NATURVATION
cities – nature – innovation

SNAPSHOT – THE ECO-VALLEY OF TIANJIN ECO-CITY

KEY POINTS

- **The 'Eco-Valley' is the unifying element of the Sino-Singapore Tianjin Eco-City, the most advanced eco-city of China, built in cooperation with Singapore**
- **The 11 km Eco-Valley aims to connect residential districts, commercial zones, sub-centers, and waterside areas as a green spine, providing connectivity and recreation space for 350,000 residents**
- **Construction started in 2008, and by now a 3.17 km section has been finished with a minimum width of 50 meters**
- **The project demonstrates how bilateral cooperation can facilitate policy diffusion and project implementation in support of large-scale green infrastructure development**

ABOUT THE PROJECT

NATure-based URban innoVATION is a 4-year project involving 14 institutions across Europe in the fields of urban development, geography, innovation studies and economics. We are creating a step-change in how we understand and use nature-based solutions for sustainable urbanisation.

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Sustainability challenges and opportunities

Tianjin is a fast-growing industrial and port city in the north coastal region of China, surrounded by the Bohai Sea, Hebei Province, and Beijing City. Tianjin experienced rapid and large scale urbanization as its population quadrupled in 40 years to 15.6 million, resulting in major environmental challenges.

Tianjin, literally meaning "the emperor's ferry", has played a significant role in the history and development of northern China, and rapidly became the center of foreign trade, industry, and logistics after the adoption of China's Open Door Policy in 1978. As the 4th largest city in China, Tianjin is no longer in the shadow of the capital, but is a rising economic powerhouse on its own right. The Tianjin Binhai New Area district is a key industrial region of the country and the maritime gate to northern China, hosting 285 Fortune Global 500 companies, the world's fourth largest port by throughput tonnage, and producing more than half of Tianjin's € 276.5 billion GDP. Air pollution, traffic congestion, lack of green space, water retention to combat droughts and intense rainfalls, loss of agricultural land and soil organic matter content are considered pressing environmental challenges in the city and Tianjin Binhai New Area. Green space development in Tianjin is generally a by-product of the rapid, large-scale, government-led urbanization and industrialization process.

Solution story and key actors

The 11 km 'Eco-Valley' is the unifying element of the Sino-Singapore Tianjin Eco-City (SSTEC), the most advanced eco-city of China, located in the fast-growing Tianjin Binhai New Area. The construction of SSTEC started in 2008 with a vision to transform the 34 km^2 barren, non-arable land and polluted wastewater ponds into *"…a thriving city which is socially harmonious, environmentally-friendly and resource-efficient"*[1].

SSTEC is a flagship bilateral project of Singapore and China with large-scale private sector involvement. It was proposed against the backdrop of rapid Chinese urbanization to promote eco-urbanism as a new model for sustainable development, in line with the emerging 'ecological civilization' political agenda. It promotes integrating Singaporean-style high-rise residential blocks with green belts and areas for diverse economic activities. Its four residential districts, three sub-centers, community spaces, commercial zones, and waterside areas are connected by the 'Eco-Valley'. This cuts across the entire Eco-City as an S-shaped green corridor with a fishbone structure, providing connectivity, sustainable transit and recreational space in a scenic trail for the 70,000 current and 350,000 future residents. By design, at least 70% of plants used are native to the region, and the Eco-Valley is designed to meet Eco-City Key Performance Indicator targets such as a minimum 45% green space and 12 m^2 green space per capita. It is also a national 'sponge city' pilot area, aiming to capture and use at least 75% of rainfall. As the largest continuous open space in the Eco-City, the Eco-Valley also serves as a major fire barrier zone, earthquake safe zone, and an emergency evacuation route. The construction has three phases. The first phase, completed in 2012, focused on the remediation of the entire 34 km^2 area, as well as the construction of a 8 km^2 'Start-up Zone', and a 3.17 km section of the Eco-Valley with a minimum width of 50 meters, and a total green space of about 180,000 m^2. The second phase of construction is currently underway and is close to completion.

Governance strategies

The governance of SSTEC is built on a complex partnership that involves several private- and public-sector actors from China and Singapore, embedded in interconnected institutional relationships, and guided by a comprehensive KPI system.

