Tianjin, Eco-City, China

A bilateral institutional NEXUS for cutting-edge sustainable metropolitan development

Tianjin Eco-City is a model for innovative sustainable urban development through bilateral cooperation between China and Singapore. The institutional NEXUS between the governments and private consortia has resulted in a comprehensive Master Plan and Key Performance Indicators to ensure the Eco-City reaches its goals.

05 Urban NEXUS Case Study August 2014

Abstract

The Sino-Singapore Tianjin Eco-City, located 40 km outside the city of Tianjin, on the coast of the Bohai Sea in Northern China, is the second pioneering government-to-government project for sustainable urban development between Singapore and China. The Eco-City aims not only to offer the highest social, economic and environmental quality of life to its residents, but also to serve as a hub for sustainable industry. The bilateral governmental cooperation has resulted in a NEXUS of managerial silos, systems and scales for enhanced coordination and customization of the new Eco-City's design and technologies. The outcome of the fruitful partnership includes an innovative Master Plan, a newly developed system of Key Performance Indicators (KPI) and incentives to transform Tianjin Eco-City into a center for eco-innovation (Tianjin Eco City, 2012).

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Date	2007-2020
Urban NEXUS Sectors	Water-Energy-Transport-Buildings
Urban NEXUS Innovations	Institutions; Delivery Models, Design + Technology
Scale	Metropolitan Region
Budget	n/a

China's and Singapore's dual commitment to sustainable development

Amidst both countries' rapid urbanization, the Tianjin Eco-City project aims to differentiate itself as a high-profile green city, demonstrating Singapore's and China's commitment to sustainable growth, green building and planning standards. Tianjin Eco-City was launched as an inter-governmental partnership between China and Singapore and involves the collaboration of private consortia from both countries, along with inter-ministerial working groups. Through integrated bilateral planning, both countries combined expertise and standards to create new benchmarks for sustainable urban development. The Eco-City will function as a laboratory for emerging eco-technologies and provide an arena for international companies to enter into the North Chinese market (SSTEC Sino-Singapore Tianjin Eco-City, 2011).

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National Animation Park, Tianjin Eco-City

Urban NEXUS Definition

The Urban NEXUS is an approach to the design of sustainable urban development solutions. The approach guides stakeholders to identify and pursue possible synergies between sectors, jurisdictions, and technical domains, so as to increase institutional performance, optimize resource management, and service quality.

It counters traditional sectoral thinking, trade-offs, and divided responsibilities that often result in poorly coordinated investments, increased costs, and underutilized infrastructures and facilities. The ultimate goal of the Urban NEXUS approach is to accelerate access to services, and to increase service quality and the quality of life within our planetary boundaries.

ICLEI / GIZ 2014

Urban NEXUS Case Study

Tianjin Eco-City: strategic partnerships for successful urban development

China is currently undergoing rapid urbanization with 64% of the population predicted to live in urban areas by 2020. The population within urban areas is forecasted to grow by 17.7 million people per year over the next 20 years (The World Bank, 2009). This presents major challenges for the country, especially in terms of resource efficiency and land use. In its 11th five-year plan, the Chinese government proclaimed to pursue "sound urbanization" through "resource conserving, environmentally friendly, economically efficient, and socially harmonious" urban development strategies (Green Prospects Asia, 2012).

The Tianjin Eco-City is located 40 km outside the city of Tianjin, on the coast of the Bohai Sea in northern China. This places the city on the cusp of the Tianjin Economic Development Area (TEDA), a free market zone belonging to the greater Tianjin Binhai New Area (TBNA), China's third largest economic powerhouse (SSTEC Sino-Singapore Tianjin Eco-City, 2011). The vast hinterland of urban areas, such as Beijing, Jilin, Lianoning or Shancong, the strong economic activity as well as increasing urbanization incited the governments of Singapore and China to build the Eco-City within this area. Tianjin Eco-City will provide a high quality of life for its residents and strengthen the area as a modern Eco-Business service hub for the entire North of China.

Setting the stage for integrated stakeholder action

The Tianjin Eco-City project was initially proposed by then Singapore Senior Minister Goh Chok Tong and Chinese Premier Wen Jiabao in April 2007, following, a respective Framework Agreement was signed on November 18, 2007 (Tianjin Eco City, 2012). During the planning process of the Eco-City, priority was given to the integration of silos and scales, primarily at the government-to-government and the private sector levels. As a result, extensive institutional NEXUS collaboration to break down silos has occurred between China and Singapore to realize the project.

