

# Climate Change and the Challenges for Chinese Urbanisation and its Adaptation

## 气候变化与中国城镇化面临的挑战与 应对建议

YU Li / 于立

Sino-UK Research Centre for Eco-cities and Sustainable Development

Cardiff University

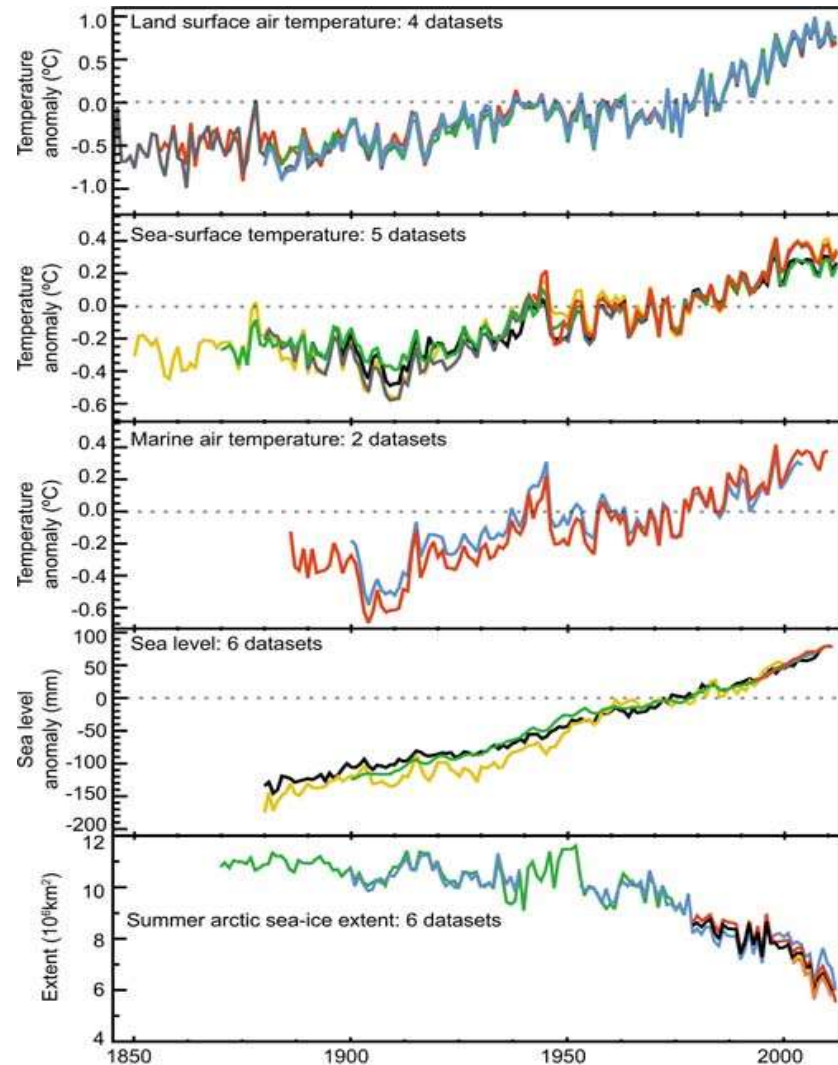
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# Climate Change: Global Warmer

## 气候变化：全球变暖

- The science research has illustrated that the climate has been changed ; the earth we are staying has been become warmer.
- The global temperatures have been continuing since 19th century. The speed has been accelerated in the 21<sup>st</sup> century
- 科学研究证明气候发生了变化，人类生存的地球变暖；
- 19世纪以来,全球的气温一直在上升，进入21世纪，气温提升的速度加快。



Source: IPCC Report (International Panel on Climate Change) (2014), *Climate Change 2014: Impacts, Adaptation and Vulnerability*,

# Cities and Urbanisation: the key actors that impact climate changes

## 城市与城镇化是影响气候变化的主要因素

- Urbanisation and climate change interactively produce negative impacts upon human being and human settlements in the perspectives of social, economic and living quality; however,
  - Urban population has been continuing to increase. In 2008, the first time the history that more than 50% of the world's population lived in urban areas. It is estimated that this will increase to 70% by 2050.
- 
- 城市化和气候变化的交互产生对人类和人居环境的社会，经济和生活质量产生负面的影响；然而，
  - 城镇人口仍在不断增加。2008年世界人口的50%居住在城镇地区。据预测到2050年，全世界的城镇人口将达到70%。

