Sustainable spatial development of Nordic urban regions: is an eco-modernization approach sufficient?

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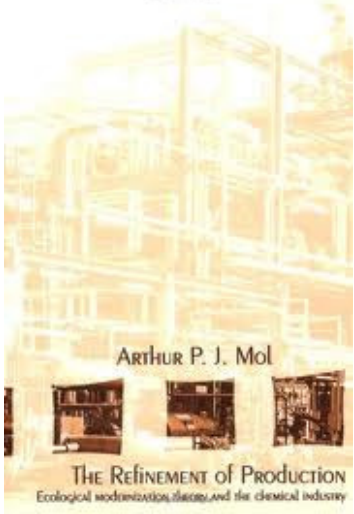
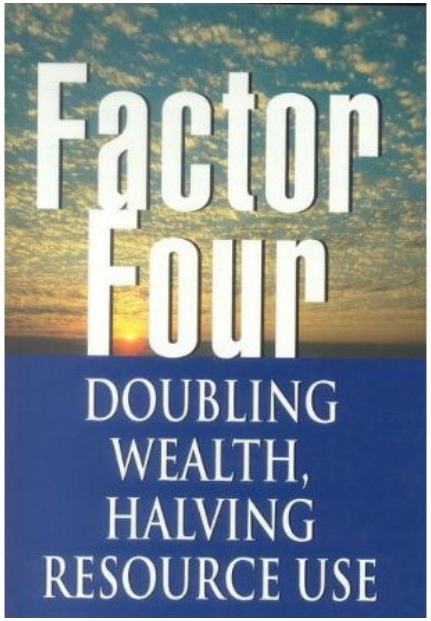
Core elements of the theory of Ecological Modernization

- Solutions to environmental problems **can be found** within the context of industrial capitalism
- The capitalist economy **in its present form** is limited by the capacity of the natural environment to absorb the effects of economic growth and to supply necessary resource inputs
- Capitalism must therefore undergo **a process of transformation** if it is to be sustainable in the long term
- **Decoupling** of economic growth from resource consumption and environmental load (”dematerialization”) are key elements in this process of transformation

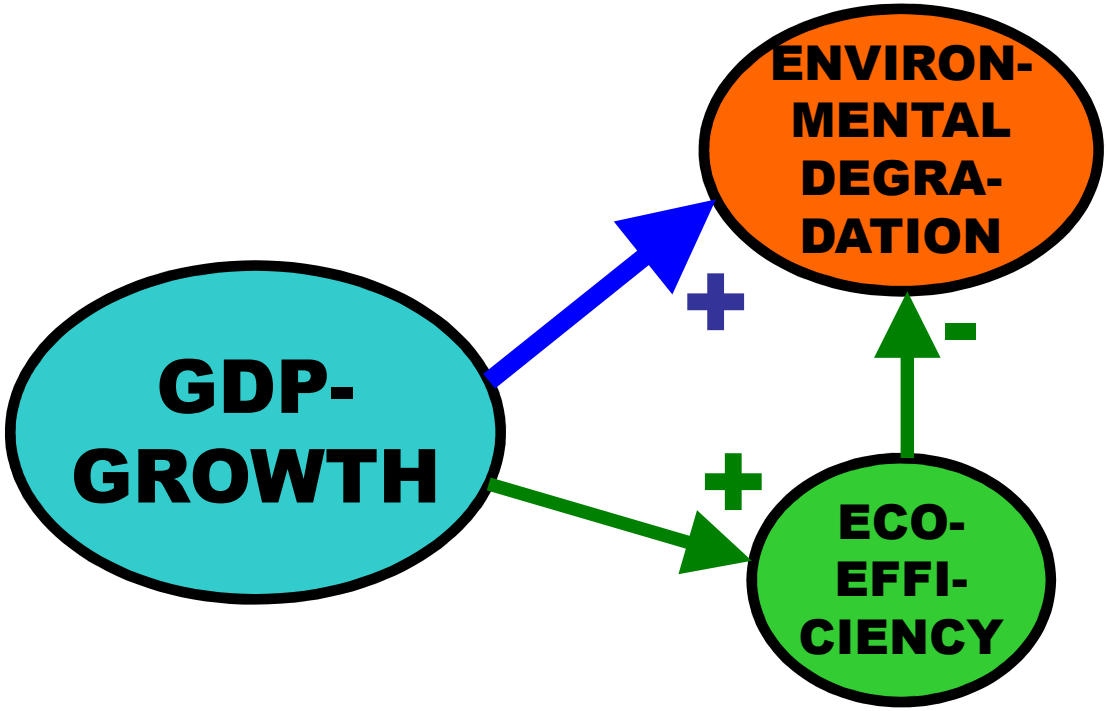




Urban development and decoupling

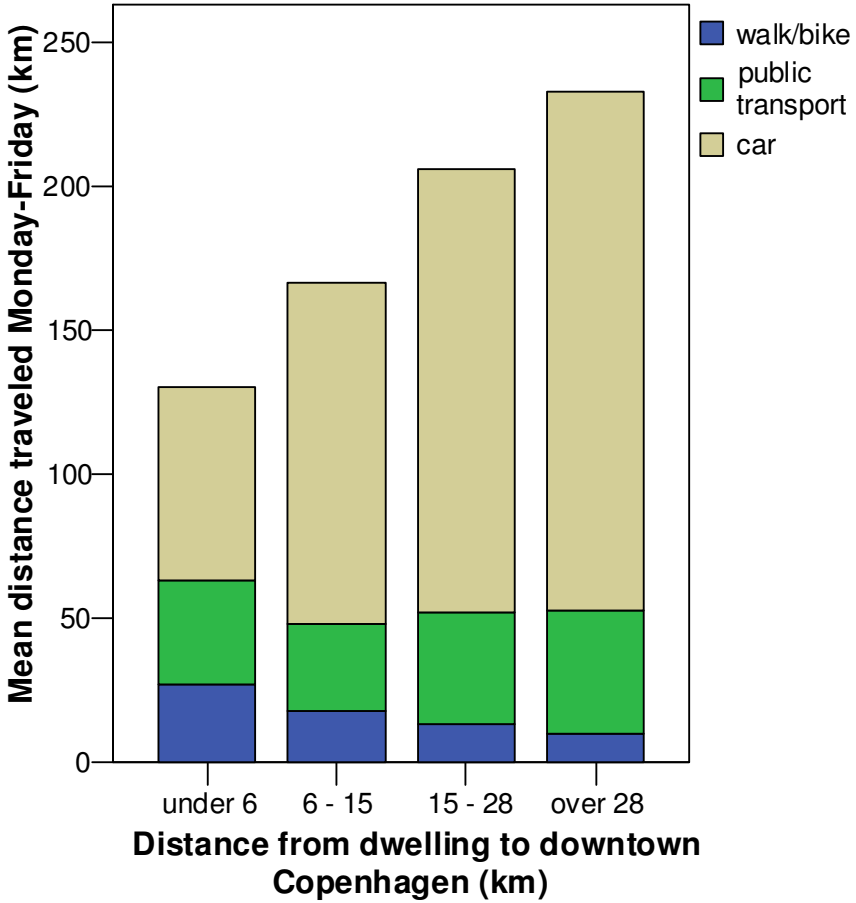
For urban development, the challenge of decoupling lies in finding ways to

