



SVENSKA ARALSJÖSÄLLSKAPET

Swedish Aral Sea Society



10. The challenges of sustainable urban development

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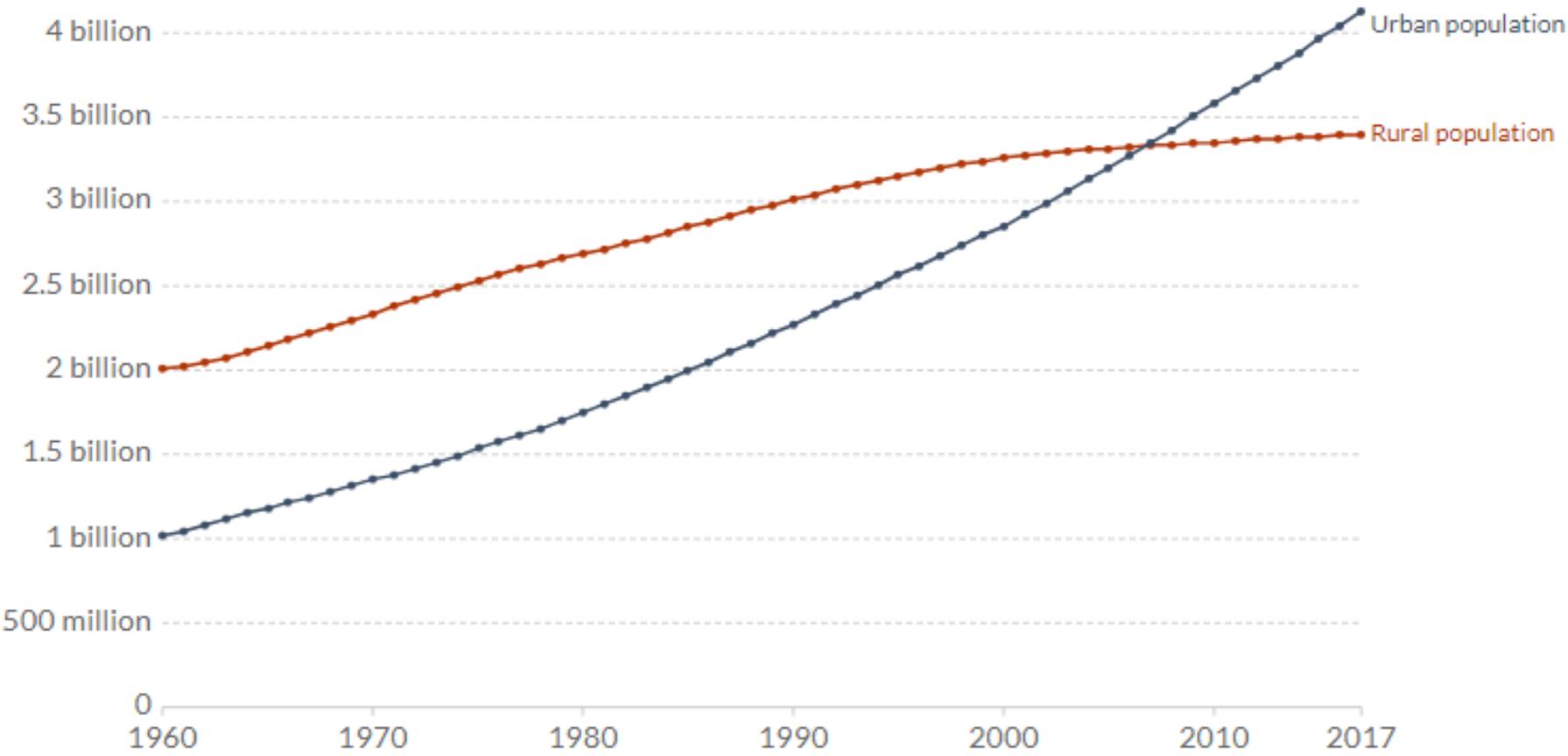
For Uzbekistan by Karakalpak State University and SASS
Master Course on Sustainable Development and Sustainability Science
Spring 2022

Urbanisation

- More than 4 billion people – more than half of the world – live in urban areas.
- 1 out of 3 people in urban areas live in a slum.
- Populations urbanize as they get richer. (In Sweden 85 % live in cities and towns.)
- Large land areas become almost empty.

Number of people living in urban and rural areas, World, 1960 to 2017

↔ Change country



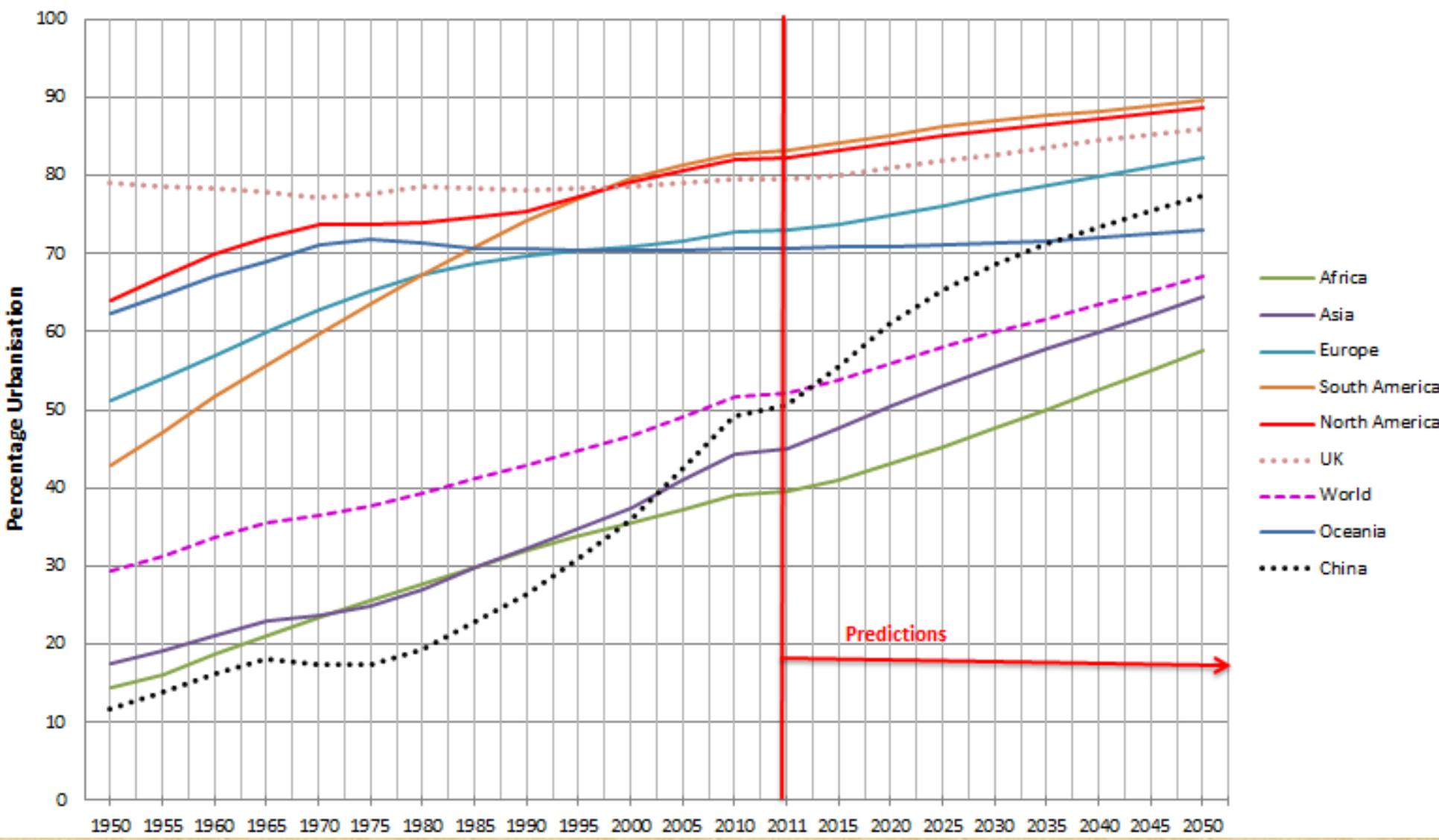
Source: UN World Urbanization Prospects (2018)

Note: Urban populations are defined based on the definition of urban areas by national statistical offices.

