“The city as a complex system: Challenges to sustainable planning”

Universität Duisburg-Essen

ARUS – Advanced Research in Urban Systems

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Guest Lecturer

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SUMMARY 1

THE PRESENTATION COVERS THE FOLLOWING ITEMS/CHALLENGES, BASED ON URBAN SYSTEMS STUDIES BY THE EUROPEAN ENVIRONMENT AGENCY:

1. WORLD-WIDE URBAN POPULATION TRENDS

    1.1. URBANISATION, SPONANEOUS VS PLANNED – LEARNING FROM SLUMS
    1.2. SHRINKING INDUSTRIAL CITIES – DETERMINANTS OF LOCATION
    1.3. AGEING OF POPULATION AND LENGHTENING OF HUMAN LIFE
    1.4. THE CHALLENGE OF TECHNICAL PROGRESS AND CLUSTERING

2. GLOBALISATION OF TRADE PATTERNS, TRADE / FINANCIAL FLOWS AND NEW INVESTMENT PATTERNS IN URBAN PROJECTS – ANALYSING URBAN STRATEGIES

SUMMARY 2

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3. INVESTING IN CLIMATE CHANGE ADAPTATION: THE CASE OF THE LOW COUNTRIES

   RISK PREVENTION VS INSURANCE
   MASS INDIVIDUALISM AND WEAKENING OF INTERGENERATIONAL SOLIDARITY
   DISCOUNT RATE ISSUES – COST OF RESILIENCE

4. RECOGNITION OF CITIES AS SYSTEMS: SWITCHING FROM LINEAR TO CIRCULAR URBAN ECONOMY

   RECYCLING WASTE INTO SECONDARY MATERIALS AS WORLD RESOURCES GET SCARCER: THE KALUNDBERG CASE
   REBOUND EFFECTS OF NEW TECHNOLOGIES
   ENERGY CONSUMPTION ISSUES

SUMMARY 3

5. URBAN SPACE CONSUMPTION ISSUES: LIMITS TO A CAR-CENTERED WAY OF LIFE: INDIVIDUAL HEALTH ISSUES

6. GREENING THE COMPACT CITY/GREENING THE BUILDINGS OF TODAY AND TOMORROW

7. SMART CITIZENS MAKING SMART CITIES

SUMMARY 4

8. URBAN GOVERNANCE: CASE STUDIES

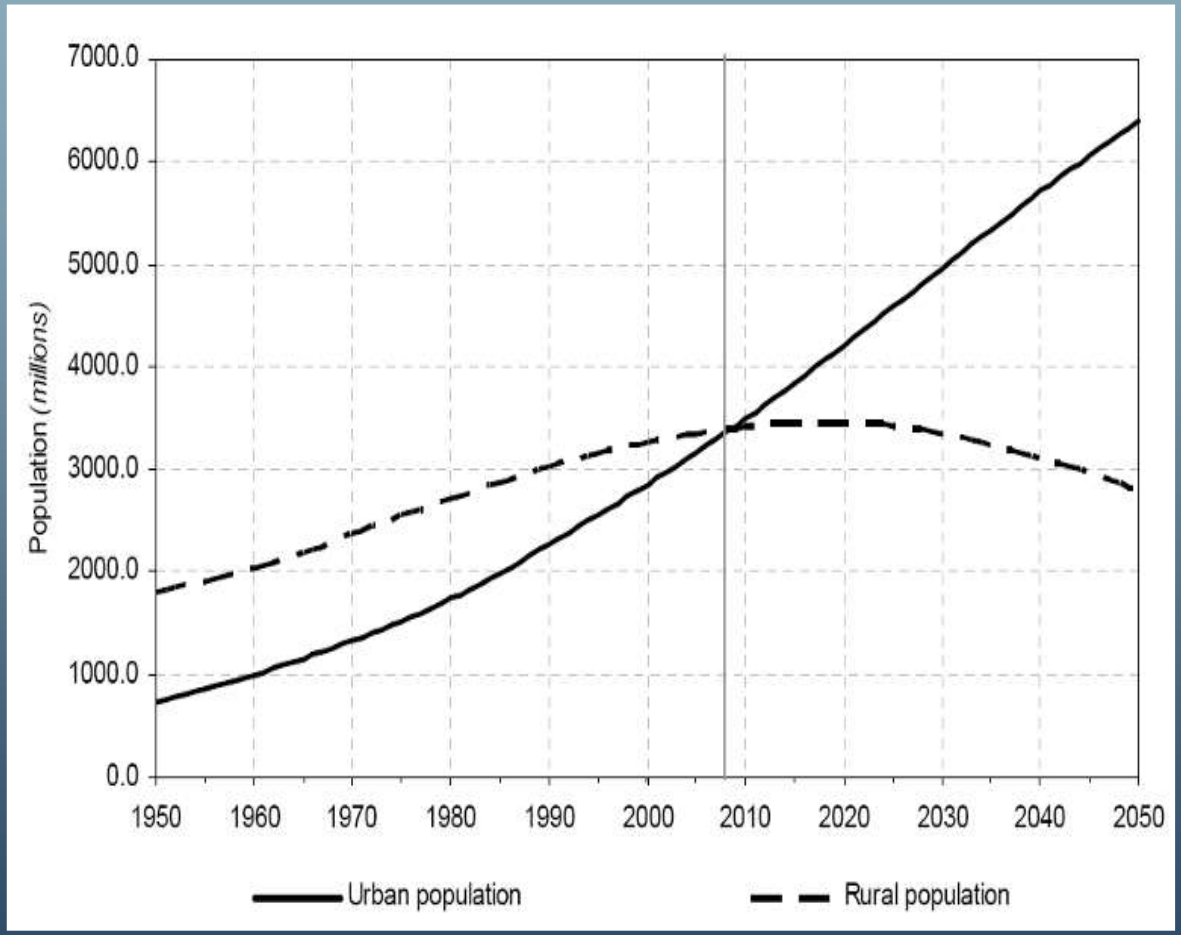
8.1. THREE CASES OF INTEGRATED SUSTAINABLE METROPOLITAN GOVERNANCE (LAND/BUILDINGS/MOBILITY) AND SOCIO/POLITICAL ACCEPTANCE:

- 8.1.1. SINGAPORE
- 8.1.2. CURITIBA
- 8.1.3. ZURICH

8.2. TWO CASES OF INTEGRATED URBAN DISTRICT MANAGEMENT:

- 8.2.1. LOUVAIN
- 8.2.2. BILBAO

1. WORLD-WIDE DEMOGRAPHIC TRENDS - an urban world



The world's urban population

2008	2050
50 %	*70 %*

(Europe's urban population

2008	2050
75 %	82 %)

Source: United Nations Department of Economic and Social Affairs/Population Division 5. World Urbanization Prospects The 2007 Revision.

European Environment Agency

Megacities - Whatever the precise definition (F. Choay: "L'urbain contre la ville"), megacities are the future (60 million additional "urban" inhabitants per year)

In the next 20 years:

China: 30 new "cities" with >1 million inhabitants

India: 26 new "cities" with >1 million inhabitants

Growing social duality:

- **Between "urban" places and slums**
- **Between informal and planned**

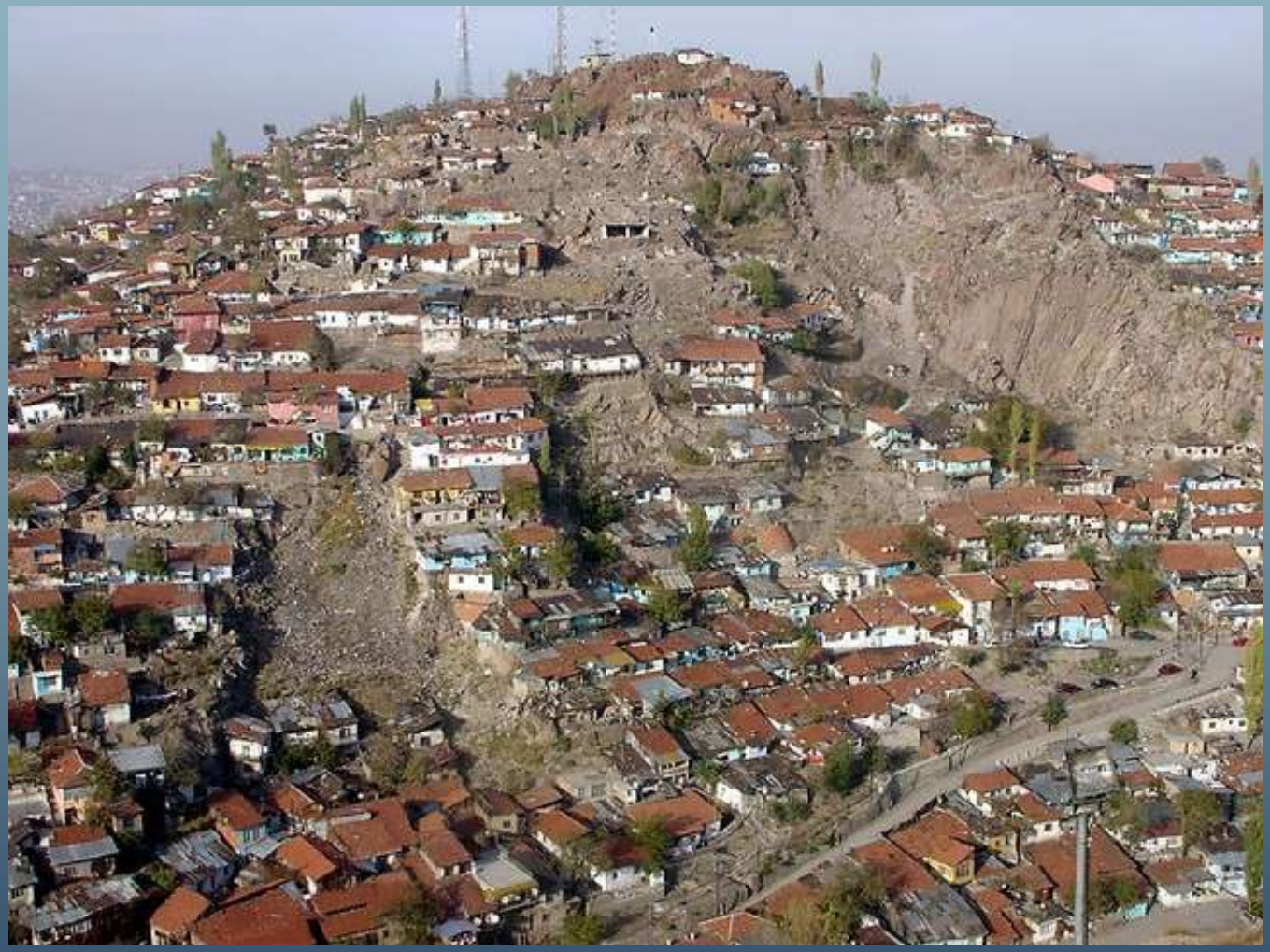
1.1. Urbanisation: spontaneous vs planned

1.1.1. Spontaneous self-built dwellings, later becoming “urban” developments - raising gentrification and value capture issues

Tunis : Ettadamen

Tunis-Ettadamen (meaning « solidarity ») : a self-built settlement born spontaneously in the 1970s from rural migration onto vacant land, and later included in the city's fabric through an extension of the light rail system.

Istanbul’s “gecekondus”



Istanbul’s “gecekondus” : self-constructed settlements, built in a very short time on vacant land by a new workforce migrating from remote rural areas; later connected to utilities, legalised and sold on the market by the initial settlers

Rio’s favelas

September 13, 2013 6:51 pm

Brazil property: buyers target homes in Rio’s ‘pacified’ favelas

By Francesca Steele

A favela on the slopes near Corcovado in Rio de Janeiro

On a hill overlooking the golden beaches of Ipanema in the south of Rio de Janeiro, a new community is developing. Local artists and architects come here alongside expat property developers and hotel owners to buy properties with spectacular ocean views. A sushi bar has recently opened and a boutique hotel is under construction.

This is Vidigal, formerly one of Rio’s most dangerous slums, or favelas. In December 2011 it became the latest area to benefit from “pacification”, the Brazilian government’s programme which aims to clean up the city before next year’s World Cup and the 2016 Olympics. Many of the drug traffickers previously in charge of the slums were jailed and replaced with a round-the-clock police presence.

“It has become fashionable to live in Vidigal,” says Leonardo Schneider, Secovi Rio’s vice-president. “There is some controversy, as the original poorer communities are gradually moving elsewhere, but there is no doubt that it has become popular with investors and owner-occupiers.”

Some residents argue that they feel safer in favelas than in non-pacified areas because of the police presence. For prospective buyers, the biggest issue is no longer gang-related crime but ownership disputes. Andreas Wieland, a local resident, recently won a dispute over his ownership of the popular Alto Vidigal nightclub, which he bought four years ago for $10,000. He has since, he claims, been offered $300,000 to sell it.

Rio’s favelas, spontaneous settlements for the poorest, later improved, legalised and sold on the market

Source : Financial Times 13/09/2013

http://www.ft.com/intl/cms/s/2/5a4c57ea-1612-11e3-a57d-00144feabdc0.html#axzz2gxkVQbpn

1.1.2. New capitals and cities planned as iconic urban objects

Senegal : Yamoussoukro

This new capital city reflects the vision of its founder, in line with many new rulers' capitals throughout history

Abu Dhabi : Mazdar

Norman Foster and engineering consultancy Mott MacDonald designed Mazdar as an iconic tribute to the low energy city. It claims to be a sustainable zero-carbon car-free city, relying entirely on solar energy and other renewable energy sources. Located 17 km from Abu Dhabi, it will be accessible mainly by fossil fuelled cars.

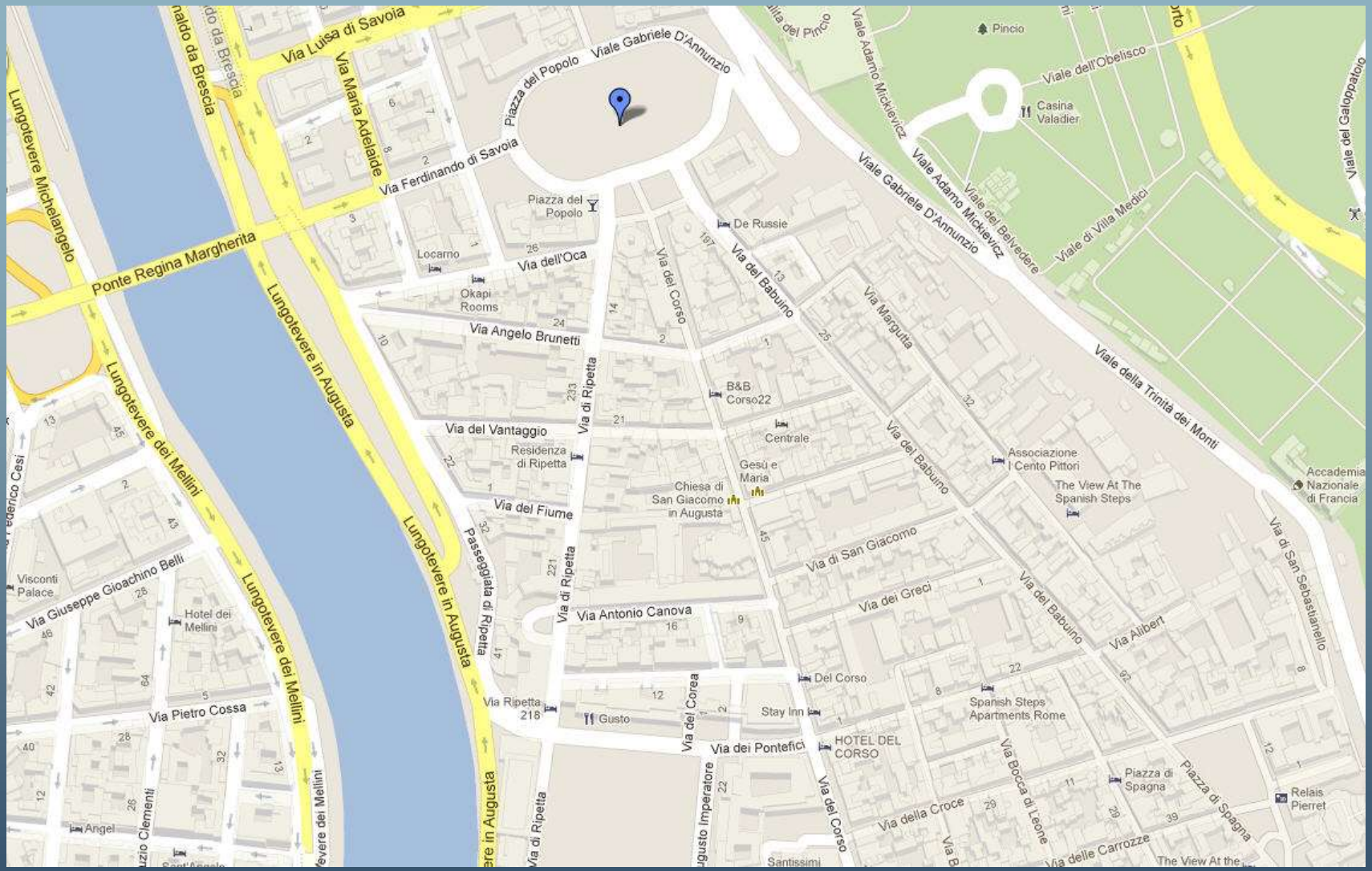
Hangzhou : Tianducheng

China's Tianducheng development in Hangzhou started construction in 2007 and was intended as a knockoff of Paris, with scaled down replicas of the Eiffel Tower and Parisian blocks. Tianducheng remains sparsely populated and is now locally considered as a “ghost town”.