# New features of Global Urbanisation and Potential Demands of Supplies

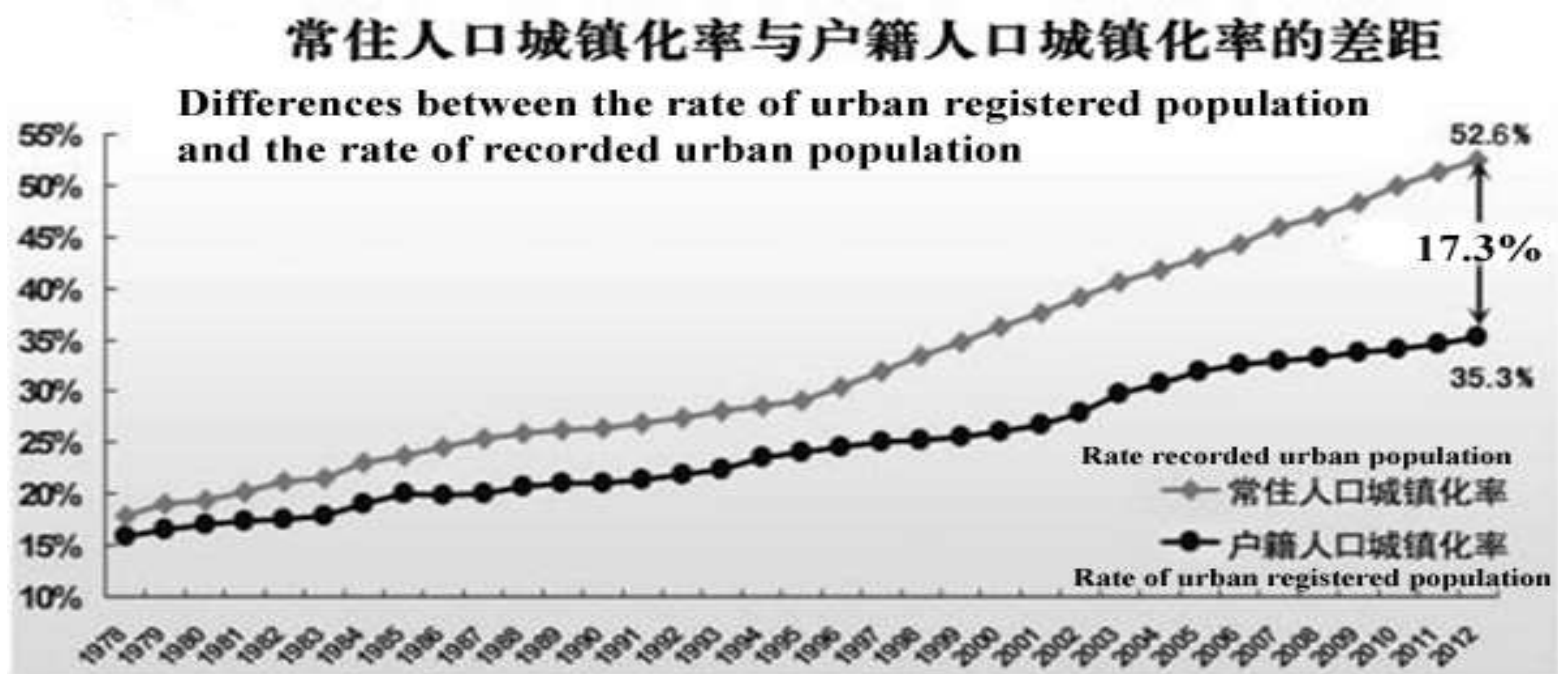
## 全球城市化的新特点以及未来的供需问题

- **Urbanisation mainly takes place in developing countries. Between 2007 and 2025, the annual urban population increase in developing countries is about 53 million, while only 3 million in developed countries**
- **the scale of urban areas is increasing. There are now a number of megacities. Majority are in developing countries. In 2011, 23 mega-cities in the world, only 5 of them were in high-income countries**
- **Rapid urbanization has mainly associated with economic development; demand of resources to support growth, typically the growth in large cities and metropolises. It means great amount of CO<sub>2</sub> emission due to long distance travel and supply, if there is not appropriate management and control of demands.**
- **城镇化主要发生在发展中国家。从2007年到2025之间，发展中国家每年城市人口增长预计约为5300万，而发达国家只有300万**
- **城市规模越来越大,出现了特大城市。这些特大城市多数在发展中国家。2011年全世界23特大城市中，只有5个在高收入国家**
- **快速的城镇化与经济发展相结合；支撑增长的需求进一步增长，特别是满足大城市和特大城市的需求。这意味着如果没有适当的管理和控制，由于长途运输,出行和生活需求的供应，二氧化碳的排放进一步增长。**

# Chinese Urbanisation 中国的城镇化

- China is one of countries in the process of accelerating urbanisation process
- Urban population 711.8 million, 52.57% of total population in 2012
- The mega-cities are appearing in China:
  - 30 cities were with a permanent resident population of over 8 million,
  - 13 out of 30 cities were with a population exceeding 10 million out of 657 cities in China in 2011
- 中国是在加速城镇化的国家之一
- 城市人口的7.118亿，2012年占总人口的52.57%
- 中国的特大城市。2011年中国657个城市中：
  - 30个城市常住人口超过800万，
