中国未来的可持续发展城市研究

Towards Future Sustainable City in China

QINGYUAN ZHANG MASTER THESIS 张清源 研究生毕业论文

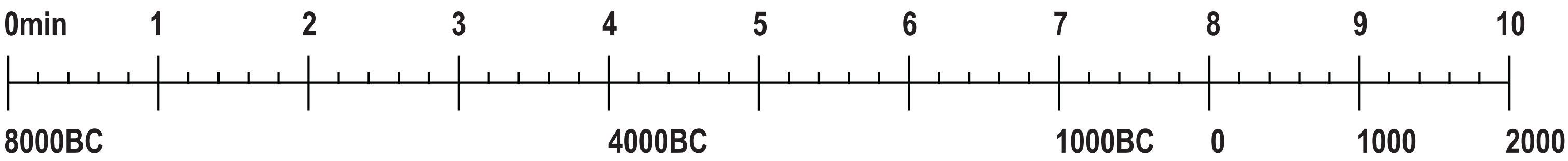
CHALMERS ARCHITECTURE
NFR ARCHITECTS
查尔穆斯理工大学建筑学院
NFR 建筑师事务所

Contents 目录

Contents 目录

Introduction

If a documentary was to be made of earth's history, filmed from outer space, the last ten minutes of the film would tell the story of the last 10,000 years of history. Of these last ten minutes, the first seven would show a still planet with a blue sphere and a land of rolling green. The ninth minute would show a planet tinged with yellow following the flourishing of agricultural civilization, and the last twelve seconds – representing the last two centuries of history, a time when the Industrial Revolution was ushered in – would show the yellow deepening in intensity. During the last three seconds (from 1950 until now), we would see explosive changes in the picture, presenting a catastrophic image of planet, with nature ravaged, and natural species dying out at a rapid rate. The film would end frozen on an image of a world undergoing severe resource shortages and depletion, ecological deterioration and environmental pollution.



Motivation/ Background

Modern cities are not only the largest structures we have made, but they also use the bulk of the world's resources. *"On just two percent of the world's land surface, and with half its pollution, cities consume over 75 percent of its resources of which the key resource, fossil fuels, are non-renewable."* [1] A huge demand for energy defines modern cities more then any other factor – for operating their internal and external transportation systems, and for operating their buildings most of which could not function without air conditioning, and without lifts ceaselessly going up and down.

As China moves towards full-scale unbanisation, the challenge it faces is particularly important. In June 2005, the state of Environment Protection of China released an importantion report titled "China's Environmental Condition in 2004". It states that:

"More than half of China's cities suffer from the effects of acid rain;
Nearly a third of 19 major cities suffer from contaminated groundwater as well as a continuous drop in water levels;
Only 38.6% of cities meet China's residential standard for air quality.

It is therefore not surprising that many experts think that rapid urban-industrial development, and in adequate urban services provision, are imposing tremendous pressures on China's - and indeed the world's - natural environment.
In the last 11 years alone, 200 million people from rural China have taken up residence in cities. Their number will continue to increase 600 million to 700 million in the next 50 years. Meanwhile, this relentless process of urbanisation now gose hand-in-hand with a soaring rise in energy consumption, recently China became the world's second largest consumer of energy after the United States." [2]

Since reform and opening up, the urbanization of China has increased rapidly, with the number of cities in China reaching 655 by the end of 2007, an increase of 462 compared to 1978, according to a report released by the National Bureau of Statistics of China (NBS).The number of cities at prefecture-level and above has increased from 111 in 1978 to 287 in 2007. [3]

China is the world biggest developing country with the largest population.

Under the pressures from urbanization and the demand of economic development, how to build and plan sustainable cities in China is a challenging and valuable topic.

"Sustainable development is development city that meets the needs of today without jeopardising the possibilities of future generations to fulfil their needs. Sustainable development is about the right of every human being, living today or yet not born, to social and economic develop ment within the limits imposed by the carrying capacity of the ecosystems." [4]

+

How to plan a future sustainable city?

- Past ------ Learning from global experience
- Present ------ Cities and the Sustainability challenge
- Future ------ Future vision and New Technology

+

Chinese cities?

- Status & Background
- Culture & Life style
- Policy & Regulations

= Towards Future Sustainable Cities in China!

Method

WHY...?

- I am a Chinese architucture student.
- Environmental problem in China.
- Better city, better life.
- Policy.
- Potentials and oppotunities in Chinese market.

HOW..?

- Learning from global experience
- Cities and the sustainability challenge today
- Future vision and new technology
- Research on China's status quo and background.
- Indentify a place to design a new city

WHAT...?

- Sustainable development.
- Sustainable city.
- China's status quo and background.
- China's sustainable city looks like
- Policies and Regulations

WHO...?

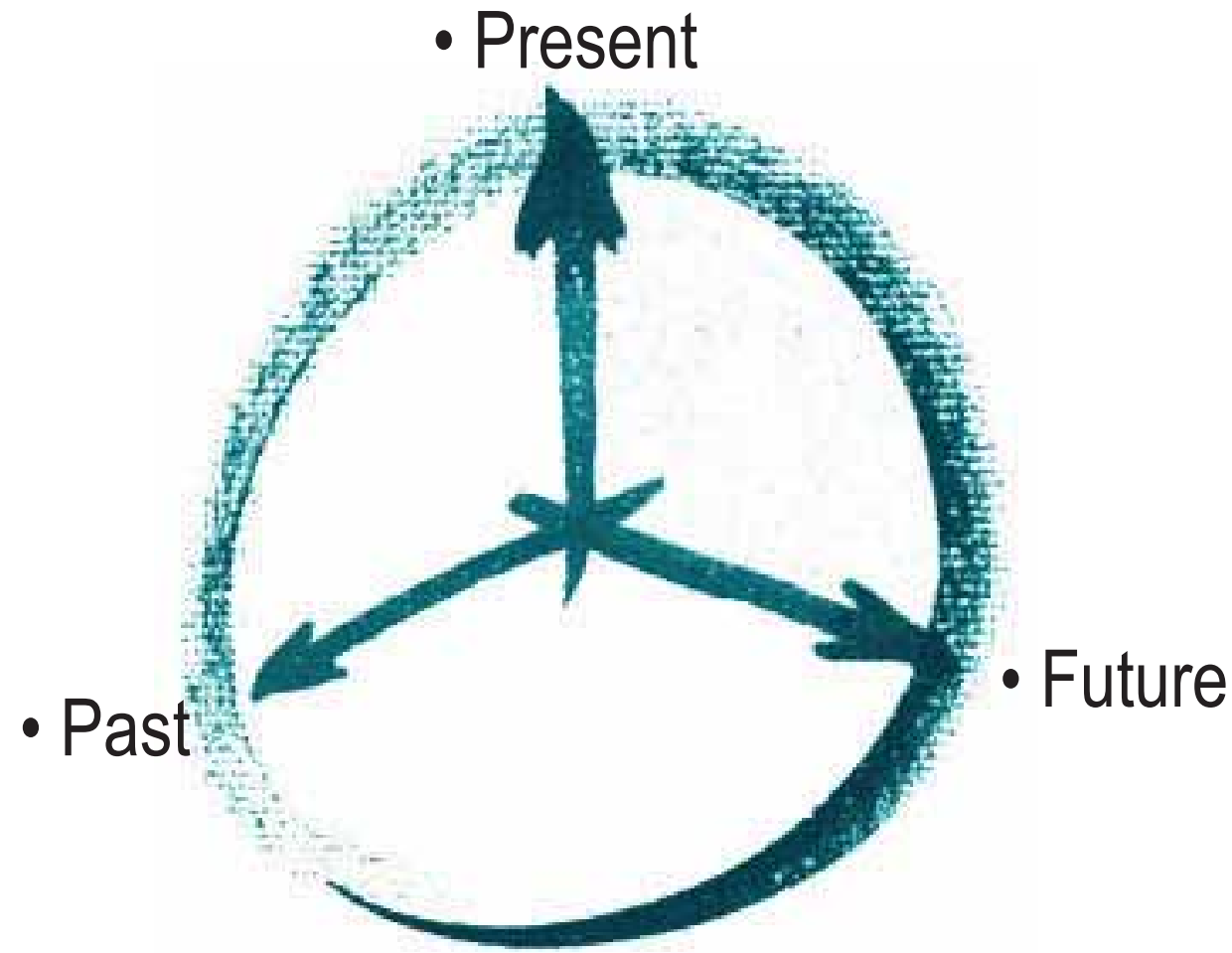
- People who live in this new city.
- Architects and city planningers.
- Policy-makers and governments.
- People who are involved in this market.

Contents

目录

Planning a future sustainable city

- Learning From Global Experience
- Cities and Sustainability Challenges
- Future Vision and New Technology



In doing so, it is necessary to be systematic. There are, I would argue, two key questions that need to be asked about such attempts:

First, location: what is the relation to the “parent city”? Here, we can distinguish two models:

• Distance from the parent city and thus self-contained, as in the London new towns
• Close to the parent city and thus a satellite town, as in the Stockholm satellites.

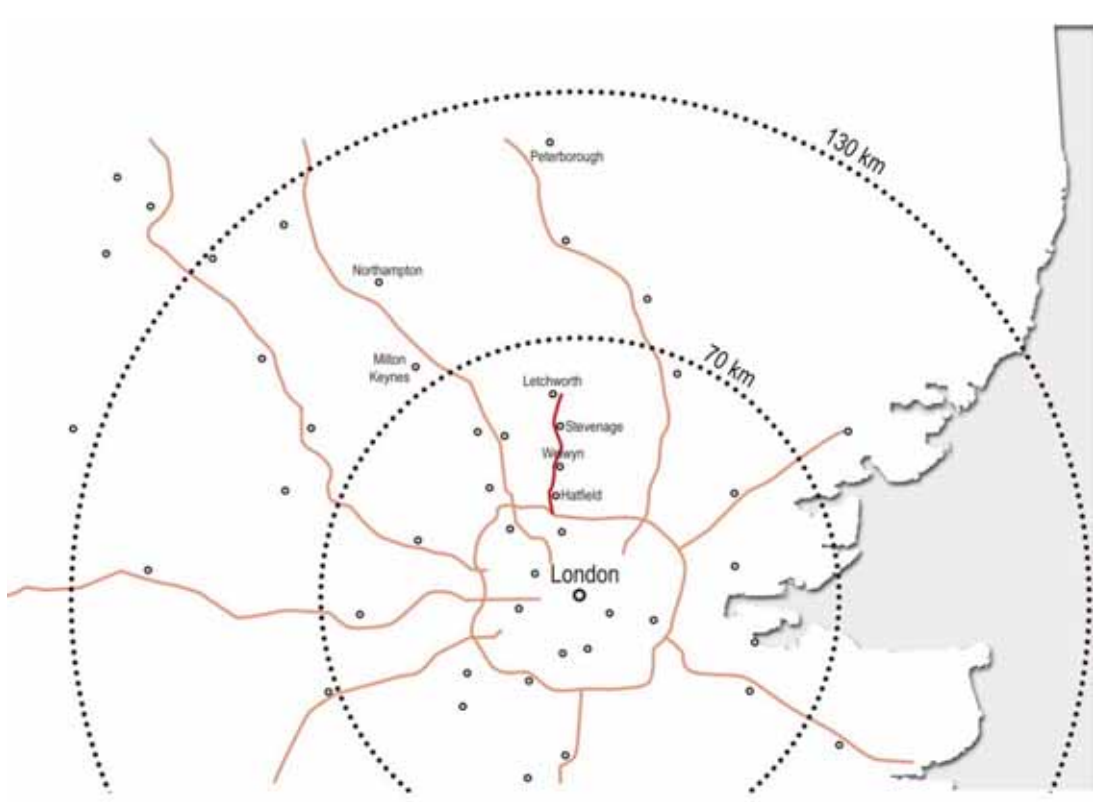
Second, design: how to achieve a sustainable design? What are the key elements? I cannot pretend at a complete list, but there are at least two critical elements:

• Green space which should surround the town and penetrating right into and through it;
• Transport which should be planned to reduce dependence on the private car, through maximizing public transport access, either by rail or bus or some combination of the two---and related to land use planning.

Location

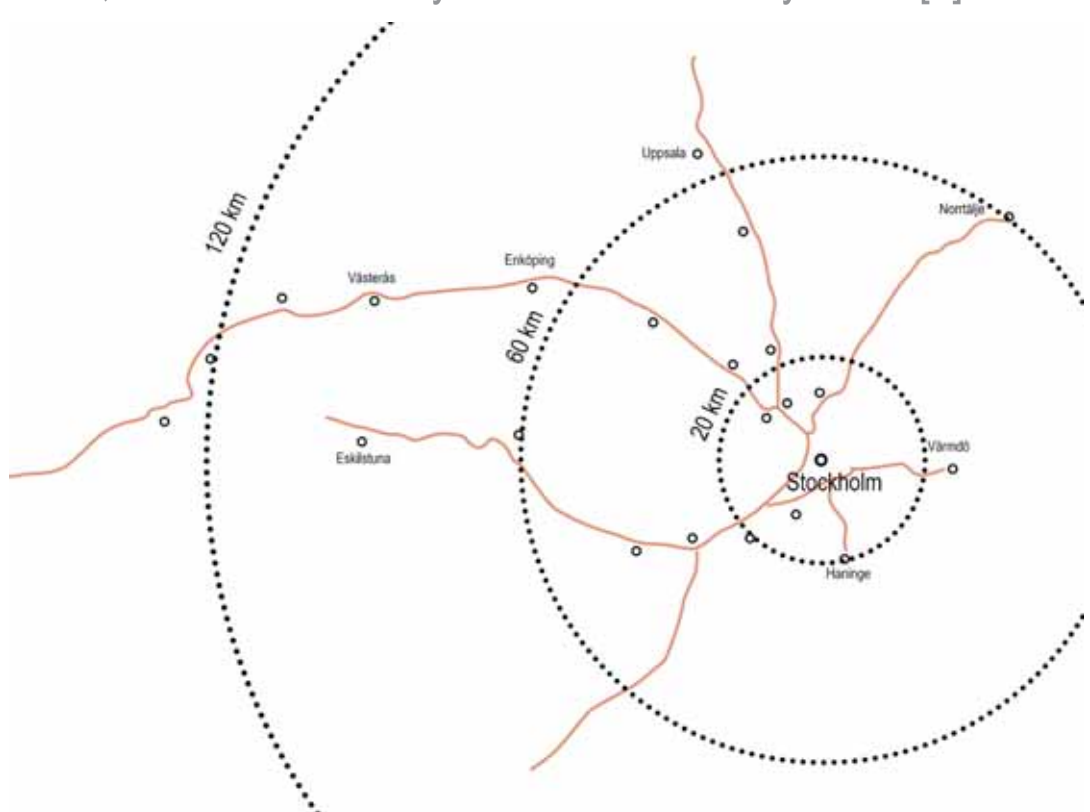
Case 1: London new towns

The first garden city was started in 1903 at Letchworth[5], 60 kilometers north of London, the second at in 1920 at Welwyn[6], 35 kilometers north of London. These two cities are in this same belt. But ironically, transport technology caught up: today these cities, too, are served by fast trains connecting them as up to 200 km/hr. with London, and have considerable commuter traffic.



Case 2: Stockholm satellite towns

In the 1950s, the Swedish government was pursuing a very different model around the city of Stockholm: satellite communities at about 15-20 kilometers distant, linked to the city center by a new metro (Tunnelbana) system. It worked well at first generated more car traffic because of the demand for access between the satellites and also to other outer areas, which the metro system did not directly serve.[7]



Letchworth

Tunnelbana

Conclusion

Before we start to plan a city, we should give full consideration to the location of the city, for instance, distance between the new city and the large city, transportation type, etc. In a way, we can figure out the time to the large city and if it is self-contained or not.

Sustainable design: How to achieve it?

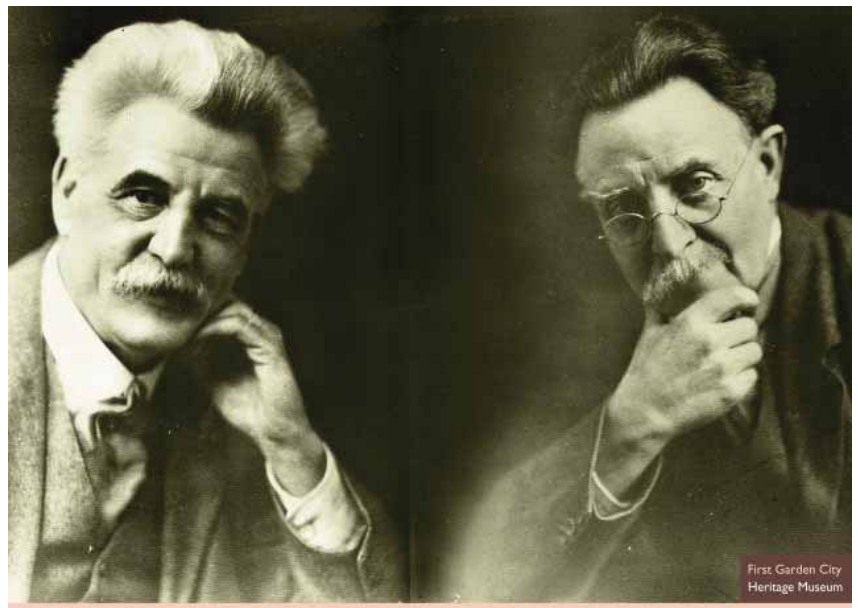
When come to consider the internal planning of land uses and connecting transport systems within such a planned new town, entirely different – but related – considerations apply.

The first is the disposition of green space.

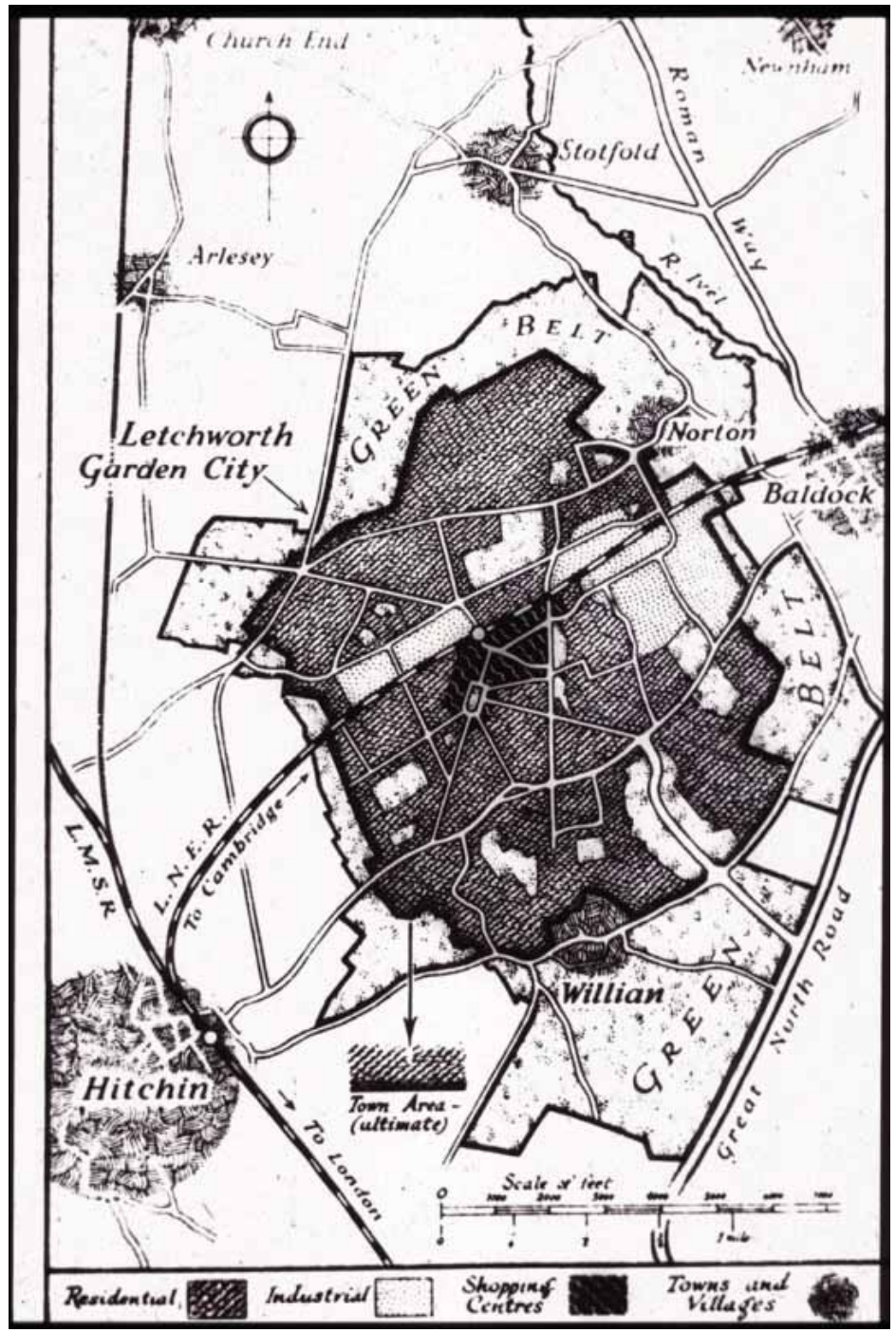
The other critical question is the relationship of land uses, and the activities they house, with the urban transport system connecting them together.

Green Space ----- Howard's garden cities

Howard's garden cities would each be surrounded by a green belt separating them from the next garden city or existing settlement: the resulting Social Cities diagram shows that they would follow a pattern later described by Raymond Unwin, Howard's architect at Letchworth and one the key founding figures of UK town planning, as "towns against a background of open country". [8] But equally, they would be totally penetrated by green space inside. Because they could be planned without any concern for land values – the essence of Howard's concept was that the land would be purchased very cheaply at agricultural values and then owned and leased out by a trust – the center of each garden city would be a huge circular public park surrounded by civic buildings; this was actually achieved at Letchworth. Further, half way between this central park and the edge of the town there would be an internal circular green belt – a green park ring – providing open space for schools.



