

IMPACT SHEET • SWITCH-ASIA PROJECT
INDUSTRIAL SYMBIOSIS IN TIANJIN BINHAI NEW AREA

Facilitating Industrial Symbiosis in Chinese Industrial Parks to Reduce Environmental Impact



**Synergies between companies in the Tianjin Binhai
New Area diverted 1 430 000 tonnes of waste from landfill,
and reduced CO₂ emissions by 167 000 tonnes**



The Challenge

China's environment could not sustain the production system of high input, low output, high consumption and low efficiency. Industry was a major contributor to resource consumption and pollution. Industrial areas such as Tianjin Binhai New Area (TBNA) could reduce their environmental impact by applying the principles of industrial ecology and establishing a network of material and energy flows among enterprises. TBNA needed to tackle problems like the large quantity of industrial waste. It faced weak environmental management capacity, and lack of effective networks for creating waste exchange synergies between companies. The project Industrial Symbiosis in Tianjin Binhai New Area facilitated synergies between companies to raise the effectiveness of resource and energy utilisation, and to minimise the discharge of waste.

Objective

The project aimed to promote sustainable production among small and medium-sized enterprises (SMEs) in TBNA by introducing industrial symbiosis (IS) and environmental management systems, and by showcasing a large-scale industrial symbiosis network. By creating an industrial symbiosis network, TBNA facilitated material, by-product, energy and logistic exchange among 800 SMEs.

TARGET GROUPS

- 800 SMEs within the TBNA area, including manufacturing enterprises, recyclers, and technology and services providers
- Local government and affiliated agencies



Activities / Strategy

The project established an industrial symbiosis network and recruited 800 member enterprises. It aimed to facilitate 80 synergies, where industrial waste can be diverted from landfill to replace raw materials.



Facilitating Synergies

Facilitating synergies was at the heart of this project. An in-depth survey of the established industries enabled the project to identify the amounts of material input and waste output across the industrial park. The project team categorised the waste based on the source sectors. All information was fed into a database comprising 'supply' (companies that produce waste); and 'demand' (recipients who can make use of waste) parts. Through this database, the project team could search who offers what and who could use what. Based on such information regarding material flows, the project highlighted potential synergies and organised meetings and workshops to bring companies together.



Information Provision

The project team provided information on access to funding in cases where investment was needed to implement synergy. The project also offered training and education programmes concerning environmental management systems (ISO14001), including free one-day environmental audits for SMEs. Practical demands for environmental policy were identified based on project experience, and a special work package aimed to have such policies effected in TBNA.



Scaling-up Strategy



Designing a Model: Development of Guidelines

China has many industrial parks and therefore required a successful symbiosis model. The project was led by Tianjin Economic-Technological Development Area (TEDA), one of China's most successful industrial parks. The project team adapted the approach of the UK National Industrial Symbiosis Programme (NISP) to local Chinese conditions. TEDA's Eco Centre first implemented an industrial symbiosis network within TEDA and neighbouring parks in TBNA. By early 2013, the project team had prepared national guidelines for replication to other areas, and conducted a road show to present their symbiosis model to other industrial parks, zones and areas.



Up-scaling via Policymakers

The project was led by a local governmental agency. Its policy recommendations were based on experience, on the data collected and synergies achieved. By working with local authorities and enterprises, the project won the trust of all stakeholders involved which enabled the policy recommendations to be adopted smoothly. The project built a strong bridge between government and local business.