  - 其中的13个城市人口超过1000万

# Gap between urban registered population and recorded urban population



If China reaches 75% of urbanisation in next 2 decades, around 360 million rural-urban migrants will move to urban areas. However, the actual urbanisation in China is lower than the statistics due to the methodology of statistics. From this perspective, the rural to urban migrants (who will enjoy the urban services and welfare) may be ranged between 360 million to 500 million.

如果在未来20年，中国城镇化率达到75%，大约3.6亿的乡村到城镇的移民。然而，由于目前中国城镇人口和城镇化统计的方法存在差异，实际享受城镇服务的人口低于城镇化人口。因此未来实际的乡村-城镇流动人口（或能够享受城镇服务和福利的人口）可能介于3.6亿至5亿之间。

# Challenges for Chinese Urbanisation 1

## 中国城镇化面临的挑战 一

### **Shortage of necessary resources 必要的资源缺乏**

- Chinese urbanisation: 20% of the world's largest population but only sharing 9% of the world land resources, 4% of petroleum, 2% of natural gas and 25% of water resources on a country basis of the world average. However,
- Based on existing standard of consumption, petroleum, gas and iron mine in China will be exhausted in 16 years, 55 year and 43 years separately
- In the 1990s, the cultivated land was declining at a rate of 330,000 Ha per year; while desertification process has reached annually 246,000 Ha.
- Water shortage was severe. The deficiency of water supply in agriculture was 30 billion cubic metres. 90% of urban water had been polluted
- 中国的城镇是在9%土地资源，4 %的石油，2 %的天然气，和25%的人均水资源基础上解决世界20%的人口的城镇化。然而，
- 基于现有的石油，天然气和钢铁的消费水平，中国的石油将16年内耗尽，天然气可继续使用55年，铁矿石可维持55年；
- 在20世纪90年代，农业耕地以每年33万公顷的速度在减少；沙漠化的速度为每年24.6万公顷。
- 水资源严重短缺。农业供水缺口30万亿立方米。90%的城市水资源遭到污染

