

The European environment — State and outlook 2005

Executive summary

European improvements, local choices, global impacts

Europeans value their environment — Eurobarometer polls show that a large majority (over 70 %) want decision-makers to give equal weight to environmental, economic and social policies. As individuals, Europeans are prepared to take some environmental action, though they would do more if they had better information on environmental choices that cost little or nothing. They would also do more if they felt confident that their fellow citizens were doing the same.

Over the past 30 years, much has been done to improve Europe's environment. Lead has been eliminated from most petrol. Ozone depleting chlorofluorocarbons (CFCs) have been phased out. Nitrogen oxide emissions from road transport have been reduced by around 90 % compared to what they would have been had catalytic converters not been introduced.

Increasing treatment of urban wastewater is allowing Europe's rivers, lakes and estuaries to recover from pollution. Designation of protected natural areas in the European Union now amounts to 18 % of all the territory, helping to maintain ecosystems and preserve biological diversity. Forests are slightly increasing and in some regions are regenerating at a faster rate than before. These and many other advances translate into benefits for people's health and for their quality of life.

But major challenges remain for the future. The most pressing is climate change whose impacts are already thought to be evident in ever more frequent extreme weather events, regional water shortages and melting polar ice. Other environmental priorities are: air pollution and regulation of chemicals so as to reduce impacts on health and on the environment; the preservation of land as a productive resource and as a reservoir for biodiversity; improving the quality and quantity of freshwater; and ensuring the health of the oceans. Oceans, in particular, are key ecosystems that sustain many of the ecological goods and services on which we depend.

Answers to some of these challenges can be found in increased use of renewable energy resources such as wind and solar power to replace some of the finite non-renewable resources that both developed and emerging economies are competing to exploit.

Many of the environmental problems we currently face are rooted in the way Europe uses its land, and in its economic structure and our ways of life. These are difficult to change. Most notably, there has been a shift in environmental emphasis from production to consumption issues. Better awareness about environmental and health effects would positively impact our daily choices on what to buy, where to live and work, and where and how to travel.

Household expenditure increased by a third in the EU-15 between 1990 and 2002. It is projected to double across the EU-25 by 2030, with major differences between income groups and regions. In an increasingly globalised economy, consumer choices everywhere increasingly impact not just Europe's environment but also many other parts of the world. Better understanding of potential impacts through keener research is needed to help reverse some of the current and future downward trends.

At around five 'global hectares' per person, the 'ecological footprint' of the EU-25 — the estimated land area required to produce the resources we consume and to absorb the wastes we generate — is approximately half that of the United States, but bigger than that of Japan. It is more than double the average for countries like Brazil, China or India. Already, the total global use of natural resources is some 20 % higher than the rate of replacement each year. This has been called, 'living off the capital rather than off the interest'.

Increasing urbanisation, abandoning land

Almost three-quarters of Europe's population live in urban and suburban areas which account for some 10 percent of the total EU land area. This seems



manageable, yet the intensity and conflicts over the multiple uses of land can have repercussions on valuable portions of Europe's territory, far away from where the initial land use is actually taking place.

Recent analysis shows that more than 800 000 additional hectares of naturally productive land were converted into artificial surfaces for homes, offices, shops, factories, and roads, adding 6 % to the continent's urban areas between 1990 and 2000. This is equivalent to three times the area of Luxembourg and represents a significant shrinking of natural capital. The low price of good agricultural land compared with that of already urbanised land is among the key factors influencing this urban expansion.

Tourism, too, keeps growing rapidly, driven in part by cheap prices for air travel and by Europe's increasingly affluent and ageing population. Tourism also contributes to urban sprawl, particularly in the hinterland of coastal agglomerations, such as along the heavily developed Mediterranean coast. Poorly planned tourism development can also increase pressures on areas already experiencing water stress.

As urban areas grow, so their use of land and water from surrounding areas intensifies. This growth impacts key 'services' assumed to be provided free by nature, such as the natural filtration of groundwaters into drinking water aquifers, the preservation of wetlands and of the genetic diversity found in areas of small-scale extensive agriculture. The removal of woodland cover can radically alter rainwater run-off, provoking mudslides and other problems, while increasing the areas at risk from flooding.

Climate change is here

Climate change is underway. Average European temperatures have risen over the past 100 years by 0.95 °C, and are expected to rise by 2–6 °C in this century. In some places, agriculture is likely to benefit from longer growing seasons, but in others, severe water shortages and more severe (and less predictable) weather events will make farming more risky.

