



# Cities as a European challenge

*Policies and application of technology for a more sustainable urban physical environment*

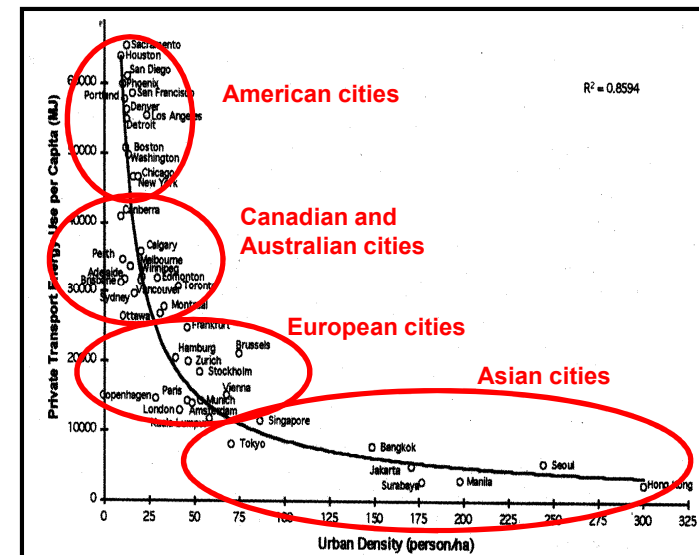
Judith Borsboom- van Beurden

JlIP April 2011



## Common characteristics of most cities in Europe

- › Often founded in Middle Ages for exchange of goods and defense
- › Waves of urban expansion during Industrial Revolution (manufacturing), Interbellum (tram and rail lines), after World War II (mass car ownership)
- › In older parts rather high densities, mixed land use and multifunctionality
- › Centres rather high percentage of buildings before 1910



Source: Newman and Kenworthy 1999





## Urban dynamics in last decades

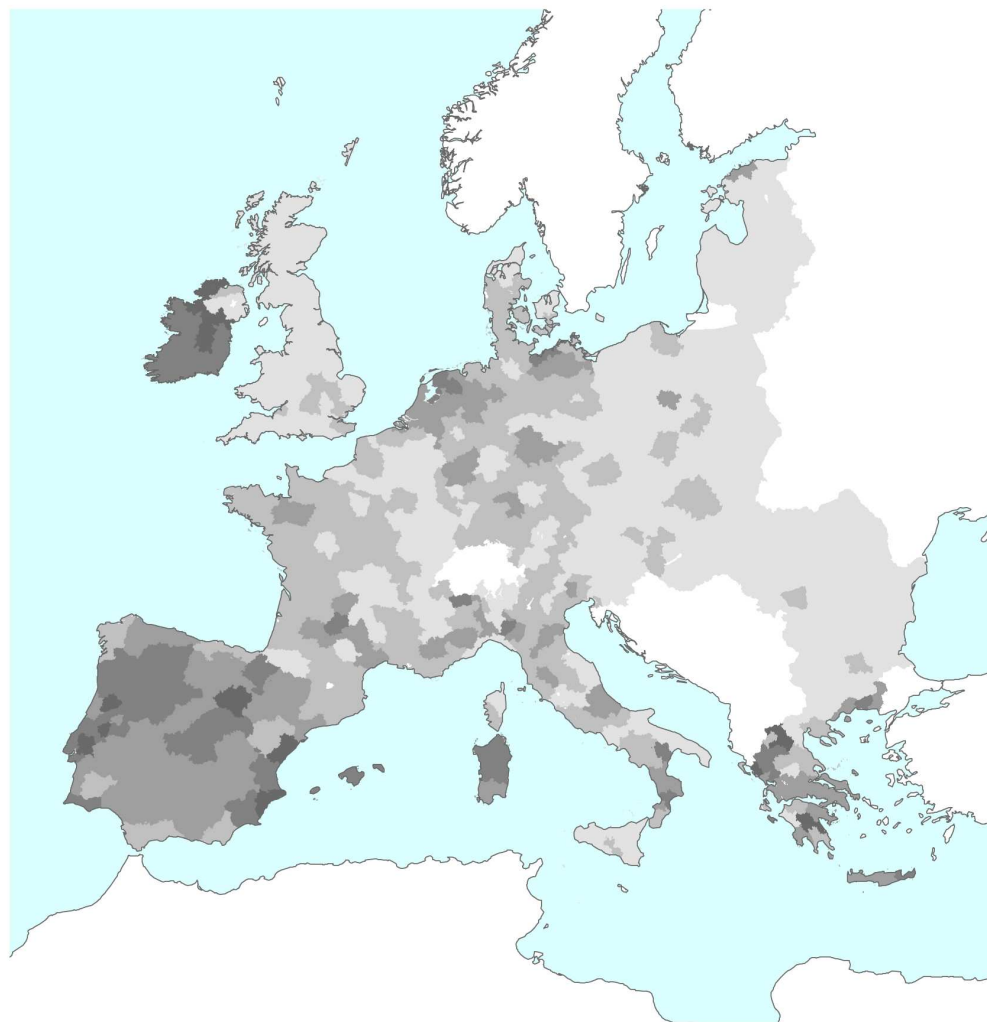
- › Different demographic patterns: ageing, dejuvenation, individualisation
- › Housing preferences: lifestyles, net income growth
- › Globalisation, rise of knowledge economy and de-industrialisation
- › Increased mobility and fundamental changes in logistics
- › Suburbanisation and urban expansion in decreasing densities, sprawling tendencies
- › Increased use of natural resources including energy



