to the various cogs and mechanisms that the central government has at its disposal to see its agenda turned into concrete, operational, and efficient projects; however, compliance is quite a tricky term to use when one speaks about China, as the distinction between wholehearted, rational, and enlightened compliance and careerist political soothing or corruption is often rather thin.

Based on their analysis, compliance is hard to achieve in China because of too great a dissonance of agenda between different layers of the administration; put in a simpler fashion, the core may well want to focus on sustainability, but some of the peripheries may have neither the will nor the means to actively comply with the core's will. Going back to the case of Lake Taihu, it is worth noting that the reason the lake has not yet been entirely depolluted is because the local government decided to only displace the polluting industries to different locations around the lake, and provided them with tax incentives to compensate for the loss occasioned by the monetary sanction that the WPPCL dictated. This naturally cancelled the disturbance that may have been created for those industries, and suppressed any deterring factor that may have prevented them from committing subsequent environmental offenses. This behavior is not limited to one particular sector of activity in China, and can also be seen in tax related issues where the periphery lies about its financial health to please the core (Stone, 2011).

This scenario leads one to believe that ecological enterprises such as eco-cities must follow similar patterns. What it would imply is that the Eco-City in China is, indeed, understood by the core as a good initiative, as it constitutes a technically effective alternative to current urbanizing patterns, but that its success as a project will depend on the compliance of lower levels of the government and their capacity to (1) integrate the eco-project into their constituency's global development scheme; (2) understand the necessity and value of the eco-city; and (3) formulate and operationalize well thought-through projects whose existence is not merely intended to please their superiors. The presence of quantitative and the qualitative standards set by the MEP and MoHURD suggest that eco-city projects are well conceived as far as urban ecology is concerned, but the difficulties of Huangbaiyu or Dongtan eco-projects, for example, present a major problematic situation that one needs to clearly understand before any judgment on Chinese eco-cities may be formulated.

3. Methods

To adequately capture the nuances and idiosyncrasies of Chinese eco-cities, three case studies were conducted to present three different degrees of ecological soundness i.e., the Sino-Singapore Tianjin Eco-City; the Sino-United Kingdom Dongtan Eco-City; and the Sino-German Qingdao Eco-Park. As noted by Bengtsson (2009), multiple case studies help to achieve a more robust result relative to single case study. The Tianjin Eco-city was the first study on the list because it is an eco-city that many western media have reported on over the last couple of years, and that many informed experts and observers regard as an example of a perfect ecological urbanism. Similar to Tianjin Eco-city, Dongtan Eco-city was chosen as the second case study but not for the same reasons. Dongtan Eco-city is, indeed, a case of failed urban ecology, as the eco-city was never built. Preliminary research into this case suggests that this failure was presumably connected to political factors that worked against it, notably corruption. Finally, the Qingdao Eco-park was chosen as the third case study. During a lecture that he gave at the Beijing Normal University's School of Development and Public Policy on March 22, 2012, Christian Junge, a German architect and urban planner based in Beijing, introduced Qingdao Eco-park as a promising project that had, however, greatly been modified by the local political authorities, and made—to some extent—less sustainable than what had originally been designed. Albeit, he still considered Qingdao Eco-park to be a sound and promising project which we believe could serve as the middle-ground of this research.

In the first place, the research called for a deeper acquaintance with the literature and theories of the eco-city, official documents on eco-projects, archival documents, and media reports etc. The approach adopted was international and transdisciplinary, therefore, data collected were not only limited to sources in English but also scholarly articles in Chinese, French, and German that reflected on concepts of ecological urbanism, garden cities, eco-cities, and urban ecological restoration. Some sources were, however, very similar in their orientation, thus, leading to the inclusion of only the ones that were very relevant to the study in the list of works cited. Interestingly, works on sustainable development such as Shimon Peres and Jacques Attali's"Avec nous, après nous…"[With Us, After Us…] (2013) published, or discovered after the completion of this research, like Jean Haëntjens''Le gouvernement des machines" [Governing the machines] (2010) reinforce the researchers' conviction that the initial literature used in order to develop the following reflection was justified .

The study primarily aims to assess how China's political system interacts with Chinese eco-city conceptualization and implementation. The research question lends itself to a more qualitative investigation, than quantitative analysis, to explore this phenomenon. Accordingly, semi-structured interviews were conducted to seek the views of respondents on the subject matter. A semi-structured interview is noted to encourage interviewees to freely discuss the subject under study, and also allows the researcher to probe the thoughts of respondents where necessary (Note 18). Morse et al. (2002) identify a good use of probing questions as a major contributor to the quality of data collected and subsequent analysis conducted.Besides, qualitative research allows for an iterative approach to gathering and sorting responses to questions to avoid inconsistency in research objectives, literature, and analysis.