1.1.3. A historic counter-point

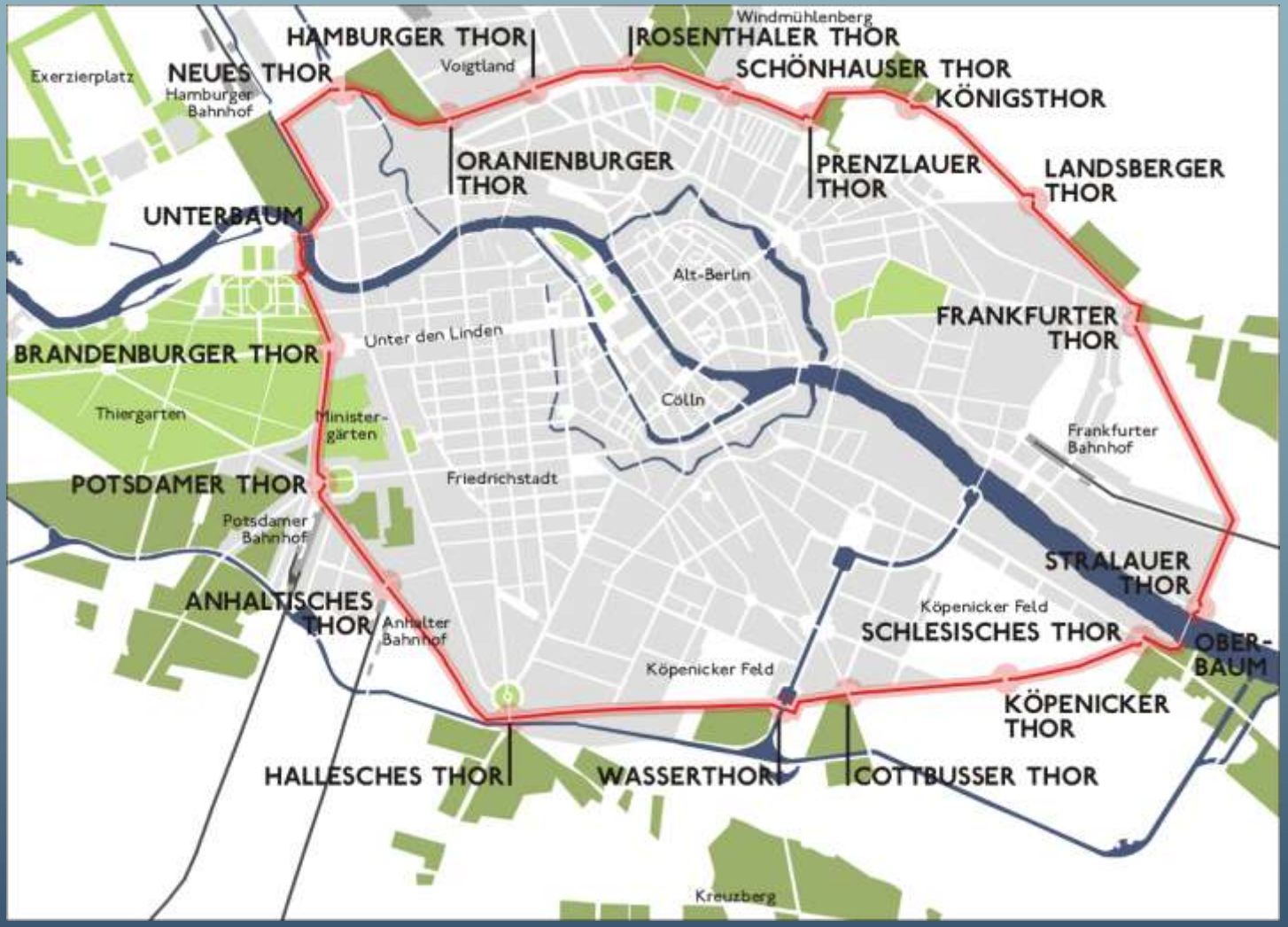
Three urban plans designed for gradual, long-term implementation

Rome : Sixtus V Plan



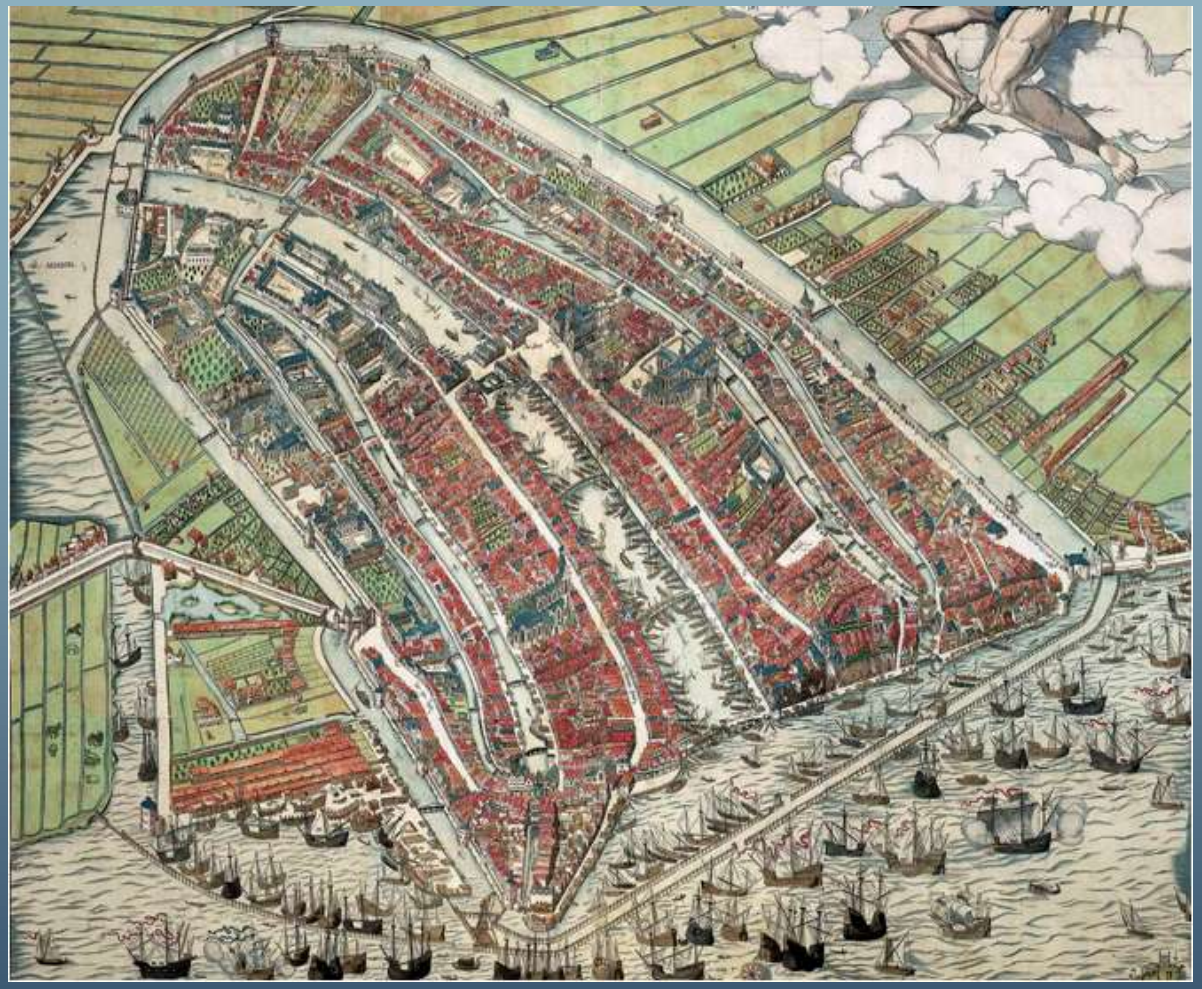
The plan embodied a long term vision through its strong framework combining a radial linear and grid pattern of development. The starting point was the present Piazza del Popolo. The urban expansion followed the Via del Corso, Via Ripetta and Via del Babuino. The filling-in of the framework was flexible, allowing for changes in style and function through the following centuries.

Friedrichstadt Berlin : an inversion of the Sixtus V Plan



The urban framework starts from the present Mehringenplatz (Hallesssches Thor) and develops northwards along the Friedrichstrasse towards the Oranienburger Thor. Once divided by the Berlin wall, today it is once again the central part of the capital (“Mitte”), strictly following the linear and

Amsterdam’s curvilinear extension : Singel

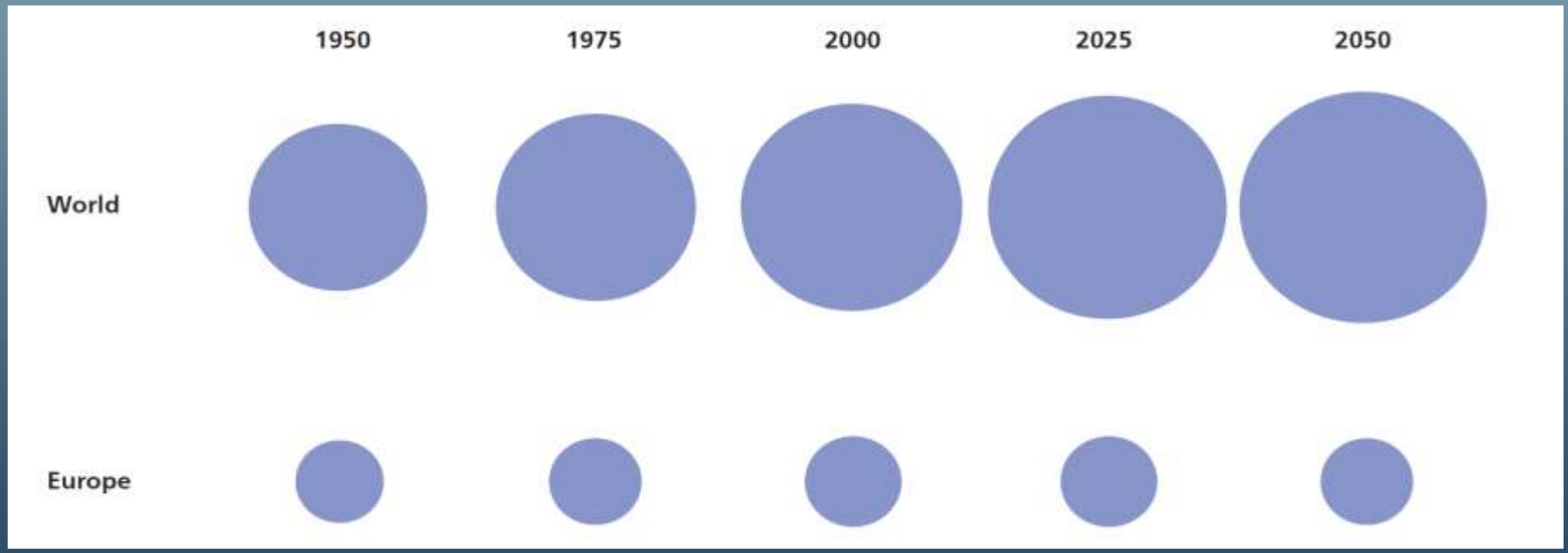


The medieval town developed southwards from the port along a main waterway and parallel canals but was confronted in the early 17th century by the need to accommodate major population growth.

The city adopted a curvilinear development framework, surrounding the old town by a triple circle of canals and a grid of streets. This plan was implemented over some 400 years and has become a World Heritage site (http://www.ffue.org/?s=singel)

1.2. European perspectives today

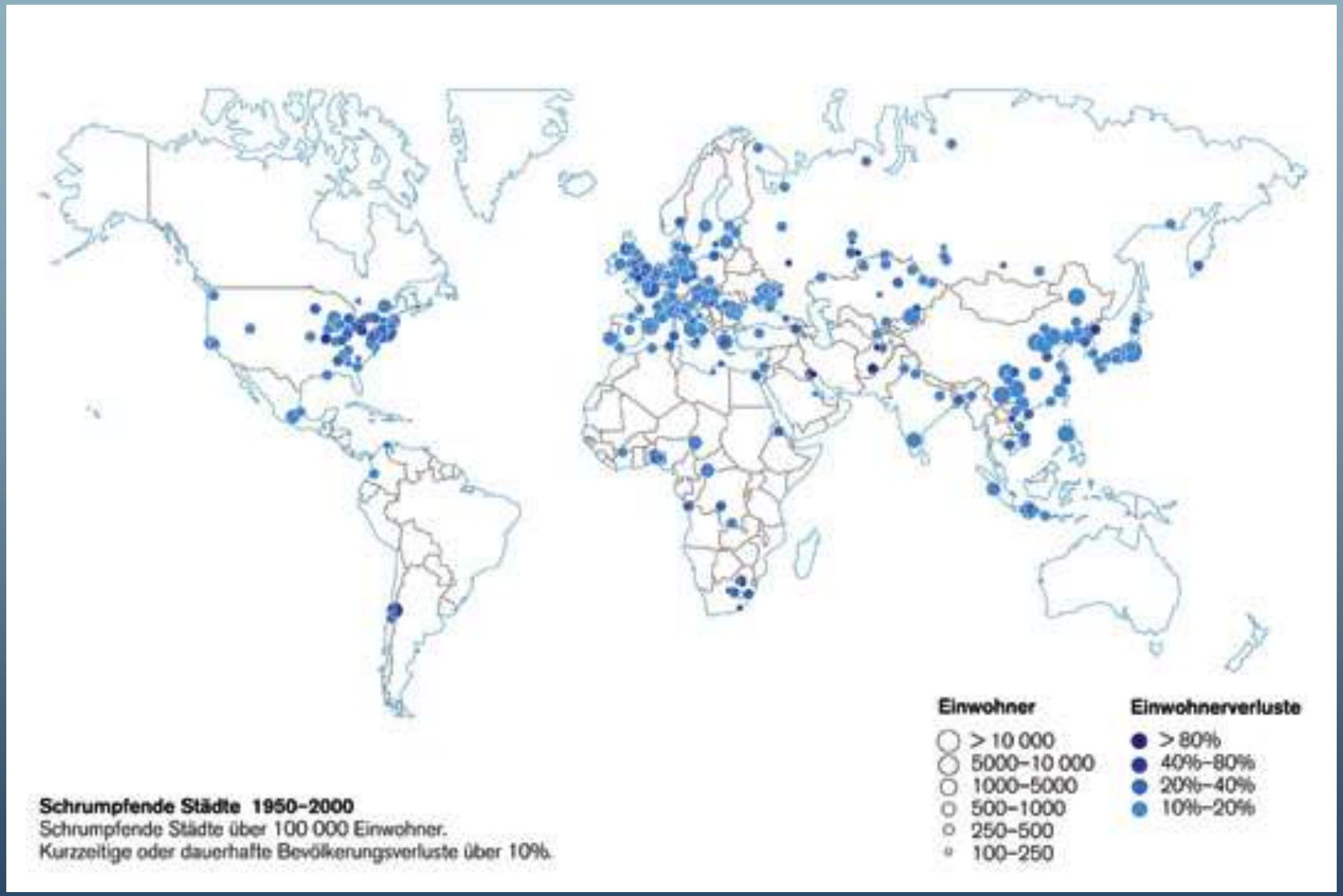
A fall in the EU's population by 2050 to 5% of the world population, and shrinking industrial cities



IBA See : drowning an East German industrial wasteland

The pioneering Berlin-based Shrinking Cities International Research Network, founded in 2004 by Philipp Oswalt, conducts and disseminates research on the social, economic, environmental, cultural and land-use issues facing shrinking cities. It endeavours to analyse the different situations and recommend appropriate cross-sector and cross-disciplinary projects. This is in line with the long German ‘IBA’ experience in: innovative construction (Berlin), urban greening (Emscher Park/Kothen) and blue, i.e. water-centric, developments (IBA See, as pictured, and Strassberg lake on ‘Pingen’, i.e. mining sinkholes).

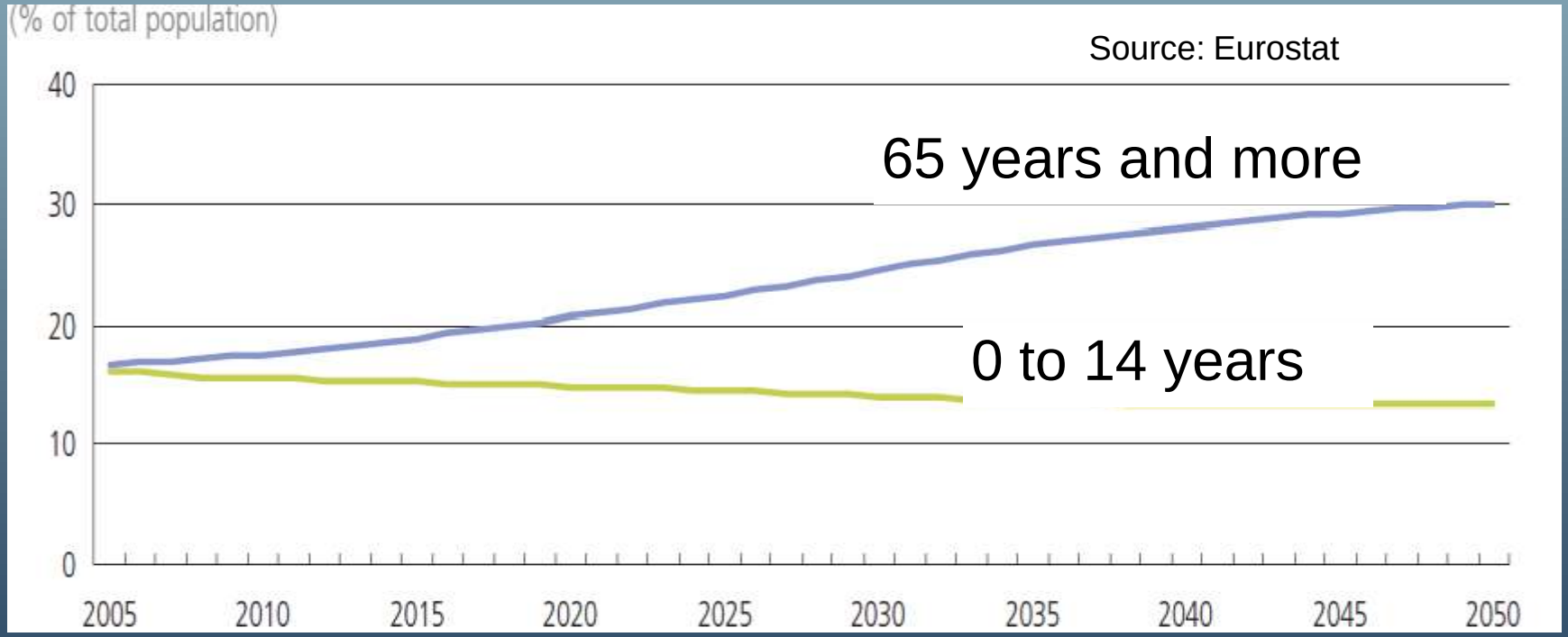
Shrinking industrial cities : a world-wide form of de-urbanisation



Source : Oswalt, Ph., “Atlas of Shrinking Cities”, Hatje Cantz 2006

1.3. An ageing society (two people of working age for each person aged 65 or more)

Population projections, EU-27



Challenge of adapting urban society to ageing population (lessons from Japan)

Longer lives brought about by medical progress

Genetic manipulations and medical engineering bring the prospect of ever longer human lives for the privileged. For example, three-dimensional bio-printing may allow the replacement of defective organs. The photo shows the 3D bio-printing of a kidney prototype with cells and biomaterials (Source: “Organs on Demand”, The Scientist Magazine, September 2013). A million US citizens will be older than 100 years in 2050, requiring unprecedented medical care.
Progress in medical technology will require clustering/pooling of the investments required (see 1.4)

1.4 The global challenge of technological clustering

Technical progress ignores the boundaries between disciplines and requires ever more complex and capital intensive investments conceived, built and managed by poly-disciplinary teams. Among others effective decoding of the human genome for medical purposes (e.g. oncology) requires investments shared among multiple shareholders, meaning a management revolution.