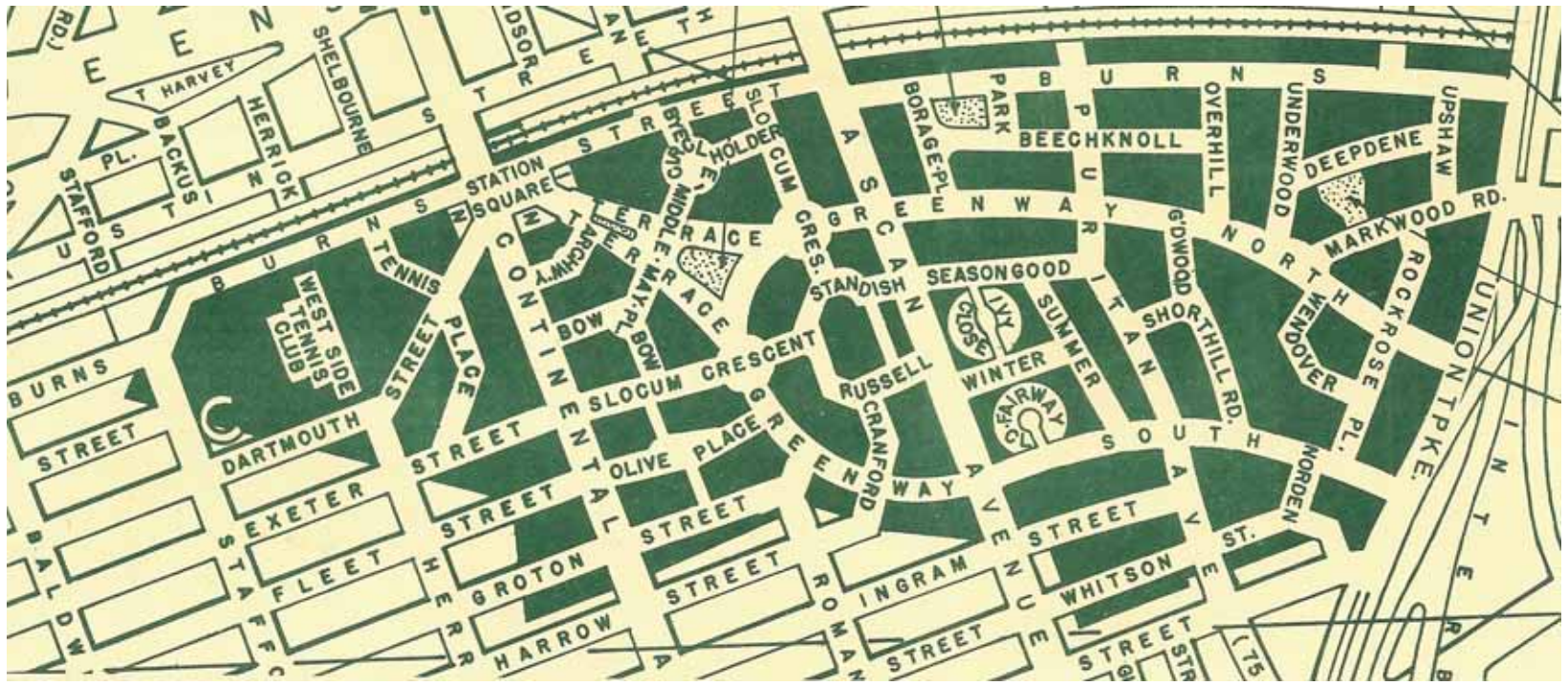
Barry Parker and Raymond Unwin



Town planning of Letchworth garden city[9]

Green Space ----- neighborhood units

Howard stressed in his book that these maps were purely diagrammatical and that the actual planning must be adapted to the local geography. Both Letchworth and Welwyn do contain large areas of green park space, though it does not take a circular from. So do the new towns planned in the 1940s, where the green space is used to define and separate local neighborhood units of 5-8000 people, each with their own shops and schools – an area borrowed from an American community planner, Clarence Perry, who first developed it in a planned garden suburb of New York, Forest Hill Gardens, in 1912.[10]



Forest Hill Gardens, New York.

Green Space ----- separating car and pedestrian-cycle

American planners in fact developed Howard's idea further in two remarkable schemes which represent perhaps the finest extant examples of interpenetrating green space inside a planned new town: Radburn (1928) outside New York City and Greenbelt (1935) outside Washington DC. In both, the architect-planner Clarence Perry played a key role. The Redburn plan was the first to employ the idea of separating car and pedestrian-cycle traffic to provide safe routes for children to and from school, which was later successfully employed in many of the UK new towns; instead, it gave its name to that layout. Unfortunately, the town itself was never completed because the Great Depression intervened, and only a small part of the original design survives. Greenbelt in contrast was completed, and forms a remarkably coherent plan to this day: here the same principle of traffic separation is employed, but the pedestrian-cycle paths lead directly into a vast circular central park containing schools and community facilities, around which the residential areas are grouped in a giant horseshoe.[11]

FIG. 15
RADBURN, NEW JERSEY—PLAN OF MODEL COMMUNITY
[134]

Relationship of land and activities, with the urban transport system connecting them together.

Critical here are the densities, especially of residential development, but also of commercial development, that will underpin a viable and satisfactory public transport system in cities where the majority of households may own cars; and, related to this, the nature of that public transport system.

Bus

In many places in this world, The heavy metro type rail, with high construction costs and high minimum density requirements may not feasible. Here is an example, Curitiba in Brazil, involves seamless-web interchange between high-capacity articulated buses carrying up to 270 people on express busway corridors, orbital buses running in rings, and local buses providing feeder services into local interchange hubs, with deliberate zoning for high-density development along the express radials.[13]

Bus stop in Curitiba, Brazil[14]

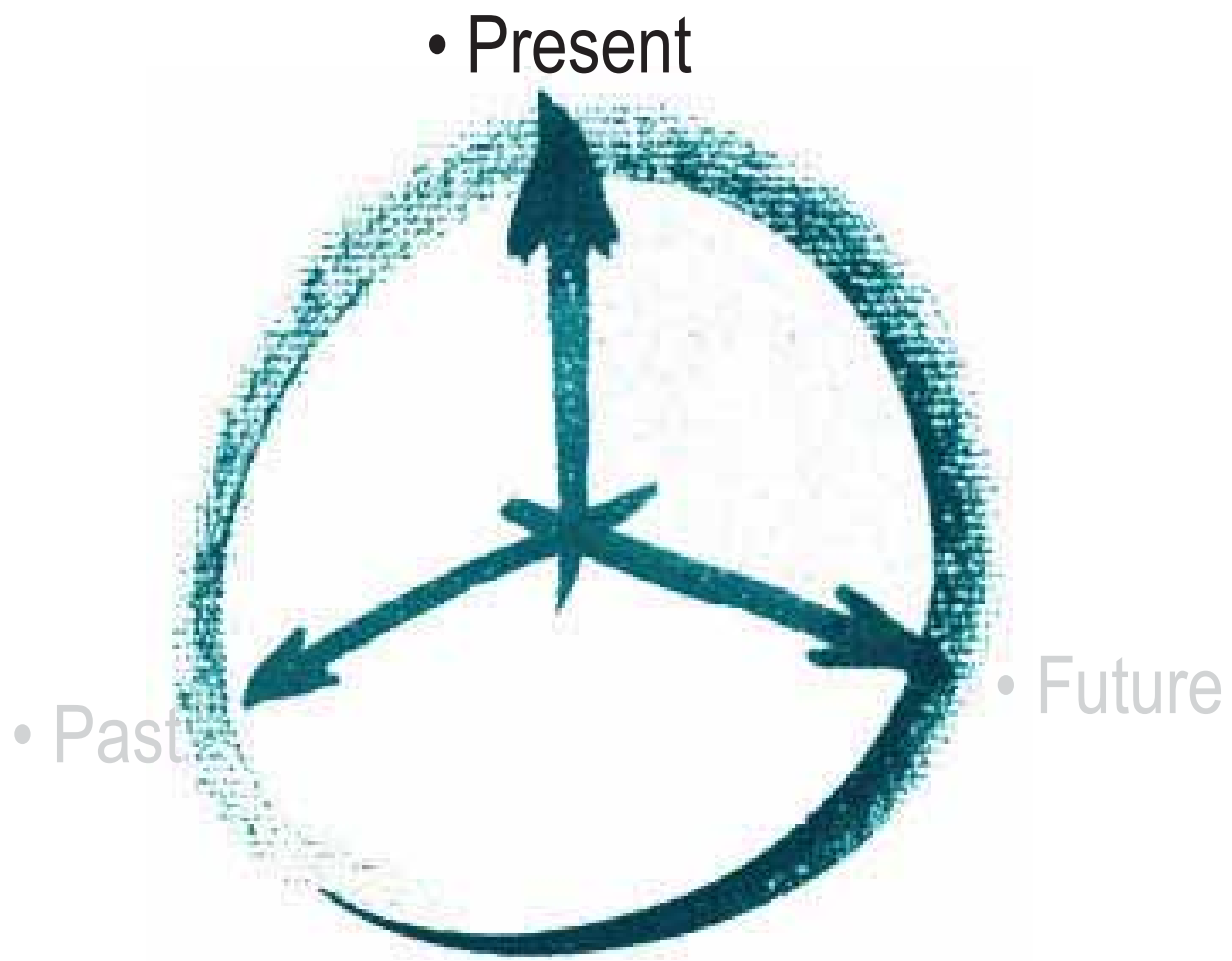
Tram & Light rail

This, it must be stressed, is not the only possible model. European cities like Freiburg in Germany or Strasbourg in France have recently developed very effective new suburbs at medium-high densities along new tram way extensions, while Denmark is developing a “new town intown”, Ørestad, along a new metro corridor near to the Copenhagen airport and the approach to the new road rail crossing to Sweden.

Conclusion

Green spaces in cities can be the public space or landscape, they but also can have some functions in city planning. How to choose the suitable urban transportation depends on urban densities, residential development, and commercial development.

It would be an illusion to try and implement sustainable development without focusing on sustainable urban development. Global urban growth is changing the condition of humanity and the face of the earth. Half of the world's people now living in cities, with most of the other half depending on them for their economic survival.



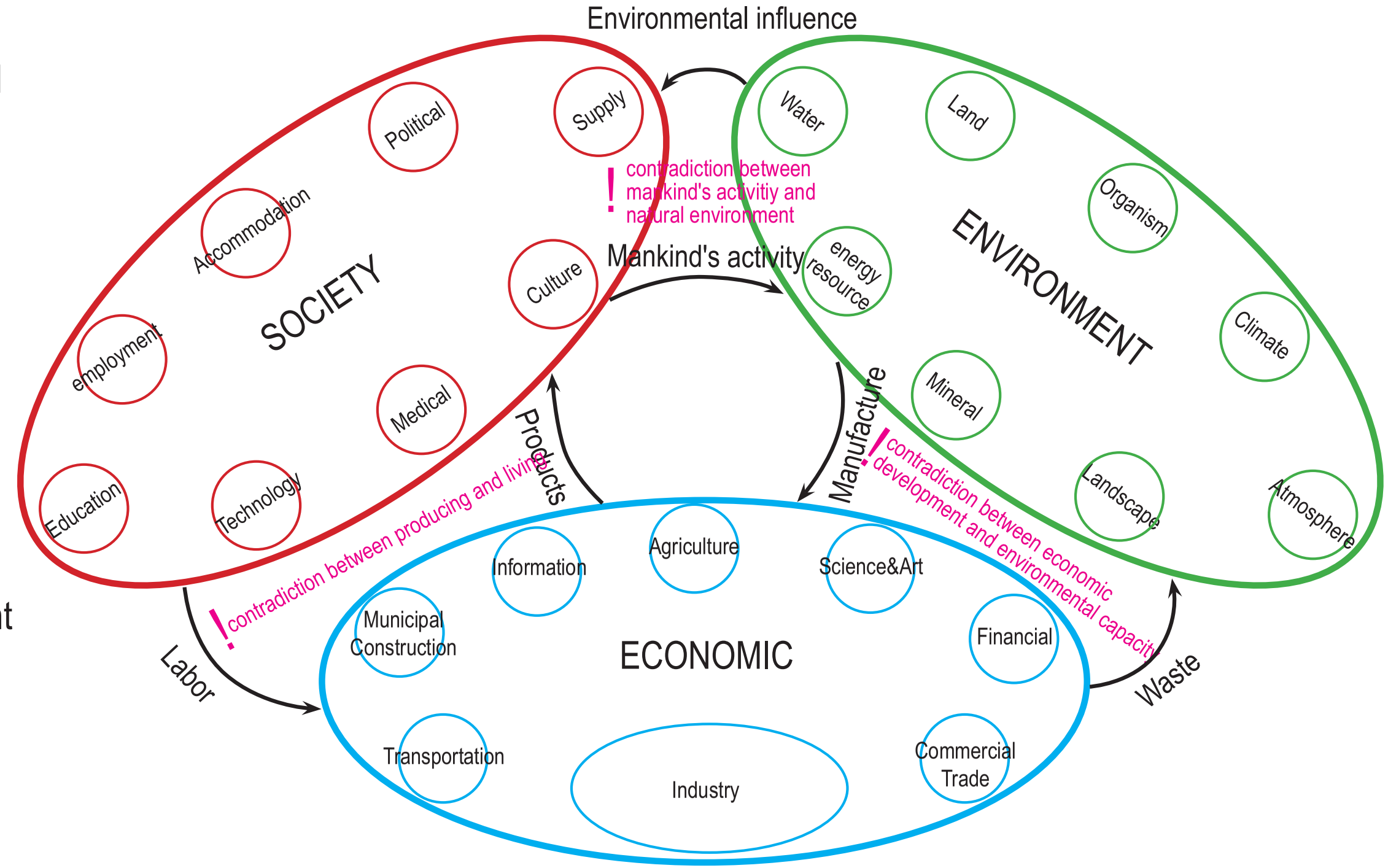

RECYCLE

Contradictions

• Between mankind's activitiy and natural environment (Society-Environment).
- Water,air pollutions
- GHG emission
- Bad behave & life styles
...

• Between producing and living (Society- Economic).
- Food & water supply
- Living space
- Working opportunities
- Transportation
...

• Between economic development and environmental capacity (Environment- Economic).
- Energy resources
- Land resources
-Water resources
...



Planning a future sustainable city

Mega-cities of ten million or more people, such as Shanghai, are the largest, most complex man-made structures ever created. They are the central hubs of modern economies and their transport and communication systems.

Fossil fuel technology has been powering modern urbanization. But 40 percent of the world's people live within 40 miles of the sea, and in the coming decades, if current practices are maintained; many cities will be threatened by the rising tides of climate change.[15]

Towards the new energy city

It is becoming clear that the dependence of our cities on fossil fuels can be dramatically reduced. In many cities, renewable energy technology is already showing substantial economic and social benefits.

Across the world, we need a revolution in “future-proofing” our urban energy systems, assuring the highest possible levels of energy- efficiency and progressively switching to renewable energy technology. The sustainable cities of the future will need to be powered by wind, solar and biomass energy.

Towards the new energy city ------ Wind Power

Already 20 percent of the electricity supply to some major European cities, such as Copenhagen, is from wind power.[16] London is expected to reduce its carbon dioxide output by around 60 percent by 2050 by building the "London Array" in the Thames estuary, which will include up to 270 turbines which are intended to supply 25 percent of the domestic electricity demand of 7.5 million Londoners. The construction of this, the world's largest offshore wind park, is expected to commence in 2006 and will be completed by 2011.[17]

Towards the new energy city ------ Solar Power

Solar electricity is still much more expensive than the conventional electricity, but its cost is now coming down rapidly. Government support programs in Japan, Europe and China now give households and companies substantial financial incentives to install PV cells on their buildings. In 15 European countries legislation now allows the owner of solar roofs to charge up to four times the price for the electricity they sell to the grid as compared with conventional power station. As a result, a global boom in solar energy systems is underway.[18]

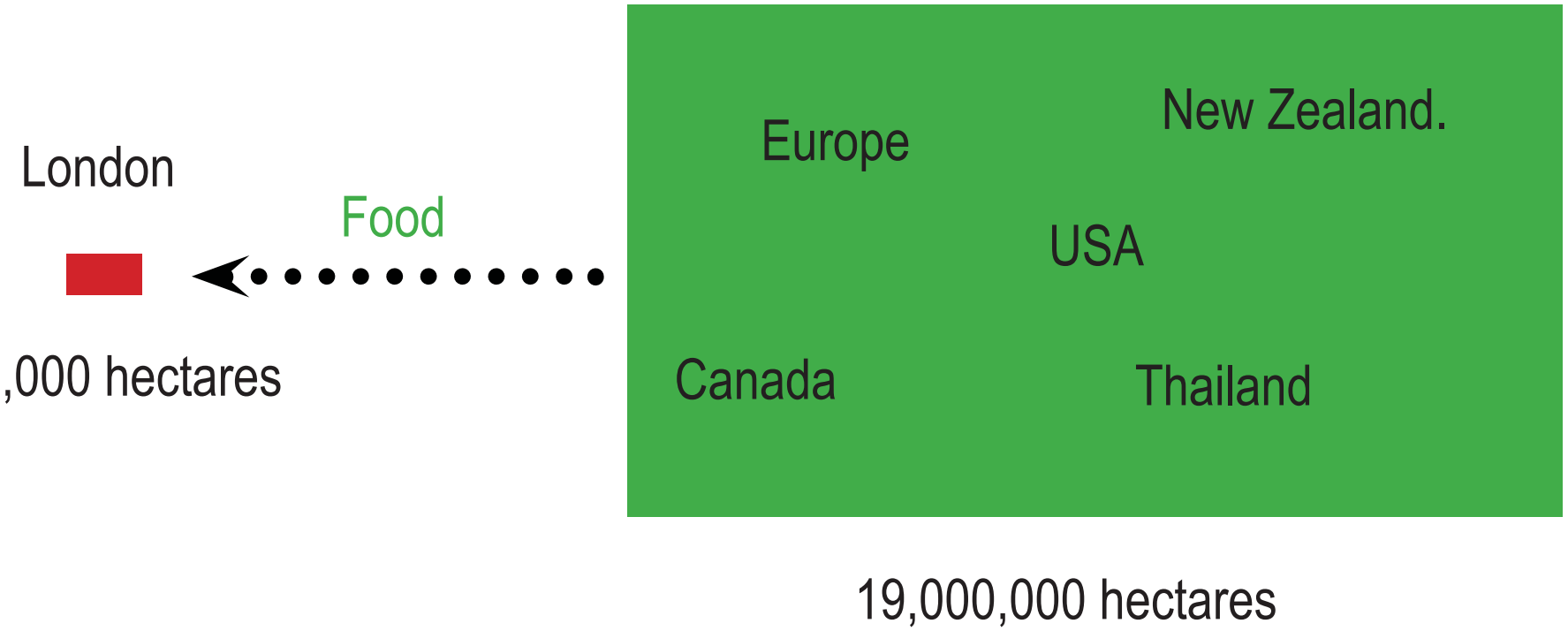
Towards the new energy city ------ Fuel cell technology

Fuel cell technology is another component of the future sustainable city, converting hydrogen straight to electricity without combustion, using an electro-chemical process. Fuel cell-powered buses, trucks, cars and boats are expected to be mass produced within a decade or so. One important advantage they have for cities is that they don't burn fuel when they are stationary. Fuel cells can also power buildings or whole urban districts. In various cities in Europe and America, fuel cell power stations are now coming on stream, making highly efficient use of natural gas, methanol or pure hydrogen.

Mercedes-Benz fuel cell bus.[19]

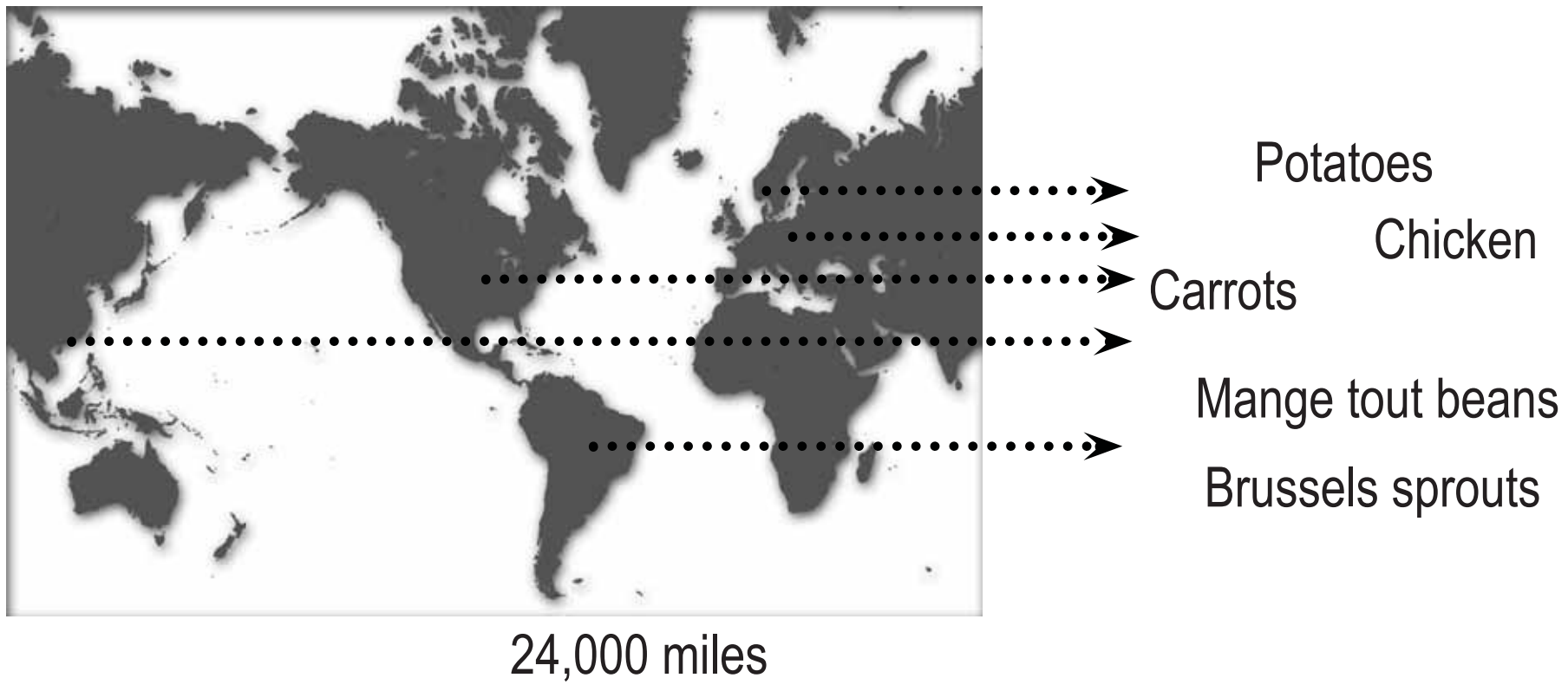
Improving urban food system

For the bulk of their food, many modern cities have come to depend on highly unsustainable supplies. The energy technologies that have made cities of millions people possible has also helped create energy and technology-dependent food systems, and urban food supplies originate in an increasingly global hinterland. London, for instance, has a surface area of some 160,000 hectares, but it currently requires 120 times its own area, or around 19 million hectares, to supply it with food. Much of that farmland, of course, is not located Britain itself, but across Europe and in places as far away as the USA, Canada, Brazil, Thailand or New Zealand.[20]



Improving urban food system

People are being designed out of farming system. In the UK, for instance, only 1.5 percent of the population still works the land. Rural landscapes across the world no longer exist in their own right but are mainly for supplying food demands from distant cities, via food distribution centers located near airports, ports or motorways. In the United States food typically travels between 1,500 and 2,500 miles from farm to plate, as much as 25 percent further than it did in 1980. In Britain, a typical Sunday lunch for four people, consisting of chicken, potatoes, carrots, mange tout beans and Brussels sprouts, travel over 24,000 miles to reach a dinner table. [21]



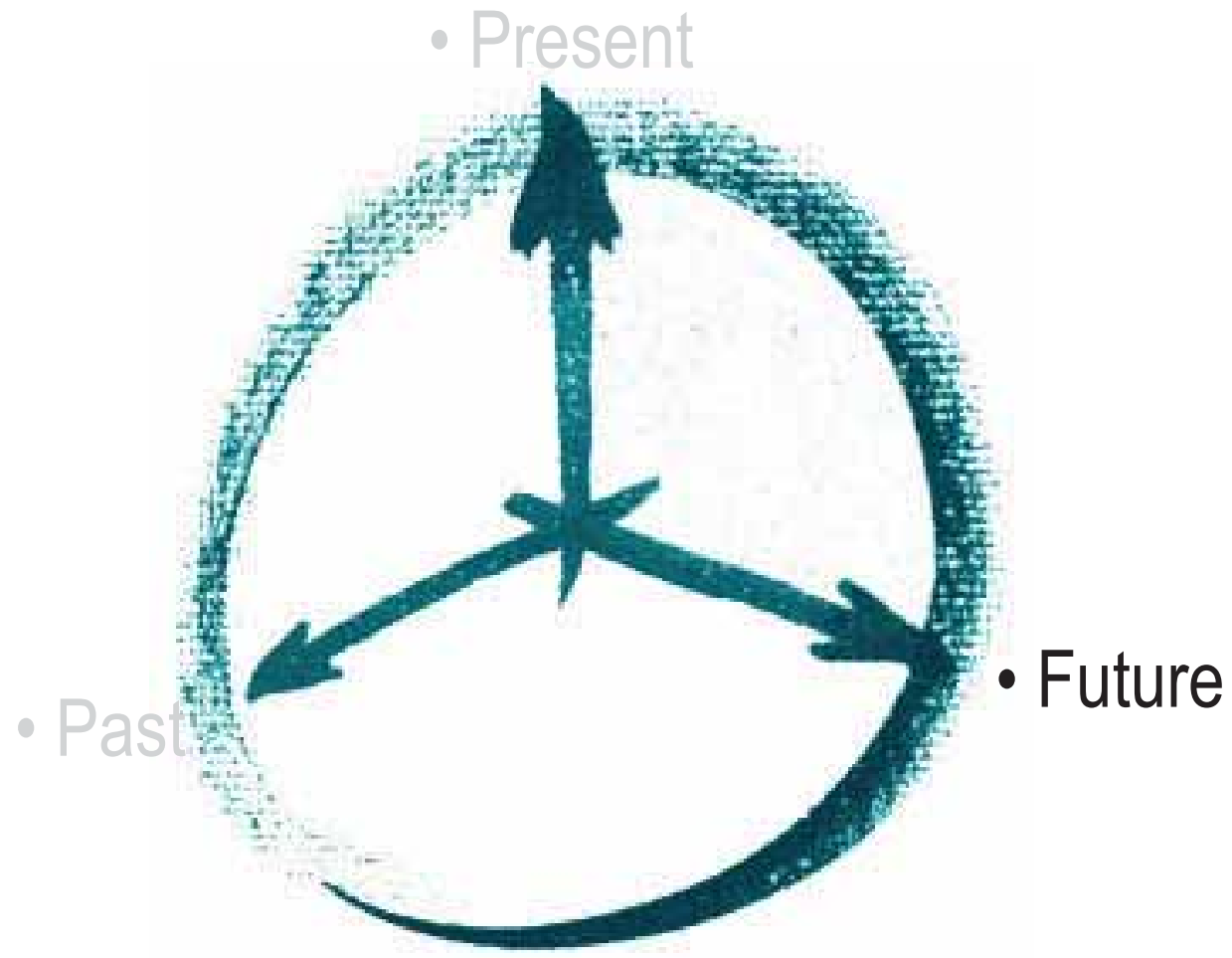
Improving urban food system

Creating sustainable cities requires us to take a close look at urban food supplies. To increase the efficiency of urban consumption patterns also requires us to reintroduce the concept of proximity – reducing the distances of where key resources originate. For instance, the bulk of the food consumed In our cities should ultimately be supplied from peri-urban regions rather than being trucked and flown in long-distance expending huge amounts of energy in transportation.

