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Environmental trends and perspectives in the Western Balkans: future production and consumption patterns

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List of abbreviations

BOD	Biological oxygen demand
CLRTAP	Convention on Long-range Transboundary Air Pollution
CSI	Core set of indicators (EEA)
EBRD	European Bank for Reconstruction and Development
EEA	European Environment Agency
Eionet	European Environment Information and Observation Network
EMAS	Eco-Management and Audit Scheme
ETC/SCP	European Topic Centre on Sustainable Consumption and Production
EU	European Union
EU-12	The 12 Member States that joined the EU in 2004 and 2008
EU-15	The 15 Member States that joined the EU before 2004
EU-27	All 27 EU Member States since 2008
EU-25	The 25 EU Member States between 2004 and 2008
FAO	Food and Agriculture Organization
GDP	Gross domestic product
GEO	Global Environment Outlook (published by UNEP)
GHG	Greenhouse gas
GRID	Global Resource Information Database
HDI	Human Development Index
IEA	International Energy Agency
IIASA	International Institute for Applied Systems Analysis
IPCC	Intergovernmental Panel on Climate Change
ISO	International Organisation for Standardization
IUCN	World Conservation Union
MAP	Mediterranean Action Plan
NGO	Non-governmental organisation
NMVOC	Non-methane volatile organic compounds
NO_X	mono-nitrogen oxides
$PM_{2.5}$	Particulates smaller than 2.5 micrometres in diameter
PM_{10}	Particulates smaller than 10 micrometres and larger than 2.5 micrometres in diameter
REC	Regional Environmental Centre for Central and Eastern Europe
STEEP	Social, technology, economic, environment and political (drivers)
STEEPL	Social, technology, economic, environment, political and legislative (drivers)
UN	United Nations
UNDP	United Nations Development Programme
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNIDO	UN Industrial Development Organization
VOCs	Volatile organic compounds
WB	Western Balkans
WBCSD	World Business Council on Sustainable Development
WHO	World Health Organization
WWF	World Wide Fund for Nature

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Summary

The countries of the Western Balkans are at a turning point in the development of their economies, societies and environment. Among the key issues facing Albania, Bosnia and Herzegovina, Croatia, the former Yugoslav Republic of Macedonia and Serbia (as well as the territory of Kosovo under UN Security Council Resolution 1244/99) are the pace of their integration with the European Union and the prospect of future membership. European integration represents an important opportunity and also a challenge in terms of reforming national institutions, policies and laws. The region's economies face the task of shifting from their industrial past to advanced, post-industrial economies. National policies moreover need to address changing consumption patterns and the growth of consumerism driven by societal reforms and shifts, which will have a growing impact on the region's environment.

The choices that governments in the region make concerning these and other pressing questions today will influence not only the region's environment in the coming decades, but also that of other European countries. For this reason, a future-oriented perspective is important. This study seeks to encourage future-oriented discussions and actions in the Western Balkans by providing an analysis of the forces that are shaping the future of the region's environment. In particular, it highlights the importance of drivers and of changing consumption and production patterns on the region's environment.

Part I of the study reviews recent environmental trends in the region. The important issues today include the following:

- pollution and health remain important concerns, notably air pollution in urban and industrial areas and wastewater discharges from these areas;
- while countries in the Western Balkans have acted to protect the region's remarkable biodiversity, there is much need for ongoing work and additional research;
- resource use, in particular land use, and waste are undergoing a series of changes, including the abandonment of agricultural land, especially in mountain areas, and growing sprawl around many cities and towns and along coastlines, and these growing urban areas are generating higher levels of urban waste;
- many issues that need to be tackled are legacies from the past, related to war, old industrial sites, illegal waste dumping and shipment, the extraction of minerals and others. This puts additional burden on the countries in the region, which also need to deal with current transition challenges.

Part II of the study highlights drivers that will affect the region's environment in future decades. These include, for example, future climate change, which will affect water resources and biodiversity, as well as trends in a range of economic sectors, including agriculture and energy, which is heavily reliant on hydroelectricity.

The study links drivers to changing consumption and production patterns, which will be a key factor of environmental change in coming decades: these patterns are described in Part III. If current trends continue, such as the increasing demand for personal mobility and changing patterns of food consumption, they will have wide-ranging impacts on the environment. Many of the changes will influence resource use and waste. Moreover, land use changes such as the sprawl of urban areas, development of coastal areas, changes in forest management land use changes related to energy supply needs and the abandonment of agricultural land will in turn affect the natural resource use and rich biodiversity of the Western Balkans. This is an important concern, as other drivers, such as climate change, will also influence biodiversity. A forward-looking perspective should consider these existing trends and their interactions, as well as investigate the uncertainties concerning their future development and possible new challenges and opportunities that may arise.

Recent environmental trends

Pollution is an important concern in terms of environmental health. Air pollution remains an important problem in many urban and industrial

areas, due to emissions from industry and from motor vehicles. Problems found in specific areas include the continued use of leaded petrol and high-sulphur diesel in some countries, as well as emissions from ageing mines and power and manufacturing plants. While national trends have varied, for several key pollutants such as acidifying substances, total regional air emissions from the Western Balkans have not changed greatly in recent years, however better information support is needed to evaluate these trends more accurately.

Freshwater quality also varies significantly across the region, which has pristine mountain streams as well as rivers polluted by industrial and urban wastewater and agricultural run-off. Concentrations of key pollutants, such as organic pollution and ammonium, remained largely steady in the first five years of the decade.

A high share of the population has access to safe drinking water, according to data gathered by the United Nations Development Programme (UNDP). However, a smaller share is attached to sewerage systems, and wastewater treatment is poor or non-existent in many urban and industrial areas.

The countries of the Western Balkans are rich in biodiversity, due in part to the region's variety of geography and habitats, though some of the region's specific habitats still need more investigation, such as old tectonic lakes and ecosystems specific for Dinaric karst region — landscape which is characterised by sinkholes, underground streams and caves. This natural wealth has been threatened in recent years by urban sprawl, agricultural land abandonment, illegal timber cutting, infrastructure projects and other pressures. Countries in the region have taken important steps to protect biodiversity and natural areas: notably, the extent of protected areas in the region has grown steadily in recent years. However, they are unlikely to meet the European goal to halt biodiversity loss by 2010.

Greenhouse gas emissions from the region increased rapidly in the first years of this decade, though per capita emissions remain lower than the EU average. Croatia has a target to reduce its emissions under the Kyoto Protocol.

In terms of natural resource use, the region has seen important changes in land cover. In 2000, about 45 % of land in the Western Balkans was used for agriculture, and forests covered a further 40 %. In recent years, however, many areas of agricultural land have been abandoned, in particular small farms in remote areas, esepically in mountains and mining areas. Urban areas have sprawled; so has construction for tourism in coastal zones.

Coastal areas in the Western Balkans face a further set of pressures, such as effluents and solid waste from urban and tourist areas, eutrophication of coastal waters and sprawl along coastlines. Despite these pressures, the quality of coastal bathing water in the region remains quite good — for example, nearly all sites in Croatia met national standards in 2005.

The marine environment of the Adriatic and Ionian Seas is affected by land-based pollution and overfishing, as well as pressures from marine transport, including transport of petroleum and natural gas, and from natural gas extraction in the Northern Adriatic (an important share of these pressures comes from countries outside the Western Balkans).

In recent years, the generation of municipal waste has risen steadily in the Western Balkans, and it is currently estimated to be at levels similar to those in the EU-12 (data on solid waste, however, are poor). Municipal waste management is weak in many parts of the region and many waste facilities are old. Abandoned landfills are a problem. In addition, both ongoing and accumulated industrial waste, and in particular mining waste, is also a serious problem in some areas.

