生态城市与可持续的城市发展－机遇与挑战

The ecological city and sustainable urban development – Opportunities and challenges

Bernhard Müller

acatech
NATIONAL ACADEMY OF SCIENCE AND ENGINEERING

Tongji University
November 25, 2015

为什么要讨论… Why shall we talk about …

Green Urbanism and
Ecological Infrastructure

… 生态城市

… the Ecological City

?

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Green Urbanism and
Ecological Infrastructure

UN Population Division
Department of Economic and Social Affairs
World Urbanisation Prospects (2014)
China: + 292 M urban dwellers between 2014 and 2050
Shanghai: Third largest urban agglomeration in the world

Sustainable and Resilient Cities?

… 生态城市
… the Ecological City

?

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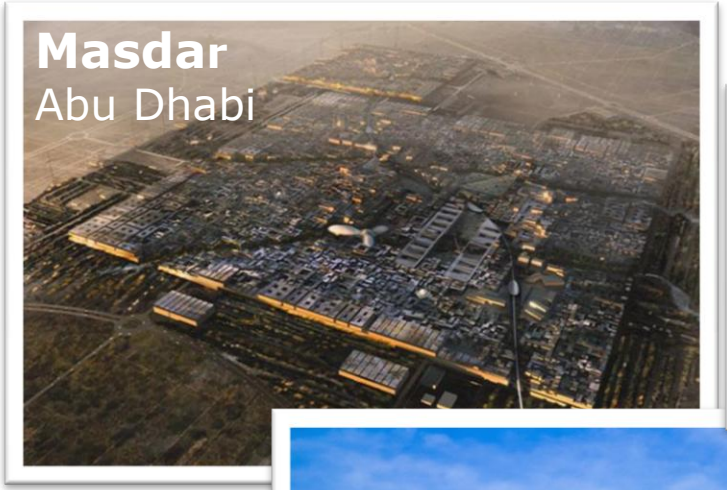
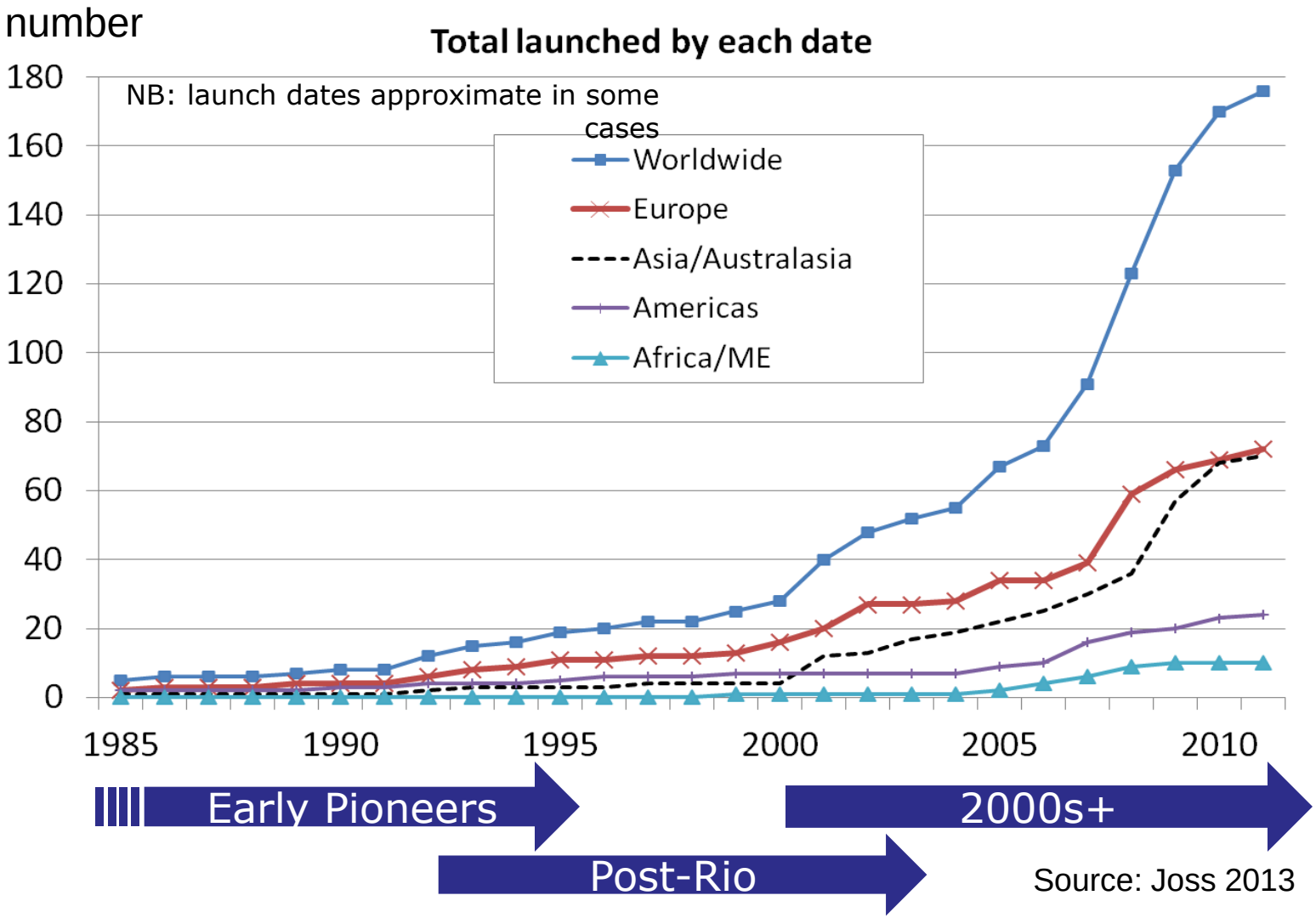
DRESDEN concept
Leibniz Institute of Ecological Urban and Regional Development

生态城市在全球蓬勃发展
Eco-cities flourishing globally



生态城市的全球兴起 - The global rise of eco-cities



Source: Joss 2013

Ecological City
生态城市

Eco-City
生态城

Interactions between organisms and their environment

Smart City
智慧城市

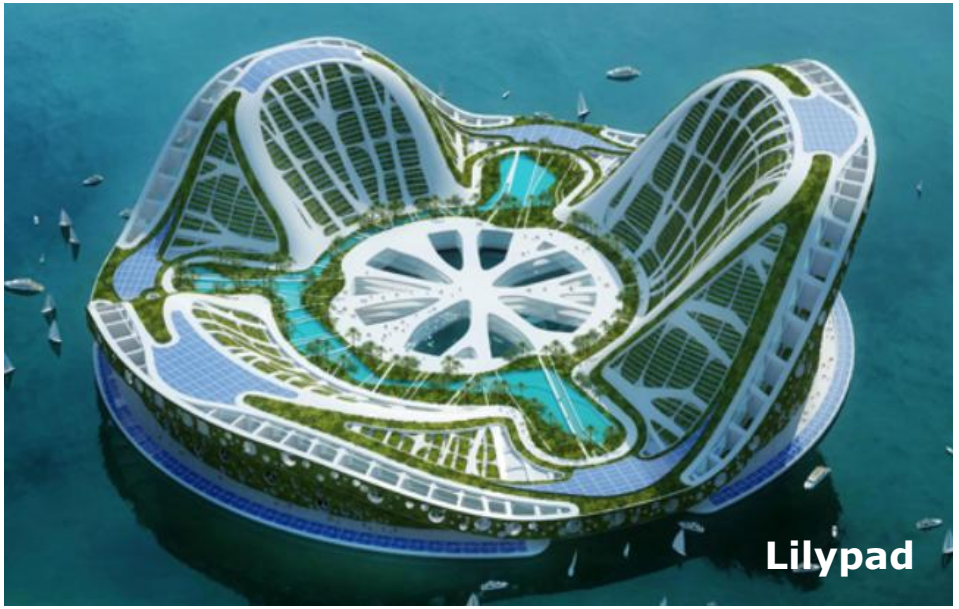
Green City
绿色城市

Energy Efficient City
节能城市

Resilient City
韧性城市

City of Tomorrow
未来城市


Gwanggyo City Center

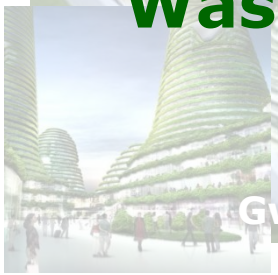

Lilypad


Beirut Wonder Forest

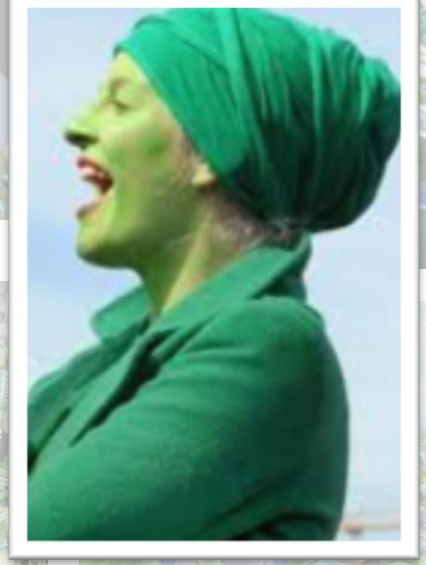

Build an ecofriendly city
(computer game)

Ecological/Green City – More than a Catchword?

Green Washing?



Gwanggyo City Center



Green Dreams?

Lilypad

Green Cosmetics?

Beirut Wonder Forest

Green Marketing?

Green = Green ?

我想谈什么？
What do I want to talk about?

- 生态城市 - 我们这个时代的发现？
  The Ecological City – Discovery of our Time?

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- 展望 — 面临的挑战
  Perspectives – Challenges Ahead

The Leibniz Institute of Ecological Urban and Regional Development in Dresden
莱布尼茨生态与区域发展研究所

Research and Policy Advice for the Sustainable Urban and Regional Development
面向环境友好的城市与区域发展的研究和咨询

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DRESDEN concept

Leibniz Institute of Ecological Urban and Regional Development

Research and Policy Advice for Sustainable Urban and Regional Development

- Non-university research institute
  （独立的空间科学研究所）
- Member of the Leibniz Association
  （隶属于莱布尼茨学会）
- Founded in 1992
  （创立于1992年）
- Research on spatial development, interdisciplinary approach
  （跨学科研究）

Research and Policy Advice for Sustainable Urban and Regional Development

- Non-university research institute
- Member of the Leibniz Association
- Founded in 1992
- Research on spatial development, interdisciplinary approach
- Approximately 120 employees, 5 joint professorships, and 10 scholarship holders
  （120名科研工作人员，5位联合教授和10名奖学金生）
- Budget: 9.6 million Euros, including 3.9 Mio. million Euros of third-party funding
  （2013年科研经费共计980万欧元，其中390万欧元横向经费）

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- Close cooperation with the Technische Universität Dresden and United Nations University (UNU-Flores, Dresden)
  （与德累斯顿工业大学和德雷斯顿联合国大学物质用量与资源综合管理研究所紧密合作）
- Cooperation with partners in Europe, Asia, Africa and America
  （和欧洲，亚洲以及美国的独立科研机构以及高校建立了合作框架）

Research Topics
（科研侧重点）

- Landscape Change and Management
  （生态景观变迁与管理研究）
- Resource-Efficiency of Settlement Structures
  （高能效的城乡结构研究）
- Environmental Risks in Urban and Regional Development
  （城市与区域发展中的环境风险研究）
- Monitoring of Settlement and Open Space Development
  （居民点以及开放空间发展监测）
- Strategic Issues and Perspectives
  （发展中的战略问题和展望）
- Ecological and revitalizing urban renewal
  （生态友好和注入活力的城市更新）

Research and Policy Advice
（知识转换和政策建议）

With the results of its research, the IOER provides politics, administration, and society with an important basis for planning and policy decisions.

凭借其研究成果，IOER为政治、行政和社会提供规划和政策决策的重要依据。

Promotion of Young Scientists
(青年科研工作者的培养资助)

- Doctoral and Post-doc projects of young scientists from a range of disciplines

  利用博士和博士后项目培养多学科的青年科研工作者

- IOER provides structured support for doctoral candidates and diploma/master theses

  IOER为博士论文和硕士论文提供系统性支持

- International **Dresden Leibniz Graduate School (DLGS)** together with TU Dresden

  和德雷斯顿工业大学共建德雷斯顿莱布尼茨研究生院

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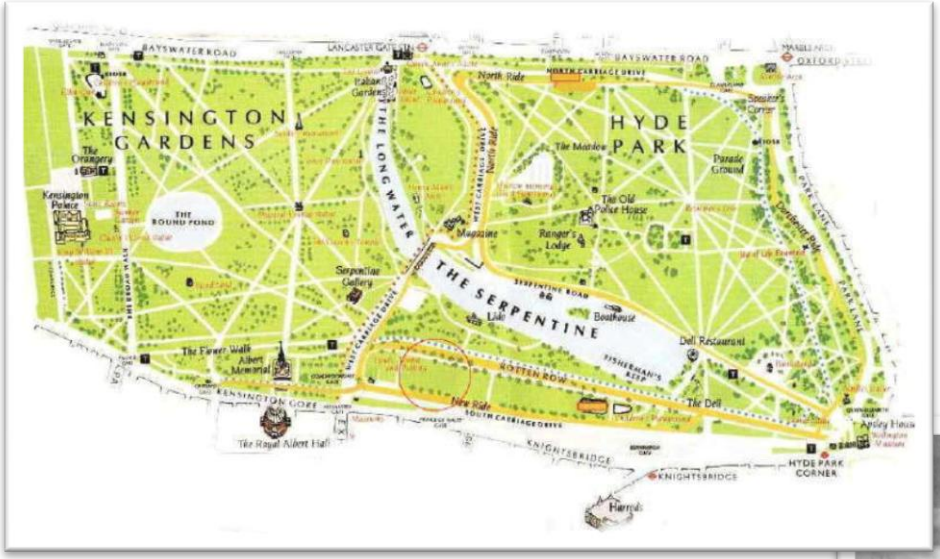
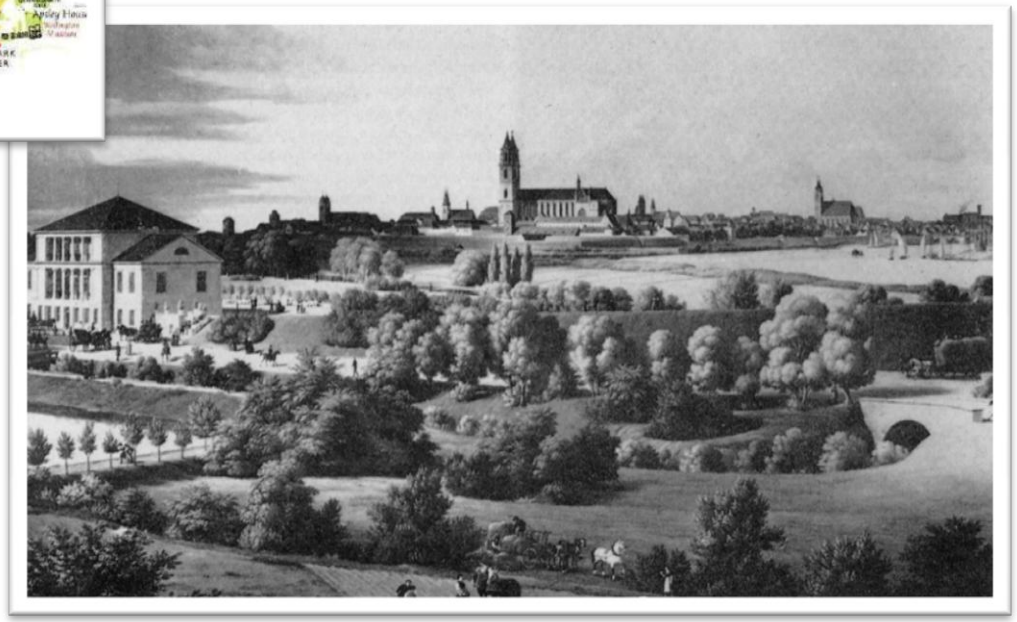
公园
Public Parks

