CHINA TODAY

The Art and Science of Eco-Development

Khee Poh Lam PhD, RIBA

Professor of Architecture
Center for Building Performance & Diagnostics
Carnegie Mellon University


China urbanization rate will reach 75%
Urban population will reach 1000 million by 2030
At least 400 million more people will move to the city in the next 25 years

China's Building Blitz

In scale and pace, the building boom currently sweeping over China has no precedent in human history. China is spending about $375 billion each year on construction, nearly 16 percent of its gross domestic product. In the process, it is using 54.7 percent of the world's production of concrete, 36.1 percent of the world's steel, and 30.4 percent of the world's coal.

Current status

40 billion square meters of construction between now and 2030, spread over 5 million new buildings.

Non-building related construction - RMB 12 trillion (US$1.76 trillion)

Residential construction – RMB 4.255 trillion (US$0.63 trillion)

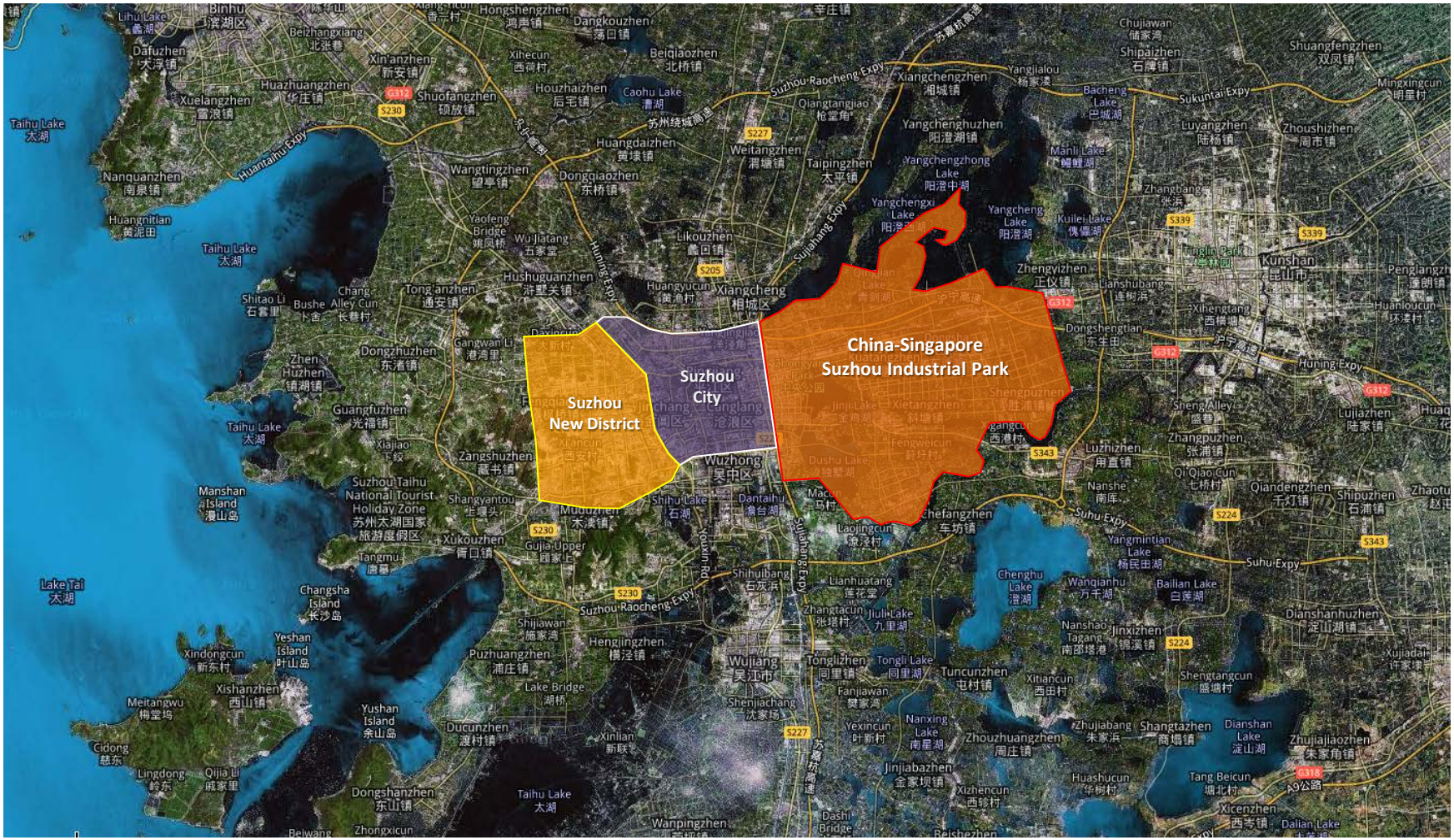
Non-residential construction – RMB 4 trillion (US$0.59 trillion)

Total building related construction - about 25% of its GDP

projects
the next generation
in the works
china in photos
links

Photo © Sam Lubell

Suzhou Industrial Park (SIP)



SIP covers a total jurisdiction area of 288 sq km, among which 80 sq km area belongs to China-Singapore Cooperation Zone.

SIP “Scientific” Master Plan

6 Major Bases for Industrial Transformation and Upgrading

1 DuShu Lake Innovation District of Science and Technology	Main Base for Scientific Innovation
2 Jinji Lake-rim CBD	Main Base for Development of Modern Service Industry
3 SIP Ecological Science Hub	Main Base for Development of Eco-environment Protection Industry
4 Intergrated Free Trade Zone	Main Base for Development of Trade and Logistics
5 High-tech Industrial Zone,Phase 3	Main Base for Development of Hi-tech Industry
6 Yangcheng Lake Tourism Resort	Main Base for Development of Recreation and Tourism

… in pursuit of a comprehensive, harmonious, and sustainable development

G-to-G agreement signed on February 26, 1994

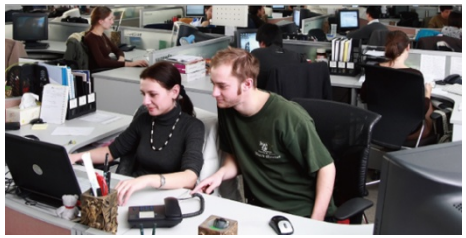
http://www.sipac.gov.cn/english/sipprofile/200901/t20090116_36671.htm

Planning Concepts and Practices

Think Globally, Act Locally

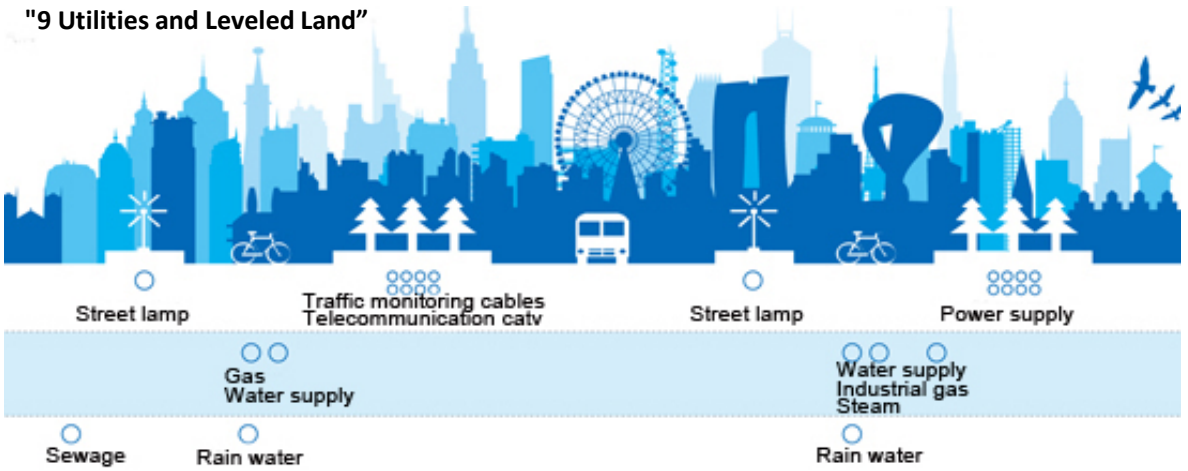
- Focus on "transformation, optimization, upgrading, and innovation“.
- Four action plans:
  - industrial upgrading (“3 + 5” Industrial Planning)
    - coordinated clustering development of advanced industries
  - technological leap growth (new “Silicon Valley”)
    - Policies, business and financial support to encourage innovation and integration capacities
  - service sector multiple growth
    - realized by replacing energy-consuming industries with highly efficient and advanced industries, optimizing the secondary sectors and promoting the tertiary industry
  - ecological optimization
    - guidelines for comprehensive, harmonious, and sustainable development
- Planning Legislation and Enforcement
  - strict land parcel bidding procedures
  - flexible control of functionally undefined land to improve development efficiency and land use intensity
  - “one-stop” coordinated public bidding, project examination and approval process for all construction projects
  - transparent administration environment