The countries share many water resources, including in the Danube basin and tributaries such as the Sava River. In the summer, however, water scarcity can be a problem in southern countries, in coastal areas and on islands, especially in leaky karstic regions.

Driving forces

A series of social, economic and other drivers will shape the region's future. Table S.1 lists the main forces identified and reviewed in this study. This list is based on the STEEP framework, developed for future analysis (see also Box 2.1). It builds on the work for the EEA's 2007 study, *The pan-European environment: glimpses into an uncertain future* (EEA Report No 4/2007).

In coming decades, the population of most of the countries in the region is projected to decline and age; demographic growth will continue only in Albania and Kosovo as defined by the United Nations Security Council Resolution 1244. Migration patterns are less certain. The region must still resolve the legacy of migrants who in the 1990s left to escape conflict and economic problems. In coming

Table S.1 The STEEPL driving forces

Social	Population and migration
	Culture, values and needs
Technology	Technology
Economic	Globalisation and trade
	Macro-economic development
	Markets and business
Environment	Global environmental change
Politics	Politics
Legislation and policy	Legislation and policy

decades, countries may see further departures to richer countries; migrants arriving from other continents and regions; and domestically, further movements from rural to urban areas.

Based on these trends, households are expected to become smaller, resulting in higher consumption per capita: for example, energy for heating needed per person will increase. Migration patterns are likely to continue agricultural land abandonment as well as pressures for sprawl in urban areas.

In terms of culture and values, many households in the Western Balkans are seeking to catch up with western levels of consumption, though traditional consumption patterns continue in the region. These forces will also shape future consumption patterns, such as the food people buy, how they use energy and the extent of traffic. These consumption patterns will directly affect the environment in the Western Balkans.

Some studies see the possibility of a new global industrial revolution based on new technology, such as breakthroughs in information technology, biotechnology and nanotechnologies. New discoveries and inventions could help address climate change and other problems — but they could also create new threats for the environment. Innovation policies in the Western Balkans could influence which technologies are introduced in the region. Some countries have a strong scientific tradition and could take an active role, cooperating with Member States in the EU and around the world.

Globalisation has linked the world economy through markets, investment, technology and communications.

However, links such as trade have spread the environmental impacts of production and consumption across the globe. For example, the countries of the Western Balkans export large quantities of minerals to the EU — but suffer the environmental problems related to mining. The future of globalisation is uncertain in the face of today's economic problems. Security fears in the future might also weaken these links. Future trade and investment patterns help to shape agriculture as well as fuel and mineral extraction in the Western Balkans.

The current global economic crisis highlights the uncertainty of macro-economic development, though it offers opportunities for the future, such as seeking a new global 'green deal'. National economic governance will shape the economies of the Western Balkans as well, and thus could have a different influence on the environment. Economic growth can increase environmental pressures: as people in the region have higher disposable incomes, they may change their consumption patterns, which will result in greater environmental impacts. At the same time, economic growth can provide resources to address environmental issues, such as financing for investments.

In recent decades, markets and business have played a growing role in the global economy. Around the world, enterprises have encouraged consumption patterns that use high amounts of natural resources, though some have adopted environmental management systems to reduce their pressures on the environment. In the Western Balkans, markets and business have taken some environmental initiatives, and they could have an important role in supporting environmental solutions in the future.

Global environmental change will affect the environment in the Western Balkans. Climate change is expected to bring higher summer temperatures and lower rainfall and to shape agriculture, hydroelectricity production and energy use. In addition to the general changes in biodiversity that are already taking place at a global level, climate change is expected to have a significant impact on the region's biodiversity — global losses could affect the rich biodiversity in the Western Balkans; moreover, loss of biodiversity in the region could affect biodiversity and ecosystem services important also for other parts of Europe as well as globally.

Politics at all levels — global, EU, regional and national — will set the scene for environmental policies, laws and actions in the coming decades, and thus will have a strong influence on environmental trends. Political futures are, by

nature, uncertain, but especially so for this region. At global level, the extent of cooperation or conflict among nations will be vital in terms of determining the world's economic and social framework in coming decades. This choice between conflict and cooperation will affect the extent and effectiveness of international environmental agreements. The future of the European Union — both its internal effectiveness and its enlargement policies — is also uncertain: and its future will, however, greatly influence Western Balkan politics as well as environmental laws and policies in the region. Special historically determined role is identified for neighbouring countries to Western Balkan region, be it as a liaison for economic development and EU accession or in the management of the environmental impacts. Also the countries east from Balkans will be important shaping factor for the future developments.

Countries in the Western Balkans need to address a number of political problems, including a generally low level of public governance, which hinders effective implementation of all policies and legislation.

Future developments of legislation and policy will also affect the region. Strong global agreements to tackle climate change could change transport and energy systems around the world, including those in the Western Balkans. The future of EU environmental laws and policies will also have a key role in the region. Countries can strengthen their environmental legislation by harmonising with EU requirements. For these steps to be effective, however, governments will need to improve their implementation of environmental policy, including enforcement actions.

These drivers (which are described in detail in Chapter 2) will influence consumption and production patterns in the region, described in Chapters 3 and 4. Table S.2 summarises the links between driving forces and consumption and production patterns.

Household consumption patterns

Unsustainable patterns of consumption around the world are a major cause of environmental problems, from climate change to resource degradation and biodiversity loss. In the Western Balkan countries, household consumption patterns are of key interest as they have changed rapidly in recent years.

Three areas account for about two-thirds of all environmental pressures from consumption in EU Member States, and these bear close attention in the Western Balkans. These are: food and drink; housing and infrastructure (including residential heating, which is a focus in this report); and the transport of persons and goods.

Food consumption patterns will influence environmental impacts throughout the food production chain, and in particular impacts arising from agriculture and fisheries. In the Western Balkans, traditional patterns continue to influence household food choices — for example, strong ties to rural areas and family farms. New consumption patterns, facilitated by new supermarkets and processed food products, are spreading quickly — and these will increase environmental impacts related to food.

Food is, of course, closely tied to personal well-being. Across the region, malnourishment has declined since the 1990s, most likely due to the end of conflicts and a return to broad economic growth. Current economic problems could reverse this trend. Another health problem, however, has grown in recent years: the increase in the number of overweight and obese adults in the region.

Residential buildings are the largest single consumer of energy in the Western Balkans, mainly for heating (though electricity use for air conditioning and appliances is increasing). In some countries of the region, poorer households continue to use inefficient electric heaters. Many also use fuel wood and coal, which contribute to both indoor and local air pollution. Building construction and demolition is also an important source of waste, and construction has fuelled sprawl in urban and coastal areas.

Personal mobility is another growing source of environmental impacts. Passenger transport in the Western Balkans rose by 40 % between 2000 and 2007; the volume of air travel tripled, and road travel also increased. These trends affect air pollution, especially in urban areas, as well as greenhouse gas emissions. Many private motor vehicles in the region are old and highly polluting, and this increases pollution problems. An outlook for a much larger area, Eurasia, sees an ongoing increase in private road and air transport to 2050 — and if current trends continue, mobility will increase in the Western Balkans as well.