- ***accommodate growth in the building stock*** and
- ***ensuring accessibility to facilities***
- while reducing negative environmental impacts resulting from the construction and use of buildings and infrastructure

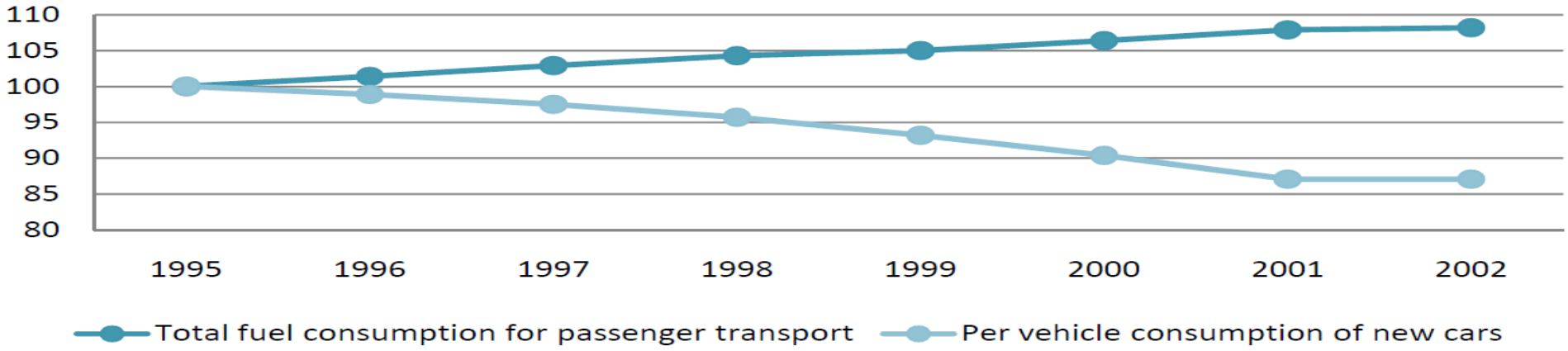


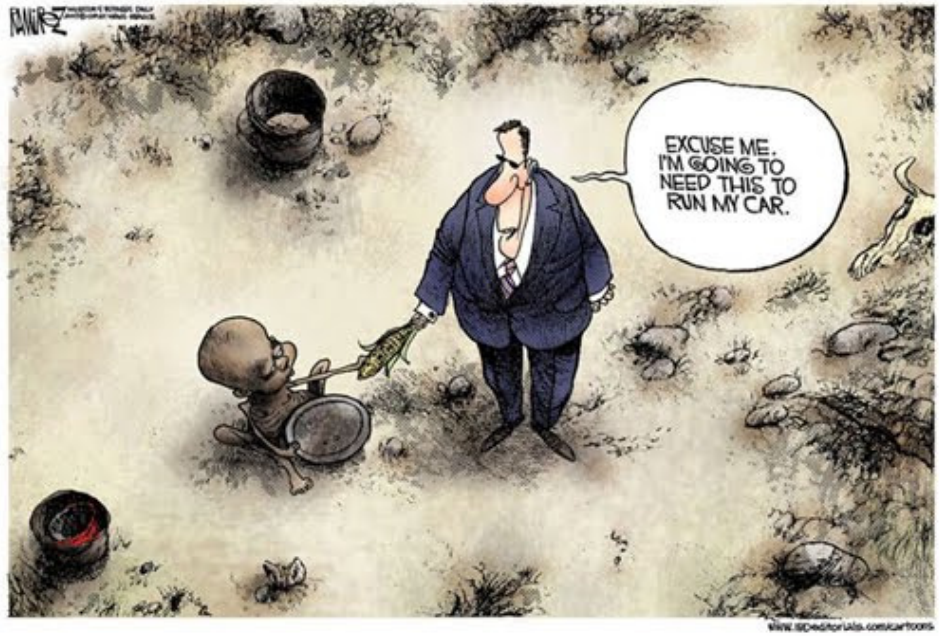
Sustainability arguments for the dense, compact city

- Limit the losses of surrounding natural and agricultural areas
- Reduce the amount of travel, car dependency and energy use for transport
- Reduce energy use in buildings
- Limit the consumption of building materials for infrastructure and buildings
- Maintain the diversity and possibilities for choice among workplaces, service facilities and social contacts