OurWorldInData.org/urbanization • CC BY

A graph to show world urbanisation for different world areas from 1950 to

2050





Guangzhou, a city of 12.7 million people, is one of the 8 adjacent metropolises located in the largest single agglomeration on earth, the Pearl River Delta of China. The nine cities have together 57 million inhabitants (2013) and is the largest urban area in the world (Wikipedia)

Sum area in African cities



Image © 2009 DigitalGlobe

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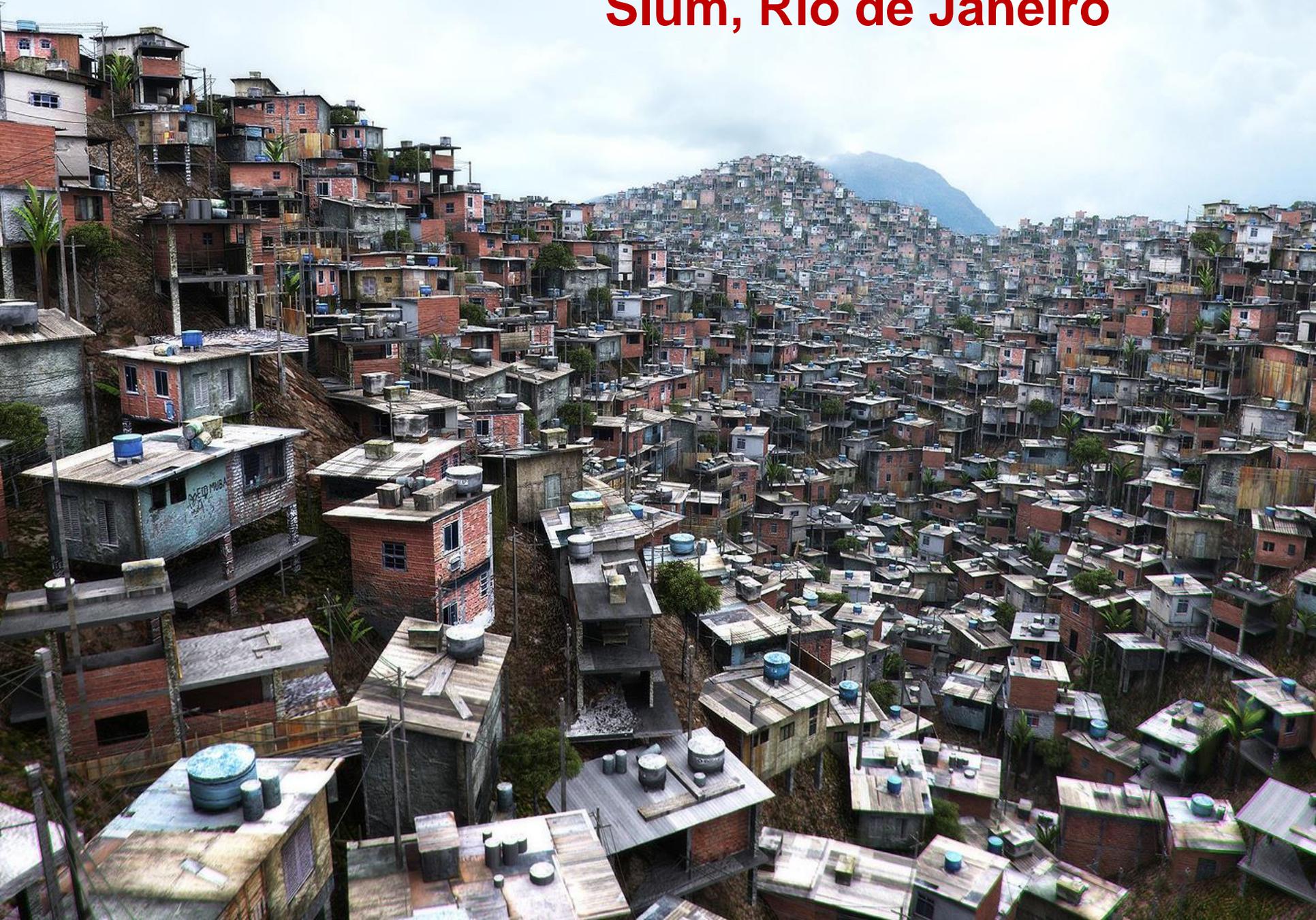
1°18'52.05" S 36°47'49.43" E

Visningsh...

Sum area in African cities



Slum, Rio de Janeiro





Depopulated countryside Portugal

What would be a Sustainable Human Habitat?

**The sustainable city –
models since antiquity
City on the hill (France)**



Urbanisation and densification

Stockholm County 300 000 new apartments to 2030



More traffic and congestion

Sthlm & NY 70% PT. Kph 40% bike.



The sustainable city Today?



Urban challenges



- Rate of urbanisation/urban growth
- Demand for land (direct and indirect)
- Demand for natural resources and energy (incl. water)
- Pollution (air, water, land)
- Mobility (congestion)
- Health (air- and waterborne diseases, pandemic)
- Safety (natural disasters, deteriorating infrastructure, terrorism)

Urban strengths/opportunities



- Engines of economic growth and knowledge
- Cultural integration/multiculturalism
- High potential for efficiency (energy/land/water etc.)
- High potential for sustainable/affordable system solutions

Main challenges for the local level

1. Energy

Transition to energy without fossils

2. Materials management

Recycling all materials

3. Economy

Transition to a post-industrial economy

4. Demography

A growing and aging population

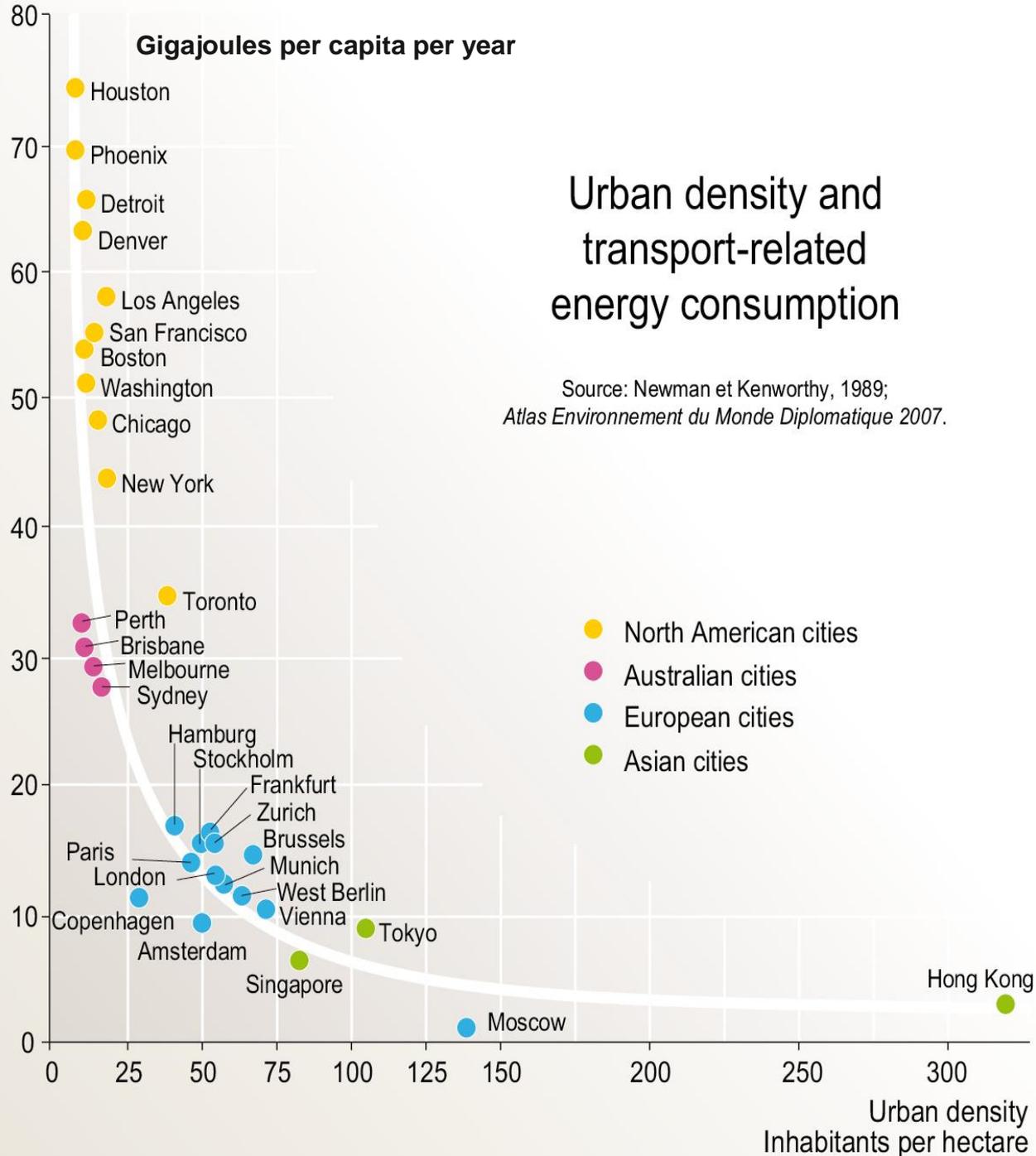
Elements of sustainable urbanisation

Preserving space and improve mobility!

