Case Study of Green Industrial Parks as an Integrated Developer of Green Infrastructure

Dr. SHI Han
Department of Public Policy
City University of Hong Kong
Timeline of Development of Industrial Parks in China

- **1979**: Special Economic Zones (SEZs)
- **1984**: National Economic & Technological Development Zones (NETDZs)
- **1988**: National Hi-Tech Industrial Development Zones (NHIDZs)
- **1990**: Special Customs Controlling Zones (SCCZs)
- **2013**: Free Trade Zones (FTZs, Shanghai, Tianjin, Guangdong, Fujian)
Opportunities and challenges of industrial agglomeration in industrial parks in China

<table>
<thead>
<tr>
<th>Type of industrial parks</th>
<th>Number</th>
<th>Government oversight entities</th>
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<tbody>
<tr>
<td>National Economic and Technological Development Zones (NETDZs)</td>
<td>219</td>
<td>Ministry of Commerce</td>
</tr>
<tr>
<td>National High-Tech Industrial Development Zones (NHIDZs)</td>
<td>162</td>
<td>Ministry of Science and Technology</td>
</tr>
<tr>
<td>Provincial industrial parks</td>
<td>1300 plus</td>
<td>Provincial governments</td>
</tr>
<tr>
<td>Other lower level industrial parks</td>
<td>2500 plus</td>
<td>Municipal and county governments</td>
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- **Opportunities**: Colocation of polluting industries can increase the efficiency of environmental enforcement and allow the cost-effective provision of environmental infrastructure services.

- **Challenges**: Over-concentration of polluting activities can lead to serious, even irreversible environmental pollution. For example, many chemical industrial parks present great environmental risks and public health concerns.

Industrial parks have contributed more than 50 percent of GDP in several Chinese provinces (e.g. Jiangsu, Zhejiang).
Location and role of 219 NETDZs in China

Location of 219 NETDZs

Western Region (49)
Central Region (63)
Eastern Region (107)

Comparison of economic outputs and resource consumption between 219 NETDZs and China in 2015

- GDP: 11.3%
- Industrial added value: 20.7%
- Energy consumption: 8.0%
- Water consumption: 14.3%
- Land area: 0.3%
China’s National Pilots and Demonstrations for Transition to Green and Low-carbon Industrial Parks

- National Eco-Industrial Demonstration Parks (2001)
- Circular Economy Pilot Industrial Parks (2005)
- International Cooperative Eco (innovation) Parks (2010)
- Green Building and Ecological City (2013)
- National Pilot Low Carbon Industrial Parks (2014)
- Green Industrial Parks (2017)
8 International Cooperative Eco-parks between China and Partner Countries

- Sino-German Qingdao Eco-Park (2010)
- Sino-Austria Su Tong Eco-Park (2015)
- Sino-Finland Beijing Eco-Innovation Park (2014)
- Sino-Swiss Zhenjiang Eco-Industrial Park (2010)
- Sino-France Chengdu & Shenyang Eco-Parks (2014)
- Sino-Italy Hai’an & Ningbo Eco-Parks (2014)
Introduction to Sino-German Ecopark

- Positioning: Sino-German Ecopark as an eco-industrial park demonstrative of sustainable development jointly supported by the Chinese and German governments
- Planned area: 29 km²
- Planned population: 110,000
- Bilateral MOU was signed in July 2010.
- Ecopark broke ground in July 2013 after two-year planning.
Opportunities for industrial parks as an integrated developer of green infrastructure

- Industrial parks in China not only strive to be regional economic growth engines, but also serve as testbeds for new policies, technologies and business models.

- Green industrial parks are more readily to experiment on and demonstrate innovative green infrastructure services because:
  - Supplying comprehensive, reliable and cost-effective infrastructure services is one of their core competences of industrial parks; and
  - They seek the opportunities of local production of the experimented technologies and services.

- The streamlined governance mode allows them:
  - To make more independent and efficient decisions on the development and operation of various infrastructure facilities as compared to their local government counterparts.
  - More likely to harness the synergies and address the trade-offs between different types of infrastructure services.
Sino-German Ecopark makes direct contribution to the realization 12 out of 17 SDGs
Sino-German Ecopark serves as a trailblazer in searching the new quality-oriented economic development model.

**Current mainstream speed-based development model**

- Low initial capital investment
- Too quick construction periods
- Inferior quality, short lifespan of the stock of manufactured capital, resultant lower resource productivity

**Future quality-oriented development model**

- Incremental initial capital investment
- Proper construction periods
- Better quality, longer lifespan of the stocks of manufactured capital, resultant greater resource productivity

**Economic and environmental outcomes**

Single-headed pursuit of GDP growth leads to hype environmental cost. China consumes close to 50% of world steel and cement at a per capita GDP of US$ 8000.

Substantial increase in quality of manufactured capital stock and resource productivity is precondition for overcoming the middle-income trap.
Sino-German Ecopark serves as a living lab for transition towards a green and smart city.

Multiple actors conduct collaborative innovation in the geographical and institutional sphere of Qingdao Sino-German Ecopark. Replicable and transferable solutions and models for green and smart cities are developed and shared.
Sino-German Ecopark offers an inclusive and collaborative testbed for transition towards a green and smart city.
Large scale construction of passive buildings

Largest Passive Building in Asia

Second DGNB Platinum Award in China
Energy transition

• Coal-free and renewable energy-intensive energy supply structure
• Decentralized natural gas-based trigeneration systems
• Park-wide smart grid
• Setting a carbon intensity target of 180 tCO$_{2eq}$ per million US dollar GDP for 2020, around 20% of China’s national average in 2015.
Lessons learned

• Importance of forging a common vision and translating the common vision into actionable indicators and targets.

• Addressing the incremental upfront investment:
  • Fare burden sharing of incremental capital investments among government, infrastructure developers, and users.
  • Cross-subsidizing between different but connected infrastructure services by the park-wide infrastructure operator.

• Dual role of standards:
  • Existing design codes and standards need to be breached at the early adoption stage of innovative green infrastructure.
  • Nonetheless, innovative technical solutions need to be incorporated into mainstream standards in order to be scaled up.

• Crucial role of collaborative learning among key actors and indispensable role of users to the successful adoption of innovative infrastructure.

• Vital role of developing indigenous technological capabilities in the adaptation and successful adoption of innovative green infrastructure.

• The Administrative Committee of Ecopark serves as a honest and trustworthy broker between green infrastructure suppliers and users and other related parties such as financiers.
Thanks for your attention

Dr. Han SHI
China Institute for Greening Industrial Parks (CINOGIP)
City University of Hong Kong

Email: shihanmail@gmail.com
Tel: +86-13910765385