Cooperation at the government-to-government and private sector levels stands on four main organizational pillars (see Figure 1): strategic steering and oversight of the project is facilitated by the Joint Steering Committee (JSC), co-chaired with Singapore's Deputy Prime Minister, Teo Chee Hean and Chinese Vice-Premier, Wang Quishan.

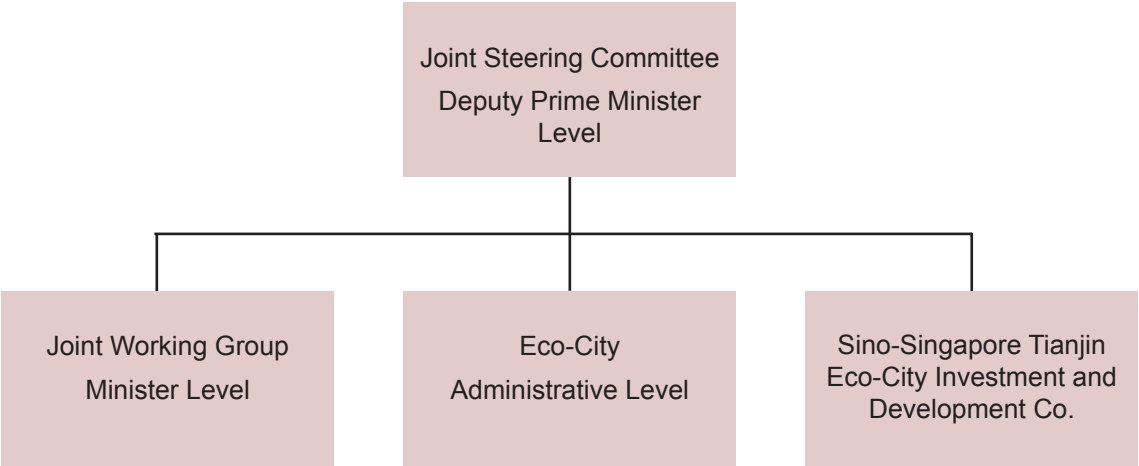
At the inter-ministerial level Singapore's Ministry for National Development and the Chinese Ministry for Housing and Urban Rural Development form the Joint Working Committee (JWC), which supervises the implementation of the Eco-City project, together with the Tianjin Municipal Government (UNEP, 2013).

The Eco-City Administrative Committee (ECAC) constitutes the Chinese authority which governs all administrative functions in the Eco-City. Under the ECAC, six working-level sub-committees have been created with Singaporean agencies to facilitate collaboration in the areas of public housing, water management, urban planning, transport, environmental and social development.

The fourth pillar of the Eco-City's development cooperation is comprised of the private sector. The Sino-Singapore Tianjin Eco-City Investment and Development Co. (SSTEC) is composed of a Chinese Consortium of private investors led by Tianjin TEDA Investment Holding and a Singaporean Consortium led by the Keppel Group, each holding a share of 50% in the corporation.

Together, the four levels of supervision and planning form an institutional NEXUS spanning from the governmental to the private sector level. The achieved integration of scales enhances economic spin-offs and learning processes.

Institutional NEXUS integration spanning from the governmental to the private sector level.



Selecting the site: transforming polluted land and water into an eco-hub

The site selection for the future Eco-city was finalized following a thorough comparison of possible locations. The Chinese Government demanded the fulfillment of two criteria concerning the chosen project site: to develop the new city on non-arable land, as well as within a region suffering from water shortage challenges. Thusly, Tianjin Eco-City is built on a site that was formerly comprised of saltpans, barren land and polluted water bodies. The water bodies will be recovered and desalination of sea water will take place. In this sense, the project contributes to the ecological recovery of the area and successfully addresses issues of land shortage in China through the avoidance of agricultural land use (The World Bank, 2009).

Integrated urban planning through multi stakeholder involvement

The Tianjin Eco-City Master Plan was a multi-stakeholder effort, overseen by the Urban Redevelopment Authority and designed by the China Academy of Urban Planning and Design, the Tianjin Urban Planning and Design Institute, and the Singapore planning team. The plan was influenced by the Singapore Neighborhood Concept and tailored to meet the local requirements of the Eco-City.