19,000,000 hectares

Future vision for sustainable development

- Make renewable energy dominant
- Future sustainable lifestyle



Make Renewable energy dominant.

Renewable energy sources, such as solar energy, were introduced into our life for many years, however fossil fuel energy are still dominant in this world. Human beings are still fighting for acquiring fossil fuels, petroleum especially to satisfy their existing unsustainable want. How to make renewable energy dominant is our crucial task for human future.

Make Renewable energy dominant.

--- increase efficiency of using renewable energy.

How to increase efficiency of using renewable energy is a problem, for a instance, The efficiency rating of solar panels is fairly low, Depending on your situation it can range from 5% to 15%. Crystalline silicon, which is one of the best materials, is now approaching the theoretical limiting efficiency of 29%.[22]

Make Renewable energy dominant.

--- encourage people to choose renewable energy.

Government support programs in Japan, Europe and China now give households and companies substantial financial incentives to install PV cells on their buildings. In 15 European countries legislation now allows the owner of solar roofs to charge up to four times the price for the electricity they sell to the grid as compared with conventional power station.[23]

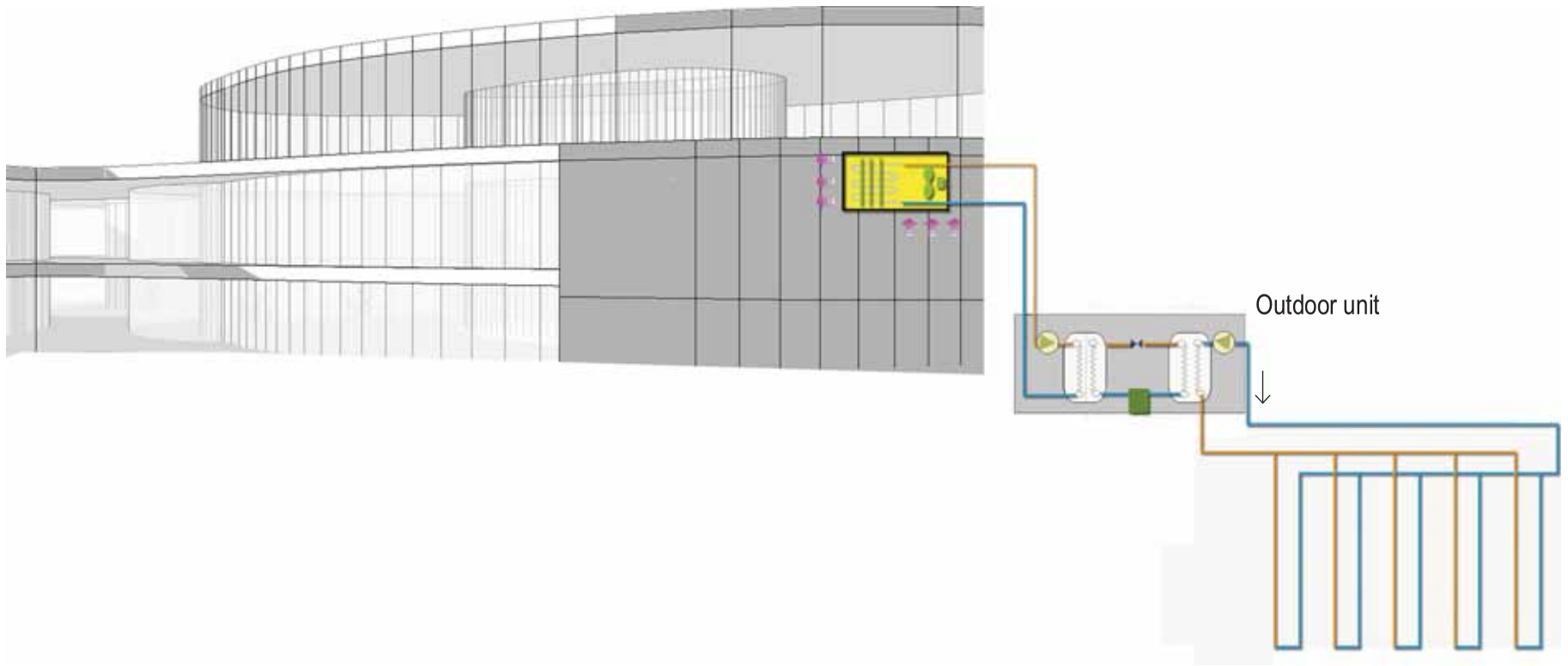
+

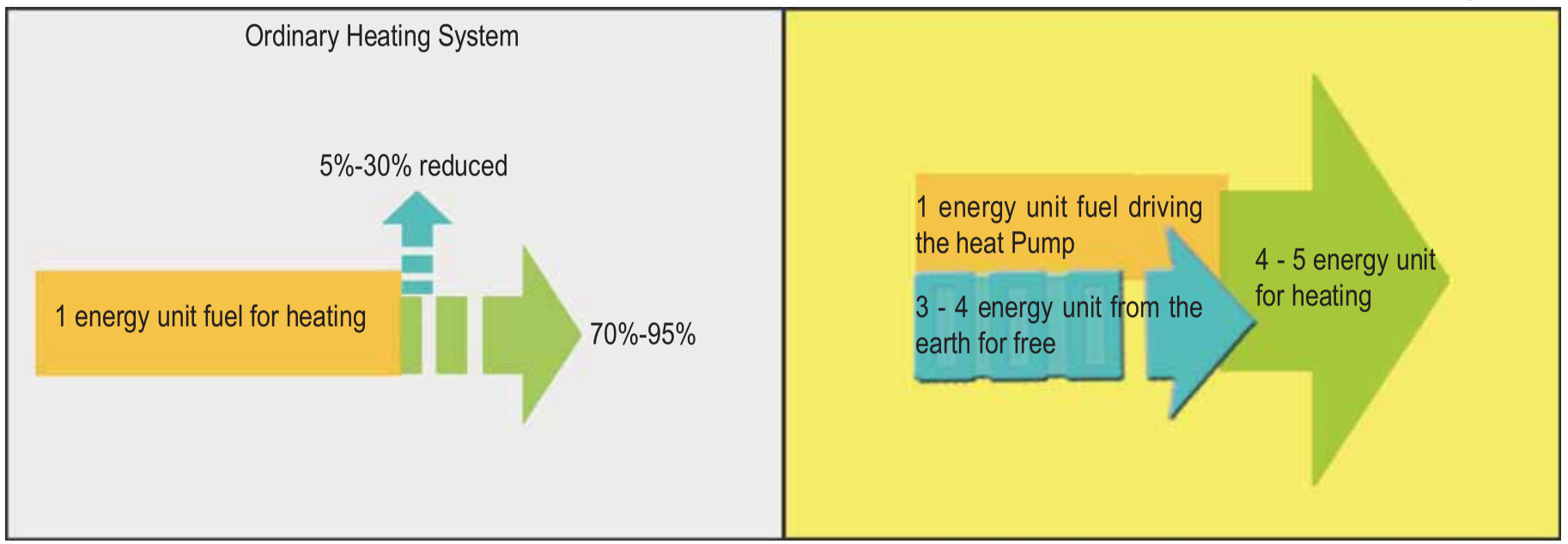
Make Renewable energy dominant.

--- find new renewable energy sources.

Geothermal energy

Geothermal energy is energy obtained by tapping the heat of the earth itself, both from kilometers deep into the Earth's crust in volcanically active locations of the globe or from shallow depths, as in geothermal heat pumps in most locations of the planet. It is expensive to build a power station but operating costs are low resulting in low energy costs for suitable sites. Ultimately, this energy derives from heat in the Earth's core. [24]





Future sustainable lifestyle

Future sustainable lifestyle

The first green "straddling" bus in China started its design and production process on Aug 24 and is expected to be put into operation by the end of 2011. It is to be put into pilot use in Beijing's Mentougou district.[25]

Nokia, the world's largest mobile phone maker launched four low-priced handsets and a recharger that can be connected to a bicycle's dynamo which charges when the wheels turn.[25]

The "Green Pass" turnstile is designed to harness the energy produced by people passing through it. The energy then can be used to power the swiping card readers, coin counters and other electronics present in every such device.[25]

The bottle features a perforated paper-tape dispenser at the bottom plus a temporary storage space for used gum.
To dispose of the chewed gum, you just need pull off the paper stub, wrap the used gum and shove it into the bottom.[25]

Contents

目录

Speak loudly in public

modest

Chopsticks

Panda

Low Quality

Fake

No belief

Different perspectives about China

One-party system

Bicycles

Made in China

invade the world

Authoritarian Rule

Crowded

Undemocratic

collectivism

Millitary

Kung Fu

Cheap

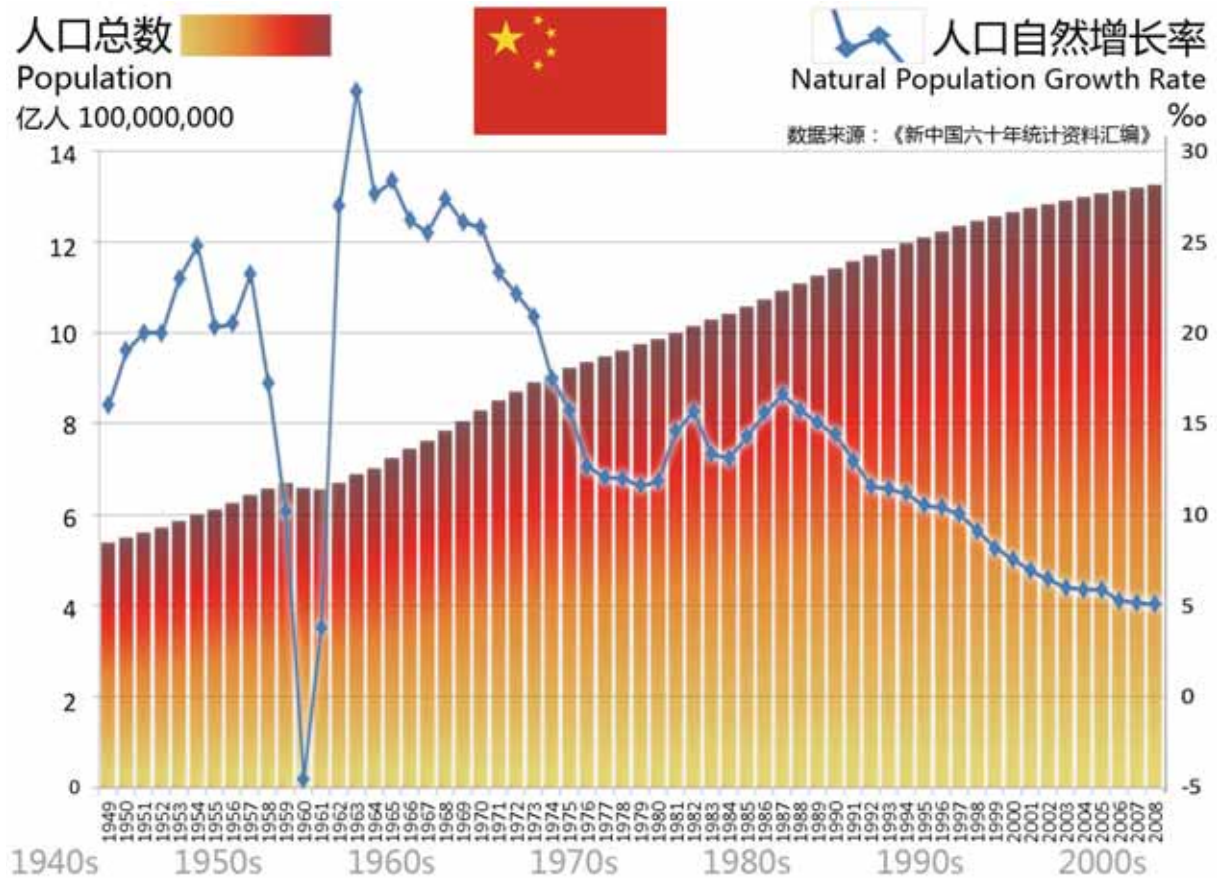
Always want to be NO. 1

Location of People's Republic of China.[26]

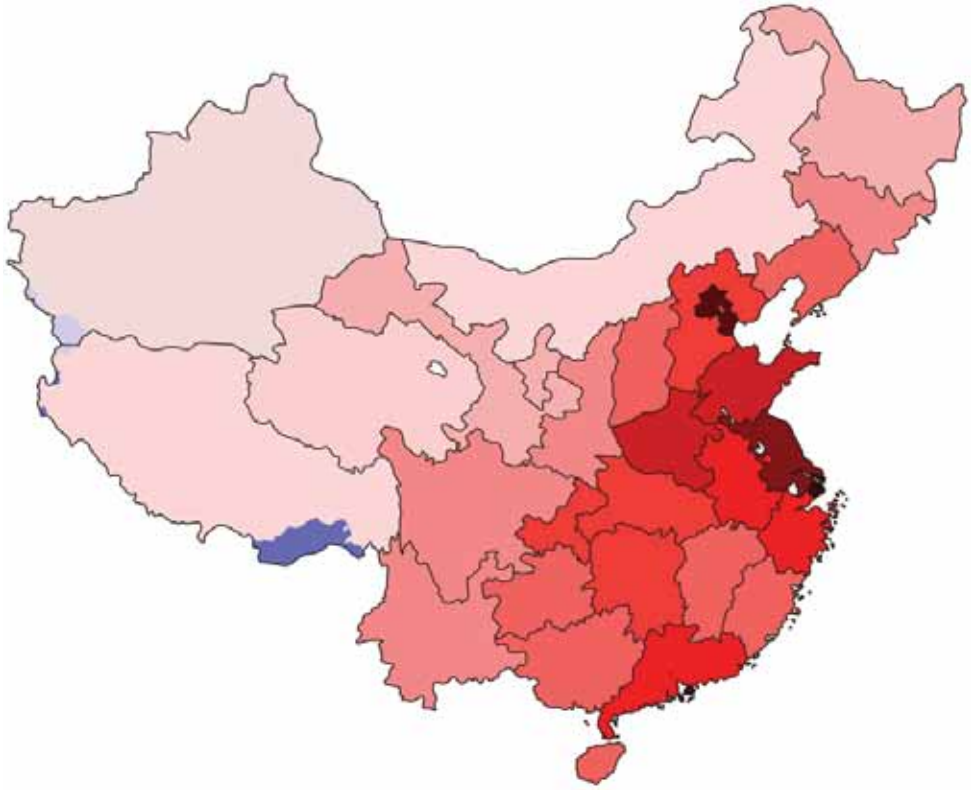
Area:
- Total:9,671,018 km²
- Water: 2.8% [27]

Ethnic groups
91.6% Han;
55 minorities [28]

Language
Mandarin[official]
293 Languages [31]



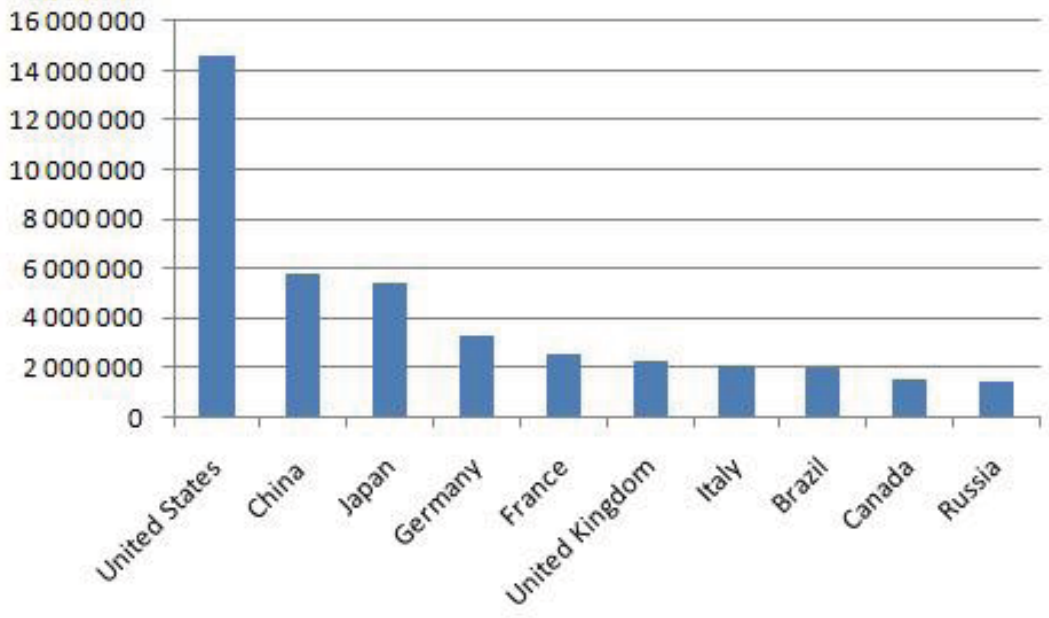
Population and Natural Increase Rate of PRC.[30]



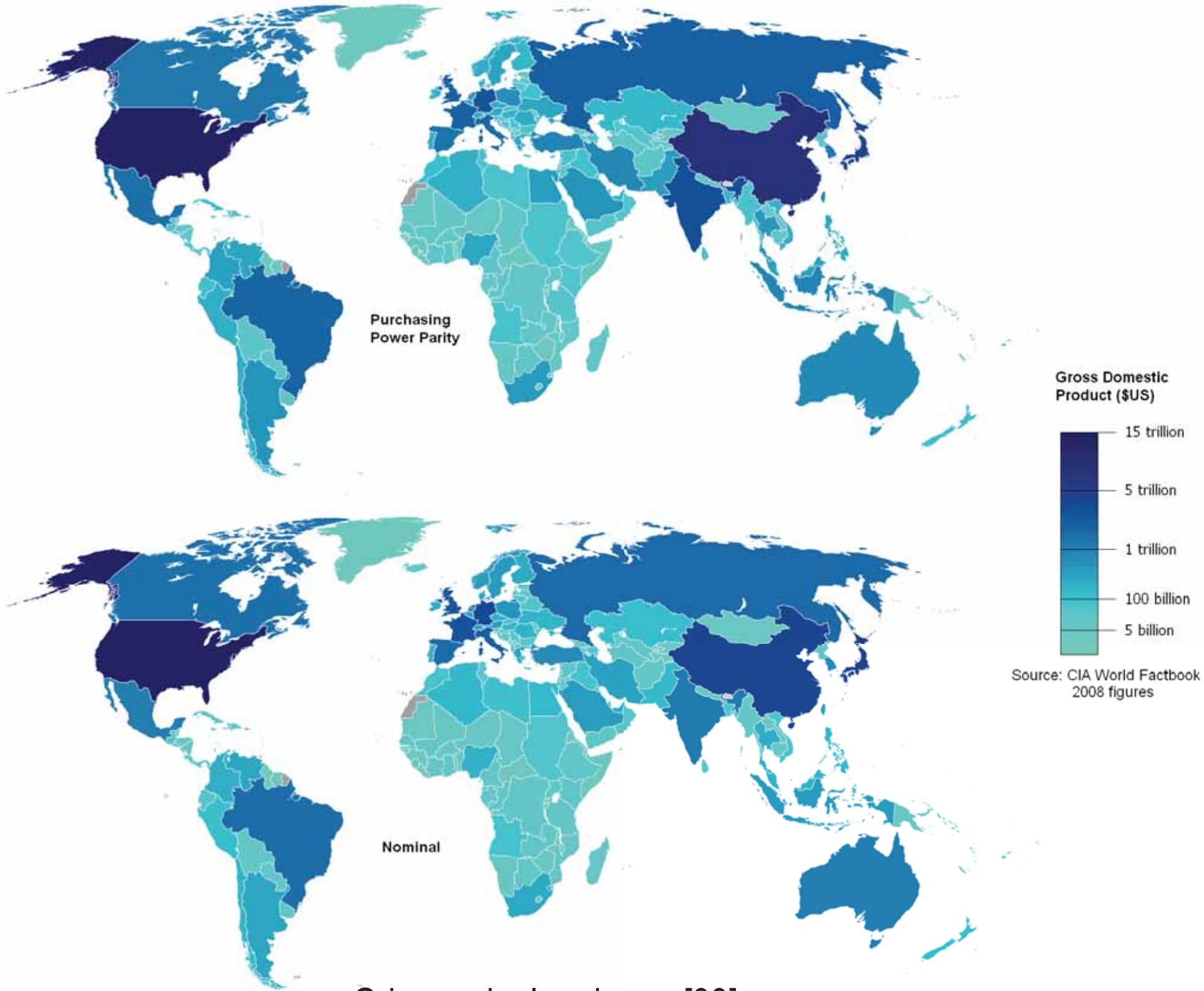
A population density map of the People's Republic of China.[29]

A population density map of the Mainland of China. The eastern, coastal provinces are much more densely populated than the western interior.