Production patterns

Small farms make up the bulk of the agricultural sector in the Western Balkans. However, many of

Table S.2 The links between driving forces and production and consumption patterns in the Western Balkans

STEEPL driving forces that will influence the Western Balkans		The geographic scale of the most important driving forces				How these driving forces can shape future patterns of production and consumption in the Western Balkans (focusing on food, energy, transport)	
		Global	EU	WB	National	Consumption patterns	Production patterns
S	**Population and migration** Key trends: ageing populations, declining household sizes Key uncertainties: patterns and extent of migration			√	√	**Strong, direct influence:** Smaller, ageing households may buy more processed foods and consume more energy per person In-migration will increase consumption Rural to urban migration will increase sprawl	**Indirect influence:** With ageing rural populations and migration to urban areas, farmland will be abandoned (esp. in mountain areas)
	Culture, values and needs Key uncertainties: consumerism and 'catching up with west' vs. traditional and green values		√	√		**Strong, direct influence:** Culture and values will influence the types of food people consume and their preferences for personal mobility	**Indirect influence:** Can influence business awareness of environment
T	**Technology** Key trend: influence of technology low in short term; will grow over time Key uncertainties: introduction of new technologies vs. public fears of risks; EU and Western Balkan efforts to develop and implement 'greener' technologies	√	√			**Direct influence:** Technology will create new food products for consumers Transport technologies will change impacts of personal mobility Influence on environment could be both positive and negative	**Strong, direct influence:** Technology will influence agriculture, energy production and freight methods Can reduce environmental impacts of production New technologies (e.g. nano and bio-technologies) can bring new risks
E	**Globalisation and trade** Key trend: EU expected to remain main trade partner for Western Balkans Key uncertainty: will globalisation continue in coming decades?	√	√			**Direct influence:** Extent of import of exotic foods for consumption in region Global prices of oil and other fuels will influence energy use, personal mobility	**Strong, direct influence:** Global and EU agricultural trade patterns will affect farming in the Western Balkans International demand for marine fish (esp. tuna) Global prices of oil and other fuels will influence energy, freight investments Oil and gas transit will bring environmental risks
	Macro-economic development Key uncertainties: levels of economic growth at global, EU and regional scales	√	√	√	√	**Strong, direct influence:** Economic growth is closely linked to household incomes and spending on consumption	**Strong, direct influence:** Economic growth closely linked to enterprise investments Enterprise restructuring in the region could lead to greater efficiencies
	Markets and business Key uncertainties: extent of business action for the environment at global, EU and regional scales; food retailing sector in Western Balkans		√	√	√	**Direct influence:** Future retail sector will influence food products available Automobile industry can develop, promote lower emissions vehicles	**Strong, direct influence:** Food retailers will influence regional farming methods Enterprises and manufacturing methods will determine levels of freight transport
E	**Global environmental change** Key trends and uncertainties: pace of global warming and biodiversity loss	√				**Indirect influence:** Global warming will affect energy consumption in the region	**Strong, direct influence:** Global warming and biodiversity loss will directly influence agriculture and fisheries Changing precipitation levels will affect hydropower

Table S.2 The links between driving forces and production and consumption patterns in the Western Balkans (cont.)

STEEPL driving forces that will influence the Western Balkans		The geographic scale of the most important driving forces				How these driving forces can shape future patterns of production and consumption in the Western Balkans (focusing on food, energy, transport)	
		Global	EU	WB	National	Consumption patterns	Production patterns
P	**Politics** Key uncertainties: global cooperation vs. conflict; EU effectiveness and enlargement; cooperation and national reforms in Western Balkans	√	√	√	√	**Strong, indirect influence:** Political developments will determine many other driving forces; e.g. joining EU will affect legislation and policy influencing consumption	**Strong, indirect influence:** Political developments will determine many other forces, from global economic growth to EU legislation Regional cooperation for energy, environment can influence production
L	**Legislation and policy** Key uncertainties: strength of global environmental agreements; future EU legislation; national implementation of environmental laws	√	√		√	**Direct influence:** EU and national legislation can affect many areas: e.g. influence food products; promote energy efficiency; set requirements on motor vehicles	**Strong, direct influence:** Global climate agreements and EU laws can change energy production EU environmental legislation and its national implementation will affect production methods

these small farms are being abandoned — especially in mountain areas — as people move from rural to urban areas, and also as the population ages. Conflicts in the 1990s also led to farm abandonment. At the same time, agricultural production is increasing — and fertiliser use increased in the 1990s, indicating that farming in the region has become more intensive.

Fleets of numerous small boats dominate marine fishing in the Adriatic and Ionian Seas, though it is hard to sketch an accurate picture: data on the fleets in Western Balkan countries have not been available; moreover, countries outside the region — notably Italy and Greece — have major fleets in these seas. Data on the current status of fish stocks are also incomplete, though overfishing is a major concern throughout the Mediterranean.

Aquaculture is a growing activity in the coastal zones of the Western Balkans. It brings a range of environmental impacts: notably, where wild species are used as feed, aquaculture can increase overfishing.

Locally mined coal and lignite supply a large share of energy production in the Western Balkans — and this creates air pollution, greenhouse gas emissions and solid waste and water pollution from mines. Hydroelectricity is another important source, and it affects freshwater ecosystems. Other renewable sources are little used in the region.

The region's cumulative energy intensity in terms of gross domestic product (GDP) improved slightly in recent years, though it remains much higher than in EU Member States. Energy use per capita, however,

Table S.3 The links between production and consumption patterns and environmental futures in the Western Balkans

Consumption patterns	Production patterns	Environmental pollution [a] and human health	Climate change: greenhouse gas emissions	Ecosystems and biodiversity	Resource use and waste generation [b]
Food consumption	Agriculture and fisheries	••	••	•••	•••
Household energy consumption	Energy production	•••	•••	•	••
Personal mobility	Freight transport	•••	•••	••	••

Notes: [a] including air and water pollution
[b] including land use, freshwater consumption, marine ecosystems and waste

Strength of the links: • Weak influence; •• Medium influence; ••• Strong influence

The scores are based on the assessment in Chapters 3, 4 and 5 of this report.

is lower. The countries in the region thus have a key task in terms of continuing to reduce energy intensity as GDP increases.

Freight transport has increased rapidly in the Western Balkans — between 2000 and 2007 it rose by about 100 %, far faster than GDP. Freight transport contributes to air pollution. The Danube river provides an important alternative to road transport, though works to increase navigation on the Danube and its tributaries could harm the basin's freshwater ecosystems.

The future development of these production and consumption patterns will directly affect the environment in the Western Balkans. Table S.3 shows the intensity of the links between production and consumption patterns and the environment.

Impacts on the region's environment — some glimpses into the future

A few outlooks are available for the Western Balkan environment. These, together with outlooks for wider geographic areas in Europe, sketch out the expected impacts if current trends continue in coming decades.

Among these impacts, pollution and health issues will remain an important concern in the region:

- emissions of some air pollutants are expected to decline over the coming decade, though it is not clear if this will improve local air quality;
- the countries in the region face a major challenge in terms of improving drinking water and wastewater treatment services.

Greenhouse gas emissions from the Western Balkans are projected to increase. Climate change impacts are expected to become strong. Moreover, the region's rich ecosystems will face ongoing threats.

Other problems will affect natural resources in the region:

- coastal and urban sprawl threatens to continue, along with depopulation and land abandonment in rural areas, especially in the mountains;
- overfishing is likely to remain a threat in local seas;
- uncontrolled exploitations of forests is an issue to be managed in the context of sustainable developments and expected climate change;
- municipal solid waste is growing, and the management of waste streams remains a problem.

These trends and their outcomes are not inevitable. Changes in the key drivers could yield other futures. Alternative futures could take shape in response to sudden, unexpected changes: for example, an energy crisis or new technology. Other scenarios might arise if trends currently projected for the region — such as European integration and ongoing economic growth — are not realised, or if governments, business and other actors in the Western Balkans lead the way to a different path.