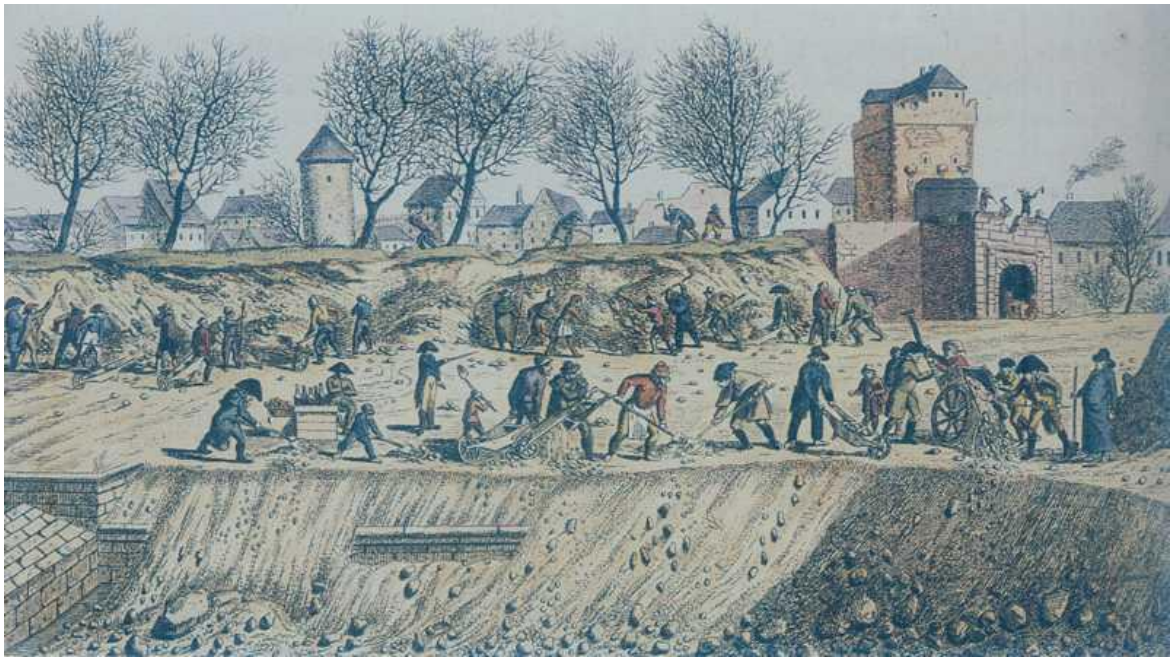


London: Hyde Park
~1000 Documented
1536 Fenced for hunting
1637 Opened to public



Public Park (Volkspark) in Magdeburg 1824

Frankfurt –
Tearing down the city walls
Establishing the green belt
18th/19th century



GRÜNGÜRTEL
FRANKFURT

两幅图片...
两个国家...
Two pictures ...
Two countries ...

Germany 德国

英国 England

一个主题！工业化
One topic!
Industrialisation
城市的快速发展！
Rapid urban growth!

End of 19th Century:

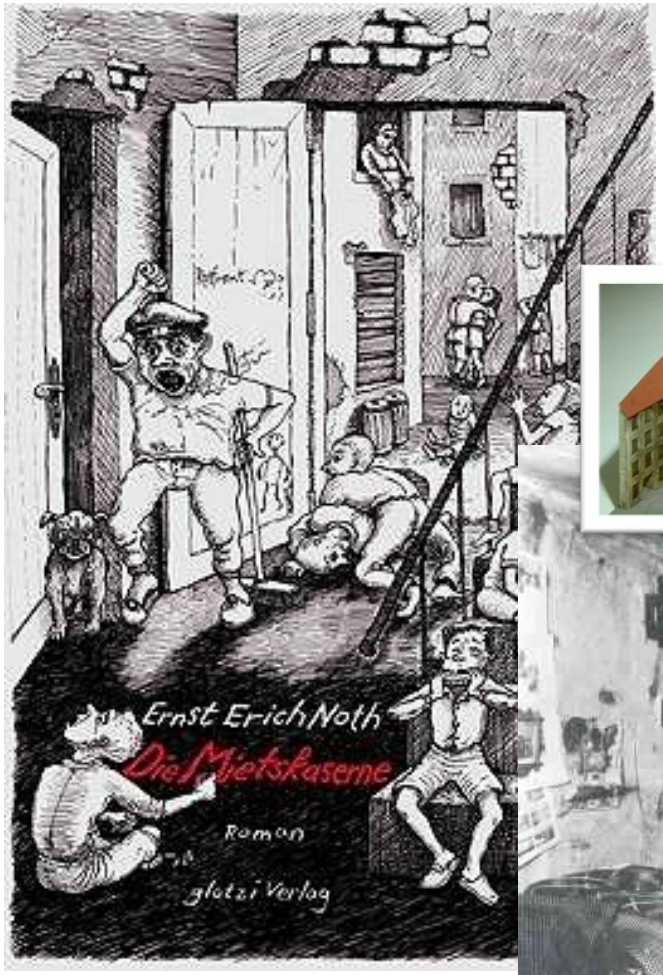
Extreme density:

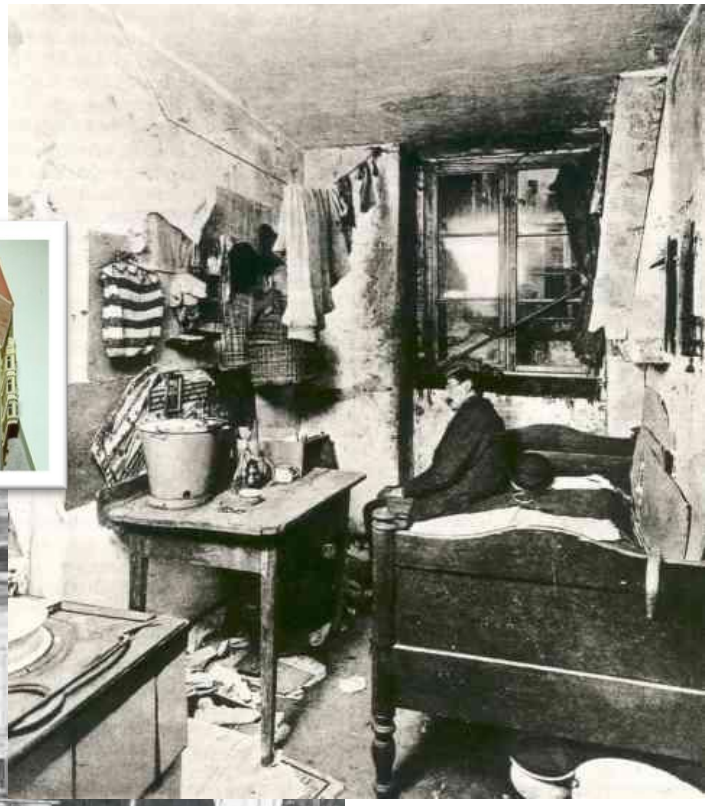
巴塞罗纳 Barcelona:	85.000居民/平方公里
伦敦 London:	40.000居民/平方公里
巴黎 Paris:	37.000居民/平方公里
柏林 Berlin:	20.000居民/平方公里

Urban densities (today) (Inh./km²):

Dresden	approx.	1.600
München		4.500
Berlin		4.000
City Center		*11.000*
Monaco		17.500
Barcelona		15.900
Greater Paris		3.660
City Center		*21.000*
London		5.200
Singapur		7.100
Hongkong		6.400
上海 - Shanghai		3.630

Cities –
Places of
opportunities
and misery

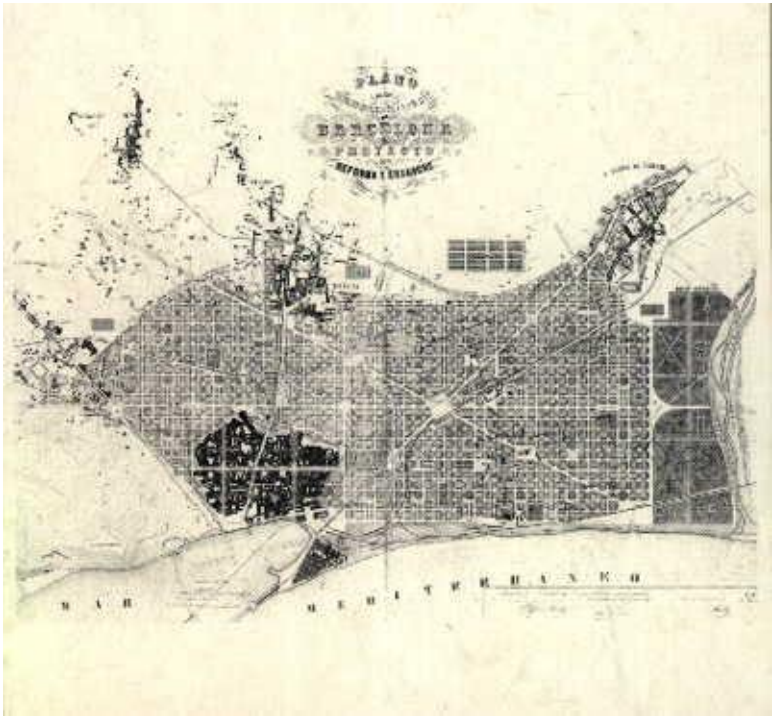




厄尔德方斯·西达(1859)－巴塞罗纳城市扩张图
Ildefons Cerda (1859) – Urban Extension Plan Barcelona

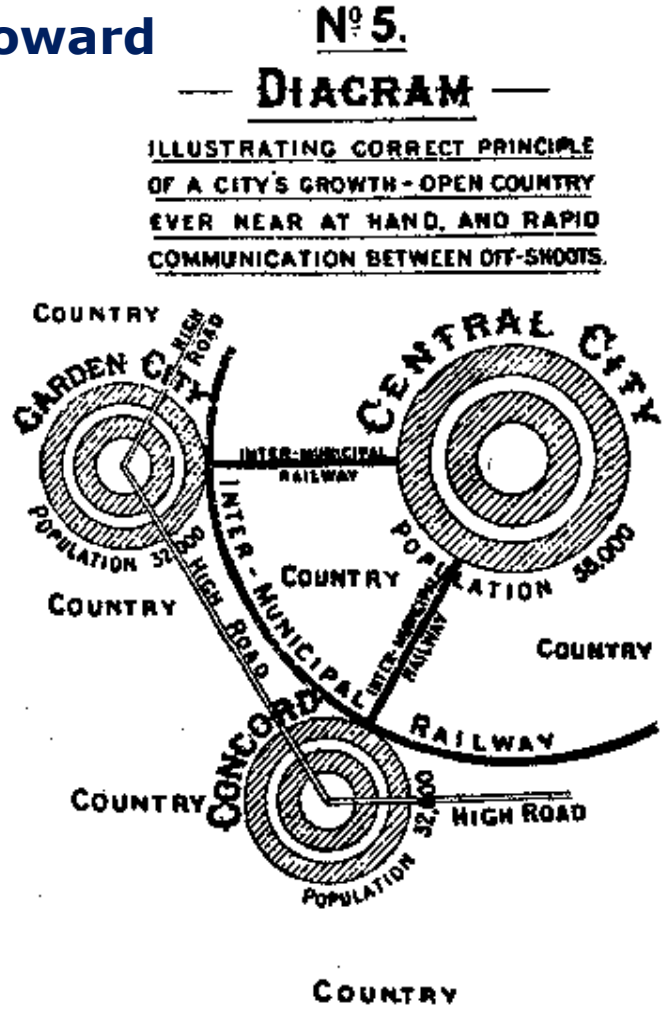
- 个人自由
- 所有住宅享有空气，阳光和自然光
- 所有城区对优质服务享有平等
- 机动性和沟通可达性

- Freedom of the individual
- Air, sun and natural light in all dwellings
- Egalitarian desire for quality services in all city districts
- Mobility and ease of communication

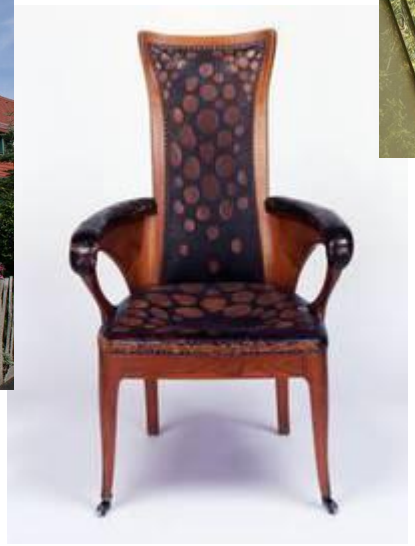


1898

埃比尼泽·霍华德
田园城市
Ebenezer Howard
Garden City



Dresden–Hellerau



Garden City Marga

Sweden
since end of
19th century

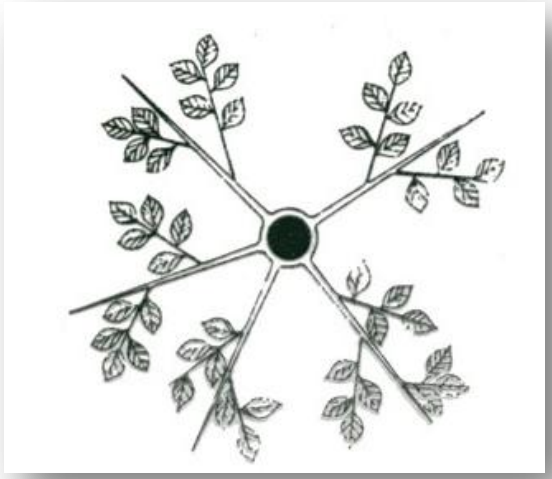
Germany (mid 19th century)