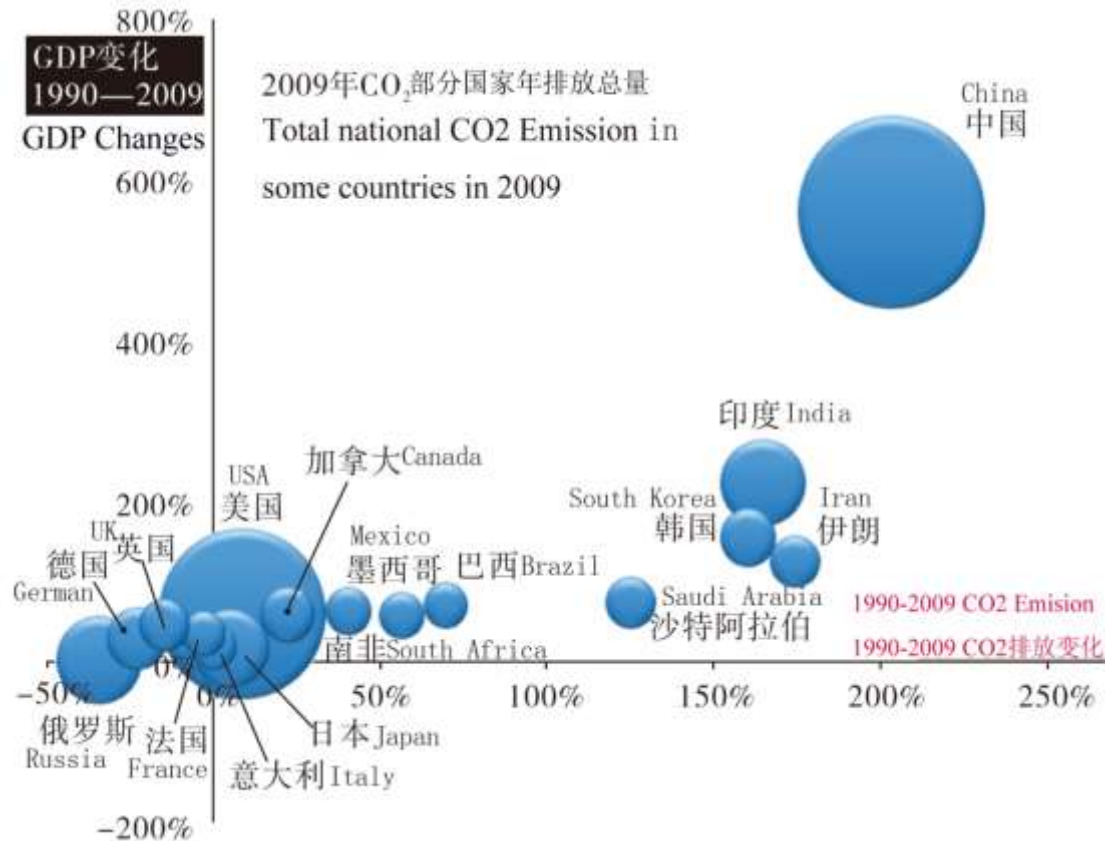
# Challenges for Chinese Urbanisation 2

## 中国城镇化面临的挑战 二

### High CO<sub>2</sub> Emission 高CO<sub>2</sub>排放

Chinese rapid development has been closely associated with high CO<sub>2</sub> emission. Its GHG emission is 3.25 time higher than the world average