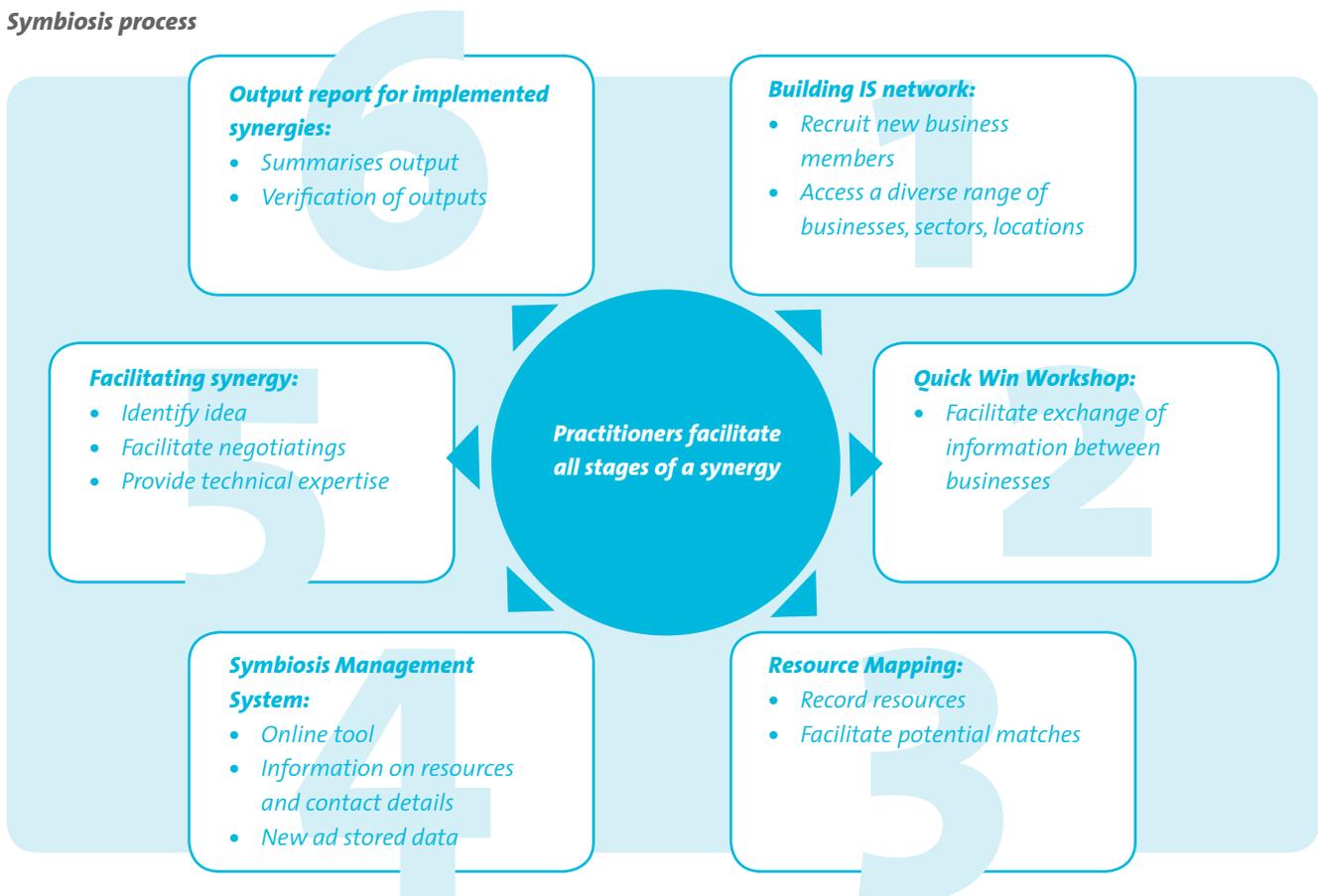
Setting Up Service Providers to Sustain Project Work

The project was implemented by the TEDA Eco Centre, which has grown into an important local environmental services provider. The industrial symbiosis project team was retained by this centre

and, after the project ended, continues to roll out industrial symbiosis in the area. The Eco Centre is also the secretariat of the Tianjin Industrial Symbiosis Innovative Technology Alliance, established in 2011 by 17 companies in TEDA and supported by the Tianjin Municipal Science and Technology Commission. The alliance is a legal entity constituted of enterprises, research institutes and other organisations aiming to respond to the common need for technological innovation. The alliance is a cooperative organisation featuring joint development, complementary advantages, shared interests, and shared risks.