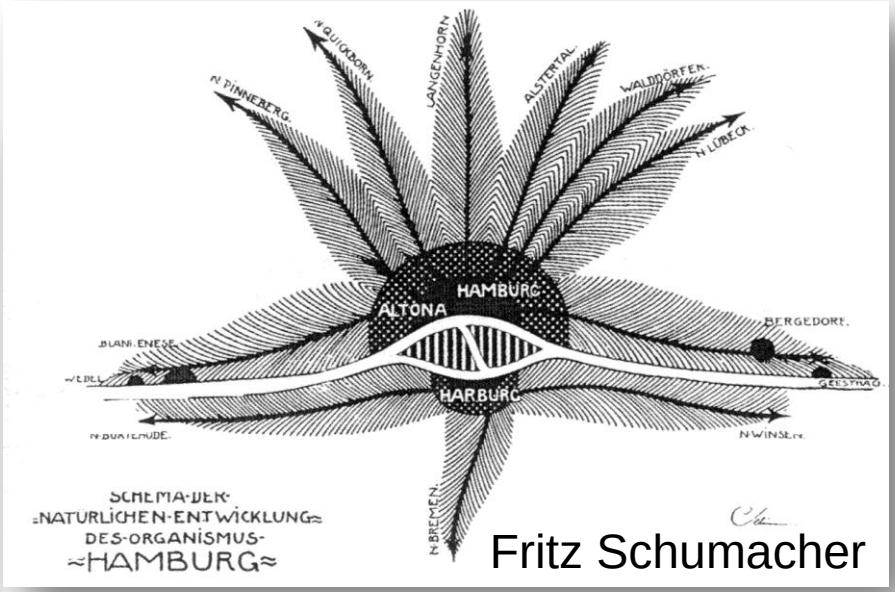
Allotment Gardens

Mid 18th century
Russia , Great Britain

Nature inspiring urban planners

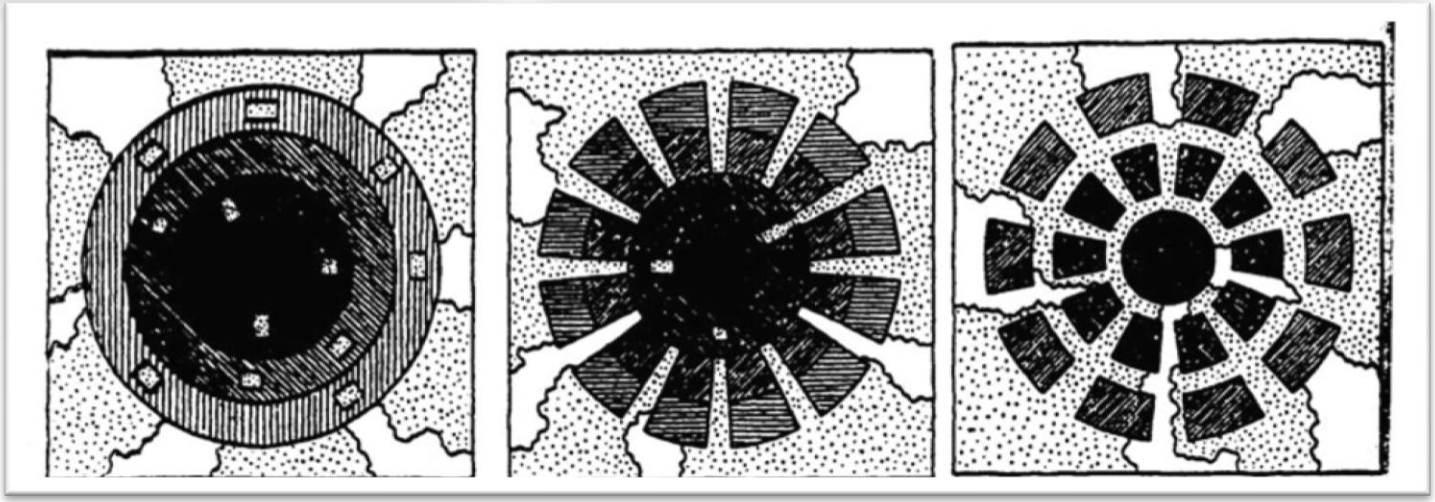
Wilhelm Seidensticker

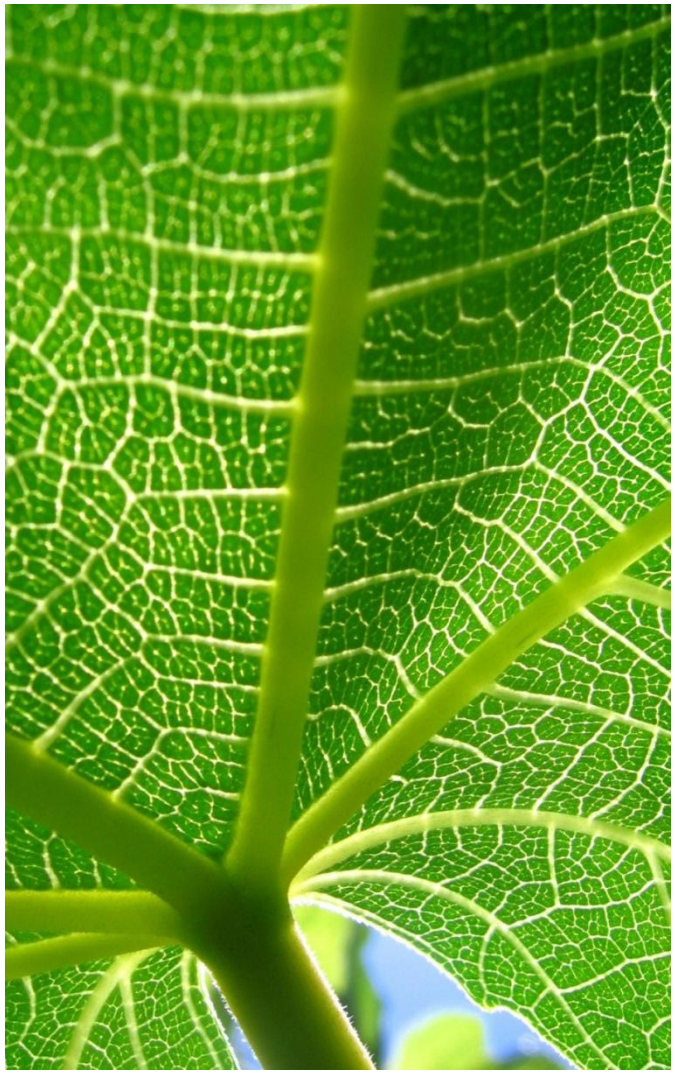




Fritz Schumacher

How shall cities grow?





Urban BIOMIMICRY

Innovation Inspired by Nature

Source:
Movie about Centenary City - Abuja

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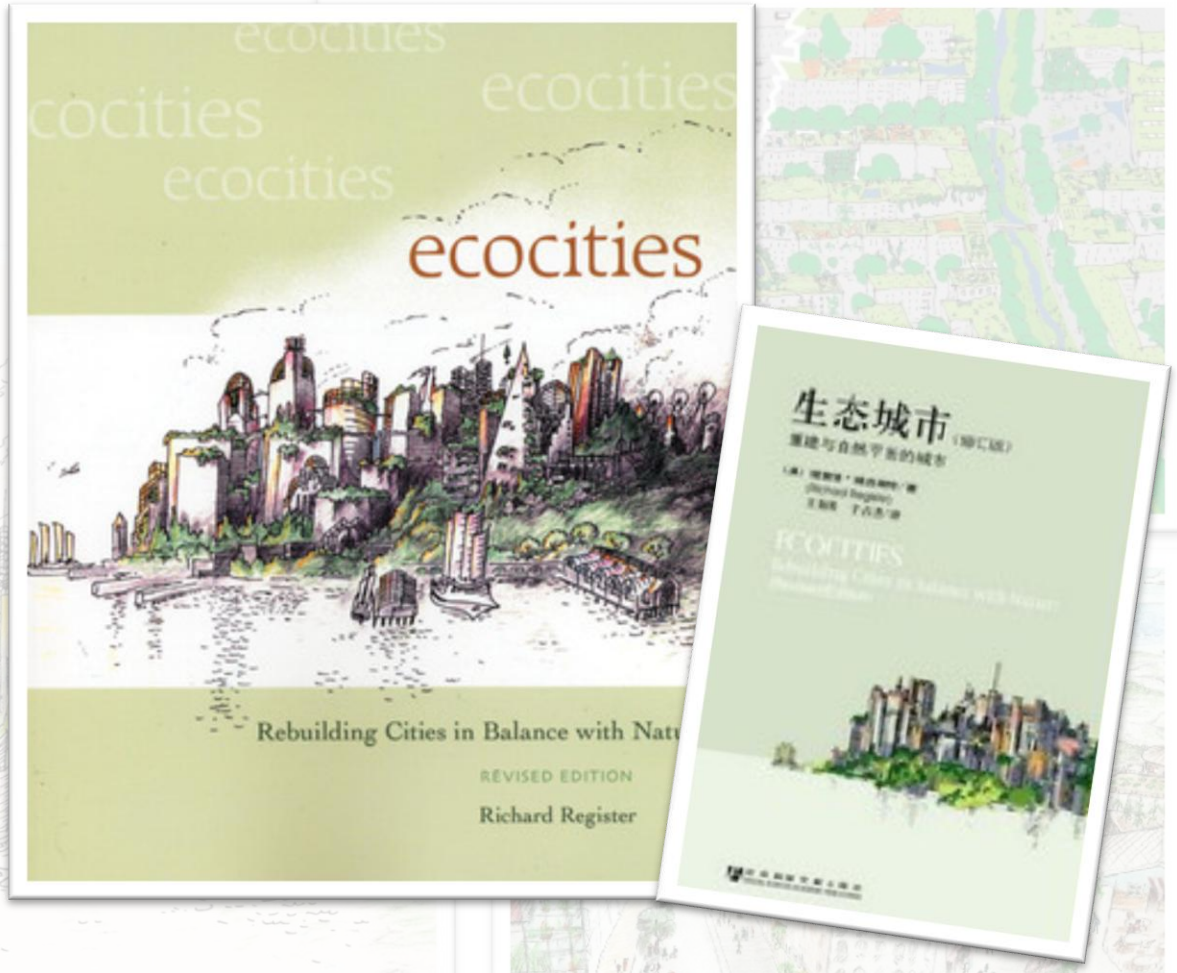
City Images by



1975 NGO Urban Ecology Berkeley: “rebuild cities in balance with nature” – in part: reaction to urban sprawl

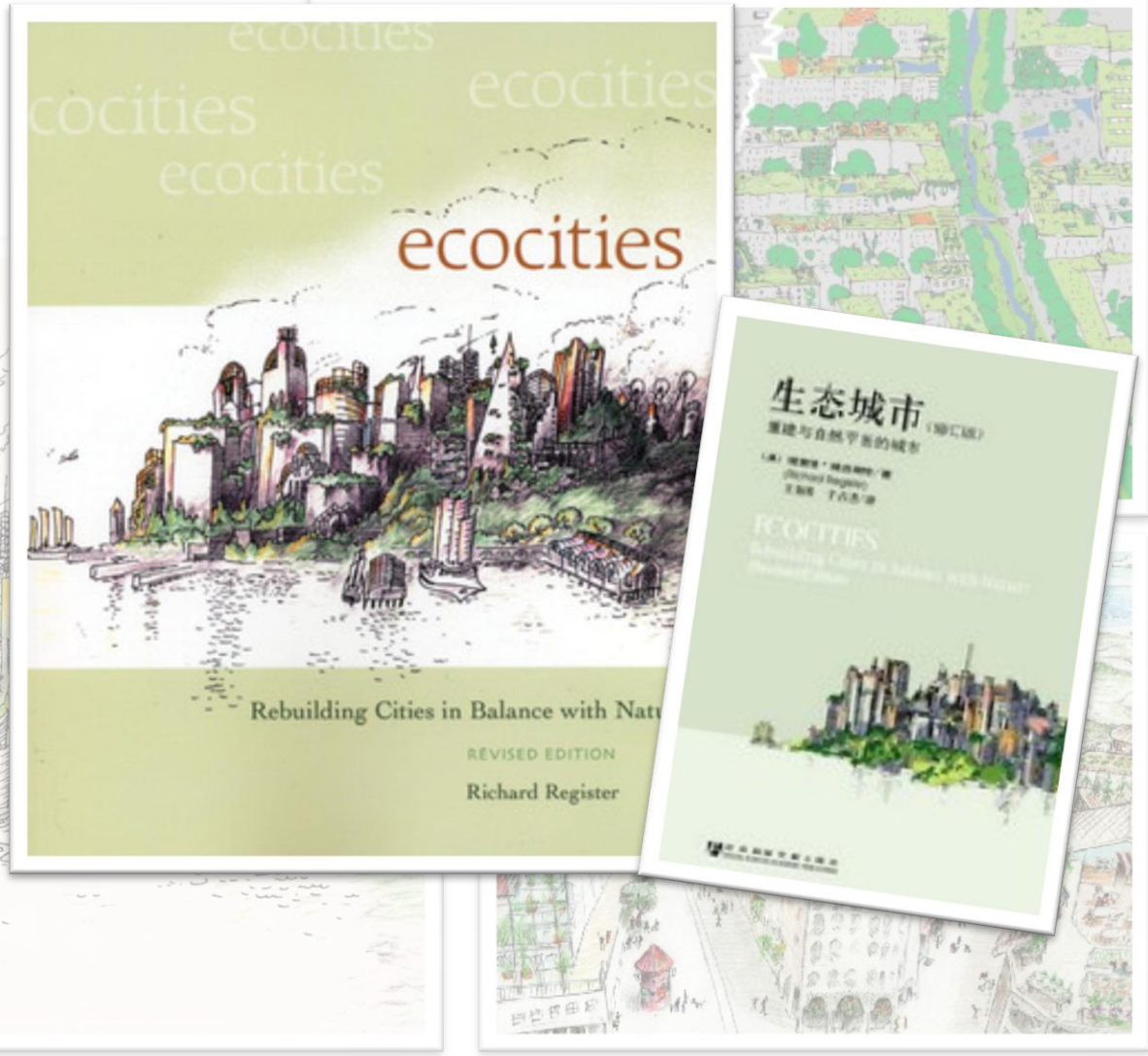
1997 NGO Urban Ecology Berkeley: “its mission is to create ecological cities following 10 principles …”

Principles for creating eco-cities

1. Revise land use priorities to create compact, diverse, green and vital mixed communities near transportation facilities
2. Revise transportation priorities to favour bicycle and foot over autos
3. Restore damaged urban environments (creeks, wetlands)
4. Create affordable, safe, convenient and racially and economically mixed housing
5. Nurture social justice and create improved opportunities for women, people of colour and disabled
6. Support local agriculture, urban greening projects and community gardening
7. Promote recycling, innovative appropriate technology and resource conservation while reducing pollution and hazardous waste
8. Work with business to support ecologically conscious economic activity
9. Promote voluntary simplicity and discourage excessive consumption of material goods
10. Increase awareness of the local environment and bioregion through activist and educational projects

Source: Urban Ecology 1996

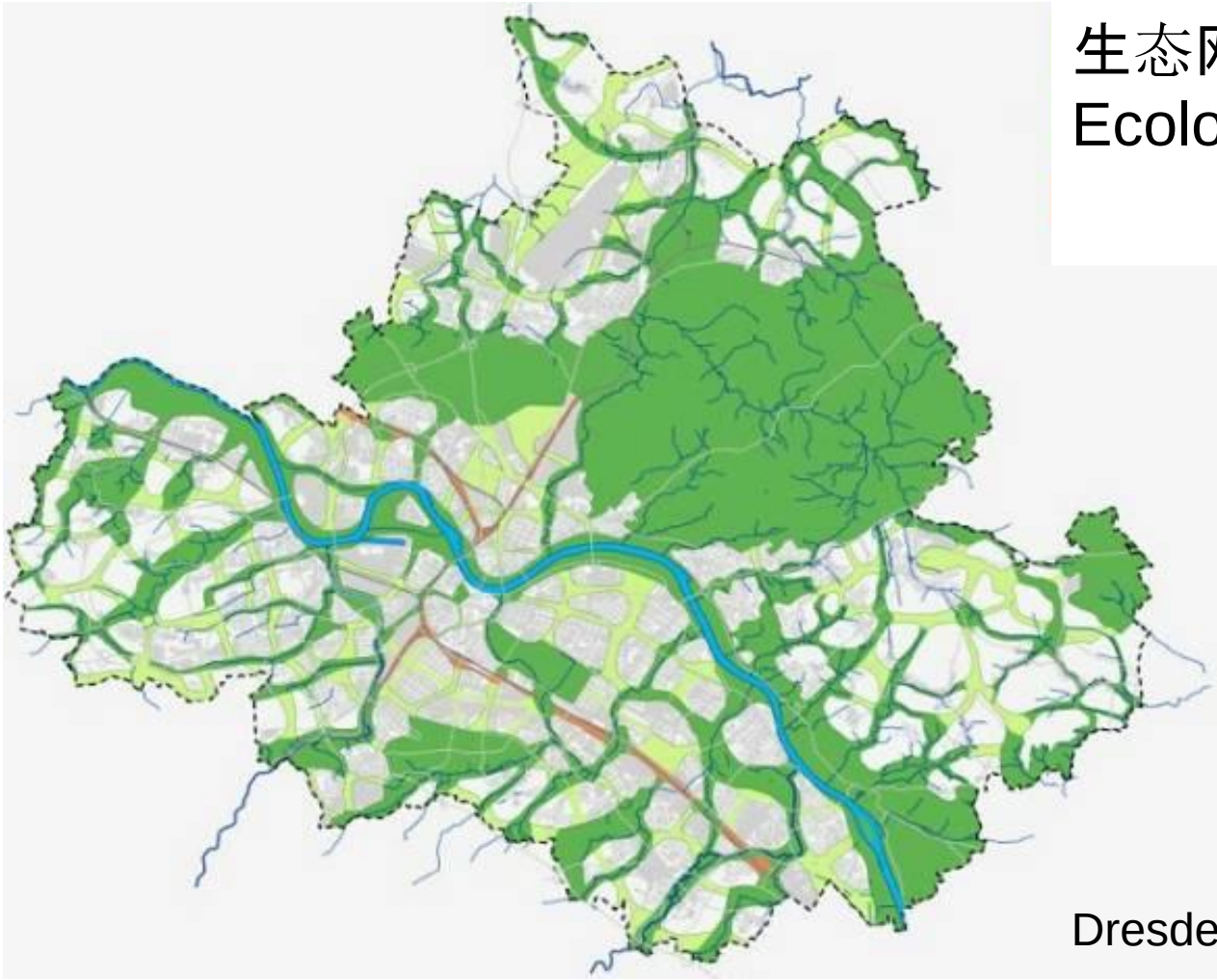
City Images by



Ecocity World Summits

Abu Dhabi, 2015
Nantes, France, 2013
Montreal, Canada, 2011
Istanbul, Turkey, 2009
San Francisco, USA, 2008
Bangalore, India, 2006
Shenzhen, China, 2002
Curitiba, Brazil, 2000
Dakar/Yoff, Senegal, 1996
Adelaide, Australia, 1992
Berkeley, California, USA, 1990