Rising sea temperatures and increased nutrients levels bring a greater probability of algal blooms — toxic phytoplankton, harmful both to marine life and humans. Zooplankton — at the bottom of the food-chain — and the fish that rely on them as a main food source tend to follow temperature trends. In fact, some species have already migrated a thousand kilometres north. Land-based animal and plant species are also on the move. For some species migration is unfortunately not an option. Alpine species living at the highest altitudes are running out of options for where to go next.

In response, EU ministers have agreed to a target to limit the long-term global increase in average temperature to no more than 2 °C above pre-industrial levels. They have also indicated that stabilisation of CO₂ concentrations well below 550 ppm may be needed to achieve this target, requiring cuts in greenhouse gas emissions in developed countries of some 60–80 % by 2050 compared to 1990 levels. In the short term, the EU is broadly on track to meet its Kyoto targets as a result of the EU emissions trading scheme and other measures including the European climate change programme. However, its mid-term goal for 2020 — a 15 to 30 % reduction in greenhouse gas emissions from 1990 levels — will be more difficult to achieve.

EEA scenario studies conclude that the key to a low carbon emissions economy lies primarily with three measures: reducing energy consumption, increasing the share of renewable energy, and improving energy efficiency in power generation and use, notably through further energy conservation measures. The use of renewables for power generation is increasing gradually, while the possibility of increased nuclear power remains an open — and hotly debated — issue in most countries.

Slow progress on energy demand management

Since 2000, improved efficiency in energy generation and declining energy demand from industry have been offset by rising energy consumption by consumers and

the service sector. More electrical appliances are being used in increasing numbers of households. Studies indicate that electrical appliances left on stand-by mode, for example, now account for 3–13 % of household electricity consumption.

By 2030, the demand for energy across Europe is expected to rise by close to 20 %, a much slower rate than foreseen for gross domestic product (GDP), but nonetheless in the wrong direction vis-à-vis the requirements to combat climate change. Cost-effective measures for improving energy efficiency remain underused. More efficient combined heat and power stations could improve energy supply efficiencies. Carbon capture and storage could serve as a transition technology. Efficiency measures for buildings, vehicles and consumer goods stimulated by market-based instruments and regulations would help reduce demand.

In the medium term, sustained investment in renewable energies, energy efficiency and in hydrogen as an energy source could help reduce European dependency on fossil fuels. The latter would especially help the transport sector which is the fastest growing contributor to Europe's growing energy demand and CO₂ emissions. Worryingly, this trend is expected to continue in coming decades. Air travel in particular is expected to double its share of overall transport between 2000 and 2030.

The EU has shown committed leadership by setting ambitious targets and goals for greenhouse gas reductions. It has also accepted that inaction poses too great a risk. Shifting to low-carbon energy sources, as suggested by EEA scenarios, will entail higher energy bills for the consumer. But doing nothing also has a cost, as several studies looking at this issue are beginning to show. One suggests that the 'social costs of carbon' — the costs to global society of every tonne of carbon emitted to the atmosphere — are around EUR 60 per tonne. Other studies suggest much higher costs. Different estimates depend on how long-term impacts on climate, agriculture, air quality, pests, water supplies and diseases are given a monetary value.

These costs can be put into perspective when considering that greenhouse gas emissions in the EU-25

range from 5 tonnes to 25 tonnes of carbon per person depending on which country you live in (equivalent to EUR 300/person to EUR 1 500/person in social costs). This compares with the estimated additional costs of EUR 45/person in 2030 for a low carbon economy: the latter is considerably less expensive.

We are healthier, but exposure to pollutants remain

Europe has made great strides in reducing many forms of air pollution. In particular, it has eliminated smog in many areas and reduced acid rain. However, high concentrations of fine particulates, and ground-level ozone in particular, are still causing health problems in many cities and surrounding areas. Ground-level ozone is also damaging for ecosystem health and for crops across large areas of rural Europe.

Despite reductions in emissions, concentrations of these pollutants remain high, often above existing targets. Exposure to concentrations leads to reduced life expectancy and causes premature death and widespread aggravation to health. The increasing volume of transport, 30 % for freight and 20 % for passengers over the past 10 years, has meant that significant technological improvements have not resulted in much overall reduction in emissions.

Europe loses 200 million working days a year to air pollution-related illness. Moreover, the OECD estimates that 6.4 % of deaths and illnesses in young European children are caused by outdoor pollution. This figure is disproportionately more in the new EU Member States. Analysis underpinning the Thematic Strategy for air pollution published in September 2005 has shown that substantial impacts on people's health and ecosystems will persist even with full implementation of existing legislation.

Improvements in transport technologies, from hybrids to hydrogen fuelled vehicles, all have their parts to play in reducing the exposure. So, too, does urban planning, which could offer integrated transport approaches as real alternatives to car transport in many urban areas.