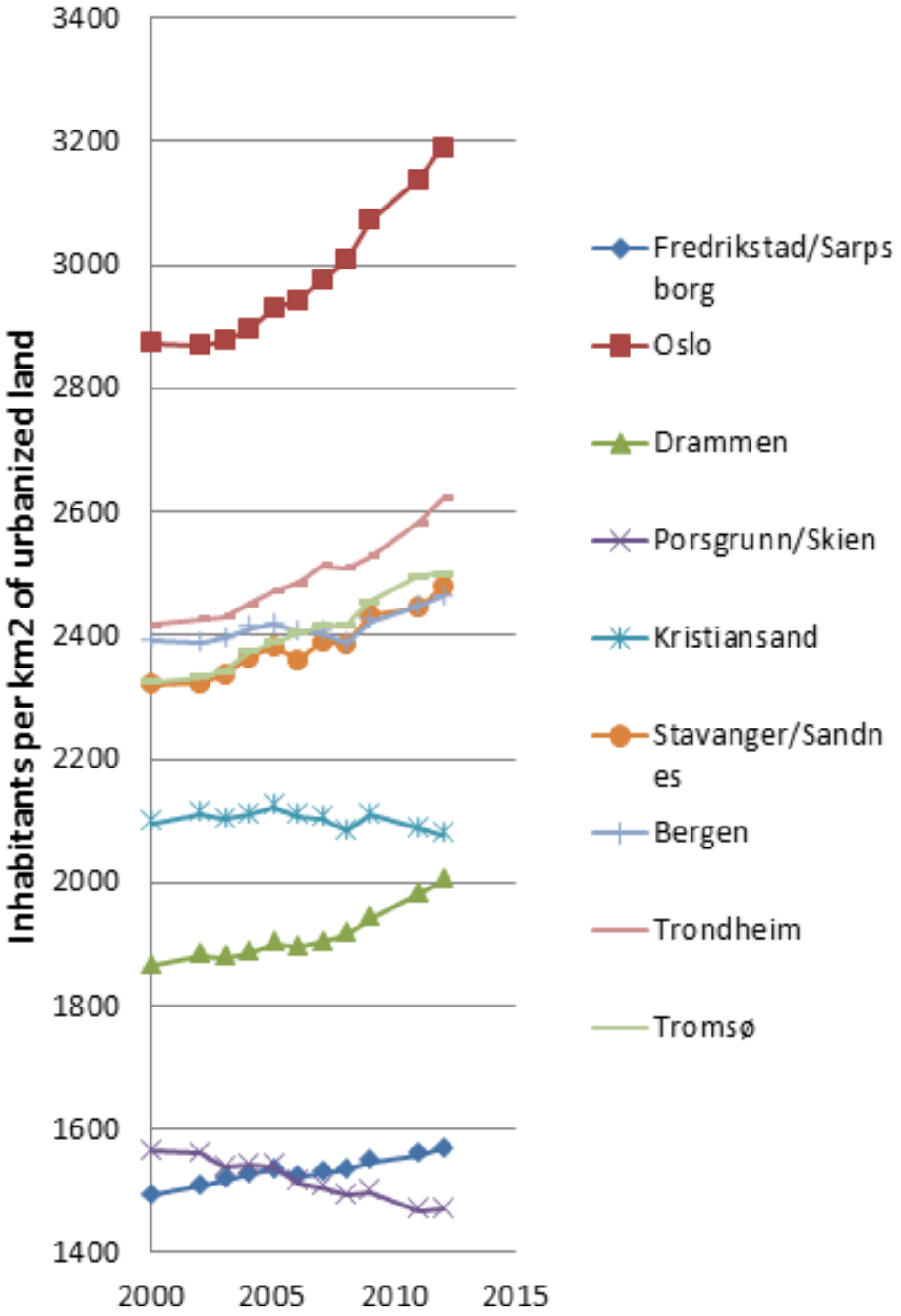
More energy-efficient cars and alternative fuels won't do away with the environmental problems of urban car traffic





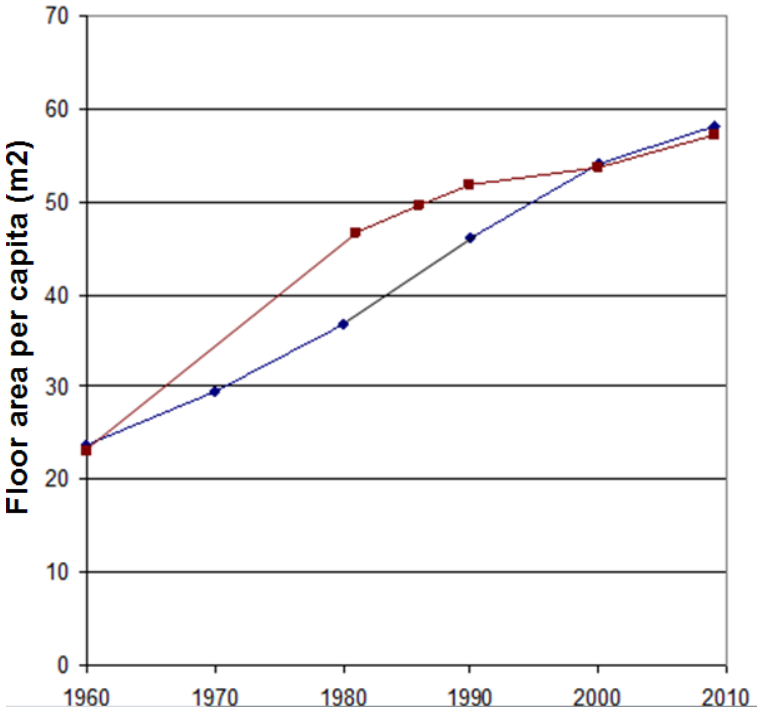
Norwegian policies for sustainable of urban development have been inspired by the recommendations of the so-called NAMIT-project (1988-1992)