Increase urban density to achieve energy efficient mobility

Urban density and transport-related energy consumption

Source: Newman et Kenworthy, 1989;
Atlas Environnement du Monde Diplomatique 2007.



Source: Atlas Environnement du
Monde Diplomatique 2007

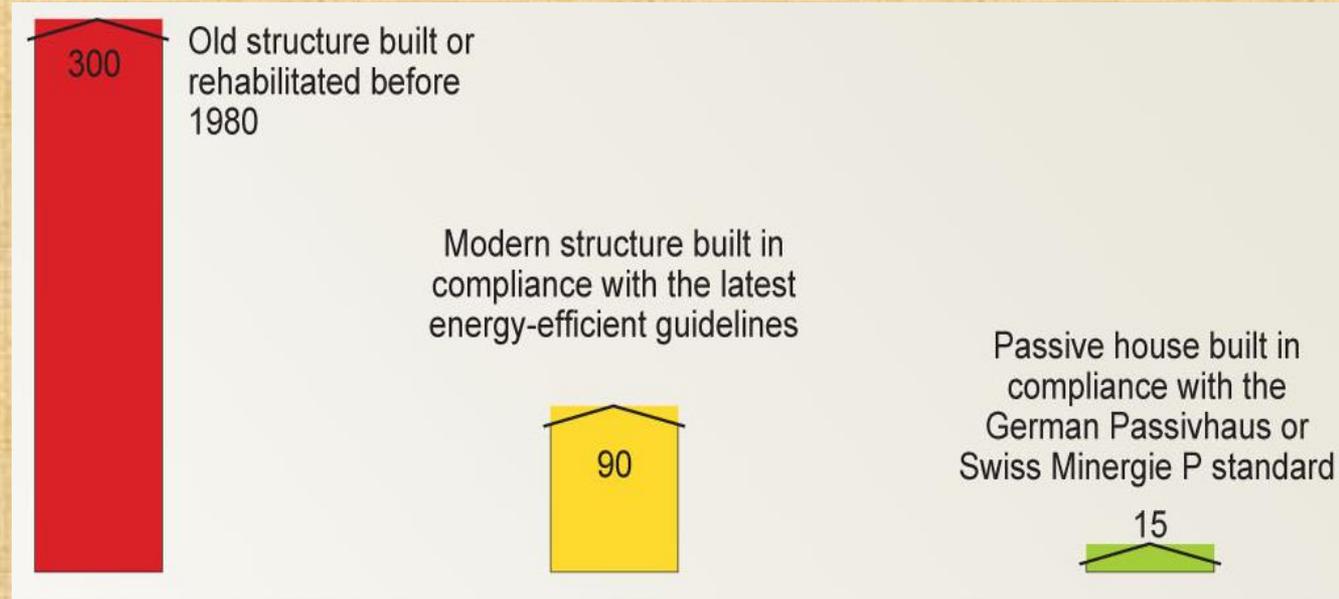
<http://maps.google.com/graphic>

2022-05-13

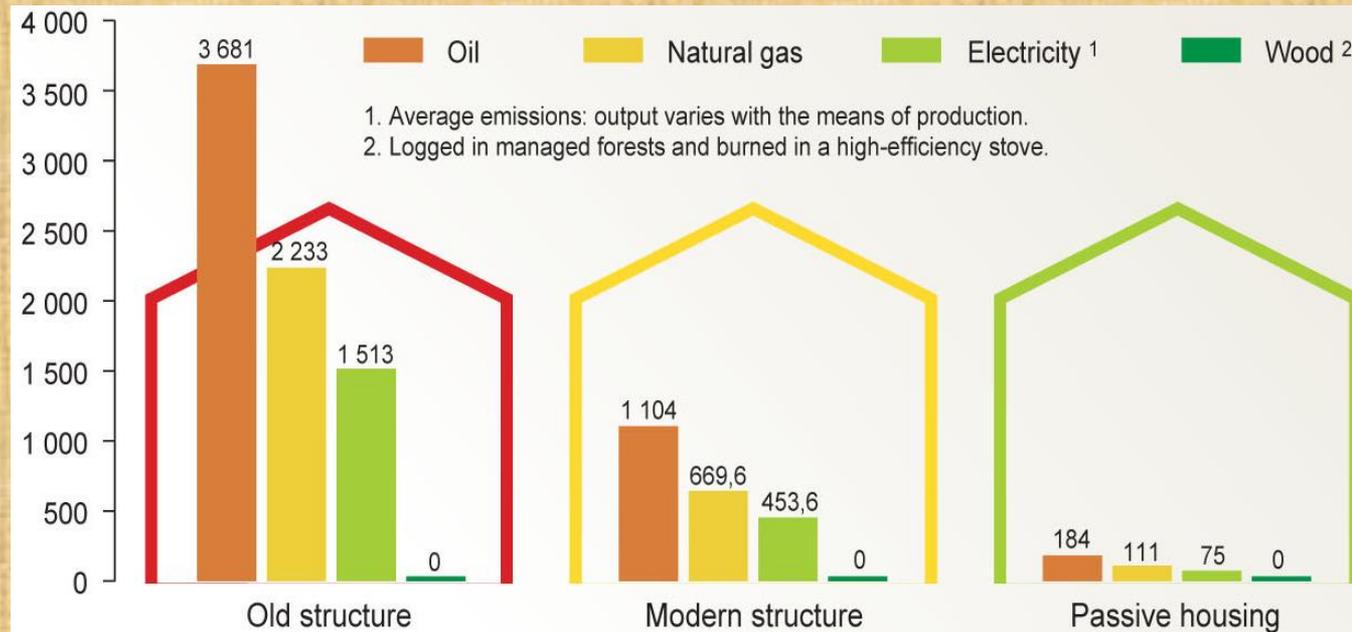
Elements of sustainable urbanisation

Preserving energy!
Reduce energy consumption and CO₂ emissions from buildings

kWh/m²/year



Kg CO₂ eqv/100m²/year



Lowenergyhouse



Passive house Fiskarhedenvillan in Upplands Väsby

Elements of sustainable urbanisation

Preserving energy!
Reduce energy consumption and CO₂ emissions from traffic



New streetcars in Marseille



Examples of sustainable urbanisation

- Gårdsten, Gothenburg





Green Buildings Are More Ecological And Cost-Effective

24

<https://youmatter.world/en/green-buildings-are-more-ecological-and-cost-effective/>



Green spaces play an important role in sustainable development.

Conclusions:

A sustainable city has to

- Be fairly dense
- Be fairly green
- Have good transport infrastructure
- Have good materials recycling
- Be well managed
-

Urban Management

The city is
a system

questions have to
be treated together

The system "city" can be treated as five resources

- 1. Material resources – all material flows in the city**
- 2. Urban planning resources – all surface area in the city**
- 3. Human resources – all inhabitants in the city**
- 4. Societal resources – the city and all its functions and institutions**
- 5. Economic resources – companies and all other economic units**

These resources are not inter-changable and are all limited

Sustainable development in cities are best understood as careful management of limited resources