In this regard, a purposive sampling approach was used to identify as many scholars, consulting firms, urban planners, and Chinese officials as possible, who have relevant knowledge of the research topic to achieve optimum quality data and minimum dross. No concern was given to the repartition of the respondents; solely to their level of expertise with the topic this research is interested in. The last category of informants identified above turned out to be the hardest to access (it is quite hard to talk to a Chinese official due to their extremely busy schedule and the procedures that one has to go through—especially as a foreigner—before being granted an interview). In terms of the three other categories identified, four persons agreed to grant the interview: Christian JUNGE (March and April 2012), Richard REGISTER (October 9th, 2012), Professor CHEN Bin (December 5th, 2012), and Professor WANG Zhifang (December 6th, 2012). The depth of knowledge and expertise of the respondents on the subject under study, in no doubt, lends credence to the worth and quality of information

elicited during the interviews: Christian Junge is a practicing urban planner in China; Richard Register is one of the most prominent theorist on sustainable development and Eco-cities; Professor Chen Bin is the Assistant Dean of the Beijing Normal University School of Environment and notably collaborated on a series of sustainability assessment projects and eco-city projects for the Chinese government; andfinally, Professor Wang Zhifang is an associate professor and Dean Assistant at Beijing University who, at the time this research was conducted, was working on a book on sustainability in China in which she intended to address the Tianjing Eco-city case.

The interview with Mr. Junge was purely informal and is not directly used in this work, though reference is occasionally made to his lecture at SSDPP on March 12, 2012, and our conversation from April 2012 when analyzing the data. Moreover, interviews with Professor Chen and Professor Wang were not recorded for technical and practical reasons, but interview notes were taken and subsequently validated via email by both participants to ensure the reliability of the data (Burnard et al., 2008). Finally, the skype interview with Richard Register, along with a brief verbal interaction with Professor Wang Rusong (after his presentation in a symposium on "Frontiers in Urban Ecological Research and Planning: Linking Ideas from the East to the West"at East China Normal University on November 25, 2012), were recorded and then transcribed with respondents'permission. Unfortunately, efforts made to interview Arup, the organization in charge of Tianjin Eco-city, and the German Chamber of Commerce proved unsuccessful because of lack of interest expressed by the respective organizations.

The interviews and conversations that were used in this research were all prepared in advance, and all made use of an interview guide that was adapted to each interviewee. To establish trustworthiness of this study, data collected were carefully verified to identify and correct errors in the course of the interviews to avoid subverted analysis and difficulties arising out of post hoc assessments of qualitative research (Morse et al., 2002). Interviews were conducted with proper recourse to ethical issues. For example, interview participants were made aware of their right to withdraw at any stage of the interview without any consequences. They were also made to understand their right to answer or not to answer any question(s) they found uncomfortable to discuss. Also, a consensus was reached as to how to quote respondents: either by name or anonymously.

The following sections introduce the three case studies: the Sino-Singapore Tianjin Eco-City; the Sino-United Kingdom Dongtan Eco-City; and the Sino-German Qingdao Eco-Park (Note 19). The analysis of the three cases were organized as follows: Tianjin Eco-City, Dongtan Eco-City, and Qingdao Eco-City. This order will allow for a successful case to be made that the vitality and successful implementation of Chinese eco-city projects is strongly connected to the political milieu in which they are implanted.

4. Sino-Singapore Tianjin Eco-City: Politics and Green Urbanism

The Sino-Singapore Tianjin Eco-city (SSTEC) project began in April 2007 when Singapore Senior Minister GohChok Tong and Chinese Premier Wen Jiabao signed a Framework Agreement under the flag of inter-governmental cooperation. This is the second eco-project that involves a joint venture between the two countries—the first was Suzhou Industrial Park. SSTEC was envisioned as an ecological alternative to urban planning and urban design that would help China transition from an industrial to a more eco-friendly nation, fuel the drive for more eco-friendly alternatives in China by setting an example for others to replicate, and allow for both Singapore and China's economies to grow together and learn from one another (World Bank, 2009). As explained by the official webpage of the Eco-city, "This vision [was] underpinned by the concepts of 'Three Harmonies'and 'Three Abilities'.

The'**Three Harmonies'**refers to: (1) People living in harmony with other people, i.e. social harmony; (2) People living in harmony with economic activities, i.e. economic vibrancy; and (3) People living in harmony with the environment, i.e. environmental sustainability. Furthermore, the **'Three Abilities'**refers to the Eco-city being: (1) Practicable—the technologies adopted in the Eco-city must be affordable and commercially viable; (2) Replicable—the principles and models of the Eco-city could be applied to other cities in China and even in other countries; and (3) Scalable—the principles and models could be adapted for another project or development of a different scale." (Note 20)

The site for this project was not imposed by either parties but criteria were established: in accordance with the Chinese leaders'will to see eco-cities help with the nation's environmental reconstruction and cleaning effort, and the future eco-city would have to be built on non-arable land and in an area facing water shortage. This ecological endeavor eventually led to the new industrial zone of Tianjin being chosen by the bilateral consortium. The master plan that was adopted for the project is also a model of urban ecology at first glance: SSTEC is implanted 40km north of Tianjin on 34.2 (non-arable and highly polluted) square-kilometers of the Tianjin Binhai New Area (TBNA)—an industrial development project of the municipality of Tianjin.