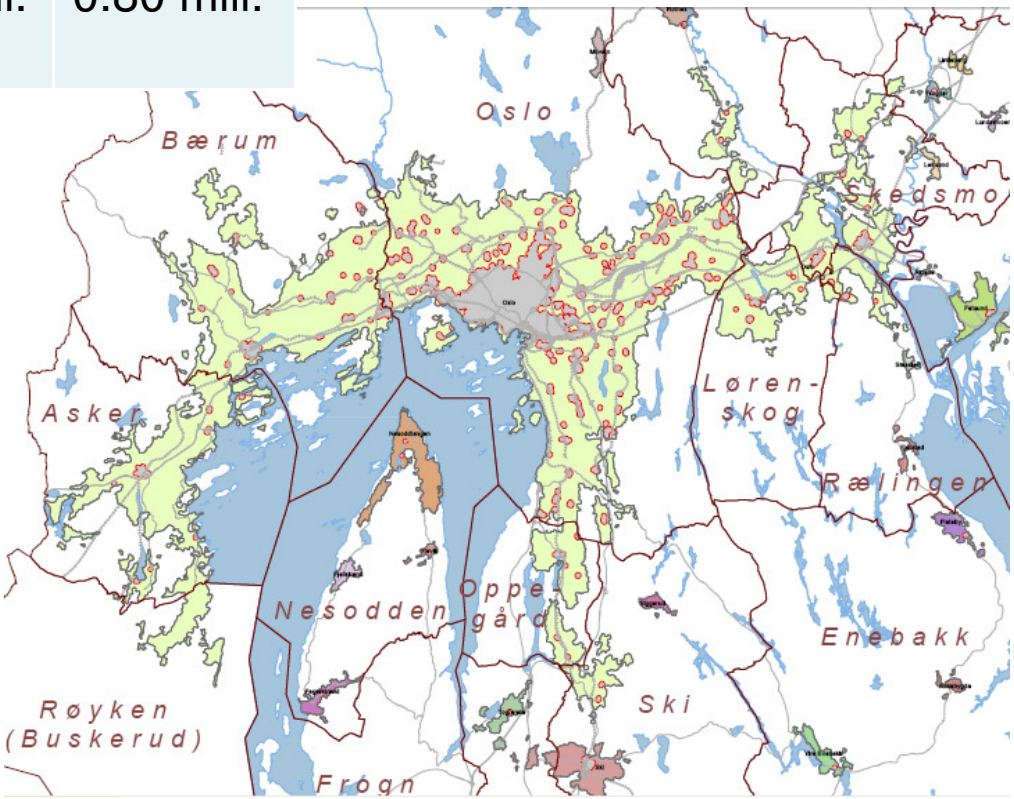
- Concentration of the technical encroachments on nature:
  - At a city-wide scale: Densification instead of spatial urban expansion, with a clear demarcation between urban and rural areas
  - At a city district and neighborhood level: Densification on ”brownfields” (old harbor areas, derelict or low-utilized industrial areas, oversized road and parking areas, etc.), but not in parks and green areas
- Efficient land utilization:
  - A reasonably high density: Build few or no new single-family homes. Instead, build apartment buildings and row houses, locate parking beneath the buildings, under access roads or in P-houses instead of at surface level
- Restructuring of the transport system:
  - Limit the space available for cars, invest in better public transport and bike paths, introduce road pricing

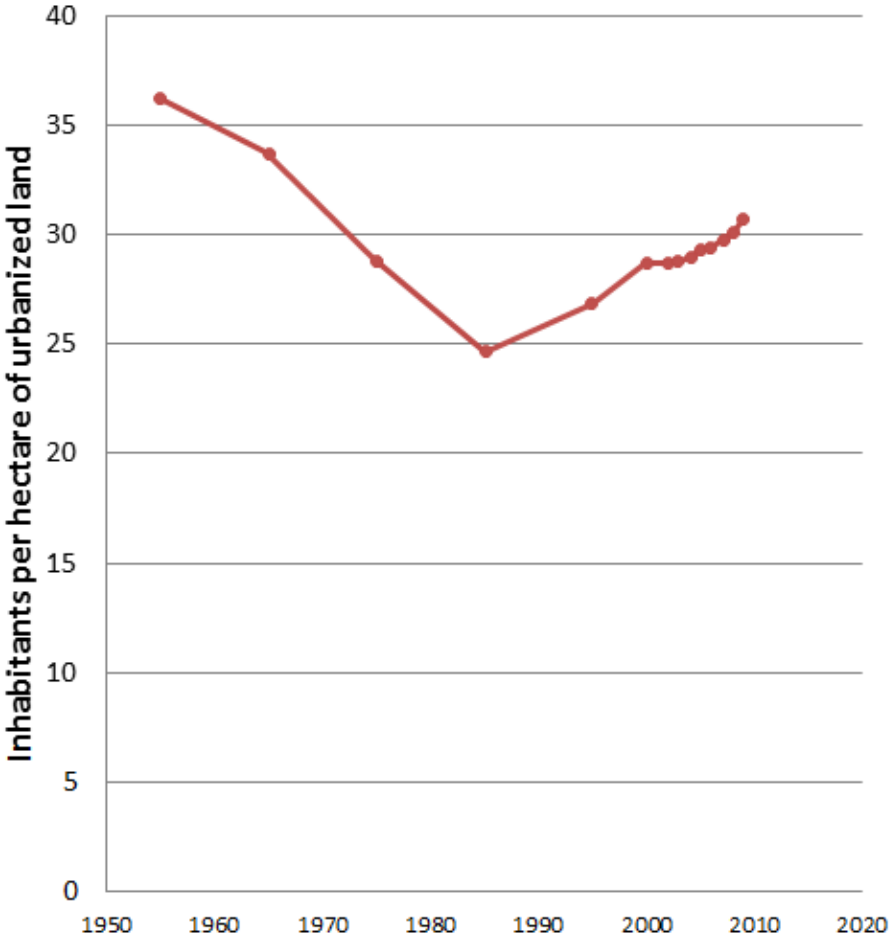

Inhabitants per km2 of urbanized land
3400
3200
3000
2800
2600
2400
2200
2000
1800
1600
1400
2000
2005
2010
2015
Fredrikstad/Sarpsborg
Oslo
Drammen
Porsgrunn/Skien
Kristiansand
Stavanger/Sandnes
Bergen
Trondheim
Tromsø