Population
-1,336,718,015[2011]
-Density: 139.6/km2.[28]



GDP (PPP)
2010 estimate
- Total: $10.084 trillion
- Per capita: $7,518.
[32]



Gdp nominal and ppp. [33]

PRC - Importanten Cities. [34]

City	Urban Core Population123	Level	Province-level Division
1- Shanghai	9,495,701	Municipality	Shanghai
2- Beijing	7,296,962	Municipality	Beijing
3- Hong Kong	6,780,000	SAR	Hong Kong
4- Tianjin	5,066,129	Municipality	Tianjin
5- Wuhan	4,488,892	Sub-provincial city	Hubei
6- Guangzhou	4,154,808	Sub-provincial city	Guangdong
7- Shenyang	3,981,023	Sub-provincial city	Liaoning
8- Chongqing	3,934,239	Municipality	Chongqing
9- Nanjing	2,822,117	Sub-provincial city	Jiangsu
10- Harbin	2,672,069	Sub-provincial city	Heilongjiang

2008 Estimated - Urban Population. [35]

Urbanization
-660 cities
-Rate: 46.8%
[36]

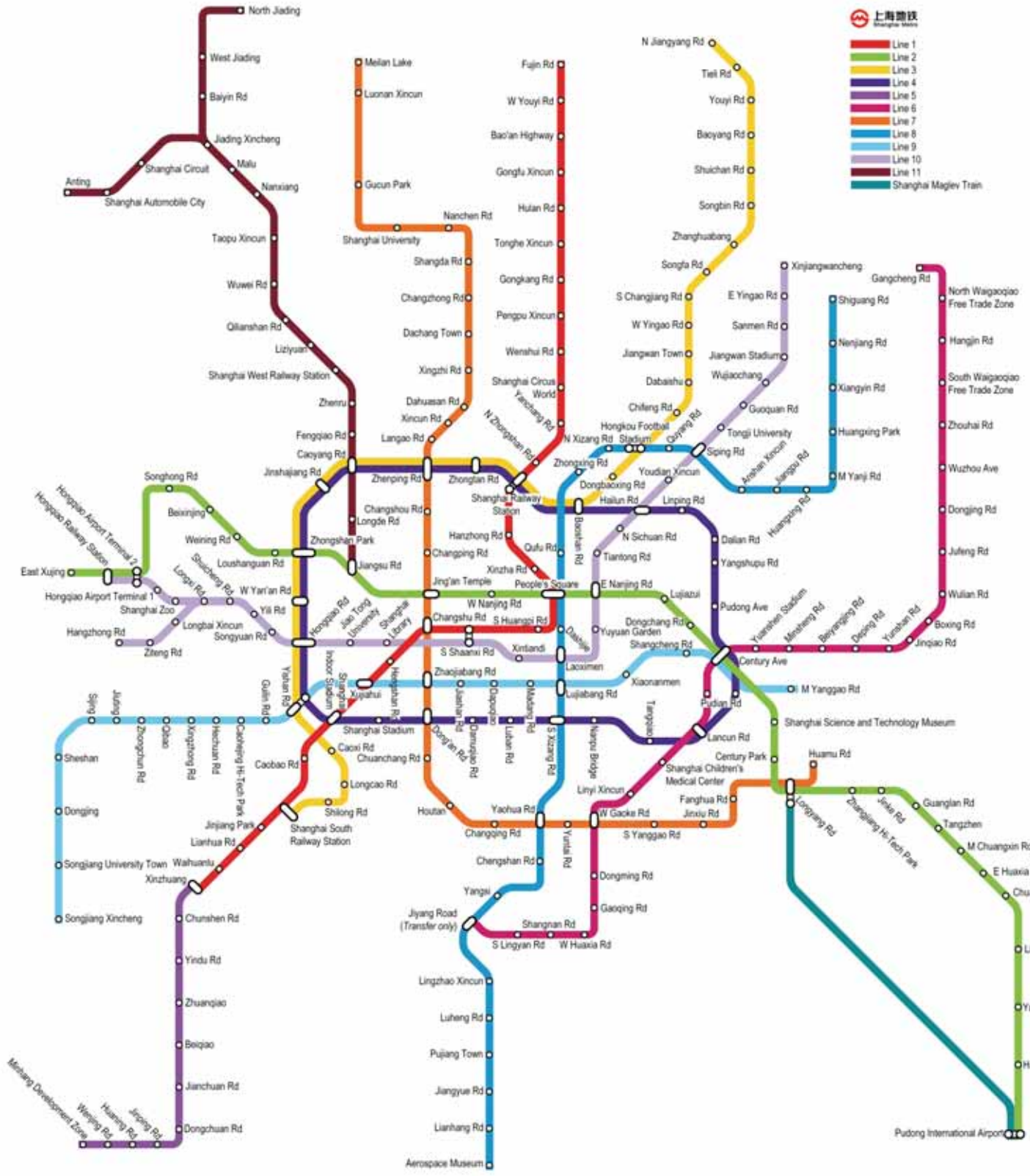
Railway in China. [37]

Transportation
-Rail
-Road

Railway in China. [39]

Rail is the major mode of transport in China. Carrying some 24% of the world's railway transport volume, China's railway system is critical to its economy. China has the world's second largest rail network, the total track length being at 86,000 km in 2009.
The national rail system is modernizing and expanding rapidly and is efficient within the limits of the available track. Some 5,000 km of track were added in 2010. The total mileage is 91,000 km, about 40% is electrified.[38]

Today, China is linked by a still evolving network of roads (China National Highways) and expressways (Expressways of China). In the past few years, China has been rapidly developing its highway system. China National Highways stretch to all four corners of mainland China. Expressways reach the same destinations as China National Highways, except for the rugged terrain of Tibet. An expressway link is already at the planning stage.[40]



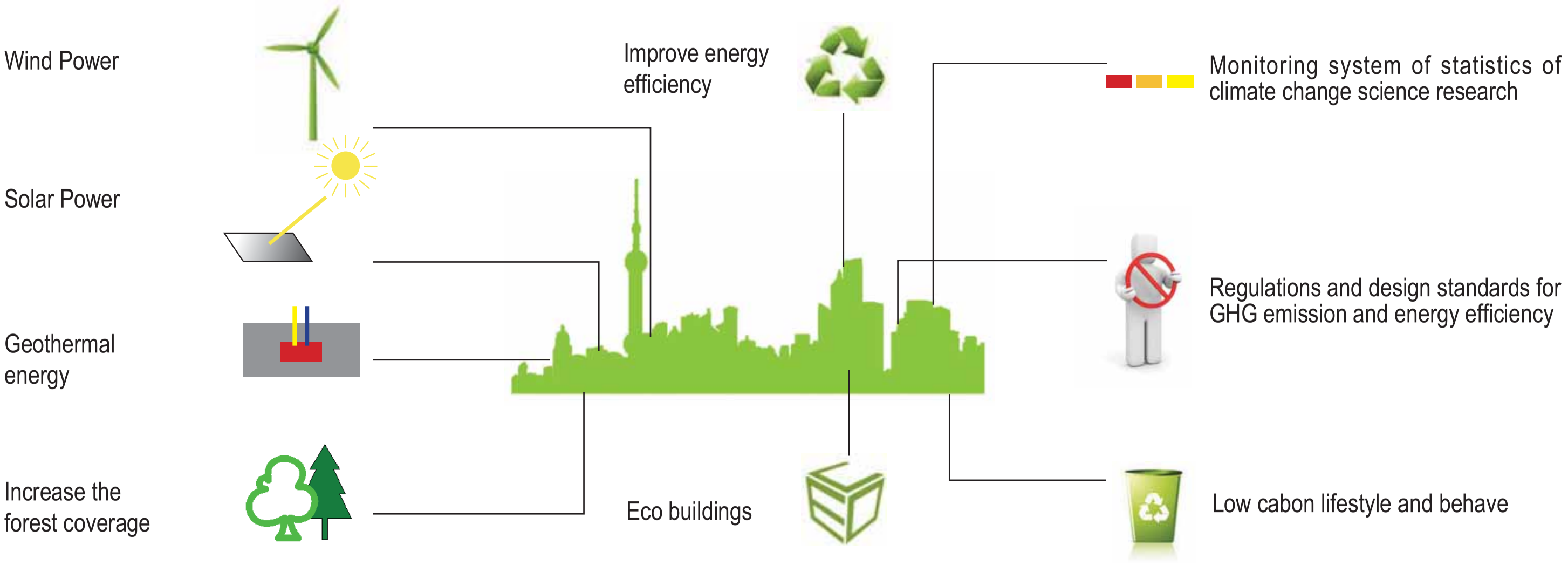
Current Map of Shanghai Metro.[41]

Transportation
-Metro

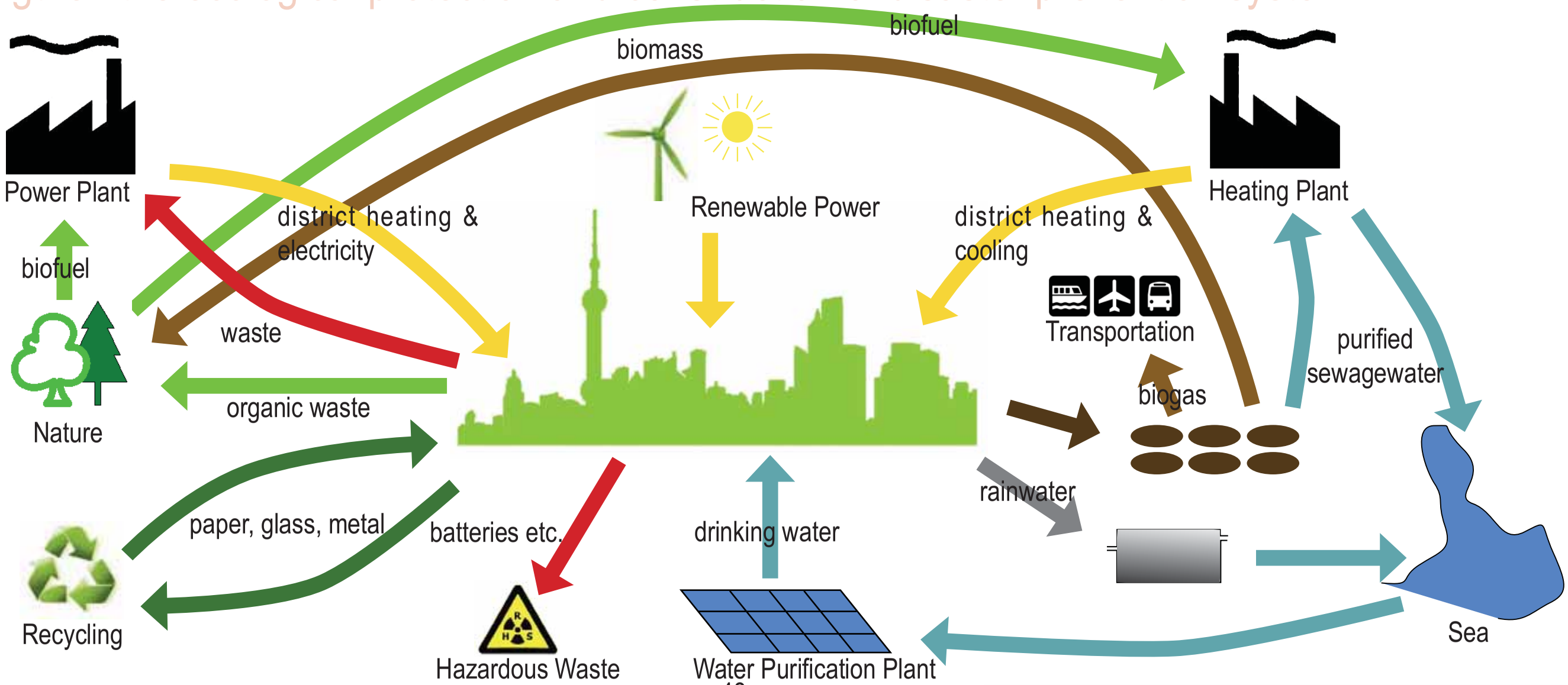
In the report of "12th five-year plan" published by Chinese Governments in 2011, accelerating a resource-conserving, environment-friendly society and improving the ecological civilization level is one of the most important chapter.(Chapter 6, "12th five-year plan" report).
It mainly contain five parts, they are[42]:

- Actively respond to climate change.
- To develop recycling economy.
- Strengthen resource conservation and management.
- Intensify environmental protection.
- Strengthen the ecological protection and construction of disaster prevention system.

- Actively respond to climate change.
- To develop recycling economy.
- Strengthen resource conservation and management.
- Intensify environmental protection.
- Strengthen the ecological protection and construction of disaster prevention system.



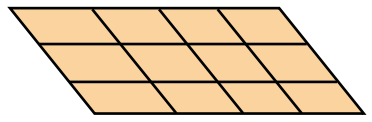
- Actively respond to climate change.
- To develop recycling economy.
- Strengthen resource conservation and management.
- Intensify environmental protection.
- Strengthen the ecological protection and construction of disaster prevention system.



- Actively respond to climate change.
- To develop recycling economy.
- Strengthen resource conservation and management.
- Intensify environmental protection.
- Strengthen the ecological protection and construction of disaster prevention system.

Increase Efficiency of Using Energy Resouces

Create mineral resources reserve system



Improve land management system

Nature conservation system

Highly safe and water-saving society construction of water resources allocation system

- Actively respond to climate change.
- To develop recycling economy.
- Strengthen resource conservation and management.
- Intensify environmental protection.
- Strengthen the ecological protection and construction of disaster prevention system.

Drinking Water

Air

urban sewage and garbage

noise control

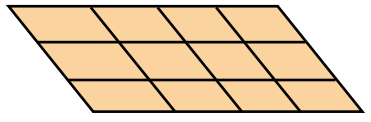
management of hazardous waste and heavy metal

supervision and radiation nuclear capability

- Actively respond to climate change.
- To develop recycling economy.
- Strengthen resource conservation and management.
- Intensify environmental protection.
- Strengthen the ecological protection and construction of disaster prevention system.

Natural forest protection 

Prevent rocky desertification 

Conservation grain and grazing land 

Strengthen urban flood control ability 

Protect the grassland and wetlands 

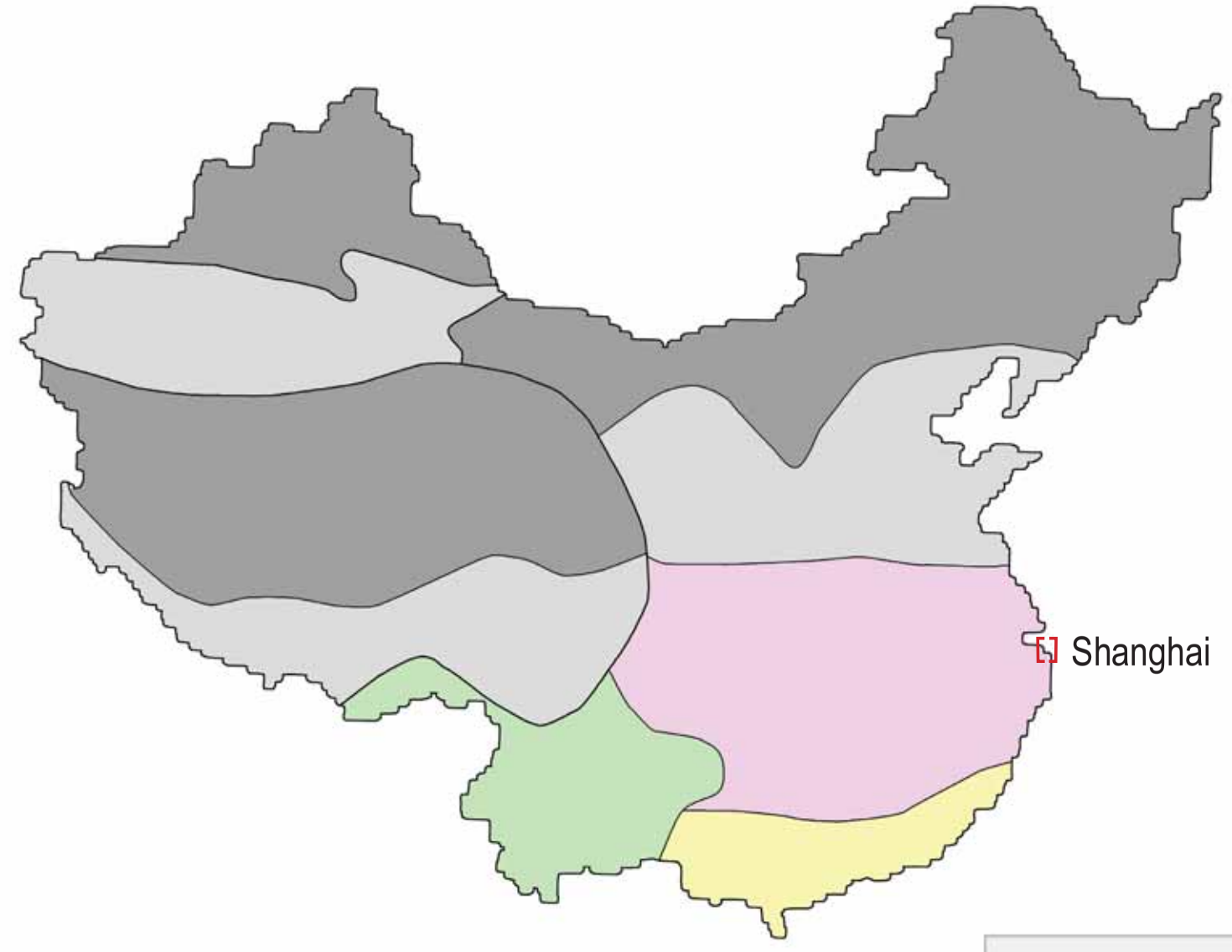
Construction of disaster prevention system. 

Conclusion

China has good infrastucture constrction, and the policy encourage to create a resource-conserving, environment-friendly society.

LOCATION

Shanghai is one of the most populous city in China. The city is located in eastern China, and sits at the mouth of the Yangtze River. Because of its rapid economy growth in the recent years, it has again become one of the world's leading cities, exerting influence over finance, commerce, fashion, and culture.



Climate

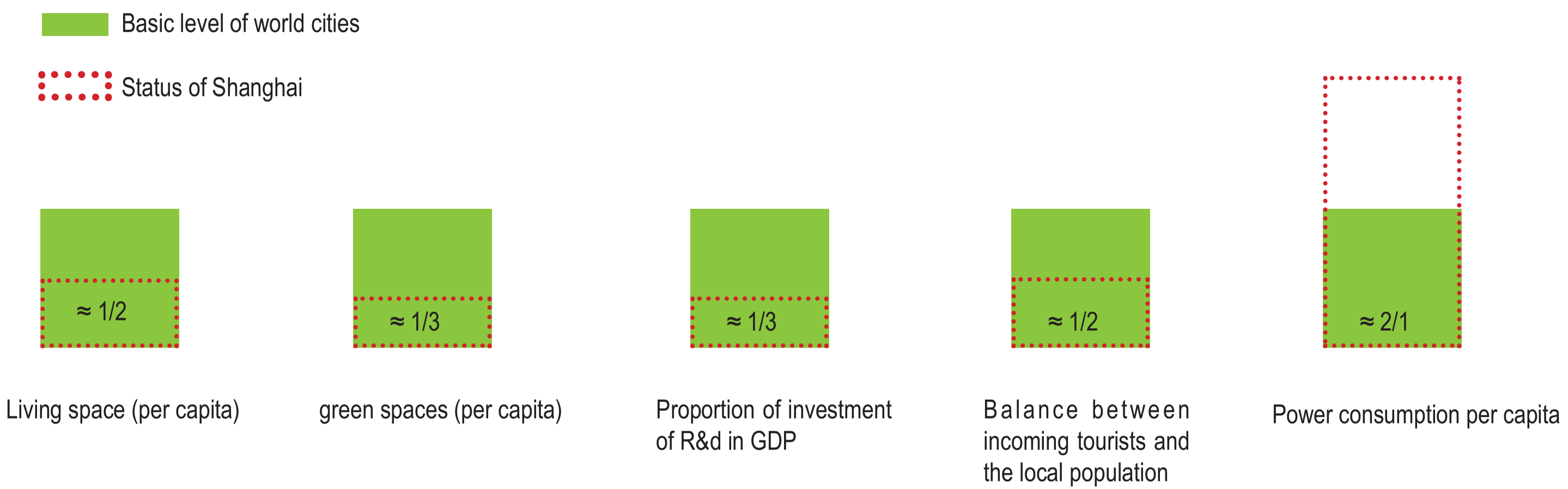
Shanghai has a humid subtropical climate (Köppen Cfa) and experiences four distinct seasons. Winters are chilly and damp, and cold northwesterly winds from Siberia can cause nighttime temperatures to drop below freezing, although most years there are only one or two days of snowfall. Summers are hot and humid, with an average of 8.7 days exceeding 35 °C (95 °F) annually; occasional downpours or freak thunderstorms can be expected. The city is also susceptible to typhoons in summer and the beginning of autumn, none of which in recent years has caused considerable damage.[44] The most pleasant seasons are Spring, although changeable and often rainy, and Autumn, which is generally sunny and dry. The city averages 4.2 °C (39.6 °F) in January and 27.9 °C (82.2 °F) in July, for an annual mean of 16.1 °C (61.0 °F). Shanghai experiences on average 1,878 hours of sunshine per year, with the hottest temperature ever recorded at 40.2 °C (104 °F), and the lowest at −12.1 °C (10 °F).[45] The average frost-free period is 276 days.