SSTEC is built in a cocoon-like shape (see figure 1 below) and adopts a basic eco-structure expressed in a hierarchy of "live-work-play"spaces, eco-cells, walkable districts, high and tight housing structures and neighborhoods, green and blue spaces—the green represents vegetation, and the blue water spaces—that contrast with and complete the city's outgrowth of concrete, and embedded transportation networks (Note 21). On the energy issue, SSTEC envisions a city where "clean energy sources will be used in addition to traditional energy supply. Practical energy solutions such as solar water heaters and geothermal heating systems will be adopted. Energy efficient solutions such as energy saving light bulbs will also be promoted" (Sino-Singapore Tianjin Eco-city: A Practical Vision for Sustainable Development, p. 14).

Figure 1. Master plan of the Sino-Singapore Tianjin Eco-city

Source: http://www.tianjinecocity.gov.sg/bg_masterplan.htm

The World Bank, in its 2009 report, pointed out that this target is far from extraordinary or commendable in comparison with some European countries (Sweden was then nationally powered by renewable energies by up to 33%. To date, this number is up to 48% and should reach 50% by 2020) (Note 22) and other Chinese cities (Caofeidian eco-city plans a 50% coverage by 2020). SSTEC's carbon emission estimations—which are always intrinsically linked to the energetic supply of any city, should it be ecologic or not—are also quite disappointing, as they rise up to 150 ton-C per one million US dollars, whereas Japan reaches 59 ton-C (World Bank, 2009, p. 29). SSTEC however fares well by Chinese and international standards in the matters of green building and recycling of hazardous chemicals (World Bank, 2009, p. 29, 79).

Another major discrepancy between SSTEC and the vision that one may have of *the Eco-City* appears when attention is given to the plan for the city's transportation network. Contrary to whatRichard Register's vision of the eco-city prompts us to imagine, SSTEC does not ban cars fromwithin its city limits but rather tries to limit their access to some districts. The master plan providesfor the integration of traditional and green means of transportation, with priority being given togreen transportation at "family and individual levels" (Sino-Singapore Tianjin Eco-city, 2009, p. 13) butstill gives cars a lot of places to roam free on four- to six-lanes highspeed arterial roads. One may however object that only electric cars will be allowed within the actual eco-city (Note 23), whichcompensates on an ecological level since "certain electric-powered vehicles …provide environmental benefits over carbon-based vehicle fuels" (World Bank, 2009, p. 61).

For most writers, the strong political back-up, accountability, and adaptability that SSTEC enjoys are key to explaining the success of this enterprise. In all fairness, SSTEC was designed from the very beginning to become a political success: the Chinese government deployed the best of what Chinese decentralization has to offer by ordering the creation of an independent managing organ, the Sino-Singapore Tianjin Eco-City Administrative Committee (SSTECAC), and both the Chinese and Singaporean consortiums keep on releasing countless official documents, reports, and promotional documents on the two bilingual official websites of the eco-city (SSTECAC, 2008 and Government of Singapore, 2012). The active involvement of international agencies such as the World Bank, along with international and Chinese external consultants such as Richard Register and Professor Wang Rusong (Note 24), is also a positive approach that allows SSTEC to fully make use of its made-for-adaptability nature and allows for more transparency. And this is maybe one of the strongest features of the eco-city: it strives for an ecological perfection but is also humbly aware of its limitations and goes beyond welcoming criticism by simply asking for it (Bardsley, 2012).

Indeed, despite the fact that SSTEC will only be completed in 2020, Tianjin's party boss Zhang Gaoli was recently promoted to the highest rank in the Chinese government, the Standing Committee of the CPC Politburo. According to a conversation with Beijing Normal University School of Environment's Professor Chen Bin, this promotion is to be understood as a clear recognition of—and reward for—Zhang Gaoli's accomplishments with the municipality's development.

If anything, this proves that as presupposed by the literature, the success of the building of an eco-city relies primarily on the will of the leadership. With the Chinese political core rewarding Zhang Gaoli with a promotion to the Standing Committee, one can easily understand that the hidden purpose of this move is to inspire/pressure other local officials in search of political advancement to turn towards eco-city building or similar spectacularly successful environmental projects. With this in mind, it is needful to look at other eco-city projects in China to try out these two assumptions.

5. Sino-United Kingdom ChongmingDongtan Eco-City: Requiem for an Eco-Dream

The Sino-United Kingdom ChongmingDongtan Eco-City (Dongtan Eco-City) started around the same time as SSTEC but tells us a completely different story, which adds a layer of complexity to the eco-political equation that SSTEC just unveiled. With SSTEC, there is a risk to conclude that this Eco-city presents but a benign case of the need for politics—with Chinese characteristics—to enter the realm of sustainability to see change occur. But Dongtan Eco-city shows that the reality is unfortunately more complex than the previous assumption and presents worrying characteristics that may well cause one to doubt the success of the eco-city in China, and the positive impact of the Chinese enforcement system on ecological development.