http://www.sipac.gov.cn/english/Investment/200901/t20090116_36719.htm

Art and Science of Eco Development



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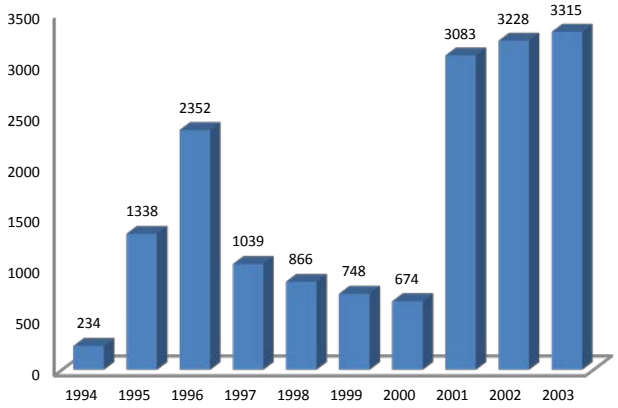
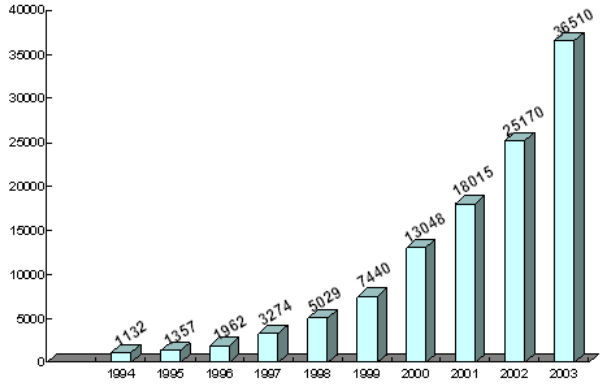
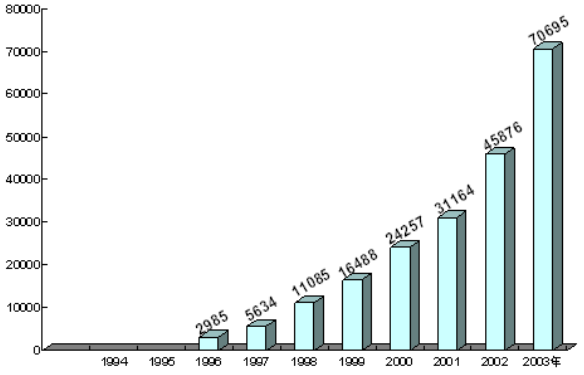
Some Major Economic Indicators of SIP



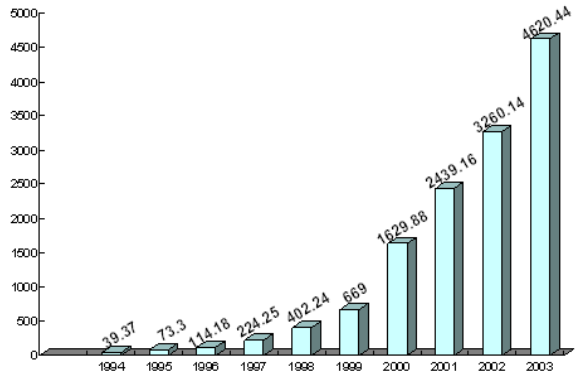
Total Investment (x million US$)



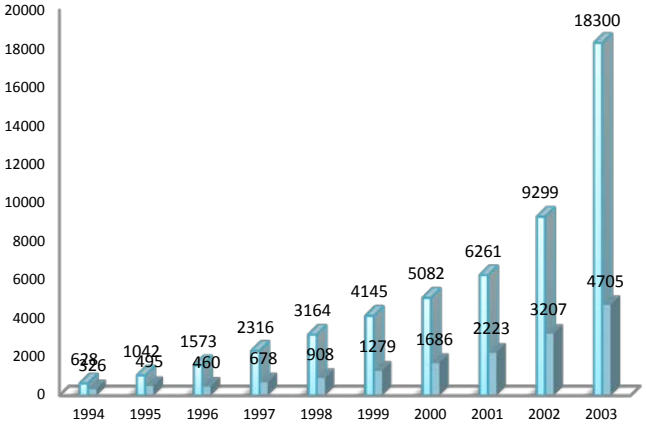
Gross Domestic Product (x million Yuan)



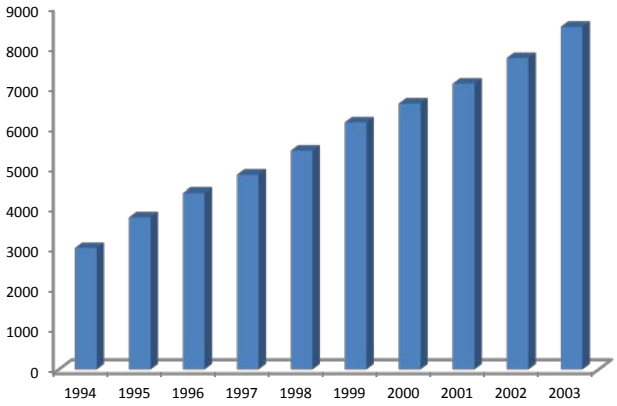
Total Employees



Total Government Revenue (x million Yuan)



Deposits Balance of Financial Institutions at Yearend
And Savings Deposits of Residents (x million Yuan)



Net Income Per Capita of Farmers (Yuan)

Key Achievements

(over the past 15 years since 1994)

- Annual revenue increased from 30 million Yuan in the beginning, to nearly 10 billion Yuan.
- Gross regional product exceeded 100 billion Yuan, increasing nearly 100 times compared to the early days of exploration.
- Total of more than 100 billion Yuan in tax revenues.
- Utilized foreign funds of nearly US$ 16 billion.
- Registered capital of more than 130 billion Yuan, and created 500,000 job opportunities.
- Average salary of local working population reaches 37,700 Yuan, and the rural per capita net income is 15,000 Yuan, both registering about five times increase over the early period of its development.
- Level of per capita GDP in the SIP is close to that of Singapore (Spore-US$37,300.00) (China average – US$3680.00)
- First integrated free trade zone in the country, which makes SIP an experimental field for new policies on reform and opening-up in China.
- IT technology, integrated circuit, and offshore outsourcing output value accounted for 3%, 17%, and 8.8% of the national total respectively. (2008). Service outsourcing output value and offshore income increased by 35.9% and 108% respectively (from Jan – Aug 2009).
- Added value of service sector accounts for 30% of GDP for the first time (2008) and the proportion keeps increasing at a speed of 2% every year.
- 45% and a total of 33.67 million square meters of green area obtained the ISO14000 certification for environment, and became one of the first National Pilot Ecological Industrial Parks, with several records in terms of total coverage of environmental-protection infrastructure, of green towns and villages, and with the most local enterprises meeting ISO14001 standards.
- Reducing the amount of energy consumption to 0.36 ton of standard coal equivalent per ten thousand Yuan GDP, and the emission of CO_2 and SO_2 to 1/18 and 1/40 of national averages
- Initiated an ecological optimization campaign aimed to build a pilot ecological city district of green lifestyle and sustainable industrial and social growth (2009).