Information base to support forward-looking integrated environment assessments in the Western Balkans

This study shows that the poor base of region-wide information makes it difficult to develop a reliable assessment of the environmental situation, as well as a good picture for many of the drivers shaping the future. Information is difficult to obtain, data are often scarce, incompatible or missing. In many cases there is also lack of qualitative information. In the areas of waste, greenhouse gas emissions, water use and the maritime environment in particular, many types of data are missing or large gaps exist, preventing a strong regional assessment. Also, for biodiversity and forestry, it is difficult to obtain a good region-wide picture as data are very dispersed and often incompatible. Moreover, further scientific research is needed to clearly map the biodiversity strengths of the region and to link such results more clearly with policy-making. Information on the status and trends in the use of natural resources (fish stocks, water, land use, contaminated sites) also is not available. Information on land-use changes is important for the assessment of environmental impacts and sustainable development, so further work here is a priority.

Information support is very poor for production patterns such as agriculture, fisheries, and freight transport. The assessment of food consumption was also severely limited by the lack of quantitative and qualitative information (for example, consumption by major food groups, retail food markets and sources of food products).

Across all areas, forward-looking information is scanty. In most cases, where information is available, it can be obtained only from international sources. Since this region is experiencing extremely dynamic changes and many uncertainties, it is particularly

important to develop structured and sound information support for the future.

Regional assessments of past and present trends were possible for only 13 of the 37 indicators in EEA's core set. Outlooks were found for only four indicators, and these mainly from international sources, such as the European Monitoring and Evaluation Programme (EMEP). For 10 indicators it has not been possible to assess either past or future trends (these include indicators for urban wastewater treatment, gross nutrient balance, species diversity, packaging waste, contaminated sites and marine indicators).

These information problems need to be addressed in order to strengthen forward-looking analysis for the region.

Production, consumption — and cleaner growth

Despite gaps in the information base, the study has identified a series of major challenges for policy makers and other actors in the region to consider in the coming decades. Many of the forces influencing the state of the environment of the region arise outside the region (technology development, trade flows, global economic growth, foreign investments, EU enlargement, climate change impacts); but many crucial ones arise at national or regional levels (i.e. changing consumption and production patterns, commitment to political and economic transition and how to deal with it, feedbacks to climate change impacts in the region, demographic trends and national capacities to respond to challenges).

Among the key challenges for the countries in the Western Balkans is the adoption and implementation of new environmental laws and policies, taking particular note of EU legislation. While the countries have started this process, a further challenge is that of improving governance in order to ensure proper implementation of the new measures.

Preparing for and adapting to climate change impacts will be another key area where the region needs to prepare for the future.

Addressing the environmental impacts of consumption and production patterns will be another major challenge. By encouraging energy efficiency in buildings, for example, governments and households will be able to reduce the environmental impacts of energy production. Actions to slow the growth of personal mobility and contain urban sprawl can cut air pollution. This report seeks to provide these actors with information and analysis to address this challenge.

For the countries of the Western Balkans, addressing the environmental issues related to consumption and production patterns can help stimulate growth and innovation — and also avoid future costs (including costs of EU regulation implementation). For example, investments for better waste management could stem the growth in waste generation and help reduce costs of cleaning up poorly managed landfills. In industry and agriculture, such efforts could make enterprises in the region more competitive.

All the actors in the region — including governments, business, NGOs and others — have a role in shaping its future environment. Study shows that number of uncertainties can be managed and beneficial developments can arise if taking in account driving forces at appropriate level (national, regional, neighbouring countries, the EU and others). Threats and scenario analyses also showed crucial importance of the regional cooperation within the Balkan region as well as with the neighbouring countries. It is hoped that this study will encourage all actors concerned with the sustainable development of the Western Balkans to look closely at the forces and trends shaping the future and to prepare for the challenges of the coming decades.

Introduction

This study looks at the forces shaping the future of the environment in the Western Balkans, and in particular at the role of consumption and production patterns. The study begins with a review of key recent environmental trends in the region. The study then analyses the drivers — such as social, political and economic forces — that are shaping production and consumption patterns. Changes in these patterns will directly influence the region's environment. The study goes on to look at several key areas; in particular, household consumption patterns and related production patterns. The study discusses outlooks of possible environmental futures and how drivers and changing consumption and production patterns might influence these outlooks. It concludes by looking at how different actors in the region can act to shape environmental futures.

The study takes a futures perspective because the countries of the Western Balkan are at a turning point in the development of their economies, societies and environment. The challenges and opportunities that the countries in the region face today include the following:

- the need to address issues remaining in the aftermath of the conflicts of the 1990s;
- the opportunity to consolidate the shift in political focus from regional conflicts to engagement with the European Union and other international bodies;
- the opportunity to shift from industrial to post-industrial economies. This shift requires highly competent management, flexibility in the organisation of work, the introduction of innovative technology, public sector institutions that can support economic competitiveness and the development of effective partnerships between the private and public sector ([1]);
- the need to address past environmental problems, such as those that have arisen from the legacy of their 20th-century industrial development;
- the need to prepare for new environmental issues, such as the pressures arising from new consumption patterns, the impacts of global climate change, and issues arising from biodiversity loss.

A futures perspective is valuable in addressing the complex set of challenges and opportunities that the region faces. It provides a broad view of drivers, production and consumption patterns and environmental futures. This is important as in the long term, political, economic and other changes may exacerbate some environmental problems, create new ones and provide the means to address existing issues. Thus, addressing environmental challenges in a sustainable manner requires a close review of plausible future developments in other sectors and the potential implications of these drivers on the environment.

Assessing production and consumption patterns provides an important perspective on these dynamics. The Johannesburg World Summit on Sustainable Development highlighted the importance of these patterns in shaping environmental problems and called for a move towards sustainable consumption and production. This study focuses on selected patterns, in particular on key areas of household consumption in the Western Balkans, as well as related production patterns. Household consumption patterns in the region are changing rapidly and are playing a growing role in terms of their impacts on the environment.

Forward-looking studies in the Western Balkans

This report draws on many existing forward-looking studies. The analysis in such studies can help policy makers, stakeholders and the interested public think about future problems. While they cannot predict

([1]) Adam, F.; Makarovic, M.; Roncevic, B. and Tomsic, M. (2005), *The challenges of sustainable development, the role of socio-cultural factors in east and central Europe*, Central European University.

the future, these studies can address the combination of issues that these actors face, help them assess the complexities and uncertainties and set realistic, long-term paths. Such studies thus provide the context for taking far-sighted actions today.

A wide range of methods are used to study future issues and concerns. These include: quantitative projections or forecasts, narrative scenario studies in combination with quantitative tools, horizon scanning, mega-trend analysis, back-casting, road mapping, system dynamics, sensitivity analysis and probabilistic analysis ([2]).

The future is being studied in the Western Balkans to a limited degree. A literature search in 2006 identified 34 future-oriented studies on the region, of which 10 focus on environment and sustainability topics and the remainder on other issues (Table I.1) ([3]).