The Dongtan story started in 2005 when the municipality of Shanghai, via the Shanghai Industrial Investment Corporation (SIIC), commissioned the British consulting and design firm Arup to build an eco-city on Chongming Island, northwest of the city of Shanghai (designbuild-network.com). The original idea was to create a city that would be as close to an ecological urban dream as possible, would perpetuate and improve China's long-lasting tradition of satellite cities, and emphasize the nation's latest commitment to green development since China is one of the signatories of the 1992 "Agenda 21." (Note 25) This eco-city was supposed to be developed and built in time for the 2010 World Expo that was hosted in Shanghai, and was envisioned as a way to showcase China's commitment to sustainability. Unfortunately, the project is however far from being completed (Fox, 2009; Pearce, 2009; Brenhouse, 2010).

The first reason for this situation is corruption. The project's champion, Shanghai Communist party Chief Chen Liangyu, was found guilty of corruption and sentenced to 18 years in prison in 2008 (Brenhouse, 2010). His downfall sentenced the Dongtan project to death, if not partial oblivion, by unveiling the many cracks and tumors that had corroded it from the very beginning. Secondly, if Tianjin Eco-city can be criticized for allowing cars within its walls, or not striving enough for green energies, Dongtan presents a master case of poor planning. As mentioned earlier, the eco-city was to be built on Chongming Island (see figure 2 below). Located at the mouth of the Yangtze River and some 25 km away from Shanghai, Chongming Island is not connected to the mainland by any natural route, and was planned to be made accessible from Shanghai via an approximately 25 kilometer-long bridge-tunnel and a highway. As independent observers have noted, the remote location of the eco-city and its connection to Shanghai via a highway might greatly jeopardize the ecological stance that Arup was striving for (Sigrist, 2009).

Figure 2. Chongming Island

Source: www.tunneltalk.com

Dongtan eco-city was also to be constructed on an island that is subject to floods and although Arup claimed to have addressed that situation thanks to a "water-city flooding management"system (Head, 2006), the literature warns us about the dangers of constructing an eco-city on a terrain or environment that is subject to predictable climatic disasters (Register, 2006, p. 12). Moreover, it seems that Dongtan pushed the boundaries of eco-dictatorship by expropriating the land of farmers who already inhabited the island. The financial compensations that China's laws provide for were reportedly not given to the farmers and the eco-city project was, as a result, met with significant local opposition (Larson, 2009). This really tumultuous start reminds us of Peter Sigrist's summary of the predictions that Dongtan might turn out to be an eco-city for a particularly high-end audience which would automatically transform the eco-city into a green amusement park or, at worst, a dormitory satellite city, rather than a vibrant and neuralgic city that would inspire other similar projects throughout the country.

Against this background, it is worth noting the various factors that contributed to the failure of this project. The literature, without pointing at corruption as the twisted villain of the story, unveils that the strong political ties of the project precipitated its fall. The "economic restraints"that the new leadership points out as the main reason Dongtan Eco-city has not been built should be read as a clear rejection of the project. Indeed, as explained by Schwartz (2003), Chinese officials want to identify with projects they have initiated or will bring them direct political benefits. Therefore, the fact that there is no rush to revive Dongtan Eco-city shows that the initial political back-up was so important that without it the project will only remain a white elephant. Arguably, had Dongtan Eco-city been more popular among the people, or vital to the environmental improvement of Shanghai's serenity, the new leadership would have possibly gone beyond the corruption case and seen it implemented. Instead, they started anew with eco-projects such as Linggang New City or the eco-restoration of Suzhou (Williams, 2009).

6. Sino-German Qingdao Eco-park: Three Cases Suggest a Pattern

The available literature suggests that, unless some gigantic conspiracy is unveiled in the near future, Dongtan eco-city was flawed because of economic pressures (i.e., the race to development) and political malfunctions. Without too many surprises, these two impeding factors were highlighted in the SSTEC case as factors of success, and that one may expect similar scenario with the Sino- German Qingdao Eco-Park (SGQEP). It is important to note that although the official name of the SGQEP differs from the other projects by not being called an "eco-city"an analysis of the master plan demonstrates that the difference between SGQEP and an eco-city is minimal, and that the different terminology does not create any ambiguity for this paper.

During the visit of Germany's Chancellor Angela Merkel in China, the partnership between both countries took a new turn when China and Germany signed a memorandum to jointly create an Eco-Park in Qingdao. The SGQEP aimed to make use of Germany's leading position in Europe to create a green and economically vibrant new [city] that will "offer German enterprises office space, consultancy services, conference facilities, a business center and a startup company 'incubator' [and] will also make a contribution to introduce more advanced technologies and management practices in various sectors, such as renewable energy, energy saving and environmental protection, to Qingdao" (Lin & Xie, 2012).