Climate data for 上海 (1971–2000) [46] [hide]

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Average high °C (°F)	8.1 (46.6)	9.2 (48.6)	12.8 (55)	19.1 (66.4)	24.1 (75.4)	27.6 (81.7)	31.8 (89.2)	31.3 (88.3)	27.2 (81)	22.6 (72.7)	17.0 (62.6)	11.1 (52)	20.2 (68.4)
Average low °C (°F)	1.1 (34)	2.2 (36)	5.6 (42.1)	10.9 (51.6)	16.1 (61)	20.8 (69.4)	25.0 (77)	24.9 (76.8)	20.6 (69.1)	15.1 (59.2)	9.0 (48.2)	3.0 (37.4)	12.9 (55.2)
Precipitation mm (inches)	50.6 (1.992)	56.8 (2.236)	98.8 (3.89)	89.3 (3.516)	102.3 (4.028)	169.6 (6.677)	156.3 (6.154)	157.9 (6.217)	137.3 (5.406)	62.5 (2.461)	46.2 (1.819)	37.1 (1.461)	1,164.7 (45.854)
% Humidity	75	74	76	76	76	82	82	81	78	75	74	73	76.8
Avg. precipitation days (≥ 0.1 mm)	9.7	10.3	13.9	12.7	12.1	14.4	12.0	11.3	11.0	8.1	7.0	6.5	129.0
Sunshine hours	123.0	115.7	126.0	156.1	173.5	147.6	217.8	220.8	158.9	160.8	146.6	147.7	1,894.5

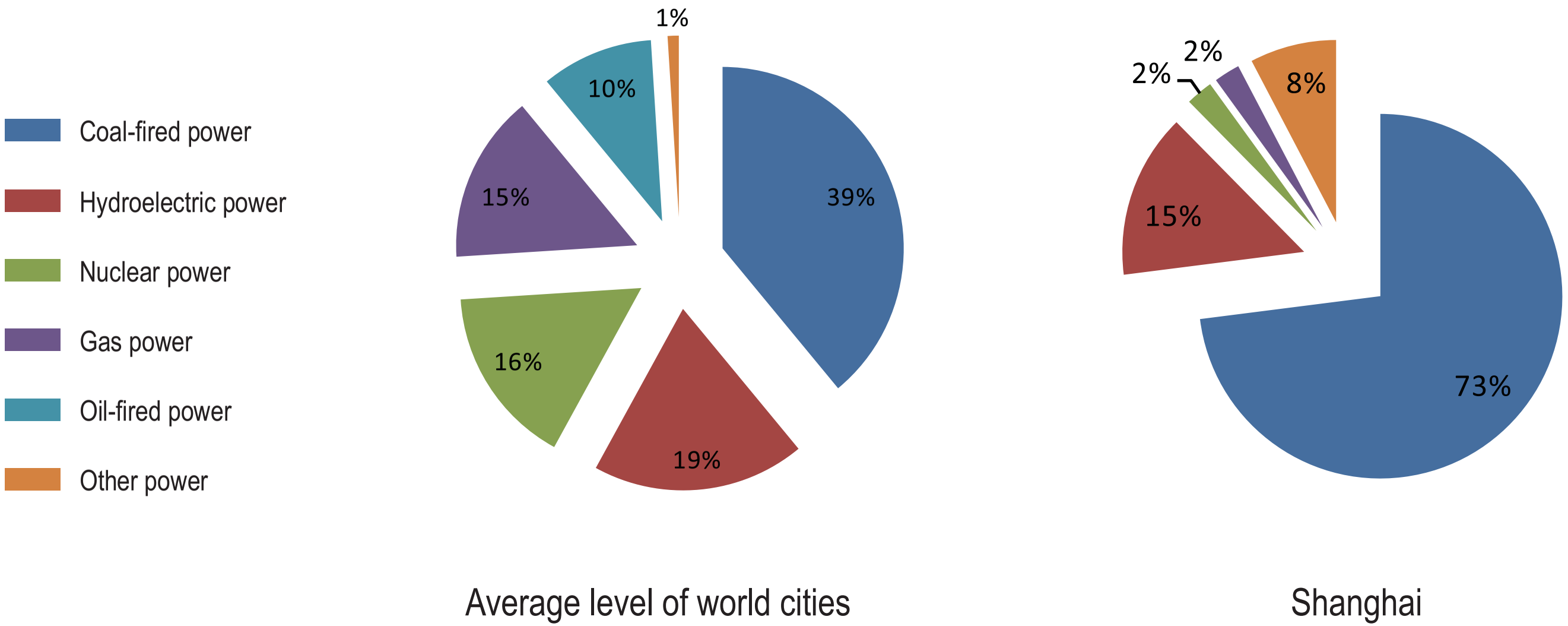
Some indicators compare to the criteria of the world

In addition to GDP, the criteria for world cities also include other important areas such as social development, environmental qulity, and the development of science, technology and edu cation.[47]



Other indicators, such as the ratio of the added value of tertiary in dustry, enrolment rate in higher education, information index, and composite index of air pollution, are all below the accepted atandards od world cities.

Power Resources



Average level of world cities

Shanghai

Heating & Cooling System

Shanghai is in the Hot Summer and Cold Winter Zone, according to the regulation, there is no central heating system in the buildings in Shanghai area. At present, they only use air conditioner or electric radiators.

Air conditioner

Electric radiator

Central air conditioner

Conclusion

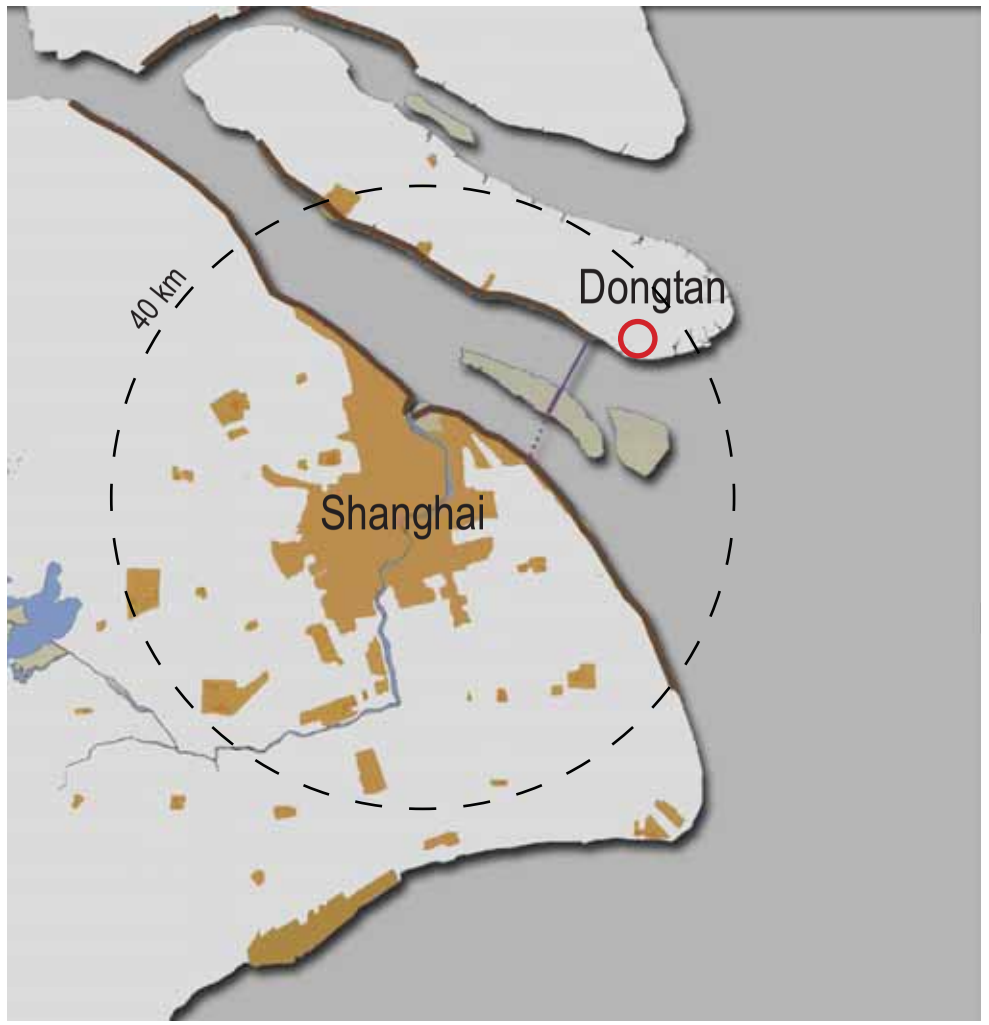
Non-renewable resources are still powering Chinese cities, meanwhile sustainable technology has not been used extensively.

Contents

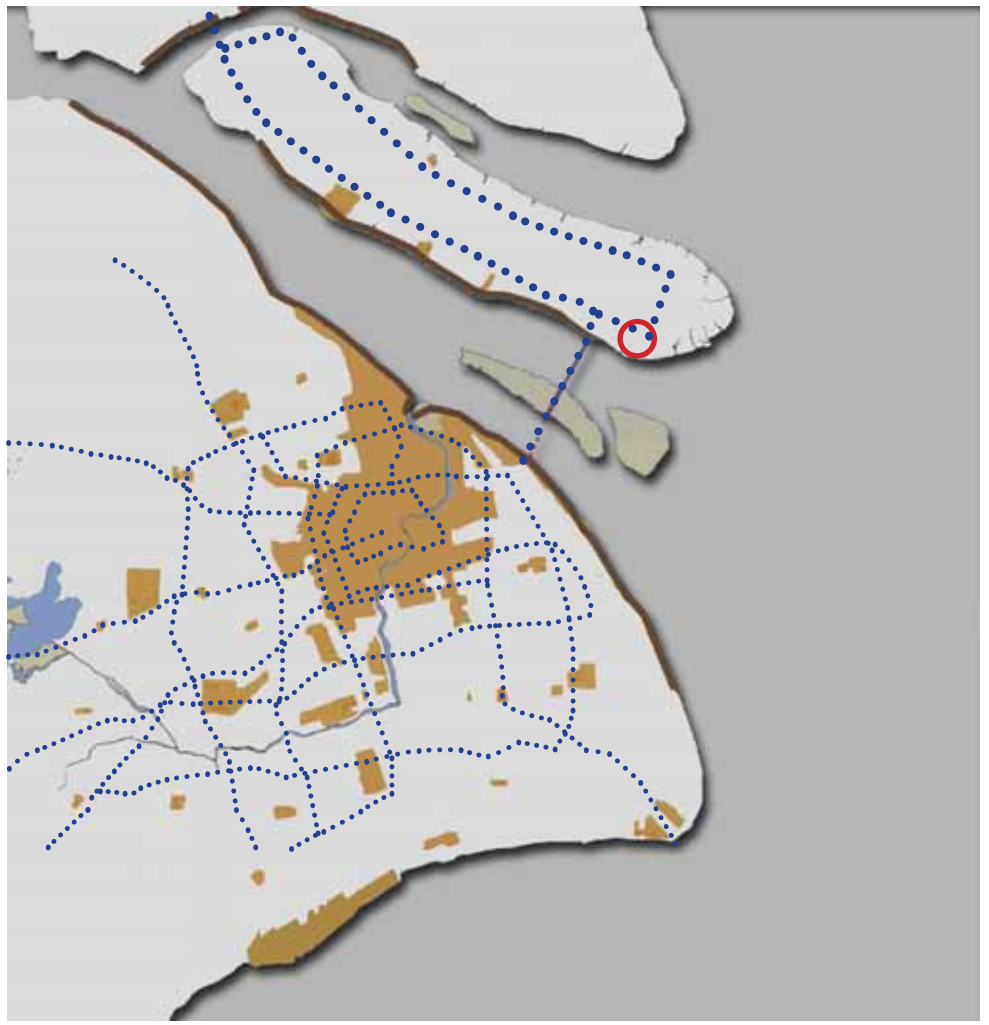
目录

Dongtan

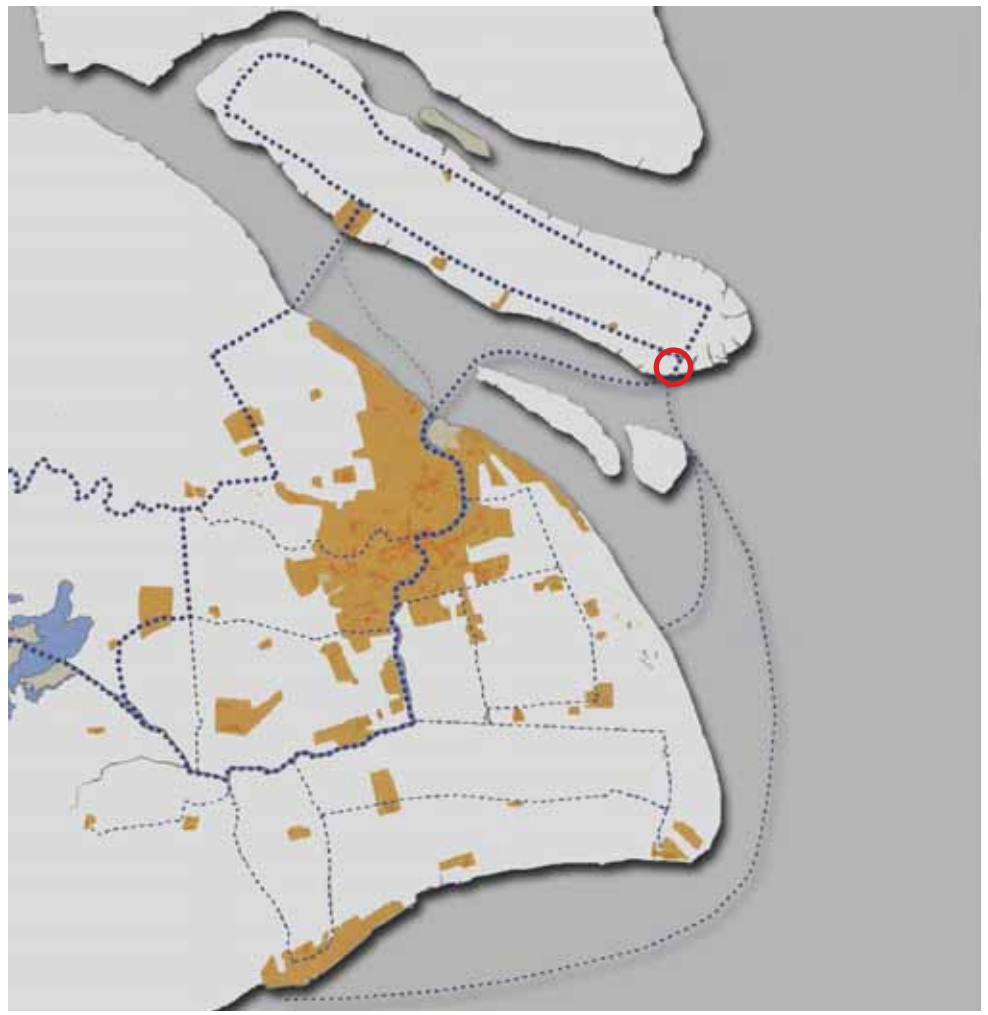
Dongtan, meaning "easten sandbank" in Chinese, is a rather descriptive name. Situated at the eastern end of Chongming Island, Dongtan has acquired its unique shape as a result of interflow between river and sea, with silt deposits gradually extending the island eastward. Having gone though 4 rounds of reclamation since 1966, the current landscape of Dongtan emerged from the land enclosure undertaken between 1968 and 1998. It covers an area of 86 square kilometres stretching 16 kilometres from north to south and five kilometres from east to west and is located juest 4 kilometres from the landing site of Chongming crossriver passageway.
Dongtan's flat terrain is embraced by water on three sides. It faces the end of northern branch of Yangtze in the north, the waterway of Beigang Port in the south and coastal district at the Yangtze Estuary in the east. Although large number of people come and visite Dongtan fromoutside the area, it currenty has few permanent rsidents of its own, since its main attraction is Dongtan's neighbour, Dongtan wetland.