Among the environmental future studies, only the topic of climate change is studied separately. Here, most of the studies identified are national communications prepared under the United Nations Framework Convention on Climate Change (UNFCCC) ([4]). These reports forecast

Table I.1 Forward-looking studies in the Western Balkans

Topic	Regional and multi-country studies	Albania	Bosnia and Herzegovina	Croatia	The former Yugoslav Republic of Macedonia	Montenegro	Serbia	Total
Air								
Biodiversity								
Climate change	1	1		2	1			5
Fisheries								
Forestry								
Land use								
Waste								
Water								
Environment and sustainability (general)	2		1			2		5
Sub-total: environment and sustainability	**3**	**1**	**1**	**2**	**1**	**2**	**0**	**10**
Agriculture								
Demography			1	1	2			4
Economy	5			1		1		7
Energy	3			3		1		7
Health		1						1
Politics	2		1	1				4
Transport	1							1
Sub-total: non-environmental topics	**11**	**1**	**2**	**6**	**2**	**2**	**0**	**24**
Total	**14**	**2**	**3**	**8**	**3**	**4**	**0**	**34**

Source: EEA project: Review of future-related studies and analyses of uncertainties in the pan-European region, Milieu Ltd *et al.*, 2006. Lists of studies for the Western Balkans and other regions are available at http://scenarios.ew.eea.europa.eu.

([2]) For an overview of key techniques, see Sheate, W. *et al.* (2007), EEA research foresight for environment and sustainability: final report, November 2007.

([3]) In-country national and other experts were employed for each of the nine countries (Albania, Bosnia and Herzegovina, Bulgaria, Croatia, the former Yugoslav Republic of Macedonia, Montenegro, Romania, Serbia and Turkey), to identify studies in English and in national languages. Thus, this search, which was completed at the end of 2006, is fairly comprehensive. Further details on results can be found on the EEA scenarios website at http://scenarios.ew.eea.europa.eu and in the EEA Envirowindows at http://ew.eea.europa.eu.

([4]) Several countries have prepared more than one communication since 2000; only the most recent ones were counted.

future greenhouse gas emissions, most to 2020, and climate change impacts, often to 2100. Moreover, in order to calculate future emissions, these climate change studies forecast future economic conditions as well as other key factors, such as the growth in energy consumption and motor vehicle use. No issue-specific future studies were found on other topics, such as air pollution or forestry in the region (some relevant information can be found in studies and projections carried out for wider geographic areas, i.e. for international conventions). The other five environmental future studies cover more than one topic: some of these were prepared in the context of national strategies.

The other 24 future studies cover a broad range of non-environmental issues, from demography to transport. Economics and energy are the two areas with the highest number of studies.

Many of these future studies are cited in this report and used in its analysis, together with future studies carried out at global and European levels. However, there is the need to develop more forward-looking studies which are targeted to actual policy and environmental problems.

The socio-economic and political context

The Western Balkans comprise six countries — Albania, Bosnia and Herzegovina ([5]), Croatia, the former Yugoslav Republic of Macedonia, Montenegro and Serbia — and the territory of Kosovo under UN Security Council Resolution 1244/99 (Map I.1).

The region's economic and social conditions vary significantly (Table I.2). For example, in 2006, annual income per capita (based on purchasing power

Map I.1 Political map of the Western Balkans, 2007

Note: The declaration of independence by Kosovo under UN Security Council Resolution 1244/99 on 17 February 2008 has been recognised by over 50 countries around the world, including several of its neighbours, several EU Member States and the United States, but not by others, among them some EU Member States as well as Serbia.

Source: EEA, 2009.

([5]) Bosnia and Herzegovina is divided into two main administrative divisions: the Federation of Bosnia and Herzegovina and Republika Srpska; in addition, the district of Brčko is under international administration.

parity) ranged from about EUR 5 800 in Albania to more than EUR 14 000 in Croatia. Most of the countries have relatively similar levels in the Human Development Index (HDI) — a measure of the quality of life, incorporating life-expectancy, education, health levels and other measures of quality of life, along with economic prosperity. The HDI is close to 0.8 (on a scale of 0 to 1) for all countries except Kosovo under UN Security Council Resolution 1244/99, where it is estimated at less than half this level. In Kosovo in the middle of this decade, levels of income, poverty, unemployment and child mortality were all lower than in the rest of the region.

All of the countries have an ecological footprint that is below the average for the EU, (on average, a citizen in one of the EU's 27 Member States has an environmental footprint of 4.7 global hectares, twice the size of the capacity of the European continent to provide natural resources and absorb waste), which is only 2.1 ha/capita. Joint activities between EU and Western Balkans are needed to tackle consumption and production challenges in order to reduce unsustainable natural resources use (see more on the drivers and uncertainties for consumption and production in Western Balkans in Part III).

The countries in the region emerged from socialist economies established after World War II. Yugoslavia's form of socialism allowed significant autonomy for enterprises, individual ownership of property and the possibility of emigration. In contrast, Albania's regime established and maintained strict central planning and social control over four decades.

In the 1990s, the countries of the former Yugoslavia were engulfed in a series of conflicts that damaged populations, economies and societies. While these conflicts have ended, many issues remain in their aftermath: the status of Kosovo under UN Security Council Resolution 1244/99 is one; others include the return of refugees and the clearing of areas contaminated with land mines. While many of those who fled war have gone back to their homes, millions are still unsure of whether to return.

Over the past two decades, the economies of the Western Balkans first underwent a transition to market-based systems; they are now undertaking further policy reforms as part of their harmonisation with the EU.

Most of the region saw rapid economic growth between 1995 and 2006: for example, GDP per capita (measured in purchasing power parity) doubled in Albania and Croatia over this period and tripled in Bosnia and Herzegovina. In contrast, Serbia in particular suffered steep economic decline in 1999 due to the Kosovo under UN Security Council Resolution 1244/99 war: according to World Bank data, only in 2003 did Serbia return to its 1998 level of GDP per capita (Section 2.6 describes recent economic trends and current outlooks) ([6]).

Table I.2 Key characteristics of the Western Balkan countries

Country	Population, 2005 (million)	Surface area (thousand km²)	GDP/capita, 2006 (EUR)	Human Development Index, 2006	Ecological footprint (global ha per capita), 2005
Albania	3.1	28.8	5 814	0.784	2.2
Bosnia and Herzegovina	3.8	51.2	6 502	0.800	2.9
Croatia	4.3	56.5	14 222	0.846	3.2
Kosovo under UN Security Council Resolution 1244/99	2.1	10.9	n.a.	0.374	n.a.
The former Yugoslav Republic of Macedonia	2.0	25.7	7 898	0.796	4.6
Montenegro	0.6	14.0	9 459 *	0.799	2.6
Serbia ***	4.8	77.4	9 459 *	0.786 **	2.6

Notes: * For Serbia and Montenegro before their division.
** Recent calculations by the Republic Development Bureau of Serbia indicate a value of 0.821.
*** Serbia without Kosovo under UN Security Council Resolution 1244/99.

Source: World Bank; UNDP; Global Footprint Network.

([6]) According to the Serbian government, however, the 1998 level of GDP/capita had already been exceeded in 2002.

Overview of the sections of this report

This report reviews the environment in the Western Balkans, together with the drivers that are shaping environmental trends. Specifically, the study takes a look at how these drivers are shaping household consumption in three areas — food consumption, buildings and infrastructure and mobility — as well as production patterns. These changing consumption and production patterns will in turn affect the region's environment in coming decades. Figure I.1 provides an overview of this framework, which also provides the structure for the report.

Part I (Chapter 1) reviews recent trends in the region's environment, using indicators from the EEA's core set as well as other indicators. The chapter covers key environmental issues, including climate change, biodiversity, water, waste and air pollution.

Environmental change is firmly embedded in the wider societal context, and Part II (Chapter 2) focuses on the drivers that will influence the future of the region's environment. The chapter uses a version of the STEEP framework, which presents the social, technological, economic, environmental and political forces shaping environmental futures (a sixth category, legislation and policy, is added, see Box 2.1). The drivers themselves act at several geographic scales: from global, to European, regional and national. Figure I.1 illustrates the framework for this analysis, which links drivers — broader societal forces as well as production and consumption patterns — and the environment.