However, the traditional higher education faculty structure tended to encourage mono-disciplinary “silo” thinking and marginalise inter-disciplinary projects.

1.4 (continued)

New experiences are worth mentioning:

- Essen and Duisburg universities reshuffled their faculty structure when they merged, generating systemic thinking and advanced research in urban systems – ARUS. The objective is to bring together and cross-fertilise research and teaching through common national/international projects including human sciences and management – strictly avoiding to extrapolate mechanical models onto unpredictable human behaviour.

- The three Lyons universities have created a common poly-disciplinary laboratory (“Intelligence des mondes urbains”) based on the needs of the cities of tomorrow, such as adaptation to climate change and recycling.

2. GLOBALISATION OF TRADE AND FINANCIAL FLOWS :

Financial flows and new investment patterns in urban projects

2.1. Trade flows

1956 : the first container ship; 2013: close to $20 trillion trade (source “The Economist” 18/05/2013).

Many mega cities in the world are located on the coast : Tokyo, Mumbai, Sáo Paulo, New York City, Shanghai, Lagos, Los Angeles, Calcutta, Buenos Aires, etc. (source UN – 2011).

2.2. Financial Flows

Financial flows have been boosted by “quantitative easing” policies (USA, UK and BCE). This monetary injection, estimated at some $10 trillion may have irreversible effects on cities, as long-term urban development projects are adopted or rejected in response to short term concerns, as was illustrated by the MIPIM (http://www.ffue.org/?s=mipim+2013).

Interlocking systems

Several interrelated but un-mastered systems are at work :

- Financing the financial economy vs financing the “real” economy.
Unshared power of financial interests leading to bubbles and bail-outs.

- Increased consumption of resources while their supply is decreasing.
Public services captured by private groups becoming tax collectors.

- Increased climate instability vs un-met requirements for adaptation.

- Short term governance led by interest groups.
Responding to systemic phenomena in a mono-disciplinary fashion.

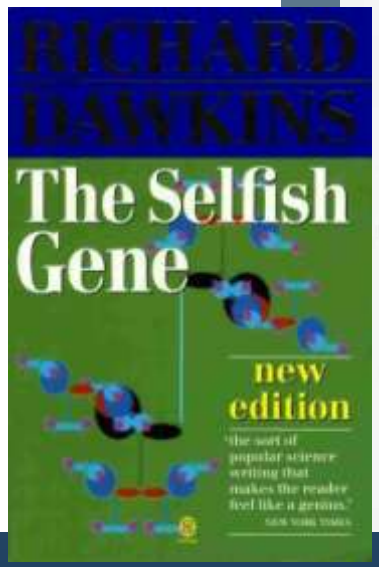
Source: "Building a Low Carbon Economy in a post-crisis world", Foundation for the Urban Environment May 19th 2009, Pr. Jacqueline McGlade, Executive Director European Environment Agency.

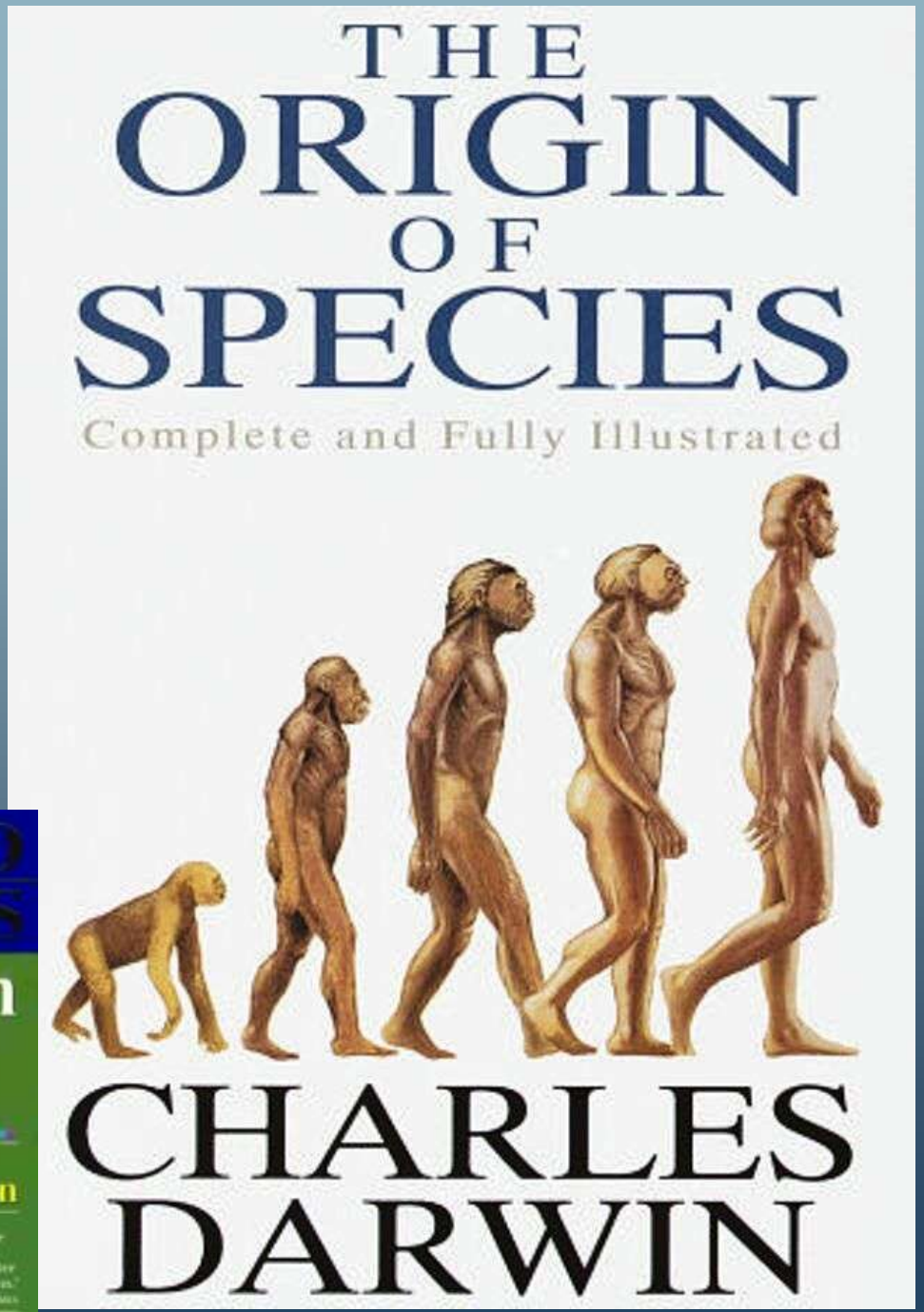
2.3. Climate change adaptation

Intergenerational solidarity issues on facing the future cost of climate change.

Homo sapiens conquered the planet through intelligence and greed, without limit, far beyond the available resources (Darwin).

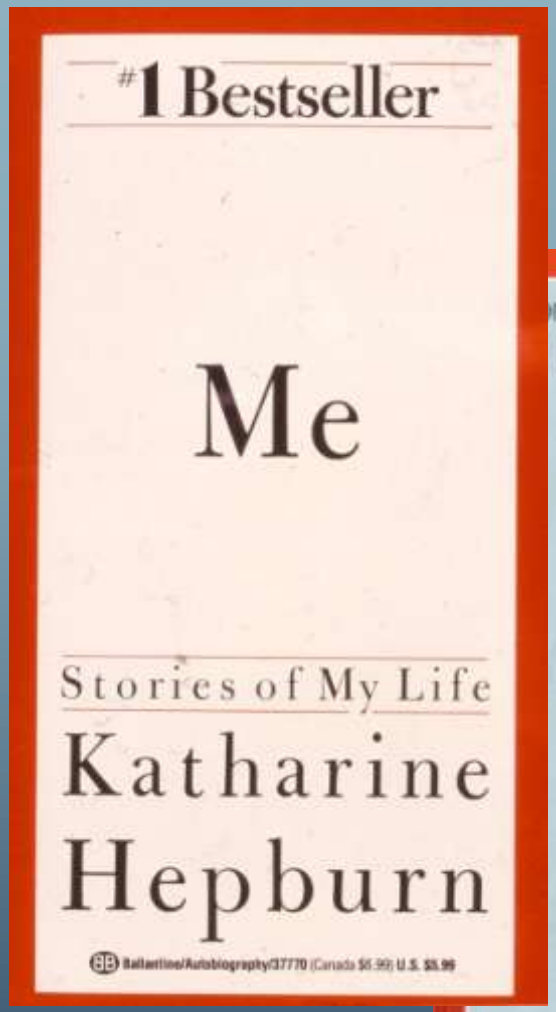
The short-term interest of individuals takes precedence over the collective longer-term interest (Dawkins, de Duve).





The post-war “me culture” expanded into the “me-me-me culture” of the post-baby boom generation.

“Mass individualism” (F. Gauchet) weakens intergenerational solidarity in financing adaptation to future challenges, mainly climate change.



3. THE COST OF RESILIENCE: INVESTING IN FUTURE CLIMATE CHANGE ADAPTATION

The case of the Low Countries

The Dutch approach – Rotterdam's Maeslantkering protective barrier

The Netherlands has been pioneering long term infrastructure investments to protect its coastal cities from the sea. In the 1980s, it was decided to reinforce dikes in the Delta generally. The epitome was the giant "Maeslantkering" barrier on the main canal serving the Port of Rotterdam. Built in 1997 at a cost of circa €400 million, it has been used only once, in 2007. Questions are being raised in the Netherlands about the economic justification of giant infrastructure works.

The Maeslantkering barrier when open

Economic issues related to the chosen discount rate for infrastructure investments

The Stern Report's assumptions (fixing artificially low discount rates of 2-3%) are opposed by economists who favour the use of standard public or private market discount rates.

"Building your way out of Armageddon by investing now" vs "letting future generations pay later for the effects of climate change, using their own resources".

ALTERNATVE: Preparing human resources for emergency rescues (civil and military).

The Belgian approach – buffer islands

Belgium has taken the opposite approach, shunning large coastal investments and relying on (subsidised) private sector initiatives. The “Vlaamse Baaien” project combines buffer islands against high tides and North Sea storm surges with the construction of large- scale wind parks providing renewable energy aimed at - among others - the future German market.

Storage of energy at times of peak production is to be achieved by creating a supplier-owned “energy atoll”, i.e. a basin equipped with locks and turbines which start to work when there is a surplus of wind electricity, filling the basin. It acts as an energy reservoir.

(c) Martin La Monica – MIT Technology Review – 5 Feb 2013
http://www.technologyreview.com/view/510806/a-manmade-island-to-store-wind-energy/

The logic of artificial islands has been expanded to autonomous mobile floating communities (Vincent Callebaut, Paris).

4. URBAN METABOLISM AS A NEW PARADIGM OF URBAN ANALYSIS AND POLICIES

Energy and matter

Urban **system**

waste and emisssions

European Environment Agency

Inputs

Society / Economy

Outputs

Local extraction, production and space
- minerals, biomass, water, space, etc.

Imports
- raw materials, fossil fuels, products, etc.

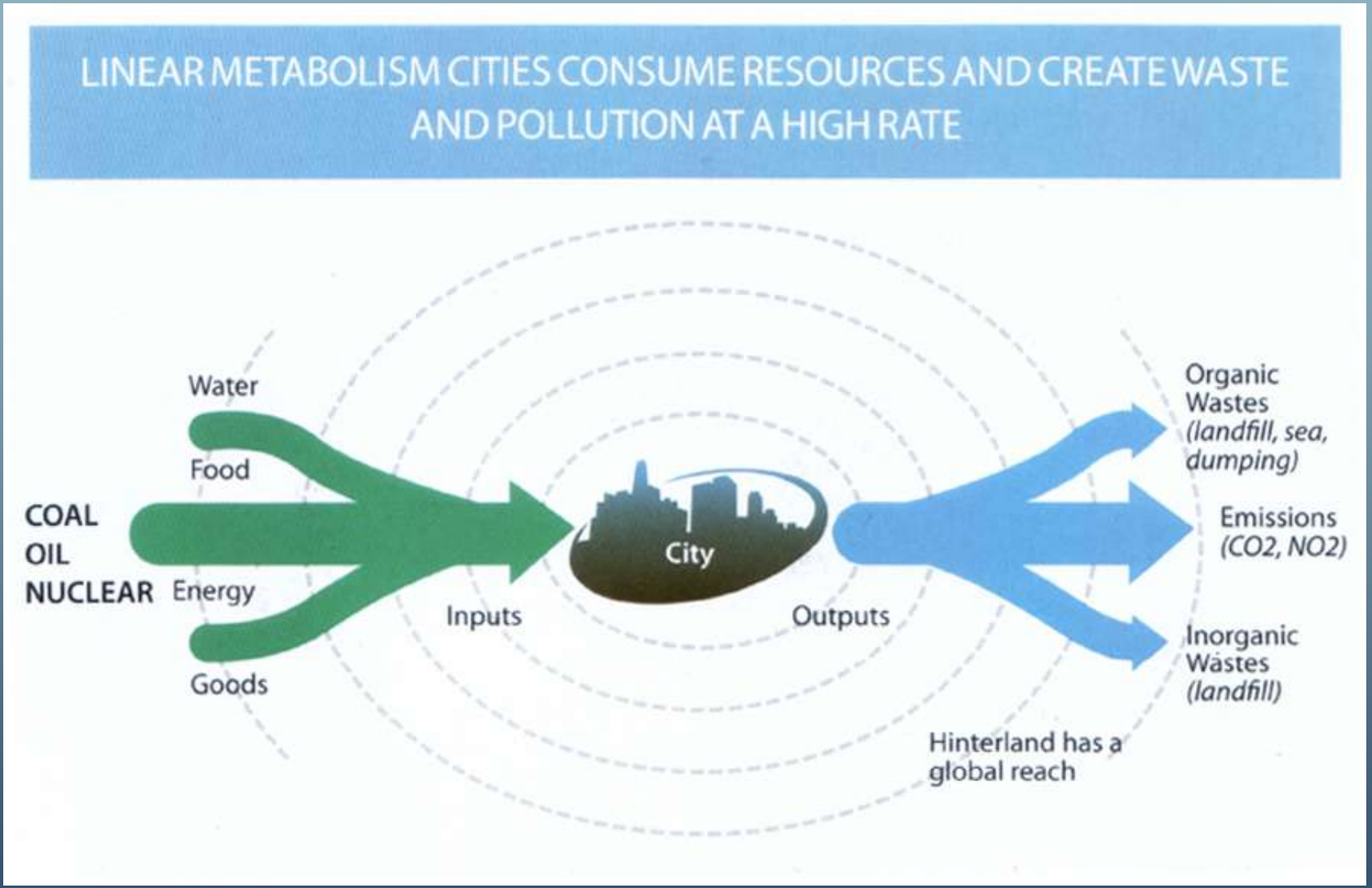
Indirect flows associated with imports

To nature:
- emissions to air
- emissions to water
- waste to landfill
- dissipation flows

Exports
- waste, emissions, etc.

Indirect flows associated with exports

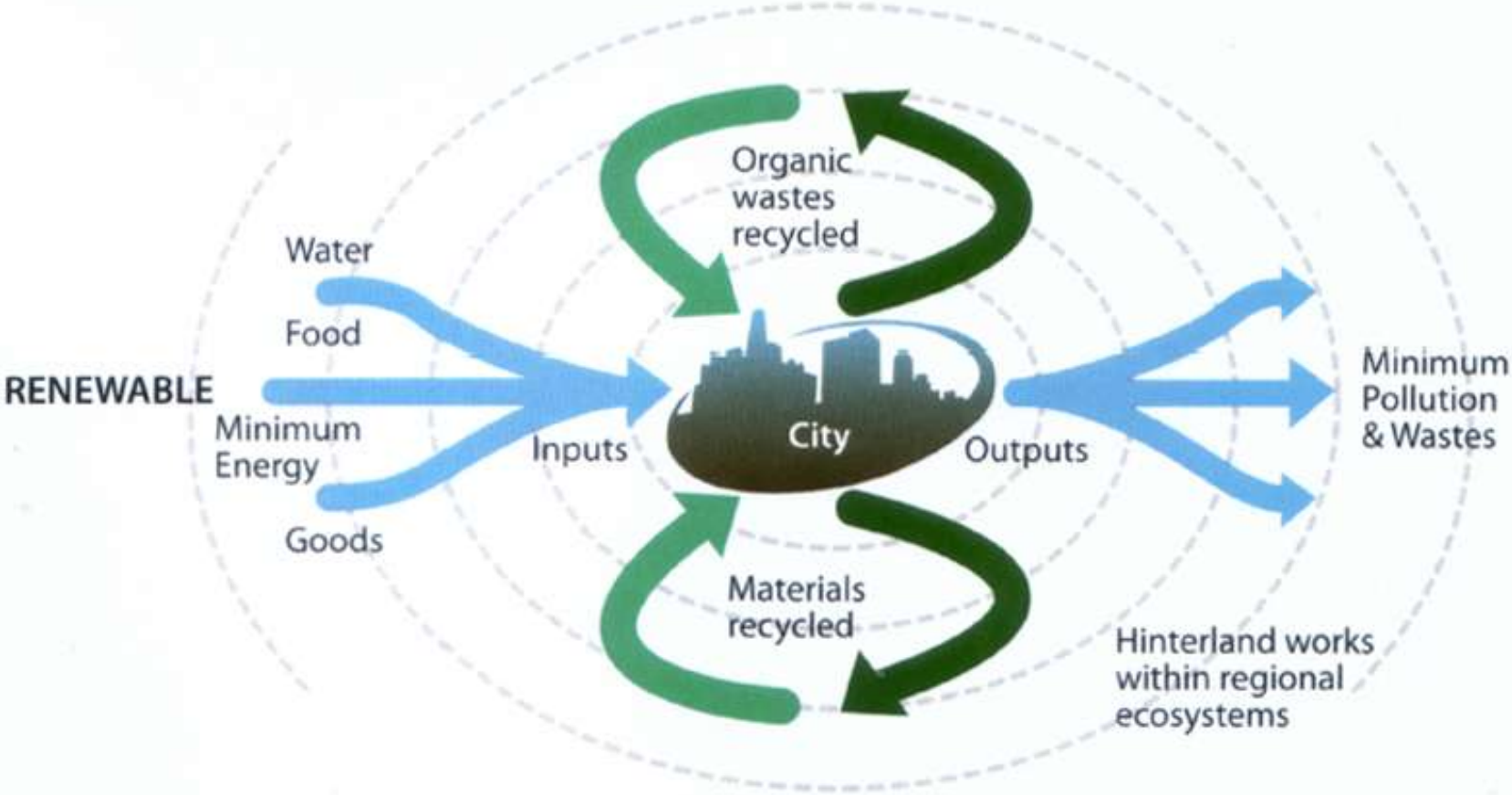
The metabolism of cities: from linear to circular