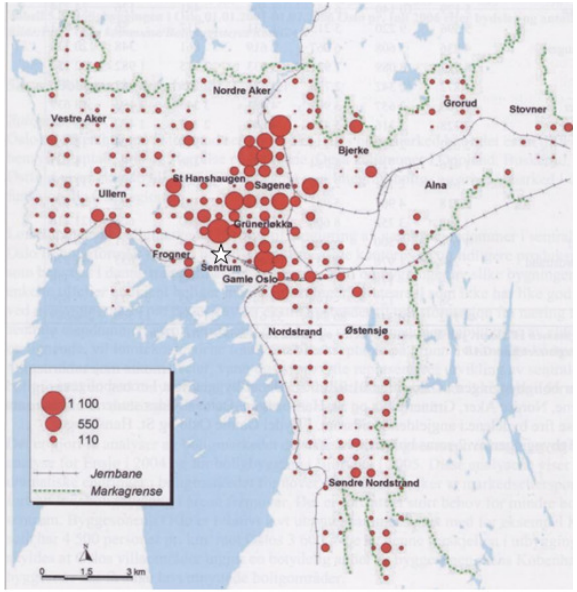
The case of Oslo Metropolitan Area

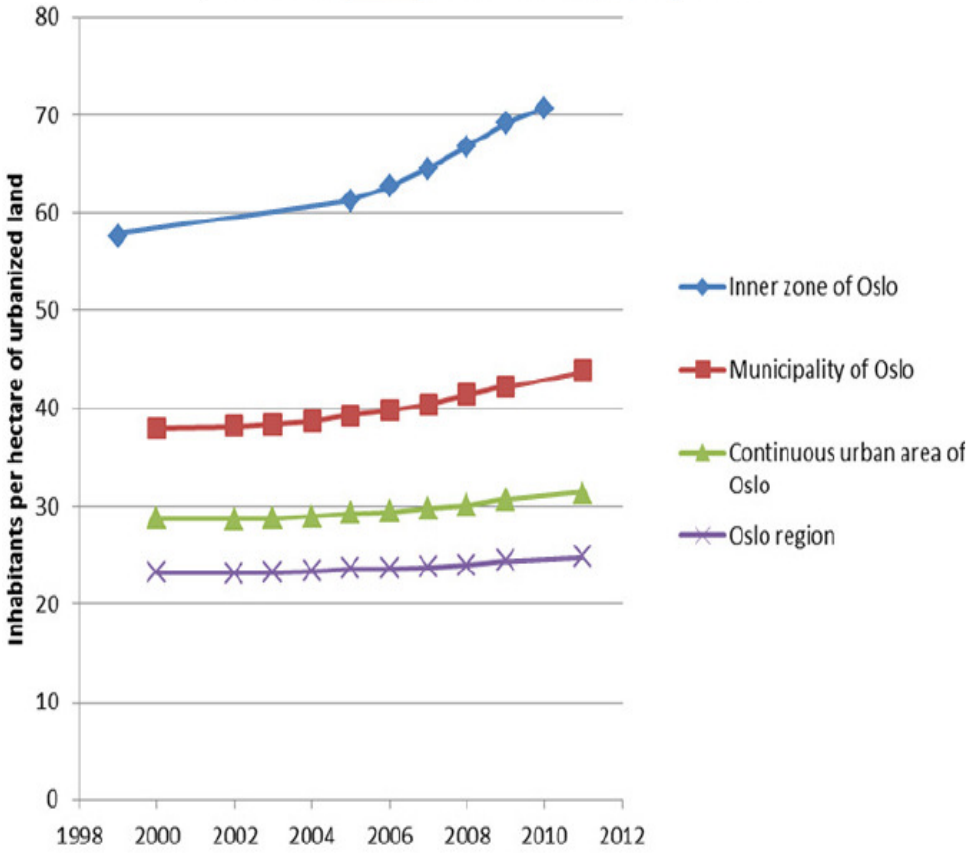
	2012	2032, medium forecast
Metropolitan area population	1.26 mill.	1.63 mill.
Population of continuous urbanized area	0.93 mill.	1.23 mill.
Population of core municipality	0.61 mill.	0.80 mill.



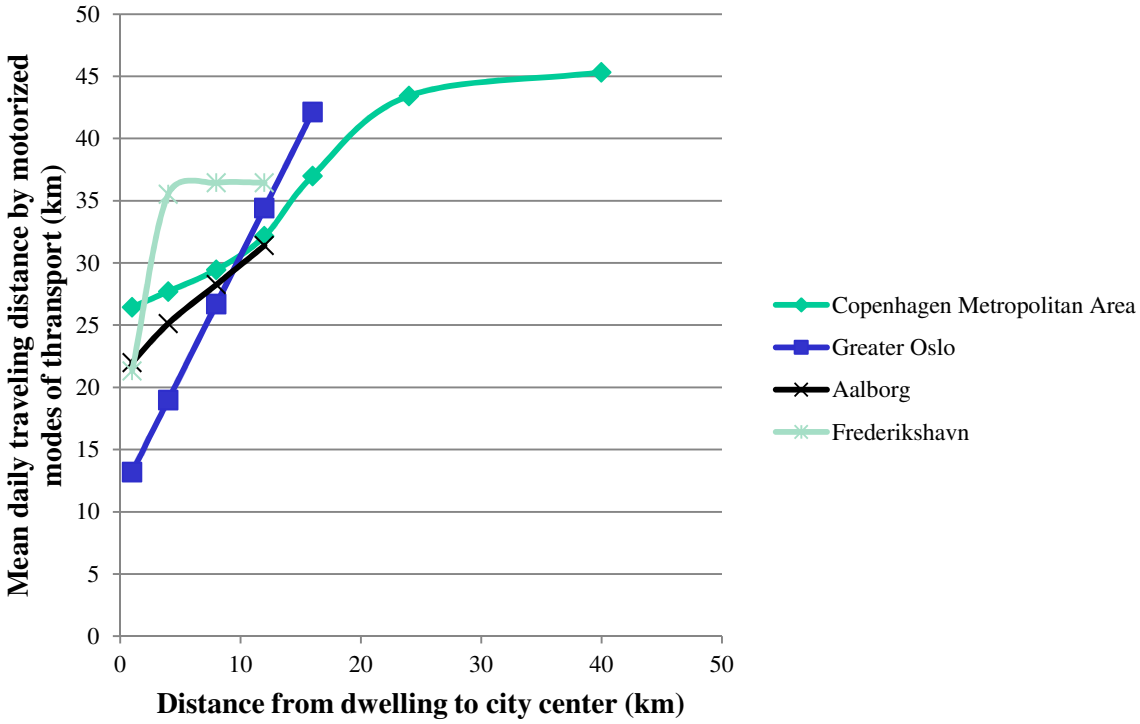



Inhabitants per hectare of urbanized land
40
35
30
25
20
15
10
5
0
1950
1960
1970
1980
1990
2000
2010
2020

