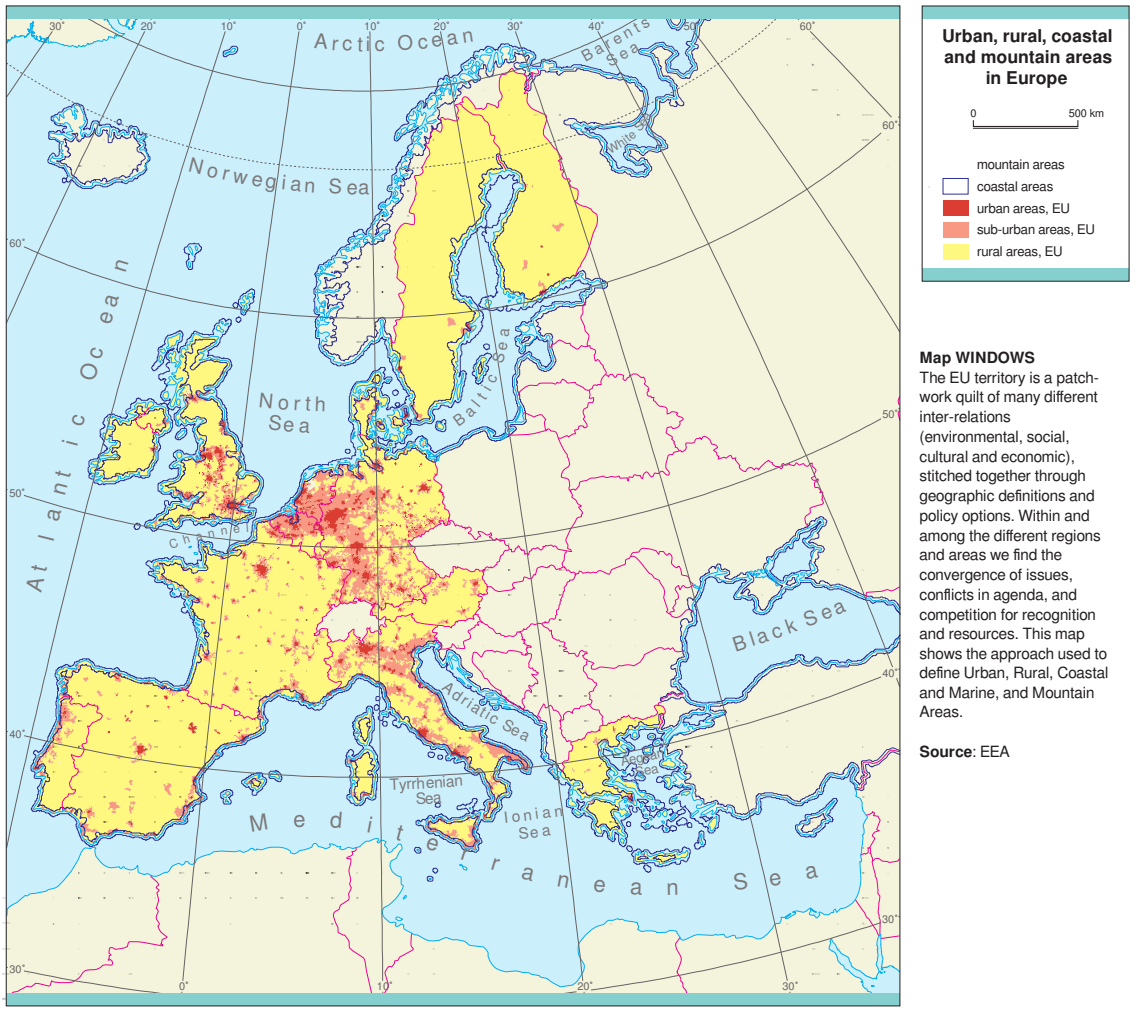
Windows on Europe: the Spatial dimension

Setting the stage with common spatial roots

A spatial approach is essential when studying and reporting on the state of the European environment, especially when intentions are to provide support to policy framing and evaluation. Today's policy makers are expected to understand and react to a host of complex issues and the inter-relations of many processes, a number of which are touching on global concerns, regional disparities, and the local implications. To this end, the next four chapters explore and assess the state of the environment with regards to urban, rural, coastal and marine and mountain areas. These areas have been selected for study because they are corresponding to the reality of Europe's diversity, and it is this diversity which must be addressed and interpreted by territorial planning.

Although limited by a lack of proper or sufficient public systems to monitor, report and interpret environmental changes, chapters 3.12 to 15 serve to contribute to the necessary debate. The next pages, while looking into the changes in Europe's environmental quality, attempt to draw out the strong regional diversity and territorial



Map WINDOWS
The EU territory is a patchwork quilt of many different inter-relations (environmental, social, cultural and economic), stitched together through geographic definitions and policy options. Within and among the different regions and areas we find the convergence of issues, conflicts in agenda, and competition for recognition and resources. This map shows the approach used to define Urban, Rural, Coastal and Marine, and Mountain Areas.

Source: EEA

implications of these changes. The analyses within the chapters are rooted in the specific socio-economic characteristics of the different areas as defined, and the current and historical land uses of their particular geographical patterns.

In fact, there really is no clear spatial line between any of these four chapters. As vexing as this may be, this has important consequences since many policy and decision-making scenarios (both now and in the future) will need to consider numerous inter-relations: What is happening in rural-urban situations? What about the rural-coastal places? Are these different from those which are composed of rural-mountain? And are these like or unlike the urban-mountain areas? And what of urban-coastal? And so on.

In what is a modest first step, area definitions have been developed. These definitions are serving as the territorial background for each Spatial Chapter, providing generalised descriptions of the spatial dimension for Urban Areas, Rural Areas, Coastal and Marine Areas and Mountain Areas. In the latter two cases, area definitions have been based upon geomorphologic considerations, while in the first two cases administrative territories have been used to sketch spatial definitions.

3.12. Urban areas

Cities and towns are engines of progress, the source of much of the world's cultural, intellectual, educational and technological achievements and innovations.
— Kofi Annan

1. Our urban lifestyle, urban sprawl: the unsustainable present

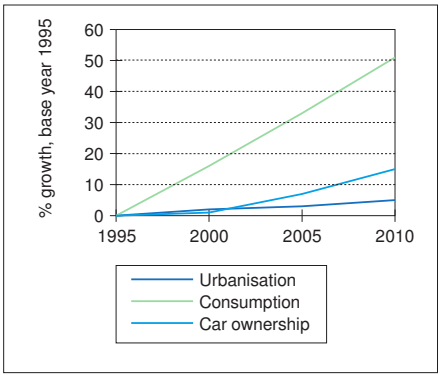
Europe is one of the most urbanised continents and today some 70% of its population (560 million) is urban (UN/ESA, 1997; Figure 3.12.1), while urban areas (with a population density above 100 inhabitants per km^2) account for some 25% of the EU's territory.

Cities, by their nature, concentrate large masses of population in small areas. This has some evident advantages in terms of economic and social development, and in some respects it is even beneficial to the environment, inasmuch as land use and energy consumption tend to be lower than for more dispersed populations; moreover, urban waste and waste-water treatment have economies of scale. Nevertheless, the urban population still suffers from severe, localised environmental problems (such as impacts of noise, pollutants and waste, and restricted availability of fresh water and open space).

Urban agglomerations are increasing steadily in the EU: it is expected that the – already high – population of 'urban agglomerations' in the EU will increase by more than 4% between 1995 and 2010 (Figure 3.12.2). As cities continue to sprawl, bringing about land use stresses and social inequities, a growing number of areas become urbanised (Map 3.12.2, Map 3.12.3; see Box 3.12.2).

Both economic activity and environmental problems are therefore intensified, with the (interrelated) pressures of extensive devel-

Key urban trends Figure 3.12.2



The figure provides EU average forecasts (Luxembourg not included in the GDP and consumption curves), since data available for Accession Countries was not comprehensive. Urbanisation is expressed as the fraction of individuals residing in urban areas (74.5% in 1995); consumption amounted 3.3 billion euros in 1995; car ownership was calculated from data on cars/1000 heads (395 in 1995).

Source: EEA; European Commission 1999

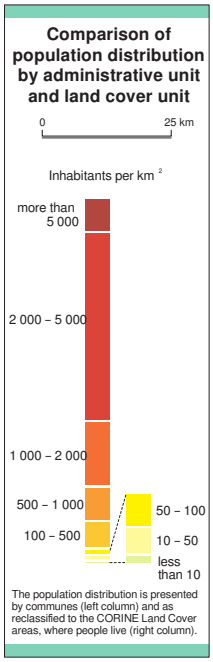
The urban presence in Europe Figure 3.12.1

Source: USA's Defense Meteorological Satellite Program – NOAA/NGDC

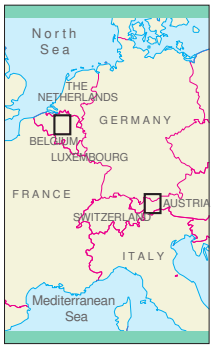
Box 3.12.1. Urban definition

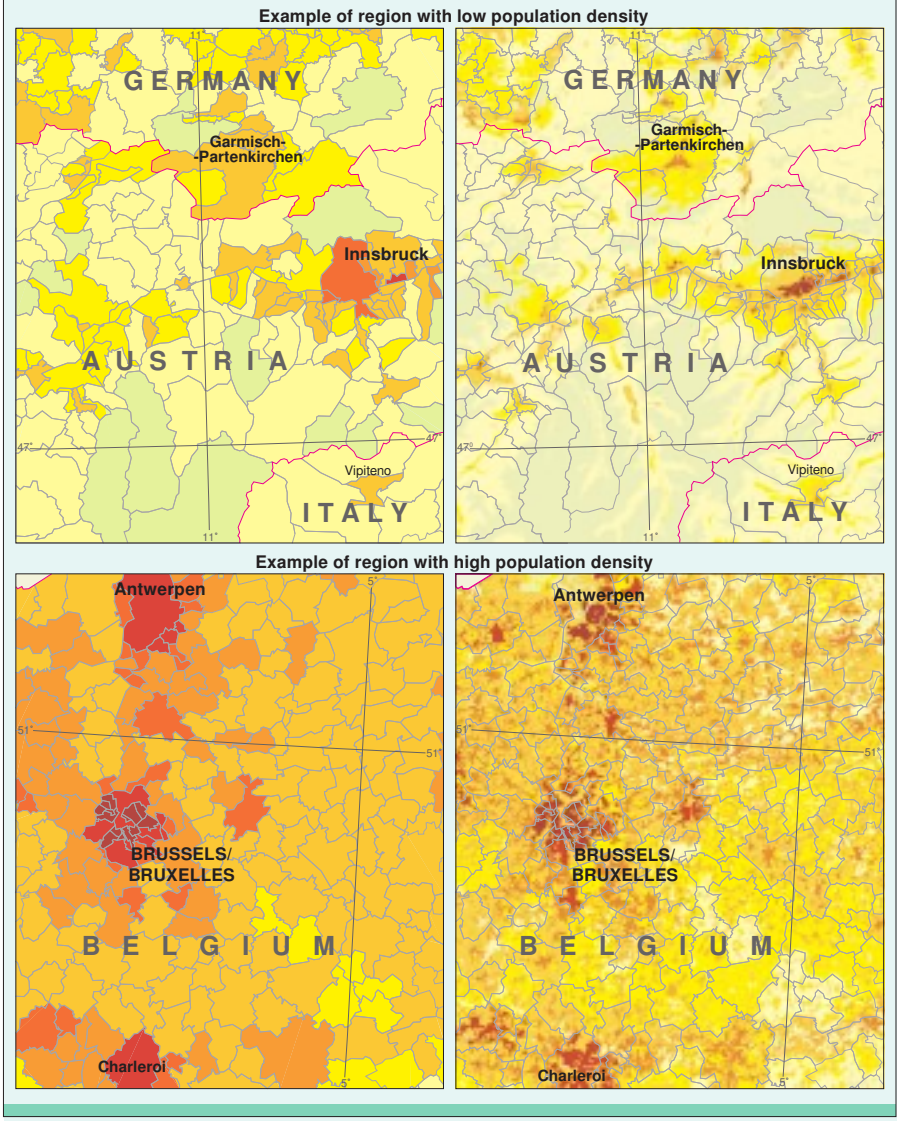
Urbanisation can be defined and expressed in different ways – for example by statistical-administrative criteria or in physical-morphological terms (Map 3.12.1). The latter relies on the physical expression of urbanisation patterns, and uses land cover information. The former relies on basic statistical and territorial building blocks to give a socio-economic and political expression of populations and urbanisation.