The Site



Road Transportation



Water Transportation

Shanghai Yangtze River Tunnel

Shanghai Yangtze River Bridge

Ferry

The Site of Future City

Dongtan city

Dongtan Wetland

Dongtan Wetland Park

Farmland

Dongtan Wetland

Dongtan city

Dongtan Wetland

Dongtan Wetland Park

Farmland

Dongtan Wetland Park










Dongtan city
Dongtan Wetland
Dongtan Wetland Park
Farmland

Farmland

Dongtan city

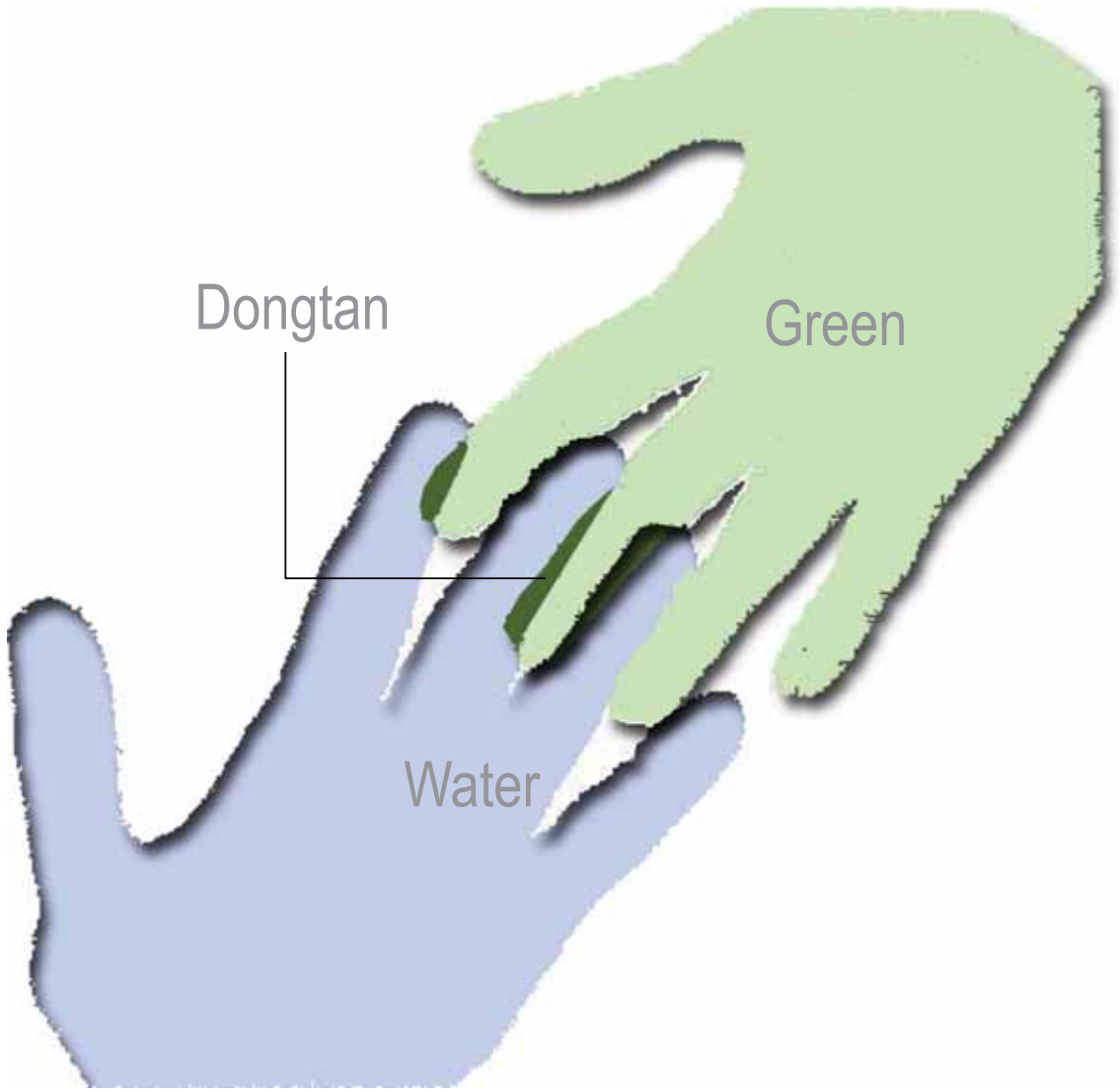
Dongtan Wetland

Dongtan Wetland Park

Farmland

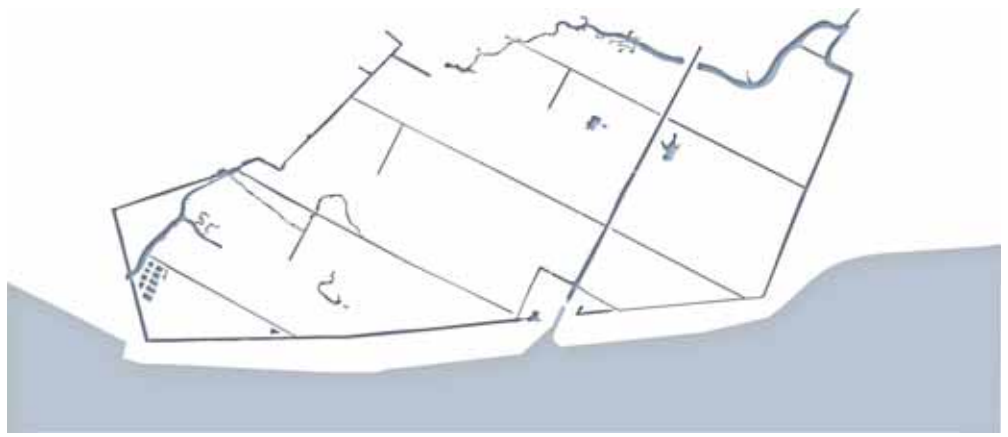
Status Quo of the Site

A Water & Green City

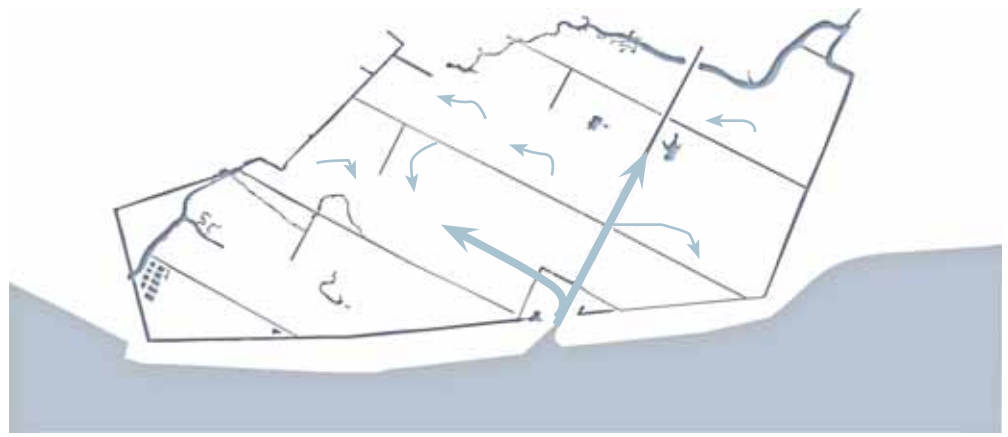


Where water and green meet a vibrant town

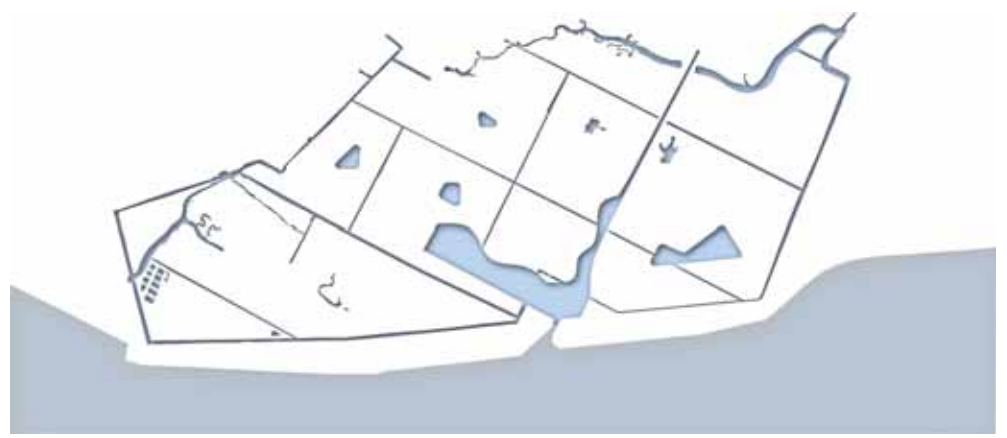
A Water City



Status Quo of the Water



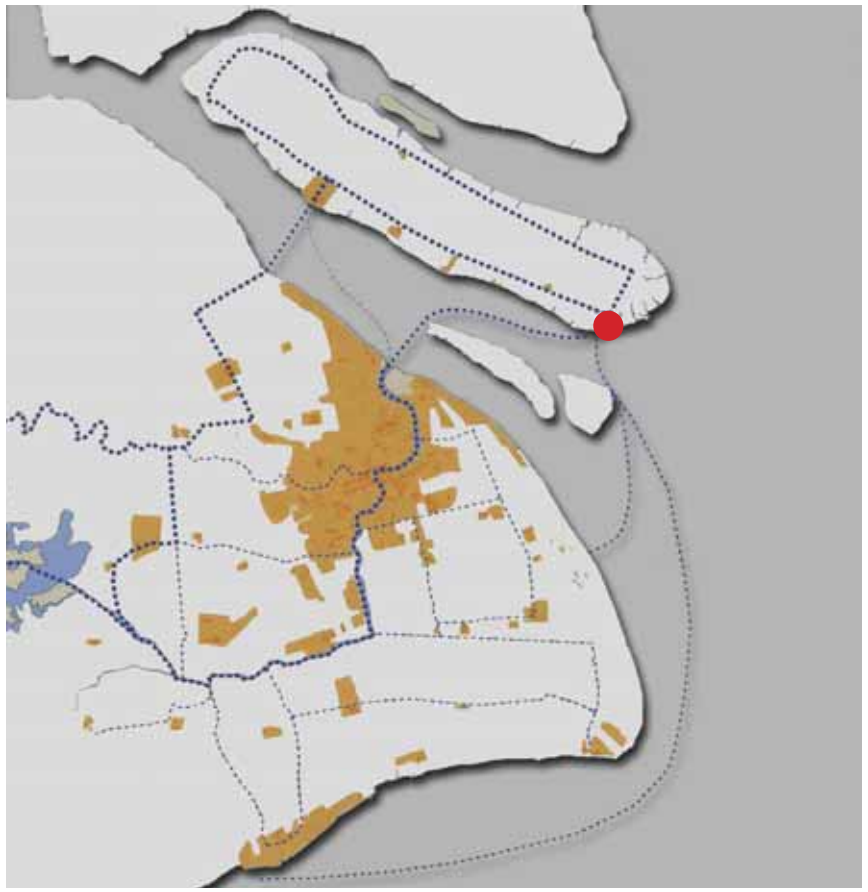
Welcome Water into the Town

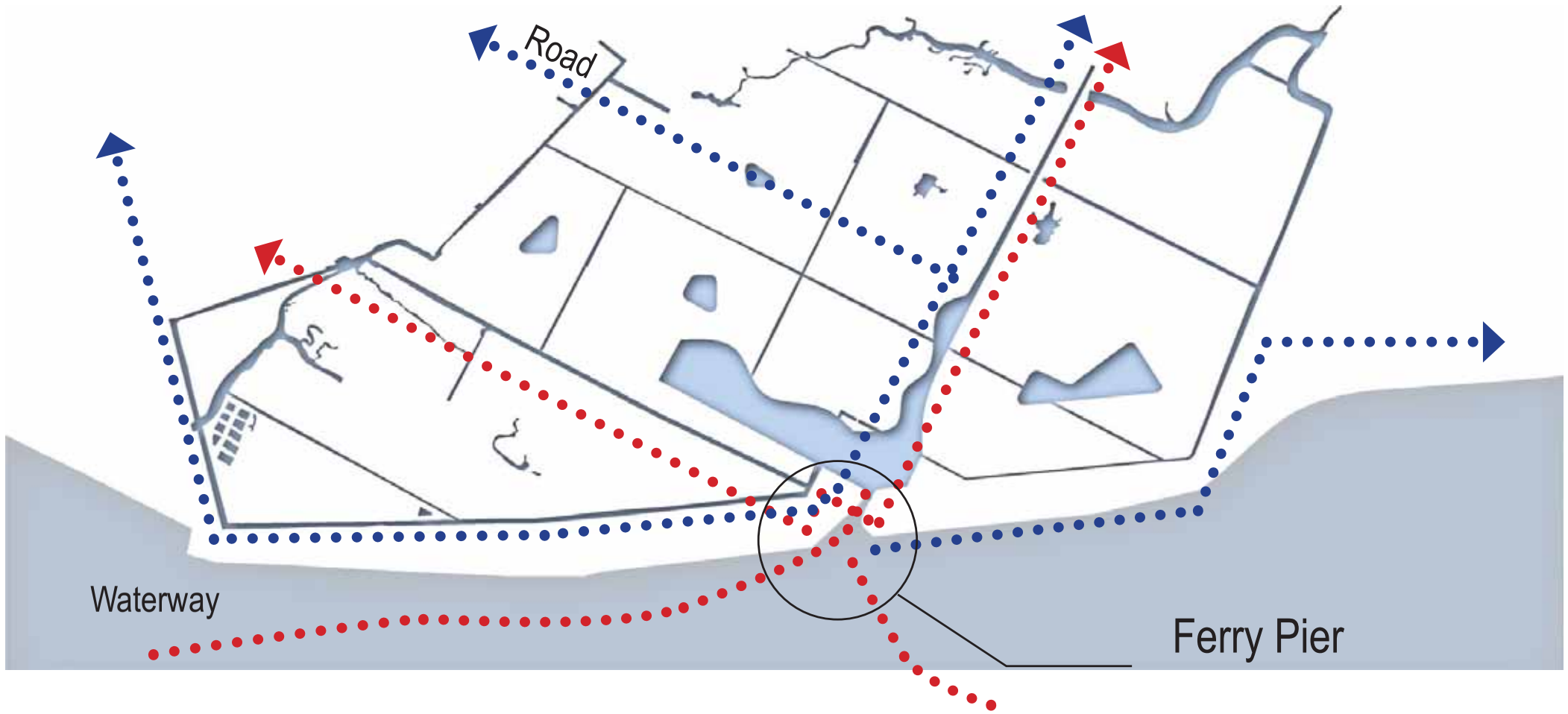


A Water city

A Water City

--- Water gateway to Chongming at the heart of Dongtan



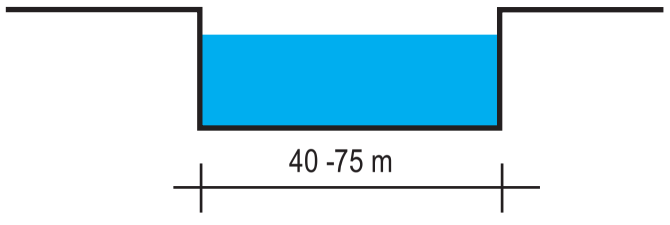


As part of the new vision, Dontan will be one of the key water gateways to Chongming Island, creating an access point to the existiing and planned canal network. This gateway should be at the heart of Dongtan, providing it with identity, a sense of place and a vibrant and active core, which also performs in an environmentally sustainable manner..

A Water City

Main Canal

Varying from between 40 and 75 metres wide, it will be part of the main Chongming canal network. The east-west canal will meet the north-south canal at the heart of the Dongtan, where the ferry port is proposed in the long-term. This main route could also provide water based public transport facilities for residents and touridts.



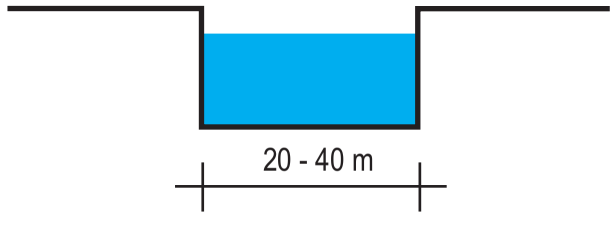
A Water City

Secondary Canal

A secondary canal network is proposed that could be used to access different parts of each village.

Small Intets and Docks

Inlets and docks from the secondary and main canals creat a third hierarchy of spaces that could provide boat moorings and define more intimate spaces for high qulity residential developments and retail accommodation. Other could be used for freight transport, waste management or docks for barges.



Intets and Docks

A Water City

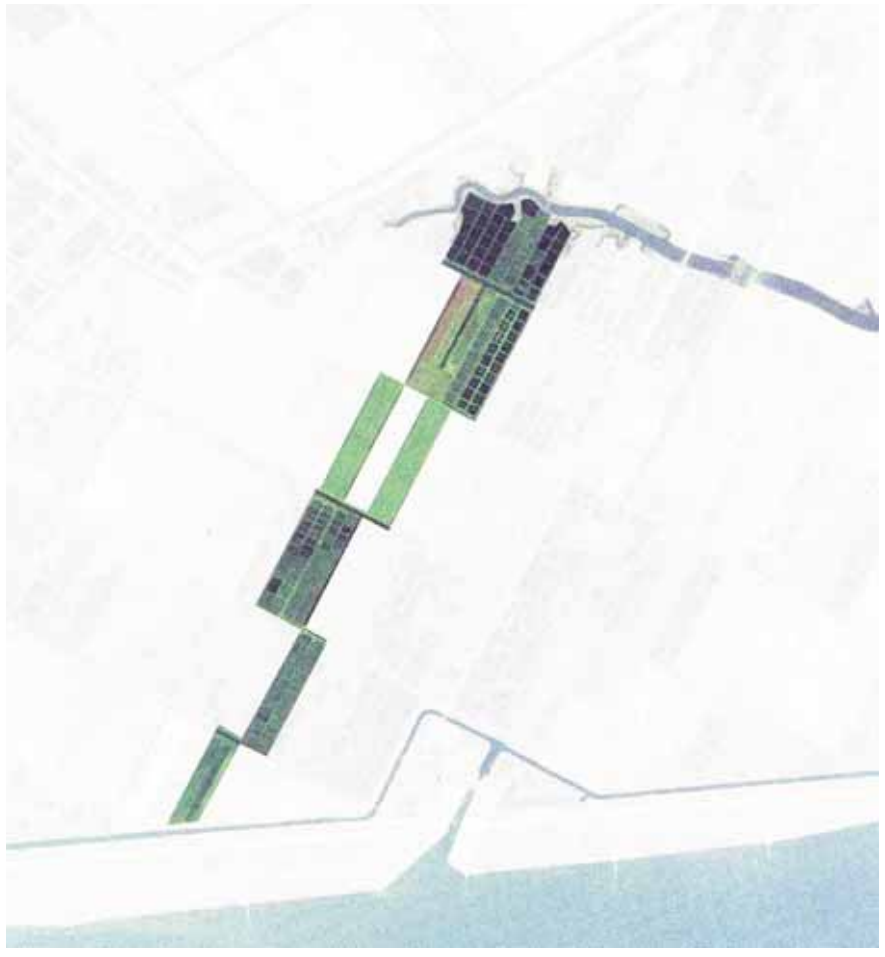
Marina, Activity Lake

The pedestrian friendly environment around the marina and small scale ferry port will create the city core for the first village. Facilities such as yacht moorings, ferry port piers, a fishing pier, restaurants, hotel, high end residences, retail space, public promenades and squares could all be accommodated.

The central feature of the second village is an activity lake to be used for leisure, tourism and water sports. This lake could be connected to the racetrack and key landmark hotels and buildings.

Pedestrian Way
Ferry Port Piers
Fishing Pier
Pulic

A Green City



The unique spatial history of agricultural plots

The Green City Strategy will use the historical landscape of Chongming Island and the powerful geometric order of its agricultural plots asits basic components. Green Spaces will be based on this existing geometry to create a strong sense of historical continuity. Continuous green corridors will be created - a network of green spaces that will bring a sense of orientation, rhythm and relief to the development. These corridors will be staggered in order to produce a sense of surpeise when passing from one to the other and by the making slight changes to their alignment, a sense of anticipation will be achieved when looking from one to another.

A Water & Green City

Harmony = ' 和谐 '
' 和 ' : Peace, Safe.
' 谐 ' : Coordination.

CONCEPT

The construction of a Harmonious Society is a socio-economic vision that is said to be the ultimate end result of Chinese leader Hu Jintao's signature ideology of the Scientific Development Concept. It serves as the ultimate goal for the ruling Communist Party of China along with Xiaokang society, which aims for a "basically well-off" middle-class oriented society. First proposed by the Chinese government under the Hu-Wen Administration during the 2005 National People's Congress, the idea changes China's focus from economic growth to overall society balance and harmony.The idea is clearly visible in banners all over China. The idea has been described as resembling characteristics of New Confucianism in some aspects.

POLICY

CULTURE

GOAL

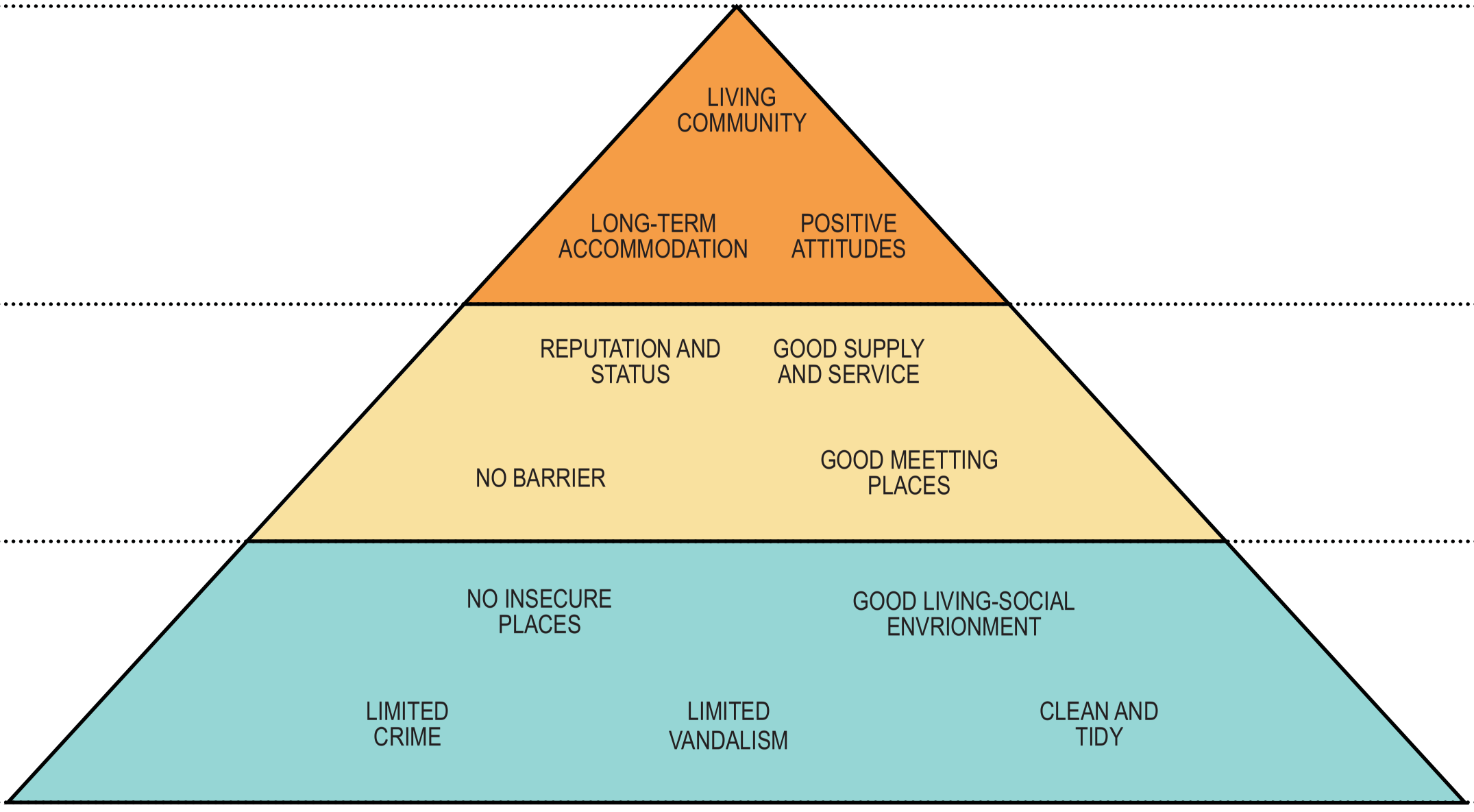
Harmony City = ' 和谐城市 '

A 'Harmony' City

Attractive

Livable

Safety



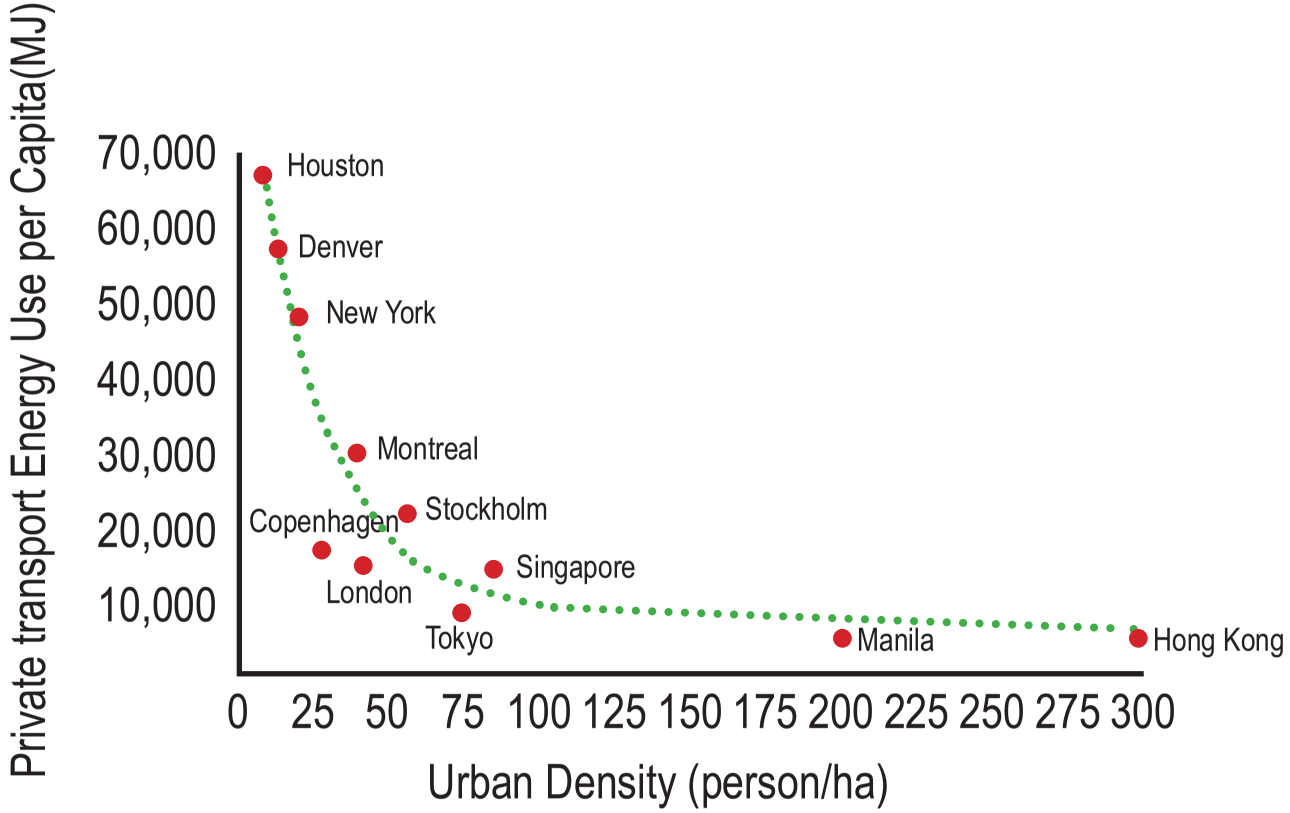
A 'Harmony' City

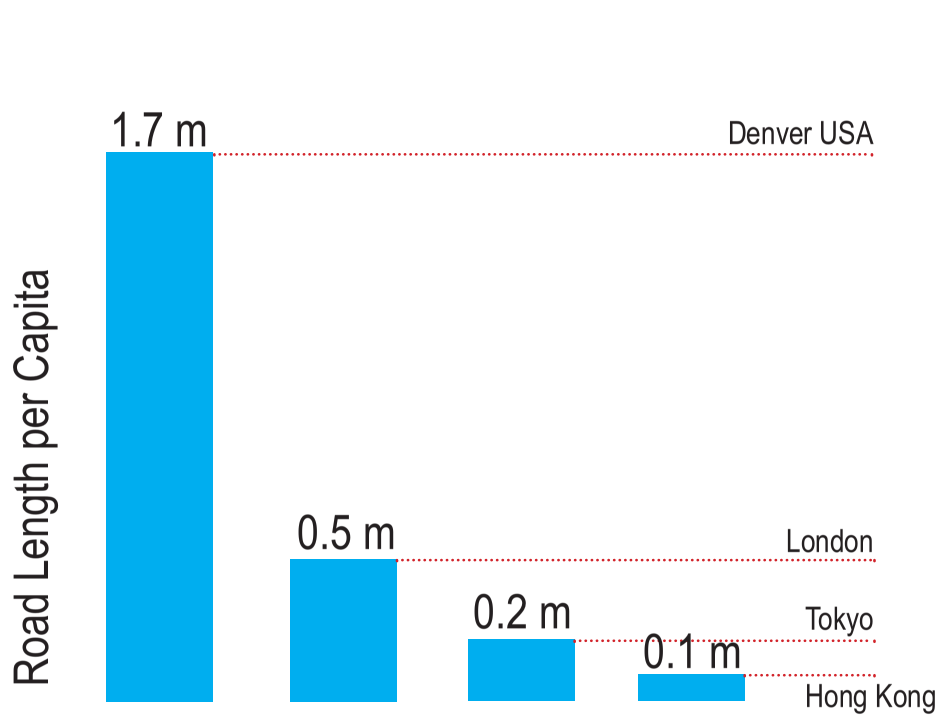
- Urban Scale & Further Development
- Traffic and Accessibility
- Urban Environment
- Clean and Tidy
- Safety and Security
- Supply and Service

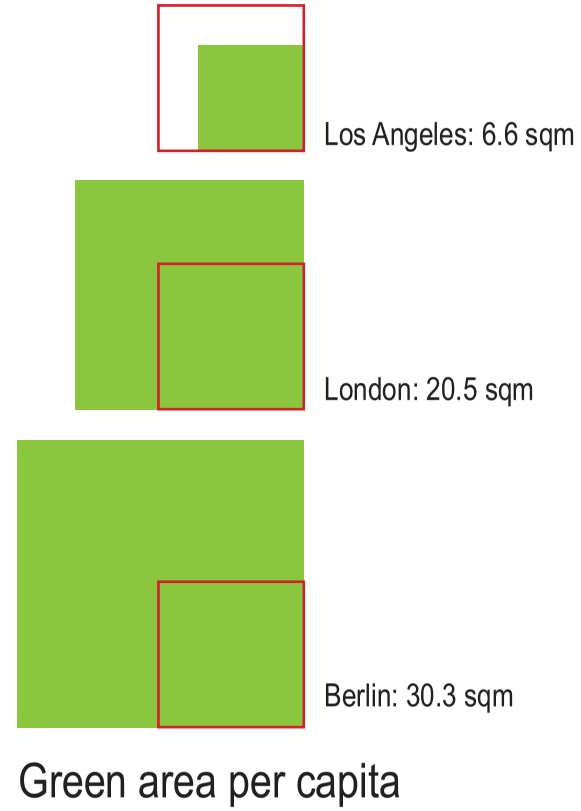
A 'Harmony' City

- Urban Scale & Further Development

It will minimise energy consumption from transport. Studies demonstrate that there is a strong connection between densities and energy use for private transport. It is now well established that the denser the city the less energy consumption from private vehicles. A concentration of between 50 and 120 people per hectare is the most efficient when balancing density and energy consumption for transport. It also apparent that there are no significant transport energy savings by increasing densities above 120 people per hectare.[48]
There will be very significant savings in infrastructure costs per capita. Research suggest, for example, that a low-density city such as Denver has 17 times more road length per person than Hong Kong, making its infrastructure costs vastly more expensive.[48] The implications of this are very important to the business case for Dongtan since the end user will ultimately have to pay for the infrastructure costs. The aim is to create a high-quality environment that is cost effective for both the developer and the end user