生态网络
Ecological Network



Dresden

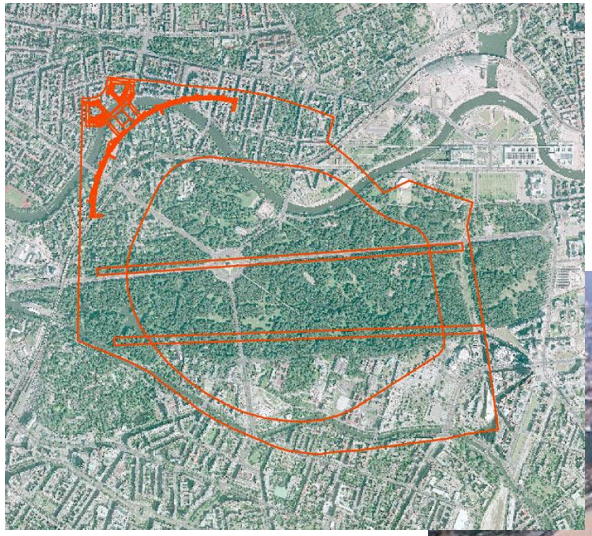
Berlin
Tiergarten
(2.1 sqkm)

Berlin – Gleisdreieck (former freight train area)

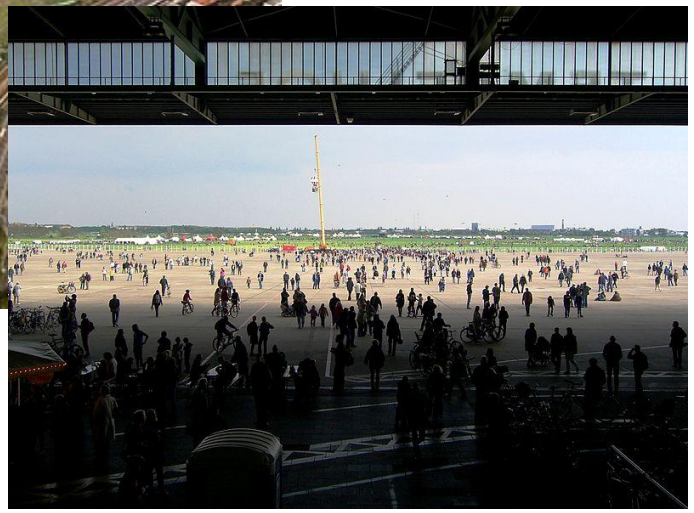
Berlin - Gleisdreieck

Berlin - Gleisdreieck

Tempelhof Airport (1923-2008)



Since 2014
Protected by law
Open space



城市实验室 - Urban laboratories

生态区域
Eco-Region

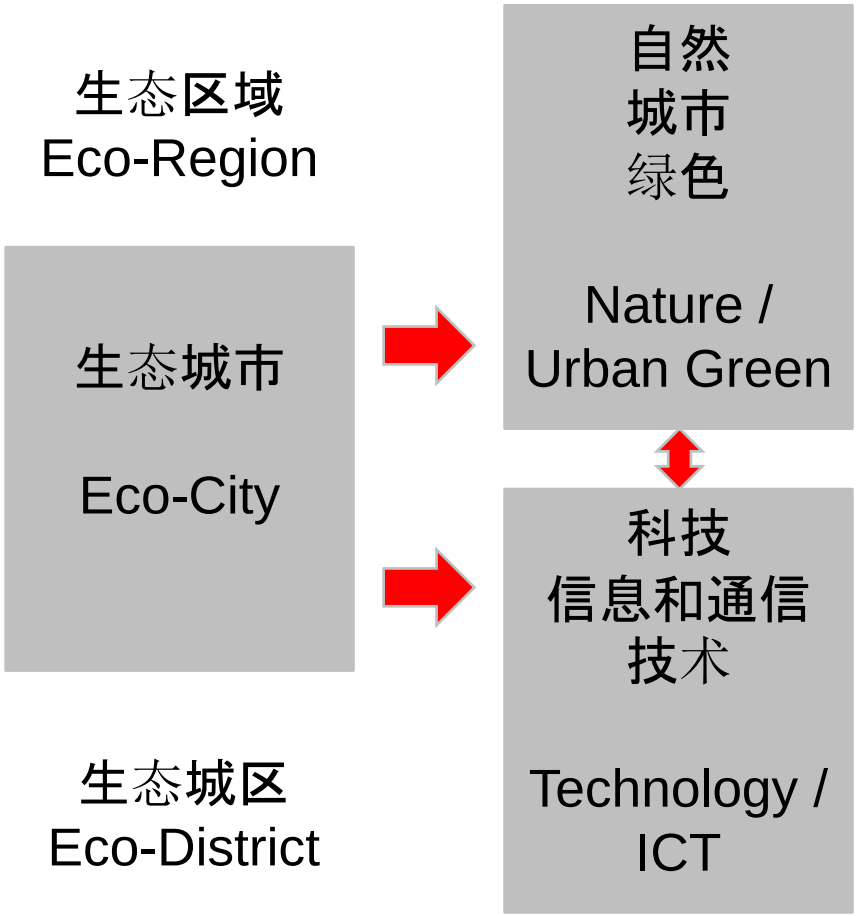
生态城市

Eco-City

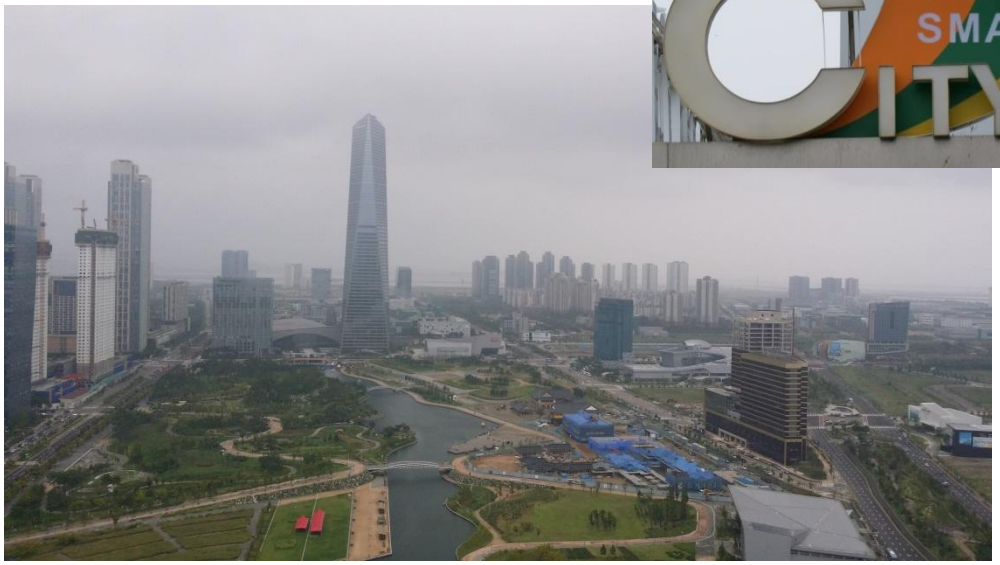
生态城区
Eco-District

“Eco-Cities have moved from a relatively loosely defined concept with only few, mainly experimental pilots, to a multitude of concrete, practice led initiatives” (Joss 2010)

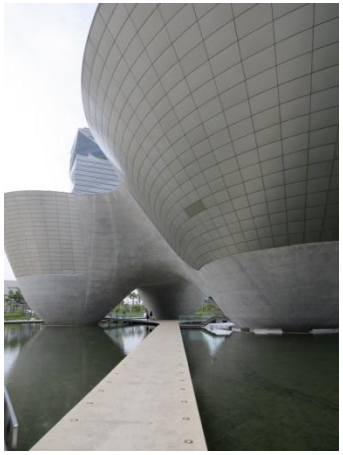
城市实验室 - Urban laboratories

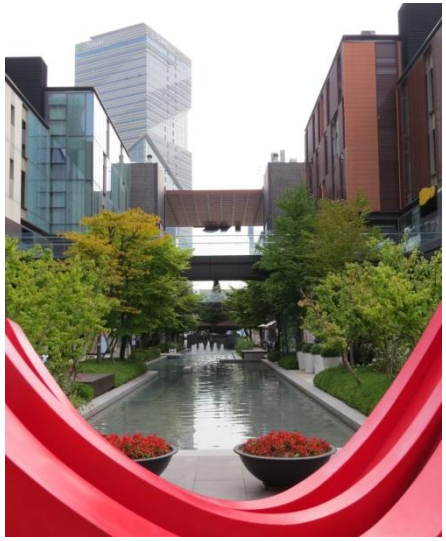


Songdo
South Korea



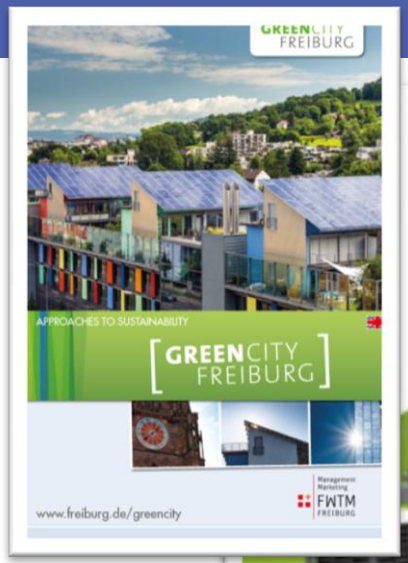
Songdo:
6 sqkm
Reclaimed land
2003-2020
3 phases
70.000 Inh.
(2012: 22.000)





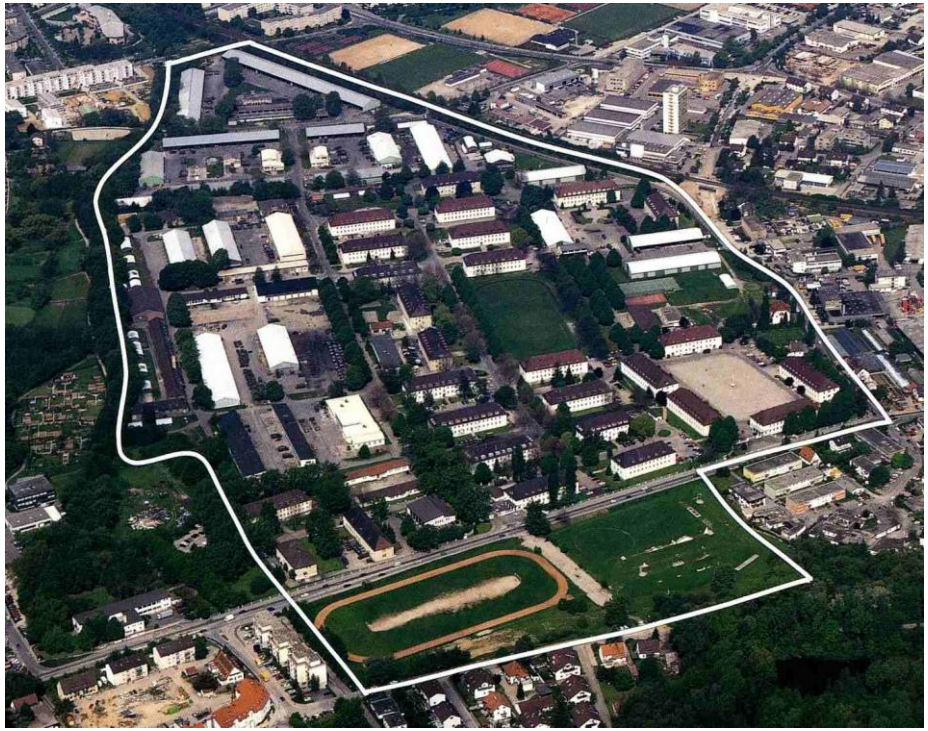
温哥华, 加拿大
Vancover, Canada

弗莱堡，德国
Freiburg, Germany



Green Economy and Research
Climate Protection and Energy Supply
Sustainable Urban Development
Sustainable Mobility
Nature, the City's Resource
Waste Management Concept
Experiencing Sustainability
Citizens' Commitment

More than just climate protection:
Freiburg's sustainability process



Freiburg-Vauban 1992

GREENCITY FREIBURG

Comprehensive approach

Freiburg-Vauban 2006

One area – two pictures

弗莱堡，德国
Freiburg, Germany

- Area formerly in military use
- 1990 initiative founded by citizens
- Integrated bottom-up planning

Emphasis on:

- a strongly car reduced mobility concept
- the creation of a neighbourhood of short distances
- installation of local heat
- social integration
- priority of private and cooperative groups over investors

(Source: Vauban 2012)

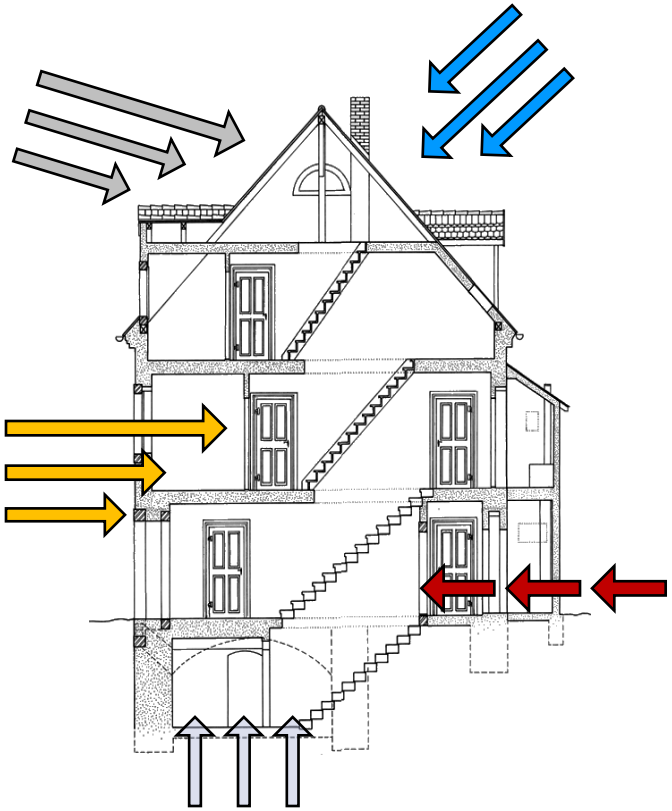
气候变迁 – 对建筑物的潜在影响
Climate change – potential impact on buildings

II.