This chapter's area definition has been sketched out using very small territorial units and expressions of population densities. Urban agglomerations are here defined as 'territorial units characterised by the presence of buildings, transport infrastructure and public amenities, and by a minimum threshold size' (European Commission, 1998a).

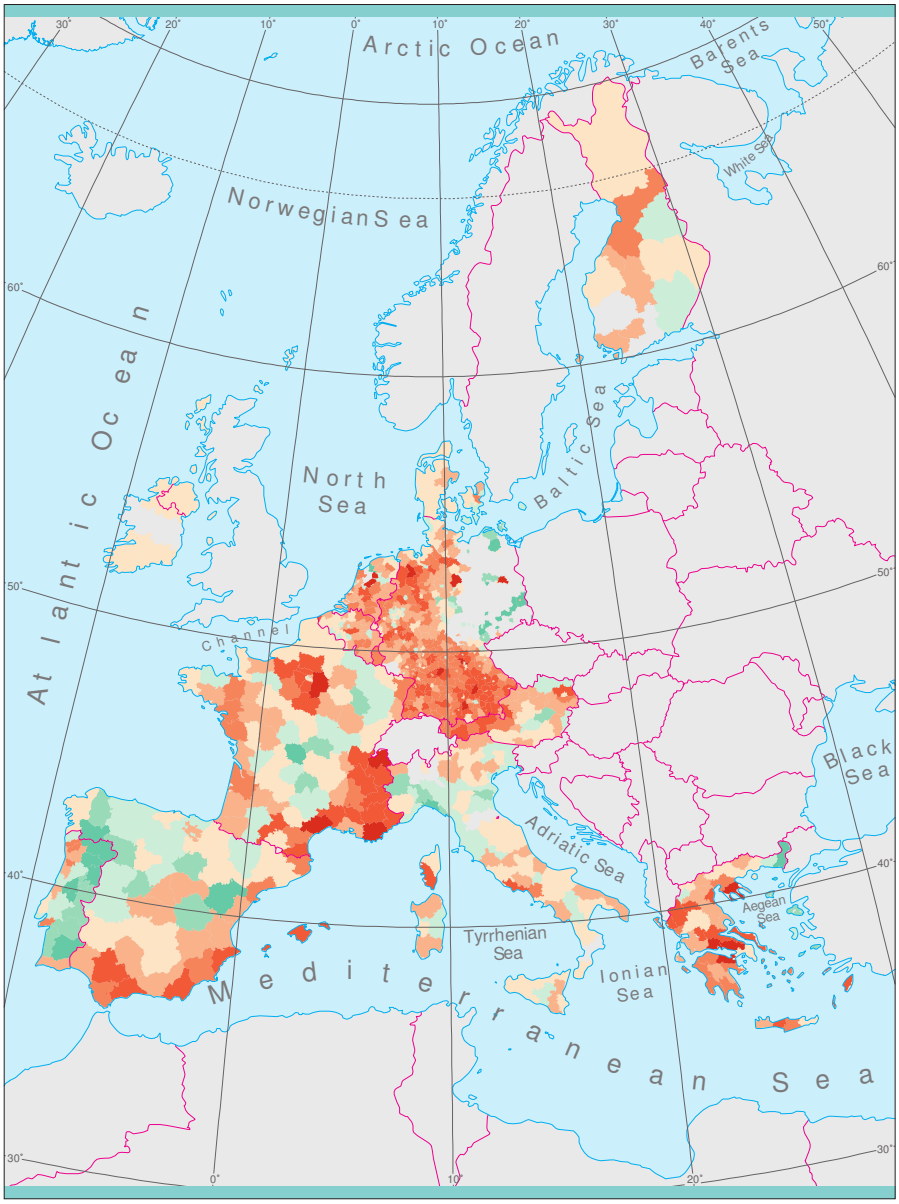


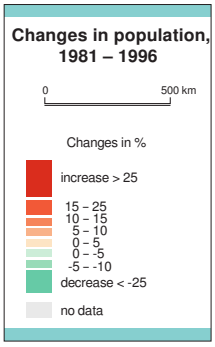
Map 3.12.1





Source: EEA

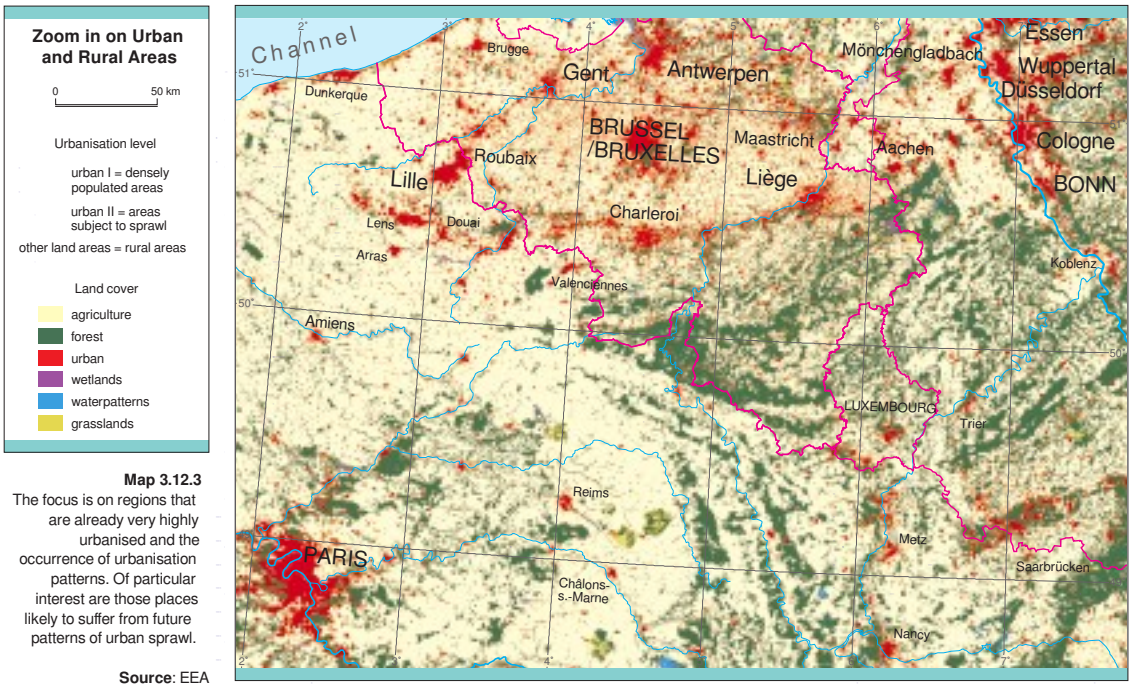




Map 3.12.2

Source: Eurostat

opment ('urban sprawl'), transport and consumption patterns. Urban sprawl is often motivated by a desire for better living conditions in more spacious sub-urban areas (Table 3.12.1), but it also leads to inner city dereliction, and increased demand for transport which continues to be a key threat to the urban environment, with few positive developments noted (EEA, 1998a). Although not entirely related to urban areas, forecasts for passenger transport demand show a 40% growth above 1990 levels in 2010 and a 25% increase in car-ownership is expected over the same period. Accession Countries will reach the lowest EU car ownership levels (366 cars per 1 000 heads in Greece) by 2010, while no further growth is expected at the high end (673 cars per 1 000 heads in Luxembourg), although additional EU countries are expected to reach this saturation level. Overall, such trends, translated into an increase in average kilometres driven per person, result in significant health threats (see Chapter 3.10) and severe noise, congestion and air-quality problems (see Chapter 3.4).



Map 3.12.3
The focus is on regions that are already very highly urbanised and the occurrence of urbanisation patterns. Of particular interest are those places likely to suffer from future patterns of urban sprawl.

Source: EEA

However, the effect of growing demand for transport is now difficult to assess, because the development of information technology may radically alter travel patterns (see Box 3.12.3).

Beyond 2010, the population of the EU15 is expected to grow by only 0,5% over the following 20 to 30 years (European Commission, 1997b). Conversely, the composition and social status of the population is changing: while the number of households continues to rise, the average number of persons per household has decreased below three. Households affect the environment through their consumption patterns, and have a key role in the land use / transport interface.

Table 3.12.1 **Land use in urban areas**

POPULATION DENSITY (inhabitants/km²)	URBAN FABRIC (% of total area)	ARTIFICIAL SURFACES (% of total area)	FORESTS AND AGRICULTURAL LAND (% of total area)
> 500	31	40	59
100 - 500	7	9	90

Source: EEA

Heavy industry has reduced its presence in cities, but remains a problem in most Accession Countries. Industrial pollution control measures are generally well underway. However, small and medium-size enterprises are overwhelmingly concentrated in urban areas and improving their environmental performance is a major challenge. Energy sector-related problems are comparable to those arising from industry and often addressed jointly. Tourism brings about intense seasonal stresses concentrated in a number of key areas (see Chapters 3.14 and 3.15). Agriculture sector-related problems are inextricably linked to the urban reality, as the urban / rural border is often loose (see Chapters 2.3 and 3.13).

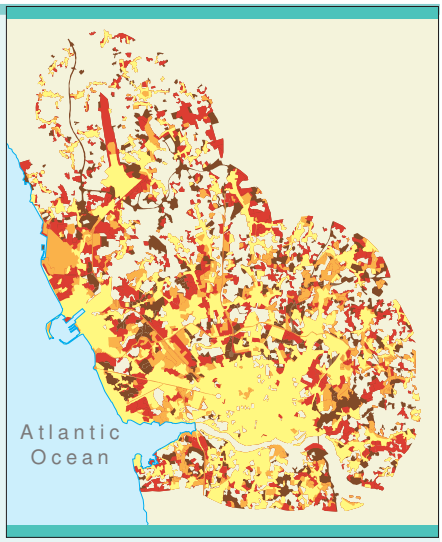
Large urban agglomerations typically manifest economic segregation, with lower-income groups tending to be concentrated in inner-city areas and/or extensive peripheral estates, sometimes in substandard dwellings, which are found throughout Europe (WHO, 1997. Box 3.12.4). Finally, traditional environmental health problems from unsafe drinking water, inadequate sanitation and poor housing have largely disappeared from the EU cities.