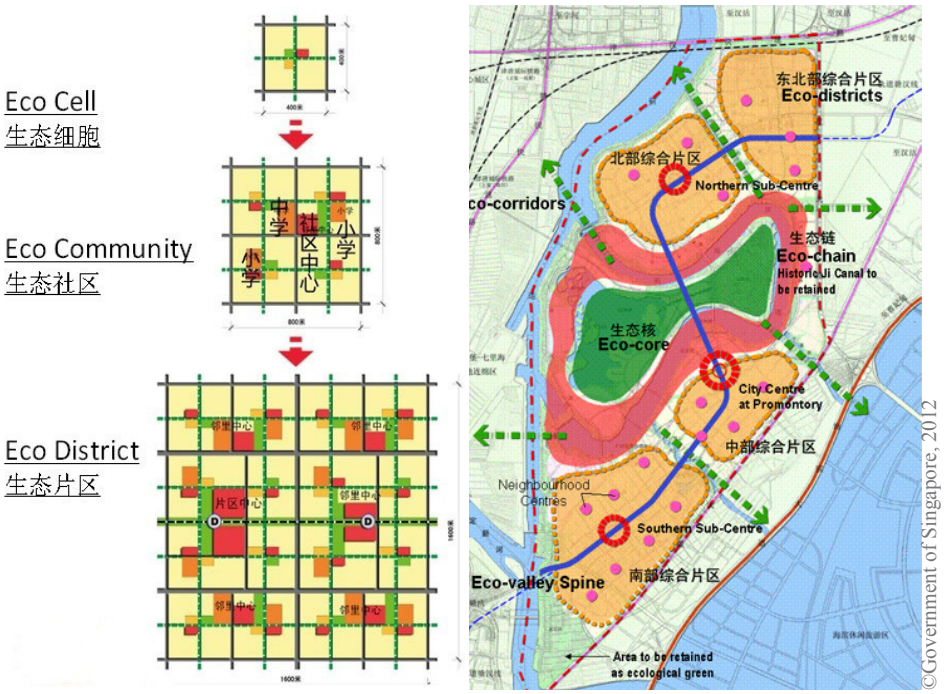
The completed city will consist of one axis, three high density centers and several districts spanning an area of 30km² (see Figure 2). A green-blue Eco-Valley, 50m wide and 12km long, will run through the city, forming a "spine" for transit and recreation, easily accessible from all parts of the city (SSTEC, 2011).

The mixed-use districts are divided into Eco-Cells of 400m² with 2,500 dwelling units, each for approximately 8,000 residents. Six urban nodes will be spread throughout the city, serving as major functional zones for diverse activities. The city will furthermore be amended by three industrial areas, the Eco-Information Park, the Eco-Industrial Park and the Eco-Business Park (SSTEC Sino-Singapore Tianjin Eco-City, 2011).

The planning structure of Tianjin Eco-City encompasses the integration of transport and land use through a density index. High density development is only planned alongside major transport hubs, thus reducing commuting times and providing residents with an incentive to utilize public transport. The aim is to provide public transit options for 80% of the population within 800m distance (The World Bank, 2009).

A sustainable Masterplan

The Eco-city's 5 districts follow the Neighborhood Concept of Singapore which has been adapted to local needs. Eco-cells (about 400m x 400m) form the basic building blocks. Their size is based on what is considered as a comfortable walking distance. Each Eco-cell can accommodate about 2,500 dwelling units (DUs) with approximately 8,000 residents. Four Eco-cells together form an Eco-community with about 9,000 DUs and 30,000 residents. Four or more Eco-communities form an Eco-district.



Masterplan (right) and district planning structure (left) of the Tianjin Eco-City

Key Performance Indicators (KPI's)

In order to measure the ecological, social and economic performance of Tianjin Eco-City, a set of twenty-two quantitative and four qualitative KPIs were developed, the majority of which exceed prevailing national standards (see Figure 3). The quantitative KPIs, developed by Chinese and Singaporean experts and approved by the inter-ministerial Joint Working Committee, are grouped into four sub-categories: good natural environment, healthy balance in the man-made environment, good lifestyle habits and developing a dynamic and efficient economy. The four qualitative KPIs focus on ecology via green consumption and low-carbon activities, the adoption of innovative policies through regional cooperation and impacts, the preservation of cultural heritage and the regional development of recycling industries (Tianjin Eco City, 2012).