According to the master plan, the actual eco-park should be composed of nine centers divided into two sections: one that will host business activities, and one that will be reserved for housing and leisure facilities (GMP, 2011, p. 23). Although polluting industries should naturally be banned from the eco-city, nobody ventures into claiming that the eco-city should not be conceived to facilitate any industrial activity; quite the contrary, an eco-city is to allow and promote such activity at the same time that it protects the environment and provides its inhabitants with a better and healthier lifestyle. Accordingly, Richard Register (2006) sees the eco-city as a vibrant economic actor that integrates ecology and business as two of its pillars.

The energy needs of the eco-park are to be met with 50% of renewable energies (geothermal, waste-incineration, biomass, solar- and wind energy), and the ecological landscape is to help with the purification of the environment. Besides, the eco-park also plans to connect each of the five pieces of its fabric in an integrated network of transportation systems that comprises subways, buses, bikes, and cars (GMP, 2011, pp. 48-65). The presence of cars, although not especially surprising since Tianjin Eco-city—which could be considered the "good example"of an eco-city in China—also allows them inside its city limits, nevertheless suggests that closer attention needs to be given to the road-layout of the eco-park. Indeed, it always seems surprising to see that architects let cars roam free in an eco-city while scholars and idealists wish to see them banned altogether.

With regard to this particular detail, SGQEP's ecological agenda starts to look unfocused and inadequate: in contrast with Dongtan Eco-city (which would have banned cars from the city but required their existence for people to get access to the Eco-city) and Tianjin Eco-City (which is careful enough to limit the access that cars have to the Eco-City to very reserved areas), Qingdao Eco-park fails at containing cars and seems to give them free access to the downtown and to every part of the city (GMP, 2011, p. 47). This triggers questions regarding the ecological stance that SGQEP is putting on the table. An article by Bernhard Bartsch (2011) also questions the ecological readiness of SGQEP, and notes that the idea behind Chinese eco-projects is not to protect the environment or the climate, but to bring in more international investments.

Christian Junge (Note 26), in his lecture on March 22, 2012 at the School of Social Development and Public Policy (Beijing Normal University), noted that cars were initially not allowed within the core of the eco-park but that the Chinese consortium (i.e., the local government) favored opening up the downtowns to free movement of cars. He, however, acknowledged that the provision of roads that seem to allow for high-speed acceleration, and the remote location of the project from the city of Qingdao could be detrimental to the eco-ability of the SGQEP since it, just like Dongtan would have done with Shanghai, creates an unnecessary distance between the new eco-park and the current and more economically active city of Qingdao. In saying this, one is reminded of the energy consumption that navigating from one city to another will require, but also to the infamous city of Ordos in Inner Mongolia that was so far away from any economic activity that it is now more of a ghost city.

Similar to Dongtan's or Tianjin's aspirations, SGQEP's preference for "companies in green energy, environmental protection and mechanics, electronics and food and beverage"(Lin & Xie, 2012) is, for now, not backed up by any estimations regarding the footprint of such business, nor the types of industries that may be rejected by the Eco-Park. Therefore, it is completely plausible to imagine that BMW or Volkswagen may be allowed to establish a Research and Development Center in Qingdao Eco-Park. We do not seek to enter the debate on whether allowing the car industry (whose reliance on, and promotion of, a life-style dependent on fossil fuels is obvious) to enter the Eco-Park is an ecofriendly decision, but we, however, want to point out that such a possibility may threaten the already weak eco-consensus that surrounds the project. As emphasized earlier, thanks to Bernhard Bartsch's analysis of the situation, most of those concerns seem to emerge out of a lack of commitment from the political leaders:

> "The first challenge is the conflict of two cultures. Germans are more careful and concrete in the way they work, and will proceed only with the utmost caution. Chinese officials like to do things as fast as they possibly can."Bartsch (2011).

A concern that many Germany investors have is whether the ecological standards agreed on in talks will remain consistent as the project proceeds (Lin & Xie, 2012).

7. Discussion and Conclusion

The story that Tianjin Eco-city, Dongtan Eco-city, and Qingdao Eco-park have to tell is not as positively green as one could hope and it shall be made obvious that reading Richard Register's "Eco-Cities: Rebuilding Cities In Balance with Nature"gives more hope for the future than the three cases above. The conclusion of this research is that this dichotomy between the discourse of the Chinese central government and the eco-cities that are now being developed is caused by a series of powerful pressures that prevent the optimal development of the eco-city in China. Moreover, allowing private cars undermine the green environment those project aim to create. Even if,

just as Tianjin Eco-city wishes to do, those cars are electric, the production costs for the environment will still remain greater than not producing cars at all and simply creating a city where people can walk, bike, or use public transportation. Echoing this point, Richard Register, during his interview, confided that Tianjin Eco-city would have been much more ecological had it not wasted so much space on building roads.