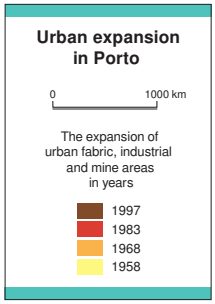
Box 3.12.2. Urban dynamics in Dublin and Porto

The European Commission's MURBANDY project aims (i) to study past and current land uses in cities, (ii) to monitor the dynamics of Europe's cities; (iii) to develop a number of 'urban' and 'environmental' indicators that help to understand these dynamics and the impact these cities have on the environment, and (iv) to elaborate scenarios of urban growth.

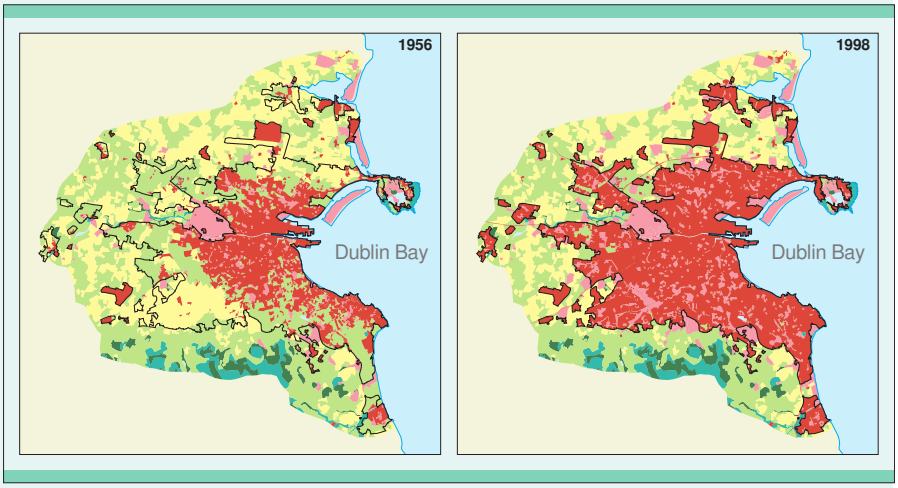
Initial results for Porto and Dublin (Maps 3.12.4. & 3.12.5.) illustrate how European cities continue to expand and increase their use of natural resources and land – even if population growth levels are relatively modest: 30% between 1960 and 1997 for Porto, 39% between 1958 and 1998 fof Dublin

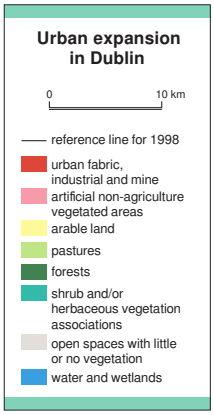
Source: Area Metropolitana do Porto; Central Statistical Office; EC Joint Research Centre





Map 3.12.4.
Residential urban fabric in Porto almost doubled from 1958 to 1997, while forest and semi-natural areas and agricultural areas nearly halved; conversely, the area used for road and rail networks increased by a factor of 7.





Map 3.12.5.
Dublin shows the same pattern: the area of residential urban fabric more than doubled between 1956 and 1998, while the area used for road and rail networks increased by a factor of almost 10; the reduction in forest and semi-natural areas and agricultural areas was approximately 15%.

Box 3.12.3. Information Society: the big question mark for urban planning

The development of Information Society Services and Applications (ISSA) is expected to bring about important changes to urban systems. Telecommunications and fast transport networks are emerging that interconnect cities across long distances: the spatial dimension of communications between cities loses importance, while concerns are being raised about the exclusion of intervening areas (Graham and Marvin, 1996).

While telecommunication and infrastructure are prerequisites for the development of networks, their effects on urban expansion and densities are not known. This might encourage people to settle in rural areas; but many observers argue that networks will lead to greater concentration, both due to the costs of physical infrastructure and to the economic dynamics that can be found only in urban centres (Hall, 1997; Coyle, 1997). Indeed, there is evidence that new technologies will strengthen the already economically viable city regions (Kunzmann, 1997; European Commission, 1997a), while less favoured regions may be left out (European Commisson, 1997a).

ISSA has potential for environmental improvement. A project to evaluate the effects of teleworking was launched in the Public Administration in Rome on the basis of the following considerations: (i) traffic is very congested in Rome; (ii) more than half of Rome's workforce uses a private vehicle to reach the workplace; (iii) the majority of people who work in Rome are employed in the service sector; and (iv) technology has made decentralisation of parts of the service sector possible. The project started in 1995 and ended in 1997, covering 18% of Rome's workforce. It was found that, in the long run, teleworking could result in savings of LIT 6 billion in energy consumption and a 7% decrease in air pollution (ECTF, 1997).

Box 3.12.4. Social issues and sustainable development

The social component of sustainable development is highlighted by UN Agenda 21 and has since been echoed elsewhere.

'Poverty and environmental degradation are closely interrelated. While poverty results in environmental stress, the major cause of global environmental deterioration is an unsustainable pattern of consumption and production, particularly in the industrialised countries, which aggravates poverty and imbalances.'

— Section 1, Chapter 4, 'Agenda 21'

The European Sustainable Cities report acknowledged and put this challenge in a European perspective. 'Sustainable development is thus a much broader concept than environmental protection. [...] It embraces concerns for the quality of life (not just income growth), for equity between people in the present (including the prevention of poverty), for inter-generational equity (people in the future deserve an environment which is at least as good as the one we currently enjoy, if not better), and for the social and ethical dimensions of human welfare. [...]'

— Section 3, Chapter 1, 'European Sustainable Cities Report'

2. Pressures on environmental resources

2.1. Urban flows

In the past, rising incomes, and consequent growth in consumption, have tended to increase energy and water usage and waste generation (Slob *et al.*, 1996). The phenomenon is illustrated by changes in water consumption, energy consumption and waste generation (Box 3.12.5). To break this linkage between economic development and environmental pressures will require significant changes in attitudes and lifestyles (see section 6 'Towards an integrated urban policy?'), which are not yet apparent in the EU.

There is a strong correlation between electricity consumption and waste generation (see EEA, 1998b, p.144). Some cities (e.g. Warsaw, Cracow and Berlin), however, deviate significantly from the general pattern due to high waste generation. Electricity consumption also correlates with water consumption, although to a lesser degree. Interestingly, Nordic capitals and Zurich cluster around the high end not only for electricity consumption but also for water use. Urban waste has increased in volume and changed in composition over the past two decades: while volumes are still expected to increase, current management practices do not meet the requirements of the EU waste hierarchy (see Chapter 3.7), nor is waste generation generally subject to corrective economic instruments such as taxation.

Seasonal water shortages are already common mostly in southern European cities, and demands will generally not be met in the next century if renewable water-resources pollution and abstraction continues to increase at current levels. Water distribution is a problem in several urban areas with obsolete infrastructure and the unaccounted-for water component can reach 50% of the total abstracted volume (network leakage in Oslo, for example, amounts to 40%) (see also Chapter 3.5).

Energy consumption by both transport and households has risen steadily in the past two decades and further increases can be anticipated unless energy pricing measures provide a sufficient deterrent. Domestic energy consumption varies with income level and household size; demand is expected to grow as a consequence of the widespread penetration of household appliances, outweighing technological improvements (see Chapter 2.2).

2.2. About some urban land use …

Urbanisation exerts environmental pressures, both on the nature areas in cities (forests, large parks and wetlands) and beyond the boundaries of cities. The impacts from urbanisation around cities concern areas of high economic, recreational and ecological value such as agricultural and forest areas, through increasing run-off, deforestation, soil erosion, habitats fragmentation and change in biodiversity. In contrast, afforestation also occurs in order to enchance recreation and water infiltration (drinking water reservoirs) possibilities.

The use of the landscape around cities by the urban population depends on the accessibility and availability of nature areas, mostly forests and beaches. The amount of forests within a one-day trip (ca 50 km distance from town limit) around major urban areas varies greatly, with large areas accessible mostly in countries in central, eastern and northern Europe (Map 3.12.6). In the same countries, people in smaller urban areas also have easier access to forests.

While most people live within 15 minutes' walk of at least one green area, urban green space amounts to an average of only 1.4% in the EU (EEA, 1998b). Surveys (EEA, 1998a and WHO, 1997) show that access to green space varies considerably; the proportion of urban land taken by green areas in European cities ranges from only 2% in Seville and Bratislava to around 70% in Turku, Oslo and Gothenburg. Such areas are extremely vulnerable and exposed to fragmentation

Box 3.12.5. Size and impacts of urban flows - the case of the largest Northern Mediterranean agglomeration, Barcelona

Barcelona stretches over a total administrative area of 101 km ^{2} and is the largest agglomeration in the Northern Mediterranean basin (pop. 1 508 805 - Eurostat).

As a signatory of the Charter of European Cities and Towns Towards Sustainability, Barcelona committed to adopting its own Local Agenda 21 by the end of 1999. This has brought significant challenges to the municipal political agenda, some of which are summarised below.

a) Waste flows

Waste streams
- household waste (600 000 t/year)
- household-like waste (125 000 t/year).

Waste treatment capacities
- landfilling (555 000 t/year)
- incineration (150 000 t/year)
- recycling (20 000 t/year).

It is the aim of the Metropolitan Waste Plan to stabilise waste generation at 1996 levels by 2006. If accomplished, such an ambitious goal would result in both lesser waste volumes and reduced greenhouse gases (GHG) emissions. To this end, Barcelona will have to extend its capacities as follows:

- composting (167 000 t/year)
- methanisation (337 000 t/year)
- incineration (370 000 t/year)
- recycling.

Such an extension would bring about substantial (more than 20%) reductions in the GHG emissions from waste treatment, thereby allowing for compliance with the Heidelberg compromises (15% reduction in 1987 values by 2006).

b) Energy flows

Barcelona's energy flow is far from being sustainable (Table 3.12.2). The electrical efficiency of the city's energy suppliers is below 35% and the losses in the distribution system account for approximately 9% of the total produced.

Similarly, growing mobility trends have resulted in the transport sector being the largest energy consumer, with around 40% of the total.

Finally, greenhouse gas emissions showed an increase of 400 000 tons of CO_2 equivalents over the 10 year period studied (up 35% of the city's contribution to the greenhouse gas effect result

For Barcelona's energy balance for the years 1985 and 1995, the results are evaluated against qualitative sustainability values developed under the auspices of the Charter of European Cities and Towns for Sustainability.

c) Water flows

Barcelona's water flow is largely unbalanced (Table 3.12.3). This is further underlined by comparing the drainage area required by the city with its extension, which increases by a factor of 3.5 for an average year, and by a factor of 8 for a dry year. (Based on data from a number of water-management agencies and on estimates when data were not available).