As the events of the past two decades have also shown, the dynamics of political, economic and societal developments are far from certain, Chapter 2 highlights some of these uncertainties, for example presenting alternative scenarios of the future developed in recent studies at global, European and regional scales.

These broader, societal forces in turn influence the patterns of production and consumption in the Western Balkans, which are described in Part III (Chapters 3 and 4). Chapter 3 reviews household consumption patterns in three key areas: food, buildings and infrastructure (such as water and electricity), and mobility; Chapter 4 discusses related production patterns.

Part IV looks first at the impacts of the drivers and the production and consumption patterns on possible environmental futures (Chapter 5). It then considers the role of key actors in the region in terms of shaping these futures (Chapter 6).

Figure I.1 Framework of the report

Environmental trends in the Western Balkan countries today

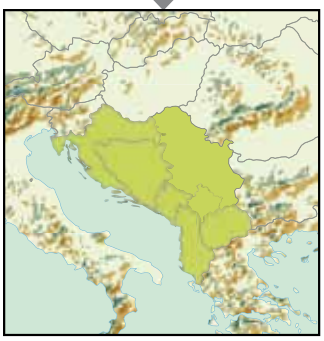
Described in Chapter 1

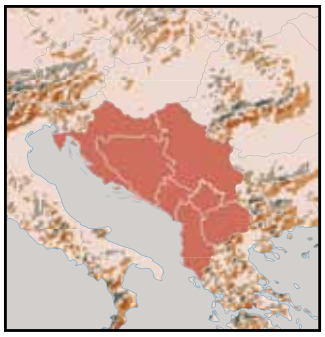
Driving forces and uncertainties shaping the future environment in the region

		Global European Regional National
Social	• Population and migration • Consumer behaviour	
Technology	• Technology	
Economics	• Globalisation and trade • Macro-economic development • Markets and business	The STEEPL driving forces are described in Chapter 2
Environment	• Global environmental change	
Politics	• Politics	
Legislation and policy	• Legislation and policy	

The driving forces will change production and consumption patterns that directly affect the environment in the Western Balkans

Chapters 3 and 4 look at the key areas of production and consumption patterns





Potential environmental futures in the Western Balkan countries

Chapter 5 discusses outlooks and alternatives for major environmental impacts

Part I: Environmental trends

1 Environmental trends in the Western Balkans

This chapter provides a brief overview of recent trends for a series of key environmental issues in the Western Balkan region, using EEA's core set of indicators. The chapter thus provides an information base for thinking about the future of the environment in the region. However, current trends cannot be simply extrapolated into the future; following this chapter, Parts II and III of the study will look at the drivers and uncertainties that are shaping the future of the region's environment, including consumption and production patterns. Part IV provides some glimpses of the possible outlooks for the future and indications of main actors that can influence the future developments.

The chapter is organised according to themes of the European Union's Sixth Environment Action Programme: pollution and environmental health; greenhouse gas emissions and climate change; ecosystems and biodiversity; and resource use and waste. Within this framework, individual sections cover the key environmental issues and themes in EEA's core set of indicators (CSI):

- air pollution;
- water (water quality and water services);
- climate change;
- biodiversity;
- land use;
- marine and coastal environment;
- waste;
- water quantity.

Each section reviews the policy goals for the issue at global and European levels and in the Western Balkan region. Each section then provides an overview of key trends regarding the state of and pressures on the environment.

Further information on the indicators is provided in the annexes.

Annex I presents an overview of the availability of indicators in the core set for which recent trend and forward-looking data are available, based on the EEA project *Building up of regular environment reporting system according to the EEA core set of indicators for the West Balkan countries* (2008), which gathered data from the countries in the region or from international sources where data have been already reported, together with previous EEA projects in the region.

Annex II presents assessments of past and present trends for all core set indicators where data are available, as well as forward-looking assessment, where data are available. However, forward-looking trends should not be regarded as predictions as there are various uncertainties concerning how these trends might unfold in the future. This provides options for alternative scenarios. Some of them are discussed in this report; but for many key issues this has not been possible.

1.1 Pollution and environmental health: air pollution

Key messages

Industry and motor vehicles are important sources of air pollution emissions in the Western Balkans. In some countries of the region, continued use of leaded petrol and high-sulphur diesel exacerbate motor vehicle emissions. Ageing mining, energy and manufacturing plants also generate high levels of air pollution.

As a result, air pollution is a concern in many urban areas and industrial hot spots. Comparable data on urban air quality in the region, however, are not available.

For several key pollutants, including acidifying substances, total regional air emissions have not changed greatly in recent years; national trends have varied (based on estimates prepared for the Convention on Long-range Transboundary Air Pollution (LRTAP Convention). However, national information bases needs improvement for better analyses.

Countries in the region have put in place new air pollution legislation and have worked together on regional initiatives, such as programmes to phase out leaded petrol and reduce sulphur levels in diesel.

Air pollution is a serious problem in much of Europe, in particular in cities and in industrial areas. In the EU, exposure to fine particulates smaller than 2.5 micrometres in diameter ($PM_{2.5}$) is estimated to reduce average life expectancy by eight months. Air pollution also contributes to acid precipitation and to eutrophication of water bodies, often in countries distant from the source of emissions as pollutants are easily carried by the wind. In the Western Balkans, both industry and transport are key sources of air pollution.

This section reviews recent trends concerning emissions of air pollution in the region as well as air quality. The following chapters discuss drivers and production and consumption patterns that will influence regional levels of air pollution in the future. Some future outlooks on pollution and health are provided in Section 5.2.

Policy goals

The World Health Organization establishes guideline limits for outdoor, ambient air levels of four key pollutants: particulate matter (limits for both PM_{10} and $PM_{2.5}$), ozone (O_3), nitrogen dioxide (NO_2) and sulphur dioxide (SO_2) ([7]).

The LRTAP Convention establishes a common framework for reducing air pollution emissions at pan-European scale and addressing transboundary impacts such as acid precipitation. Protocols to the Convention set national emission limits on specific air pollutants, such as sulphur, nitrogen oxides and heavy metals. The most recent, a 1999 Protocol signed in Gothenburg, sets emission ceilings for 2010 for four pollutants: sulphur, mono-nitrogen oxides (NO_x), volatile organic compounds (VOCs) and ammonia (NH_3) ([8]). The ceilings were negotiated on the basis of scientific assessments of pollution effects and national abatement options. All the recognised countries of the Western Balkans are parties to this Convention — as yet, however, they are parties to few protocols. For example, only Croatia is party to the Gothenburg Protocol ([9]).

In the European Union, a range of legislation limits air pollution emissions and regulates air quality. For example, EU directives set standards limiting emissions from industrial installations such large combustion plants and waste incinerators. The Directive on Integrated Pollution Prevention and Control requires other industrial facilities to adopt best-available techniques to limit their pollution levels. Other requirements restrict pollution from petrol and diesel motor vehicles. The EU's air quality requirements restrict ambient levels of 12 pollutants; these were updated in the new Air Quality Directive (2008/50/EC) ([10]). As candidate countries, Croatia and the former Yugoslav Republic of Macedonia must adopt this legislation.

Both through the accession process and national initiatives to strengthen legislation, the many of the

([7]) See www.who.int/phe/health_topics/outdoorair_aqg/en for the 2005 update of these guidelines (accessed January 2010). PM_{10} refers to inhalable coarse particles smaller than 10 micrometres and larger than 2.5 micrometres in diameter.
([8]) The Gothenburg Protocol to Abate Acidification, Eutrophication and Ground-level Ozone.
([9]) www.unece.org/env/lrtap provides lists of signatories and parties to the Convention and its protocols (accessed January 2010).
([10]) Based on information at http://ec.europa.eu/environment/air/quality/index.htm (accessed January 2010).