中国的快速发展与高的CO<sub>2</sub>排放密切相关。中国的温室气体排放量比世界平均水平高3.25倍





# Challenges for Chinese Urbanisation 3

## 中国城镇化面临的挑战 三

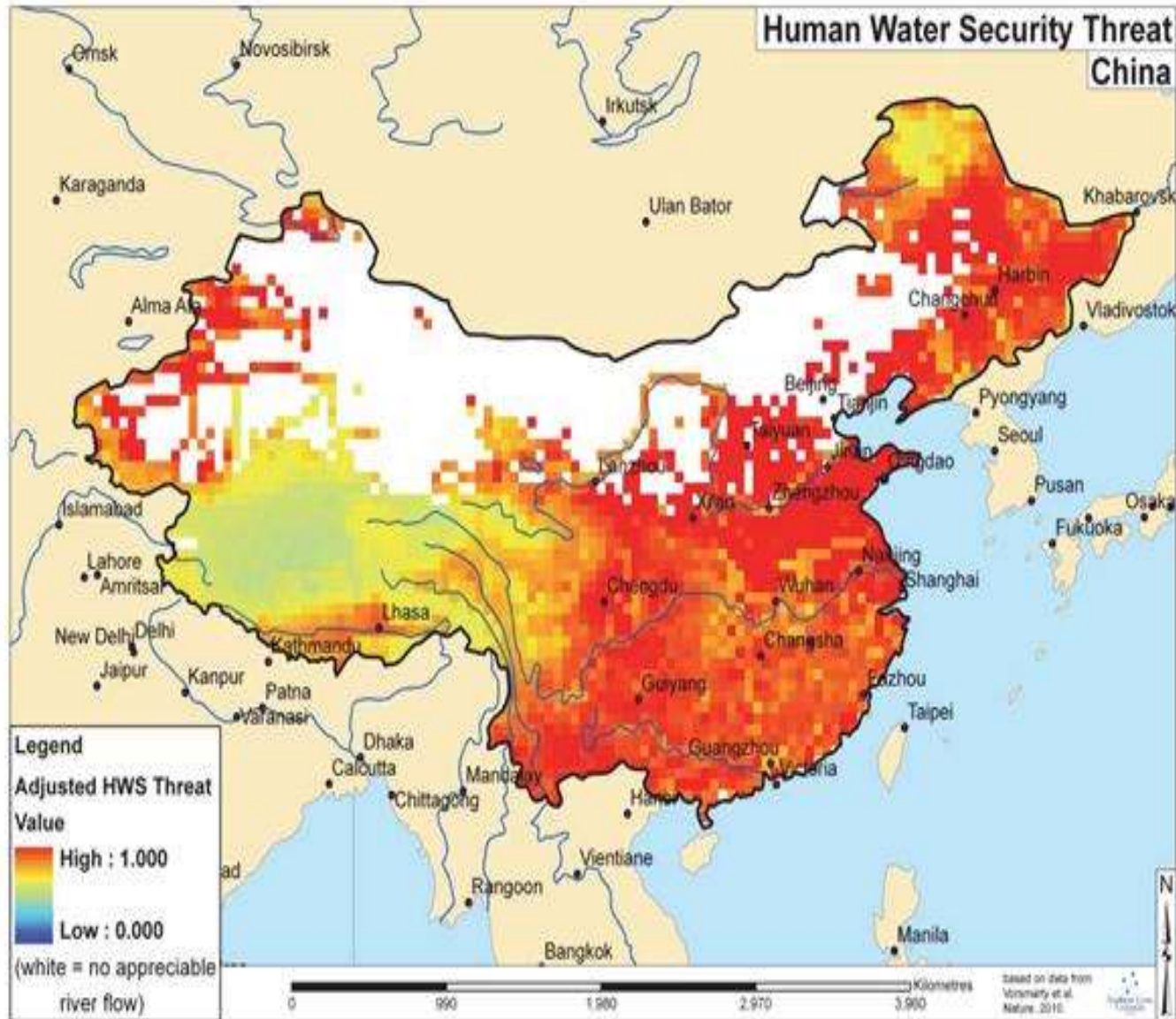
### **Impacts of climate change and unsustainable urban construction pattern**

#### 气候变化的影响和不可持续的城市建设模式

- Impact of climate change
- Vulnerable Urban Infrastructures due to ignoring natural ecological systems, local geographic and topographic features
- Cities without features owing to ignoring local cultural and historical heritages
- 气候变化的影响
- 由于建设过程忽视自然生态系统、本地的地理和地形特征，城市基础设施脆弱
- 忽略本地的文化和历史遗产，城市没有特色

# Human Water Security Threat in China

## 中国境内对人类产生水患风险的地区



# Vulnerable Urban Infrastructures Impacting by Heavy Precipitation

## 强降雨对脆弱的城市基础设施造成影响





# Frequent Droughts

## 常态的干旱



# Challenges for Chinese Urbanisation 4

## 中国城镇化面临的挑战 四

**Population continue moving to large cities and megacity The potential problems include:**

向大城市和特大城市的聚集可能的问题包括

Emissions by transport continue increasing due to longer distance daily trip, and relying on inward flows of food, water and consumer goods

- More negative impacts to climate change generating by metropolises due to large and high density population, e.g., heat island and outdoor pollution which increase more heat waves
- High-rise housing price
- Potential health risk owing to over-density within limited land use
- Others. ...
- 由于长距离出行，以及依赖外地向城市输送食品，水和其他消费品，交通的碳排放继续增长
- 气候变化带来更多的负面影响，特大城市众多和高密度的人口更容易产生热岛效应和室外的污染，生成更多的热浪。
- 高住宅价格
- 由于有限的土地，过度的密度带来潜在的健康风险；
- 其他...