1 Eurostat (Pressure Indices Project), 1995
2 Fòrum Cívic Barcelona Sostenible, 1996
3 European Environment Agency, 1995
4 Working proposals for Barcelona, 1998

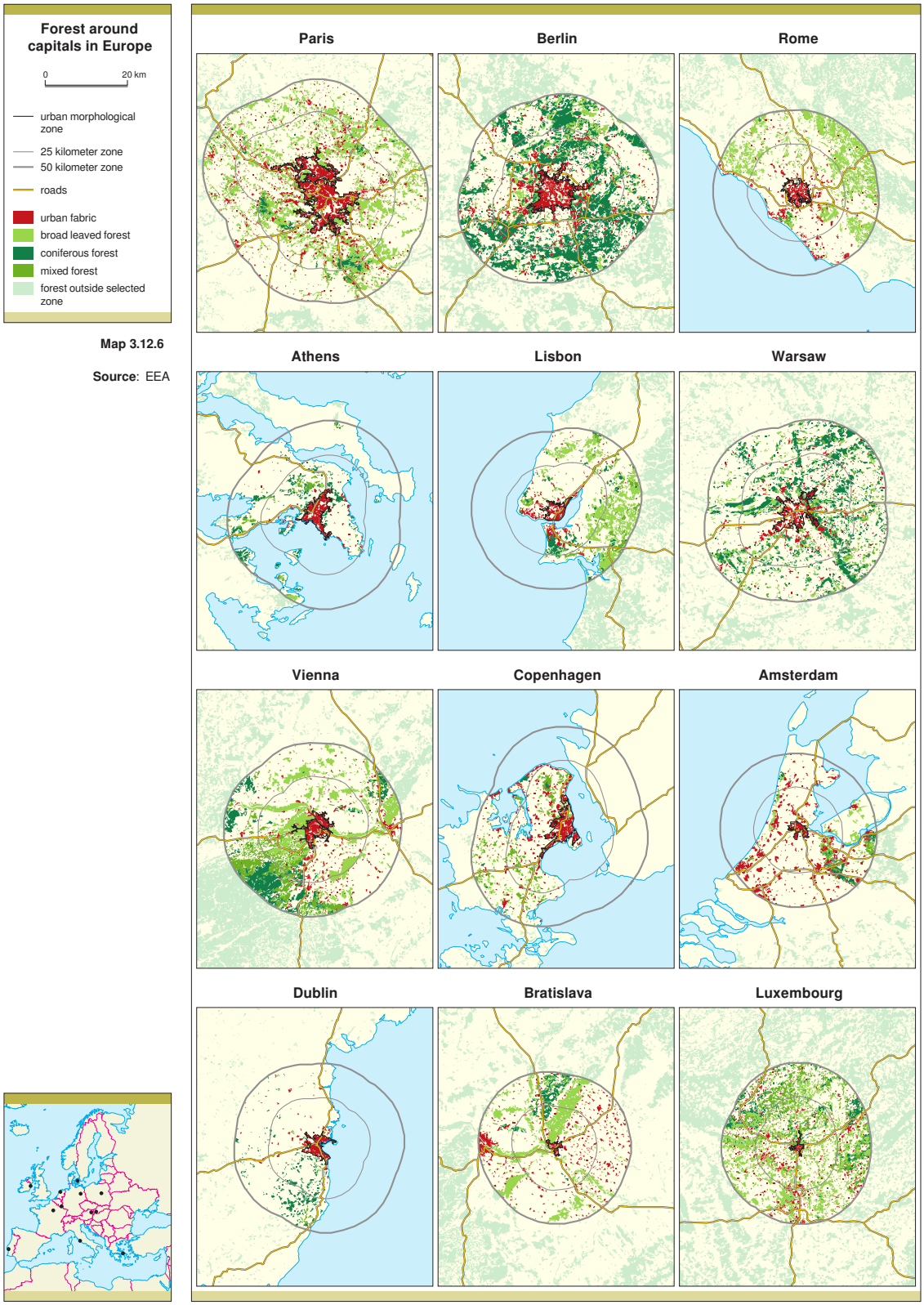
Source: Ginés, Noguer, Nogués, 1997

Energy flows Table 3.12.2.

Indicator	Value 1985	1995
Per capita energy consumption (GJ/person)	23.4	34.8
Co-generation in electricity production (%)	1.7	9.4
Electricity production from nuclear power stations	52.8	71.8
Electricity production from renewable – aeolic and photovoltaic – energy sources (%)	0.008	0.308
Energy – liquid fuels – consumed by transport (GJ)	16 990 660	20 013 740
Average travelled distance (km/vehicle)	3 600	4 400
Energy consumption per vehicle (GJ/vehicle)	23.3	19.5
Energy 'ecological footprint' (Barcelona's surface=1)	69.3	75.3
Per capita net greenhouse-gas effect (t CO_2 equ./person/year)	2.3	2.7
Transport generated CO_2 emissions (t CO_2)	1 212 121	1 487 603
CO_2 absorption by the city (t CO_2)	27 016	22 435

Water flows Table 3.12.3.

Indicator	Indicator source	Value	Indicator characteristics
Water origin Imported water (%)	4	47,4	Reflects dependence from foreign sources
Groundwater (%)	3	6.5	Shows degree of exploitation of aquifers
Water inputs Water abstraction (l/inhab/day)	1	271.5	Reflects losses and savings over time Up to 22.6% of the distributed water is not billed
Water supply (l/inhab/day)		210.1	Supply figures fluctuate between 60 l/inhab/day in Belfast (UK) and 607 l/inhab/day in Milan (Italy)
Consumption by sector (l/inhab/day)	2	hous.: 135 ind.: 60 pub.: 15	Highlights trends in de/industrialisation, de/population, etc. Use has increased for households, decreased for industry, and remained stable for the public sector
Water outputs Evacuated waste-water (m ^{3}/sec)	4	4.6	Illustrates the potential impact on the receiving body
Dwellings connected to sewer systems (%)	3	100	Values fluctuate in Europe between 83% in Reggio-Emilia (Italy) and 100% in most European cities
Water quality Non-treated wastewater (%)	1 2	38	On average figures fluctuate between 77% in Greece and 3% in Germany
Treated rainwater (%)	4	0	Illustrates CSO phenomena problematics
Reused water (l/inhab/day)	2	0	Shows the usefulness and degree of purification achieved
Reused sludge (%)	4	0	Shows the usefulness and degree of purification achieved
BILL-ecological index	2	0-1	Illustrates quality of main water-bodies at final stretches Does not show improvements over the past 10 years



Map 3.12.6

Source: EEA

and conversion to urban uses unless planning guidelines are observed (adapted from Soulé, 1991):

- natural open-space elements ought to be as large as possible and be made continuous;
- a single large habitat fragment is superior (in most cases) to small fragments;
- development configurations ought to minimise adverse edge effects;
- corridors between green areas and between green urban areas and the countryside ought to be maintained and developed.

Subsurface conditions are also affected by the combined pressures of increased urbanisation and the accumulation of planned and unplanned impacts on the natural environment. There are risks to lives and property, even in those countries not at first sight affected by geological hazards (see also Chapter 3.8). Urban areas and their hinterlands are becoming increasingly vulnerable to geo-problems controlled by geological processes, the total cost of which to society ranges from major (hazards such as volcanic eruptions, earthquakes, floods, land subsidence, landslides) to minor (local swelling or shrinking of clays in foundations). Reworking and removal of the soil surface by construction can unbalance watersheds and landscapes, contributing to the loss of biological diversity, of ecosystem integrity and productivity as well as to land degradation and erosion (see Box 3.12.6; also Chapter 3.6).

Land-use planning systems play a central role in encouraging a more sustainable use

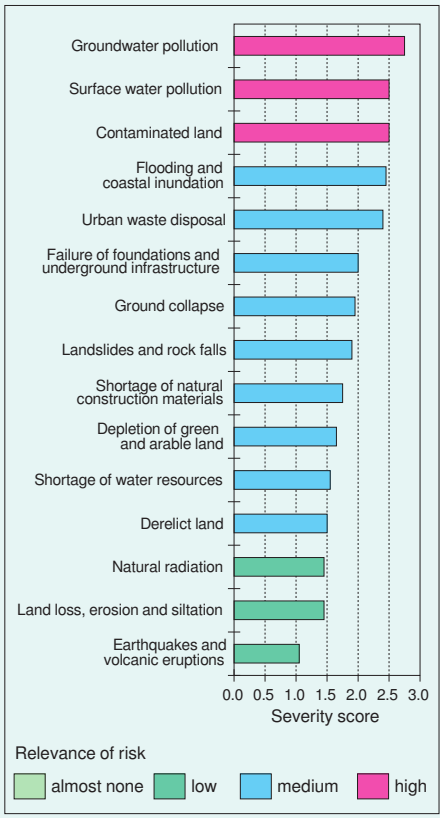
Box 3.12.6. Urbanisation: the geological risk

EuroGeoSurveys, an advisory group of all geological surveys in the EU Member States and Norway, believes that integration of the geosciences into holistic urban environmental planning can alert decision makers to the wide range of geo-problems relevant to urbanisation and other pressures resulting from human activities. The indicative matrix shown below (Figure 3.12.3 a and b) lists the relevance of fifteen geo-problems for cities in the EU Member Countries and Norway and indicates that cities are at greater risk from geo-problems in the southern European countries than in northern Europe. The recent disastrous landslides near the city of Naples (Italy) show that geo-problems related to deforestation and poor hill-slope management are relevant to expanding urbanisation.

.../...

Geo-problems of urban areas in the European Union and Norway

Figure 3.12.3 a



Source: EuroGeoSurveys

Figure 3.12.3 b **Geo-problems of urban areas in the European Union and Norway**

Source: EuroGeoSurveys

of land resources: at the Community level spatial policies (European Commission, 1997b) call for a reduction of urban sprawl and transport demand; they further advocate a common European spatial planning perspective that provides a framework for the national, regional, and local levels.

3. Transport and the urban environment

Transport – and specifically road traffic – has major external impacts which diminish the quality of life, particularly within urban areas. The main such impact is from congestion (causing economic losses in terms of time and fuel utilised), which arises when transport infrastructure is used beyond its capacity (Map 3.12.7); other impacts include the costs of accidents, visual intrusion (caused by billboards, signage, and pylons), and the contribution of road transport to global warming (overall, estimated at a quarter of man-made emissions - Figure 3.12.4 (see also Chapter 4.1).

The costs of congestion arise mainly from road transport (costs estimated at 2% of GDP), but also from air and rail transport (respectively some 0.04% and 0.01% of GDP) (European Commission, 1995). To date, policy action has failed efficiently to address congestion, as (i) road transport continues to grow and (ii) its environmental costs are only covered partly or not at all (European Commission, 1998b).

Both freight and passenger road transport in the EU have increased by around 50% (EEA, 1998a) since the early 1980s, with motor cars representing the predominant passenger mode. Increased car ownership trends will

Average daily motor road traffic, 1995

0 500 km

Number of vehicles per day

- more than 100 000
- 50 000 – 100 000
- 30 000 – 50 000
- 10 000 – 30 000
- less than 10 000

Map 3.12.7

Source: UN-ECE

cause a growth of road transport, although this may be offset to some extent by a growth in rail transport in congested cities (Figure 3.12.5).