- › Increased pressure on cities and regions to maintain social, economic and environmental quality now and in the future
- › Highly diverging paths for “overpressure” and “underpressure” cities



## Development of urban land use 1990-2000



### Legend

Increase of built-up area

Low

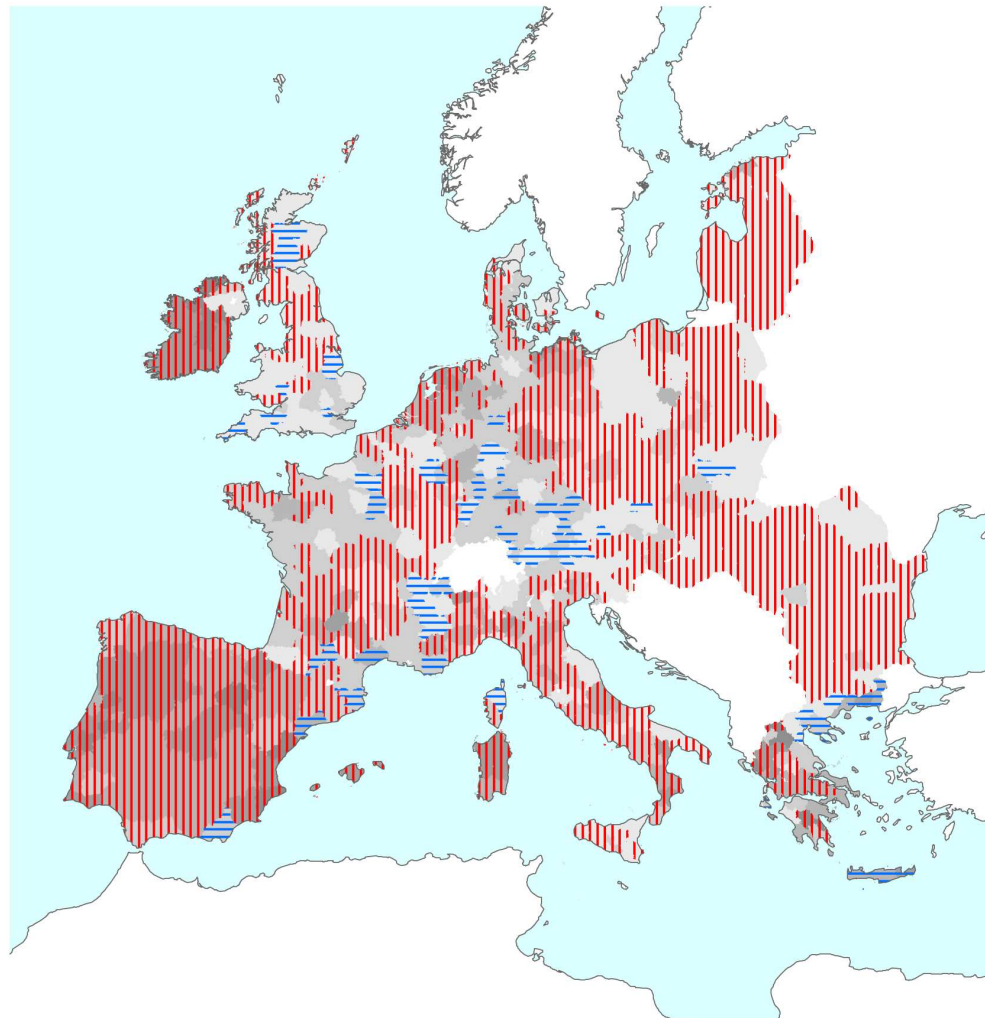


High

Source: NEAA (PBL)  
2009



## Development of residential densities 1990-2000



### Legend

Change of residential density

||||| Dedensification

==== Densification

Increase of built-up area

Low



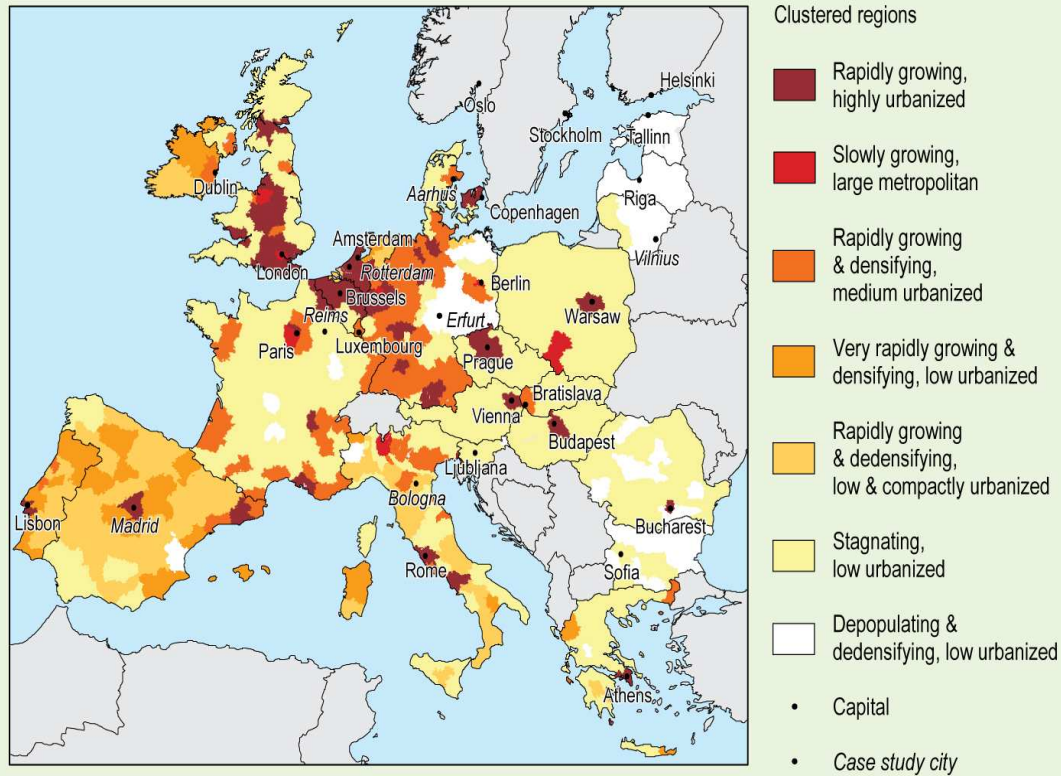
High

Source: NEAA (PBL)  
2009



# Typology of urban growth: considerable variation

Combination of urbanity and urbanisation in European regions 1990-2000



Planning culture

Effectiveness spatial  
planning

Demographic  
development

Residential preferences

Sources economic  
growth

Source: NEAA (PBL) 2009



## Impact of recent dynamics on physical environment

State and Outlook of the European Environment - november 2010

- › Air and noise pollution, CO2 emission
- › Fragmentation nature areas, loss of biodiversity
- › Deterioration of valuable landscapes, often lack of urban green
- › Increased vulnerability for consequences of climate change
- › Soil sealing and water management

But also:

- › Inefficient and unsustainable use of energy for buildings and transport
- › Unsustainable material flows
- › (potential) lack of clean water, water pollution, water quality
- › External safety
- › Congestion
- › Lack of triggers for brownfield redevelopment
- › Thresholds urban transport and services



## State and Outlook of the European Environment: air pollution

**Table 2.1 The 10 most polluted cities for daily PM<sub>10</sub>, O<sub>3</sub> concentrations and NO<sub>2</sub> annual mean concentration in the urban background, 2008**