Tianjin Eco-City

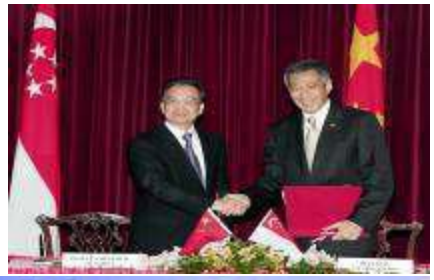
It covers an area of 31.23 sq. km (12 sq. miles) with a target population of 350,000

Tianjin Eco-City

Mode of development to be replicable, practicable and scalable

Key Performance Indicators

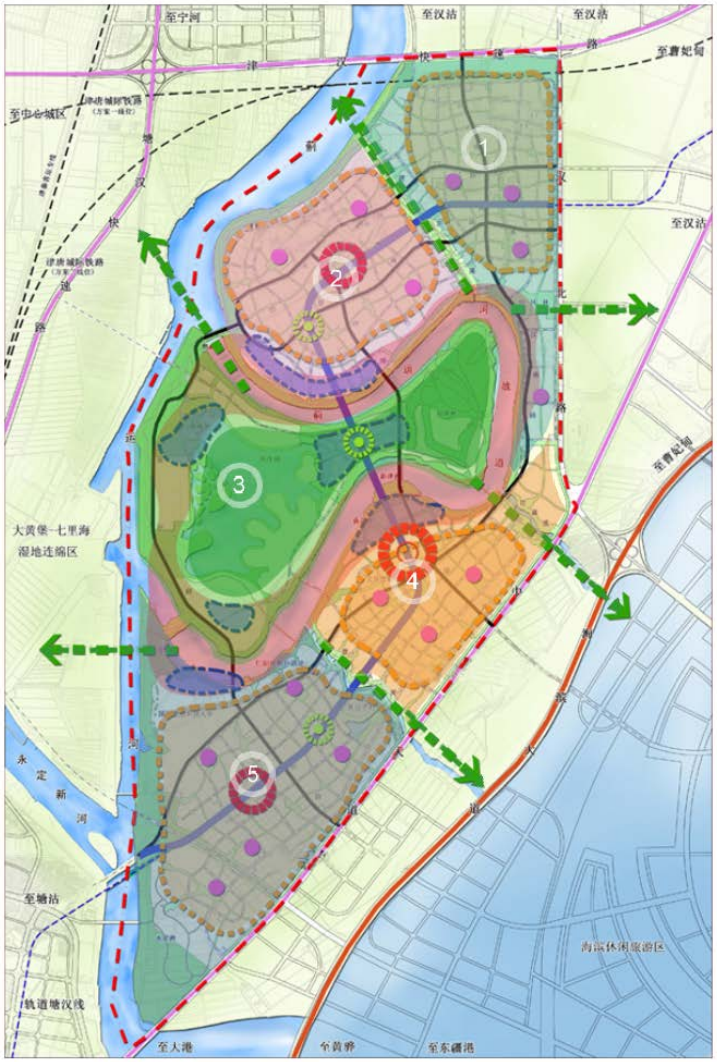
- Conceptualized based on four Guiding Key Performance Indicators:
  - Healthy Ecological Environment
  - Social Harmony and Progress
  - Vibrant and Efficient Economy,
  - Integrated Regional Coordination
- 22 Quantitative KPI's



Tianjin Eco City Project - formally commenced on November 18, 2007

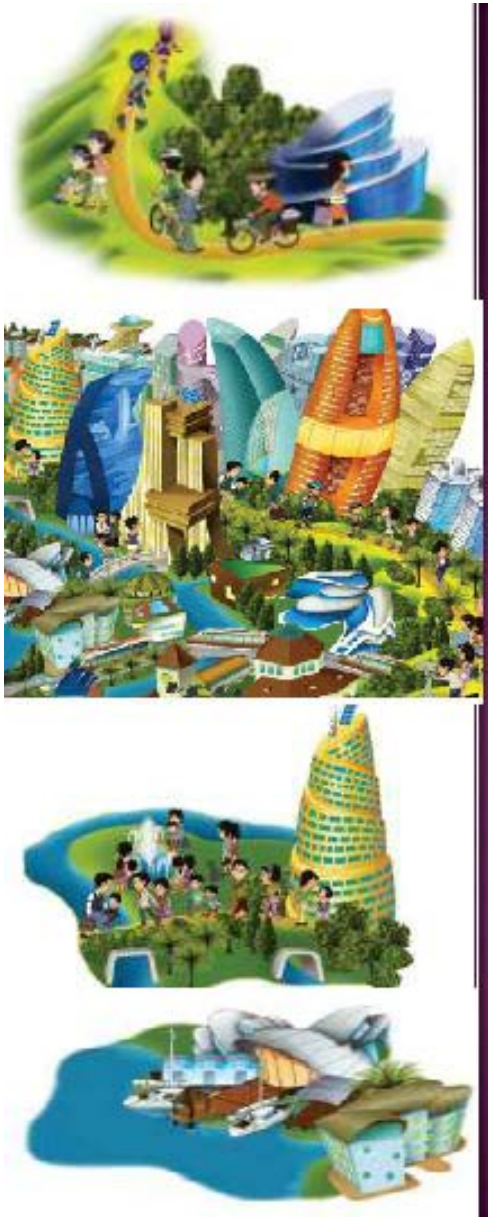
A 50:50 joint venture between Singapore Tianjin Eco-City Investment Holdings Pte. Ltd. (STEC) and Tianjin Eco-City Investment and Development Co., Ltd (TECID), signed on July 1, 2008.
Initial registered capital RMB 4 billion

Tianjin Eco-City Master Plan



1. Northeast District
   Residential and High Tech Eco Industries
2. Northern District
   Administration, Residential and Cultural Center
3. Eco Core
   Ecological Landscape, Entertainment and Eco Residence
4. Central District
   Downtown, Business Center and Residential
5. Southern District
   Residential and Film Production