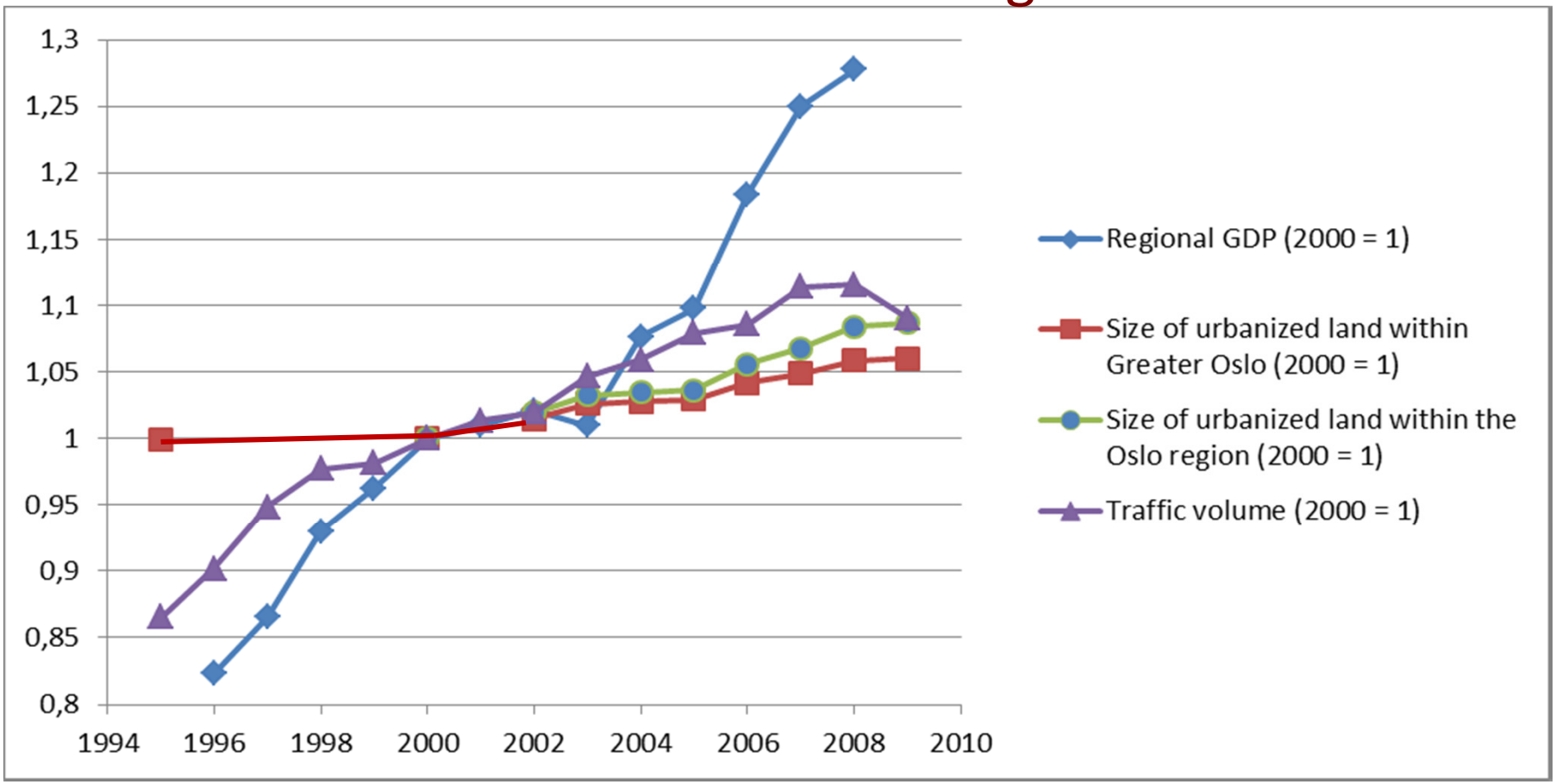

Nordre Aker
Vestre Aker
Grorud
Stovner
Bjerke
Alna
St Hanshaugen
Sagene
Ullern
Grünerløkka
Frogner
Sentrum
Gamle Oslo
Nordstrand
Østensjø
1 100
550
110
Jernbane
Markagrense
Søndre Nordstrand
0
1,5
3 km


Inhabitants per hectare of urbanized land
80
70
60
50
40
30
20
10
0
1998
2000
2002
2004
2006
2008
2010
2012
Inner zone of Oslo
Municipality of Oslo
Continuous urban area of Oslo
Oslo region

Oslo's urban containment policy has saved land and reduced the amounts of car traveling



Land consumption and road traffic has increased at much lower rates than the economic growth…