How to work with material resources

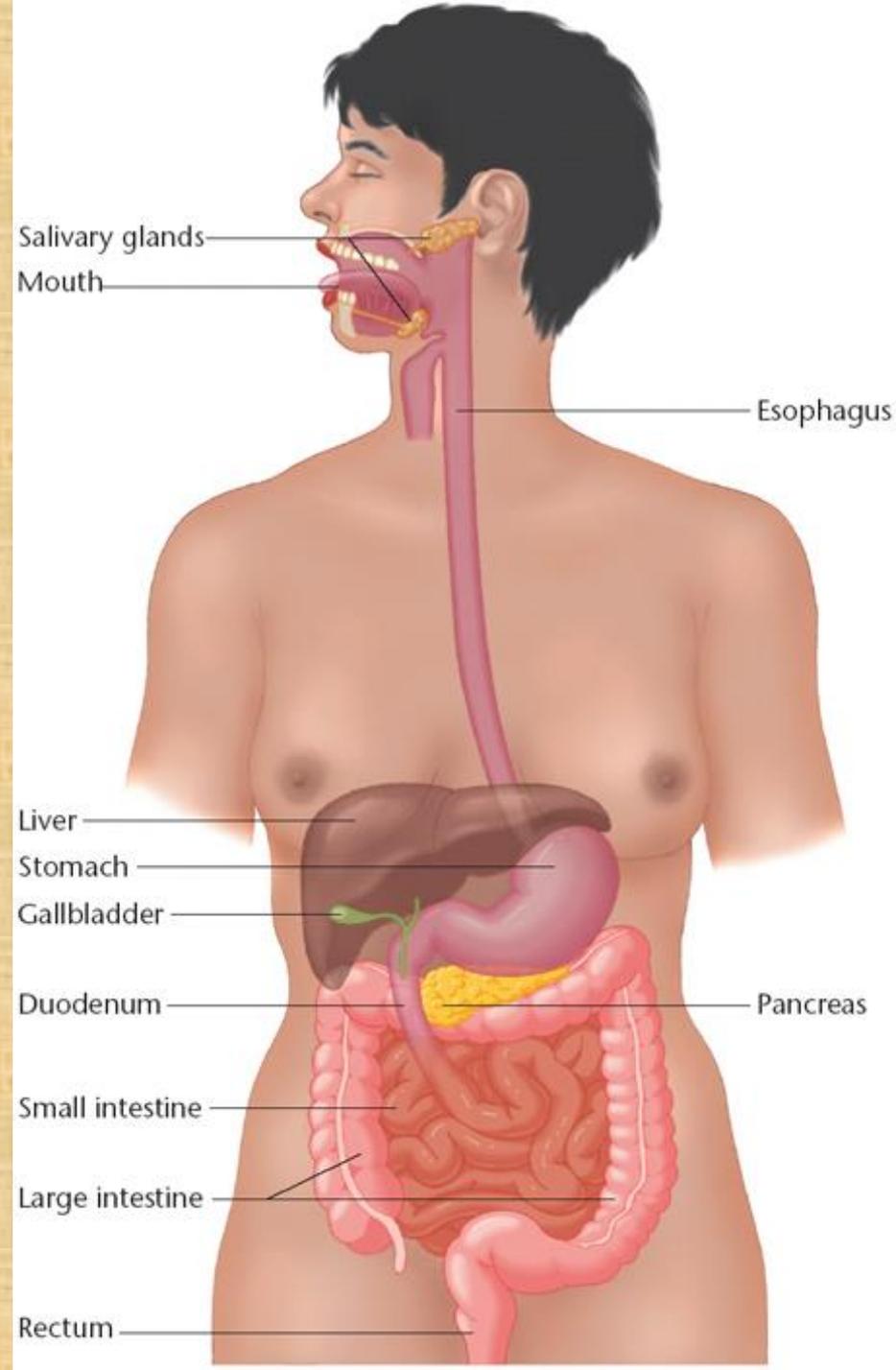
Energy-Water-Waste

Integrated material flows Energy-Water-Waste

Metabolism of the city

Energy, water and solid materials enter;
Waste leaves;
Energy is carried by solid resources.

It is one system.



The resource efficient society

- Is energy efficient**
- Save water**
- Take care of waste (recycling)**

Integrated Management is key to achieve sustainable development

- 1. Systems description**
- 2. Visioning**
- 3. Monitoring and indicators**
- 4. Management systems**
- 5. Projects**

Visioning



What would you like your city to look like 50 or so years into the future?

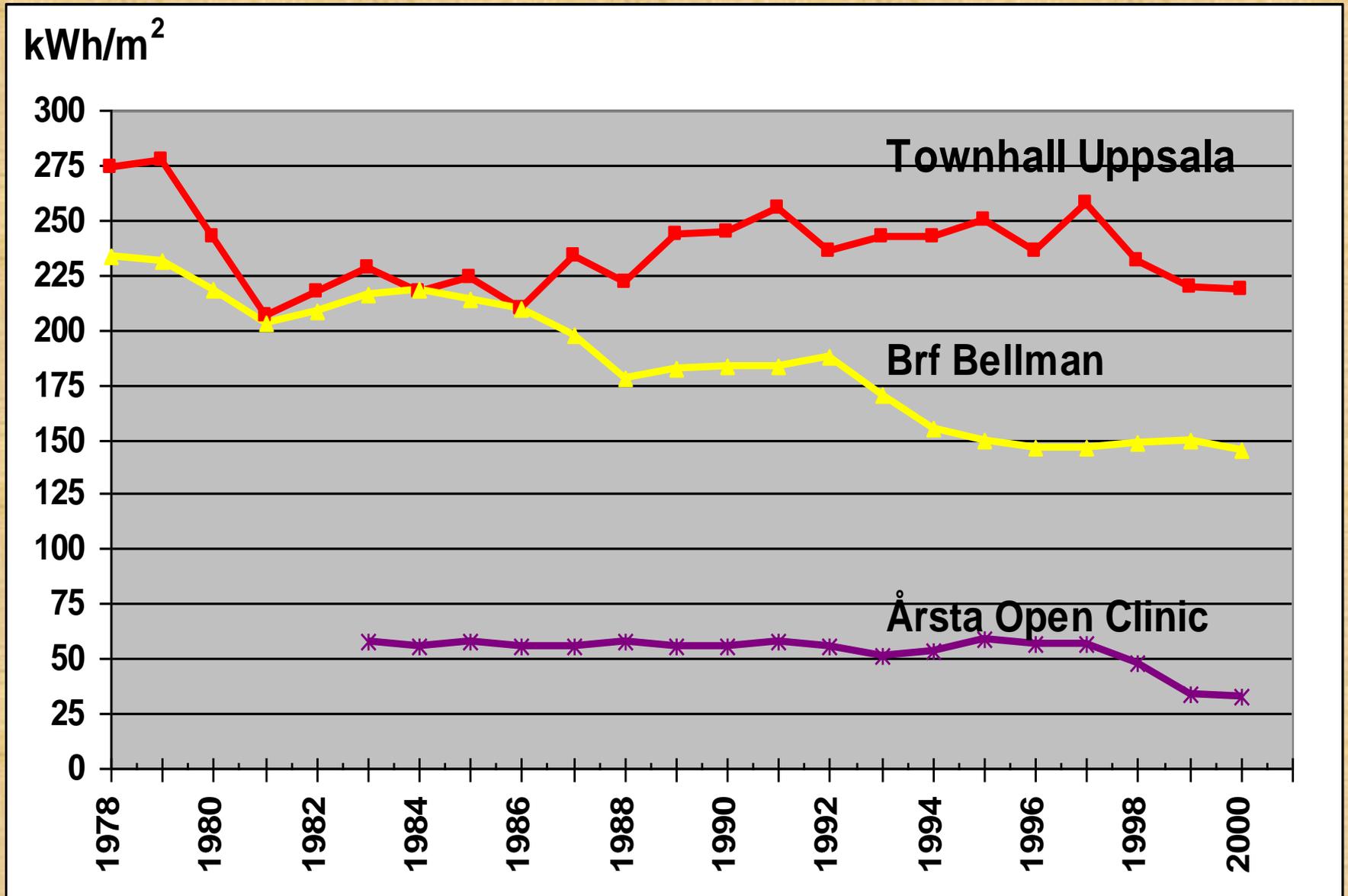
Case Göteborg – Göteborg 2050

Visioning was carried out in five main areas

- 1. Sun city (energy)**
- 2. Urban structure (includes green areas)**
- 3. Transport**
- 4. Food (e.g. includes health)**
- 5. Recycling (includes waste management)**

Indicators
allows you to follow the
development of a city or part of
it like a building