Ideally, the costs of environmental impacts would be borne by those whose activities generate the cost (a process of 'internalisation'). In the case of congestion this would involve taxes to recover the costs: however, in practice there are serious technical and implementation problems, because congestion costs vary over time and space, and

Transport related externalities as % of GDP Figure 3.12.4

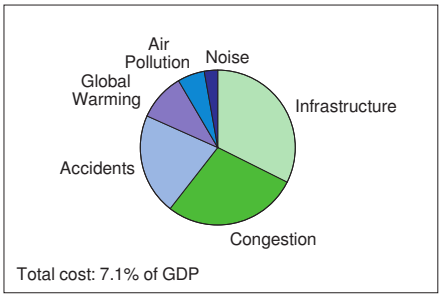
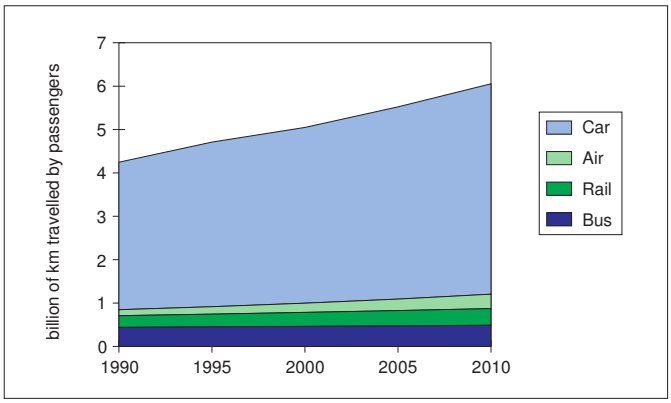


Figure 3.12.5 **Passenger transport modal split in EU (EU averages)**



Growing car usage brings about increased traffic intensity (and hence congestion) and fosters urban sprawl: for a given city size, low population densities lead to augmented car usage patterns with respect to higher density areas, where average distance travelled is lower.

Source: EEA

congestion charges at present internalise only a small proportion of the total cost (OEIL, 1997) (see Chapter 4.1).

Policies to reduce car dependence must promote alternative modes. These include public transport and also cycling. It is estimated that cyclists in the EU covered a total distance of about 70 000 million km in 1995 (approximately 1.5% of the total distance covered by all land transport), an average of 200 km/year/head (ECF, 1998). There is considerable variation between countries: Denmark and the Netherlands exceeded 900 km/year/head; Austria, Belgium, Finland, Germany, Ireland, Italy and Sweden are in the range of 100-400 km, while France, Greece, Luxembourg, Portugal, Spain and the UK are below 100 km. In general, cycle use has been fairly stable in the recent past, with only a small increase in western Germany and Denmark, and a small decrease in France, Ireland, Finland, the UK and the new German Länder. The exception have been the Netherlands and Sweden, which has seen a marked increase.

Compared to the EU15, the transport system in the Accession Countries is presently characterised by a relatively high freight transport intensity, a large share of rail transport, and a relatively low – although growing – level of private car ownership. A strong growth in road transport, largely at the expense of rail transport, is expected for the next decade (EEA, 1999).

4. Urban air pollution: road transport takes the lead

Urban air pollution is the source of a range of problems both within cities as well as outside as emissions from cities lead to an increase in the regional background concentration levels of many pollutants. These problems include damage to flora and fauna, decomposition of materials, buildings, historical monuments, weather and climatic changes, as well as health risks mostly associated with inhalation of gases and particles (see also Chapters 3.1, 3.4 and 3.10).

Health effects which arise from exposure to air pollution can be classified as: irritation and annoyance, loss of organ functions (e.g. reduced lung capacity), morbidity and mortality. Some of these effects can be acute and reversible, while others develop gradually into irreversible chronic conditions. Low-level exposure to a complex of pollutants in air, water, food, consumer products and buildings may be affecting overall quality of life or significantly contributing to asthma, allergies, food poisoning, some cancers, neuoro-toxicity and immune-suppression. Particulate air pollutants possibly cause, per year, 40 000 to 150 000 deaths in adults in EU cities. The population in rural areas is also affected, although to a lesser extent, as the urban pollution spreads across regions.

Many historic monuments and buildings are affected by air pollutants and in particular sulphur compounds, especially buildings made of marble, calcareous sandstone, or other materials susceptible to damage. Many of these edifices are situated in heavily or moderately polluted areas and thus are subject to serious deterioration. Examples from the UNESCO cultural heritage list are the Acropolis in Athens, Cologne Cathedral, and whole cities, such as Cracow and Venice.

4.1. Past and present situation

Although air quality in Europe and particularly in the large European urban areas has improved in recent decades, nearly 40 million people residing in the 115 larger European cities still experience exceedance of the WHO air-quality guidelines for at least one pollutant every year (EEA, 1998a).

The past decade has seen considerable improvements in the ambient concentrations of sulphur dioxide (SO_2), lead and particulates. The main sources of SO_2 and

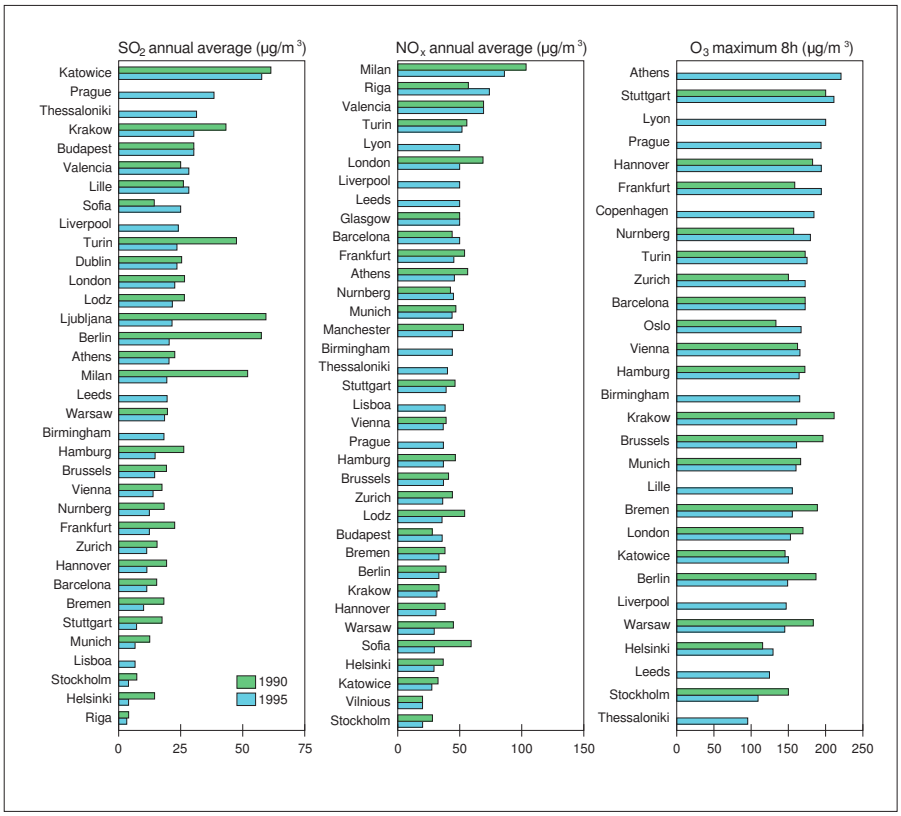
particulates in the past being industry and energy production from coal and heavy fuels combustion, emission reduction mostly relied on the emergence of new clean energy sources and more efficient combustion technologies. In a similar way, lead levels in the atmosphere were controlled by reducing lead content in fuel as a result of the EC Directive for unleaded petrol coming into force; lead concentrations have dropped sharply after 1986 in the majority of the European cities and in 1995, no city experienced exceedance of the long term WHO air quality guidelines.

SO_2 concentrations are decreasing in line with the reduction in emissions. In 1995, the long-term SO_2 guideline was exceeded only in Katowice although many European agglomerations experienced exceedances of the short-term WHO air quality guidelines for winter-smog (EEA,1998a).

However, the levels of so-called 'photochemical pollutants', nitrogen oxides, non-methane volatile organic compounds, carbon monoxide and ozone (NOx, NMVOC, CO and O_3) remain high in most European cities (EEA, 1998a). Exceedances of the short-term WHO air-quality guidelines are recorded in the majority of the large European cities (Figure 3.12.6). Road traffic emissions constitute the dominant source category for this new form of air pollution. At the European level, road traffic causes 44% of NOx, 56% of CO and 31% of NMVOC emissions (EEA, 1998c), while at city level these percentages are much higher; in Reykjavik, for instance, traffic is the only source for NOx emissions (EEA, 1998a).

A comparison of several annual average concentrations of particulate matter monitored in European cities over the past decade shows mainly downward trends (EEA, 1998c) despite the fact that, in 1995, the short-term WHO air quality guidelines were exceeded in the majority of the large European cities (EEA, 1998a). Atmospheric

Annual average SO_2, NOx and maximum 8-hour O_3 concentrations for a number of large European cities Figure 3.12.6



Source: ETC/AQ

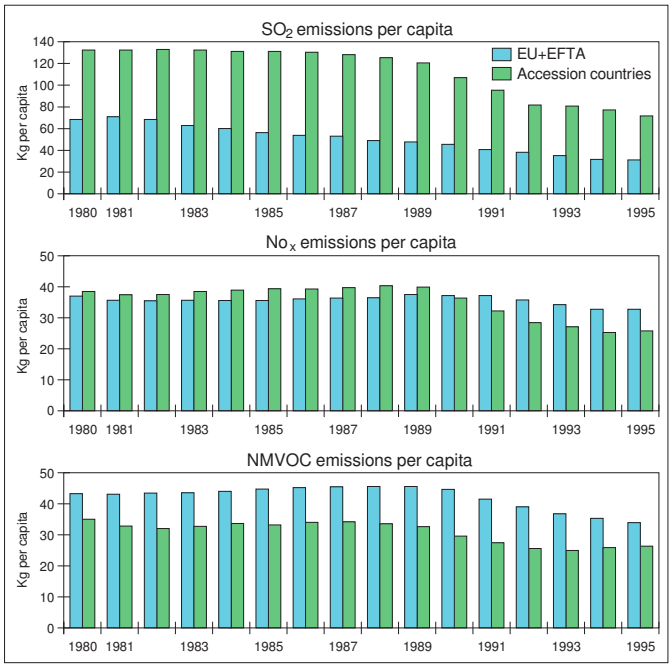
aerosol consists of particles with different sizes and chemical composition. Particles with less than 2.5 µm aerodynamic diameter are generally referred to as 'PM2.5' while particles with an aerodynamic diameter smaller than 10 µm are referred to as 'PM10'. PM10 can enter the upper parts of the human respiratory tract whereas PM2.5 can penetrate the lungs. There is increasing evidence that the health effects of particles are due principally to fine particles (PM2.5 or smaller).

Table 3.12.4 **Estimated effect on road transport from the package of measures derived from the Auto Oil Programme (Directives)**

Pollutant	Emissions in 2010 as % of 1990 level without Auto Oil measures	Emissions in 2010 as % of 1990 level with Auto Oil measures
urban NOx	37	23
urban PM	79	37
urban CO	20	10
urban VOC	23	23

Source: Auto-Oil programme

Figure 3.12.7 **Trend in NO_2, NMVOC and SO_2 emissions per capita at country level**



Source: ETC/AQ

Long-term air-quality guidelines for nitrogen dioxide (NO_2) were exceeded in many European cities in 1995. Ozone concentrations show extreme seasonal and even diurnal variations, and in 1995 many cities exceeded the maximum hourly concentrations specified in WHO air-quality guidelines.