http://www.tianjineco-city.com/en/eco_city/Eco_City_Master_Plan/988.aspx



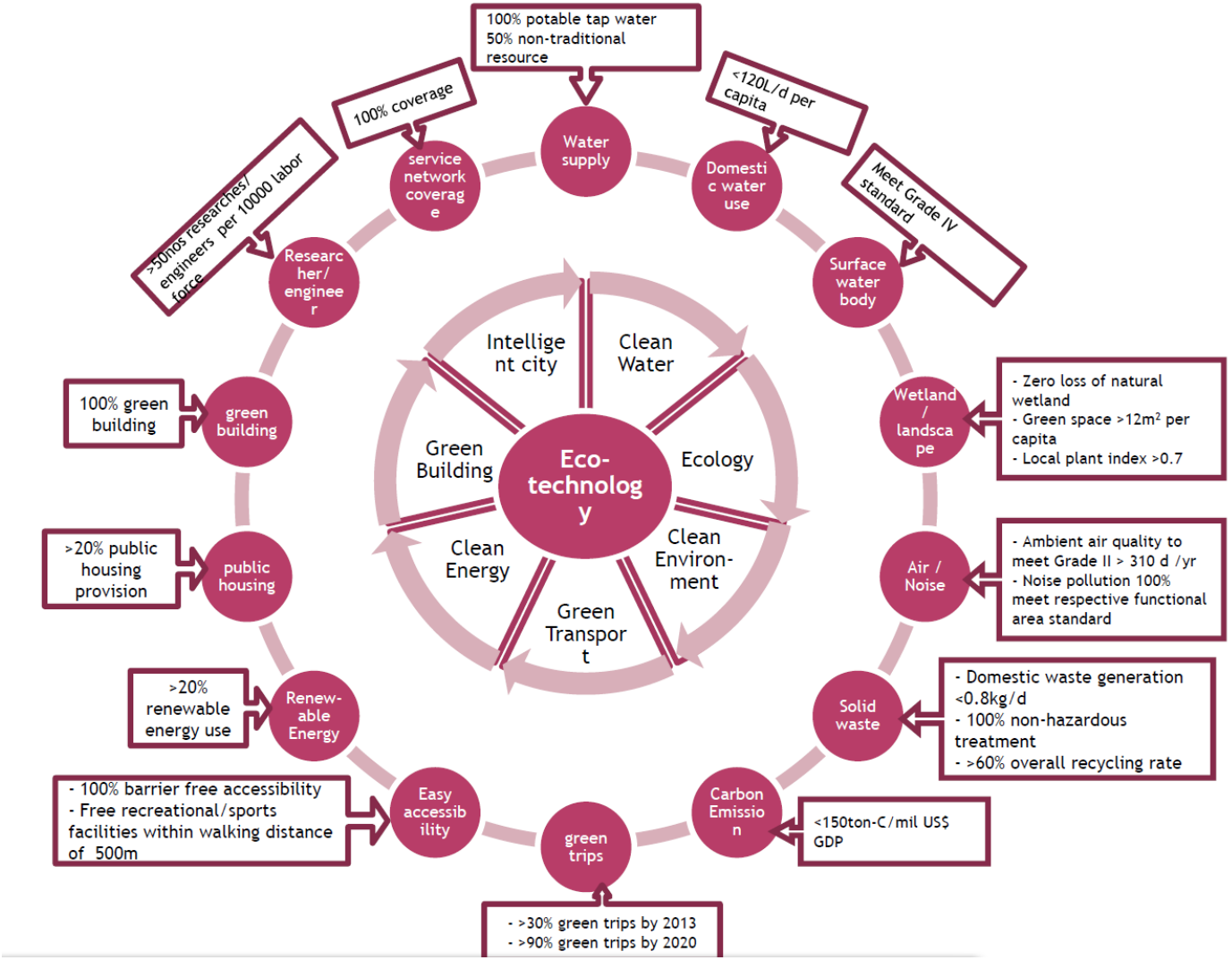
DEVELOPING A CITY OF THE FUTURE

SINO-SINGAPORE TIANJIN ECO-CITY
中新天津生态城

Mr Goh Chye Boon
CEO
Sino-Singapore Tianjin Eco-city
Investment & Development Co. Ltd

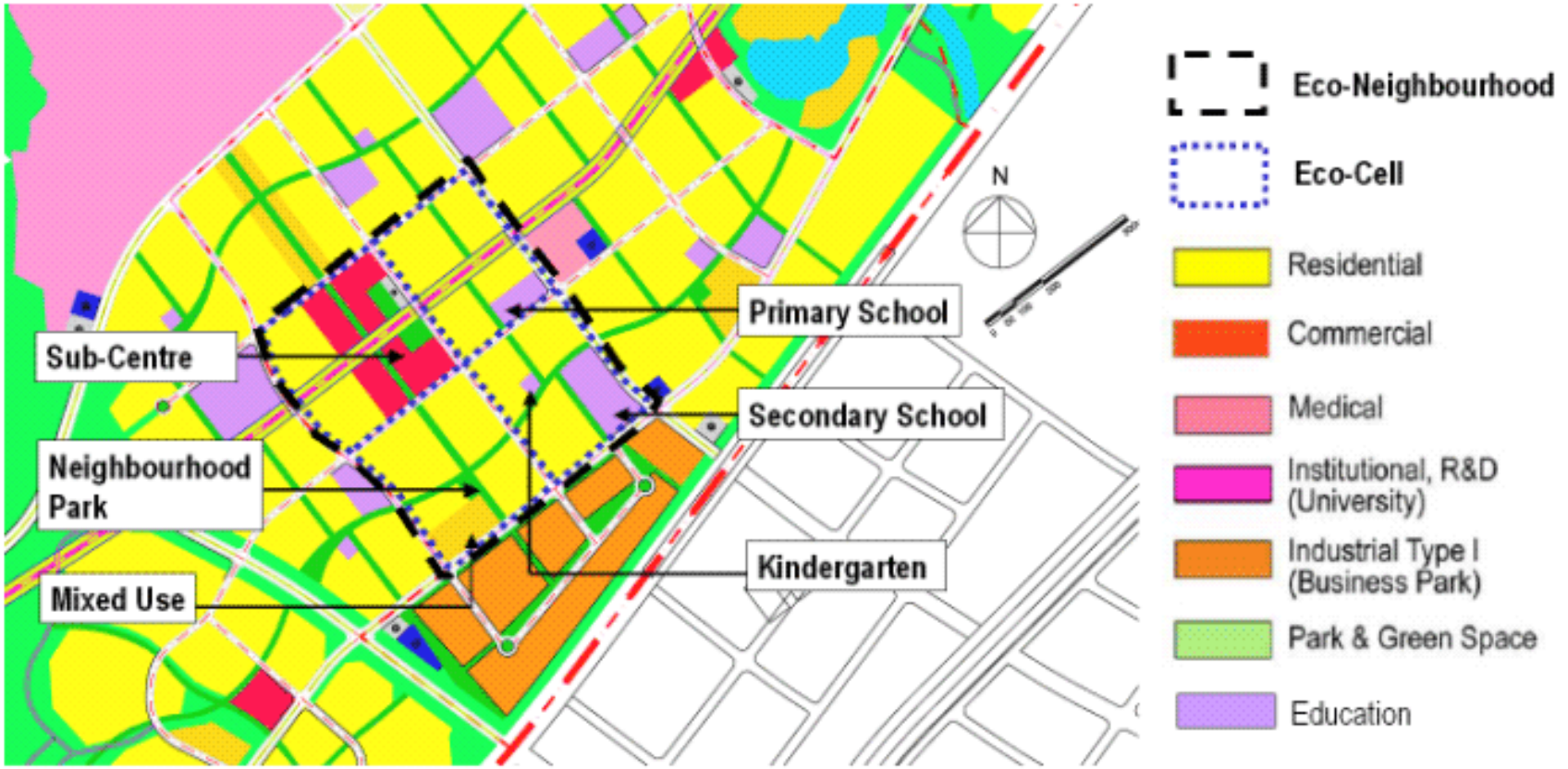
www.siww.com.sg/pdf/08_Developing_a_city_of_the_future_Sino_singapore_Tianjin_Eco_city.pdf

Eco-Technology Targets



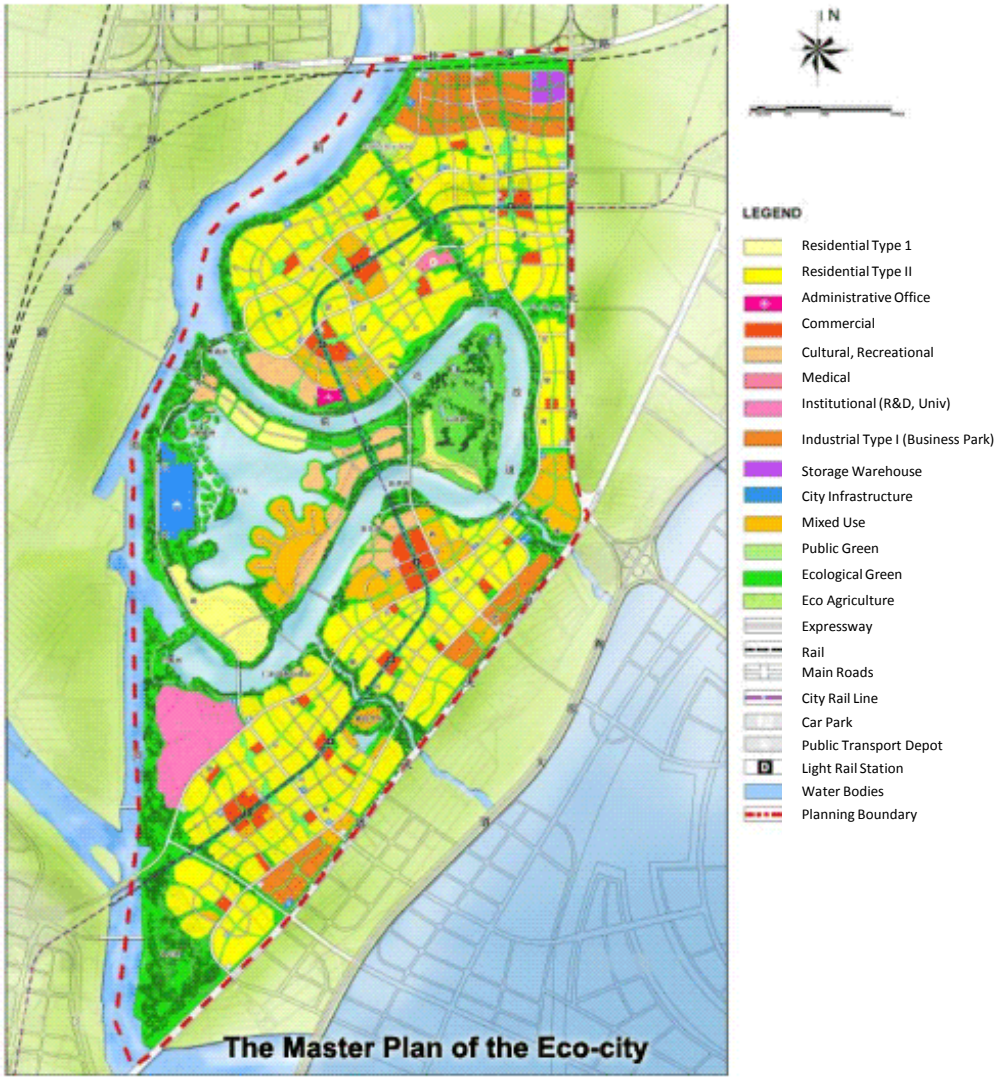
www.siww.com.sg/pdf/08_Developing_a_city_of_the_future_Sino_singapore_Tianjin_Eco_city.pdf