Step 1:

Total Land Area: 870 Ha

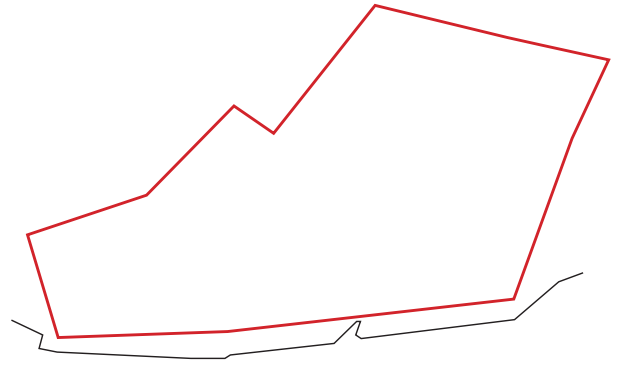
- Green Area: 180 Ha
- Farmland: 250 Ha
- Water Area: 120 Ha
- Others: 320 Ha

Total Population: 65000

- Urban Density: 74.7 person/Ha
- Private transport Energy Use≈10, 000 MJ/per Capita
- Road Length:86732m
- Green area per capita: 27.7sqm

Step 2

Total Land Area: 1300 Ha

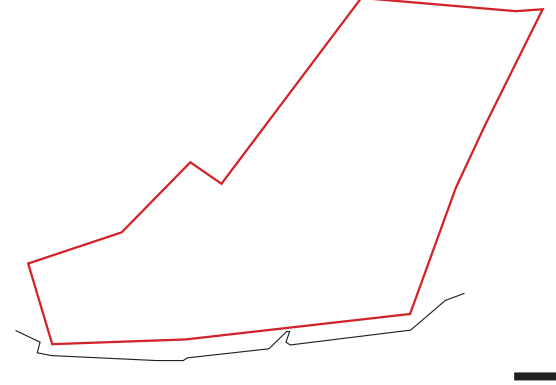


Total Population: 97500

- Urban Density: 75 person/Ha
- Private transport Energy Use≈10, 000 MJ/per Capita
- Road Length≈100000m
- Green area per capita: ≈28sqm

Step 3

Total Land Area: 1700 Ha



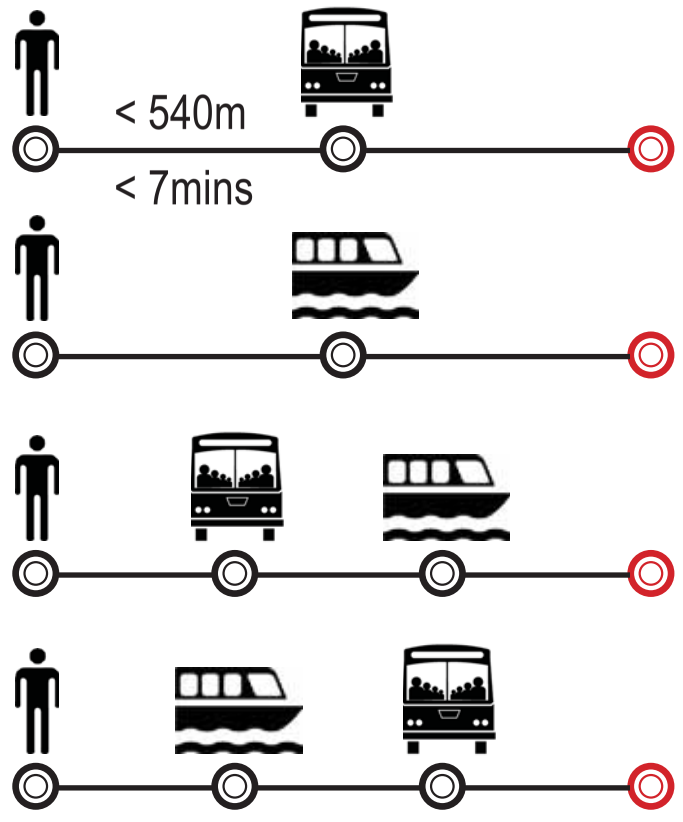
Total Population: 127500

- Urban Density: 75 person/Ha
- Private transport Energy Use≈10, 000 MJ/per Capita
- Road Length:≈120000m
- Green area per capita: ≈28sqm

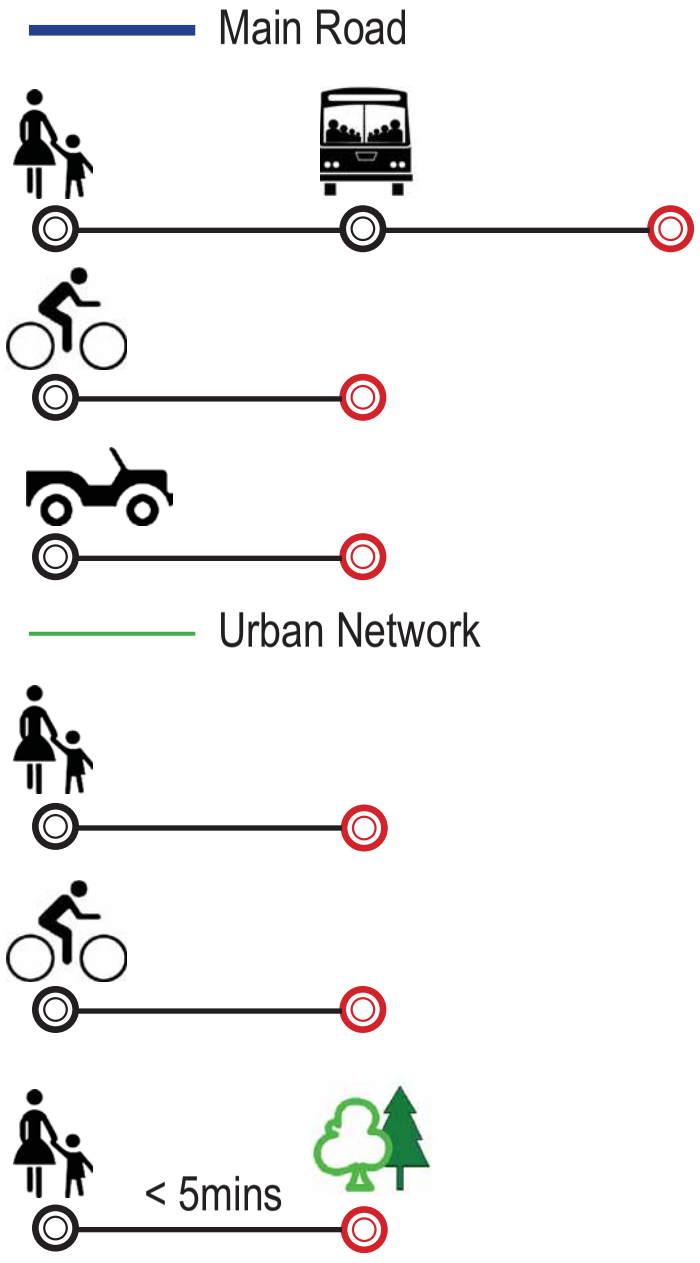
A 'Harmony' City
- Traffic and Accessibility

Bus Stop
Docks
Bus Line
Boat Line

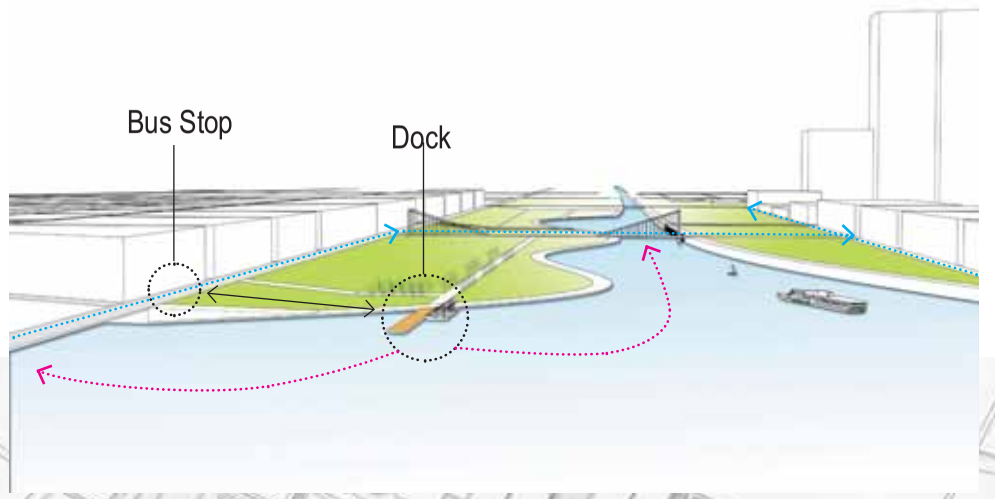
Public Transportation Strategy

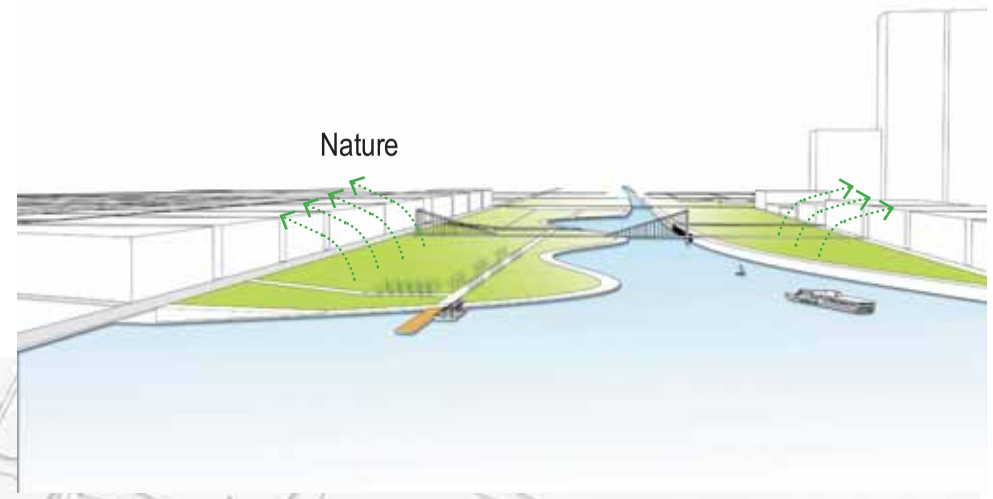


A 'Harmony' City
- Traffic and Accessibility



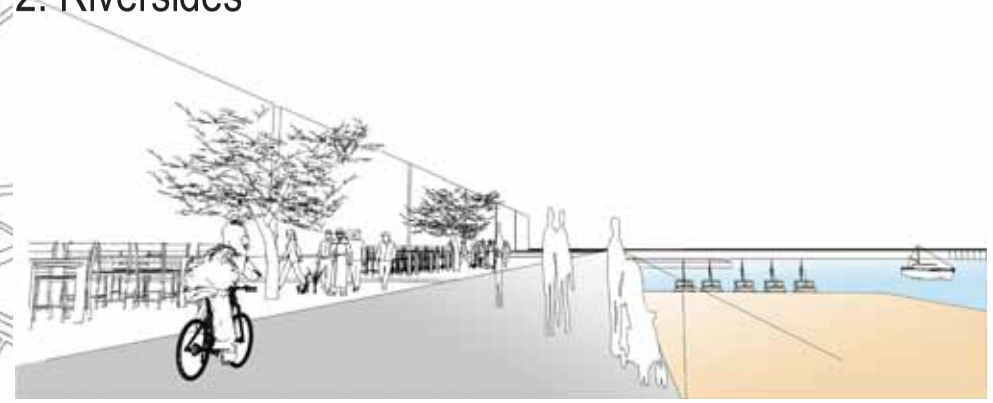
A 'Harmony' City
- Urban Environment



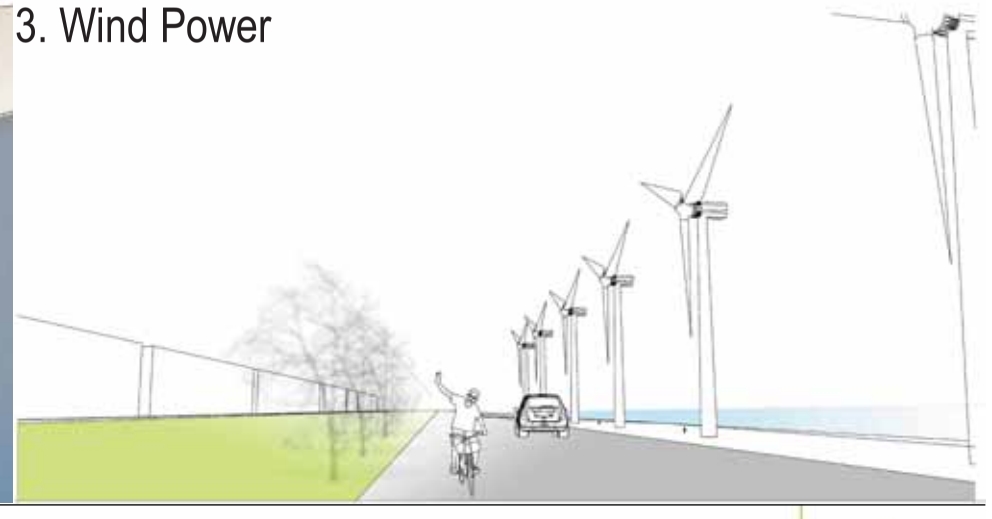


1. City Central Park

2. Riversides



3. Wind Power

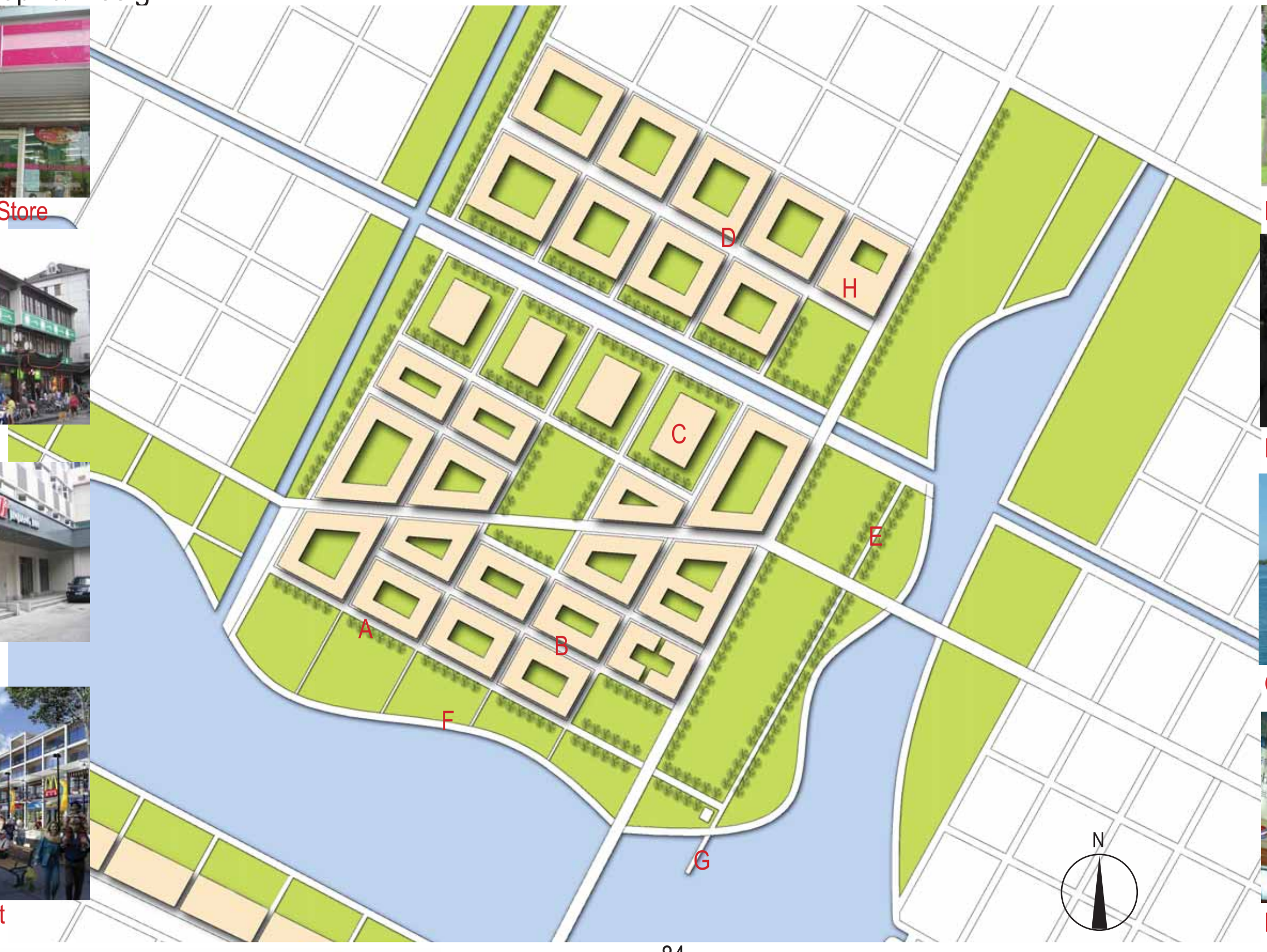


A. Convenience Store

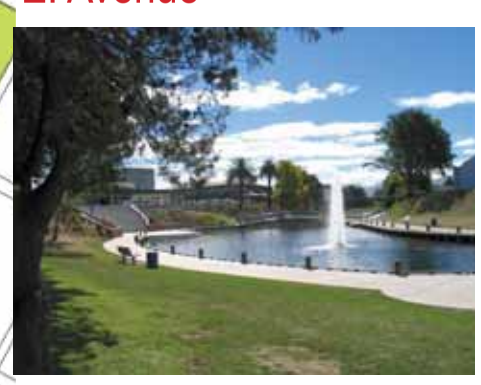

B. Restaurant


C. Hotels


D. Walking Street

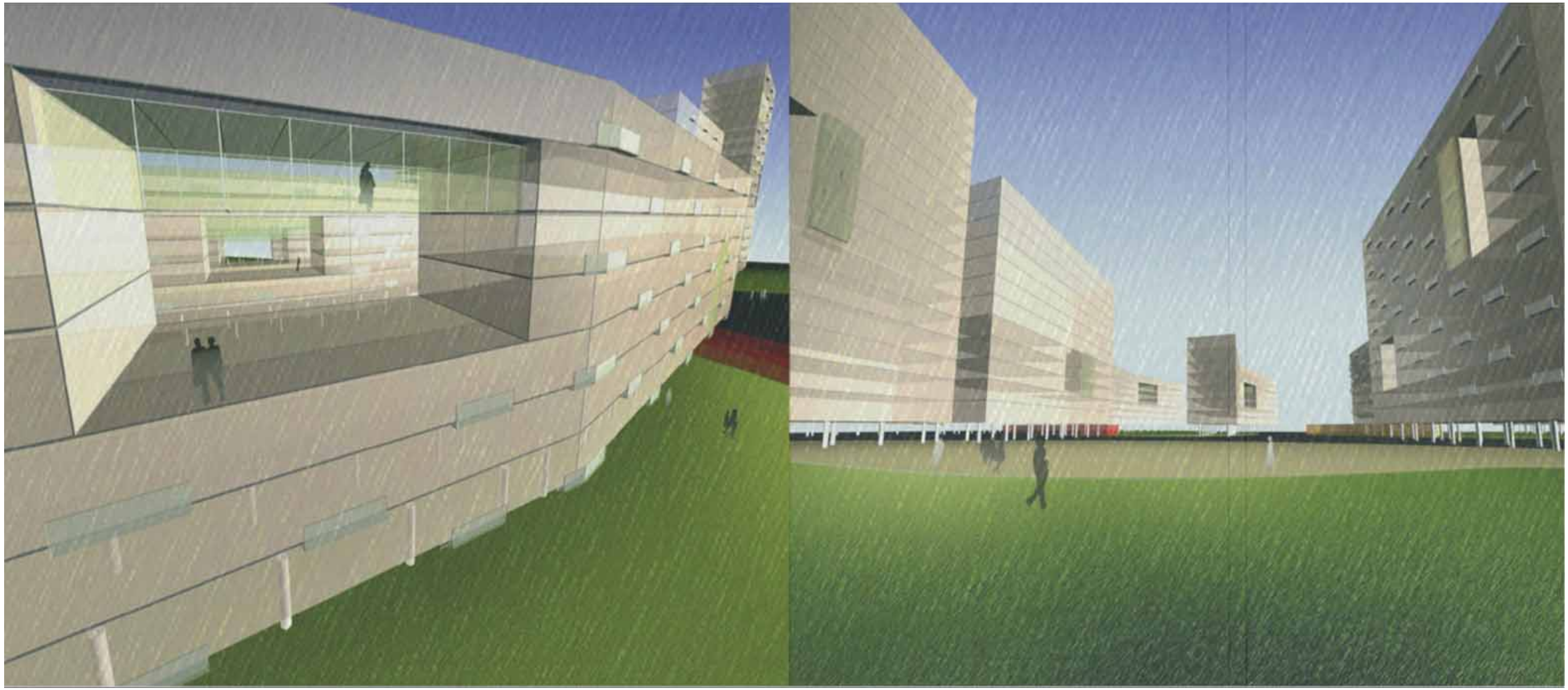



E. Avenue

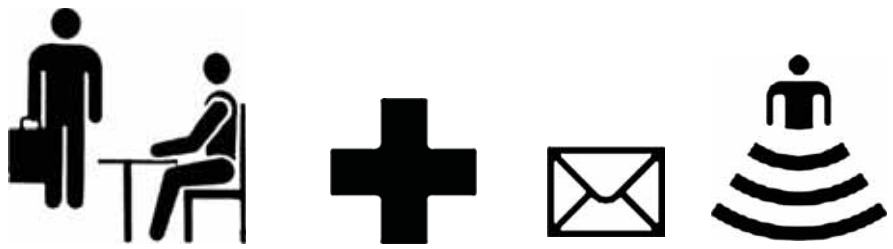

F. Riverside


G. Ferry Port


H. Shopping Mall



Offices+ Hospital+ City Hall + Meeting Centre + Theater + Service

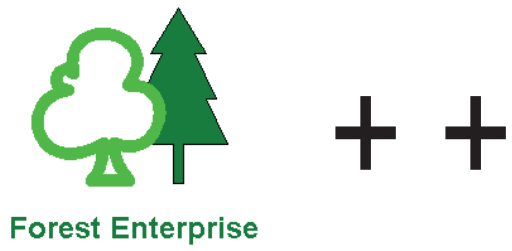


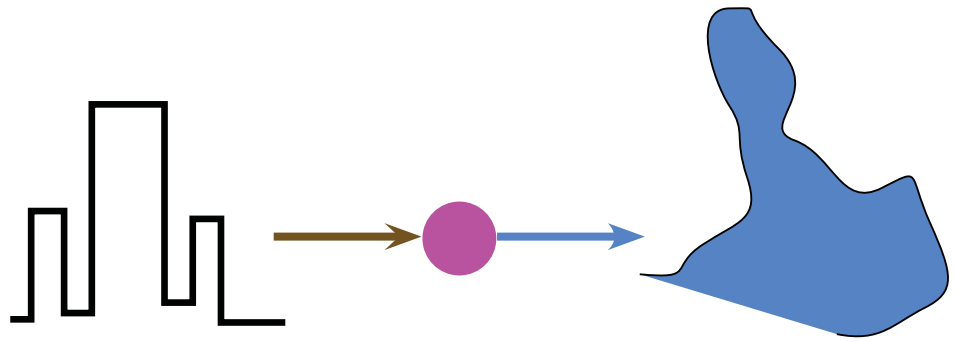
Residential + Supermarket + Clinic + Restaurant + Nature

