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## "Building related KPIs in Sino-Singapore Tianjin Eco-City"

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### Abstract

United Nations Environment Program (UNEP) has identified urbanization as one of the top environmental issues of the 21st Century. Start from 1990s, China is seeking for a practical routine to build sustainable cities and release the pressure of urbanization. A lot of "Eco-Cities" emerged with various frameworks covering environment, society, economy and other aspects. Among them, the Sino-Singapore Tianjin Eco-City (TJ Eco-City) has been recognized as a flagship project of both China and Singapore governments' cooperation aiming at establishing an Eco-City.

The paper used Sino-Singapore Tianjin Eco-City (TJ Eco-City) as an example to illustrate how to decompose and evaluate the Key Performance Indicators (KPIs) during city development phase from building perspective and suggested a next step enhancement of the KPI framework implementation in TJ Eco-City.

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### 1. Introduction

#### *1.1. Sino-Singapore Tianjin Eco-City and its development status*

Sino-Singapore Tianjin Eco-City is the first of its kind "Eco-city" in China due to its governmental collaboration background between China and Singapore. The goal is to create a world class urban community which is based on the concepts of "three harmonies" (harmony between people and environment; harmony between people and economic activities; harmony among people), and "three abilities" (Replicability, Practicability and Scalability). [1]

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By 2020, TJ Eco-City is envisaged house 350,000 permanent and 60,000 temporary residents on 34.2 km<sup>2</sup>, which will transform this 1/3 saline-alkali, 1/3 water, 1/3 non farmland area into a liveable medium size city. As articulated in the master plan, the city will be developed in three phases between 2008 and 2020. Phase I (Start Up Area, SUA) has been implemented over 2008-2010, covers a start-up 4 km<sup>2</sup> and will involve a projected population of 85,000. Phase II (2011-2015) and Phase III (2016-2020) will each be implemented over 5 years. By 2020, the city will be fully developed. [2]

### 1.2. KPI framework in Tianjin Eco-City

TJ Eco-City is that a set of Key performance indicators (KPIs) were developed in April 2008 based on the current Chinese national standards and best practices in Singapore. The KPI framework includes 22 quantitative indicators and 4 qualitative indicators and they are grouped into four categories: environment, resource, economy and society (Figure 7). These KPIs have been used to guide the development of the city's master plan and will be used to evaluate the overall performance of the city. The KPIs were formally approved by the Ministry of Housing and Urban-Rural Development on September 22, 2008. [3]

Table 1. KPI regarding society with indicative values

KPI: Society	Indicative value
Green trips	>90%
public housing provision	>20%
Employment housing equilibrium index	>50%
Coordinated regional policies	

Table 2. KPI regarding economy with indicative values

KPI: Economy	Indicative value
R&D researches&engineers equivalent weigh per 10,000 labor force	>50
Regional coordinated economy	

Table 3. KPI regarding environment with indicative values

KPI: Environment	Indicative value
Ambient air quality to meet Grade II	>310 d/year
Quality of water bodies within the Eco-City	Meet Grade IV
Noise pollution 100% meet respective functional area standard	100%
Loss of natural wetland	0
Local plant index	>0.7
Coordinated natural ecology	

Table 4. KPI regarding resources with indicative values

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