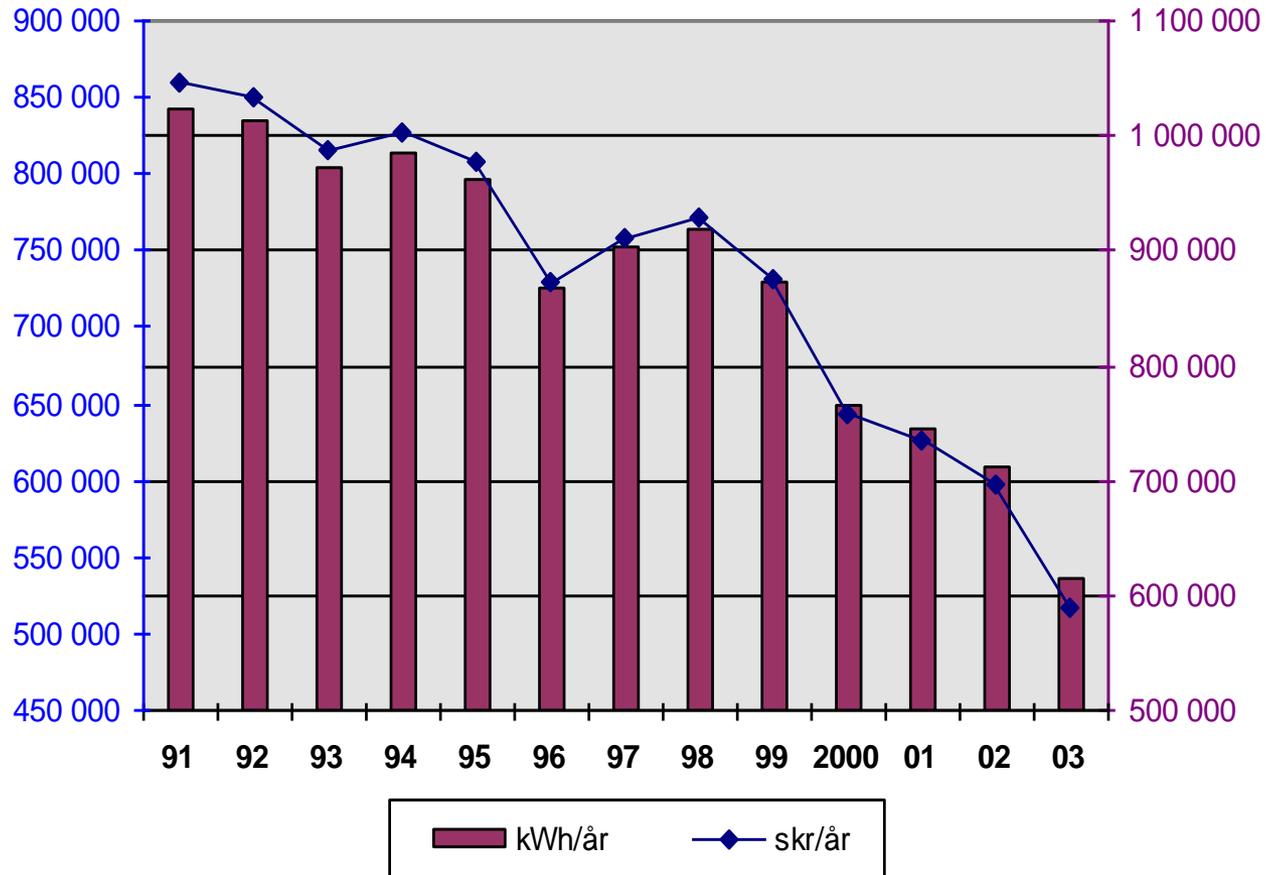
Energy use (heat) 1978-2000



skr / year

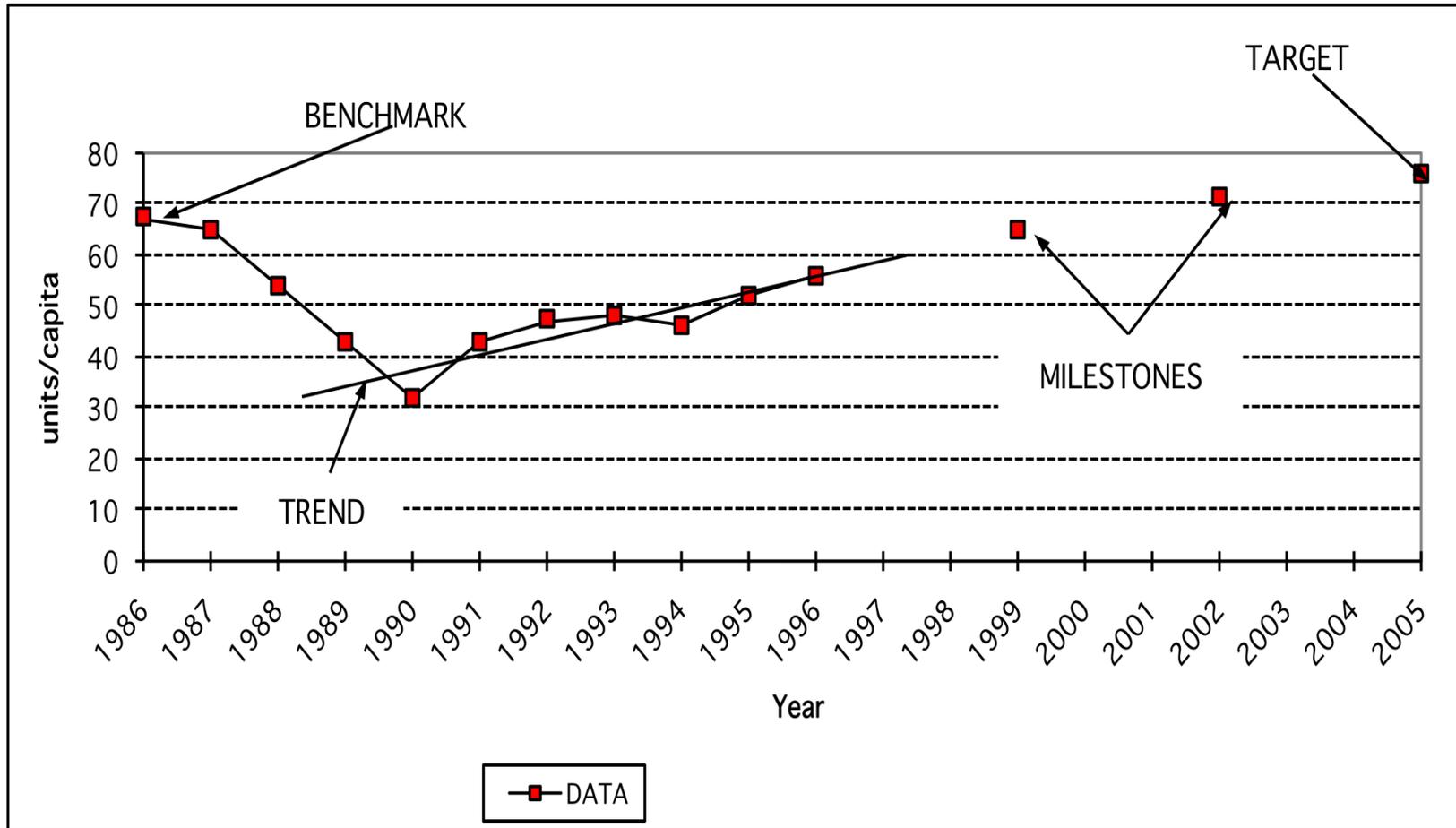
Electricity

kWh / year



Indicator Anatomy

Indicators should have a target or if it is not possible a benchmark. To follow an indicator from future milestones to the present is back-casting.



How to choose indicators

- Of course **choice of indicators** is a very serious question. You want to spend your time on something which is important and meaningful.
- **Some examples** in medicine and healthcare: We choose body temperature, not body height; We choose red blood cell count, not colour of the skin.
- In resource management: **ecological footprint**; this is monitored according to an established method. There is an understanding what the sustainability value is. (1.8 ha/cap) Values for cities are worked on by many cities. For social aspect of SD: Human development index (0.8) according to UN.
- These are **composite indices**, composed of several indicators. We need both them and special indicators, to be able to work with projects

Indicators and descriptors

1. Distinguish between indicators and descriptors.
2. **Descriptors** describe an activity, but can not be given a value for sustainability
3. **Indicators** Select a few of interest.
4. Discuss or decide on sustainability targets.
5. Estimate the sustainability gaps.
6. Discuss what to do with the gap.