During the interview that he granted the researchers, Professor Chen Bin commented (Note 27) that the Chinese eco-city is in no way supposed to be the perfect and sustainable jewel that Western journalists and bloggers fantasize about, but rather a practical and realistic tool that is to help China meet its own guidelines in terms of polluting emissions, and to secure foreign investments. His point on foreign investment is self-evident when we just glance at Qingdao Eco-Park and Tianjin Eco-city, and we can only imagine how western investors in search of a sustainability stamp for their Corporate Social Responsibility (CSR) department may be interested in finding shelter in a Chinese eco-city. Furthermore, Professor Chen's first point on how the Chinese eco-city is only a tool towards a brighter future is however much more interesting, and echoes a discussion that many participants in a symposium on "Frontiers in Urban Ecological Research and Planning: Linking Ideas from the East to the West" (Note 28) engaged in at the end of the seminar: is the eco-city a goal, or just a step towards a more sustainable world? If this question creates tumultuous debates in the West, it becomes a frantic topic for a developing country in search of solutions to limit pollution in its environment.

Indeed, as the three case studies have demonstrated, there is a relationship between Chinese politics and the degree of ecological sustainability in Chinese eco-cities. Therefore, (and while keeping in mind that the discussions that unfolded during the 2012 workshop on Frontiers in Urban Ecological Research and Planning all agreed on the fact that we now have the technology and know-how to create truly ecological urban environments), we may want to interrogate ourselves on the validity of an argument that only blames the imperfection of Chinese eco-cities on the country's development status, and leaves out the curious relationship between decisions taken by the local leadership and the development of the eco-cities. Discussions with both Professor Chen and Wang Zhifang (of Peking University College of Architecture and Landscape Architecture's) suggest that China's development status is in no way a major impediment to sounder work on eco-cities—politics is.

In the interview she granted the researchers, Professor Wang pointed out that the lack of knowledge on ecology in China proves to be quite a strong impediment, as it enables a stagnation of Chinese urban ecologies. She noted that there is a clear will to enact ecological sustainability, but there are very few who know how to do it; and if they do, they are faced with a larger group of agents who are either completely unfamiliar with or even hostile to the principles of urban ecology. Professor Chen confirmed this reading of the situation when he suggested that what is important is not to have eco-cities, but enlightened leaders who understand what the eco-city they are building is supposed to achieve.

It is also imperative to define the motivation behind China's eco-city agenda. Maybe the eco-city that China needs, is not one that sustains its corroded lifestyle, but one that actually fights for a different development path for China. An article published by Channel News Asia explains that some of the new inhabitants of Tianjin Eco-city did not decide to move there because of the ecological frontier that this mega-structure had created, but rather because it proposes decent standards of living:

> "I like the good geographical location. It's central, convenient, and located right next to the commercial street. The apartment comes with warm flooring and 24-hour solar energy generated hot water. There's also a fibre-optic connection combining telephone, television and Internet." (Note 29)

Noticeably, the need for ecological urban development in China is only felt in a top-down bureaucratic fashion: the core tells the periphery what to do. Although the interview participants of this study, along with the speakers and participants of the SHUES (Shanghai Key Lab for Urban Ecological Processes and Eco-Restoration) symposium, were adamant about the Chinese political system being a huge and positive driving force for eco-projects, one cannot ignore the fact that a purely top-down process is the reason Taihu Lake is still polluted today, or the reason Dongtan Eco-city failed so completely. Therefore, one can safely argue that if a strong top-down political process is vital for China to move towards a more ecological future in its urbanization, it is also equally important to stress the need for a strong down-top stream of knowledge to ensure that ecology is a topic that the entire Chinese population is comfortable with, and feels concerned about. This will create local support for the projects and eventually ensure their successful implementation and sustainability. As Haëntjens noticeably explains in his work "Le gouvernement des machines" (2010), a better technopolitical—or technologically sustainable future has to start with a strong political momentum. The down-top green revolution that think tankers from the1970's envisioned can only happen in a welcoming, sane, and willing political

environment. China is clearly striving to provide this; all it needs to become a third generation technopolitical country is to further down its commitment to sustainability (Note 30), and to couple its national fight for more political transparency to economic incentives. As long as they'll "keep building", Chinese eco-cities will "prove to be successful" (Note 31).

Acknowledgements

References

Bardsley, D. (2012). China Looks to Future with Eco-city. Retrieved from www.businessthenational.ae

Bartsch, B. (2011). Grüner Werbegag. Retrieved from http://www.bernhardbartsch.de/archiv/gruner-werbegag/

Brenhouse, H. (2010). Plans Shrivel for Chinese Eco-City. *The New York Times*, 24 June, section Business / Energy & Environment. Retrieved from http://www.nytimes.com/2010/06/25/business/energy-environment/25iht-rbogdong.html

Burnard, P., Gill, P., Srewart, K., Treasure, E., & Chadwick, B. (2008). Analysing and presenting qualitative data. *British Dental Journal, 204*(8), 429-432. http://dx.doi.org/10.1038/sj.bdj.2008.292

Fox, J. (2009). Dongtan, China's Flagship Ecocity Project, R.I.P. TreeHugger. Retrieved from http://www.treehugger.com/sustainable-product-design/dongtan-chinas-flagship-ecocity-project-rip.html

GMP. (2011). Chinesich-Deutscher Ökologie Park in Qingdao.