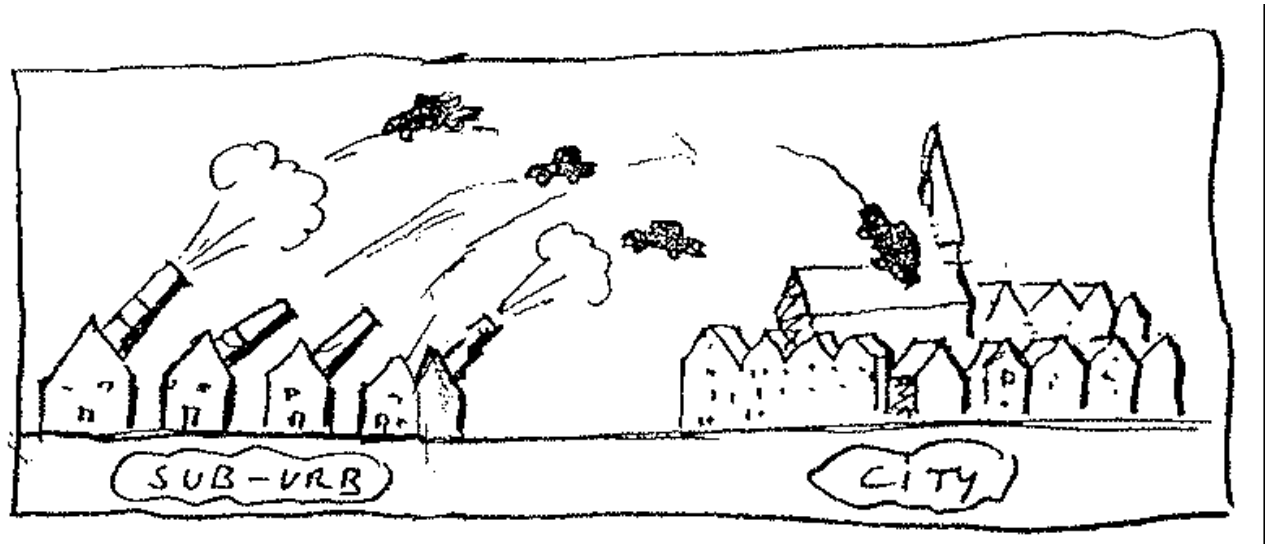
Adjusted for population growth, road traffic increased from 1996-2008 by 7% within Oslo Metropolitan Area as a whole and only 1% within the municipality of Oslo.

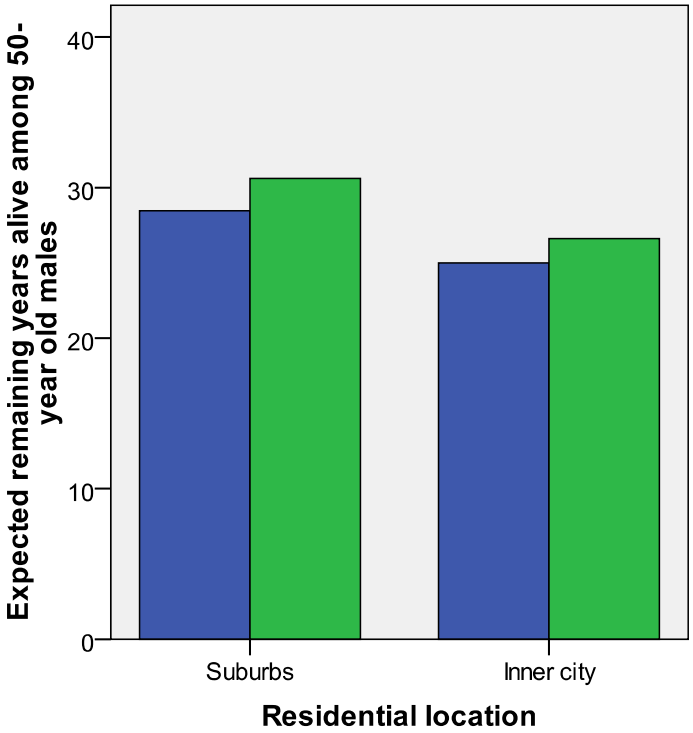
… but road traffic as well as land consumption have still increased

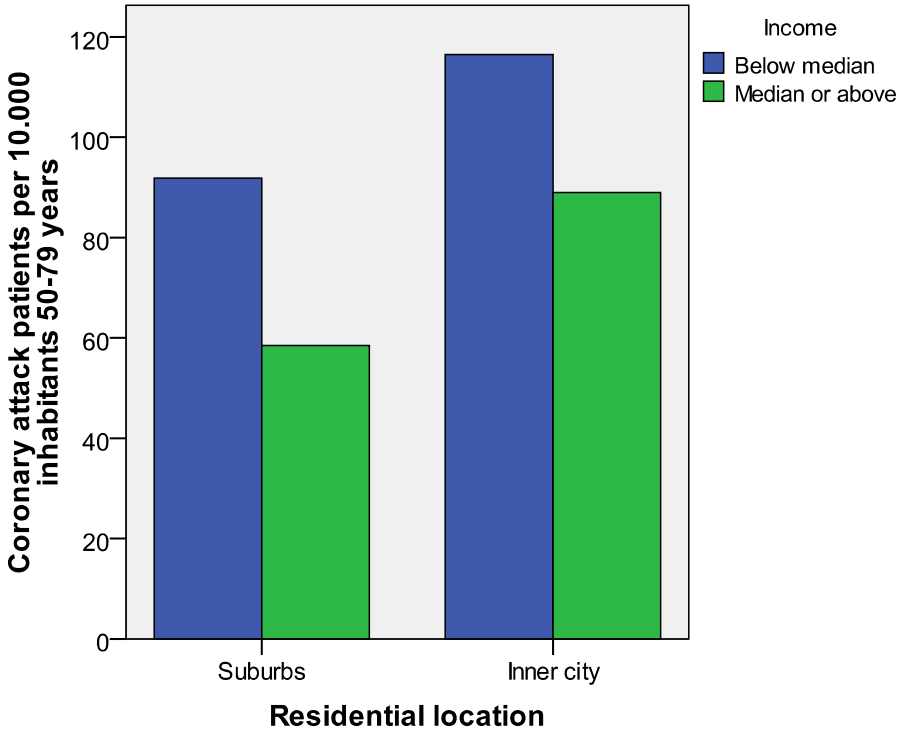
Public transport has been improved…

… but motorway construction is also going on

… and intra-urban open-access areas were reduced by 7% from 1992 to2002


SUB-URB
CITY


Expected remaining years alive among 50-year old males
40
30
20
10
0
Suburbs
Inner city
Residential location


Coronary attack patients per 10.000 inhabitants 50-79 years
120
100
80
60
40
20
0
Suburbs
Inner city
Residential location
Income
Below median
Median or above