Data on concentrations of volatile organic compounds (VOCs) is relatively scarce, because the monitoring of VOC levels is demanding in terms of equipment and analytical methods, and is not undertaken on a regular basis. Benzene is the most frequently monitored individual compound as benzene concentrations have increased with the introduction of unleaded petrol leading to high emissions from vehicles not equipped with catalytic converters. With one exception, exceedances of the long-term WHO air-quality guideline were observed in all 10 cities for which data was available (EEA,1998a).

In contrast to the clear and continuous downward trend in SO_2 emissions per capita, NOx and NMVOC emissions increased until about 1990 (Figure 3.12.7). Their decline from that year on is much smoother than the SO_2 emission decrease. It is important to note that the SO_2 emission decrease in the 10 Accession Countries starts much later than in the EU and EFTA countries, while for NO_x and NMVOC approximately the same trend is recorded for both country groups. For NO_x in particular, the reduction of emissions in the Accession Countries is faster than in EU and EFTA countries as a result of the relatively more recent renewal of the vehicle fleet.

Controlling air pollution from road traffic (including NOx, VOCs and, indirectly, O_3 levels) is identified as the single biggest and most complex issue (European Commission, DGXI, the European Air Quality Management Project), notwithstanding a modest and statistically disputable downward trend in NOx and O_3 levels from 1990 to 1995. A variety of methods include improving public transport, diverting traffic from city centres by building ring roads, reducing car use by means of parking policies or stimulating bicycle use, have been used with varying degrees of success. National and EU-level regulations aiming at automobile emissions reduction, such as the introduction of catalytic converters (EC Directive 91/441/EEC), or unleaded petrol (EC Directive 85/210/EEC), resulted in considerably lower vehicle emission factors.

The European Commission's Auto Oil Programme was aimed at improving air quality by means of evaluating cost-effective measures to reduce emissions from road transport. The process involved the car manufacturing industry and the oil industry and resulted in a number of Commission proposals in 1996, and final agreement in 1998 between the Council and the European Parliament on measures for passenger cars, light commercial vehicles and quality of petrol and diesel fuels. The measures are laid down in Directives 98/69/EC and 98/70/EC:

- a two-step tightening of vehicle emission limit values for passenger cars and light commercial vehicles with the first step in the year 2000 and the second step in 2005;
- new environmental specifications for petrol and diesel fuels to take effect from the year 2000; very low-sulphur fuels to be mandatory from 2005;
- provision made for earlier phase-in of very low-sulphur fuels;
- leaded fuels to be phased out by 2000 (with the possibility of derogation up to 2005);
- proposals to be brought forward by the Commission for further complementing measures to take effect from 2005.

The estimated effect on road transport emissions of the Auto Oil measures is substantial (Table 3.12.4).

To evaluate the impact of the Auto Oil measures on urban air quality in European cities and to assess possible further measures to reduce emissions from road transport, as well as non-technical local measures, the Auto Oil 2 Programme was launched by the Commission. This is expected to result in Commission proposals by the end of 1999.

4.2. By 2010, expectations to improve the situation

Most air quality guidelines were exceeded in 1990, the base year for the projections under the baseline scenario. The policies in place are expected to improve the situation considerably (Table 3.12.5): the average exposure of inhabitants of large agglomerations in the EU to concentrations above the recommended level is expected to be halved in 2010 in comparison with 1990.

For SO_2 and benzene a substantial improvement can be expected in the EU. Nevertheless for SO_2 in some cities, short term air quality guidelines are likely to be exceeded

Urban air quality trends Table 3.12.5

Indicator	EU 1990	EU 2010	Accession Countries 1990	Accession Countries 2010
Emission per capita				
Sulphur dioxide (kg)	38	13	103	45
Nitrogen dioxide (kg)	28	14	31	19
Benzene (kg)	0.75	0.44	0.84	0.43
PM10 (kg)	2.6	2.1	8.8	6.8
B(a)P (g)	0.58	0.53	0.77	0.59
Average population weighted concentration				
Sulphur dioxide (max. day, ug/m3)	220	75	760	540
Nitrogen dioxide (annual average, ug/m3)	56	41	59	58
Benzene (annual average, ug/m3)	8.1	3.0	12.5	3.8
PM10 (annual average, ug/m3)	42	29	68	44
Ozone (max. hour, ug/m3)	289	253		
Ozone (AOT-60, ppm.hr)	9.8	1.7		
B(a)P (annual average, ng/m3)	2.7	2.1	5.3	4.3
Average exposure				
Sulphur dioxide	80%	7.9%	96%	77%
Nitrogen dioxide	86%	40%	98%	83%
Benzene	58%	4%	83%	23%
PM10	53%	16%	94%	56%
Ozone	82%	73%		
B(a)P	88%	62%	100%	96%
Average exceedance (ratio, compared to threshold value)				
Sulphur dioxide (125 µg/m3 daily maximum)	0.8	0.15	5.1	4.1
Nitrogen dioxide (40 µg/m3 annual average)	0.45	0.13	0.48	0.46
Benzene (5 µg/m3 annual average)	0.78	0.02	1.5	0.10
PM10 (40 µg/m3 annual average)	0.18	0.03	0.71	0.21
Ozone (180 µg/m3 hourly maximum)	0.65	0.48		
B(a)P (1 ng/m3 annual average)	1.7	1.3	4.4	3.3
Maximum (2x2 km2) exceedance (ratio, compared to threshold value)				
Sulphur dioxide	1.4	0.26	6.3	5.7
Nitrogen dioxide	0.60	0.21	0.60	0.61
Benzene	1.1	0.03	2.0	0.16
PM10	0.30	0.06	1.1	0.35
Ozone	0.96	0.72		
B(a)P	2.5	1.7	5.2	4.4

Source: Eerens et al, 1999; ETC/AQ

for a limited number of days a year in 2010. The most significant exceedances expected in 2010 are PM10, ozone, NO_2 and Benzo(a)pyrene. For accumulated ozone exposure above a threshold of 60 ppb (AOT60), exposure decreases of approximately 60% are predicted for an aggregate of 50 European cities between 1990 and 2010. Nevertheless, the hourly maximum average weighted concentration of ozone of 253 µg/m^3 expected in 2010 is well above the EU target of 180 µg/m^3. The EU guidelines for NO_2 require an average concentration reduction of 30% by 2010 compared to 1990 levels. This will probably not be achieved in all EU cities under existing policies.

In Accession Country cities, the frequency of exceedances of air quality guidelines will probably be significantly higher in 2010 than in the EU. This could be countered through the application of EU guidelines, although at significant cost. The application of EU vehicle emission standards and other measures, for example, could effectively constrain projected increases in NO_x emissions, but at an anticipated cost of about 6 billion EUR/year, 2.5 times current levels.

5. Urban noise issues

Noise remains a serious environmental problem: it is estimated that about 32% of the EU population (about 120 million people) is exposed to road noise levels over 55 Ldn dB(A) on house facades; this is despite reductions in vehicle noise limits by 85% for cars and 90% for lorries since 1970 (Figure 3.12.8). Estimates of noise-related costs range from 0.2% to 2.0% of GDP (Quinet, 1993).

The latest reduction of 74 dB(A) for cars and 80 dB(A) for lorries has led to significant applications of low-noise technology. Aircraft and rail noise levels also cause annoyance although the aircraft noise footprint for modern jets around an airport has been dramatically reduced by a factor of nine compared with aircraft from 1970. Based on data from 35 major European airports that accommodate about 85% of the total air traffic, it is estimated that approximately 3 million people in Europe are exposed to aircraft noise over Ldn 55 Ldn dB(A). However, a complication is that perceptions of the various types of transport noise differ between individuals. For example for the same noise value of Ldn 60 dB(A) the sensitivity can be different: typical proportions of highly annoyed people are: aircraft noise 15%, road traffic noise 10% and railway noise 5% (Box 3.12.7).

In spite of the considerable tightening of EU-type testing limits since 1972 the actual effect on the reduction of noise emission by motor vehicles was negligible. Although the reasons for that inadequacy are known and mentioned in the Green Paper on Noise (COM(96)540), little progress has been made so far to improve the state of the urban acoustical environment.

5.1. Where do we stand?

A contemporary trend in urban planning is to direct through traffic to ring roads and away from already congested urban areas. Many ring-road systems and urban highways have noise barriers and tunnels; such measures are also promoted by the EU environmental impact assessment procedure.

However, anti-noise measures are hampered by a lack of harmonisation at European level (indices, methodologies and limit values) and international standards for the calculation and measurement of transportation noise, as well as inadequacies in testing methods for vehicles, tyres and road surfaces. The cost of mitigating existing noise problems can be very high, although it should not be underestimated the noise reduction potential through traffic management, traffic calming, parking policies and other low-cost measures that can shift mobility from private car to walking, biking and public transport. In fact the improvement of the modal split in favour of the low-noise/low-emission transport modes is considered one of the best ways to tackle the urban traffic noise problem.

Incentives are needed to motivate manufacturers to develop vehicles and aircraft with even lower noise emissions, and – importantly – for local administrations to promote anti-noise resurfacing of roads.

5.2. What does the future hold?

Under the baseline scenario, noise levels adjacent to major European road networks are expected to worsen towards 2010 because of growth in traffic, especially freight transport (see Chapter 2.2). The same applies to aircraft noise, particularly after 2010 when air traffic is projected to increase while major technological improvements in aircraft appear unlikely.

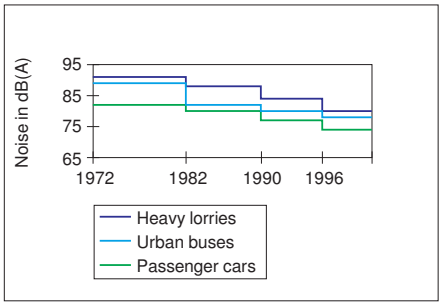
Box 3.12.7. Grim reminder of the issue

Noise is defined as unwanted sound because it affects people in both physiological and psychological ways. We are exposed to noise before birth and throughout life and it is a problem that affects everybody. At levels over 40 dB(A) it starts to influence our well being, at levels over 60 dB(A) it may well be detrimental to health (Berglund and Lindvall, 1995).

Modern lifestyles have resulted in increased mobility, with more vehicles, more roads and more travelling, and although noise is associated with all human activities it is caused mainly by the various transport modes i.e. road, rail and air traffic. So noise is spreading, both in duration and geographical coverage, in European cities.