Storms

Großenhain, 24.05.2010

Summer heat



Groundwater

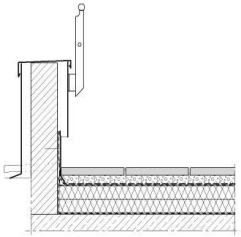
Hail, storm water

Radeberg OT Ullersdorf, 09.08.2010

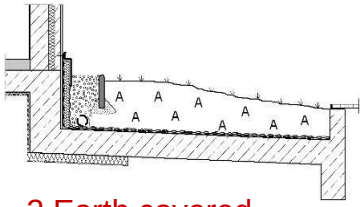
Floods

Oderwitz, 07.08.2010

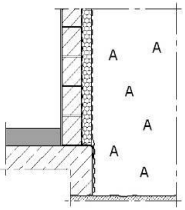
建设性和设计缺陷 - 新建筑
Constructive and design weaknesses – new buildings



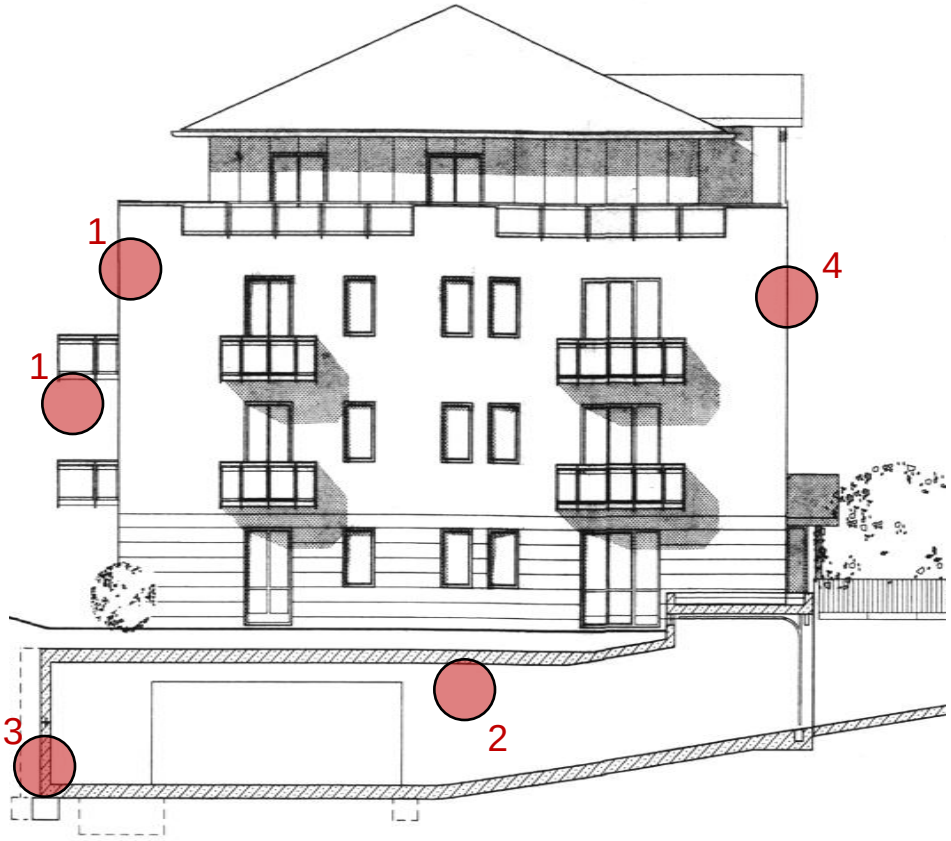
1 Balcony and roof top



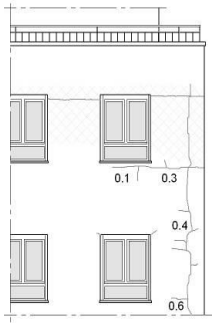
2 Earth covered underground garages



3 Isolation of walls



Affected



4 Defect walls

不同类型建筑的因数表 - Fact sheets of building types

KENNWERTE

Geometrie	
Länge	15,30 m
Breite	19,68 m
Traufhöhe	10,86 m
Firsthöhe	14,34 m

Höhenkoten	
OKFF Kellergeschoss	- 3,30 m
OK Gelände	- 0,10 m
OKFF Erdgeschoss	+/- 0,00 m
OKFF 1. Obergeschoss	+ 2,88 m
OK FF 2. Obergeschoss	+ 5,76 m
OKFF 1. Dachgeschoss	+ 8,64 m
OKFF 2. Dachgeschoss	+ 11,67 m

Nutzungen	
Kellergeschoss	Mieter- und Fahrradkeller Heizungs- und Hausanschlussraum Tiefgarage
Erdgeschoss	2 Vierzimmerwohnungen
Obergeschosse	je 2 unterschiedliche Wohneinheiten
Dachgeschosse	2 Vierzimmer-maisonettenwohnungen
Spitzboden	nicht vorhanden

Grundflächen und Rauminhalte	
Gebäudegrundfläche	240 m²
Bruttorauminhalt	~3.840 m³
Bruttogrundfläche	~ 255 m²
Nutzfläche KG	200 m²
Nutzfläche EG	210 m²
Nutzfläche OG	220 m²

KONSTRUKTIONSDETAILS

Baukonstruktion	
Gründung	Sohlplatte auf Streifenfundament (Stahlbeton)
Fassade	Putzfassade mit Putzstreifen 1. und 2. DG: Holzbeplankung/ Verblendung [Fassadentyp, konstruktive Details]
Fenster	Holz, lackiert
Balkone	Massive Bauweise (Balkontyp: evt. Betonfertigteile), mehrseitig gehalten - 2.OG Süd: Markise vorh. - 2.DG Ost und West: Gründung auf Dachterasse 1.DG Geländer: Stahl feuerverzinkt Wandanschluss, Entwässerung??
Dach	Tonnendach
Technische Gebäudeausrüstung	Art der TGA, erneuerbare Energien

Kellergeschoss	
Außenwände	Putzfassade mit Putzstreifen Aufbau, Material, Wandstärken, Wärmedurchgangskoefizient
Innenwände	Kalksandstein
Kellerdecke	Stahlbetondecke [Aufbau, Dicke]
Fußboden	Verbundestrich

Erdgeschoss	
Außenwände	Putzfassade mit Putzstreifen [Aufbau, Material, Wärmeleitfähigkeit, Durchlässigkeit, Wandstärken, Wärmedurchgangskoefizient]
Innenwände	Kalksandstein
Geschossdecke	Stahlbetondecke [Aufbau, Dicke]
Fußboden	Laminat, Fliese

Obergeschosse	
Außenwände	Holzschalung [Aspekte: Aufbau, Material, Wärmeleitfähigkeit, Durchlässigkeit, Wandstärken, Wärmedurchgangskoefizient]
Innenwände	Kalksandstein
Geschossdecke	Stahlbetondecke [Deckentyp, Aufbau, Dicke]
Fußboden	Laminat, Fliese

Dachgeschosse	
Dachart	Tonnendach
Dachneigung	variierend, Radius 6,70m
Dachfläche	~295 m²
Dachaufbau	Schichtenfolge: Deckung, Bahn
Dachdeckung	Titanzink, vorbewittert, schiefergrau
Dachüberstand	Nordwest: 20 cm Südost: 20 cm
Dachdurchdringungen	3 Dachflächenfenster, 1 Schornstein, Gaube (straßenseitig)

ZUSÄTZLICHE INFORMATIONEN

Dachentwässerung	
Fallrohre	Nordwest: 4 ⌀ ? (entlang der Ecken der Erker) Südost:
Dachrinnenführung	Ausschließlich an der Traufkante des Tonnendaches

Fensterflächen / Sonnenschutz		
Nordost	Fensterfläche	56,40 m²
	Sonnenschutz	Wohneinheiten: eingebaute außenliegende Jalousien Treppenhaus: keine Maßn.
Südost	Fensterfläche	104,30 m²
	Sonnenschutz	wie Ausrichtung-Ost
Südwest	Fensterfläche	47,30 m²
	Sonnenschutz	wie Ausrichtung-Ost
Zenit	Fensterfläche	~ 3,20 m²
	Sonnenschutz	außenliegende Jalousien

Technische Gebäudeausrüstung	
Heizung	Gasheizung
Warmwasseraufbereitung	Gasterme
Klimatisierung / Lüftung	Nicht vorhanden

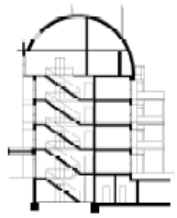
Besonderheiten	
Dachterrassen	1.DG Entwässerung über Speier und Fallrohr
Erneuerbare Energien	Nicht vorhanden
Tiefgarage	Teilweise unter Gebäude, teilweise unter Garten
Wohnungen	Eigentumswohnungen

REGKLAM - Teilprojekt 3.1.1

Gebäudestruktur	
Kategorie	ME7
Baujahr	2005
Bebauung	Mehrfamilienhaus
Geschosszahl	5
Standort	Dresden Striesen
Klimazone	2

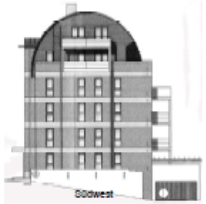
Grundriss mit Orientierung

Schnitt A-A



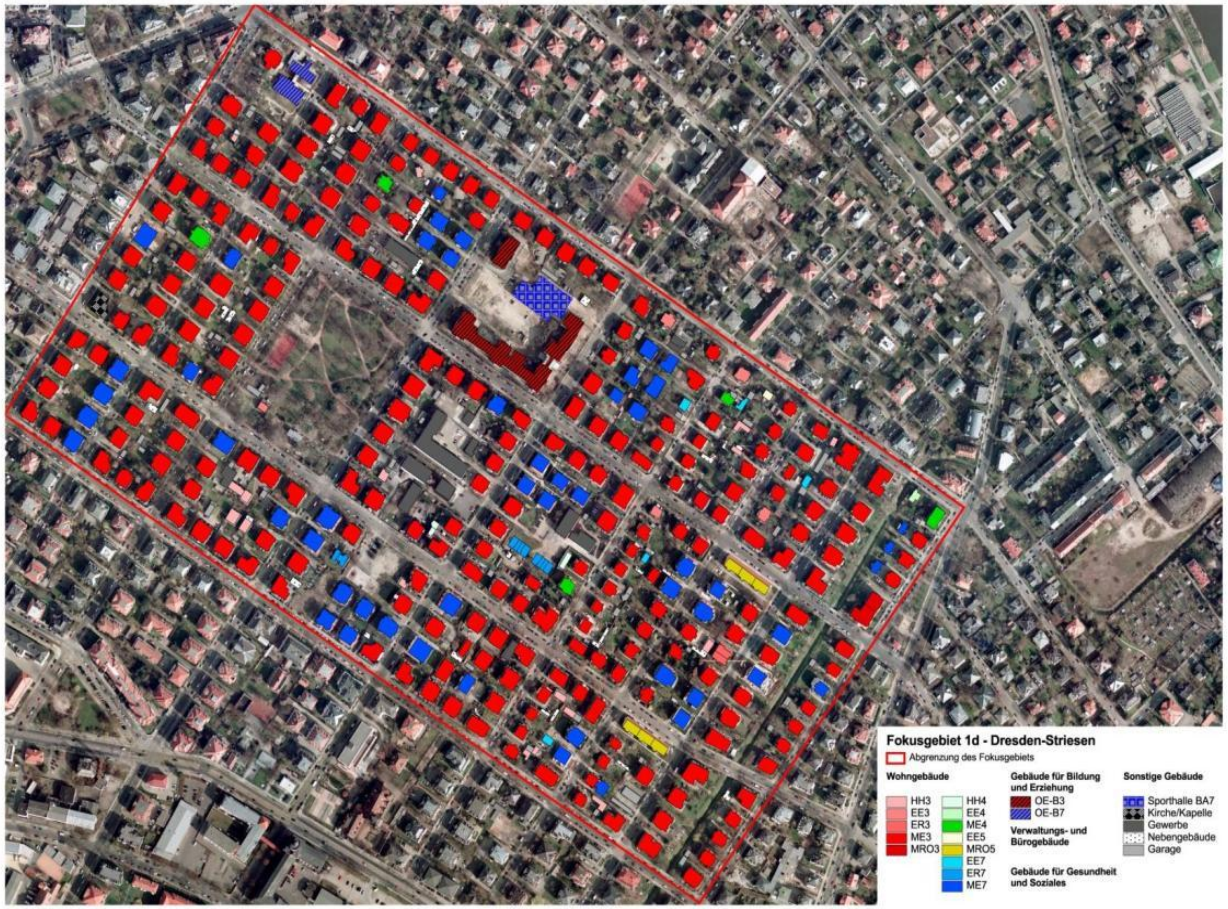
Ansichten

Nordwest



Südwest

建筑类型 - Building types



Prevailing building type (ME 3)

Pohlandstr. 26

Tzschimmerstr. 1

建议 - Recommendations

Prevailing building type (ME 3)

Pohlandstr. 26

Tzschimmerstr. 1

Rain- and stormwater management

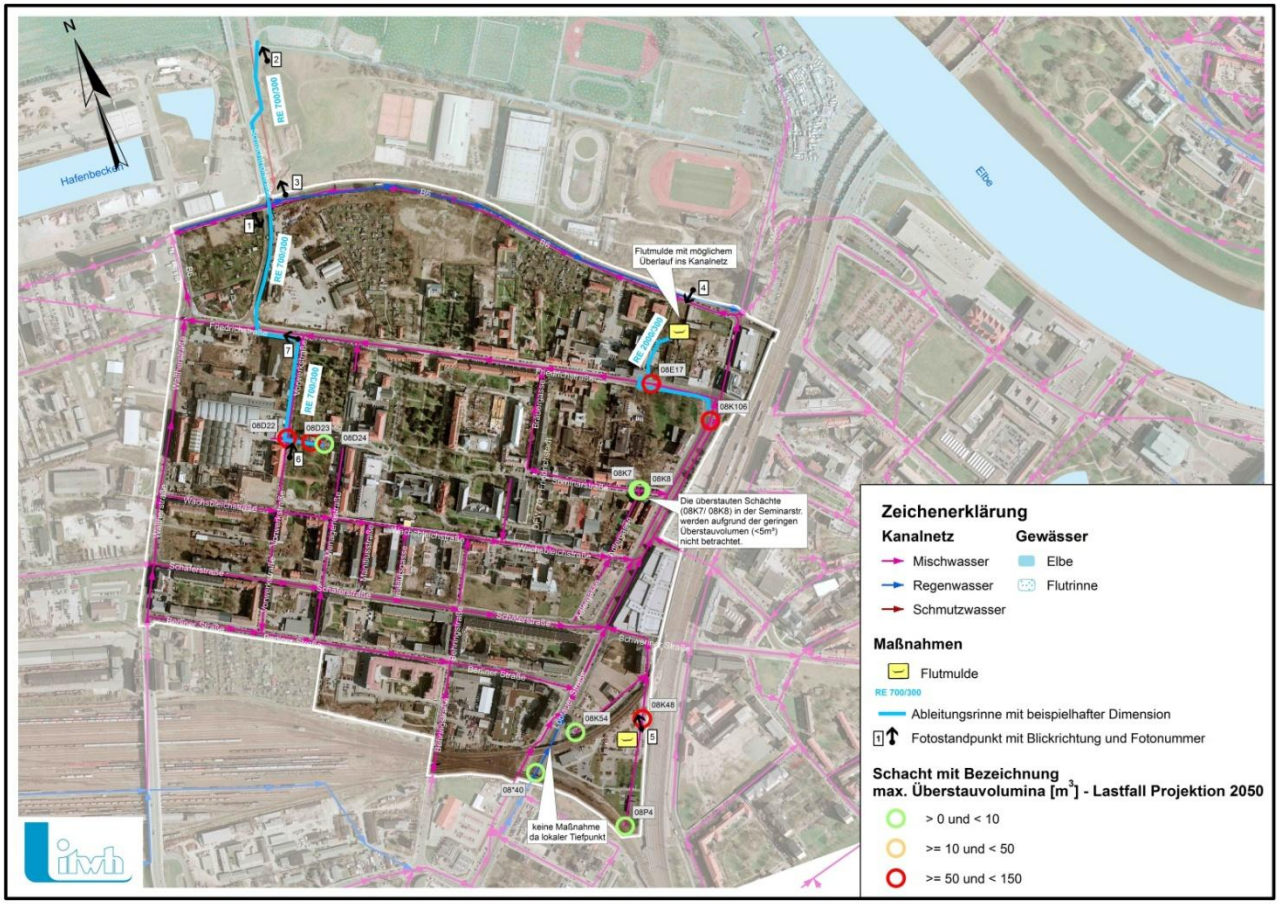
Regenwassereinleitung in eine Rasenmulde (S. Rößler)