Source: F. Girardet, World Future Council

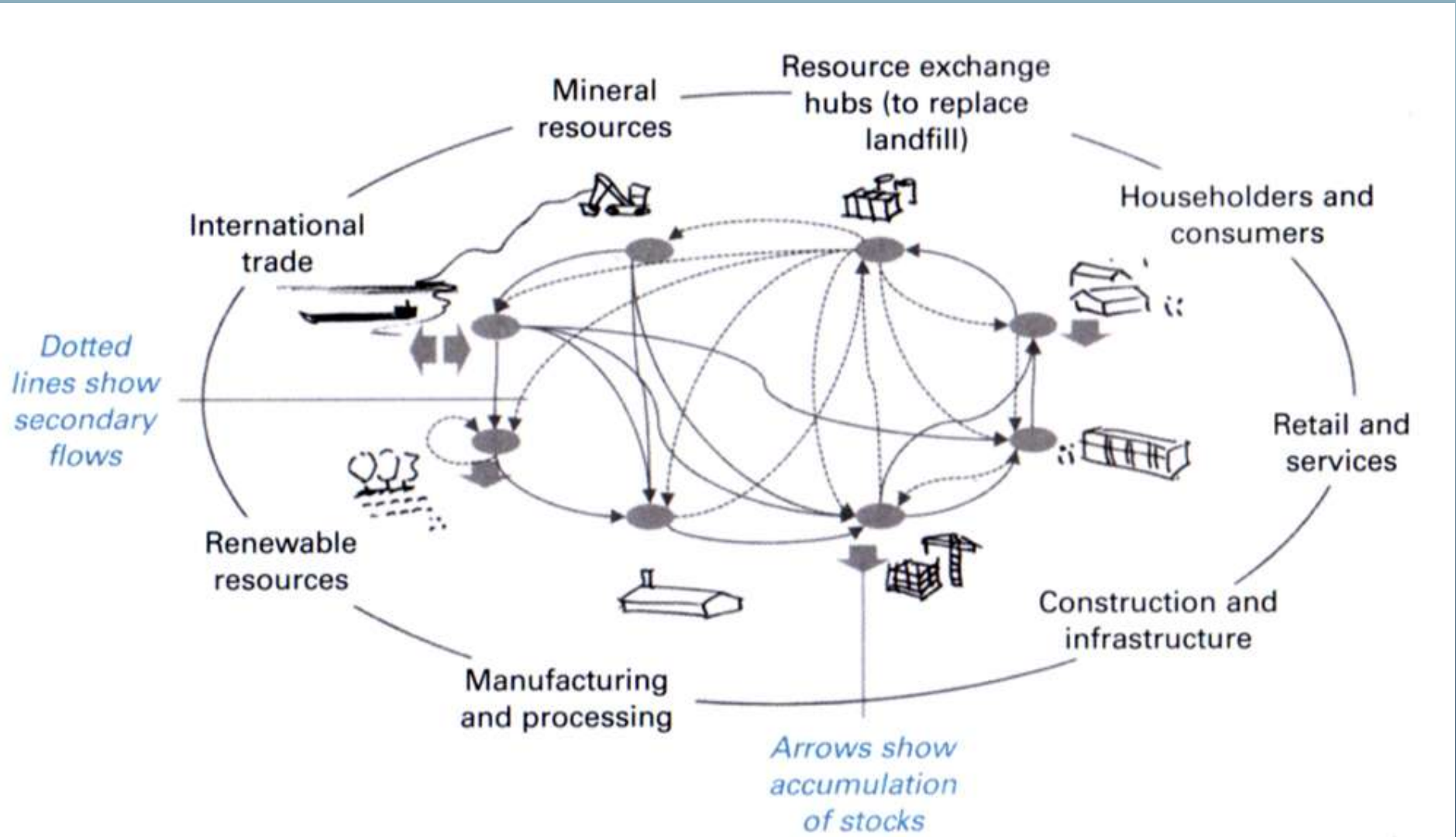
- **The open-loop approach is unsustainable in an urbanising and finite world**

CIRCULAR METABOLISM CITIES REDUCE CONSUMPTION AND POLLUTION, RECYCLE AND MAXIMIZE RENEWABLES



Source: F. Girardet, World Future Council

Resource flows in the circular urban economy



Source: Ian Douglas, Nigel Lawson, Joe Ravetz
"Urban Metabolism – changing flows and planning agendas"
Town & Country Planning, October 2013.

- On a predominantly urban planet, cities will need to adopt circular metabolic systems to assure their own long term viability as well as that of the rural environments on which they depend. Outputs will need to become inputs into the local and regional production system. Whilst in recent years a very substantial increase in recycling of paper, metals, plastic and glass has occurred, much more needs to be done. Most importantly, it is crucial to convert organic waste into compost, and to return plant nutrients and carbon to farmland feeding cities, to assure its long-term fertility.

- The local effects of urban resource use also need to be better understood. Cities accumulate large amounts of materials within them.

- Much of this is relatively inert materials, such as steel, concrete and tarmac. Other materials, such as heavy metals, have discernible environmental effects as they gradually leach from the roofs of buildings and from water pipes and accumulate in the local environment.

Japan’s recycling rate for metal is 98%, and it is also high for other materials.

In 2007, only 5% of Japan’s waste went into landfill. The majority of electronic appliances/electrical products are recycled, and up to 89% of the materials they contain are recovered.

(Source: MacArthur Foundation, World Economic Forum, Towards the Circular Economy : Accelerating the scale-up across global supply chains)

The case of Kalundborg's eco-industrial park (1)

- At the centre of the exchange network is the Asnæs power station, a 1500MW coal-fired power plant, which has material and energy links with the community and several other companies.

- Surplus heat from this power plant is used to heat 3500 local homes in addition to a nearby fish farm, whose sludge is then sold as a fertilizer.

- Steam from the power plant is sold to Novo Nordisk, a pharmaceutical and enzyme manufacturer, in addition to the Statoil power plant.

- This reuse of heat reduces the amount of thermal pollution discharged to a nearby fjord.

The case of Kalundborg’s eco-industrial park (2)

- Additionally, a by-product from the power plant's sulphur dioxide scrubber contains gypsum, which is sold to a wallboard manufacturer.
- Almost all of the manufacturer's gypsum needs are met this way, which reduces the amount of open-cast mining needed.
- Furthermore, fly ash and clinker from the power plant is used for road building and cement production.

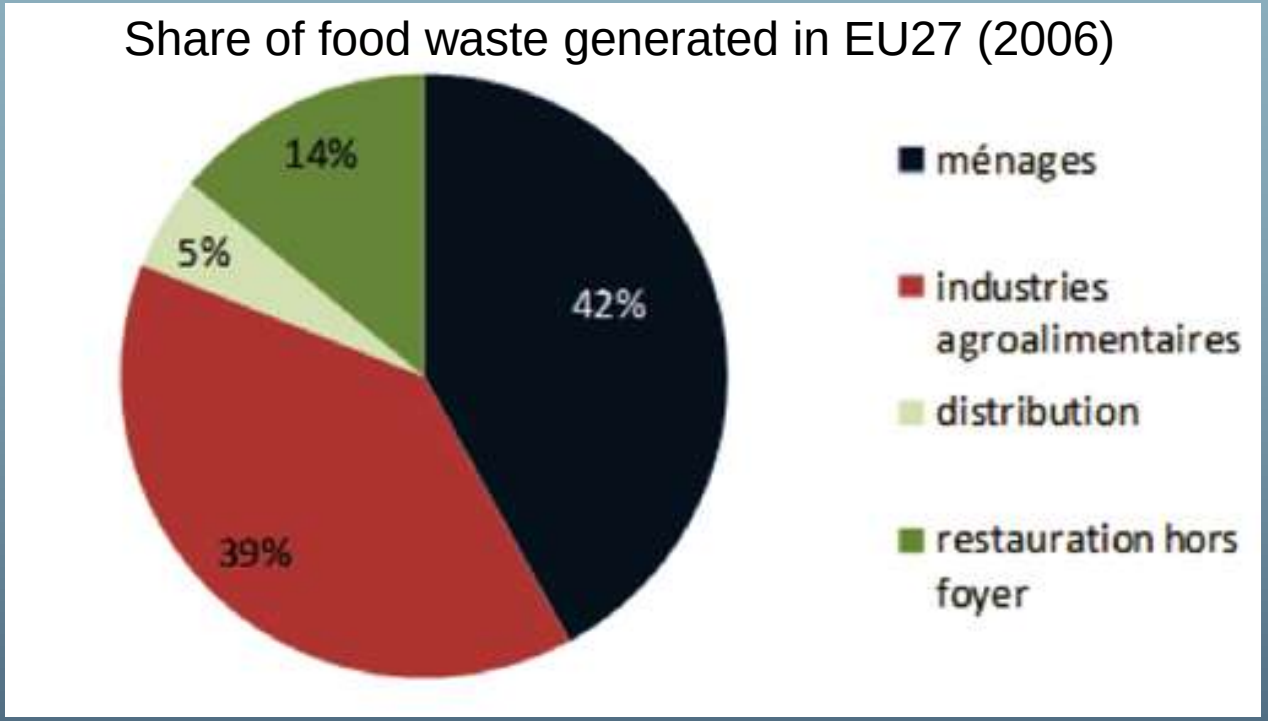
Waste as a valuable secondary resource

It is possible to reduce waste by

- reducing the quantity of waste produced and
- recycling instead of burning.

Price and/or social incentives are needed.

The cost of food waste



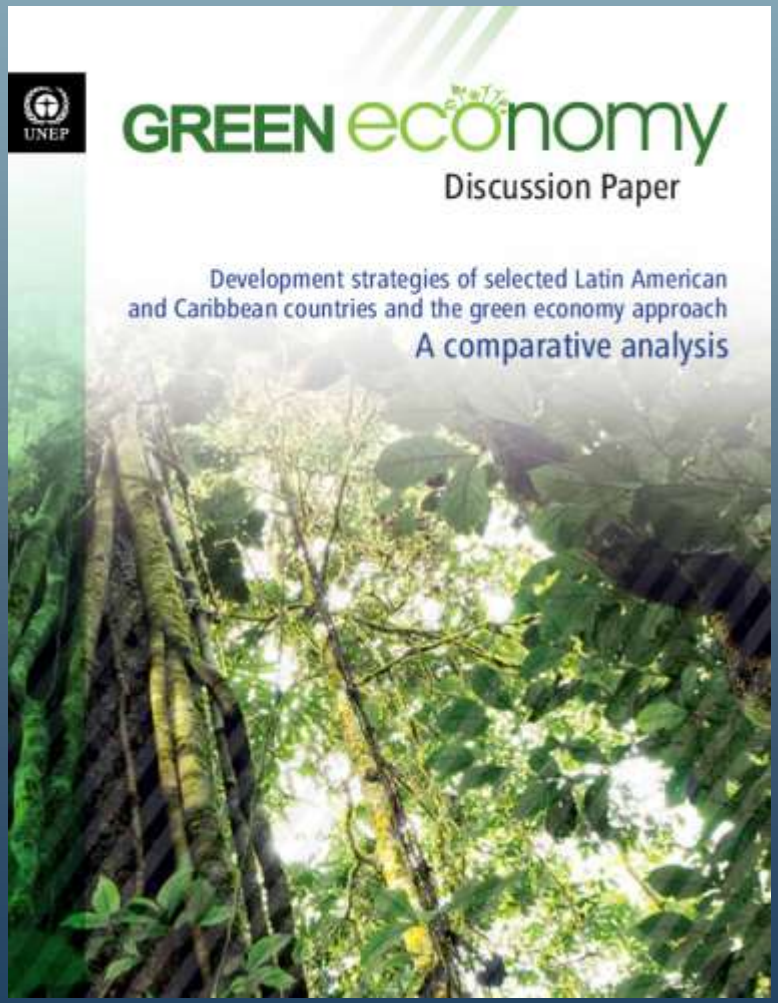
European Environment Agency

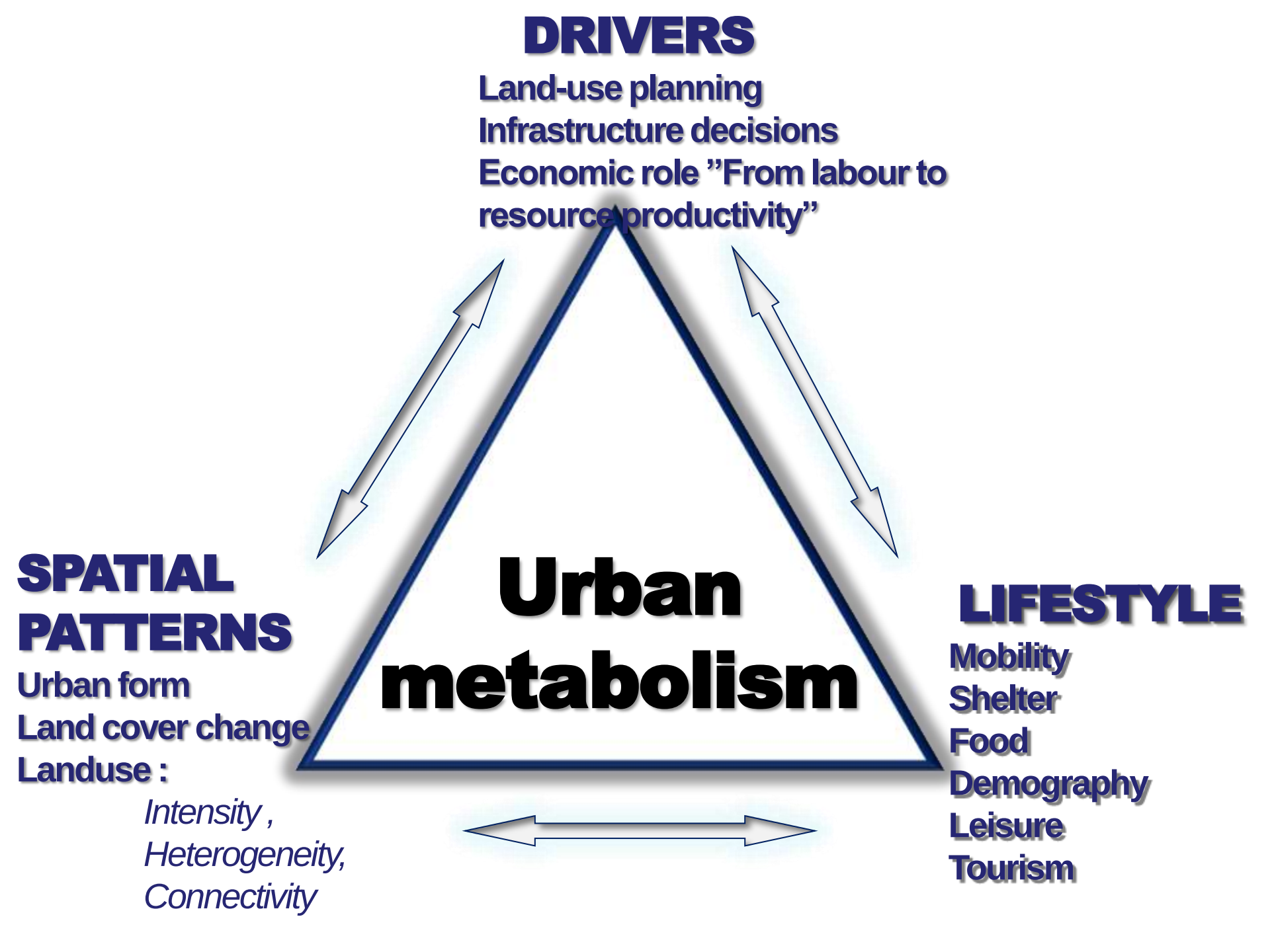
Source: Eurostat - Bio Intelligence Service 2010

- There is 181 kg of food waste per inhabitant per year (3x more than needed) (Eurostat - 2006)
- To ensure world food safety in 2050, the FAO considers that agricultural production needs to increase by 70% (Jelle Bruinsma, 2009)

Metal recycling :

opportunities, limits, Infrastructure




DRIVERS
Land-use planning
Infrastructure decisions
Economic role ”From labour to resource productivity”
SPATIAL PATTERNS
Urban form
Land cover change
Landuse :
Intensity ,
Heterogeneity,
Connectivity
Urban metabolism
LIFESTYLE
Mobility
Shelter
Food
Demography
Leisure
Tourism