"Close cooperation laid the foundation for the Eco-City."[2] In 2007, a bilateral Framework Agreement was signed to collaborate on SSTEC, followed by an operational agreement between the Ministry of Housing and Urban-Rural Development of China, and Ministry of National Development of Singapore to share management, funding, planning and implementation responsibilities. The Master Plan was designed in a collaborative process between Chinese and Singaporean agencies. The Singaporean National Parks Board was in charge of planning the Eco-Valley, using their experience in integrated green infrastructure, park connector concepts, and water management planning. As a Singaporean representative put it: ***"We leveraged our experience from Singapore, like how to build a garden city, into the Tianjin Eco-City".***[3] Collaboration between China and Singapore occurs at two levels: at the government-to-government level, and at the private sector level. At the government level, the Joint Working Committee oversees the project and key milestones, while the SSTEC Administrative Committee is responsible for administrative functions. SSTEC has set up an Environmental Bureau dedicated to all aspects of environmental management. The planning and development of the Eco-City was also guided by a KPI (Key Performance Indicator) system with 22 quantitative and 4 qualitative indicators and targets such as at least 12 m^2 green space per capita, 70% use of native plants, 50% water supply from non-traditional sources, and no net loss of natural wetlands due to construction.

Business models

The aim of SSTEC is to be commercially viable and financially sustainable, where all expenses will eventually be covered from real estate sales. The Eco-Valley, as a unique feature with high added value, substantially contributes to this goal.

As a flagship program backed by two governments and local policies, SSTEC is attractive for investors and businesses. SSTEC received capital investment from diverse sources, such as bank loans, corporate bonds, private investors, governmental grants, and international assistance programs. In terms of private sector involvement, the Sino-Singapore Tianjin Eco-City Investment and Development Co. Ltd. was formed by a Singaporean and a Chinese Consortium, each with a 50% stake, to act as a master developer of the project on behalf of the two parties, and to maximize the value of the investment. The project was initially estimated to cost € 6.5 billion, although this will likely be exceeded. The cost of the already implemented 3.17 km section of the Eco-Valley in the Start-Up Zone was approximately € 20.8 million. Revenue streams were not calculated for the Eco-Valley, but stakeholders estimate that it substantially increases the value of real estate, and contributes to the success of the live-and-work concept of the Eco-City. ***"…[SSTEC] must be financially sustainable. We want to build a live-and-work synergy: there are industrial parks, and 5,000 companies registered in the Eco-Eity. It ensures there is a revenue to sustain quality."***[4]

Citizen engagement

The Eco-Valley is based on a landscape design metaphor of a valley that residents of the high-rise buildings can come down to for various activities and services.

Based on Singaporean practice, residential areas consist of 400 by 400 meter community units with four to six 20-30 story buildings, that ***"are the most important units of the Eco-City."***[5] The Eco-Valley connects residential districts with community facilities, services, and commercial centers, and is actively used as a public space for exercise, recreation, and the famous guangchangwu (square dance). The development of the Eco-Valley in three phases allows for a learning approach: ***"We collect the demand and ideas from the local residents who already used the first section [of the Eco-Valley] and design on the basis of this demand."***[6] Feedback is gathered from the 70,000 current residents through online surveys. Based on this feedback it is broadly assumed that the plan for the Eco-Valley will remain consistent through the Eco-City's development, and that major change in the initial ideas will not be required.

Innovation pathways

SSTEC is based on government-to-government solutions and policy transfer. As the best-known, most advanced, and arguably most successful eco-city in China, its results are of significant importance for the future of urbanization in China and beyond.

The vision of SSTEC ("practicable, replicable, scalable") signals the intent of the Chinese and Singaporean governments to use it as an affordable and attractive model for future cities. The Eco-Valley and the residential blocks planning concepts are especially suitable for replication, as they are not tied to local ecosystems, and can be deployed in any context, adapted to various environments, and aggregated to any desired size. The Eco-City is widely considered exemplary in terms of how to productively repurpose highly-degraded brownfield land with this method: ***"The Tianjin Eco-City is a front-runner in this regard. The purpose of the Eco-City is exactly to make it replicable. We tried to make it a role model for other cities' development. […] If we can use this polluted environment, and make a prosperous city, then we prove that we could create cities from nothing."***[7]

Compared to other Chinese eco-city standards, the KPIs of SSTEC were broader in scope, and set more ambitious qualitative and quantitative targets. At least 20 Chinese cities have adopted SSTEC's KPI framework to guide eco-city development in recent years. The KPI system, environmental management protocols, as well as the core of the Eco-Valley and spatial planning concept are results of a government-to-government policy transfer, in which ***"learning from Singapore, which is very advanced, was a key to success."***[8]

[1] SSTEC Website: https://www.tianjinecocity.gov.sg; [2,6] Senior Officer, Landscape Department SSTEID, Tianjin, 2018; [3,7] Senior Officer, National Parks Board, Singapore, 2018; [4] Senior Officer, Eco-city Project Office at Ministry of National Development, Singapore, 2018; [5] Planning Officer, SSTECAC Construction Bureau, Tianjin, 2018; [8] Env. Officer, SSTECAC Environmental Bureau, Tianjin, 2018; Photo credit: SSTECAC Construction Bureau, 2018.