The set of Key Performance Indicators developed for the Eco-City is based on prevailing international standards as well as those existing in both countries. Thus far, higher benchmarks have been chosen whenever feasible.

Bi-lateral cooperation for the implementation of an Urban Nexus across institutions, scales and services

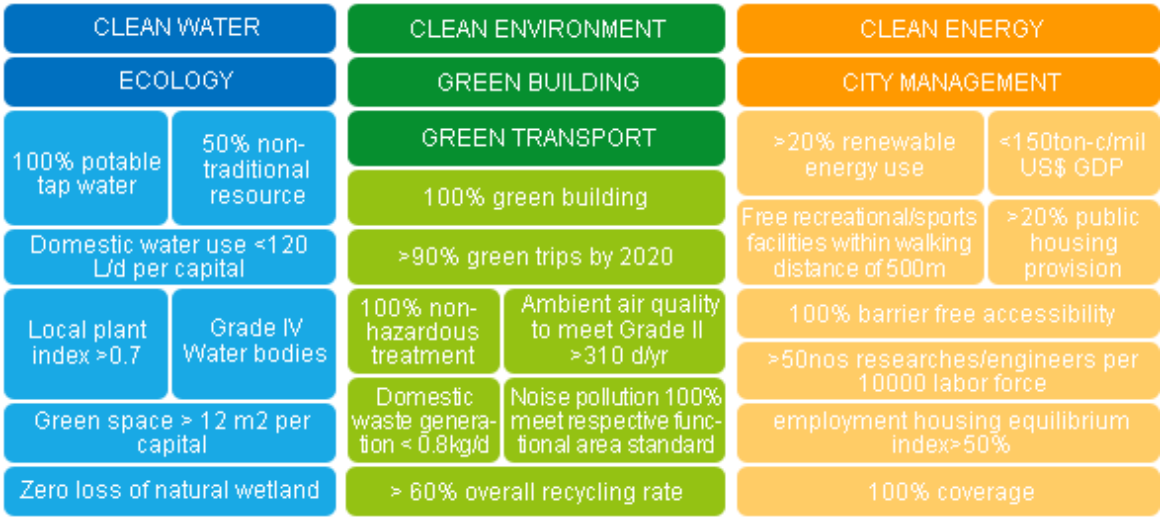
If the Eco-City succeeds in meeting its ambitious targets, it will serve as a successful example of Urban NEXUS integration of institutions, sectors and scales. The approach of country-to-country bilaterally coordinated planning is rare and opens up new dimensions for the exchange of experiences and the joint planning the setting of benchmarks.

The newly built Eco-City strives to be a locus of future eco-technologies and thus prioritizes the promotion of green innovations. In the overall design process NEXUS opportunities were identified, such as a water-energy resource loop. In Tianjin Eco-City, wastewater is collected and goes through anaerobic biodigestion, which extracts methane gas that is then used as a source for energy production. The innovative system is the outcome of collaboration with the EU-China River basin Management Program which advises the Eco-City in water issues (Vince, 2012).

The deployment of Tianjin Eco-City's laboratory of cutting-edge eco-technologies is heavily supported by private partners. For example, the company Philips has installed sound and motion sensitive lights in a public school. Additionally, the Swedish company envac AB designed a pneumatic waste collection system for installation in several districts and General Motors intends to test its next generation of driverless EN-V (Electric Network Vehicle) cars throughout the district (Vince, 2012).

Out of the total 30km², a start-up area of 3km² has been finalized, with approximately 10,000 residents living there (Kaiman, 2014; Whang, 2014). It has yet to be shown whether Tianjin Eco-City will succeed in attracting the residents and commercial activities needed to sustain it as a lively, productive city. However, official sources claim around 1,000 businesses have already registered at the Eco-City, bringing in a capital of 70 billion RMB, an equivalent of approximately $US 11, 5 billion (Liangbing, 2013). According to Ho Tong Yen, Chief Executive of the city's master developer SSTEC, every month 400 housing units are sold (Kaiman, 2014).

Key Performance Indicators: 22 quantitaive and 4 qualitative Key Performence Indicators guide the Eco-City's development process and ensure that the highest ecological standards are met.



© 2011 Sino-Singapore Tianjin Eco-City Investment and Development Co

Lessons Learned

Tianjin Eco-City remains currently under development and only a small start-up area of about 3 km² has been realized. However, from this initial development, some lessons and major challenges already become apparent:

One of the major challenges will be to attract residents to live in the eco-city. For this purpose, several incentives are given by the government such as reduced educational fees and housing subsidies (Kaiman, 2014).