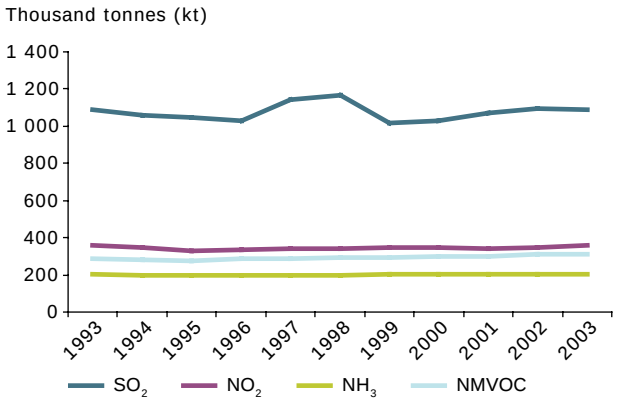
countries in the region are revising and strengthening air pollution regulations. For example, Serbia passed a new Law on Air Protection in 2006 ([11]). Regional initiatives such as the UNEP-based Partnership for Clean Fuels and Vehicles and programmes by the Regional Environmental Centre for Central and Eastern Europe (REC) are working to eliminate leaded petrol from the region, reduce sulphur levels in diesel fuel and improve vehicle standards.

Air pollution emission trends

Bosnia and Herzegovina, Kosovo under UN Security Council Resolution 1244/99, the former Yugoslav Republic of Macedonia, Montenegro and Serbia all use poor quality coal (i.e. lignite) to fire power plants. In Kosovo under UN Security Council Resolution 1244/99, Montenegro and Serbia, metal smelters contribute to high pollution levels. These plants are often near the mines, creating pollution hot spots that also suffer from wastewater discharges and mining waste. Many of these industrial plants have used old production technologies and have poor air pollution control systems.

Motor vehicles are also a major source of air pollution, in particular in large urban areas. In much of the region, many old and highly polluting used vehicles are still in use, many imported from the EU.

Figure 1.1 Emissions of acidifying substances in the Western Balkans, 1993–2003



Source: *Inventory review 2005*, emission data reported to LRTAP Convention; and NEC Directive ISSN 0804-2446.

Fuel quality is often low: in Bosnia and Herzegovina and Serbia, leaded fuel is still used; in some countries, diesel fuel has high levels of sulphur ([12]). These factors exacerbate pollution levels.

For the period from 1993 to 2003, emissions of key air pollutants such as acidifying substances (SO_2, NO_2, NH_3 and non-methane volatile organic compounds (NMVOC)) remained fairly stable (Figure 1.1). Behind this region-wide stability, however, some country emission levels changed significantly. For SO_2, for example, Croatia reduced its emissions by 41 % while those in the former Yugoslav Republic of Macedonia increased by 42 %. For this pollutant, however, the lion's share of the region's emissions came from Bosnia and Herzegovina, Serbia and Montenegro, which together accounted for about 75 % of total SO_2 emissions in 2003 ([13]).

National emission trends in turn reflect a whole series of changing economic and policy trends. In Albania, for example, the decline of industrial production in the 1990s led to a decrease in emissions of SO_2 and other pollutants around Tirana. The increase in motor vehicle numbers and other traffic, however, led to new sources of air pollution ([14]).

Air quality

Air quality is a problem and a threat to health in many regions of the Western Balkans. For example, air quality is poor in major industrial areas such as Pančevo near Belgrade in Serbia, and in mining areas that have nearby metal smelters or coal-fired power plants ([15]). In many urban areas, including Sarajevo in Bosnia and Herzegovina and Tirana in Albania, growing traffic has contributed to declining air quality ([16]).

Further information in this report

The next chapters describe drivers and production and consumption patterns that influence air pollution in the Western Balkans. Chapter 5 presents forecasts of air pollution emissions from the region. There are further details on indicators in Annexes 1 and 2.

([11]) UNECE (2007), Environmental performance review: Republic of Serbia, New York and Geneva.
([12]) Information provided by ETC-SCP.
([13]) *Inventory review 2005*, emission data reported to LRTAP Convention; and NEC Directive ISSN 0804-2446. For some of the Western Balkan countries (Croatia, the former Yugoslav Republic of Macedonia, Serbia) updated data sets until 2007 are available at the European Environment Information and Observation Network (Eionet) as part of the reporting obligations for the LRTAP Convention. However, construction of an update for the regional indicator was not possible due to the lack of updated data for some of the pollutants and the lack of the updates for the other countries in the region.
([14]) United Nations Economic Commission for Europe (UNECE) (2002), *Environmental performance review: Albania, New York and Geneva*.
([15]) UNEP/GRID-Arendal (2007), *Balkans: vital graphics*, Arendal, Norway.
([16]) REC (2006), *Environmental snapshot of south eastern Europe: REReP country profiles*, Szentendre, Hungary.

1.2 Pollution and environmental health: water pollution and water services

Key messages

Freshwater quality varies significantly across the region, which holds both pristine mountain streams as well as rivers polluted by industrial and urban wastewater as well as agricultural run-off. Concentrations of key pollutants, such as organic pollution (measured in terms of BOD, biological oxygen demand) and ammonium, remained largely steady in the first five years of the decade.

In most countries of the region, a high share of the population has access to safe drinking water, according to data gathered by UNDP. The extent of sewerage systems is low. Wastewater treatment is poor or nonexistent in many urban and industrial areas. For some countries, a lack of financing hinders improvements for these water services.

A regional assessment of water quality was obtained only with the indicators calculated with a methodology that is not comparable with the one used for the EU. Data for the assessment on wastewater treatment also have too many gaps to provide an accurate picture; no forward-looking assessment is available.

The availability and quality of fresh water is a global concern. In the Western Balkans, countries share many river basins and water resources, making this an important area for cooperation and concerted effort (i.e. the Danube River Basin Convention 1998, framework agreement on the Sava River Basin 2002, Dinaric Arc Initiative 2008).

Policy goals

The Millennium Development Goals call for halving the percentage of the global population without access to safe drinking water by 2015. This objective has been translated into specific targets for each country, including those of the Western Balkans (these targets are listed below, along with current levels of access to safe drinking water). In addition, many Western Balkans countries also have targets to improve their treatment of wastewater.

The European Union has a broad range of water legislation capped by the Water Framework Directive, which calls on Member States to establish integrated water management by river basin and to ensure that all surface water and groundwater meets 'good chemical status' (i.e. low levels of pollution) and 'good ecological status', ensuring healthy ecosystems. In addition, the EU's Urban Wastewater Treatment Directive requires the treatment of wastewaters from all urban areas with the equivalent of more than 2 500 inhabitants, and the Nitrates Directive protects surface waters and groundwater from nitrates, which arise from the use of fertilisers and manure in agriculture as well as from livestock production. The Drinking Water Directive sets standards and requirements for safe drinking water.

Countries in the region are putting in place new strategies and new legislation. For example, in 2008 Croatia approved a national Water Management Strategy (OG 91/08) as well as the corresponding Ordinance on Limit Values for Indices of Hazardous and Other Substances in Waste Water (OG 94/08), which brings in the requirements of the Urban Wastewater Treatment Directive.

Under the UN's Millennium Development Goals, all countries in the region plan to increase access to safe drinking water by 2015.