Rebound effects of technical change on resource consumption

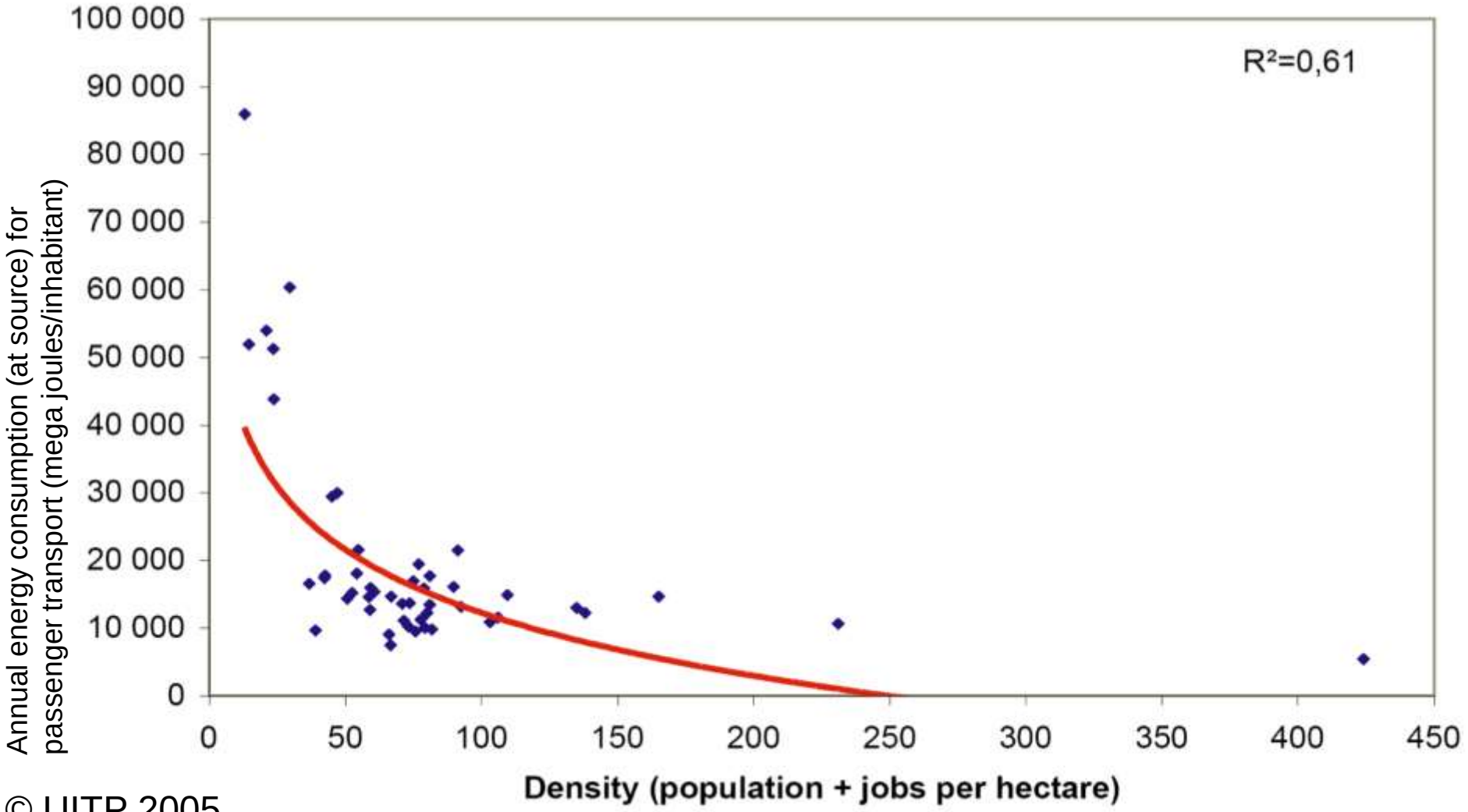
- **Direct rebound-effect** : an increase in efficiency lowers the cost of consumption which can then lead to a rise in the consumption of the same product – from loose cargo to containers packed/sealed at the point of production

- **Indirect rebound effect** : reduction in the costs of consumption increases the real income of households which can trigger a rise in the consumption of other goods and services – decoupling income from energy use

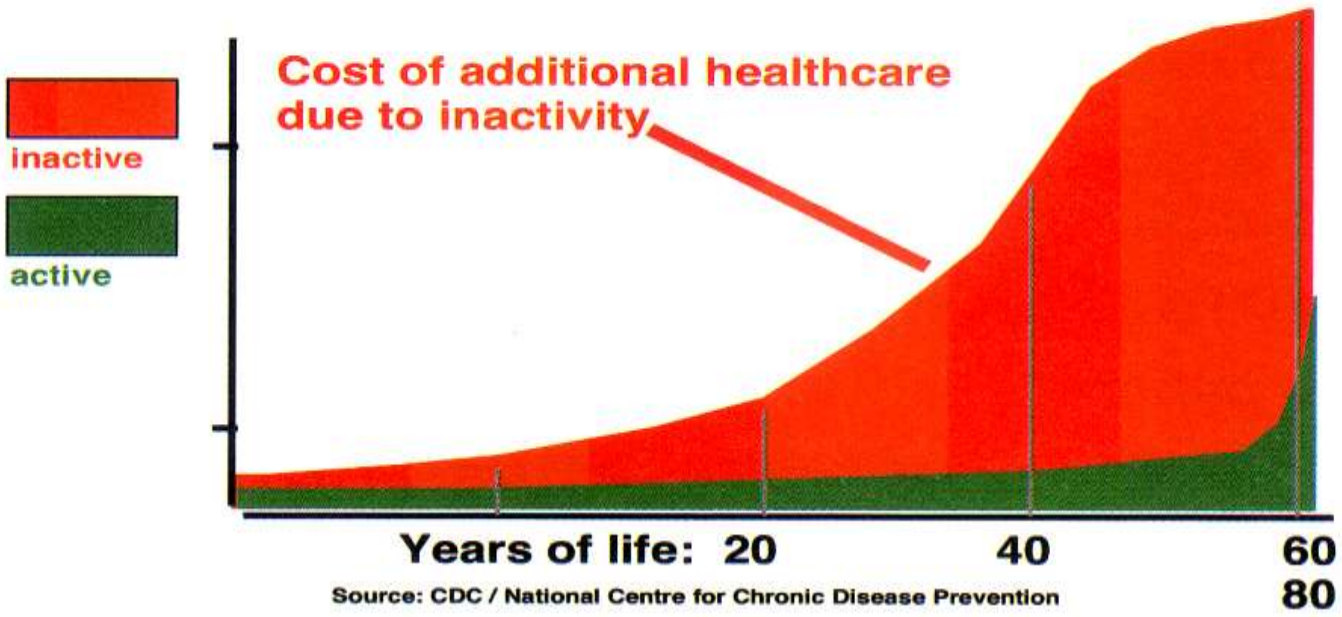
European Environment Agency

Energy consumption

Passenger transport versus density



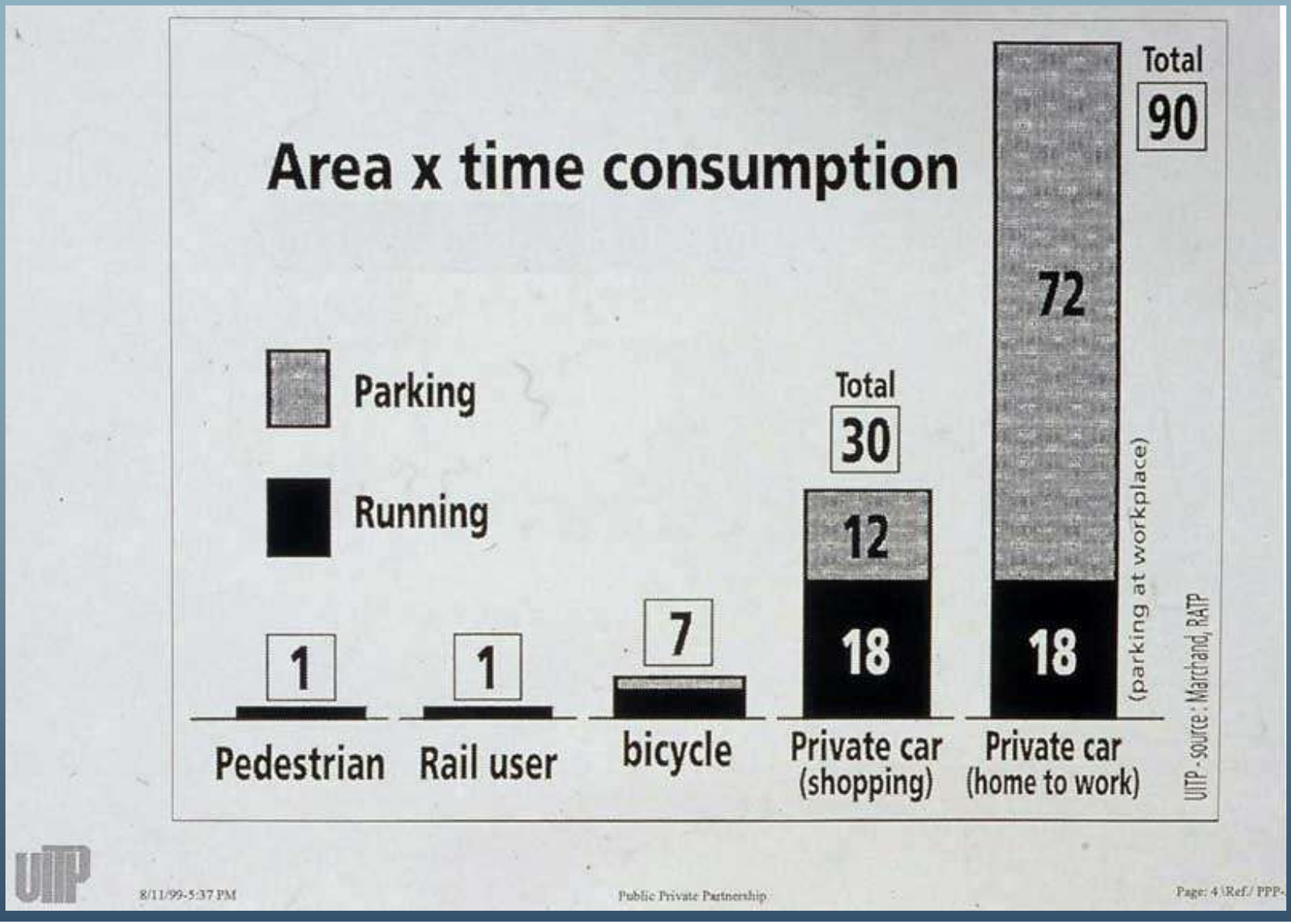
Physical inactivity is a big problem
Inactive people have higher healthcare costs



This is a critical graph. This showed the cost of additional healthcare due to inactivity. Not many health professionals will have seen this graph or know of it.

The WHO strongly recommends at least half an hour of walking per day.

5. SPACE CONSUMPTION ISSUES

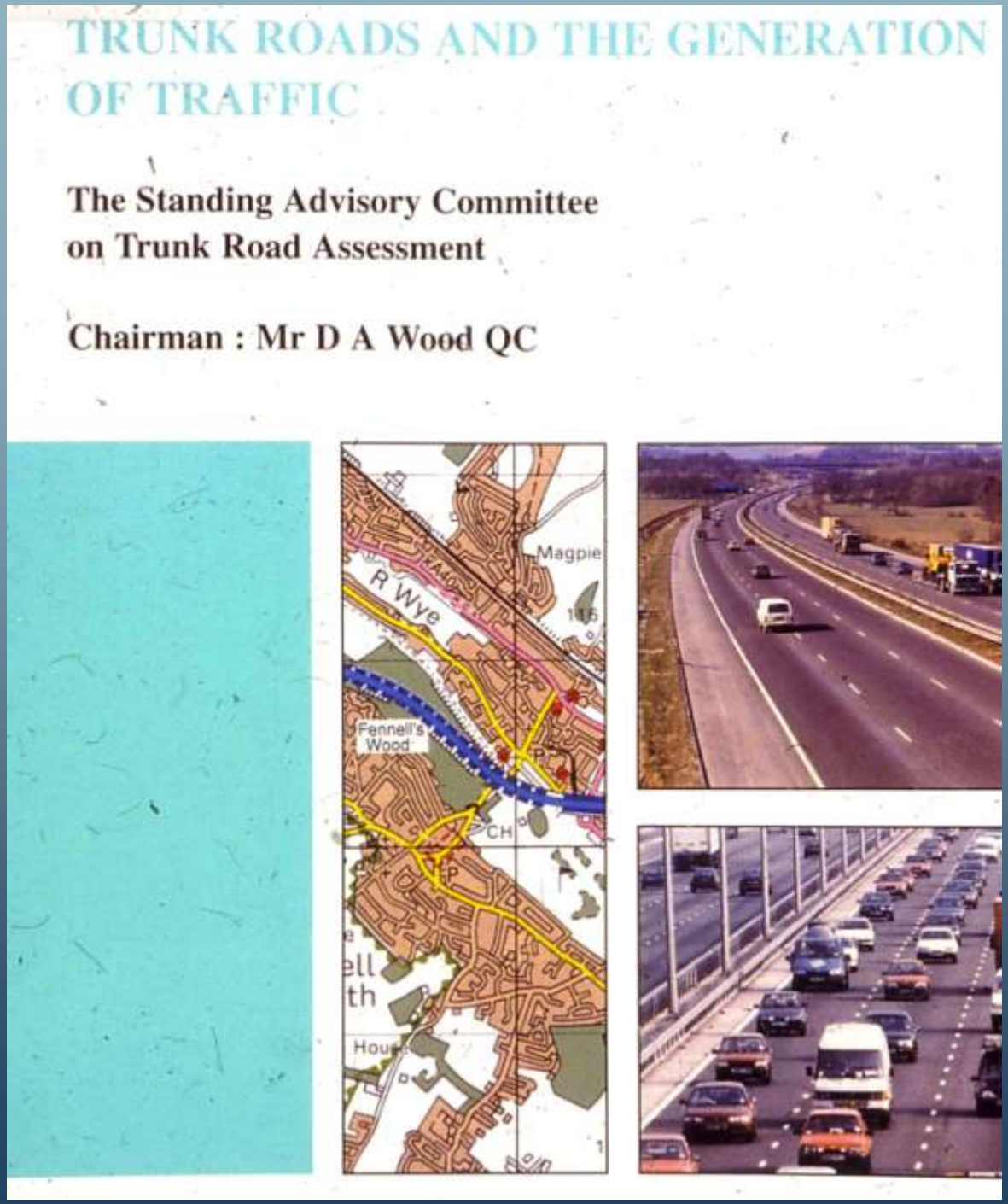


If one takes the land consumption of a pedestrian as the benchmark, the car takes up about 18 times more space as it moves, but it requires parking for the time it does not move, i.e. for some 90% of its life cycle. Land consumption therefore has an area x time dimension (Source: Louis Marchand, RATP, for UITP).

The SACTRA report (1994)

The SACTRA report showed that new road space attracts more new traffic than its additional capacity.

Source: http://webarchive.nationalarchives.gov.uk/20050301192906/http:/dft.gov.uk/stellent/groups/dft_econappr/documents/pdf/dft_econappr_pdf_022512.pdf



Historic cities consume less space

The future "low-energy" and resource-efficient city is already partially built (source: "La ville post-carbone : les formes urbaines et la transition énergétique", Jean-Pierre Traisnel 2011).
The buildings, pavement, streets, etc. mostly remain the same but the use of the city changes (view of St Pancras-King's Cross station redevelopment).

The energy supply and consumption issues of tomorrow's cities are unresolved.

Energy- and space-saving neighbourhoods and cities are easier to measure and economically reward than low carbon cities.

KWH are accounted and billed. Transport of energy has a price that helps decision makers in estimating trade-offs between locally produced energy and long distance transportation of it.

CO_2 is the result of a complex calculation and opens the way to manipulations (European emissions trading system).

6. GREENING THE COMPACT CITY, VALUING PUBLIC SPACE AND THE SERVICES RENDERED BY NATURE

- Rivers and canals as an urban recreational landscape
- Squares as the living rooms of the city
- A park fo everyone within walking distance
- Playgrounds for children
- Greenery wherever possible:
  - on public space (1 million trees Bloomberg programme in New York)
  - on private land (view of Taipei green building by Vincent Callebaut) (under construction).

Energy performance of buildings

The performance of buildings depends on a number of factors, such as the performance of the installed heating system and building envelope, and users' behaviour, strongly shaped by the cost of energy taking subsidies into account.

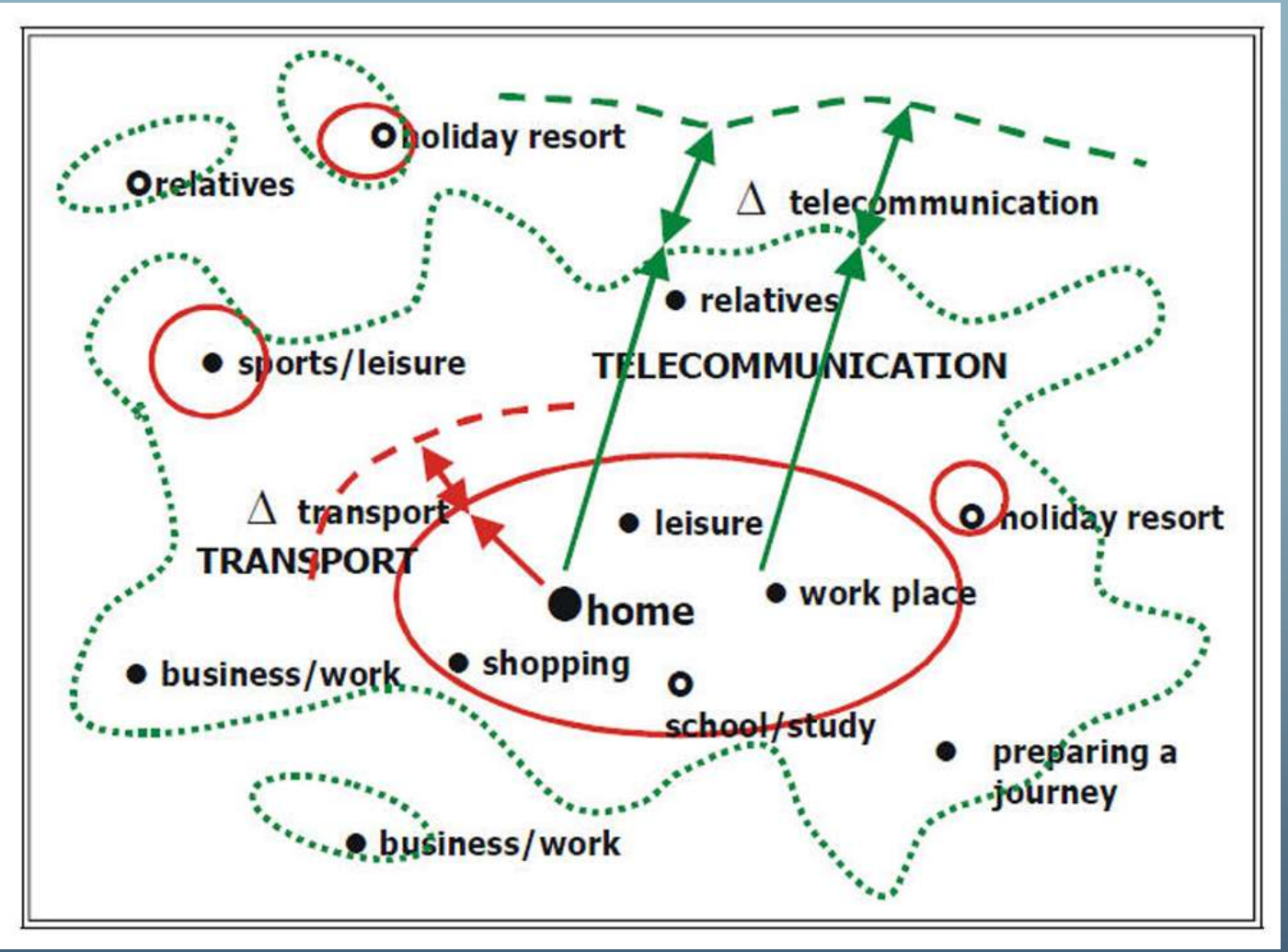
The required energy performance of buildings is too often based on new buildings, while the rate of building stock replacement is a mere 2% per year, and the energy embodied in existing buildings is ignored.