A 'Harmony' City
- Clean and Tidy

• Sanitation Clean

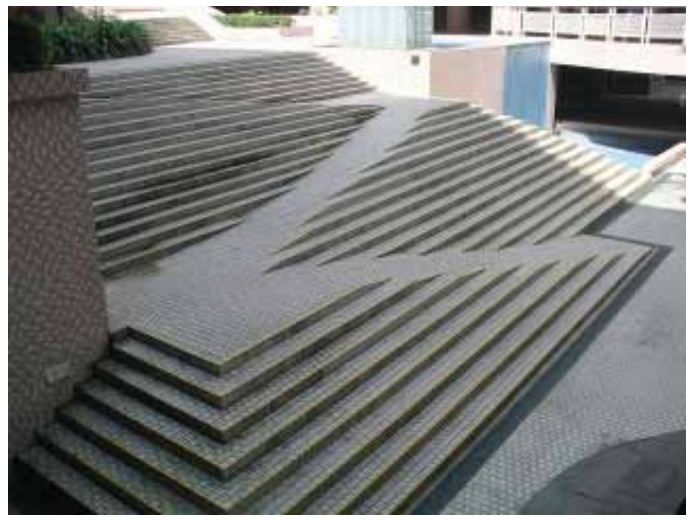
• Natural Environment





• Drinking Water & Air

A 'Harmony' City
- Safety and Security



A 'Harmony' City

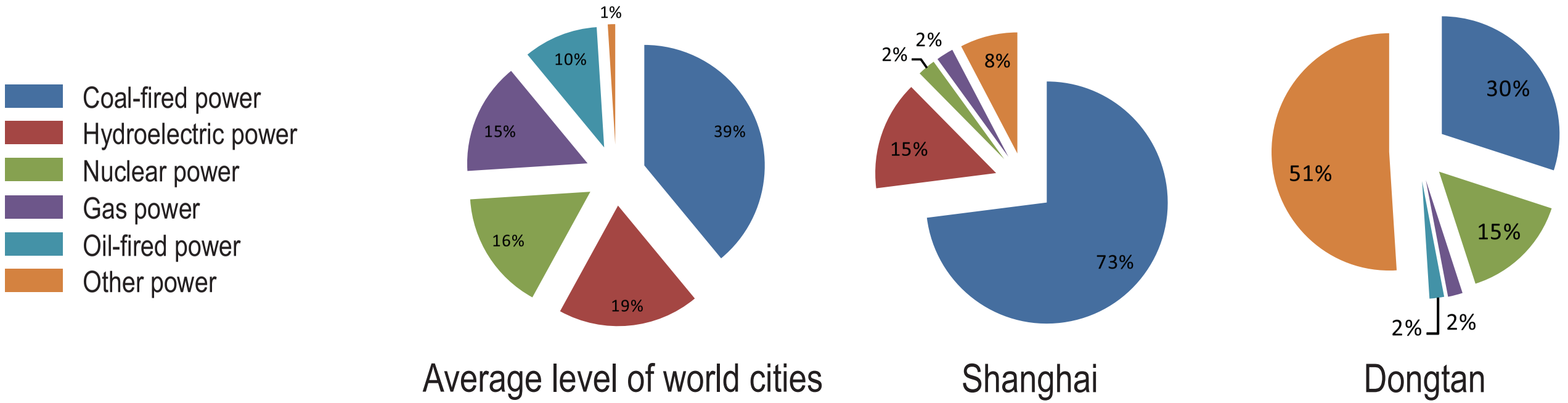
- Flooding Strategy

Water will be an important element of flood strategy, to provide enough landfill to raise the ground of the city to prevent flooding to a degree. A balanced approach to cut and fill is aimed at driving the need to create water to raise the ground levels in the development areas within the site.

A 'Harmony' City

- Supply and Service

- Power Supply



A 'Harmony' City

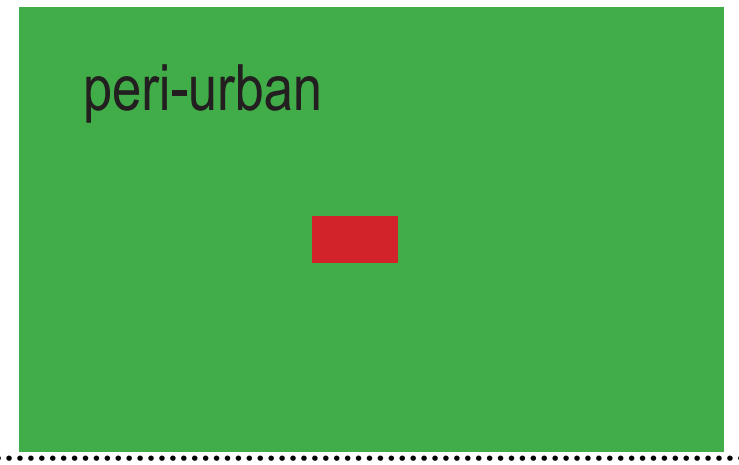
- Supply and Service

• Food Supply

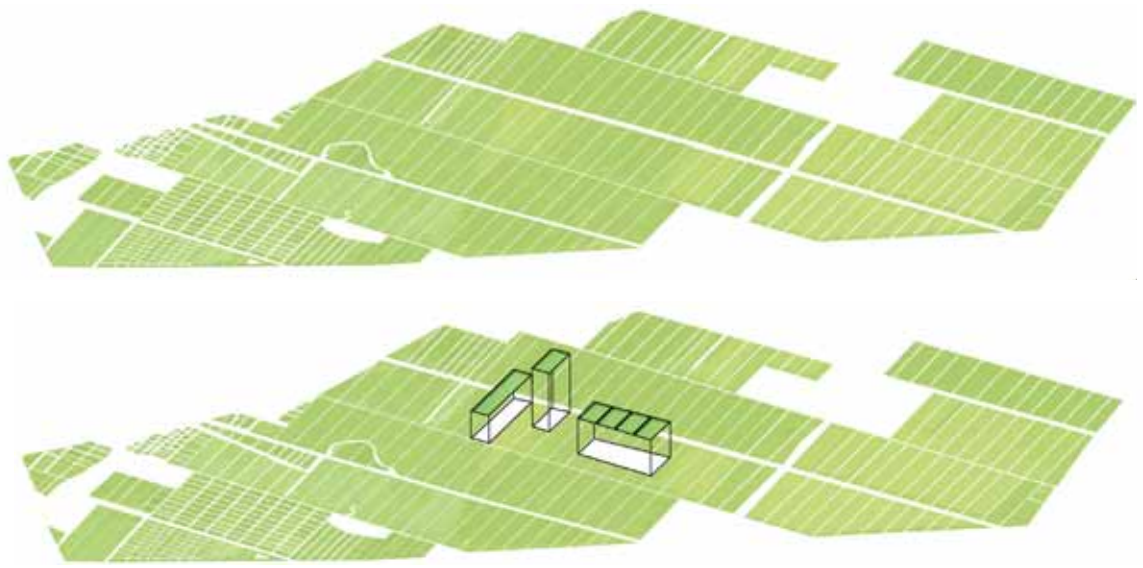
1. Transported from other place

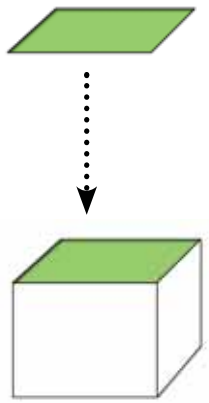
The food they can not plant or produce

2. From peri-urban area

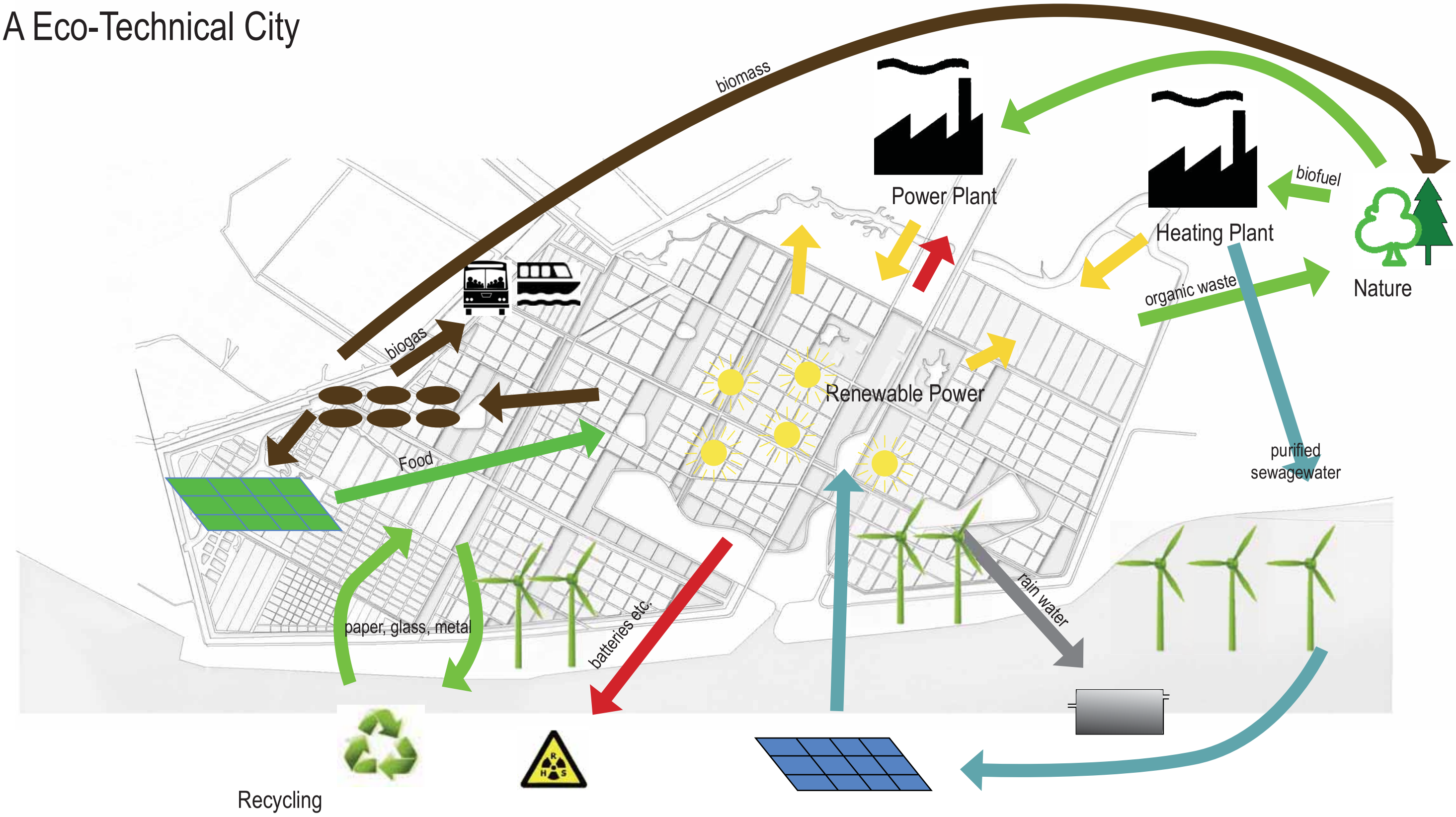


3. Urban Agriculture





A Eco-Technical City

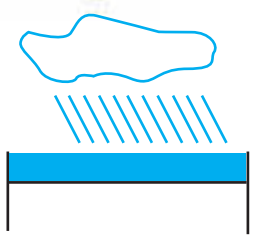


A Eco-Technical City

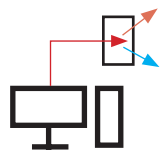
- Sustainable Buildings

Electricity by wind turbines

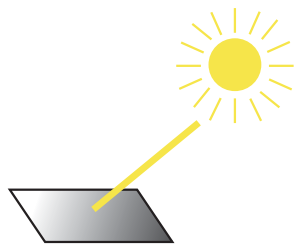
Collection and re-use of rainwater



Excess heat recovery from server room

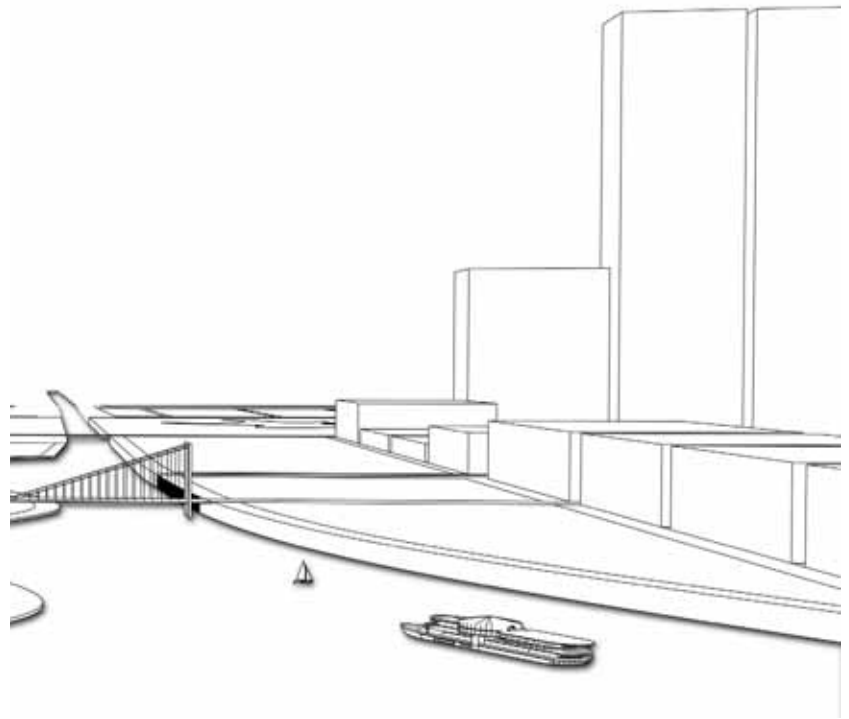


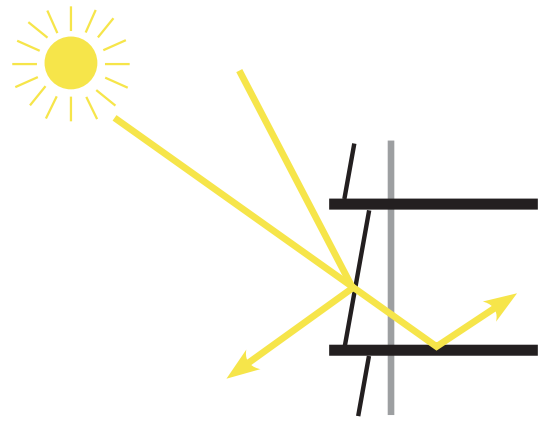
Photovoltaics integrated in roof and facade



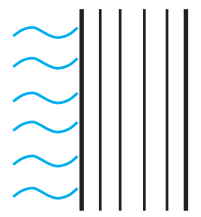
Material choices based on environmental product declarations

Sea water used to cool the building

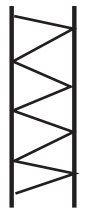




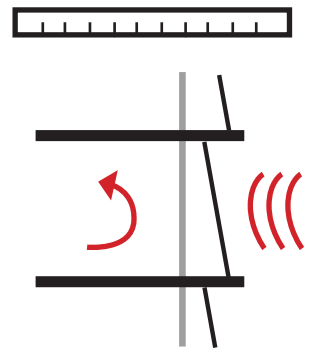
Passive solar considerations



High level of air tightness

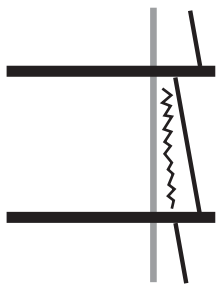


High thermal insulation

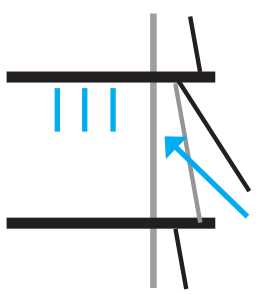


Thermally activated slab

Double layered facade for thermal and aound insulation



Integrated and wind protected splar shading



Enhanced night cooling using thermal mass of the primary construction

Conclusion

What have I learnt?

- Knowledge about sustainability and city planning by learning from history experience, the situation now, and future technology.
- Rediscover China including urbannization, transportation, economy and policies etc.
- Some new conceptural idea of city planning. for instance: 'Hamony' city.
- Experience of planning a new city with sustainable concept.
- Good communication and feedback from company.

What are the benefits of my master thesis for future?

- Knowledge accumulation for future work.
- Provide basis for sustainability and city planning.
- Could supply some informations for architects, city planners.
- Could influence policy-makers and government.

References

[1] Zhao Yan, Herbert Girardet. (2005) Shanghai Dongtan: An Eco-city, p.18.
[2] Ministry of Environmental Protection of the People's Republic of China. (2005) "China's Environmental Condition in 2004".
[3] CPIRC. http://www.cpirc.org.cn
[4] United Nations. (1987) "Report of the World Commission on Environment and Development." General Assembly Resolution 42/187. Retrieved: 2007-04-12
[5] John Webb. (2006) "An outline history of governance of Letchworth Garden City". Letchworth Garden City Council in 2006.
[6] Maurice de Soissons, Welwyn Garden City, Cambridge, Publications for Companies, 1988
[7] Fröidh, O. (2005) Market Effects of Regional High-Speed trains on the Sealand line. Journal of Transport Geography, 13, 352-361.
[8] Howard E. (1902)Garden Cities of To-morrow: being the Second Edition of "to-morrow: A Peaceful Path to Real Reform". London: Swan Sonnenschein.
[9] First Garden City Heritage Museum. http://www.gardencitymuseum.org/home
[10] Perry, C. 1998 The Neighbourhood Unit (1929) Reprinted Routledge/Thoemmes, London, 1998, p.25-44
[11] Rudlin, D., Falk, N. (1999) building the 21st Century Home: The Sustainable Urban Neighbourhood.
[12] Connectivity Part 2: Historical Background Posted by Laurence Aurbach under History , Thoroughfares. Thu 28, Dec 2006. http://pedshed.net/?p=31
[13] Goodman, Joseph. "Urban transport of Curitiba". Urbanhabitat.org. Retrieved 7 March 2011.
[14] Photo taken by Morio. 3 January 2006, Curitiba, Paraná, Brasil.
[15] Zhao Yan, Herbert Girardet. (2005) Shanghai Dongtan: An Eco-city, p.18.
[16] "World Wind Energy Report 2010" . World Wind Energy Association. February 2011. Retrieved 30-April-2011.
[17] London Array official site. http://www.londonarray.com/
[18] Zhao Yan, Herbert Girardet. (2005) Shanghai Dongtan: An Eco-city, p.19.
[19] Aktron. 3. 6. 2006. http://en.wikipedia.org/wiki/File:Brno,_Autotec,_Mercedes_Citaro_na_palivov%C3%A9_%C4%8Dl%C3%A1nky.jpg
[20] Zhao Yan, Herbert Girardet. (2005) Shanghai Dongtan: An Eco-city, p.19.
[21] Zhao Yan, Herbert Girardet. (2005) Shanghai Dongtan: An Eco-city, p.20.
[22] Part 4. http://en.wikipedia.org/wiki/Solar_cell.
[23] Butti and Perlin (1981), p. 249
[24] William E. Glassley. Geothermal Energy: Renewable Energy and the Environment CRC Press, 2010.
[25] Yu Hongyan. (2010) "Top 10 Green Gadgets". China Daily.(http://www.chinadaily.com.cn/business/2010-11/23/content_11591439.htm)
[26] People's Republic of China (orthographic projection). 30 October 2008. http://en.wikipedia.org/wiki/File:People%27s_Republic_of_China_(orthographic_projection).svg
[27] "Countries of the world ordered by land area". Listofcountriesoftheworld.com. Retrieved 27 April 2010.
[28] Communiqué of the National Bureau of Statistics of People's Republic of China on Major Figures of the 2010 Population Census
[29] PRC Population Density. Transferred from en.wikipedia. 25 August 2009. http://en.wikipedia.org/wiki/File:PRC_Population_Density.svg
[30] Population and Natural Increase Rate of PRC. 12 December 2010. http://en.wikipedia.org/wiki/File:Population_and_Natural_Increase_Rate_of_PRC.jpg
[31] "Law of the People's Republic of China on the Standard Spoken and Written Chinese Language (Order of the President No.37)". Gov.cn. Retrieved 27 April 2010. "For purposes of this Law, the standard spoken and written Chinese language means Putonghua (a common speech with pronunciation based on the Beijing dialect) and the standardized Chinese characters."
[32] "People's Republic of China". International Monetary Fund. Retrieved 2011-04-21.
[33] Gdp nominal and ppp 2005 world map single colour. http://en.wikipedia.org/wiki/File:Gdp_nominal_and_ppp_2005_world_map_single_colour.png.
[34] 24 February 2010. http://en.wikipedia.org/wiki/File:PRC_Province_Population2.svg.
[35] 5.2 Urbanization. http://en.wikipedia.org/wiki/PRC#cite_note-Ref_abce-202
[36] Cities in China. http://english.people.com.cn/data/China_in_brief/Administrative_divisions/Cities.html

References

[37] Alan Mak, 4 March 2010. The railway network of People's Republic of China. http://en.wikipedia.org/wiki/File:ChinaRailwayNetwork.png
[38] Transport in the People's Republic of China. http://en.wikipedia.org/wiki/Transport_in_the_People's_Republic_of_China.
[39] Transferred from en.wikipedia. http://en.wikipedia.org/wiki/File:Map_of_NTHS_Expressways_of_China.png
[40] "China's Highway Network Expands to 74,000 Kilometers". ChinaAutoWeb.com.
[41] Current map of Shanghai Metro in English. http://en.wikipedia.org/wiki/File:Shanghai_Metro_en.png.
[42] "China's 12th Five-Year Plan signifies a new phase in growth". Xinhua. October 27, 2010. Retrieved December 22, 2010.
[43] Danielson, Eric N., Shanghai and the Yangzi Delta, 2004.
[44] Spencer, Richard (2007-09-19). "1.6m flee Shanghai typhoon". London: The Daily Telegraph. Retrieved 2008-03-20.
[45] "Extreme Temperatures Around the World". Retrieved 2010-12-01.
[46] "中国地面国际交换站气候标准值月值数据集（1971 - 2000 年）" (in Simplified Chinese). China Meteorological Administration. Retrieved 2010-11-10.
[47] Zhao Yan, Herbert Girardet. (2005) Shanghai Dongtan: An Eco-city, p.86.
[48] Zhao Yan, Herbert Girardet. (2005) Shanghai Dongtan: An Eco-city, p.152.