Europe's citizens are also exposed to a growing cocktail of chemical pollutants generated from food and modern consumer goods, including furniture, clothing, and household products. Links between chemicals and rising trends in cancers in reproductive organs (testes, prostate and breast cancer) and in childhood leukaemia are being increasingly highlighted. Strong evidence is lacking, but the ubiquitous presence of chemical traces in people's blood samples and in the environment is an obvious cause for concern. Less use of hazardous chemicals in farming and lower residues in consumer products would help reduce the impacts of such chemical mixtures.

Pollution prevention pays off

Great efforts have been made to clean up Europe's wastewater and to reduce water polluting wastes from industry. However, there is still some way to go before the urban wastewater treatment directive is fully implemented. Progress so far has been achieved through capital investments and advanced forms of treatment.

Future trends show that further reductions in wastewater pollution will be achieved especially in the EU-10 Member States, supported by the EU structural and cohesion funds from 2007. Experience of wastewater treatment policies over the past 20 years shows that investments in treatment capacities, combined with realistic economic incentives to reduce pollution at source offers the most cost-effective way to reduce such pollution.

The EU, through such policies as the nitrates directive, has sought to reduce pollution from agriculture. Investments by the water industry continue to ensure the quality of drinking water. However, leaching into Europe's rivers and groundwater continues from the use of organic and mineral fertilisers and pesticides. While it is expected that the use of such chemicals will diminish in the EU-15, the use of mineral fertilisers is expected to rise by 35 % by 2020 in the EU-10 as agriculture intensifies.

Problems with the quality of Europe's groundwater will remain in many areas as it can take decades for

pollutants entering the ground to reach our rivers, lakes and water supplies. Prevention, through changing farming practices, is more cost-effective than cleaning up, especially in the longer term.



Depleting our natural resources

The state of the world's fish stocks illustrates the dangers of over-using natural resources and damaging the functions of ecosystems. Fish are the last major wild food source. The Food and Agriculture Organization of the United Nations (FAO) estimates that 75 % of the world's fish stocks are over-fished and top level predators such as tuna and sharks are becoming scarcer.

With many of Europe's stocks depleted, the European fishing fleet has moved further afield supported through bilateral agreements and subsidies. These fleets have played a role in 'fishing down the food chain' by removing significant tonnages of top-level species. This has left many commercially important species at risk and the ecosystem structure under threat.

On land, the designation of 18 % of Europe's land area as protected areas under the Natura 2000 network will contribute to securing the health and diversity of its ecosystems. Nevertheless, Europe's landscapes, which are a critical part of its cultural heritage and essential homes for biodiversity, are undergoing widespread and potentially irreversible changes. These changes impact both on species and ecosystem functioning.

The largest losses of habitats and ecosystems for biodiversity across the continent during the 1990s were in heath, scrub and tundra, and wetland mires, bogs and fens. Many of remaining wetlands have been lost to coastal development, mountain reservoirs and river engineering works. Similarly, although more of Europe is tree-covered today than in the recent past, many forests are harvested more intensively than before.

These losses are having an impact on individual species. Despite protection policies as part of the European strategy to conserve its critical wildlife habitats, many species remain threatened, including 42 % of native mammals, 15 % of birds, 45 % of butterflies, 30 % of amphibians, 45 % of reptiles and 52 % of freshwater fish.

Europe's soil is uniquely varied, with more than 300 major soil types found across the continent. Lost soil

may eventually be replaced through natural processes but it can take as much as 50 years to produce just a few centimetres of new soil. Soil should be regarded as a non-renewable resource. There are many threats to soil – erosion, sealing, contamination, salinisation. These have proven difficult to tackle up to now and are expected to continue to be a challenge in line with expected future developments in Europe in urbanisation, intensive agriculture and industrialisation/deindustrialisation.

Across the continent demand for water continues to increase, particularly in the household sector. In the new Member States household water use is expected to rise by 70 % in the coming decade. More water is also being used for the irrigation of food crops, particularly in southern Europe where there are already signs of water stress. Climate change is expected to extend and intensify this problem. The long-term availability of abundant, reliable and clean water supplies will become more important in the context of future land-use planning, especially around the Mediterranean Sea.

During the past decade, Europe has achieved a relative decoupling of economic growth from materials and energy use. Absolute resource use, however, has remained steady. There are large differences between EU countries with materials intensity varying from around 11 kg/EUR of GDP to less than 1 kg/EUR. These differences can in part be explained by the balance of economic activity between industry and services. Nonetheless, resource and energy productivity in western Europe is, on average, four times higher than in the new EU Member States. This provides substantial opportunities to achieve greater balance in resource productivity between the EU-15 and EU-10 through technology transfer and other measures.