Good transportation access from the outset is crucial for an initial and sustained life of a city. The metro line connecting the Eco-City to the rest of the Tianjin Binhai Area and other public transport facilities have yet to be finalized. The lacking connectivity to the major economic centers in the area might be a reason for the slow increase in residents. The metro line constitutes a crucial building block to fulfill the KPI aiming for 90% green transport trips occur through public and non-motorized transport).

Key Performence Indicators support city planning processes. However, thus far these mainly concern planning, rather than the effectiveness of institutional, administrative and contractual processes within the process. These should also be evaluated to ensure lessons are learned. This may include periodically reviewing the Masterplan (The World Bank, 2009).

The private sector involvement in the Eco-city project will be essential to enhancing the Eco-City's commercial viability and the project's potential for replication (Tianjin Eco City, 2012). The City has a strong potential to realize efficiency gains, if the institutional NEXUS is applied inter-sectorally and in a fruitful manner (The World Bank, 2009).

Further NEXUS potential of integrating water, energy, food and waste cycles could be explored in addition to the already implemented waste-to-energy scheme and water conservation strategies (The World Bank, 2009).

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Aerial view of the Tianjin Eco-City in 2011. Development and land recovery are still under way. The Eco-City is built on polluted land and water bodies that will be fully recovered.

Replication

The Tianjin Eco-City project relies extensively on established government-to-government collaboration and broad private sector involvement from both countries. In order to realize a project of such scale, a similar dimension of cooperation and investment would be needed.

However, since the Eco-City is meant to function as model city for sustainable urban development and test site for emerging green technologies, single solutions will be replicable on other scales as well.

Ho Tong Yen, CEO of SSTEC, the master developer of the Tianjin Eco-City project, voiced his wish for the Eco-City to be seen as learning example for sustainable urban development and new eco technologies:

"I think that in time to come, this will be a model that many people will study, some cities will replicate certain aspects of the concept we have developed here. They may not replicate Eco-city in its whole but I think as long as some ideas are replicated elsewhere, then I think we would have made a very big contribution to sustainable development" (DAC & Cities, 2014).

Budget and finances

Estimates of the total project costs are not available (The World Bank, 2009). However, DAC&Cities believe the total project will be worth an investment of 50 billion yuan (approximately US $9.7 billion) (DAC & Cities, 2014).

A Global Environmental Facility grant is provided from the World Bank which amounts to $US 6, 16 million. The grant is specifically designated to assist the City's Administrative Committee in planning and regulating the Tianjin Eco-City project (The World Bank, 2010). In addition, "ie Singapore", Singapore's governmental agency for international economic development, launched an assistance program running from 2012 -2017 worth S$ 9.5 million (approximately US $5 million) (ie Singapore, 2012).

Further investment will come in from Binhai New Area Public Utility providers such as Tianjin Binhai Mass Transit Development, responsible for the metro system.

SSTEC contributes with an initial investment of 4 billion yuan of the Singaporean Consortium. In addition, the land on which the eco-city is constructed has been purchased from the Chinese government by the Chinese consortium. SSTEC will receive revenue from selling the land or renting property developed on the land (UNEP, 2013).

Key Contacts

ICLEI East Asia Secretariat (EAS)
14/F, Seoul Global Center Building,
38 Jongno, Jongno-gu, Seoul,
South Korea (110-110)
Tel: +82-2-3789-0496
Fax: +82-2-3789-0497
Email: iclei-eastasia@iclei.org
and iclei-china@iclei.org

www.iclei.org/eastasia

ICLEI World Secretariat (WS)
Capacity Center
Kaiser-Friedrich-Str. 7
53113 Bonn, Germany
Tel. +49-228 / 97 62 99-00
Fax +49-228 / 97 62 99-01
Email: urban.research@iclei.org
www.iclei.org/casestudies

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Further Reading

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On behalf of: Federal Ministry for Economic Cooperation and Development

ICLEI Local Governments for Sustainability

This Case Study was elaborated for the Urban NEXUS project 2013-2014.

The ICLEI Case Study series is available at www.iclei.org/casestudies, and focuses on various types of urban sustainability activities of ICLEI Members and local governments that are part of ICLEI projects across the globe.

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