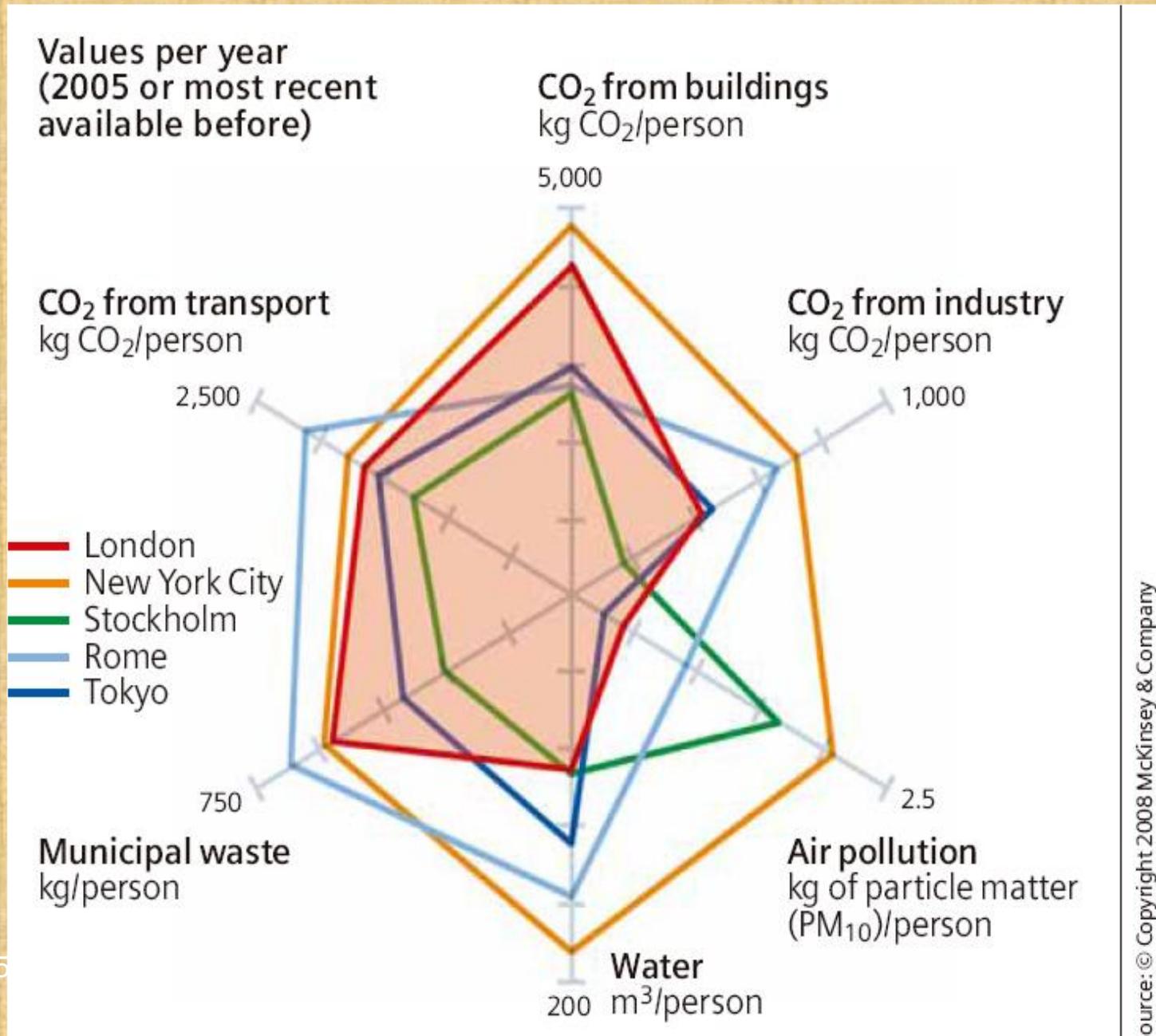
City Indicators – reports from the Sustainment project

1. Most city reports included a list of indicators, They were often around 50-60
2. Indicators were based on the political decisions. Targets were often politically decided (e.g. 40 % reduction)
3. Indicators were often for project follow-up descriptions
4. In several cases universities were involved in monitoring and collecting data
5. Some provided indicator values, best over a time period, but most not.

Why “absolute” sustainability targets?

- Basic – otherwise we do not know what is sustainable.
- Compare with a doctor responsible for the health of a patient; The City council is working with the sustainability (health) of the city.
- It is more straightforward with an indicator in the environmental field.
- For social indicators targets are related to human resource development and benchmarking.
- One learns much by analysing this question – a qualified discussion is requested.

Urban environmental indicators (examples)

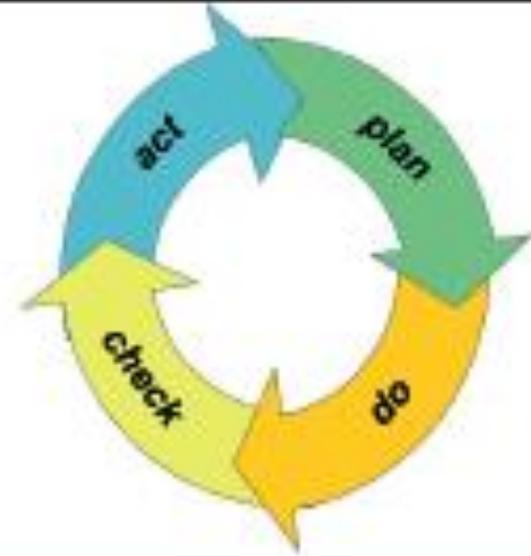
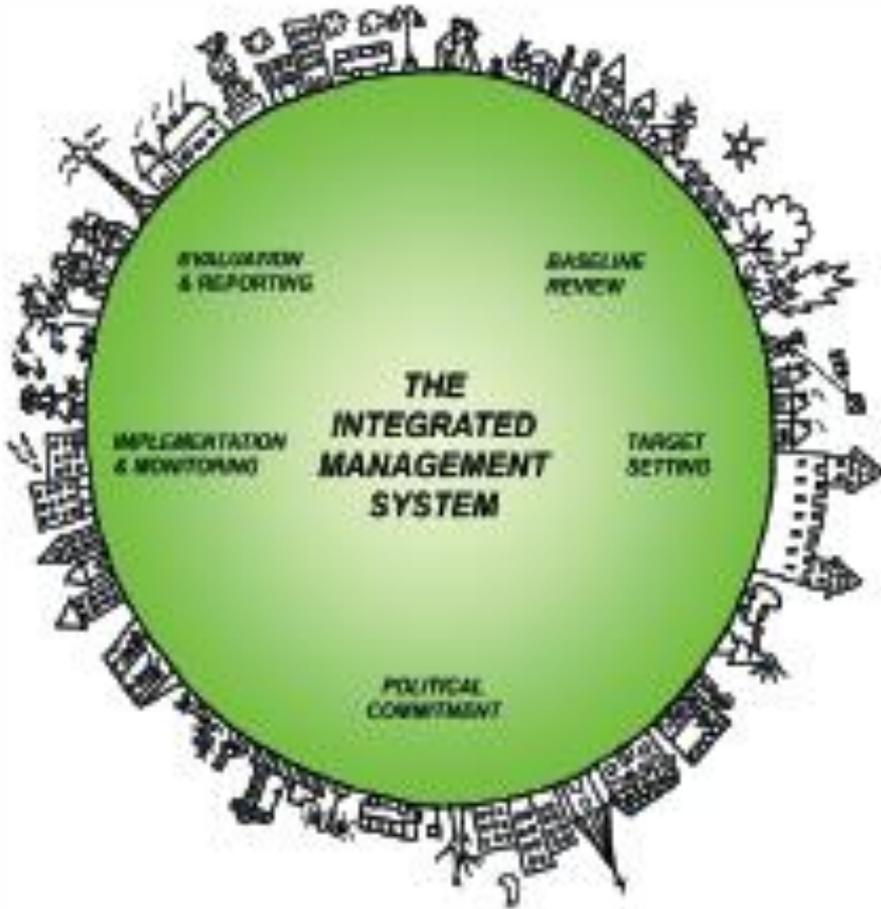


**In economics many indicators
are reported everyday
!**

Break

- Discuss which problems you have in your living area.
- Discuss which resources you have in your living area.
- Discuss how you can improve your living area.