Core policy instruments and strategies

Topics	Instruments and strategies
Key land use policy instruments promoting sustainability	Strong greenbelt policy (the Marka border) Restrictive national policy on farmland conversion National policy provisions on coordinated land use and transport planning
Dominant conception of sustainable land use strategies	Urban containment, inner-city densification, polycentric development at public transport nodes
Dominant conception of sustainable transport strategies	Public transport improvement, road tunnel building to lead traffic away from city centers and housing, road pricing

Natural, historical, cultural and political conditions influencing the preferred land use and transport policies

Influential conditions	Case-specific context
Influence of natural context and existing built environment	Surrounding rocky terrain makes urban expansion costly, farmland is a scarce resource, low urban density at the outset, vacant sites due to deindustrialization
Influence of cultural context	Strong tradition of skiing and walking in surrounding forests implies popular support of urban containment. ‘Cafe culture’ and urban living gains popularity
Influence of political conditions on planning and decision-making	Quite high acceptance of public land use control and state-level policy instruments. Moderate inter-municipal competition

Economic conditions and barriers to sustainability

Conditions and barriers	Case-specific context
Influence of economic context	High and still rising affluence level, high growth in employment and population, no perceived need to relax on land use regulations to attract investors
Main barriers to sustainable urban development (recognized)	Lack of coordination between ministries, transport forms and to some extent also across municipal borders
Main barriers to sustainable urban development (non-recognized)	Lack of reflection about limits to decoupling between growth and negative environmental impacts

Densification – more environmentally friendly than sprawl, but not without ecological costs

- The primary purpose of building construction is seldom to protect the environment, but to improve the material standard of living and stimulate economic growth
- ”Environmentally sound” ways of increasing the urban building stock are most often environmentally friendly only in a **relative** sense (compared to other, more environmentally harmful solutions), and seldom in an **absolute** sense
- ”In order to make omelet, we need to break some eggs” – and we probably **crack fewer eggs** if we choose a compact urban development than if we decide on outward urban expansion

Limits to densification

- As densification on areas that can be built on with small negative environmental impacts proceeds, these area reserves will be **exhausted**
- Further growth in the building stock must then take place on areas where the construction implies loss of nature or soil for food production
- Many of the urban transformation sites have been made available due to global and regional **relocation** processes involving **encroachments** on nature **elsewhere**
- **Climate change adaptation** measures addressing flood and urban heat island vulnerability can reduce the possibilities for urban densification
- **Rebound** effects of compact urban development

Rebound effects and limits to growth - some urban examples

- Energy use in buildings
- 'Compensatory travel'
  - Weekend leisure travel
  - Summerhouse ownership
  - Flights

Effektivisering vs. forbrugsbegrænsning – hvad har størst betydning?

Energiforbrug i boliger som eksempel

- Mellem 1990 og 2010 var væksten i energiforbruget i boliger i Norge betydeligt lavere end man forventede ud fra en forlængelse af trenden fra 1970-1990 (men det voksede alligevel noget)
- Kun 36% af forskellen mellem forventet og faktisk vækst i energiforbruget skyldtes forbedret miljøeffektivitet (tekniske løsninger)
- 9% skyldtes klimaændringer (mildere vintre)
- 55% skyldtes, at der var en svagere vækst i boligareal per person end i de forudgående 20 år

- Rebound effects exist, counteracting the effects of resource-saving principles in urban planningg
- Direct causal effects on leisure trips and summerhouse ownership seem to be **moderate** – but what about indirect effects due to money saved?
- As long as purchasing power remains the same or increases, resource efficiency improvement resulting in money-saving is like **squeezing the balloon**
- Avoiding such effects seem impossible unless the purchasing power decreases
- Anyway, creating car-dependent cities in order to reduce holiday travel is silly – taxes and regulations directly targeting the ‘rebound activities’ are much more efficient

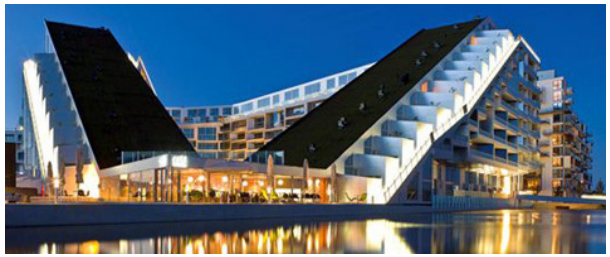
Everlasting growth in the building stock and mobility?

- "**Factor 4**" increase in resource efficiency can perhaps be obtained, and maybe even "**Factor 10**", but what about "**Factor 64**" (which must be obtained in a 200 year perspective, given 2.1% annual growth, only to avoid present annual environmental impacts from getting worse)?
- Environmental sustainability is not only about CO_2 emissions
- For many types of environmental impacts of urban development, zero-growth is far from sufficient
- For environmental, social and distribution-ethical reasons, the per capita size of the building stock and technical infrastructure in Scandinavian cities has arguably reached a level of **sufficiency**
- Instead of quantitative growth, we should give priority to **qualitative improvements** of the built environment

"Gad! Last year this was two frowzy motels and a fast-food franchise."

Long-term land use principles of environmentally sustainable urban development (I)

- **Re-use of urban land** instead of greenfield development, with densification channeled to areas already technically affected
- Build resource-efficient **housing types**. No more construction of detached single-family houses in the major urban regions – those already existing are more than sufficient
- Locate most new residential and office development to the **inner-city** and close to other major public transport nodes



Long-term land use principles of environmentally sustainable urban development (II)

- **Restrictions on the use of cars** in the city, combined with public transport improvement. No increase in road or parking capacity. Convert car lanes on multilane roads into bus lanes, bike paths and/or rows of trees
- **Moderate** amount of new housing construction, adapted to changes in the composition and number of households and geared toward improvement needs among those who live in substandard dwellings
- **Reverse urban sprawl**. The most unfavorably located and designed suburban commercial and residential areas should gradually be demolished and replaced with natural areas, orchards and farmland