Concept of Eco-Cell

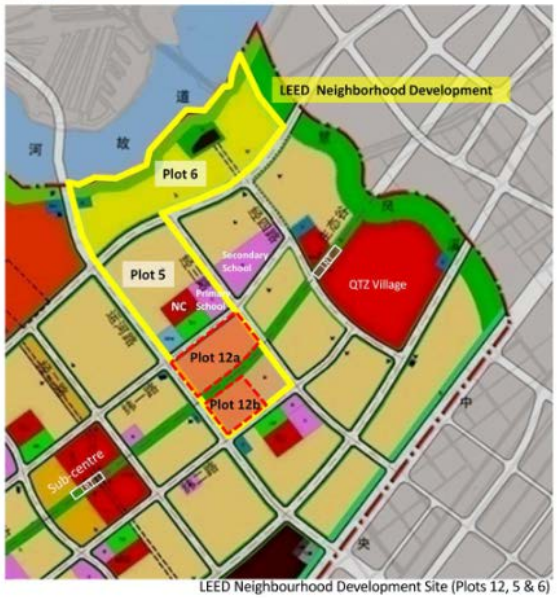


An illustration of the Eco-cell

Residential Plot 12a Development



Start Up Area of Tianjin Eco City



LEED Neighbourhood Development Site (Plots 12, 5 & 6)

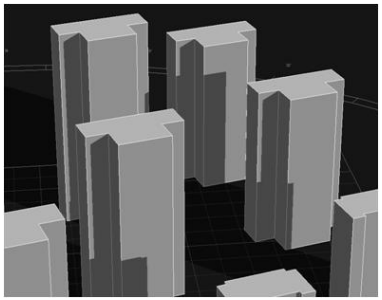
生态谷处效果图 VIEW from ECO- VALLEY

和韵路夜景效果图 NIGHT SCENE

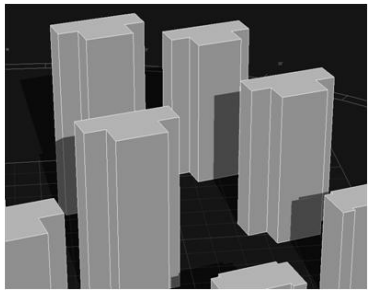
鸟瞰图 (由北南望) BIRD'S EYE VIEW

总平面图 MASTER PLAN

Plot 12 a Sunlight and Daylight Availability Analysis for Tianjin Eco-City GBES Requirements



9:00am, Jan. 20



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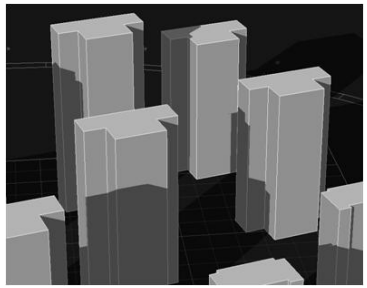