# Challenges for Chinese Urbanisation 5

## 中国城镇化面临的挑战 五

### **Food security 粮食安全问题**

- The climate change creates higher risk of food shortage worldwide due to potential extreme climate, livelihoods and food supplies may reduce, while their prices may increase
- It has always been a great task in feeding its large population in China due to largest population in the world. Without policy and supports to agriculture and protection of cultivated land, China may face a food crisis.
- However, the existing urban development pattern has been delivered by occupying arable land.
- 气候变化，特别是可能的极端气候，造成全世界食品的短缺，因此使得粮食价格的增加
- 由于中国具有世界上最庞大的人口，因此保证粮食的供给一直是中国一项重要的任务。但若没有政策对农业的支持和对耕地的保护，中国将面临食物危机。
- 然而，目前的城市发展模式以占用农业耕地为一种重要方式。

# Challenges for Chinese Urbanisation 6

## 中国城镇化面临的挑战 六

### **Sustainability and environment protection**

#### **可持续性和环境保护**

- A negative impact of existing rapid urbanisation and the economic development have greatly increased environmental pollution.
- The solid-waste production is expected to more than double by 2016: China far ahead of the United States as the largest producer.
- China's main environmental problems relate to: air pollution and acid rain; water supply; water and river pollution; the loss of forested areas, which contributes to soil erosion; the loss of fertile agricultural land for housing and industrial development and urbanisation.
- 目前快速的城镇化和经济发展对环境污染带来极大的负面影响。
- 2016年固体废弃物的数量预计将翻番，中国已经超过美国成为最大的废弃物产生国。
- 中国的主要环境问题包括：空气污染和酸雨；水的供应；水和河流的污染；森林面积的消失，土壤侵蚀；肥沃的农业土地用于住房建设，城镇化和工业的发展。

# Challenges for Chinese Urbanisation 7

## 中国城镇化面临的挑战 七

### **Social harmony** 社会和谐问题

**Poverty alleviation:** Chinese poverty alleviation is significant. However, 10% of Chinese people are still living below the absolute poverty standard

**Employment promotion:** urbanisation may creates great tasks due to the need to provide enough jobs in the urban areas where there has already been a serious problem of increasing unemployment.

**Balance development:** various rate of growth between Chinese regions. The rate of the central area was double that of the western area and that of the eastern area double that of the central area;

- **扶贫:** 中国政府扶贫政策取得重大进展。然而还有10%的中国人还生活在绝对贫困标准线下。
- **促进就业:** 失业率可产生的贫困。城镇化需要在城镇地区创造更多的就业，城镇自身目前也面临失业增长的困境。
- **均衡发展:** 中国区域之间发展不平衡 中部地区比西部的高增长率高一倍，东部地区又比中部地区高一倍



# Adaptation to Climate Changes & Sustainability

## 适应气候变化与可持续发展的措施

- to build a sustainable production and consumption urban-rural space to deliver integrated urban- rural development for food security
- to decide objectives and policies by comprehensively considering local social, cultural historical, economic and environmental conditions and context; and to establish sense of local belonging and nostalgia
- to adopt renewable energy for energy efficiency, carbon reduction and low carbon and sustainable development
- to reform existing planning system and approaches
- to promote green infrastructure development
- to retrofit built-up environment and to establish a liveable, equal, healthy and mixed community
- 建立一个生产和消费可持续的城乡空间实施城-乡一体化发展，保证粮食安全
- 在综合考虑本当地的社会，文化，历史，经济和环境条件和背景下，确定本地区的发展目标和政策；形成当地的归属感和“乡愁”
- 实施推进可再生能源，碳减排和低碳,可持续发展模式，实现能源效率的提高
- 改革现有的规划系统和规划方式
- 促进绿色基础设施的发展
- 通过生态化的城市复兴改造，建立一个宜居，平等的，健康的和混合的人类住区