Symbiosis process



Results



Available Company Data

In TEDA, the project team undertook surveys for each of its nine pillar industries, to understand the potential for synergies. In total, 574 companies were surveyed via an information form, and 170 of whom also received an on-site visit. The in-depth knowledge gained from the established industries and their materials flow ensured sustainability by enabling the Industrial Symbiosis project to offer services to local governments after the project ended.



Synergies Facilitated

The most important indicator for the symbiosis project was the number of linkages or synergies. Each synergy involved at least two companies that agreed to exchange waste. The waste of one company became the raw material for the other. The ideal case was a waste going to landfill became a raw material. By the end of November 2013, the project had facilitated 99 synergies diverting 1 430 000 tonnes of waste from landfill, reducing CO₂ emissions by 167 000 tonnes, reducing company costs by 73 000 000 RMB (approx. EUR 9.5 million), and increasing revenue by over 112 000 000 RMB (approx. EUR 14.6 million).



Network Established

The foremost contribution of the project was the TBNA industrial symbiosis platform, which contained information on the demand and supply of green technology in TBNA and vicinity. By the end of the project, the database contained contact information for 955 SMEs, 635 of which were members of the IS network providing their material and energy flow information. The information platform is a tool for identifying potential synergies, introducing advanced technology, matching local demands, and visualising environmental benefits from the IS network. To ensure project sustainability, the Tianjin Industrial Symbiosis Technology Innovation Alliance was established, with a support from Tianjin Municipal Science and Technology Commission. The alliance aimed to facilitate communication among SMEs, government and research institutions for technology innovation and transformation. The IS project attracted attention from other development zones, which could be seen as a good start towards replicating this model across China.