Regenwassereinleitung in eine Rasenmulde und Überlauf (S. Rößler)

Kaskadenförmige Anordnung von Versickerungsmulden (H. Hensel)

Eingestaute Versickerungsmulden im Naturpark Hetzdorfer Straße (Anschluss von ca. 4.700 m² Dachfläche) (M. Hergert)

Drainage system and green infrastructure



Source: Institut für technisch-wissenschaftliche Hydrologie

New park with retention area

Foto: Landschaftsarchitekturbüro Frase, August 2013

Quelle: Große Kreisstadt Freital, Stadtplanungsamt

Multifunctional use of retention areas

Hugo-Bürkner-Park Dresden

工业4.0和城市发展– Industry 4.0 and urban development

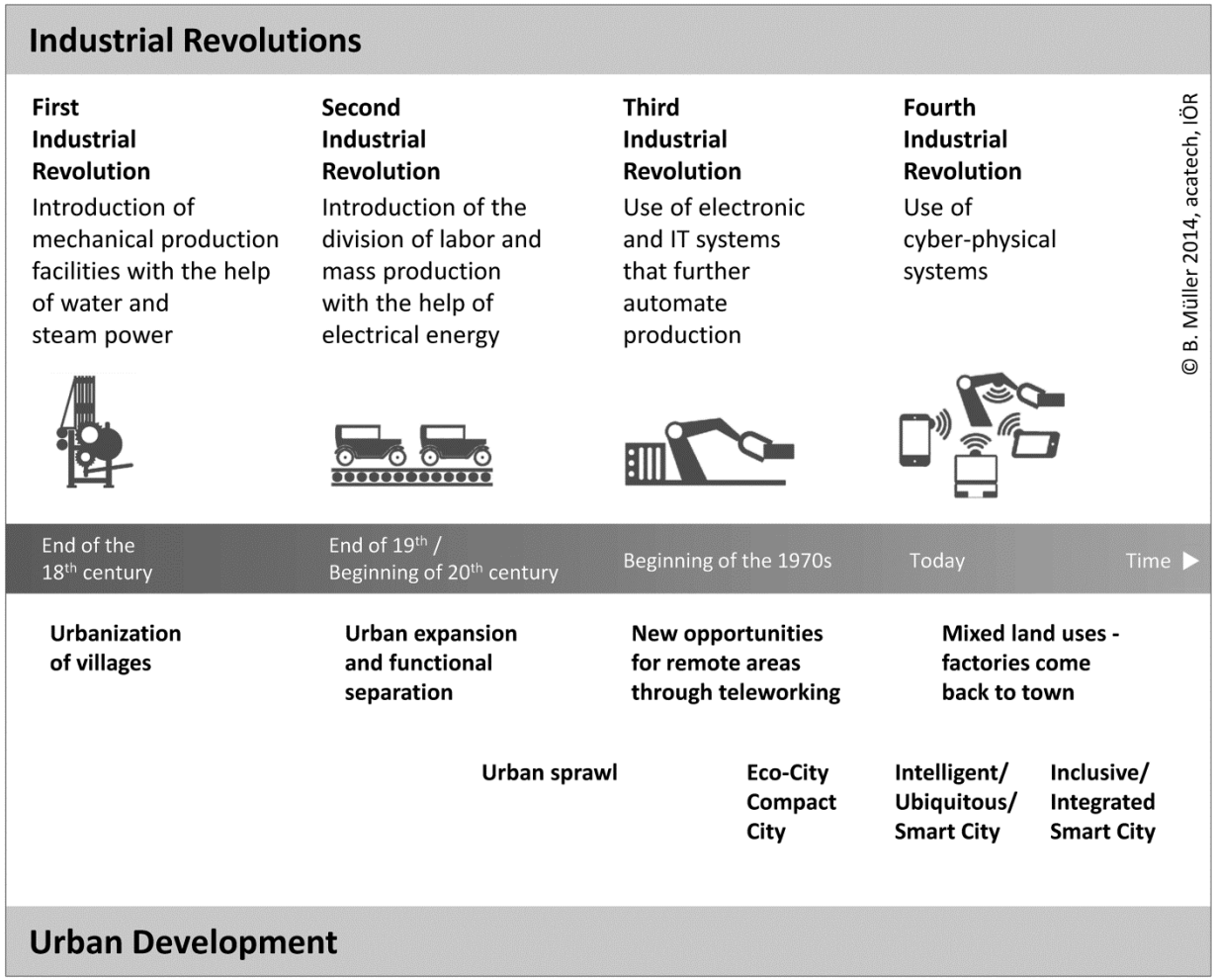


Table:
Opportunities and challenges of the nexus between advanced manufacturing (AM) and urban development
Müller, Schiappacasse (2014)

	Opportunities	Challenges
Urban economy	• Competitiveness of cities may be enhanced through core functions and pioneer establishments related to advanced manufacturing. • There may be additional opportunities for new entrepreneurial activities and small scale enterprises, especially unconventional and creative ones, to connect with the larger companies, and to offer new or better services to them. This may lead to more inclusiveness, economically and socially. • Urban economy may benefit from an increase of advanced manufacturing companies: taxes, income generation, multiplier effects, supply chain, etc. • Specialization may make better use and enhance local development potentials.	• Competition may become stiffer as companies have more locational choices due to their shrinking dependence on local production factors. • Integration into advanced manufacturing value creation chains may contribute to socio-spatial disintegration within cities (i.e. between those groups and areas which are linked with and those which are not linked with advanced manufacturing); growing social segregation as well as rising disparities between urban districts may be among the consequences. • Specialization may lead to higher economical and development risks and it may diminish resilience in case of crisis. • Good urban governance and fruitful cooperation between stakeholders (State, business community) are necessary and crucial factors for successfully raising competitiveness. This is not easy to achieve.
Urban-regional development	• Enterprises become, to a higher degree than today, multi-locational entities. • Individual locations of companies may take over more specialized and focused functions in value creation chains. • AM may diminish the companies' dependency on locational production factors. It may enlarge degrees of freedom regarding the sizes of their enterprise units and production facilities as well their locational choices. • Location factors will be re-defined. Also remoteness will be redefined. Formerly "remote" areas have more equal chances to compete successfully. • Competitiveness of regions and urban-regional development may benefit from advanced manufacturing. • Regional development may profit through regional value-added production, specialization, additional income generation, regional ancillary industries and services, multiplier effects etc.	• The availability of knowledge creation institutions (universities, research institutions), R&D activities, e.g. within companies, and interest of companies in regional connections are important prerequisites. • AM strategies are helpful, like smart specialization or urban (economic) development strategies. These require respective initiatives by the public and private sectors. • AM may widen (inter-) regional disparities (and between cities), i.e. those which are and those which are not integrated • Specialization may lead to higher risks for regional development.
Value creation	• AM may enhance production and enlarge local and regional value creation chains. • AM may create new opportunities for local regional companies and the informal sector.	• Experience shows that in many cases AM puts more emphasis on international orientation and worldwide integration than on regional embedment.

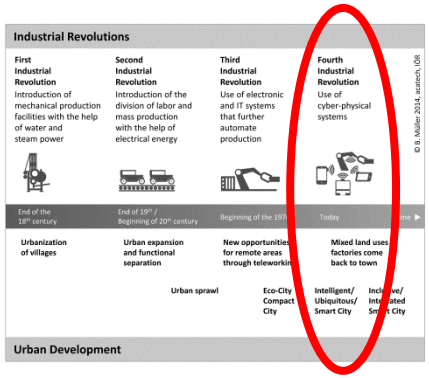
Table:
Opportunities and challenges of the nexus between advanced manufacturing (AM) and urban development
Müller, Schiappacasse (2014)

Integration and networking	• AM leads to more networked economic structures and processes. Industrial production will be more and more characterized by multi-locational networks. • AM furthers the creation of dynamic and flexible enterprise networks. • AM facilitates related companies to associate for a given time span and to form temporal virtual production or service clusters. • AM manufacturing raises the international inter-connectedness and visibility of cities and regions	• Networking has high transaction costs and investment (e.g. time, efforts, personnel) • Network access may be difficult. To a high degree, it depends on decision making by company involved in AM. • Interests of companies and local/regional stakeholders may be different (e.g. orientation on competitive production on the one hand, and socio-spatial integration on the other).
Knowledge creation	• AM may contribute to raising the educational level of a city as it requires a well-qualified labor force. • AM may contribute to facilitating the establishment and strengthening of universities and research facilities. • AM may support public private partnerships for knowledge based urban and regional development.	• AM may contribute to social exclusion by making the access to knowledge creation for certain groups of society (e.g. urban poor) even more difficult.
Socio-economic development	• AM may contribute to creating new jobs and more income opportunities for the urban population. • AM may contribute to the formation or stabilization of a strong middle-class population. • AM may contribute to poverty alleviation through the creation of additional jobs in the industry and service sector which are more accessible for the urban poor.	• AM may contribute to the loss of (especially less-paid and less-qualified) jobs through rationalization and automation. • AM may restrict job opportunities of the urban poor and the less-qualified. Thus it may contribute to increasing poverty
Infrastructure	• AM may support better urban infrastructure, e.g. digital and transportation infrastructure. • AM may have positive influence on logistics.	• Weak and un-coordinated planning and implementation may contribute to severe deficits regarding the provision and reliability of infrastructure. • Digital infrastructure may only be provided on demand to those who request and pay for it thus excluding a large part of the population, especially the urban poor. • Due to inadequate availability of funds and limited fund generating capacity of funds on the one hand and high investment needs, it may be difficult to put the adequate infrastructure in place. • The speed of urban growth may override the capabilities to establish necessary infrastructure thus widening the gap between serviced and non-serviced (or in the case of companies: auto-serviced) areas. • Cyber security may be difficult to be established.

Table:
Opportunities and challenges of the nexus between advanced manufacturing (AM) and urban development
Müller, Schiappacasse (2014)

Environmental effects	• AM will lead to cleaner production and more energy efficiency through sensor technology, high precision control and real-time information. • Material consumption and waste will be reduced. • AM will make a contribution to climate change mitigation. • AM may require less storage capacities due to real time information processing. This may result in less land "consumption" for industrial purposes. • Smart products may be easier recycled. This reduced the amount of waste.	• There may be rebound effects. As production site may be located at the edge of the city or metropolitan area, commuting distances may grow. Because of difficult traffic conditions, time and energy consumption through commuting may increase. • Production sites may be designed as to deal with a variety of difficulties, e.g. regarding infrastructure provision. This may lead to increased land "consumption" by industry. • Companies may want to secure safe infrastructure provision at their production sites and install basic infrastructure by themselves. This may lead to an uncoordinated and increased consumption of water and energy as well as to environmental damages in general. • Real time production requires just-in-time delivery. This may lead to higher pressure on transportation. More trucks become mobile storage facilities (like in just-in-time production).
Urban structures	• Modularized production allows that individual manufacturing entities become smaller. • AM may facilitate more mixed urban structures through the enhanced possibilities of environmentally friendly integrated "urban production" (e.g., with management units, design offices or clean production sites within or close to housing areas). • AM may have positive effects on the realization of the concept of the "city of short distances". • Synergies of more mixed urban functions may be used. • This may also bring back life to formerly depressed urban areas (urban retrofit).	• There may be more new urban development outside or on the edge of cities due to better and less expensive availability of land. This may contribute to increased urban sprawl. • Difficult transportation and logistics issues may make it advisable to locate production site at the edge or outside of existing cities. This may be counterproductive to the concept of the principles of the "city of short distances".
Urban governance	• AM may lead to more and better urban governance. • The necessity to cooperate may be seen more easily by the concerned stakeholders.	• Local entities of major advanced manufacturing companies and product related value creation chains may have decreasing decision-making powers. Therefore their interest and potential to become more deeply involved in local urban governance processes may be very limited.

工厂重回市区 - The urban factory is back



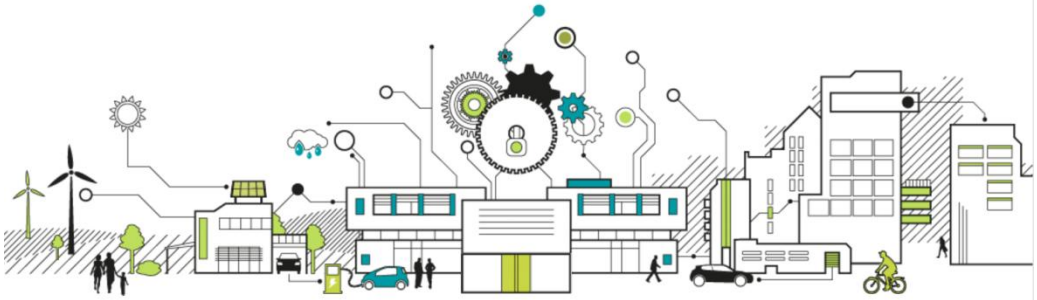
"The urban factory is back again"

DGNB
Deutsche Gesellschaft für Nachhaltiges Bauen e.V.
German Sustainable Building Council

Heilbronner Stimme vom 20.10.2012 / WEINSBERGER TAL

Die Stadtfabrik ist wieder da

Fellbach Für einen PR-Gag ist die neue Wittenstein-Fabrik mitten in Fellbach schlicht zu teuer: Allein für das Grundstück hat die Firma etwa zwei Millionen Euro bezahlt - auf der grünen Wiese im Schwäbischen Wald hätte der Bauplatz vielleicht ein Zehntel gekostet. Ganz bewusst hat die Firma aus dem ländlichen Main-Tauber-Kreis für ihre Stuttgarter Tochter mitten in der Stadt ein Werk gebaut - als Prototyp für urbane Produktion. Dass nur durch einen Radweg von der Zahnradfabrik getrennt eine Ökosiedlung steht, machte die neue Produktionsstätte auch nicht billiger: Lärm und Gestank dürfen die Wohnqualität der Nachbarn nicht beeinträchtigen. Auch architektonisch muss sich ...



WITTENSTEIN Bastian GmbH Fellbach/Stuttgart

TECHNISCHE UNIVERSITÄT DRESDEN

DRESDEN concept

德国 - Germany

IV.