7. SMART CITIZENS MAKING SMART CITIES

Information and communication technologies as an opportunity

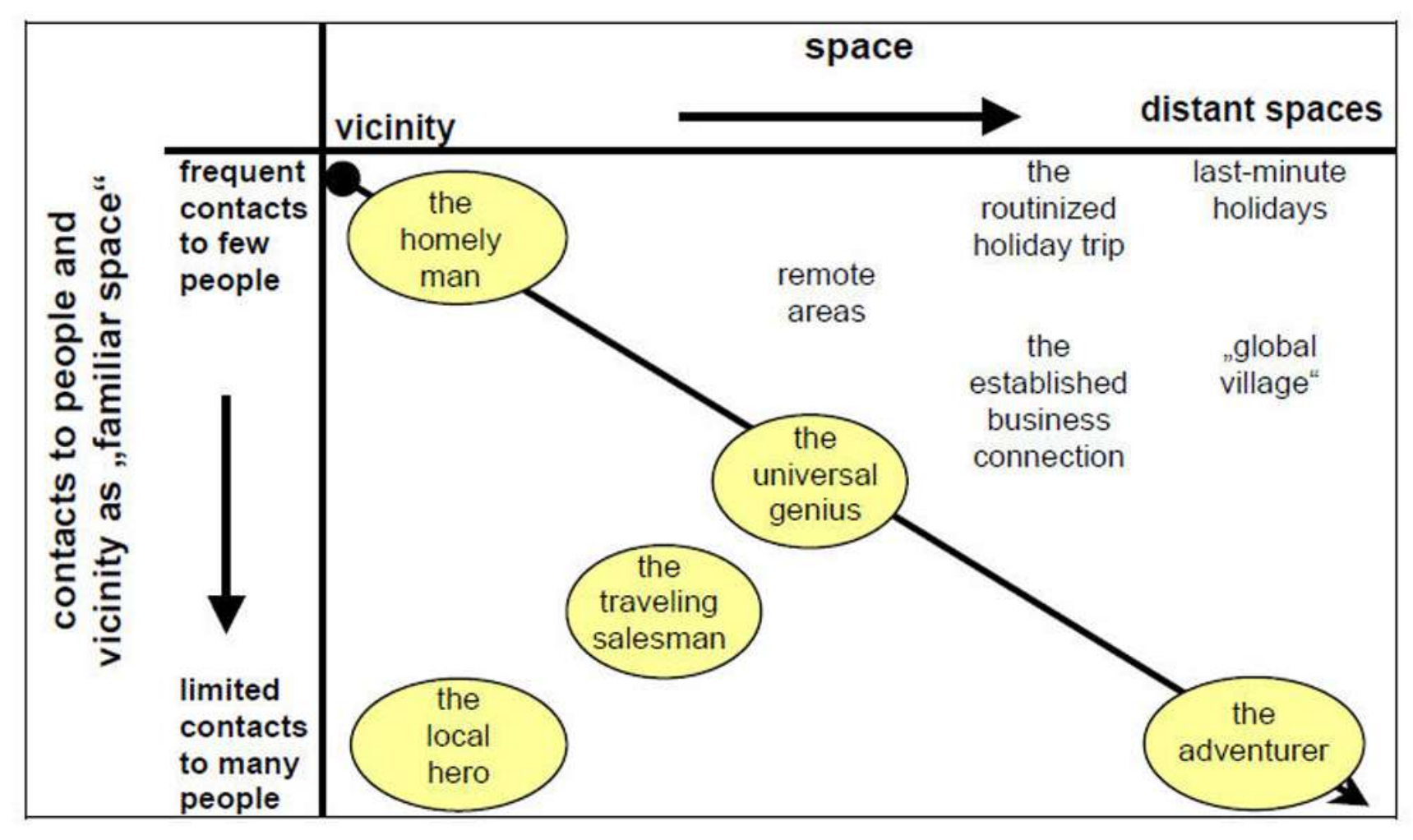
- Information about all modes of transport (anytime, anywhere) and costs of location (MVV calculator)
- Saving of trips with tele-working and video-conferencing
- Regulation of temperature and lighting of buildings
- Mobile life style

Mobile lifestyle



"In a society dominated by mass individualism, individual choices of mobility attempt to make the best of what exists rather than making "dogmatic" choices in favour of the car or public transport. Rental bikes and electric bikes (owned or rented) greatly widen the range of individual mobility choices, according to household life-style."
Source: Zumkeller, D., ISOCARP, 2007.

Patterns of mobility behaviour



“Patterns emerge from the grouping of individual behaviours according to the diversity of personal contacts and frequency of travel.”

Source: Zumkeller, D., ISOCARP, 2007.

8. URBAN GOVERNANCE

Challenges facing decision-makers in societies marked by mass individualism

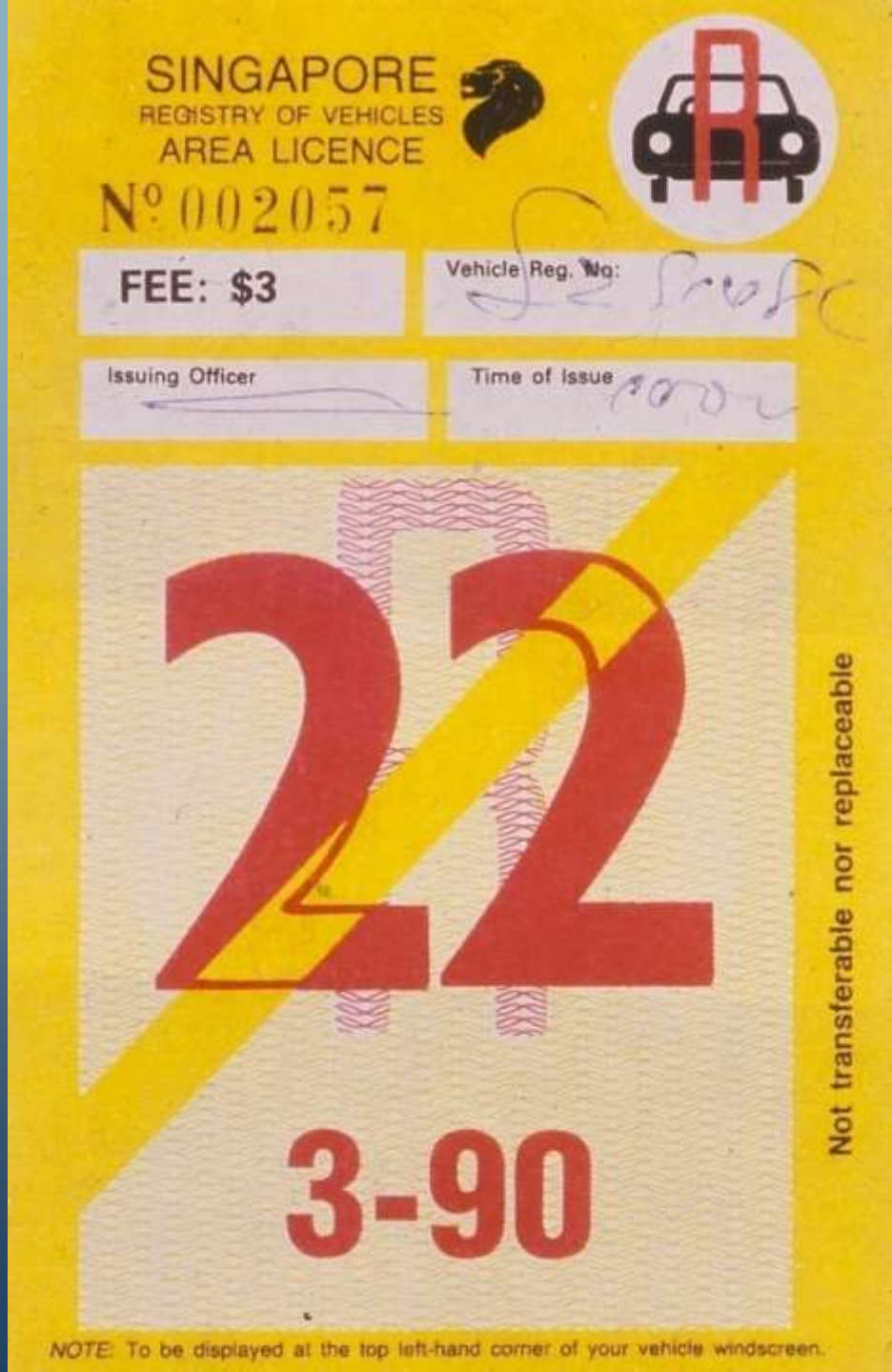
Room for "obliquity" approaches (John Kay)

CASE STUDIES OF GOVERNANCE APPROACHES IN FAVOR OF URBAN SUSTAINABILITY

8.1. Three cases of integrated sustainable metropolitan governance:

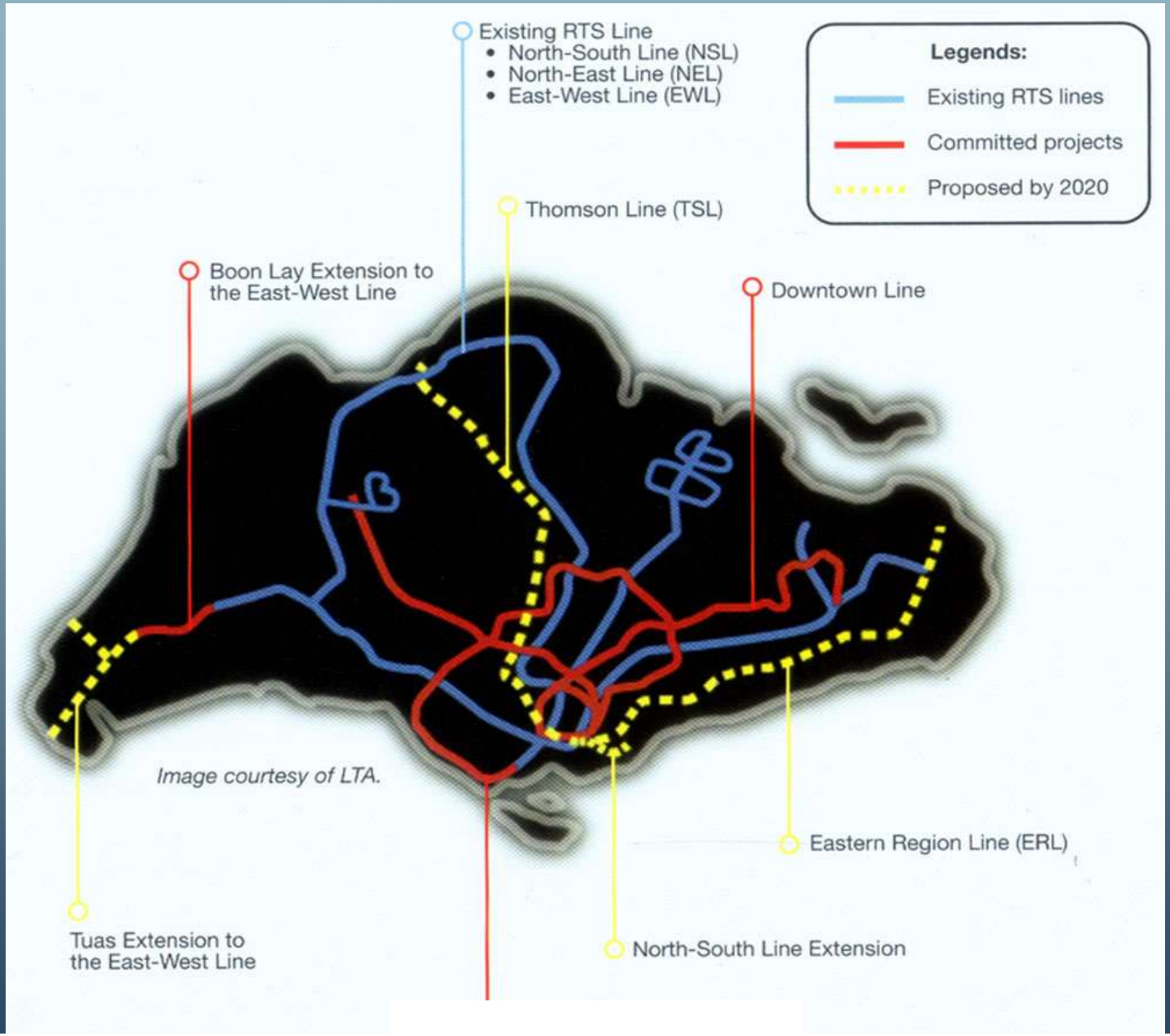
- Land, buildings, mobility and socio-political acceptance:
  - 8.1.1. Singapore
  - 8.1.2. Curitiba
  - 8.1.3. Zürich

- 8.1.1. SINGAPORE
- From 1975 Singapore has endeavoured to save scarce land and natural resources through market mechanisms such as auctioning of new car plates (replicated in Shanghai), and pricing of road access to the city for solo drivers (no fee if there are 3 passengers). This was easily accepted as it gave drivers the choice of paying for solo driving or accepting 3 passengers.



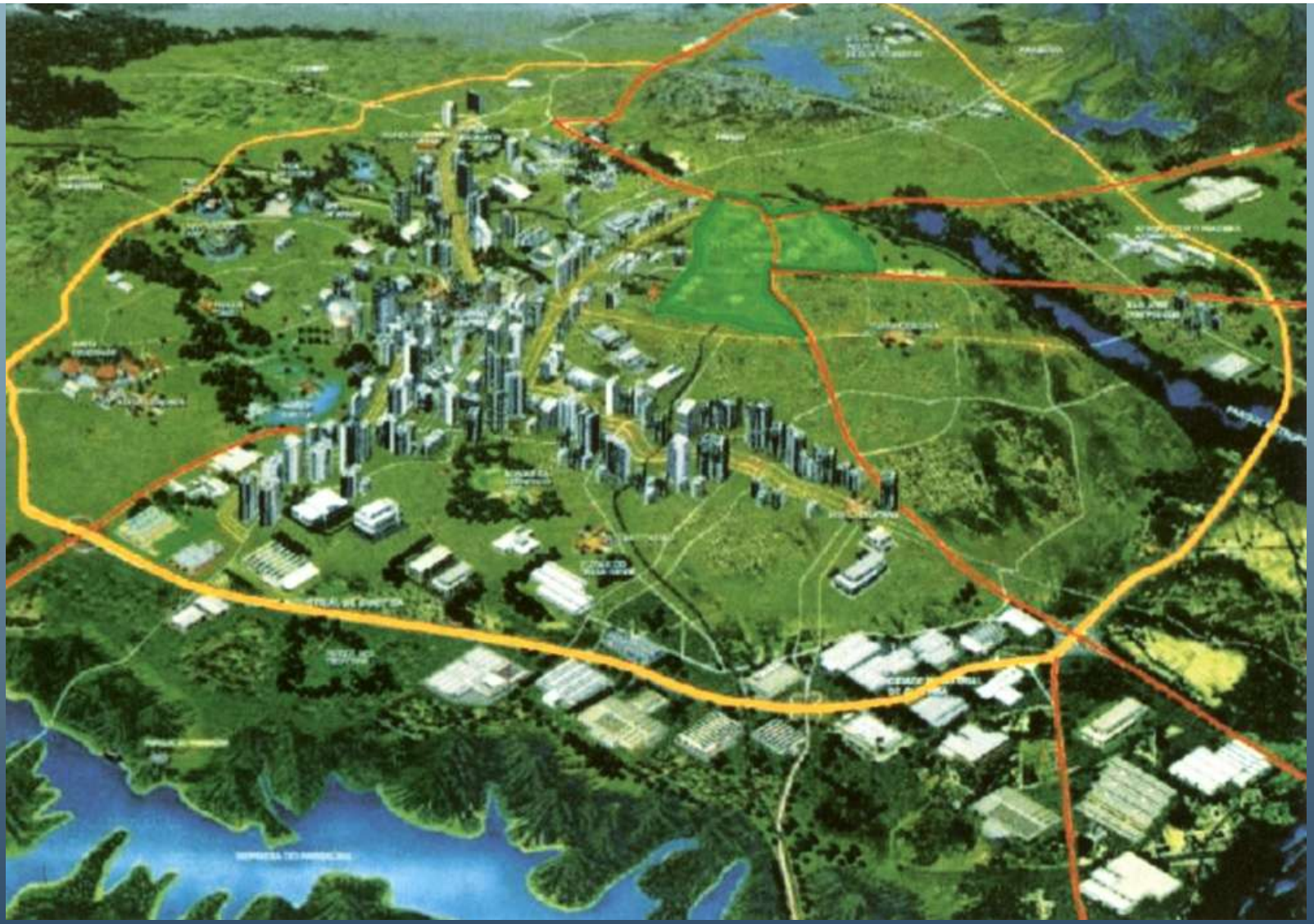
In 1998 the system was replaced by electronic road pricing, achieved through pre-paid cards debited when used (so no invoice-related privacy problem).

- Level of charges can change at any moment, according to the level of congestion (easily accepted as it is not an additional tax). In the future, the ERP will be operated from satellite at any point of road congestion (gantries no longer needed).