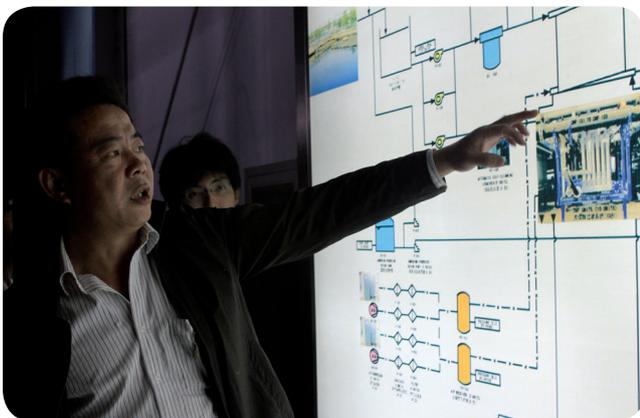


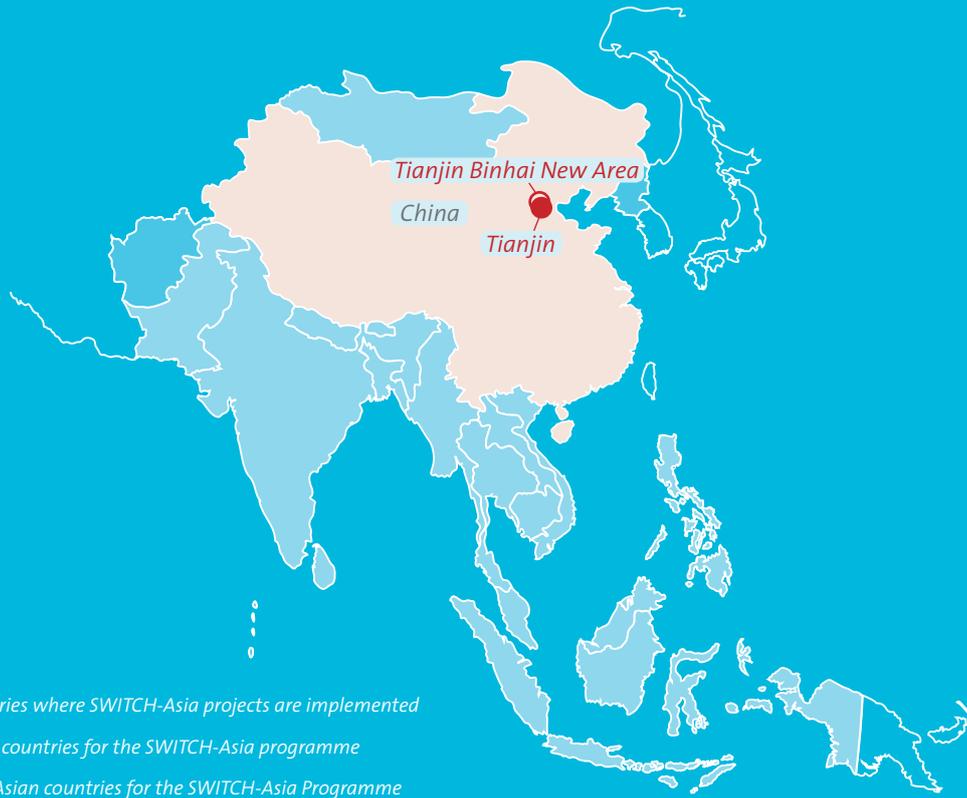
Policy Changes Recommended

A survey report on two heavy industries in Tianjin – steel and power – was finished in November 2013 and reports on another two industries – construction and chemical – in early 2014. Their production was guided and supported by the Tianjin Municipal Economic and Information Commission. A policy report on sludge treatment had been completed by the end of 2012. Another report on waste was also completed, which included a waste classification database (with information from production industries, recycling/treatment industries, and technologies). This was important for China since a good waste classification is a requirement for better governance of solid waste.

Impact in Numbers

<p>Economic Impact</p> 	<p>Monetary savings from energy efficiency measures:</p> <ul style="list-style-type: none"> • Cost saving: 73 000 000 RMB (approx. EUR 9.5 000 000) • Revenue increase: 112 000 000 RMB (approx. EUR 14.6 000 000) 	<p>Target group Engagement</p> 	<ul style="list-style-type: none"> • Engaged 955 SME members • As for ISO14001 training, 101 SMEs received walk-through audits • 300 SMEs applied for ISO14001 training where 41 obtained the certification • Achievement of 99 synergies among member companies • Established Tianjin Industrial Symbiosis Technology Innovation Alliance
<p>Environmental Impact</p> 	<ul style="list-style-type: none"> • CO₂ reduction of 167 000 tonnes • Landfill diversion 1 430 000 tonnes 	<p>Policy Development</p> 	<ul style="list-style-type: none"> • Encouraged TEDA Environmental Protection Bureau (TEDA EPB) to launch whole process management of normal solid waste among 47 pilot SMEs • Submitted a policy report on sludge treatment and disposal to TBNA EPB • Developed guidelines for industrial symbiosis network establishment in China • Drafted several policy reports to local authority on the implementation of Industrial Symbiosis Network in Eco-Industrial Parks (EIPs)
<p>Social Impact</p> 	<ul style="list-style-type: none"> • Improved employment opportunities 		





Legend

- Eligible countries where SWITCH-Asia projects are implemented
- Eligible Asian countries for the SWITCH-Asia programme
- Non-eligible Asian countries for the SWITCH-Asia Programme

Project implementation area

- City
- Region
- Country

The boundaries shown on this map do not imply on the part of the European Union any judgment on the legal status of any territory or the endorsement or acceptance of such boundaries.

OBJECTIVES

The project aimed to promote sustainable production among SMEs in Tianjin Binhai New Area by introducing industrial symbiosis and environmental management systems, and by demonstrating a large-scale industrial symbiosis network.

DURATION



PROJECT TOTAL BUDGET

EUR 1 848 316
(EU contribution: 80%)

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