针对未来城市的
战略研究和创新议程
Strategic Research and Innovation Agenda on the City of the Future

Hightech-Strategy

CO_2 neutral
Energy efficient
Adapted to climate change

政策与管理 - Policy and Administration

科研 - Research


UNITED NATIONS UNIVERSITY
UNU-EHS
Institute for Environment and Human Security
Institut für Medizinische Diagnostik Oderland
MAX-PLANCK-GESELLSCHAFT
IWU Institut Wohnen und Umwelt
izes gGmbH
Institut für ZukunftsEnergieSysteme
ILS - Institut für Landes- und Stadtentwicklungsforschung
BEUTH HOCHSCHULE FÜR TECHNIK BERLIN
University of Applied Sciences
HOCHSCHULE TRIER
Trier University of Applied Sciences
TECHNISCHE UNIVERSITÄT DARMSTADT
KWI
KULTURWISSENSCHAFTLICHES INSTITUT ESSEN
INSTITUTE FOR ADVANCED STUDY IN THE HUMANITIES
Leibniz-Institut für ökologische Raumentwicklung
HCU HafenCity Universität Hamburg
Fachhochschule Dortmund
University of Applied Sciences and Arts
Fraunhofer
DLR
acatech
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International Institute for Sustainability Management
RWTH AACHEN UNIVERSITY
berlin
TECHNISCHE UNIVERSITÄT KAISERSLAUTERN
Leibniz Universität Hannover
KIT
Karlsruher Institut für Technologie
UNIVERSITÄT DUISBURG ESSEN
Hochschule für Technik Stuttgart
Technische Universität München

企业 - Companies

主要议题 - Key Topics

1. **Socio cultural quality and urban communities:** fostering urban engagement, social innovation and acceptance of new technologies
2. **Urban transformation management:** strengthening the role of municipalities, local transformation preparedness, new forms of governance, pilot projects of transformation, integrated urban and neighbourhood concepts
3. **City – neighbourhood – building:** innovation in the construction sector, user oriented rehabilitation and renovation strategies
4. **Resilience and adaptation to climate change:** specific analyses of vulnerability, green and blue infrastructure, urban-rural relations
5. **Energy, resources, infrastructure systems:** intelligent infrastructure systems, energy and resources efficient solutions in urban water management, material glows and urban mining
6. **Mobility and logistics:** new types of offers and new technologies of mobility, mobility data and platforms, mobility behaviour, urban logistics
7. **Technologies for the city of the future:** ICT platforms, ICT services, smart urban services
8. **Urban economy:** fundamentals of urban and regional economy, new models of finance, municipal carrying capacity analyses, new business and management models
9. **Data, information and knowledge transfer:** data governance, data models, simulation, knowledge transfer.

战略行动领域- Strategic Action Fields

1. **Civil society** as a driver of urban transformation
2. Strengthening and support of **urban transformation**
3. Sustainable transformation of urban and regional **settlement patterns**
4. Pioneer projects for **urban infrastructures**
5. Tools and procedures for **planning and knowledge management**
6. New frameworks for **urban innovation**
7. Strategic **finance** management and business models

我想谈什么？
What do I want to talk about?

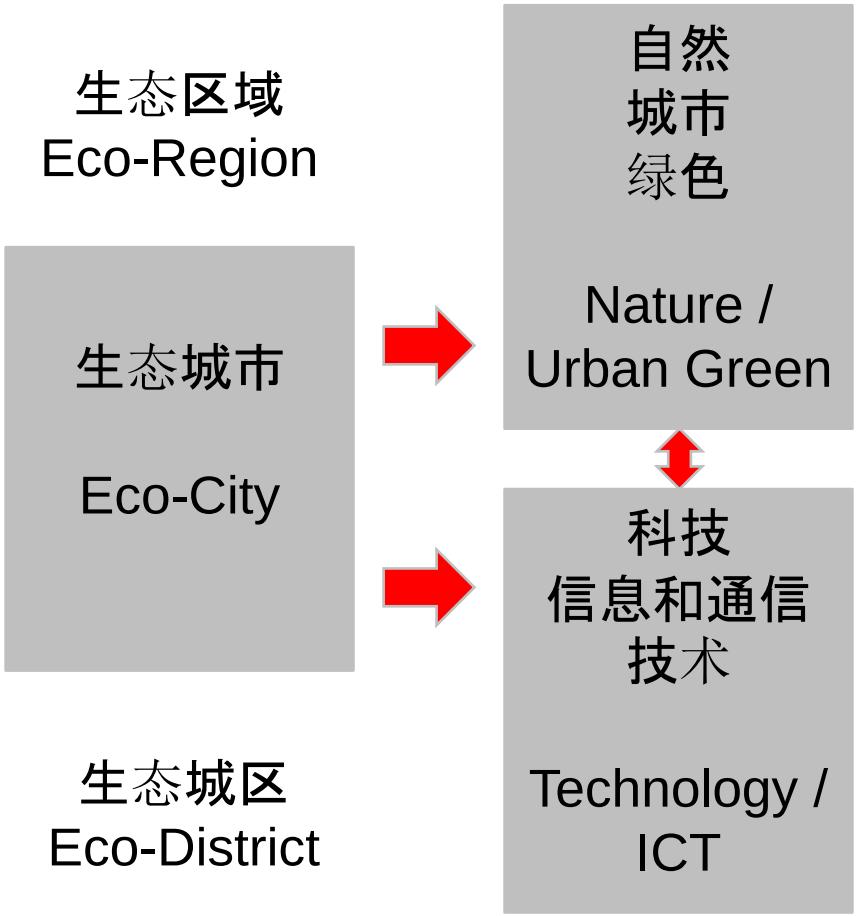
- 生态城市 - 我们这个时代的发现？
  The Ecological City – Discovery of our Time?

- 今日生态城市 – 不仅仅是公园 — 四个例子
  The Ecological City Today – More than Parks – Four examples

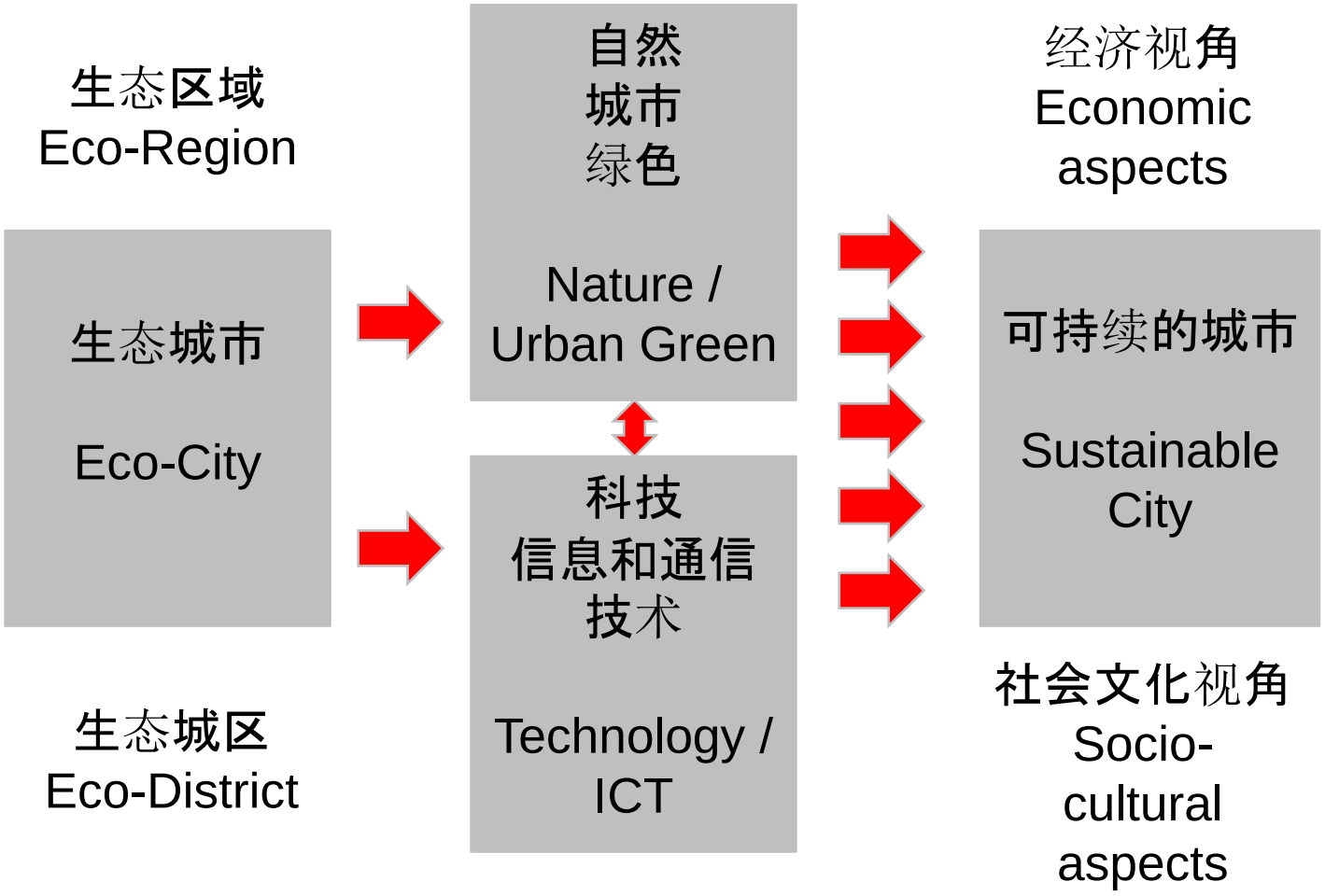
- **生态城市和可持续发展**
  The Ecological City and Sustainability

- 展望 — 面临的挑战
  Perspectives – Challenges Ahead

城市实验室 - Urban laboratories



城市实验室 - Urban laboratories



Sustainability Frameworks

1713 – 300 years of sustainability discussion

Sustainability Frameworks

1713 – 300 years of sustainability discussion


Mit GOtt!
SYLVICVLTVRA OECONOMICA,
Oder
Haußwirthliche Nachricht und Naturmäßige
Anweisung
Zur
Wilden Baum-Zucht,
Nebst
Gründlicher Darstellung/
Wie zu förderst durch Göttliches Bauedeyen dem allenthalben und insgemein einreissenden
Grossen Holtz-Mangel/
Vermittelst Säe- Pflantz- und Versetzung vielerhand Bäume zu prospiciren/
auch also durch Anzug und Wiederwachs des so wohl guten und schlechten anwachsend- als andern geringhaltigen und nützlichen Holtzes, ganz öde und abgetriebene Holtz-Oerter, Plätze und Orte anderem Holtzwuchs, nutz und brauchbar zu machen; Verzeich von Saam-Bäumen und wie der wilde Baum-Saamen zu sammlen, der Grund und Boden zum Säen zuzurichten, solche Saat zu bewerckstelligen, auch der junge Anflug und Wiederwachs zu beobachten. Daneben des sogenannte schwartze, oder Schlacken-Ober- und Unter-Holtz aufzubringen und zu vermehren, zwischen hero gefügt die Arten des Tangel- und taub Holtzes, gleich denen Tannen, Fichten und dergleichen Holtz für Saamen trage, auch wie man mit fruchtbaren Baum-Gewächsen sich zu verhalten, ferner wie das Holtz zu fällen, zu entasten, zu äschern und sonst zu nutzen.
Alles zu nothdürfftiger Versorgung des Hauß- Bau- Brau- Berg- und Schmeltz-Wesens/
und wie eine immerwährende Holtz-Nutzung Land und Leuten/ auch jedem Haus-Wirthe zumerklichen grossen
Aufnehmen/ pfleglich und füglich zu erziehen und einzuführen.
Worbey zugleich eine gründliche Nachricht von den in Churfl. Sächs. Landen
Gefundenen Turff
Dessen Natürliche Beschaffenheit/ grossen Nutzen/ Gebrauch und nützlichen Verkohlung.
Aus Liebe zu Beförderung des algemeinen Bestens beschrieben
Von
Hannß Carl von Carlowitz/
Königl. Pohl. und Churfl. Sächs. Cammer-Rath und Ober-Berg-Hauptmann.
Mit Königl. Pohl. und Churfürstl. Sächs. allergnädigsten PRIVILEGIO.
LEIPZIG/
verlegts Johann Friedrich Braun 1713.

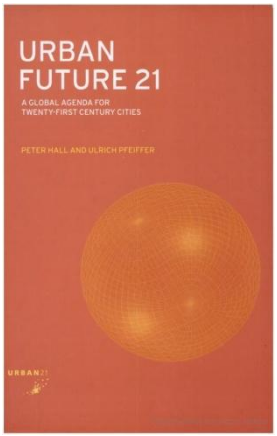
Hans von Carlowitz (1713)

Since 1711 Chief Mining Officer responsible for forestry in Saxony

Sustained supply of wood for mining and processing

可持续发展框架 - Sustainability Frameworks

1713 – 300 years of sustainability discussion
1992 – Rio Conference
1994 – Aalborg Charter
1994 – German Constitution / Basic Law
1998 – Building and Spatial Planning Laws
2000 – Urban 21
2007 – Leipzig Charter
2015 – SDGs (United Nations)
2016 – New Urban Agenda (Habitat III)



(Source: Agentur für Stadtentwicklung 2007)

Leipzig Charter on Sustainable European Cities (2007)

I. Making greater use of integrated urban development policy approaches

Implementation oriented participatory integrated urban development programs

Strategies for action:

- Creating high quality public spaces
- Modernizing infrastructure networks
- Improving energy efficiency
- Proactive innovation and educational policies

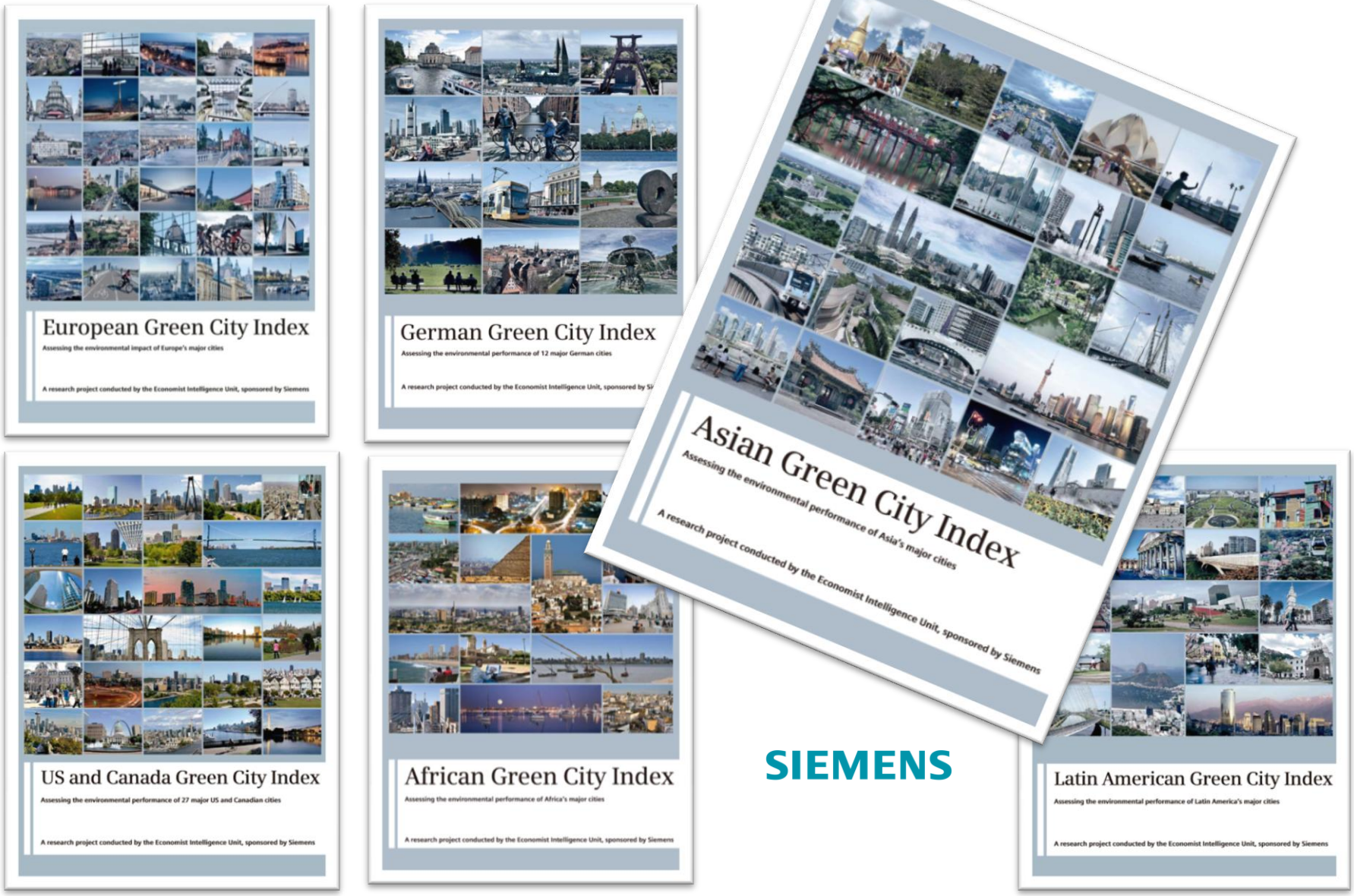
Leipzig Charter on Sustainable European Cities (2007)