# Building a sustainable production and consumption urban-rural space for food security

建立一个生产和消费可持续的城乡空间实施城-乡一体化发展，  
保证粮食安全

- 保障食品安全同时提高农村居民生活质量的一种方式是通过创建可持续的城乡可持续的生产和消费空间，提高农业生产效率。在城乡可持续发展的空间，小城市(镇)发挥着重要的作用。
- 小城市(镇)的功能不仅仅是作为桥头堡，发挥为乡村地区提供必要的公共和商业服务，为城市地区提供农产品，同时还可吸收的农村向城市迁移的人口,减缓大城市和特大城市的人口压力。但是
- 要让小城市(镇)发挥作用，具备吸引力，小城市(镇)的服务和建设质量，特别是教育和医疗。当前具有“大城市倾向”的政策必须转变。

## **Considering local social, cultural, historical, economic and environmental conditions and context**

**在综合考虑本当地的社会，文化，历史，经济和环境条件和背景下，确定本地区的发展目标和政策；形成当地的归属感和“乡愁”**

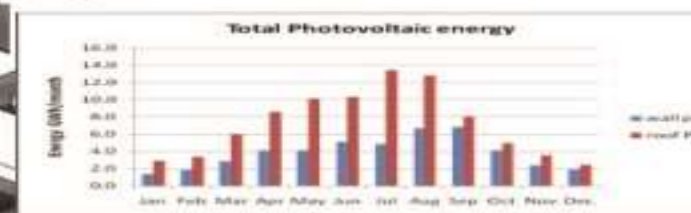
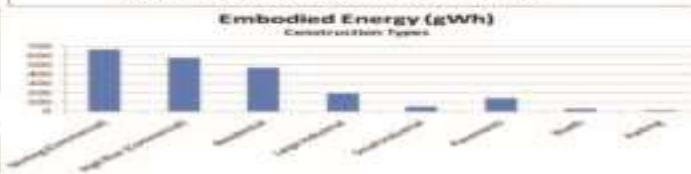
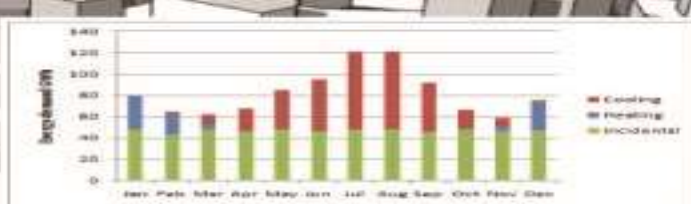
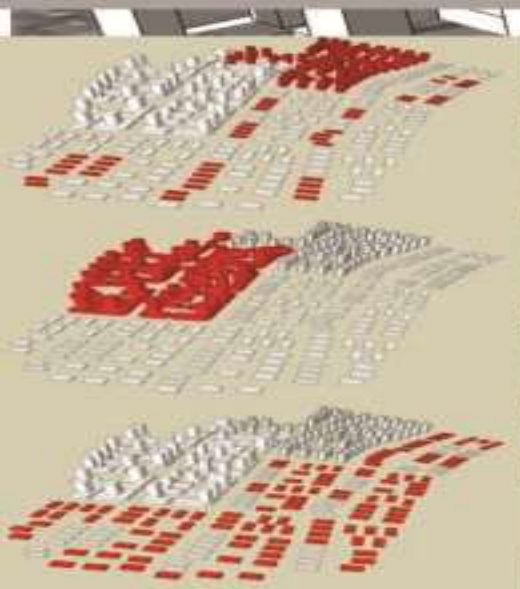
- 不同城市处在不同的发展阶段，气候条件也大相径庭。城市化和生态文明的发展战略目标的制定应当考虑当地的特色。应当明确各地的发展目标和政策在全国总目标和任务框架的前提下，应当因地制宜，考虑各地的特点。
- 自上而下的政策制定和推行需要与自下而上的行动相协调。在社会不同利益攸关者之间尽可能形成共识。应当鼓励实行简单、低碳和健康生活方式的氛围
- 城镇化和全球化过程中，中国的城市需要尽力保护当地的特征和文化，防范全球化和快速城镇化带来的同质性的趋势，避免出现城市建设的单调性和一致性。建设一个安全，健康，公平，具有文化认同的城市，创建当地的归属感，使人们有“乡愁”。