Management systems



Managing Urban Europe (MUE 25) developed a five-stage management cycle (left) for urban sustainability work based on the original Deming circle (right).
<http://www.localmanagement.eu>

The MUE25 method

1. Baseline review
2. Target setting
3. Political commitment
4. Implementation and monitoring
5. Evaluation and reporting

The cycle runs over 3 years, each with specified tasks. After 3 years a new turn starts with review of vision, indicators, targets etc

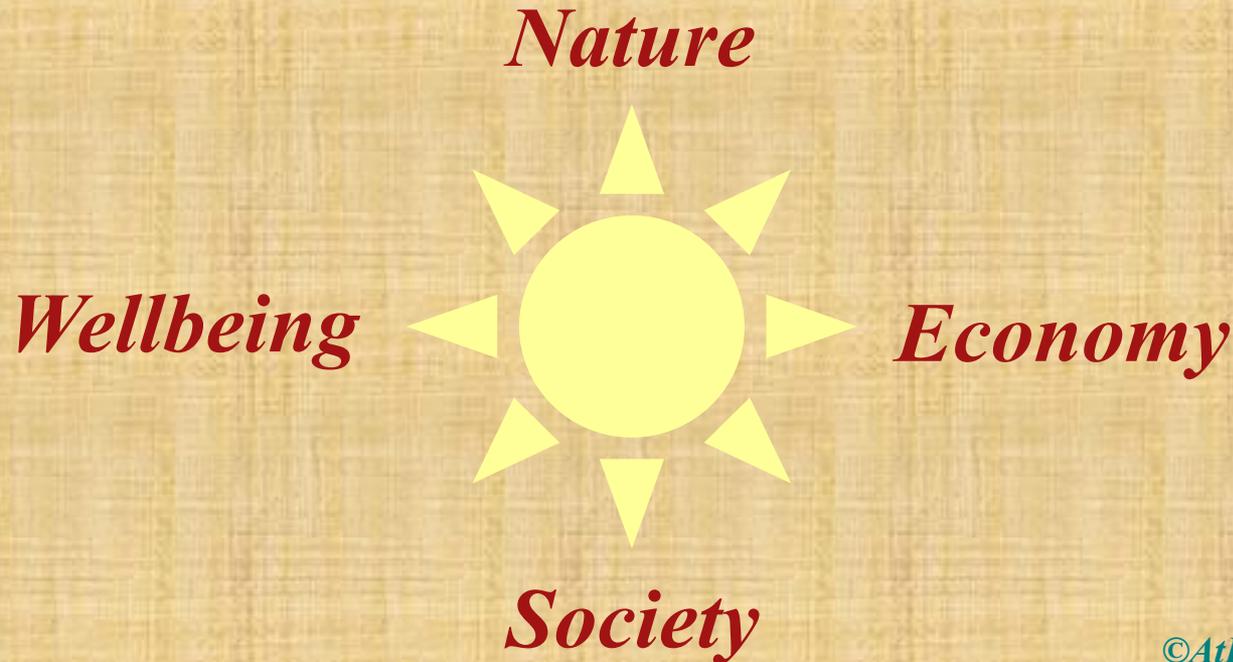
The frames of the system

- The classical system description with **3 dimensions** - ecological, social and economic dimensions, **the triple bottom line** - is not easy to make operational.
- The compass with **4 dimensions**, is better, especially for the social dimension
- Global Community Initiative uses **5 requirements**;
- Habitat uses **7 resources**
- Forum for the Future uses **5 capitals**

The Compass:

A Sustainability Framework

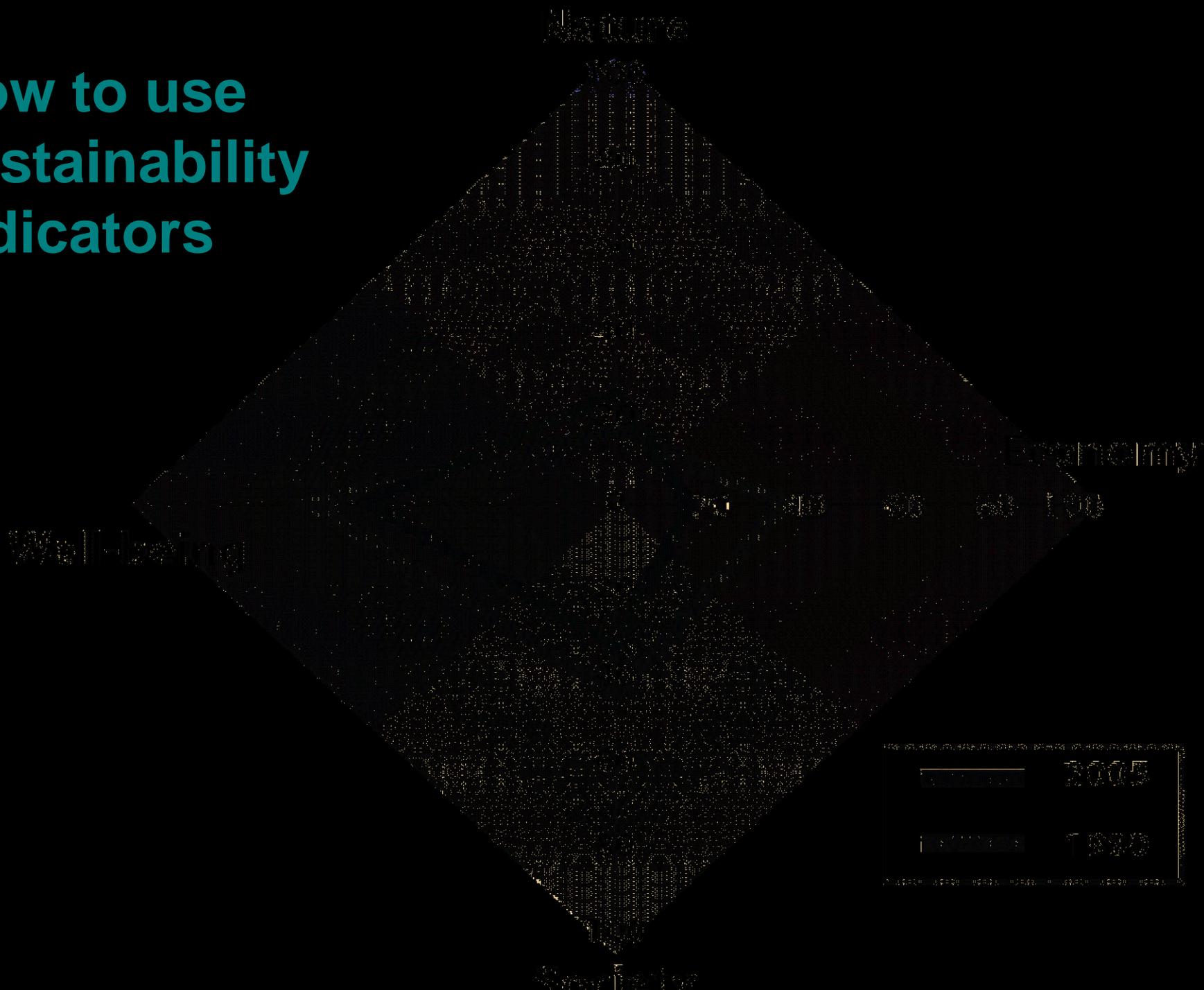
Alan AtKisson, 2004



©AtKisson, Inc.

Uses: Introduce sustainability ... assess it ...
develop sustainability indicators ... communicate results ...

How to use sustainability indicators



Strategies for sustainable development

Material flows strategies observed in the BUUF project

Reducing

Using less energy

Using less water

Replacing

Using renewables, fossil free municipalities

Using less toxic, e.g. out phasing Hg

Rescaling – down-scaling and up-scaling

Up scaling heating – district heating

Down scaling heating – heat pumps, individual boilers

Up scaling water flows – sewage, WWTP

Recycling

Recycling waste flows (product reuse, material recycle, incinerate)

Recycle nutrient flows (compost, production of biogas, nutrients to fields)

“Rescaling”

Up-scaling:

Waste water treatment plants instead of individual outlets, district heating

Down-scaling

Heat pumps, individual gas boilers, pellets burners, etc

Most common strategy, economic incentives, often efficient sustainability strategy

Strategies for integration

- Household waste to incineration (for district heating, co-generation)
- Sludge to biogas for busses
- Industrial energy (e.g. steam) to district heating
- Agricultural waste to incineration
- Waste water to mussel cultivation
- Waste water to heat pumps

Humane resources

Education

Good schools (ordinary schools)

Different kinds of education (ex culture schools)

Professional competence development (all ages)

Schooling for imigrants (not only education)

Very much used both east and west

Economic resources

“Support entrepreneurship”

Education

Offer places for starting (incubator)

Investments (loan)