Noise-Stand: Development of EU noise standards, 1972-1996

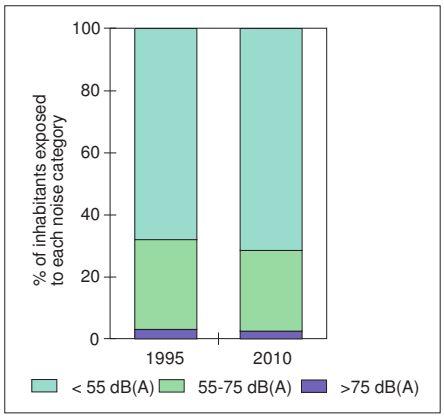
Figure 3.12.8



Source: European Commission

Percentage of inhabitants exposed to Ldn noise categories for Amsterdam, Munich and Madrid (1995 and 2010)

Figure 3.12.9

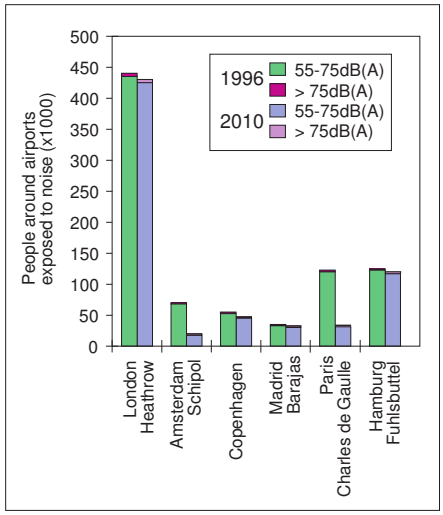


Estimated road traffic noise in the present and in the future situation 2010 taking into consideration traffic growth, technical developments on vehicles, tyres and road surfaces, traffic circulation plans and population developments.

Source: EEA

Population in Ldn 55, 65 and 75 dB(A) contours around the six studied airports. Existing situation and 2010 forecasts

Figure 3.12.10



Source: EEA

Population exposure to traffic noise is therefore unlikely to diminish significantly. This is shown by estimated projections for three European cities: Amsterdam, Madrid and Munich (Figure 3.12.9), and corroborated by expert estimates of noise reduction potential (Nordic Council of Ministers, 1994). These expert estimates suggest no significant noise reduction at speeds exceeding 60 km/hr where tyre noise is dominant; and 2 dB (A) and 1 dB (A) reductions at speeds between 0-40 and 40-60 km/hr respectively due mainly to decreased engine noise. Traffic noise exposure is expected to increase markedly in the Accession Countries from rapid growth in road traffic (including freight) and public transport decline.

New vehicle standards have a lead time of several years and require compliance by around 90% of the vehicle fleet (which can take 7-15 years) before there is a significant effect on measured road noise levels. Regulations could secure a 3 dB(A) cut in emissions from road tyre noise although the effect would not be noticeable until after 2010. Reductions in road surface noise by 5-7 dB(A), depending on the operating speed, can also be cost effective (Miljønyt, 1998).

Aircraft noise exposure at major European airports is unlikely to increase up to 2010 mainly due to phasing out of noisier aircraft, scheduled fleet renewal and noise optimisation of flight procedures and air strip geometry. At Paris CDG and Amsterdam airports, for example, significant improvement is expected with the introduction of new runways, with flight paths away from populated areas (Figure 3.12.10).

However, noise exposure may increase at European regional airports, which are

anticipated to accommodate a considerable proportion of the expected growth in aircraft operations, and in the Accession Countries due to air-traffic growth and more frequent use of noisier aircraft.

Ongoing research programs, in Europe and the United States, are trying to develop low-noise aircraft technology with the objective of a 10 dB (A) reduction in aircraft noise by the end of the century. However, even after new technologies are sufficiently developed to be introduced into service, it will take many years to incorporate these technologies into the commercial transport fleet.

5.3. Action to combat noise

Some local actions to deal with individual noise sources are presented for Athens and Amsterdam (Box 3.12.8). In Germany, local noise-abatement plans are enforced by national law and since 1990: 300 cities have started implementing such plans.

Nevertheless, action is also needed at European level, to supplement local and national measures – 'the local nature of noise problems does not mean that all action is best taken at local level' because 'generally the sources of environmental noise are not of local origin' (European Commission, 1996a. Box 3.12.9). Furthermore, single market requirements can inhibit national regulation, because any measures involving trade barriers will be unlawful unless they can be 'justified by considerations of public health and environmental protection' (see European Court of Justice Case C-389/96, which upheld Germany's stricter noise limits for aircraft engines than those specified in EU legislation). To date, European Community noise policy has essentially consisted of directives, primarily concerned with single market or social policy objectives, fixing maximum sound levels for vehicles, aeroplanes and machines.

Box 3.12.8. Examples of local action

Athens urban traffic noise control

Due to car traffic restrictions on the city inner ring road many Athenians have turned to motorcycles and mopeds as their daily transport mode. The noise problems from the motorcycles and mopeds, especially due to tampering and lack of maintenance, were enormous.

As a consequence, the Ministry of the Environment and Athens Police Force jointly began spot measurement controls on motorcycle noise in April 1996. Results available until March 1998 show the potential benefit from the controls according to EU 78/1015/EEC Directive stationary motorcycle noise method.

Apart from receiving heavy fines, offending drivers had to prove that they had dealt with the problem of their vehicle in a re-examination process usually two weeks later. The sample covered about 30 000 motorcycle checks.

The trend shows that initially (for a nine-month period) over 50% of the noise emissions were found to exceed the permissible limits. After another nine-month period the percentage had dropped to a quite constant 9% (Figure 3.12.11).

Source : Ministry of the Environment, GR

Amsterdam: Application of low noise two-layer drain asphalt on major road segments

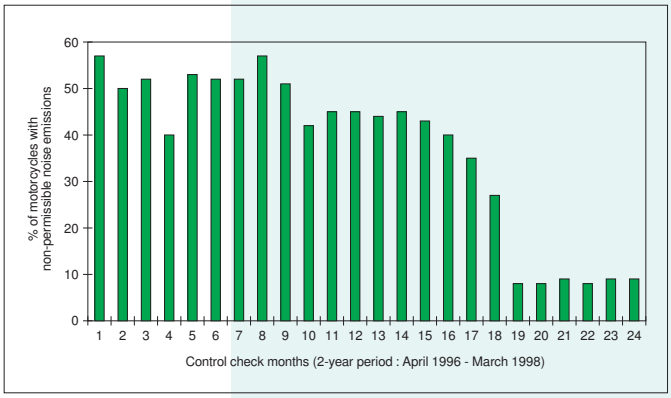
Source : M+P Consultants

In 1996 the central city council of Amsterdam decided that when they examine renewals of major roads, they should investigate the feasibility of low-noise, two-layer drain asphalt application. Such a surface can significantly decrease traffic noise levels at low city speeds, without jeopardising safety and durability.

Until mid-1998, eight street sections of major roads, with traffic intensity of more than 15 000 vehicles, undergoing major renewal, were examined and in seven cases low noise road surface was selected, about 15 km in total. The result was that 9 000 inhabitants were exposed to noise levels 5 dB (A) less than before. It should be mentioned here that a 10 dB reduction in noise is perceived as a 50% reduction.

The costs per km, comprising the costs of the road surface, the rain-water drainage system and the yearly maintenance costs over a period of 15 years, were estimated to be about 350 000 euro. The extra costs involved are financed by the central city council.

Figure 3.12.11 **Effects of measurement control on motorcycle noise, Athens**



These directives can be grouped into three main areas:

- Vehicles (and tyres): noise emissions from motor vehicles and motorcycles are covered by two directives introducing sound level limits under specified test circumstances and continuously updated to be in line with technological developments.
- Aeroplanes: this category comprises three directives. The first two, which are amended once, lay down limits on noise emissions for aeroplanes registered in the territory of Member States. The third prohibits the use of Chapter 2 (ICAO noise category) aircraft after 2002.
- Others: machinery, construction plant equipment, lawn mowers and household appliances: permissible noise emission limits and limits on the operators position.

At EU level, the basic strategic noise policy actions have been the following:

- The 5th Environmental Action Programme (5EAP): in 1993 the 5EAP set out a strategic approach by setting out a number of targets for noise exposure levels to be achieved by 2000, and outlined action to be undertaken by the major players; a recent proposal on the review of the 5EAP announced the development of a noise abatement programme for action to meet these targets. The 5EAP target of stabilisation of the fraction of EU population exposed to >65 dB(A) and avoidance of exposure to >85 dB(A), is realistically attainable, although differences between countries in procedures on noise exposure appraisal will make it difficult to assess progress in achieving the target.
- The 1996 Green Paper (European Commission, 1996a) outlining a possible step-by-step approach to the development of a new framework for Community noise policy. The orientations for the future European policy on noise and the proposed response to the Green Paper have been developed bearing in mind that the objective is to identify the noise problems and to put in place the necessary framework needed to remedy them.

Box 3.12.9. Policy developments on noise issues

The future EU strategy for noise policy (Copenhagen Conference, September 1998) is to be established in a coherent system of directives consisting of a framework directive for environmental noise and directives on noise emission: this could provide what has been missing until now, a co-ordinated approach. Working Groups have already started dealing with issues that need to be clarified and harmonised throughout Europe such as indices/indicators, dose/effect relationship, computation and measurement, noise maps, noise abatement and emission control. The following action plan was agreed:

1999 common indices/indicators proposed by Working Groups

proposal of the Commission for a Framework directive on Noise, obligation to assess with existing methods, obligation to fix national or local targets, actions in case of exceedance of targets

2001 harmonised methods and EU targets

2002 Framework Directive in force

2006 harmonised methods in force

2006+ EU targets in force

The European Commission had to ensure that hush-kitted Chapter 2 (ICAO noise category) aircraft cannot be added to the registers of the European Union and the reason is the potentially high number of those aircraft on Third country registers. For these reasons, the EC decided to propose a directive to ensure that hush-kitted Chapter 2 aircraft cannot be added to the registers of the European Union as from 1 April 1999.

A proposal (COM (97) 680 final) has been prepared by European Commission on vehicle tyre noise, meanwhile European Commission and ISO technical groups study the modification of the standard test method for the noise production of vehicles. Other proposals such as (COM(98)46 final) deal with the emission of noise by equipment used outdoors. It is intended to replace nine existing directives for seven families of equipment and to extend the number of families of equipment to more than 50.

6. Towards an integrated urban policy?

There is now a double challenge facing policies which affect, and contribute to, urban development and planning: to promote sustainable development, and at the same time to remedy the effects of mistaken policies of the past. A supportive framework is emerging at the EU level which attempts to link effectively with national and local government policies and initiatives, and action is now needed to implement specific measures within this framework. Non-governmental organisations (NGOs), community groups, and the private sector are, indeed, active partners to ensure that policies are tailored to local needs and priorities. Furthermore, because many urban problems are universal, networking between cities, which has flourished over the past 10 years, is to be further exploited.

For the three areas highlighted in this chapter (sprawl, transport and consumption patterns), the effects of policies are overshadowed by the size of the phenomena. Initiatives currently in place are in general insufficient to curb the pressures derived from noise and energy consumption. Furthermore, they are insufficient to tackle the growing threats arising from sprawl (i.e. land

use stresses and social inequities), growth in consumption (i.e. waste generation and water consumption), and transport (i.e. congestion, air pollution and noise).

6.1. Weaknesses of existing policy approaches

Policies to address urban environmental issues show serious weaknesses (see Box 3.12.10): existing measures are sectorally oriented, focusing mainly on transport and industry; cross-sectoral integration is badly needed, particularly with regard to the land use / transport interface and environmental impacts of consumption patterns (Slob *et al.,* 1996 and UNCED, 1992) (Figure 3.12.12). Policy making also requires 'vertical integration' so that responses can be tailored to unique local circumstances and priorities.