Head, P. (2006). *Case Study: Dong Tan Eco-City.* Presented at the IABSE Henderson Colloquium, Factor 10 Engineering for Sustainable Cities, Cambridge. Retrieved from http://www.istructe.org/iabse/files/henderson06/Paper_11.pdf

Larson, C. (2009). China's Grand Plans for Eco-Cities Now Lie Abandoned. Environment 360. Retrieved from http://e360.yale.edu/feature/chinas_grand_plans_for_eco-cities_now_lie_abandoned/2138/

Lee, L., & Chen, W. H. (2012). Young People Dream of a Sustainable World. *China Daily.* Retrieved from http://europe.chinadaily.com.cn/world/2012-06/22/content_15518463.htm

Lieberthal, K. (1997). China's Governing System And Its Impact on Environmental Policy Implementation. *China Environment Series, 1.* Retrieved from http://www.wilsoncenter.org/sites/default/files/CES%201%20Kenneth%20Lieberthal%20Article%20with%20Charts%20and%20Graphs.pdf

Moore, M. (2012). Chinese Move to Their Eco-city of the Future. Telegraph.co.uk, 18 March, section world news. Retrieved from http://www.telegraph.co.uk/news/worldnews/asia/china/9151487/Chinese-move-to-their-eco-city-of-the-future.html

Morse, J. M., Barrett, M., Mayan, M., Olson, K., & Spiers, J. (2002).Verification strategies for establishing reliability and validity in qualitative research. *International Journal of Qualitative Methods, 1*(2). Retrieved from http://www.ualberta.ca/~ijqm/

Pearce, F. (2009). Greenwash: The Dream of the First Eco-city Was Built on a Fiction. *The Guardian.* Retrieved from http://www.guardian.co.uk/environment/2009/apr/23/greenwash-dongtan-ecocity

Peres, S., & Attali, J. (2013). 'Avec nous, après nous…', Bakerstreet/Fayard, 1 vols., 2013.

Qiu, X., & Li, H. L. (2009). China's Environmental Super Ministry Reform: Background, Challenges, and the Future. Environmental Law Institute, Washington, DC. Retrieved from http://www.epa.gov/ogc/china/xin.pdf

Register, R. (2006). *EcoCities: Rebuilding Cities in Balance with Nature* (Kindle Edition). New Society Publishers.

Schwartz, J. (2003). The Impact of State Capacity on Enforcement of Environmental Policies: The Case of China. *The Journal of Environment & Development, 12*, 50-81. http://dx.doi.org/10.1177/1070496502250438

Sigrist, P. (2009). Dongtan Eco City: A Model of Urban Sustainability? *The Urban Inventor Online Journal, The*

Right to the City: the Entitled and the Excluded. Retrieved from http://urbanreinventors.net/3/sigrist/sigrist-urbanreinventors.pdf

Stone, R. (2011). On Lake Taihu, China Moves To Battle Massive Algae Blooms. Environment 360. Retrieved from http://e360.yale.edu/feature/on_lake_taihu_china_moves_to_battle_massive_algae_blooms/2429/

The World Bank. (2009). Sino-Singapore Tianjin Eco-City: A Case Study of an Emerging Eco-City in China. Retrieved from http://www.worldbank.org/research/2009/11/13550294/sino-singapore-tianjin-eco-city-sstec-case-study-emerging-eco-city-china

Williams, A. (2009). Dongtan: The Eco-city That Never Was. Retrieved from http://www.spiked-online.com/index.php/site/article/7330

Notes

Note 1. China Eco-City, 2011. Retrieved from http://www.youtube.com/watch?v=859qN-d4P4w&feature=youtube_gdata_player

Note 2. Golomer, Pascal, Sylvain Guillaume, and Adeline Cassier, 'Tongxiang, Ville Ecologique', 2007. Retrieved from http://matvideo.france2.fr/video/iLyROoaftn27.html

Note 3. China's "Green City" Under Construction - ABC 110622, 2011. Retrieved from http://www.youtube.com/watch?v=qaknRxATxJc&feature=youtube_gdata_player

Note 4. Gallucci, Maria, Horn, Paul, 'For U.S. and China, World's Biggest Climate Polluters, It's Still Business as Usual', 2013. Retrieved from http://insideclimatenews.org/news/20130129/united-states-china-carbon-greenhouse-gas-emissions-renewable-energy-coal-plants-pollution-global-warming-climate

Note 5. *Sino-Singapore Tianjin Eco-City: A Case Study of an Emerging Eco-City in China (The World Bank, November 2009). Retrieved from http://www.worldbank.org/research/2009/11/13550294/sino-singaporetianjin-eco-city-sstec-case-study-emerging-eco-city-china*

Note 6. Suzuki, Hiroaki, 'China Urbanization - It's Emerging Eco-cities', 2009, slide 10. Retrieved from http://siteresources.worldbank.org/INTURBANDEVELOPMENT/Resources/336387-1256566800920/suzuki.pdf

Note 7. *The Report on the Development of China's Ecocities], 1st edn (Social Sciences Academic Press (China), 2012)*