Important strategies everywhere

Social resources

Support and stimulate the third sector

Nature protection NGOs

Civil society for social care

Neighbourhood cooperation

Cooperation with universities

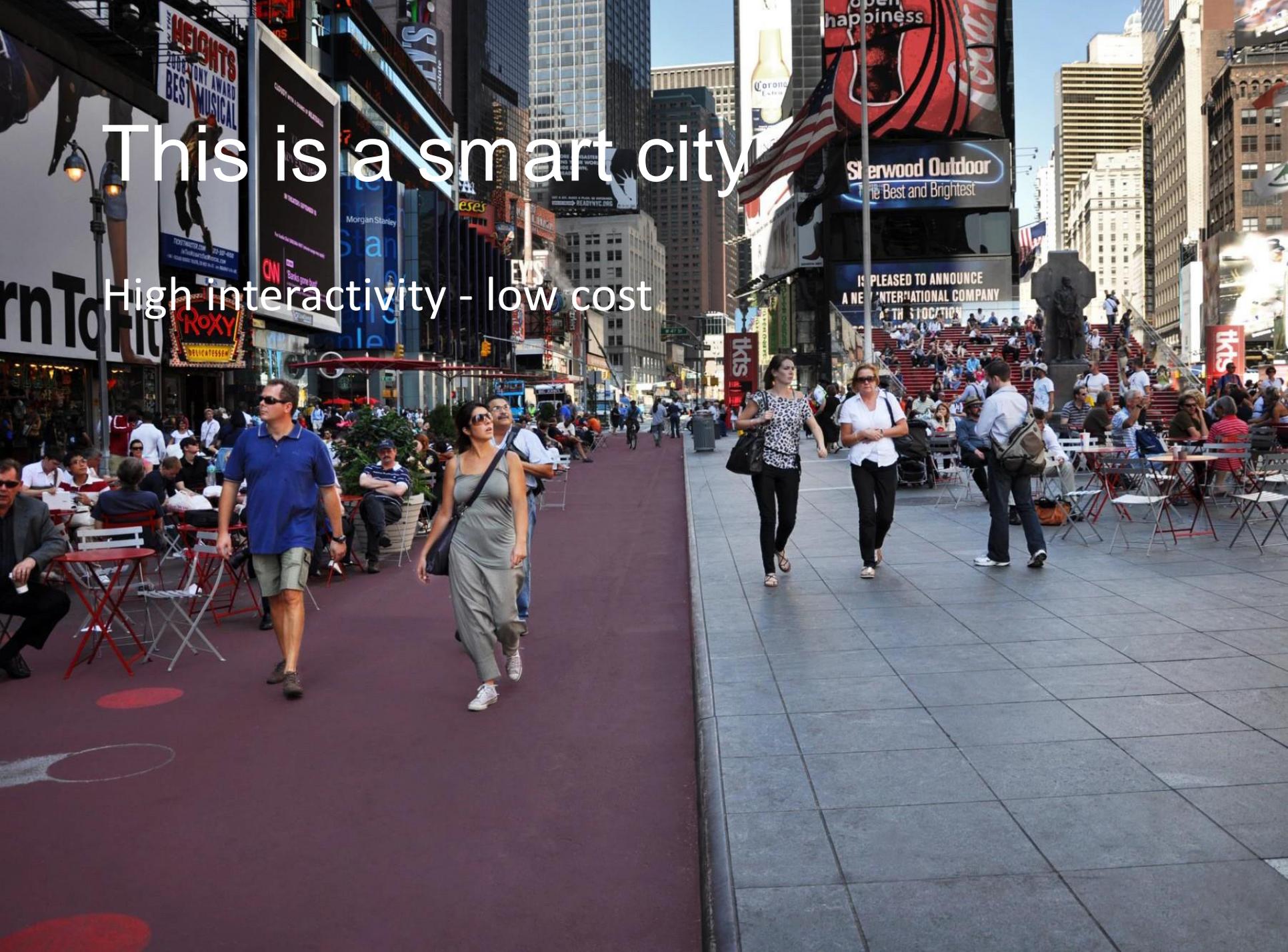
participation in interest organisations

improves life and contributes to the society

To like to live in the city is the most important sustainability indicator



Urban Networks for Sustainable Development

A wide-angle photograph of a bustling city street, likely Times Square in New York City. The scene is filled with pedestrians walking on a wide sidewalk. On the left, there are several outdoor cafe seating areas with red tables and white chairs. The buildings are covered in large, colorful billboards and advertisements, including one for 'HEAVENS' and another for 'Sherwood Outdoor'. In the background, a large set of red stairs leads up a hill, with many people sitting on them. The sky is clear and blue, suggesting a bright day.

This is a smart city

High interactivity - low cost

Tools and resources

- C40 cities

- C40 is a group of the world's largest cities committed to tackling climate change.
- www.c40cities.org

C40
CITIES
CLIMATE LEADERSHIP GROUP



CLINTON
CLIMATE
INITIATIVE

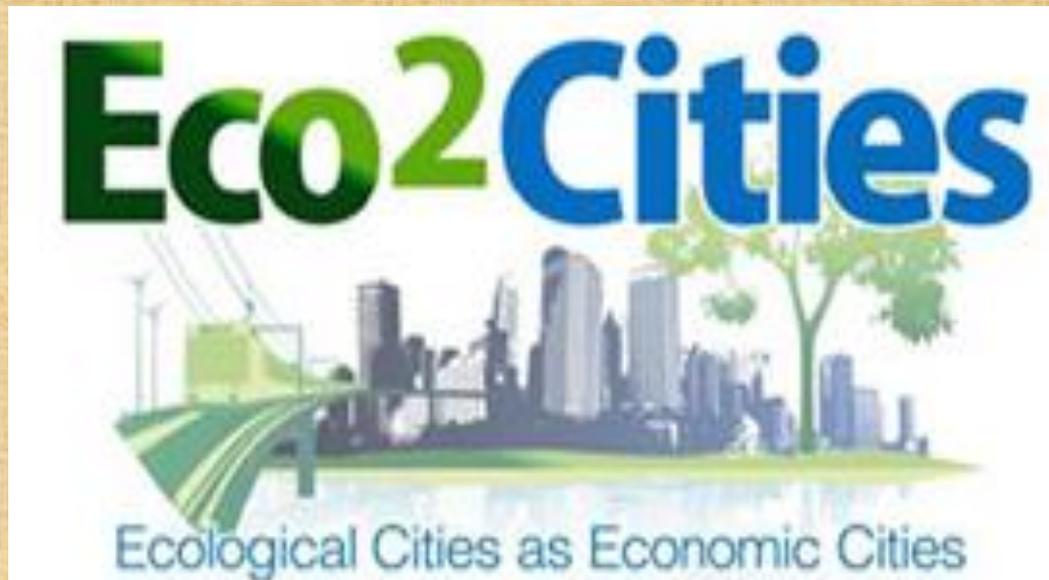
Tools and resources

- Eco² Cities Program, World Bank

Ecological Cities as Economic Cities

Aims to alter the way cities develop by avoiding growth that fosters inefficient use of energy and resources.

www.worldbank.org/eco2



Tools and resources

Sustainable urban development network

UN-HABITAT, SUD-Net

A network of global partners to promote a multi-lateral and inter-disciplinary approach to sustainable urban development.

www.unhabitat.org/categories.asp?catid=570

UN HABITAT
FOR A BETTER URBAN FUTURE

Tools and resources – Sustainable urban development organisations

- ICLEI, Germany (earlier Local Agenda 21 now sustainable local municipalities), Aalborg Commitments
- Sustainable Cities and Towns Campaign, EU
- UBC, Finland, Union of Baltic Cities
- GCI, USA, Global Community Initiatives
- The Natural Step Foundation, Sweden
- BUUF, Baltic University Urban Forum
- Forum for the Future, UK

The European Sustainable Cities and Towns Campaign

Get to learn more about how to achieve your local sustainability targets. Read the news, follow the debate and check the events.

The partners of the ESCTC provide you with practical guidance, project ideas and tools, showcased in the [Sustainability Kit](#) and in the linked partners' websites.

To mainstream local sustainability throughout Europe, the Campaign fosters the implementation of the 'Aalborg Commitments'. You can follow their structure throughout many of the items on this site.

Enjoy browsing around and [become part of the biggest movement for local sustainability across Europe!](#)

ICLEI Global

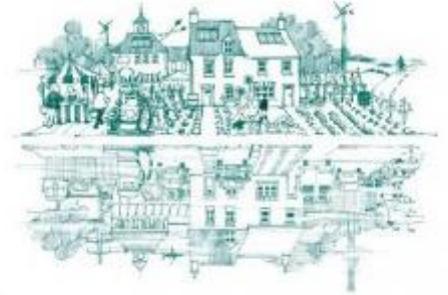
Home

ICLEI - Local Governments for Sustainability is an international association of local governments as well as national and regional local government organizations that have made a commitment to sustainable development.

ICLEI provides technical consulting, training, and information services to build capacity, share knowledge, and support local government in the implementation of sustainable development at the local level. Our basic premise is that locally designed initiatives can provide an effective and cost-efficient way to achieve local, national, and global sustainability objectives.

Transition Towns

Get the transition
movie



IN TRANSITION^{1.0}
From oil dependence to local resilience

Transition Network: tackling Peak Oil
and Climate Change, together

Lecture 10

to read

1. Building Sustainable Societies, Chapter 7. *Spatial Planning and Development*. pp 94-110.
2. Building Sustainable Societies, Chapter 9. *Green Structures in Sustainable City Development*. pp 130-149.