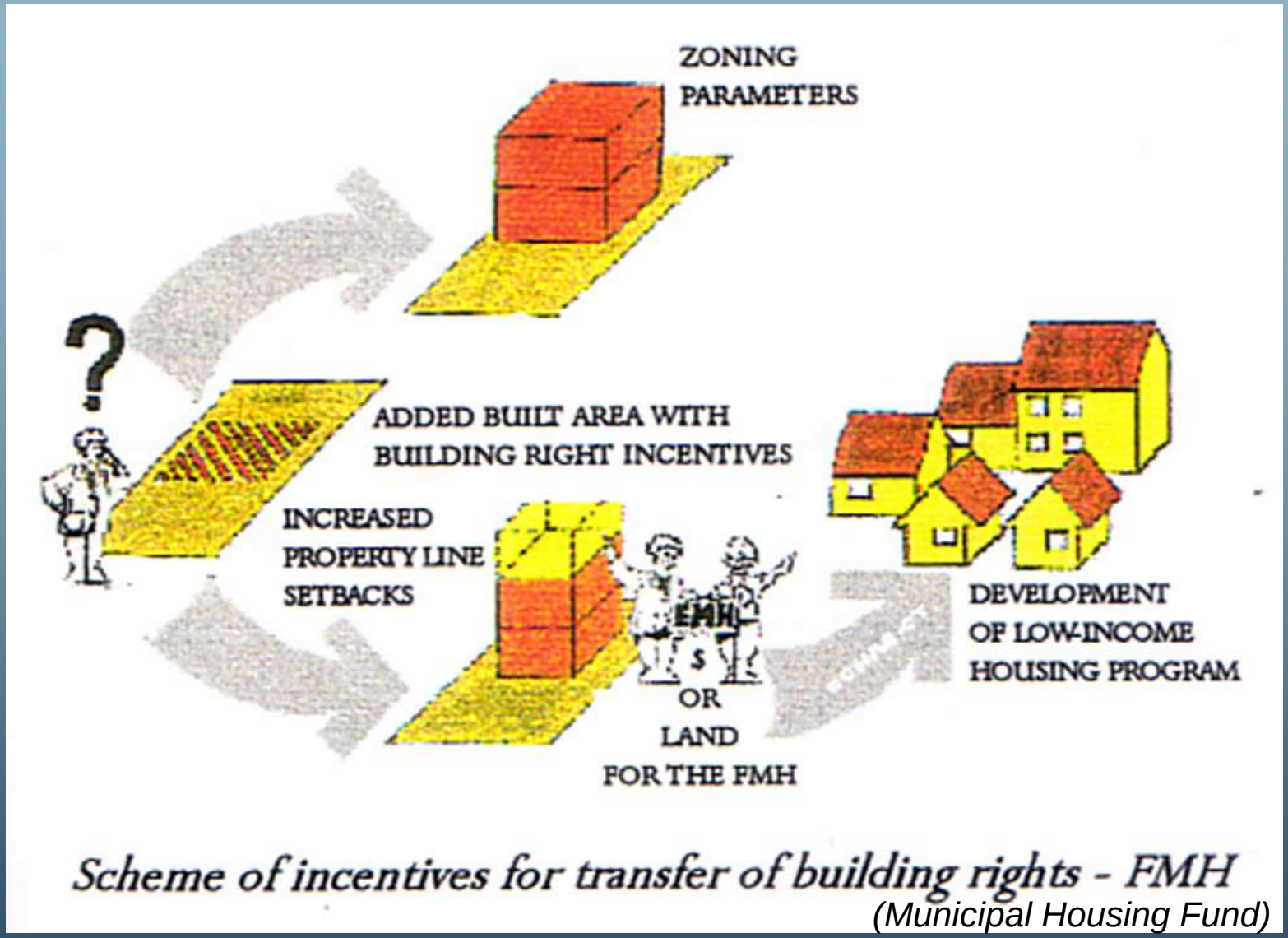


Singapore minimizes the space used for road transport while maximizing the space for parks and recreation, water reserves and recycling used water.

8.1.2. CURITIBA: self financing development plan



The urban development of Curitiba is centered on five central boulevards where high rise buildings are allowed. However, the development rights have to be bought from owners of low-lying flood-prone land or from protected landmarks.



Scheme of incentives for transfer of building rights - FMH
(Municipal Housing Fund)

Source : http://www.ippuc.org.br

The transfer of development rights is organized by IPPUC, a municipal institution created in 1965.

The boulevards were made accessible to high capacity buses with right of way and off-bus ticketing. At stops entry and exit take place through very large doors allowing very short stop times and a commercial speed of more than 30 km/h - comparable to a metro but at a fraction of the cost. The system started in 1976 and is still expanding (“Linha Verde”).

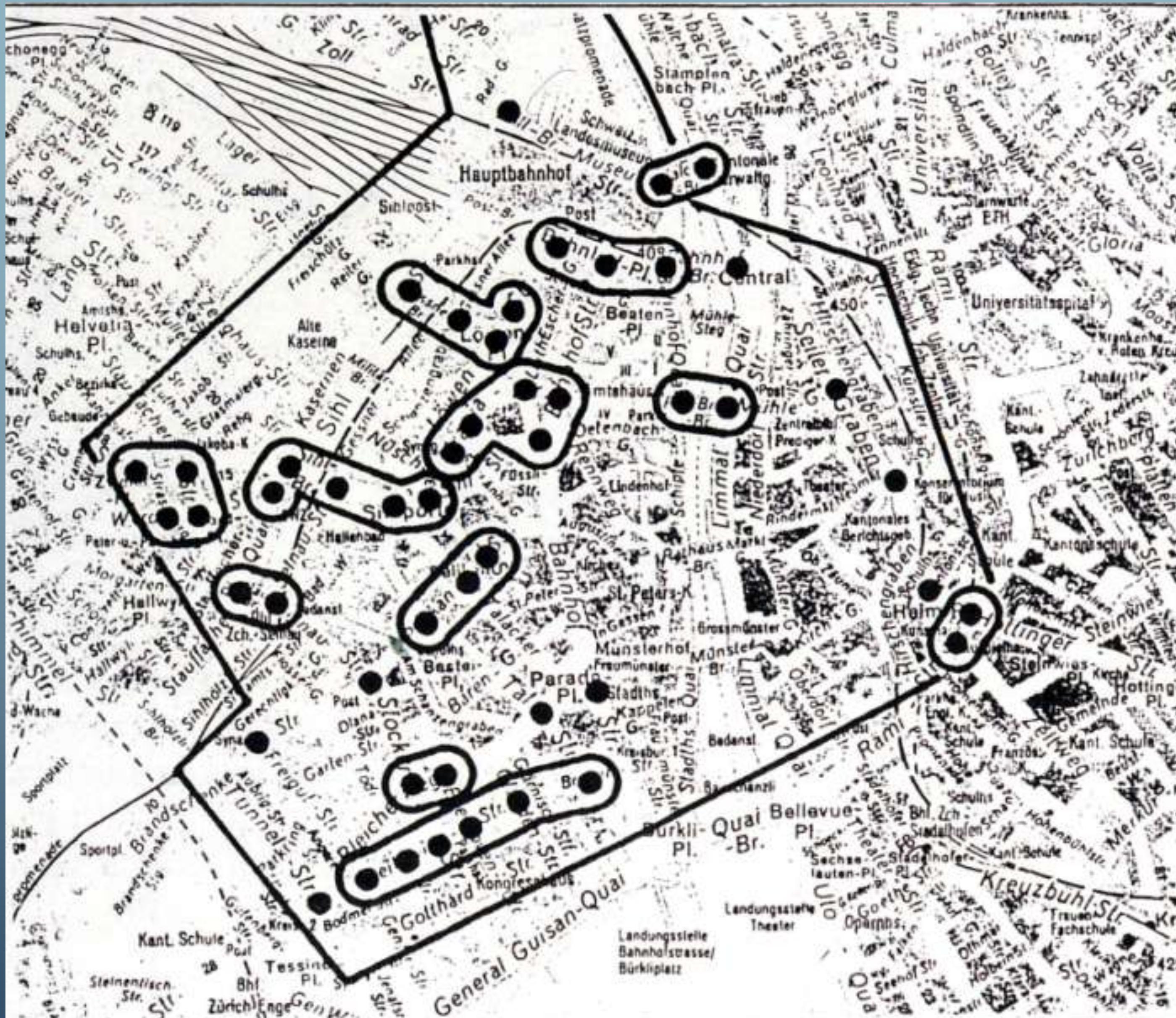
AFTER 40 YEARS THE SYSTEM IS STILL EXPANDING

(LINHA VERDE)

8.1.3. ZURICH

Zurich mobility management :

In Zurich, trams and buses enjoy absolute priority on street. When approaching a traffic light the sensor (shown on the lower left) ensures they have a green light at any time of the day. The reliability of timetables makes public transport the city's fastest mode of transport. Modal split is around 80% in favour of public transport.



The “Green wave” and long traffic light cycles have been replaced by very short traffic light cycles, favouring pedestrians.

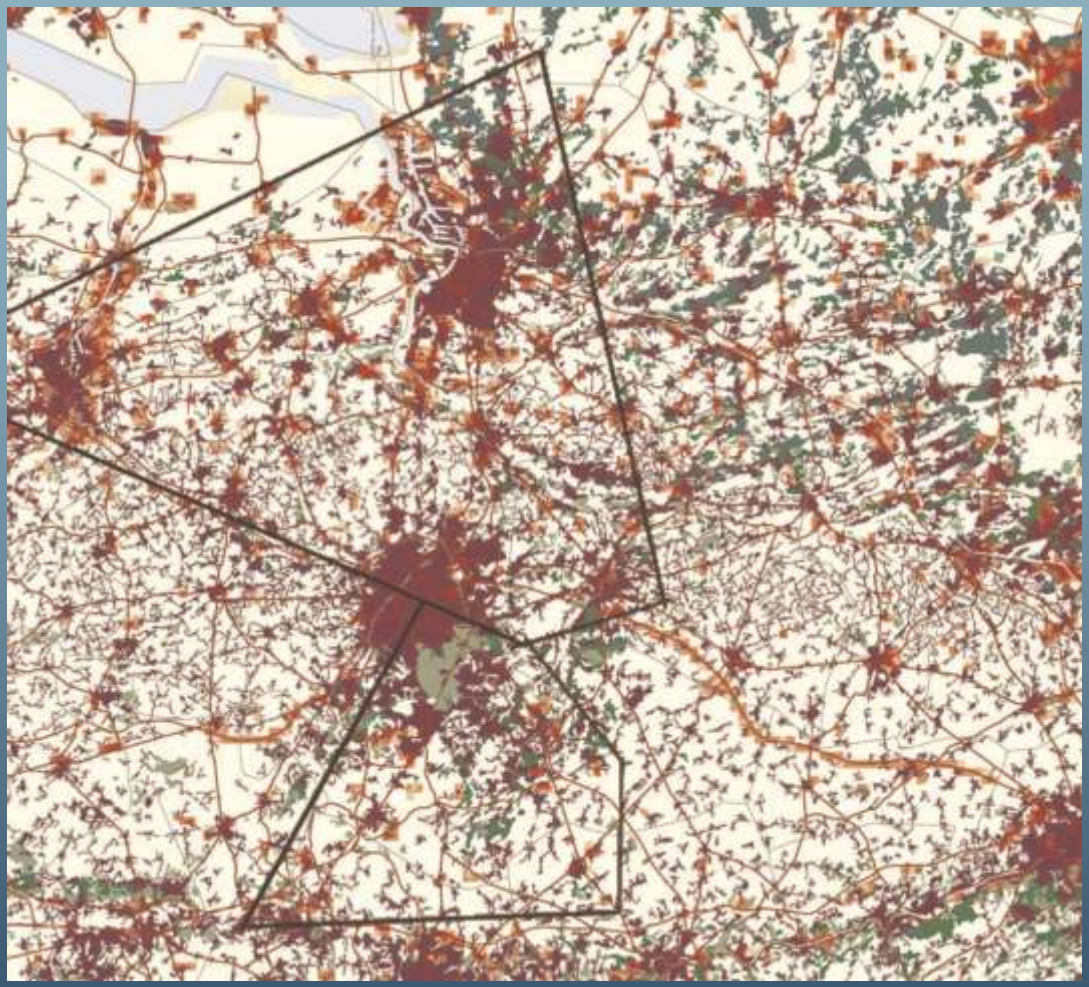
Zurich parking management

Unrestricted on-street parking is exclusively reserved for Zurich-registered residents, while car commuters entering the city from other municipalities are subject to limits on their parking time. This parking measure has allowed a large-scale return of inhabitants to the city, has benefitted the public car parks and has been politically rewarding for the city fathers, while suburban rail travel has been made easier.

8.2. Two cases of district governance:

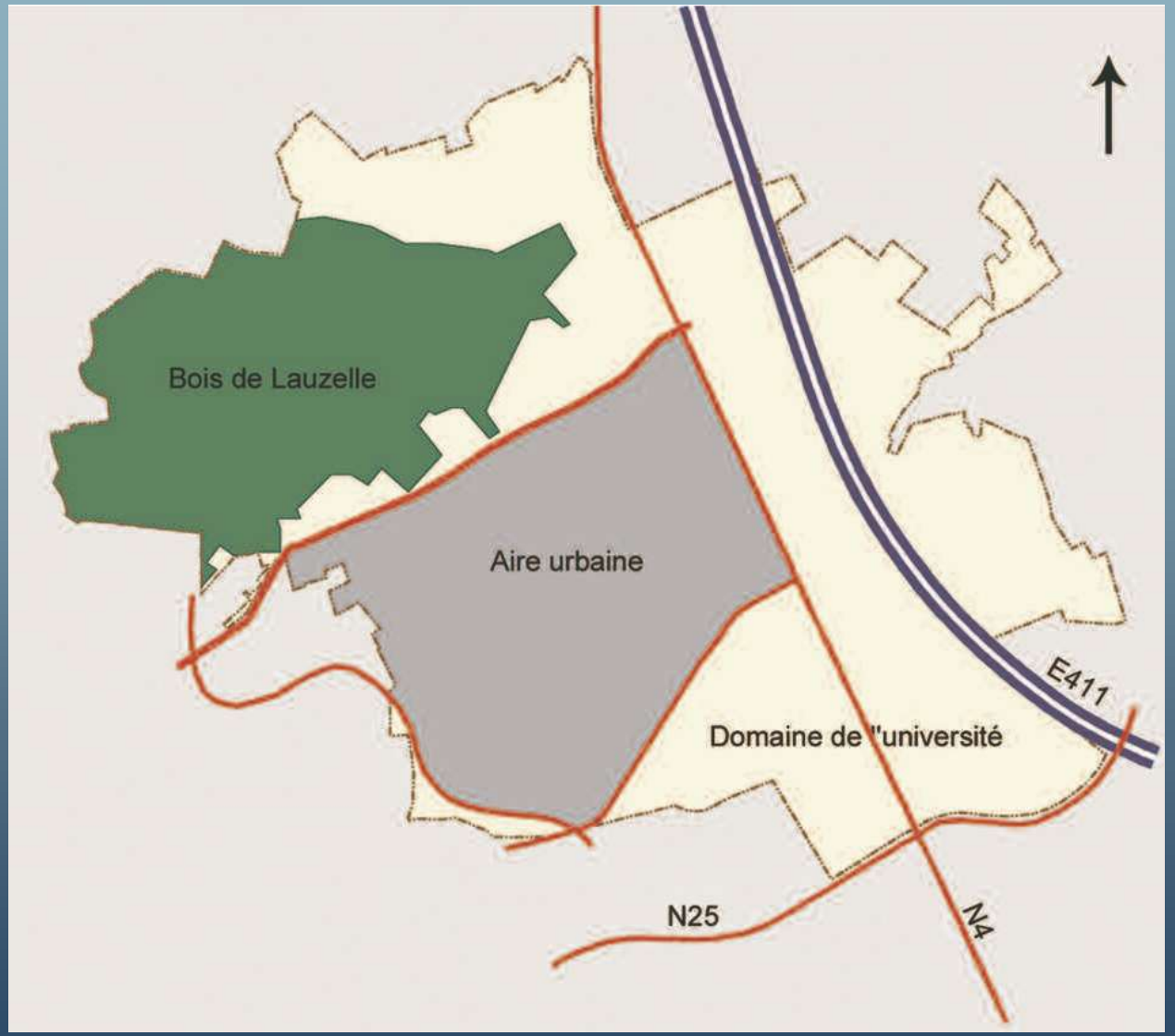
- 8.2.1. Louvain-la-Neuve (Brussels)
- 8.2.2. Bilbao's former industrial area

8.2.1. Louvain-la-Neuve (near Brussels)



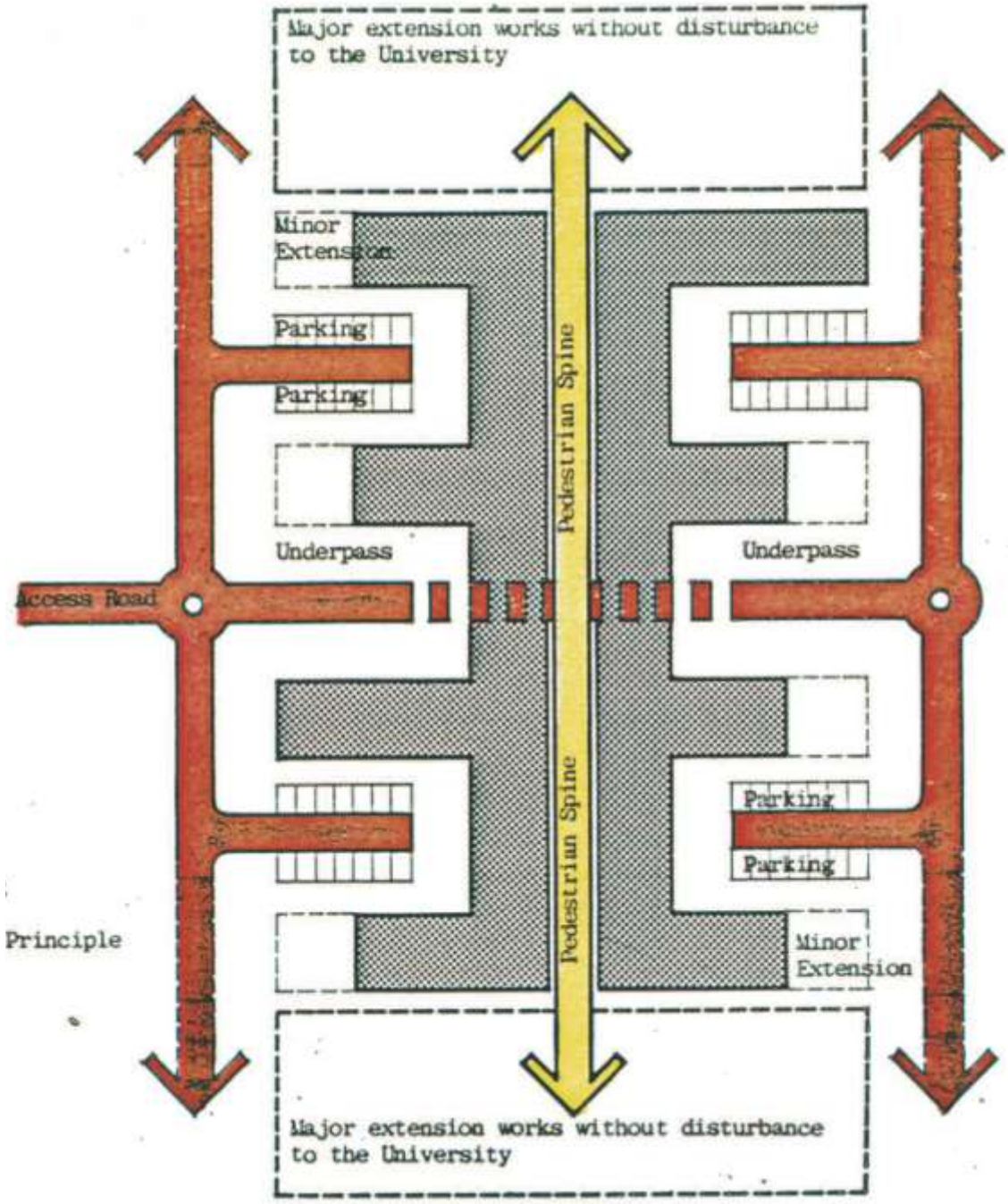
Map showing the metropolitan pattern of central Belgium. The cities of Antwerp, Ghent, Bruges and Louvain, north of Brussels, loosely suggest a diamond (lozenge). The cities of Charleroi, Nivelles, Ottignies and Wavre, south of Brussels, loosely suggest a triangle. All of them are within commuting distance from each other (maximum 60 km).