Integration, innovation and market reform

The EU's successful environmental policies over the past 30 years have largely concentrated on easily visible



point sources. These problems have been dealt with mainly by regulation and technological innovations. The challenge now is to develop and implement long-term policies for those economic sectors that contribute most to diffuse sources of pollution.

Significant progress is likely to take several decades of coherent, long-term yet flexible, policy-making that has the broad support of citizens. This means that public information-provision and awareness-raising measures will be increasingly essential for effective policy-making.

Effective policies will also need to encourage behavioural changes amongst Europe's consumers as well as to focus, in particular, the transport, energy and agricultural sectors on less environmentally damaging activities. Long-term institutional reform and financial planning that encourages greater eco-efficiency can help promote such activities. These could be supplemented by the use of market-based instruments. For example, a move away from environmentally damaging subsidies towards supporting the development and use of eco-innovations in manufacturing, energy transport and agriculture could greatly help the transition towards more sustainable economic activities.

Many EU policies already include environmental objectives and substantial budgets are being deployed to encourage actions and behaviour in line with environmental goals, for example under the common agricultural policy. Nevertheless, given the broad nature of changes arising from land use, Europe could benefit from increased cooperation across sectors to tackle a balanced territorial cohesion, for example between regional urban and transport planning and the use of EU structural and cohesion funds.

The transport sector provides a good test case for underlining the benefits of more integrated approaches. For this sector, we see a myriad of inter-linked driving forces and pressures that impact the environment. On the one hand, the sector has achieved substantial reductions in emissions of air pollutants such as ozone precursors and acidifying substances. On the

other hand, however, emissions of greenhouse gases continue to rise as the demands for transport (freight and passenger) outstrip improvements made in energy-related emissions through technological improvements and stricter regulations.

In line with urban development, transport infrastructure has a threefold impact on land. It contributes to the consumption of good agricultural land, the sealing of soil at increasing rates and the fragmentation of habitats across the European Union. Furthermore, it exposes an extensive part of the population to high noise-levels.

Our increased appetite for mobility by road and by air has resulted in transport issues rising to the top of the environmental/sustainability agenda from city level to world governance. This reflects the wide range of challenges surrounding transport from local concerns (urban planning and design) to global ones (greenhouse gases and climate change).

More integrated long-term actions have delivered substantial benefits. Taxation on petrol illustrates the effectiveness of long-term shifts in economic incentives via market-based instruments. American and European vehicle technologies are basically the same. Nevertheless, European fuel taxes of around 50 % have stimulated changes in consumer behaviour. Together with political pressure to use technologies, these factors have made new European cars almost twice as fuel-efficient in recent decades as their American counterparts, where fuel taxation is much lower. Studies suggest that considerable savings in energy intensity could be made by similar approaches to energy pricing.

What we can do

Tax reform can contribute to a more sustainable, healthy environment. A gradual shift of the tax base away from taxing 'good resources' such as investment and labour, towards taxing 'bad resources' such as pollution and inefficient use, would also help to internalise environmental costs into service and

product prices. This would in turn create more realistic market price signals.

Policy-makers could also design flanking measures to ensure that environmental taxes are not socially inequitable. Poorer members of society generally spend a greater proportion of their income on basic needs such as food, water and energy. Studies have found that particularly taxes on electricity fall on the poor, while transport taxes are relatively benign for the poor who have less access to private transport. Pollution taxes are generally neutral in their impact across social groups.

Policies that derive more revenues from consumption, and less from labour, can also provide a wider and expanding tax-base as a response to both the declining workforce and an ageing society.

The seven thematic strategies being developed under the 6th environment action programme, along with sector integration policies, and the EU's sustainable development strategy, all encourage long-term planning.

Long-term coherent policies can encourage the re-structuring of incentives from financial instruments such as market prices and taxes that will be necessary to reduce the rising and increasingly evident costs of using the planet's natural resources. The resulting gains in eco-efficiency could also help improve the competitiveness of the European economy. Better energy and resource productivity in Europe could also help partly offset other competitive advantages enjoyed by the emerging economies of Asia and South America.

Nevertheless, there are substantial barriers to effective and efficient implementation of policies at all levels of governance in the EU. EEA studies indicate that the institutional set-up can be as important as the design of the policy itself.

Public support for the environmental gains achieved over the past decades is reflected in the findings of the Eurobarometer 2005 survey, which also suggests that European citizens are prepared to do more. This



report demonstrates that more does indeed need to be done by both governments and citizens in order to bring economic development into line with the Earth's carrying capacities.

Europe is well placed to lead the way by creating a smarter, cleaner, more competitive and more secure European society. Such advances would encourage improvements in global eco-efficiency and equity that ultimately secure Europe's quality of life.