# Adopting renewable energy for energy efficiency, carbon reduction, and low carbon and sustainable development

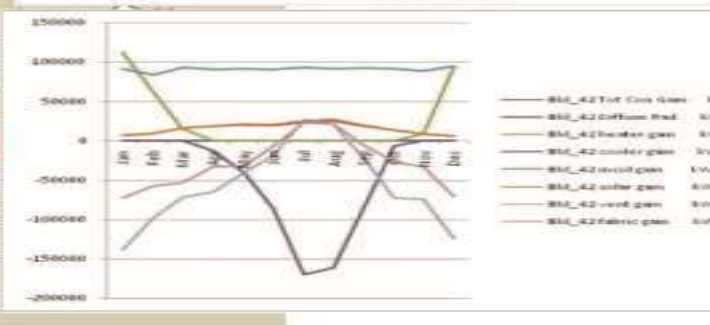
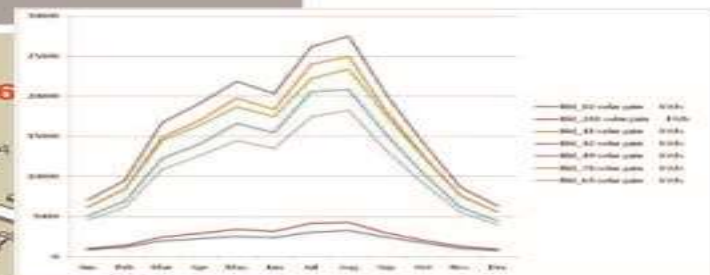
## 实施推进可再生能源，碳减排和低碳,可持续发展模式， 实现能源效率的提高

- 作为世界第二大经济体, 为了保证经济的持续发展和城镇化的进程, 中国的能源和资源的供给需求量的将持续增长且非常庞大; 同时还需要实现碳减排的目标。有必要进一步促进和强化可再生能源的推广及其运用, 特别是采取鼓励的财政和政策支持以及相关机制的建立, 以此提升社会和市场的广泛参与。
- 低碳产品的设计, 甚至包括绿色建筑的设计都需要考虑人们的行为和生活习惯, 同时建立经济机制促进产品的推行和运用
- 实行碳排放的量化分析(碳排放清单 )

# Whole Site Analysis



# Building Analysis



# Reforming existing planning system and approaches

## 改革现有的规划系统和规划方式

- 现有的规划系统和方法无法应付二十一世纪的变化和挑战，现代规划体系和方式须改革。
- 可持续发展规划范式是在多学科运作。建立“跨学科”，跨越传统的专业领域，变更思维方式,在不同的专业之间创建复合的理论和模式解决我们当前所需要面对的问题具有重要的意义。
- 强调人与自然系统各种不同的组成及其它它们之间的关系，具备一体化的观点，采取一体化的措施是应对气候变化的关键。
- 长远的观点，更明确地分析目前提出的规划政策、方案和行为将如何导致远期的碳排，影响其他的目标
- 将低碳和生态发展的目标和规范纳入规划管理和土地出让过程

# Promoting Green Infrastructures

## 促进绿色基础设施的发展

- 采用“可持续城市排水系统”(SUDS)(低冲击开发)与景观设计相结合的方式是控制雨洪的方式，也是解决城市缺水的措施之一
- 控制小汽车的使用，例如控制停车位的设置(例如,阿姆斯特丹,卡迪夫) 大力发展使用可再生能源的公共交通(例如,弗莱堡)
- 提供更多的绿色公共空间，实现综合的作用，包括休闲娱乐，泄洪，火灾和地震的避难场所。

# **Retrofitting built-up environment and establishing a liveable, equal, healthy and mixed community**

**通过生态化的城市复兴改造，建立一个宜居，平等的，健康的和混合的人类住区**

- 政府的管理机制和运营效率需要完善以满足社会的需求。提供相应的软件(鼓励优惠政策，资金，制度建设)和硬件(土地)
- 随着城市人口的增加，城市建设用地的需求将会增加。土地的供给与需求将是一个重大的困境。然而应该避免出现的“造城运动”。对现有土地的再开发和再利用应当是重点。新型城镇化应当重视和通过对现有城市的生态化改造，提高土地的使用效率。老城区生态化改造不仅改善居民的生活环境，也有利节能减排。



THANK YOU !

谢 谢 ！