The university bought ca 1000 ha of agricultural and forest land in a rural area close to the Brussels-Namur road (N4) : the central part was set aside for urban development; forest land in the north was preserved. The overall master plan and architectural coordination was entrusted to the Groupe Urbanisme-architecture (R Lemaire, J-P Blondel and P Laconte).



Planning for uncertainty (stop and go).

Starting from the existing main road a linear pedestrian central spine – in line with example of the new Lancaster University development plan - allows a step-by-step mixed urban development. Car access to buildings and parking is placed outside the spine, with occasional underpasses.



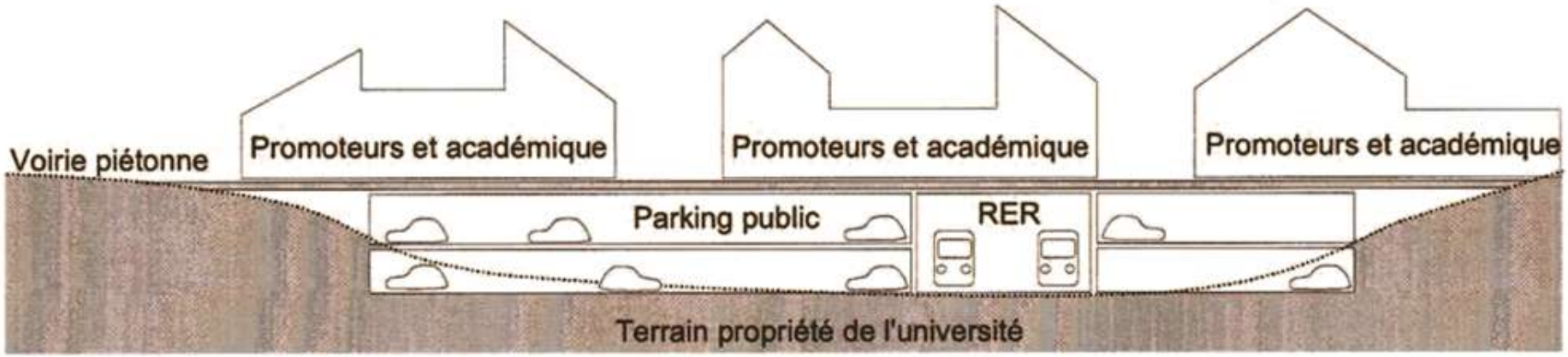
The centre of the first phase was the science library, a huge concrete building seen as the cathedral of a university town with its plaza (parvis), above a vehicle underpass. It is a social meeting place with university buildings, shops and restaurants (architect A Jacqmain). The first phase of the linear development started in 1972, from the existing road (N4). From 1976 an underground railway station was brought into service. The street and road network was developed stepwise, as required by the needs of urban development.

Parking. All of the parking spaces are planted with different tree species in order to attract different kinds of birds. They have become an ornithological reserve.

The new station (1976). It is entirely under ground. It is linked to a large shopping mall, built in 2005 (8 million visitors/year). The extension of this will cover the tracks.

The station. The arcaded entrance of the station (architect Y Lepere) on the arcaded pedestrian spine is the place where the slab starts.

The functioning of the slab

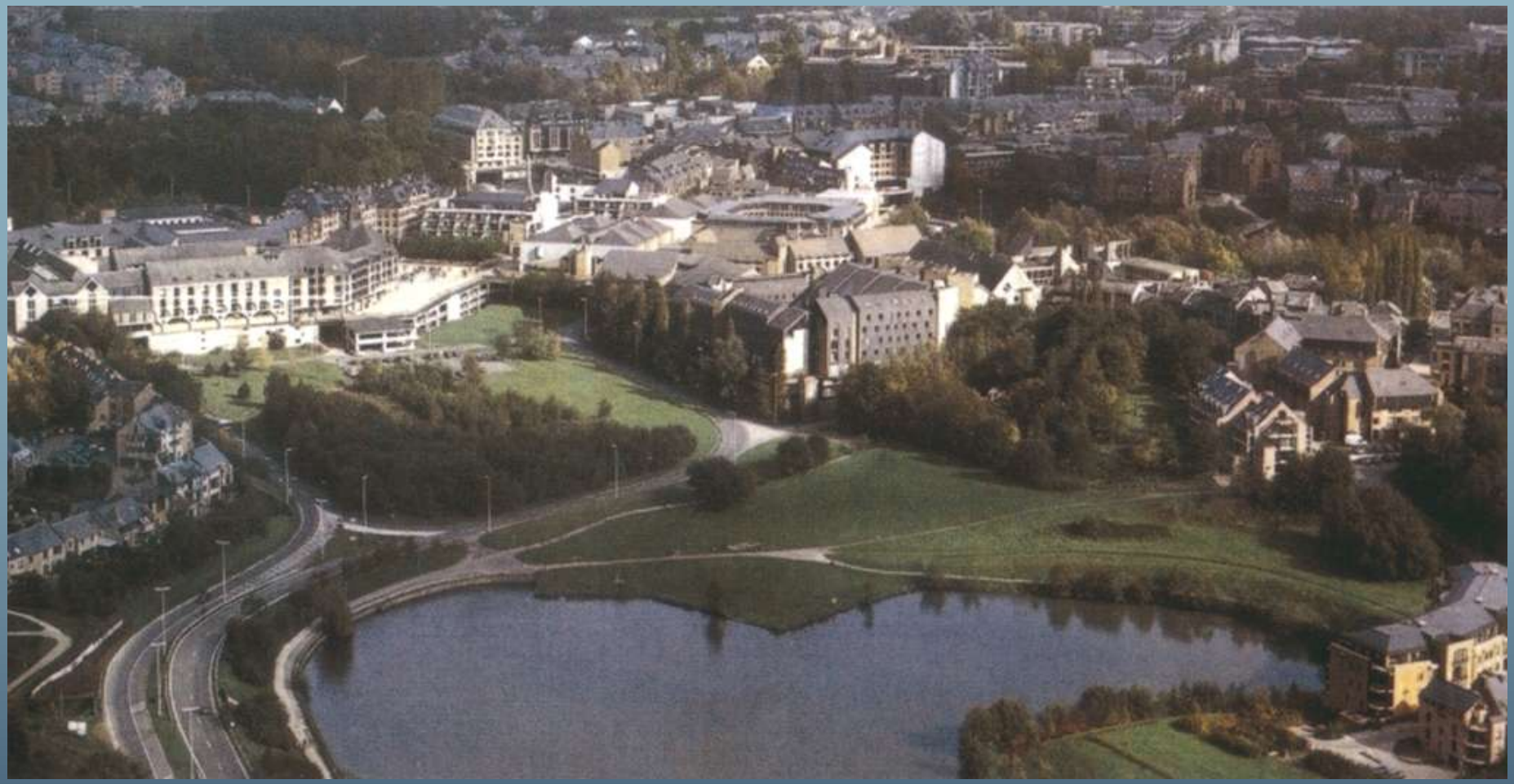


The diagram shows how the land below remains the property of the university while the infrastructure and buildings are leased (for up to 99 years) to public and private investors.

Cafés and restaurants adjoin pedestrian spaces while cars must use the underground parking.

All storm water is collected in an artificial lake that serves as a reservoir and an amenity. The banks provide room for flooding.

Pre-monitoring of water entering the lake, and of oxygen levels, allows the water quality for fishing to be checked.



An aerial view of the city taken in 2003 shows the high-density low-rise character of most of the development and the potential for further extensions close to the lake.

Similar examples have multiplied

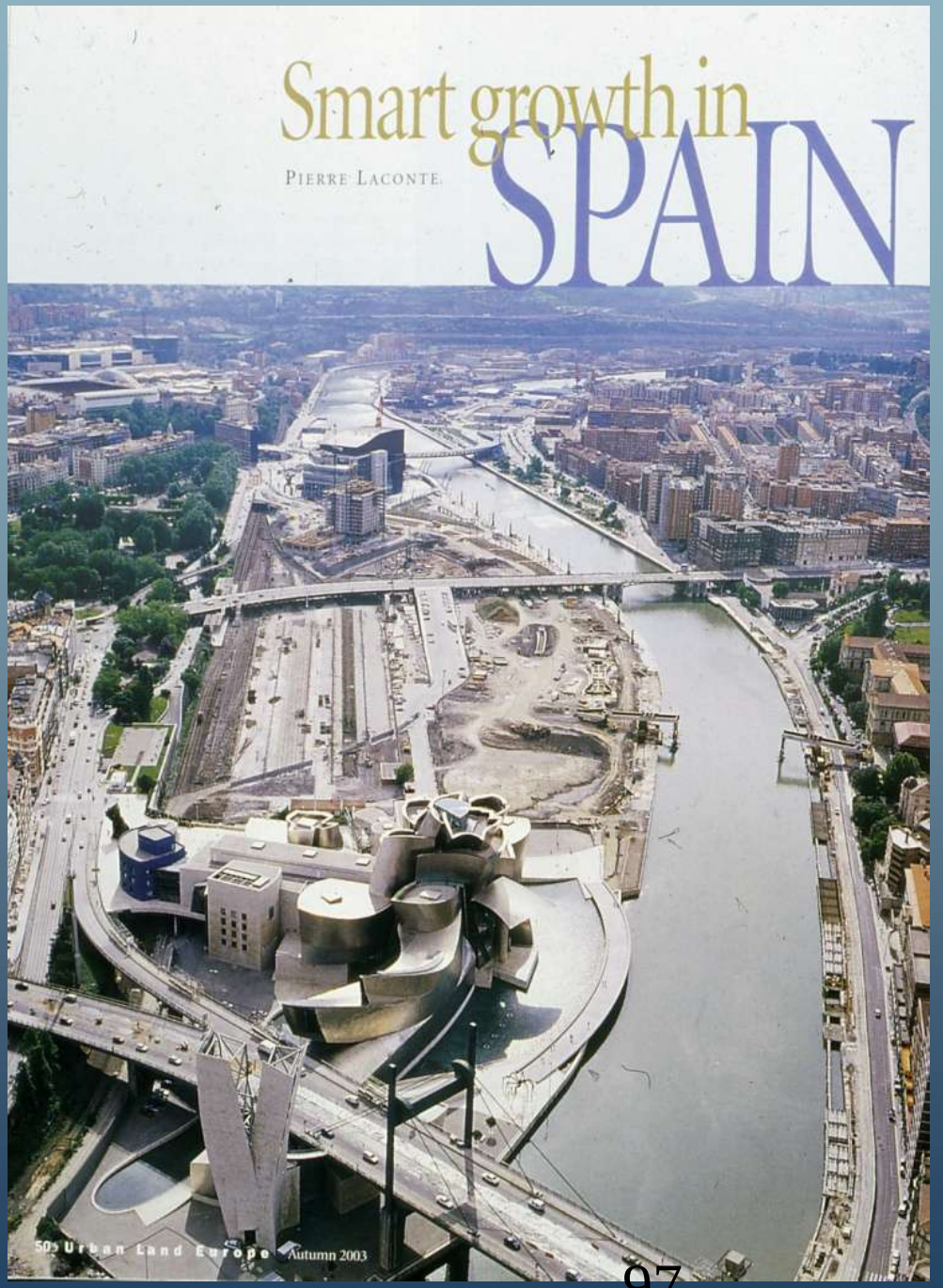
The concept of separating storm water and waste water collection was brilliantly implemented in the long new park and lake of Billancourt, running parallel with the river Seine. The park is only flooded during peak winter rainfall. All storm water is collected from the building blocks. At times of flood the lake is under water. In no circumstances is the sewage water allowed to combine with rain water and flow into the Seine (H Bava, Agence TER). This concept has achieved huge savings in water collection infrastructure.

Photo Pierre Laconte

New “park/lake” of Billancourt : high density mixed development at Billancourt-Trapèze (near Paris).

8.2.2. BILBAO: a new urban development on industrial waste land

This derelict area of around 40 ha, owned by several public bodies, was developed along a unified linear grid frame with two development anchors: the new Museum (Guggenheim Bilbao) to the south and the cultural complex to the north. The actual urban development was entrusted to an autonomous publicly owned company: Rià 2000.
http://www.ffue.org/?p=1301



- The industrial land was re-used for new services and cultural activities, while preserving the architectural heritage.

The valuable land situated between the two anchors and very close to the central business district was developed by Rià 2000, with an obligation to invest all of the proceeds in new public infrastructure along the same canal.

The plan took some 20 years to implement.

Its focal point is an office tower (C Pelli 2011)

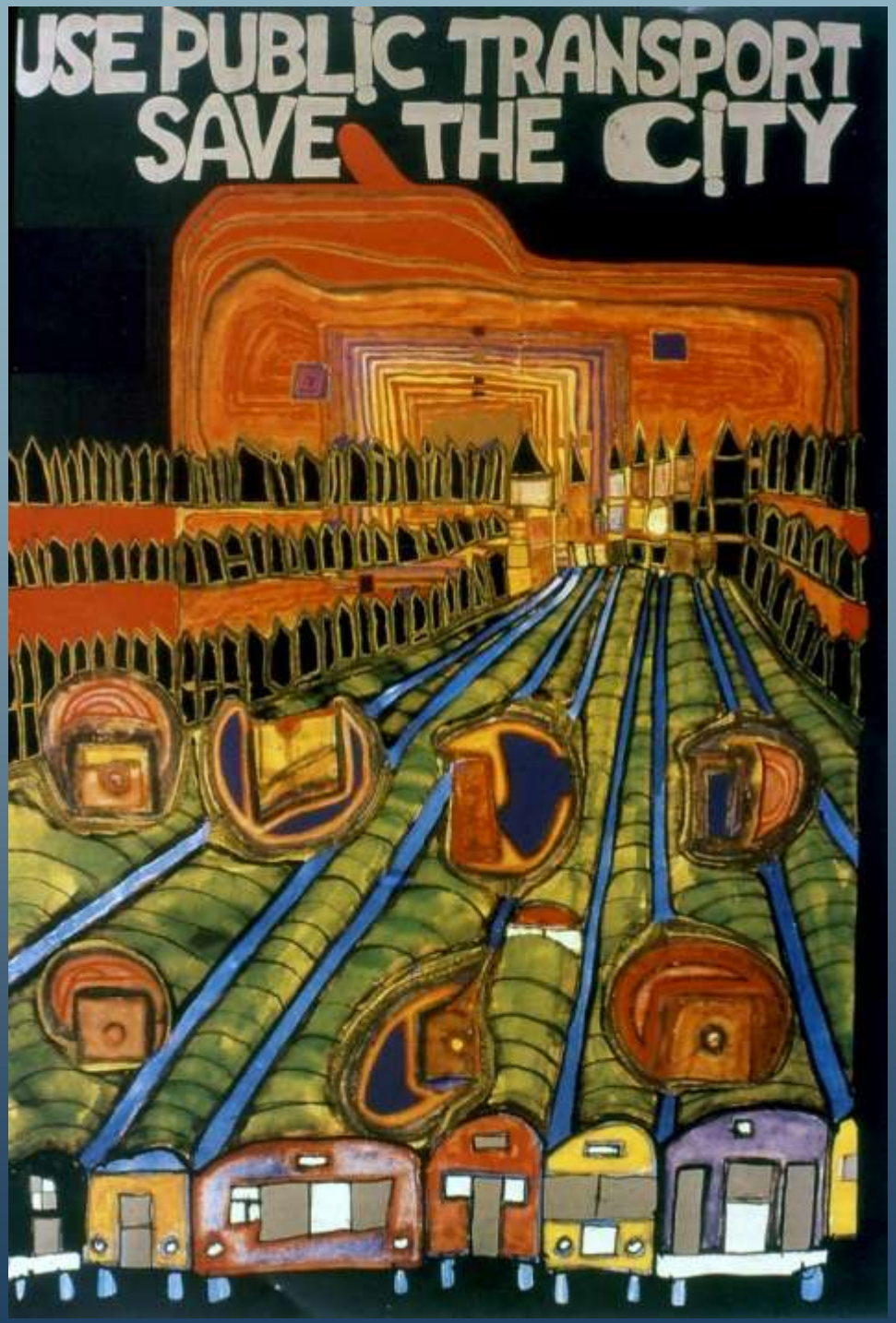
- A new tram line serves the canal bank in the city centre, saving road and parking space and adding to the citizens' quality of life.

Image 02. Tram stop

The proceeds generated by the Rià 2000 development was also used to rehabilitate Bilbao La Vieja further along the same canal.
http://www.ffue.org/?p=1301

AN ARTIST'S PERSPECTIVE

Three posters by Hundertwasser illustrate the planning vision of a sustainable city : high-density compactness, transport corridors served by public transport, and amenities making the city enjoyable.


USE PUBLIC TRANSPORT
SAVE THE CITY

UITP

ENJOY YOUR CITY
USE PUBLIC TRANSPORT

Union Internationale des Transports Publics

MOBILITY FOR ALL

Internationaler Verband für Öffentliches Verkehrswesen