Box 3.12.10. Main weaknesses in the understanding of EU urban environmental issues

- Urban growth is inextricably linked with economic growth, although it is not clear which fuels which.
- The spatial impact of telecommunications and computerised information networks is not yet known.
- The spatial impact of policies is difficult to measure (OECD, 1996), particularly due to the lack of adequate indicators for urban areas and of area typologies (European Commission, 1997b).
- Time lags associated with air pollutants exposure impacts compound to monitoring shortcomings and knowledge gaps, and make prioritisation and targeting difficult.
- The lack of Community agreed standard methods for assessing acoustic quality seriously limits the use of current EU legislation.

At EU level, urban environmental policies still lack a common implementation framework that brings together the diverse initiatives. This reflects, in a sense, the absence of direct EU competence in urban planning which has resulted in a lack of a prioritised urban agenda – only noise- and air-related targets have been set at the EU level (EEA, 1997a).

Internalisation of external costs is under slow development for the industry, energy and transport sectors, with even less progress in withdrawal of perverse subsidies (see Chapter 4.1). Economic instruments are being aimed at behavioural change (and revenue raising in the energy, transport, and – especially – tourism sectors). Strategic spatial assessment of policies must be developed, from pioneering EU initiatives in the TENs programme and URBAN project (for transport and households, respectively).

6.2. What is the challenge ahead?

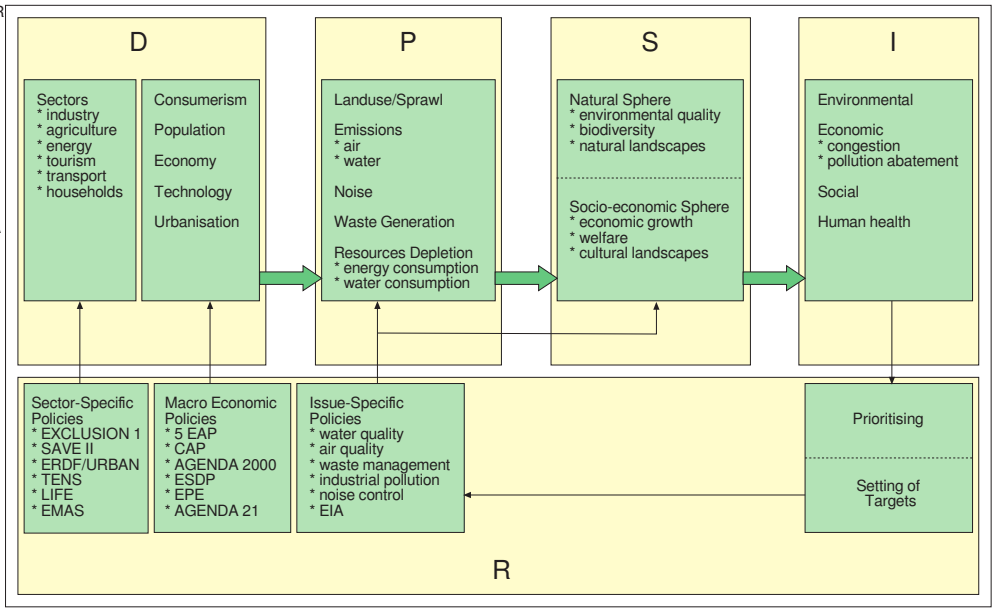
Table 3.12.6 is intended as a summary of the broadening spectrum of policy instruments, noting the trends in their application to the issues of sprawl, transport and consumerism.

Policy instruments should be geared to integrated strategic policy targets, particularly in relation to transport and land use planning. Public consensus, support and participation are of vital importance in this

Figure 3.12.12 **DPSIR for urban issues**

The EEA's DPSIR causal framework for urban stresses, showing the interconnections between driving forces [D], pressures [P], states [S], impacts [I], and responses [R]

Source: EEA



Policy instruments for urban environmental problems Table 3.12.6

	SPRAWL		CONSUMERISM				TRANSPORT	
	land use	social inequities	waste generation	water consumption	energy consumption	air pollution	noise	congestion
award / recognition		●						●
public information / education		●	●	●	●	●		●
life-cucle analysis			●	●	●			
environmental accounting / reporting			●	●	●	●	●	
eco-audits / management	●		●	●	●	●	●	●
product labelling								
„right to know“	●							
environmental agreements			●		●	●		
demand side management								
regulatory reform	●			●				●
liability rules			●					
subsidy removal	●			●	●			
marketable permits						●		
eco-taxes / tax reform	●		●	●	●			
environmental impact assessment	●						●	
trade restrictions			●					●
ambient emissions standards						●		
licensing / permitting	●		●			●	●	
bans	●		●				●	●

The table lists policy instruments for environmental protection commonly used in OECD countries. They are listed according to their character (i.e. from regulatory measures – on the bottom – to public awareness and education initiatives – on top). It is worth noting that some measures are not initially conceived to target urban areas; nonetheless, they may bring about positive developments tangentially.

Source: EEA; EEA, 1997b

context, by enhancing a sense of partnership and common cause. The recent Aarhus Convention requires signatory nations to establish legislation which gives citizens the right to quick access to environmental information. Improved reporting on urban environmental issues will increase public interest, and participation in the development of urban environmental policy and initiatives (see Chapter 4.2).

The challenge to political leaders is to take a long-term view and ensure that urban initiatives promote social integration while optimising environmental protection. As articulated by the EC Expert Group on the Urban Environment, ‘In the social field... this requires that basic services and amenities, education and training, health care, housing and employment become available to all’ and that ‘...in the environmental field an ecosystems approach is recommended which regards aspects such as energy, natural resources, waste production and information flows as chains of activities that require maintenance, restoration, stimulation and closure in order to contribute to sustainable development’.

An increasing number of local authorities in Europe have taken initiatives to implement a Local Agenda 21 and about 400 European local governments have adopted the Charter of European Cities and Towns, which emphasises integrated approaches towards sustainability and the need for better networking and collaboration between European cities. The Charter calls for action in the following four areas:

- promoting economic competitiveness and employment;

- favouring economic and social cohesion;
- improving transport and Trans-European Networks (TENs);
- promoting sustainable development and the quality of life.

While there are numerous local 'sustainable city' initiatives across Europe they remain pilot projects. The question is whether the environmental and social imperatives of these models can be politically viable and whether meaningful participatory and consensus-based approaches can be sustained in the long-run.

6.3. Urban policy initiatives at European level

It can be said that the EU has had several urban policies, as numerous European Commission services have attempted to address urban issues in their individual programmes. But the need to consolidate efforts into a single framework for strategic action for urban policy was noted in the Commission's Mid-term review of its Fifth Environmental Action Programme.

The 1990 *Green Book on the Urban Environment* (European Commission, 1990) marked the start of efforts to establish an urban dimension of EU environmental policy. Numerous initiatives followed, notably the establishment of the EC Expert Group on the Urban Environment in 1991, the initiation of the European Sustainable Cities Project in 1993, the launch of the European Sustainable Cities & Towns Campaign in 1994, and the May 1997 Communication on the urban agenda (European Commission, 1997c) (see Box 3.12.11). The EC Expert Group has already prepared an comprehensive response to the Communication which together with numerous other documents can be found on the Internet:

(*http://www.inforegio.org/wbdoc/docoffic/communic/ville/home_en.htm;*

and the EC Expert Group response:

(http://europa.eu.int/en/comm/dg11/urban/respons-en.htm).

In parallel, the European Spatial Development Perspective (ESDP) has been under development for over seven years through a concerted effort by Member State ministers responsible for spatial planning and EC authorities (see Chapter 2.3). Recognising the growing interdependence between geographic areas, sectoral policies and the various levels of government resulting from the social and economic changes in Europe, the ESDP aims to integrate the goals of economic and social cohesion, sustainable development and balanced competitiveness in the European territory. It is intended as a shared vision of the European territory as a whole, a reference framework for action.

The recognition of the importance of cities and towns in offering quality of life for European citizens has grown alongside these initiatives, with for example, the introduction of the Community Initiative URBAN and the recent commissioning of work on an Urban Audit to measure the quality of life in European cities and towns.

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Box 3.12.11. Recent policy framing developments

European Sustainable Cities (Report by the Expert Group on the Urban Environment, European Commission, 1996b).

The report is one of the main outputs of the Sustainable Cities Project and focuses on the application of the concept of sustainability to urban areas. It is not only concerned with cities but also urban settlements of different scales, and it embraces the question of the sustainability of urban regions and of the urban system as a whole.

The report has an institutional as well as an environmental focus. It is concerned with the capacity of local governments to deliver sustainability. It recognises the importance of capitalising upon the good general management practices now increasingly characteristic of local governments in Europe. The report stresses that successful progress is dependent upon active involvement of local communities and the creation of partnerships with the private and voluntary sectors within the context of strong and supportive government frameworks at all levels.

Towards an urban agenda in the European Union (Communication from the Commission, COM(97)197 final).

This document examines the possibilities for improving urban development and for increasing the effectiveness of existing Community intervention in urban areas. It is pointed out that the intention is not to develop Europe-wide policies for matters that are best dealt with at a local or regional scale. However, it is clear that the European urban areas are facing a number of common problems, and there are thus opportunities at the European scale to share and to facilitate potential solutions. One of the document's main points is that much can be achieved through a more focused approach using existing instruments at national and Community level and enhancing co-operation and co-ordination at all levels.

Two additional elements are emphasised: first, the challenges related to urban development provide an opportunity for the EU to become a more meaningful body for its citizens by bringing tangible benefits to daily lives. Second, cities play a crucial role in underpinning a European model of society, based on equal opportunities regardless of gender and ethnic origin. Urban authorities cannot be the sole agencies to act on these issues, but their active participation is paramount.

Source: Williams, 1996; European Commission, 1997d, 1998c

Agenda 2000: For a Stronger and Wider Union (European Commission, 1997).

Agenda 2000 maps out the Commission's views on the way in which the EU should address the major challenges of the next 10 years. It reaffirms the centrality of economic and social cohesion to European policy and points out that, with the prospect of enlargement to countries whose levels of prosperity are below those of the poorest Member States, even greater efforts will be needed to promote cohesion.

Although urban polices are not as such discussed in the Agenda, for the first time there is clear recognition that any measures aimed at promoting social and economic cohesion also need to specifically address the urban environment. With the current growth of urban areas, the social economic and environmental problems in these areas are increasing as well. The kind of key issues that Urban Pilot Projects address, such as high unemployment, social exclusion and environmental decay, are given prominence in European policy. Agenda 2000, through several structural measures such as Objective 2 and the Article 10 ERDF programme, offers the possibility to improve the quality of life of citizens in European cities.

Sustainable Urban Development in the European Union: a Framework for Action (COM (98) 605 final)

Sets out a Community strategy to:

- increase the effectiveness of environmental policies within an urban perspective;
- foster an integrated urban development.

To this end it relies on four basic pillars:

- strengthening economic prosperity and employment in towns and cities;
- promoting equity, social inclusion and regeneration in urban areas;
- protecting and improving the urban environment;
- contributing to good urban governance and local empowerment.

The Commission's triennial report on economic and social cohesion will serve to assess progress in the implementation of the framework for action.

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