Number of days of PM <sub>10</sub> exceedances of EU limit value of 50 ug/m <sup>3</sup> (daily mean)	Number of days of O <sub>3</sub> exceedances of EU target value of 120 ug/m <sup>3</sup> (maximum daily 8 hours mean)	NO <sub>2</sub> annual mean concentrations in ug/m <sup>3</sup> (the EU limit value is 40 ug/m <sup>3</sup> )
Plovdiv, Bulgaria 208	Turin, Italy 77	Brescia, Italy 62
Pleven, Bulgaria 185	Campobasso, Italy 74	Turin, Italy 60
Sofia, Bulgaria 176	Bologna, Italy 72	Brasov, Romania 58
Krakow, Poland 152	Bergamo, Italy 69	Modena, Italy 50
Timisoara, Romania 136	Athens, Greece 68	Milan, Italy 49
Rybnik, Poland 122	Novara, Italy 65	Trieste, Italy 48
Nowy Sacz, Poland 116	Cremona, Italy 64	Rome, Italy 43
Craiova, Romania 112	Brescia, Italy 64	Athens, Greece 42
Zabrze, Poland 108	Milan, Italy 62	Padua, Italy 41
Turin, Italy 106	Reggio nell Emilia, Italy 61	Genoa, Italy 41

**Note:** Turkish PM<sub>10</sub> data are not validated and therefore not part of this table reflecting the situation in 2008.

**Source:** AirBase, 2010.



## Policy perspectives on European cities

### European level:

Europe2020: development in a smart, sustainable and inclusive way: important role for cities to maintain a healthy physical environment

Climate and Energy policy: 20-20-20 package

Green/white paper on Urban Mobility

Territorial Agenda

### Local level:

Aalborg Commitments

Leipzig Charter

Covenant of mayors



## Well researched at the urban level? 1

### › Energy and resources in the built-up areas

- › Smart grids 😊 technology known but how to implement and which preconditions at local level
- › Energy-efficient urban transport system (including logistics) 😞 logistics research desert, personal transport depending upon development vehicle technology, saving energy in EC program
- › Electric vehicles 😊, exist but for implementation: how to solve range too short and complicated recharging
- › Energy-efficiency in buildings 😞 how to reduce costs, how to achieve in existing buildings
- › Energy-efficient urban form 😞 depends upon system of provision, needed?
- › Renewable energy 😞
- › Reduction of urban GHG emission and mitigation of climate change 😞
- › Consumption of resources and waste management 😞

### › Environmental quality



## Well researched at the urban level? 2

### › Safety and risk management

- › External safety (group risk, individual risk) ☺
- › Natural and man-made disasters, industrial hazards ☺
- › Vulnerability and adaptation to climate change (flooding, extreme events, heat stress, etc.) ☹

### › Built environment and housing

- › Construction of buildings and infrastructure (use of resources) ☺
- › Retrofitting and re-use of brownfields ☹
- › Urban design and management for sustainability and resilience (e.g. urban green, compact city) ☹
- › Multi-functionality and adaptation to demographic and economic growth or shrinkage ☹
- › Efficient urban spatial organisation and urban planning ☺
- › Cultural heritage preservation ☺



## How to be related to the local level?



Results from  
ESPON 2013  
program might be  
useful as an  
intermediate step



## Conclusions 1

1. Highly **different contexts** for cities in terms of economic competitiveness and demography: one size does not fit all! Use common principles but acknowledge different priorities and abilities, and regional variation
2. Economic **crisis** has slowed down urban dynamics but not solved problems in the physical environment, because these are highly related to our life-styles, production and consumption, only partially to cities.
3. Most difficult is adjustment of **existing built-up area** and transport system to new requirements in terms of energy efficiency and accessibility: innovative concepts needed



## Conclusions 2

4. For implementation of **proven concepts** in technologies and research: combined effort of policy, financial sector and industry needed to overcome obstacles as costs, regulations, at the local level, for example thermal insulation for housing corporations, promotion of slow transport
  
5. The applicability of **prototyped developments** as smart grids, electric vehicles, potential contribution of urban design, must be validated asap at the local level, for example in living labs
  
6. The **preconditions** for a successful application at the local level need attention as well (urban design, system of energy provision, behavioural aspects, legislation etc.)
  
7. Development of promising **new technologies** for the long term should focus on energy and transport (FP7 not applicable to cities in the coming 10-20 years)