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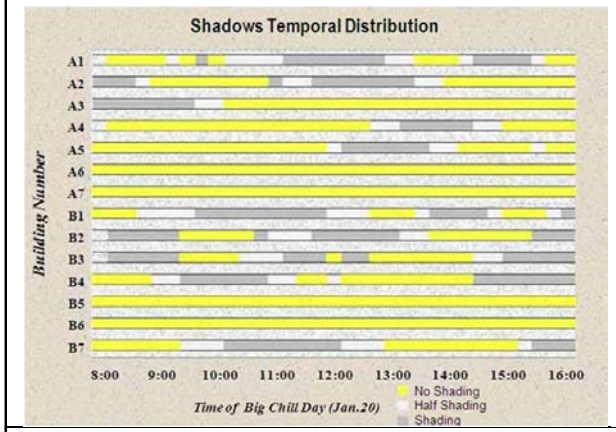
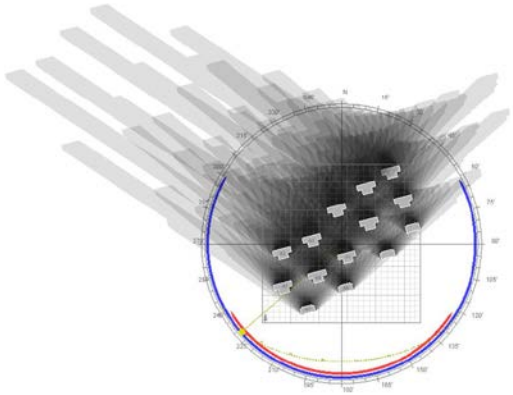
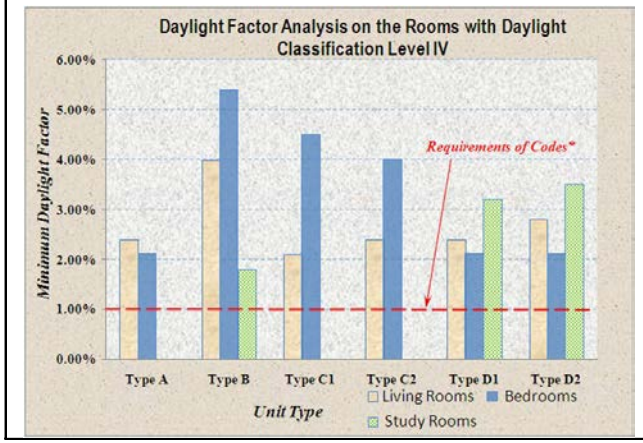
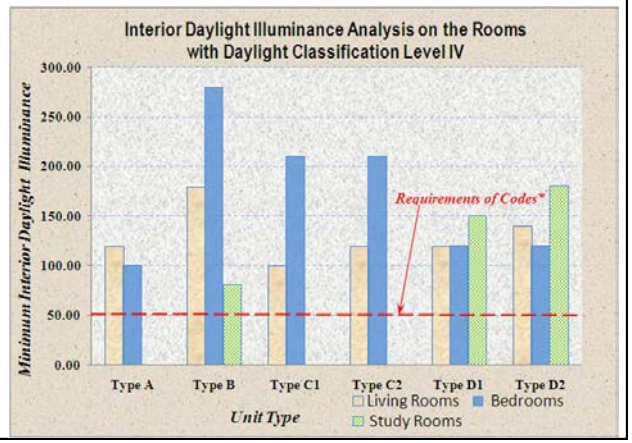
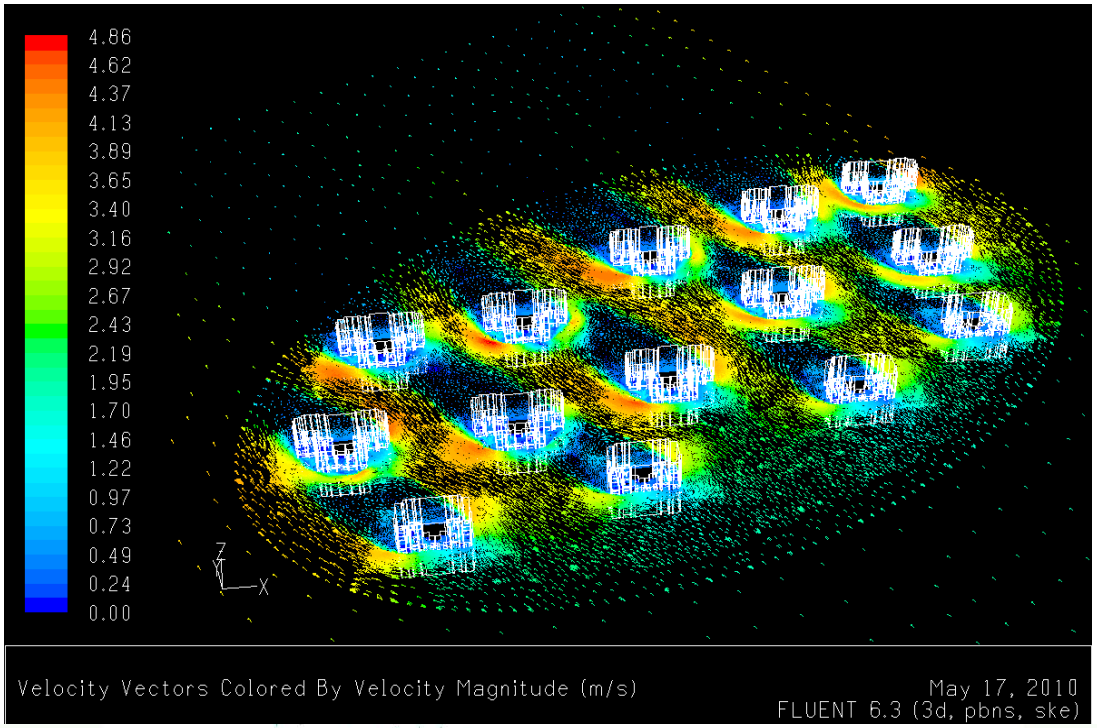
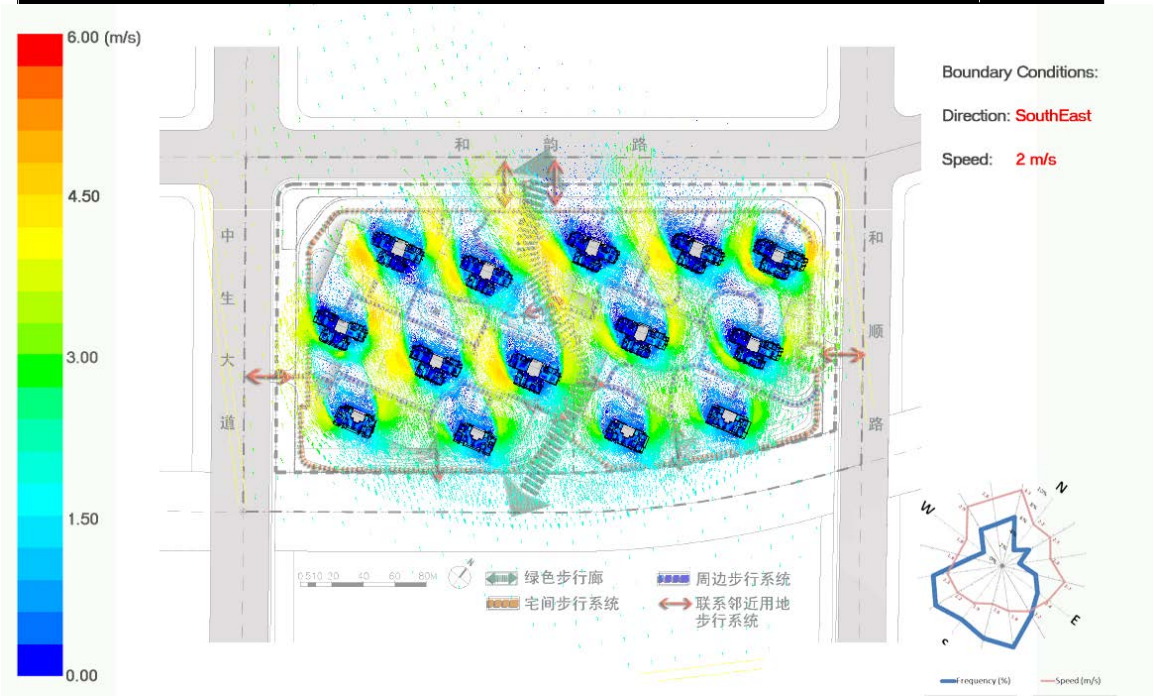








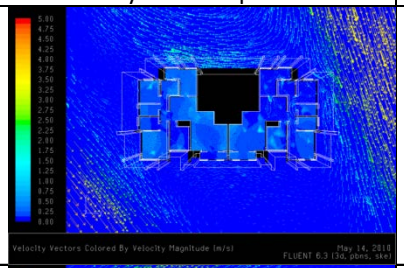
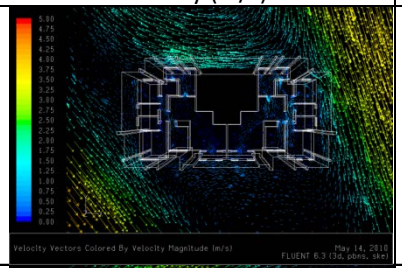
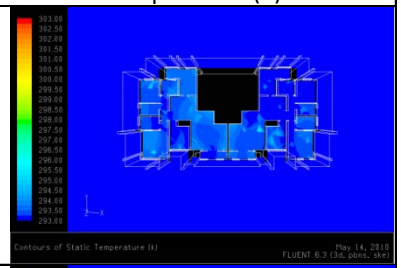
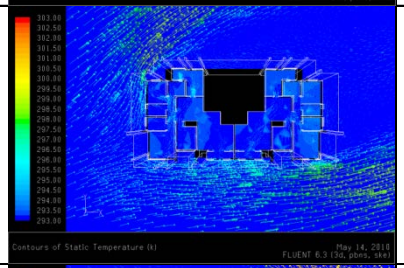
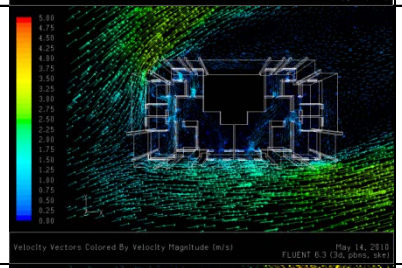
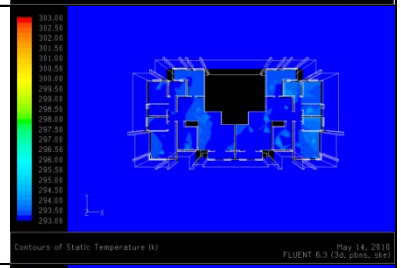
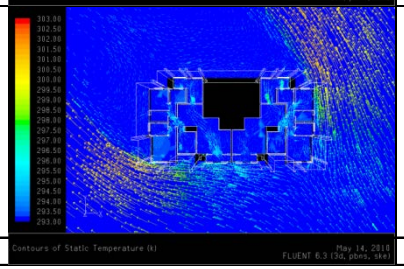
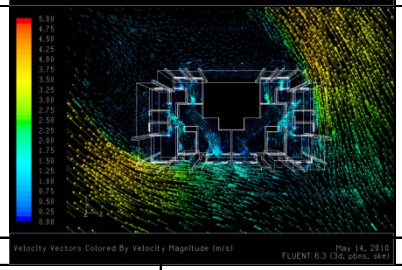
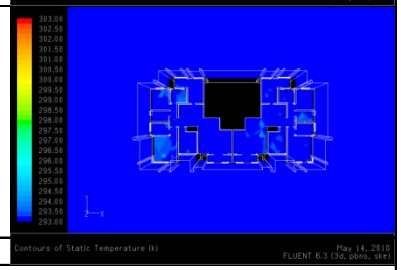