Note 8. 'Chine-Allemagne: partenariatprivilégié', ARTE, 2012. Retrieved from http://www.arte.tv/fr/chine-allemagne-partenariatprivilegie/3312644,CmC=3328922.html

Note 9. Xie, Chuanjiao, and TI Zhuan, 'New Area to Boost Qingdao's GDP', China Daily, 2012. Retrieved from http://www.chinadaily.com.cn/regional/2012-06/13/content_15499155.htm

Note 10. Larson, Christiana, 'China's Grand Plans for Eco-Cities Now Lie Abandoned', Environment 360, 2009. Retrieved from http://e360.yale.edu/feature/chinas_grand_plans_for_eco-cities_now_lie_abandoned/2138/

Note 11. Williams, Austin, 'Dongtan: The Eco-city That Never Was', spiked, 2009. Retrieved from http://www.spikedonline.com/index.php/site/article/7330

Note 12. Brenhouse, Hillary, 'Plans Shrivel for Chinese Eco-City', The New York Times, 24 June 2010, section Business /Energy & Environment. Retrieved from http://www.nytimes.com/2010/06/25/business/energy-environment/25ihtrbogdong.html

Note 13. Larson, Christiana, 'China's Grand Plans for Eco-Cities Now Lie Abandoned', Environment 360, 2009. Retrieved from http://e360.yale.edu/feature/chinas_grand_plans_for_eco-cities_now_lie_abandoned/2138/

Note 14. Uken, Marlies, 'Grüne Geschäfte: Warum Prestige-Ökocitys Nicht Chinas Zukunft Sind', ZEIT ONLINE, 2012. Retrieved from http://blog.zeit.de/gruenegeschaefte/2012/02/14/warum-prestige-okocities-nicht-chinas-zukunft-sind/

Note 15. Stone Richard, 'On Lake Taihu, China Moves To Battle Massive Algae Blooms', Environment 360 Yale, 2011. Retrieved from http://e360.yale.edu/feature/on_lake_taihu_china_moves_to_battle_massive_algae_blooms/2429/

Note 16. China Daily, 'Cleanup of Taihu Lake an Elusive Dream', 2004. Retrieved from http://www.china.org.cn/english/2004/Dec/115228.htm

Note 17. Joseph Muldavin, 2000, The Paradoxes of Environmental Policy and Resource Management in Reform-Era China".

Note 18. Russel Bernard,"ResearchMethods inCultural Anthropology, Newbury Park,CA:SagePublications.

Note 19. The Sino-German Eco-Park may represent an intellectual conundrum because of its name. Eco-Park/Ökopark is indeed very different from Eco-City/Ökostadt. However, as the presentation of the eco-park will prove, this different terminology does not disturb the analysis.

Note 20. Introduction', Tianjin Eco-city: A Model For Sustainable Development, 2012. Retrieved from http://www.tianjinecocity.gov.sg/bg_intro.htm

Note 21. 'Masterplan', Tianjin Eco-city: A Model for Sustainable Development, 2012. Retrieved from http://www.tianjineco-city.gov.sg/bg_masterplan.htm

Note 22. 'Energy Use in Sweden', Sweden Sverige. Retrieved from https://sweden.se/society/energy-use-in-sweden

Note 23. Moore, Malcolm, 'Chinese Move to Their Eco-city of the Future', Telegraph.co.uk, 18 March 2012. Retrieved from http://www.telegraph.co.uk/news/worldnews/asia/china/9151487/Chinese-move-to-their-eco-city-of-the-future.html

Note 24. Register, Richard, 'Skype Interview', 2012.

Note 25. "Agenda 21 was the main outcome of the United Nation's Earth Summit held in Rio de Janeiro in 1992. Agenda 21 outlines, in detail, the UN's vision for a centrally managed global society. This contract binds governments around the world to the United Nation's plan for controlling the way we live, eat, learn, move and communicate - all under the noble banner of saving the earth. If fully implemented, Agenda 21 would have the government involved in every aspect of life of every human on earth." Retrieved from http://www.green-agenda.com/agenda21.html

Note 26. A German architect based in Beijing who worked on the Qingdao Eco-Park.

Note 27. From the Beijing Normal University State Key Joint Laboratory of Environmental Simulation and Pollution School of Environment.

Note 28. A symposium organized on November 25th, 2012 at East China Normal University (SHUES symposium).

Note 29. Siow, Maria, 'Tianjin Eco-city Enters New Phase as First Residents Move in - Channel NewsAsia', channelnewsasia.com. Retrieved from http://www.channelnewsasia.com/stories/economicnews/view/1182997/1/.html

Note 30. Podesta, John, and John Holdren, 'The U.S. and China Just Announced Important New Actions to Reduce Carbon Pollution', whitehouse.gov. Retrieved from http://www.whitehouse.gov/embeds/footer

Note 31. Kaiman, Jonathan, 'China's "Eco-cities": Empty of Hospitals, Shopping Centres and People', the Guardian. Retrieved from http://www.theguardian.com/cities/2014/apr/14/china-tianjin-eco-city-empty-hospitals-people