II. Special attention to deprived neighborhoods

Social cohesion and integration as a goal

Strategies for action:

- Pursuing strategies for upgrading the physical environment
- Strengthening the local economy and local labor market
- Proactive education and training policies for children and young people
- Promotion of efficient and affordable housing



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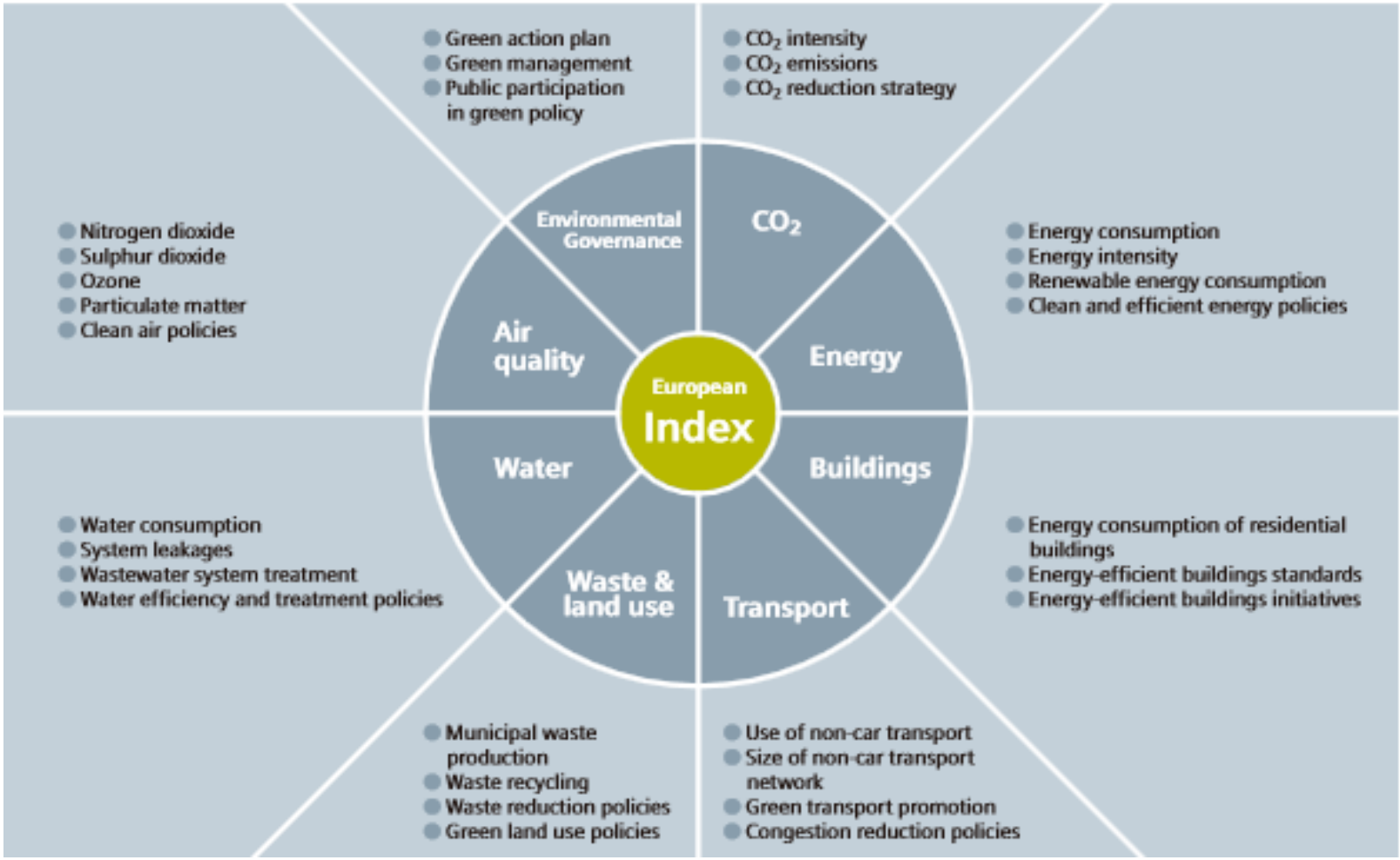
European Index
Environmental Governance
CO_2
Energy
Buildings
Transport
Waste & land use
Water
Air quality
Green action plan
Green management
Public participation in green policy
CO_2 intensity
CO_2 emissions
CO_2 reduction strategy
Energy consumption
Energy intensity
Renewable energy consumption
Clean and efficient energy policies
Energy consumption of residential buildings
Energy-efficient buildings standards
Energy-efficient buildings initiatives
Use of non-car transport
Size of non-car transport network
Green transport promotion
Congestion reduction policies
Municipal waste production
Waste recycling
Waste reduction policies
Green land use policies
Water consumption
System leakages
Wastewater system treatment
Water efficiency and treatment policies
Nitrogen dioxide
Sulphur dioxide
Ozone
Particulate matter
Clean air policies

Germany: Competition for sustainability

Opening the debate in the 1990s: **„Cities of the future“**
(in 4 model cities, 7 reference cities, tests in 50 further cities)

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Five dimensions related to urban planning / development:

- Land management
- Mobility
- Environment
- Housing
- Economy

Germany: Competition for sustainability

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Five dimensions related to urban planning / development:

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Characteristics

- Oriented towards integrated urban planning / development
- “Top-down”: Assessment of local sustainability
- Government driven

12 Standard indicators (relatively easily accessible)	12 Additional indicators (relatively difficult to collect)
Land management Area for settlements and transport purposes Intensity of land use Protected area Re-use of derelict/waste land	**Land management** Relation of urban development area within/outside of existing built-up area Mobilisation of new development areas within existing built-up area
Mobility Kilometers driven by buses and trains/trams Car density	**Mobility** Length of bikeways network Modal split: use of cars in the city Settlement area accessible by public transport Safety / victims of accidents
Environment Non-recycled garbage Consumption of drinking water	**Environment** CO2 emissions Energy consumption
Housing Relocation from suburbia Financial support of individuals for housing	**Housing** Basic supply Burglary / housebreaking
Economy Unemployment rate Number of commuters	**Economy** “Consumption” of space to provide employment Structure of local economy

DGNB®

Deutsche Gesellschaft für Nachhaltiges Bauen e.V.
German Sustainable Building Council

Initiated in 2007 by a small group of stakeholders from real estate and building sectors

Membership 2012: 1050

“Unique knowledge platform”

对新发展区域的认证体系
Certification system for new development areas

CORE CATALOG FOR BUILDINGS

Environmental Quality

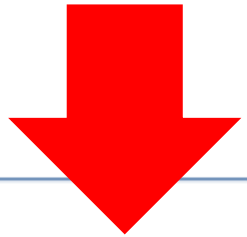
- Life Cycle Assessment
- Local Environmental Impact
- Environmentally Friendly Material Production
- Primary Energy Demand
- Drinking Water Demand and Wastewater Volume
- Land Use

CORE CATALOG FOR URBAN DISTRICTS

Environmental Quality

- Life Cycle Assessment
- Water and Soil Protection
- Change in City District Climate
- Biodiversity and Interaction
- Consideration of Possible Environmental Impacts
- Land Use
- Total Primary Energy Demand and Renewable Primary Energy
- Energy-Efficient Development Structure
- Infrastructure with Low Resource Consumption, Groundwater Management
- Local Food Production
- Water Cycle

Economic Quality



- Building-Related Lifecycle Costs
- Value Retention, Suitability for Third Party Use

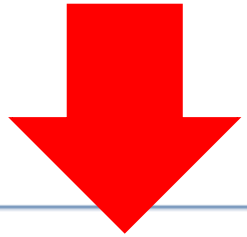
- Lifecycle Costs
- Fiscal Effects on Municipality
- Value Retention
- Efficient Use of Space

Sociocultural and Functional Quality

- Thermal Comfort
- Indoor Air Quality
- Acoustic Comfort
- Visual Comfort
- User Influence on Building Operation
- Quality of Outdoor Spaces
- Safety and Security
- Handicapped Accessibility
- Efficient Use of Floor Area
- Suitability for Conversion
- Public Access
- Cycling Convenience
- Design and Urban Planning Quality through Competition
- Integration of Public Art
- Site Features

- Social and Functional Diversity
- Social and Labour Infrastructure
- Objective / Subjective Security
- Quality of Open Areas in Public Spaces
- Noise Protection
- Proportion of Open Areas
- Handicapped Accessibility
- Occupancy Flexibility and Development Structure
- Adaptation to Urban Development Plan
- Urban Planning Design
- Use of Existing Buildings
- Public Art

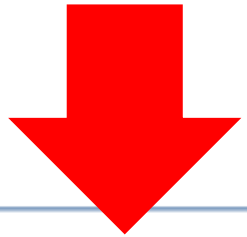
Technical Quality



- Fire Prevention
- Indoor Acoustics and Sound Insulation
- Building Envelope Quality
- Backup Capacity of Technical Building Systems
- Ease of Cleaning and Maintenance
- Resistance to Hail, Storms, and Flooding
- Ease of Dismantling and Recycling
- Pollution Control
- Noise Emission Control

- IT and Communication Infrastructure
- Energy Technology
- Waste Management
- Rainwater Management
- Dismantling, Sorting, and Recycling of the Infrastructure
- Maintenance, Servicing, Cleaning
- Quality of Transport Systems
- Quality of Road Infrastructure
- Quality of Public Transport Infrastructure
- Quality of Cycling Infrastructure
- Quality of Pedestrian Infrastructure

Process Quality



- Comprehensive Project Definition
- Integrated Planning
- Comprehensive Building Design
- Sustainability Aspects in Tender Phase
- Documentation for Facility Management
- Environmental Impact of Construction Site / Construction Process
- Construction Quality Assurance / Quality Control Measures
- Systematic Commissioning

- Participation
- Concepts Developed in Competitive Bids
- Integrated Planning
- Community Involvement
- Controlling
- Environmental Impact of Construction Site / Construction Process
- Marketing
- Quality Assurance and Monitoring

其它方案- Other schemes

- BREEAM
  Great Britain
- LEED
  USA
- CASBEE
  Japan
- GREEN STAR
  Australia
- RFSC
  Reference Framework for
  European Sustainable Cities
- ...

-> Future task

我想谈什么？
What do I want to talk about?

- 生态城市 - 我们这个时代的发现？
  The Ecological City – Discovery of our Time?

- 今日生态城市 – 不仅仅是公园 — 四个例子
  The Ecological City Today – More than Parks – Four examples

- 生态城市和可持续发展
  The Ecological City and Sustainability

- **展望 — 面临的挑战**
  Perspectives – Challenges Ahead

展望 – 面临的挑战
Perspectives – Challenges Ahead

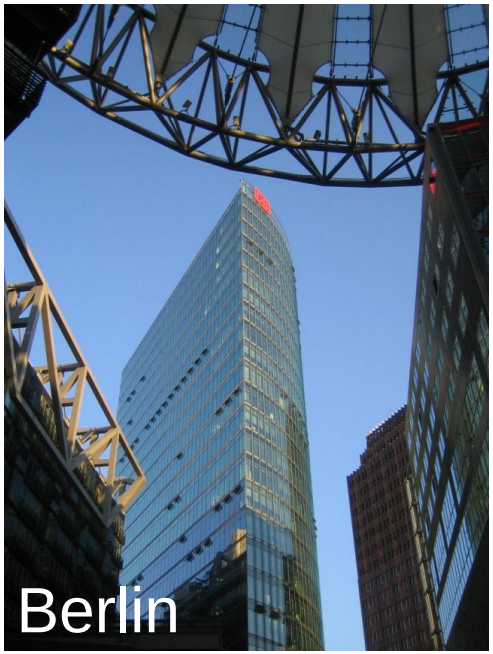
- Green/eco/smart is “in” in urban development – examples worldwide, extensive programmes
- Green is definitely more than a catchword
- Green City: much more than parks and gardens: marriage between nature and technology
- Green Cities as urban laboratories for sustainable development
- High flying expectations
- Political goals and monitoring: sustainability frameworks exist

展望 – 面临的挑战
Perspectives – Challenges Ahead

Open questions:

- **New urban districts versus retrofitting cities?**

We are strong: sustainability schemes regarding new developments
We are weak: sustainability approaches regarding the existing cities



展望 – 面临的挑战
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Open questions:

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- **Eco-islands versus integrated urban and regional development? Gated communities vs. integrated cities?**

The eco-city …

… and polluting industries in the hinterland

展望 – 面临的挑战
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Dreams of today …

… may turn into ruins of tomorrow

展望 – 面临的挑战
Perspectives – Challenges Ahead

- **Adaptability and robustness: Will the innovation cheetahs of the present turn into technological dinosaurs of tomorrow?**

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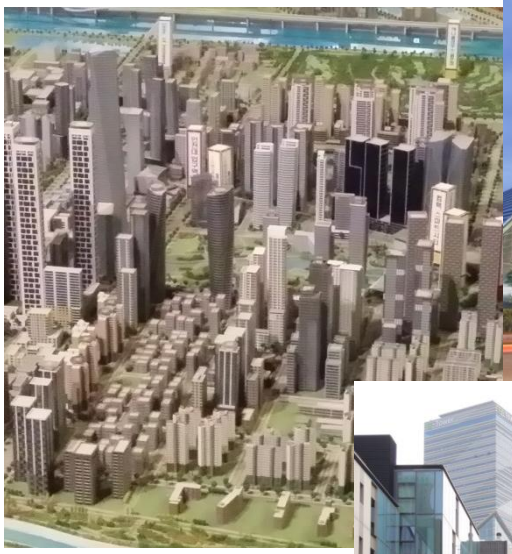
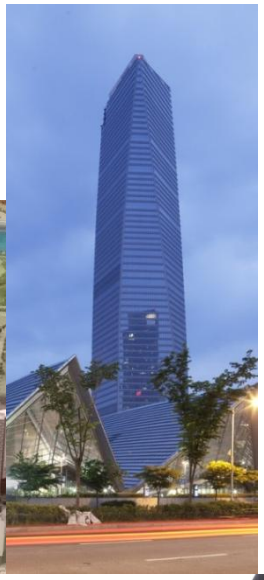
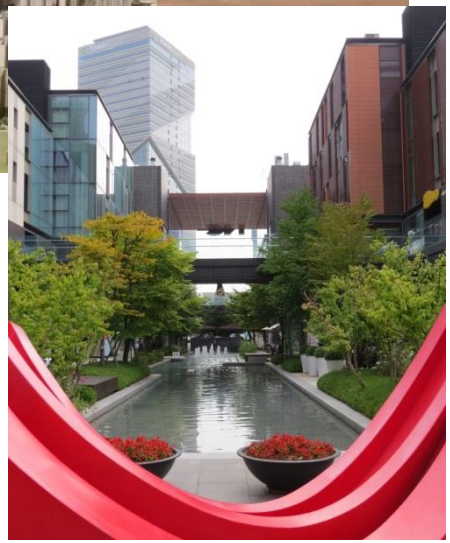
- **Poverty, poverty alleviation and social integration?**







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- Human dimension: Size, acceptance, governance, participation, willingness to participate?
- Poverty, poverty alleviation and social integration?
- **The role of urban planning in the future?**

生态城市与可持续的城市发展－机遇与挑战

The ecological city and sustainable urban development – Opportunities and challenges

Bernhard Müller

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NATIONAL ACADEMY OF SCIENCE AND ENGINEERING

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非常感谢！
Thank you very much!