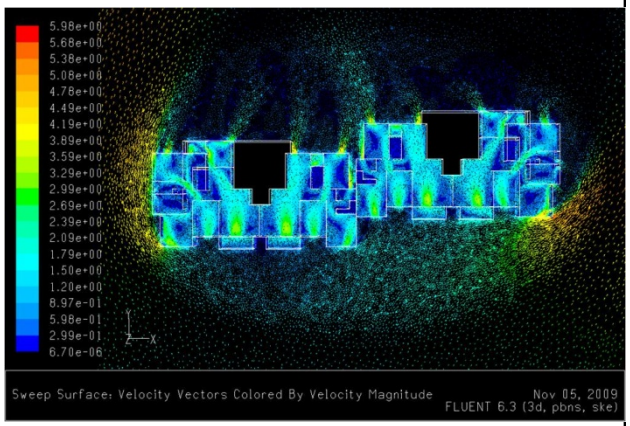


Plot 12a
CFD Modeling:
Concurrent Outdoor and Indoor Air Flow Analysis

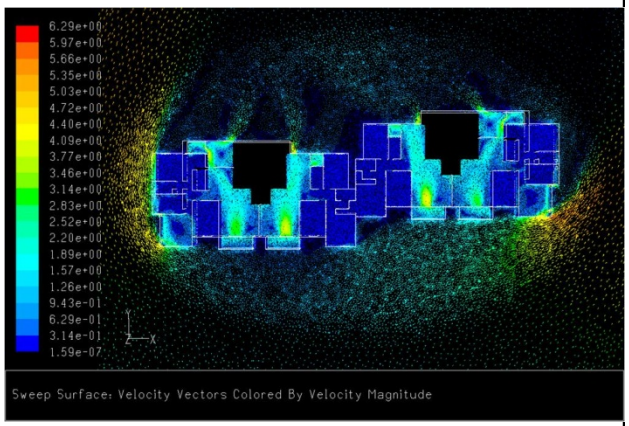
Plot 12a CFD Modeling: Concurrent Outdoor and Indoor Air Flow Analysis

11-story unit A6

	Velocity and Temperature	Velocity (m/s)	Temperature (K)
NW ACH 38.3			
SW ACH 65.3			
SE ACH 75.6			

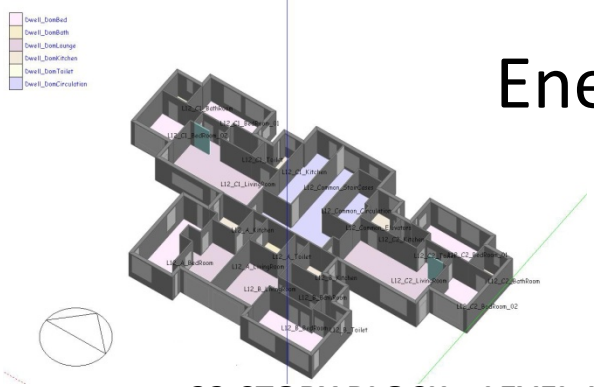


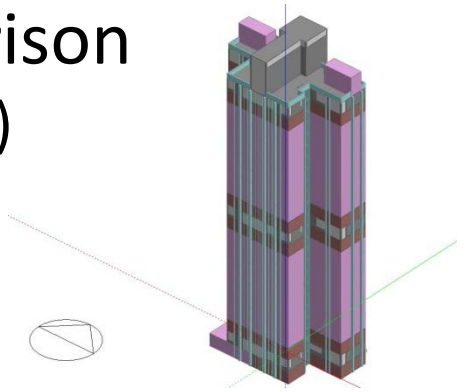
Scenario 1: All internal doors are opened.



Scenario 2: Only the Living Room doors are opened.

Energy Consumption Comparison
(Active vs. Mixed Mode Model)





23-STORY BLOCK – LEVEL 12

Energy Use Intensity (EUI) Breakdown by End-uses per Occupied Area

		Apartment A (57.4 m2)	Apartment B (69.5 m2)	Apartment C01 (86.8 m2)	Apartment C02 (87.0 m2)
Space Heating	**kWh/m2/yr**	30.3	28.8	46.5	45.2
Space Cooling		44.2	50.4	27.8	36.5
Lighting		12.4	12.8	13.2	13.2
Domestic Appliances		15.7	14.7	14.6	14.7
Domestic Hot Water		7.8	7.8	15.7	8.1
TOTAL		**110.4**	**114.5**	**117.8**	**117.7**
EUI of Level 12 BASECASE		**115.6**			

MIX-MODE MODEL

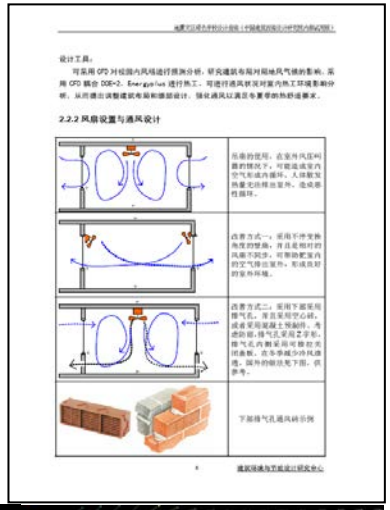
When outside temperature is between 15 and 22 °C, wind speed < 5 m/s, window is open.

		Apartment A (57.4 m2)	Apartment B (69.5 m2)	Apartment C01 (86.8 m2)	Apartment C02 (87.0 m2)
Space Heating	**kWh/m2/yr**	17.2	12.7	14.9	13.9
Space Cooling		13.1	15.3	14.2	13.8
Fan		4.3	2.3	3.2	2.9
Lighting		12.4	12.8	13.2	13.2
Domestic Appliances		15.7	14.7	14.6	14.7
Domestic Hot Water		7.8	7.8	15.7	8.1
TOTAL		**53.3**	65.6	**75.8**	**66.6**
Energy Saving (%)		**51.70**	**42.70**	**35.63**	**43.44**

Sichuan Earthquake Disaster Region

Green School Design Guide

May 12, 2008



设计工具：

可采用 CFD 对校园内风场进行预测分析，研究建筑布局对局地风气候的影响。采用 CFD 耦合 DOE-2、Energyplus 进行热工、可进行通风状况对室内热工环境影响分析，从而提出调整建筑布局和围护设计、强化通风以满足冬夏季的热舒适要求。

2.2.2 风扇设置与通风设计

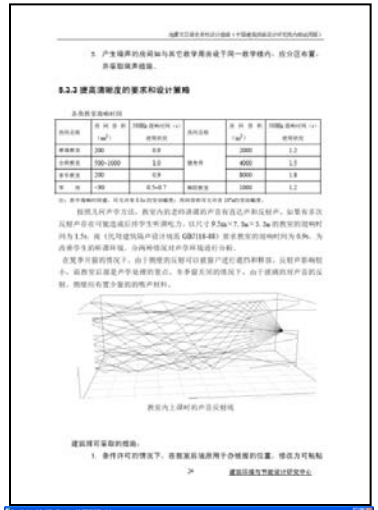
吊扇的使用，在室内风压和温的情况下，可能造成室内空气形成内循环，人体散发热量无法排出室外，造成闷热循环。

点窗方式一，采用下开窗角度的型窗，并且是相对的风扇不同步，可形成室内的空气降出室外，形成良好的室外环境。

点窗方式二，采用下部采用窗气孔，窗直采用空心砖，或者采用混凝土预制件，考虑防雨，排气孔采用 Z 字形，窗气孔内侧采用可翻启百叶闭条形，在冬季或少许风速通，国外的做法见下图，供参考。

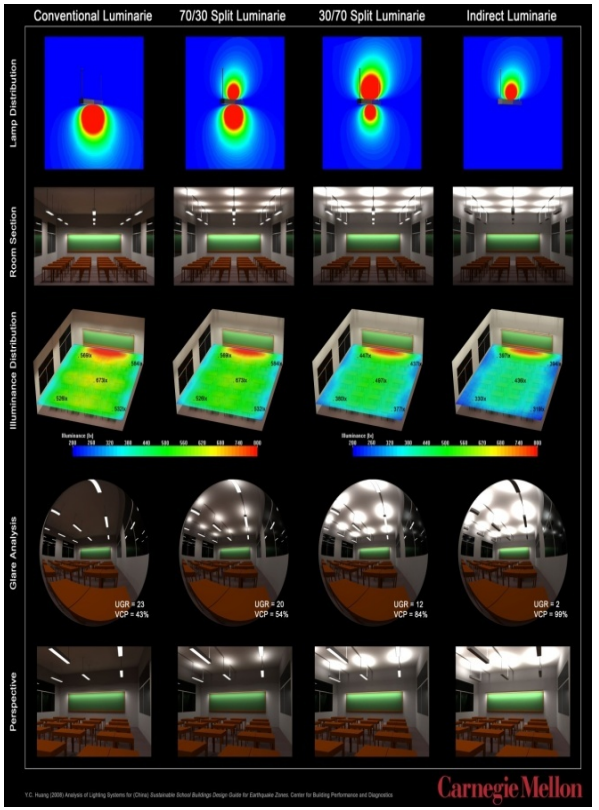
下部排气孔通风砖示例

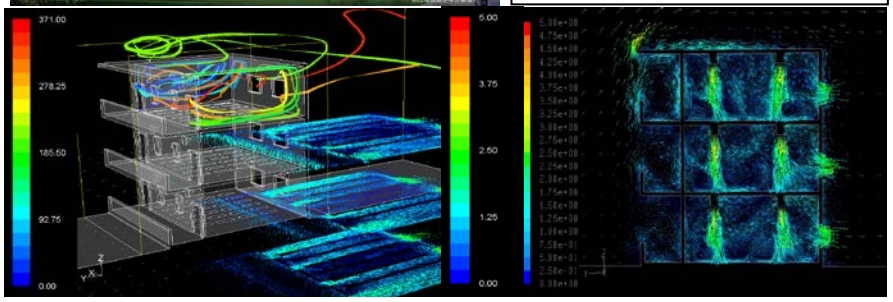
建筑环境与节能设计研究中心

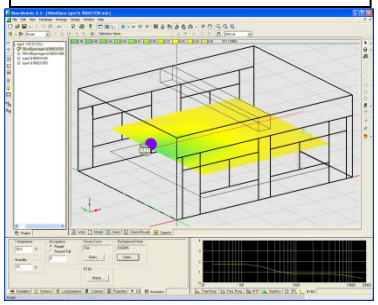


8.3.3 提高调研度的要求和设计策略

房间名称	窗（门）洞口面积（m^2）	可开启窗（门）洞口面积（m^2）	房间名称	窗（门）洞口面积（m^2）	可开启窗（门）洞口面积（m^2）
普通教室	200	80		2000	1.2
合班教室	700~1000	3.0	健身房	4000	1.5
多媒体室	200	80		3000	1.8
学 生	~80	0.5~0.7	舞蹈教室	1000	1.2

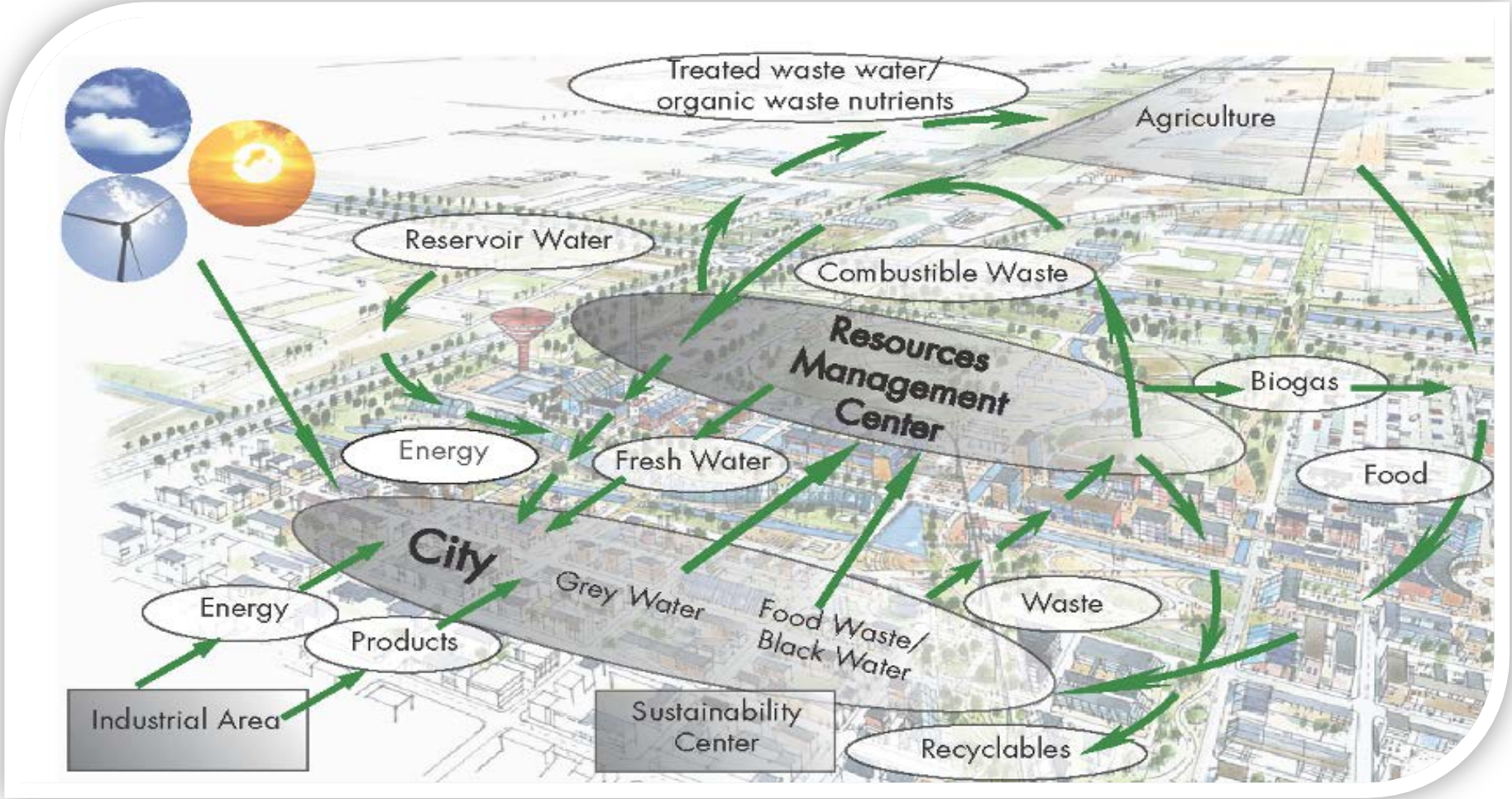




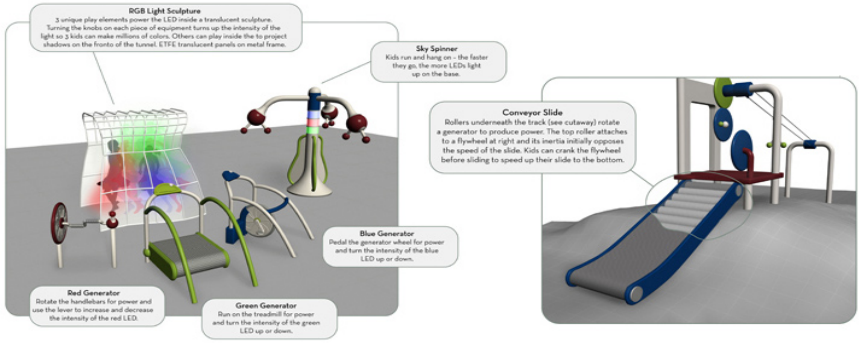


Eco- City Development

"Perfecting" China's Planning Regulations



Our future…. the next generation



CHINA TODAY

Thank you

Khee Poh Lam PhD, RIBA
Professor of Architecture
Center for Building Performance & Diagnostics
Carnegie Mellon University