Freshwater quality

Water quality varies significantly across the region. While quality is good in many mountain streams and in upper reaches of rivers, wastewater from urban areas and industry has polluted the lower courses of several rivers, such as the Sava River in Serbia and the Sitnica River in Kosovo under UN Security Council Resolution 1244/99 ([17]). Mining sites across the region have also contributed to water pollution. Recent incidents have included heavy metal spills from a tailings dam at Sasa in the former Yugoslav Republic of Macedonia; and releases from copper mines in Majdanpek and Veliki Majdan in Serbia, and also from the zinc mine in Mojkovac in Montenegro ([18]).

Agricultural run-off is a problem in many parts of the Western Balkans. Agriculture is the largest contributor of nitrogen pollution to groundwater and many surface water bodies, as nitrogen fertilisers and manure are used on arable crops to increase yields and productivity. During the 1980s, agriculture expanded in most countries of the West Balkan region,

([17]) UNECE (2007), *Environmental performance reviews: Republic of Serbia*, New York and Geneva.
([18]) UNEP/GRID-Arendal (2007), *Balkans: vital graphics*, Arendal, Norway.

leading to an increase of nitrates in water bodies. In the 1990s, conflict and economic crisis reduced the pollution from agriculture, but fertiliser use has increased in recent years (Chapter 4).

Since 2000, water pollution levels have been largely steady. This is the case for concentrations of oxygen consuming substances (measured as BOD_5) ([19]) and ammonium (NH_4+) measured at over 200 river monitoring stations in the region (Figure 1.2).

The average level of BOD_5 recorded in 2006 in the region, 2.43 mg O_2/l, is slightly higher than the average value for EU rivers (2.38 mg O_2/l). On the other hand, average ammonium concentrations in the Western Balkans are much lower. The average concentrations of two other pollutants, NO_3 and phosphorus, in regional rivers have generally remained stable since 2000.

In many locations across the region, groundwater in shallow aquifers is at risk from contamination by agricultural run-off and other sources ([20]). This is a concern as groundwater is an important source of drinking water in many countries: Serbia, for example, obtains 60 % of drinking water from groundwater ([21]).

Drinking water supply and wastewater treatment

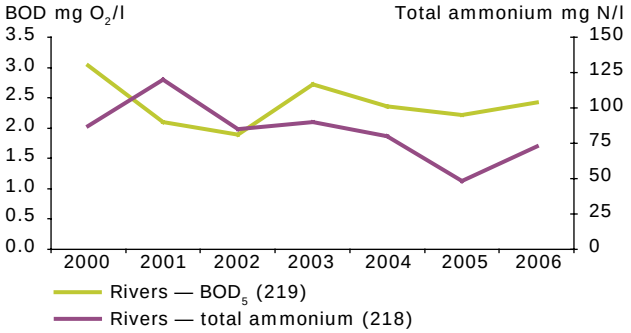
According to UNDP, the share of population with access to safe drinking water varies significantly among the countries of the Western Balkans. However, recent comparable data are not available.

Wastewater treatment in the region is often poor or nonexistent. In Serbia, for example, many large industrial facilities are located at the outskirts of urban areas and discharge their wastewater directly into rivers with little treatment, though total discharges have decreased in recent years. Wastewater treatment plants served only 16 % of the country's population in the middle of this decade ([22]). Albania has one working wastewater treatment plant. In Bosnia and Herzegovina, 90 % of wastewater is reportedly released without treatment. In Kosovo under UN Security Council Resolution 1244/99, there is no wastewater treatment and less than a third of the population has access to a sewer system (a wastewater treatment plant built for Pristina never entered service) ([23]).

A lack of finance for needed investments and maintenance is a common problem. For example, in Bosnia and Herzegovina, water fees are low and governments do not make up the shortfall. Often, collection rates are low as well. Industry faces higher taxes and charges on water use and wastewater treatment — however, the current levels are usually too low to create an incentive for more efficient use and for better wastewater pre-treatment ([24]). In Serbia, few investments were made in water services in the past decade, and facilities deteriorated ([25]).

Croatia has undertaken the construction of several wastewater treatment plants through programmes cofinanced by the World Bank. The recent Adriatic Project and Internal Water Project have a combined value of EUR 385 million ([26]).

Figure 1.2 BOD and total ammonium concentrations in the Western Balkan rivers, 2000–2006



Source: EEA West Balkan project (see Annex 1 for national sources used).

Further information in this report

The next chapters describe drivers as well as production and consumption patterns that will shape freshwater quality in the region in coming decades, as well as improvements in water services. Chapter 5 describes the scale of the challenge for improving water services in coming decades. There are further details on indicators in Annexes 1 and 2.

([19]) BOD, biological oxygen demand, is an index of the degree of organic pollution in water.
([20]) World Bank (2003), *Water resources management in south-east Europe: volume I—issues and directions* (work in progress for public discussion), Washington DC.
([21]) UNECE (2007), *Environmental performance reviews: Republic of Serbia*, New York and Geneva.
([22]) UNECE (2007), *Environmental performance reviews: Republic of Serbia*, New York and Geneva.
([23]) Regio*nal Environmental Center (2006), Environmental snapshot of south eastern Europe: REReP (Regional Environmental Reconstruction Programme for South East Europe) country profiles, Szentendre, Hungary.*
([24]) Speck, S. (2006), *Financial aspects of water supply and sanitation in transboundary waters of south-eastern Europe*, Report for the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety. (available at www.bmu.de/files/pdfs/allgemein/application/pdf/financial_aspect_water_investment.pdf [accessed January 2010]).
([25]) UNECE (2007), *Environmental performance reviews: Republic of Serbia*, New York and Geneva.
([26]) Croatian Environment Agency, September 2008.

1.3 Ecosystems and biodiversity

Key messages

The countries of the Western Balkans are rich in biodiversity, due in part to the region's variety of geography and habitats (which includes some specific ecosystems, i.e. karstic regions with rich underground biodiversity and old tectonic lakes (especially fauna and flora) still need to be researched more in detail).

A series of factors have threatened the region's natural wealth in recent years, including urban sprawl, agricultural land abandonment, loss of wetlands due to irrigation, hunting, overfishing and illegal timber cutting and fragmentation of habitats. While many of these pressures are also seen in the EU, the rate of change and scale of impacts is however greater in the Western Balkan countries due to the effects of integration with the EU and economic restructuring as well as the legacies of war.

Countries in the region have taken steps to protect biodiversity and natural areas: notably, the extent of protected areas in the region has grown steadily in recent years; and new initiatives to protect crossborder ecosystems are under way. However, EU legislation and other international regulations are insufficient. National regulation has a key role, but many endemic species are inadequately protected. As a result, the countries are unlikely to meet the European goal to halt biodiversity loss by 2010.

The biodiversity and ecosystem information base (including forests) for the assessment is very dispersed and data are often incomparable. There is also an urgent need for more scientific research on important specific ecosystems in the Western Balkans (karstic ecosystems and old tectonic lakes), and for linking this to policy-making.

The Western Balkans is one of the richest parts of Europe in terms of biodiversity. It encompasses a variety of geographic areas, from the Adriatic Sea and coastal zones to the hills and peaks of the Balkan Mountains and overthe Dinaric Karst to the Danube, Drava and Sava river plains. The region is influenced by Mediterranean, continental and mountain climates. The countries of the region enjoy a great variety of natural habitats, ranging from coastal lagoons and wetlands to Mediterranean forests, freshwater wetlands, karstic terrain ([27]) and mountain forests.

Many ancient tectonic features host endemic water, terrestrial and underground habitats, and these are important for protection also from the wider European perspective. Freshwater fish are of key importance regarding diversity on a European scale. The region's small farms tend to use low levels of pesticides and other inputs, creating extensive, high-nature-value farmland. Extensive forests and pristine natural areas also preserve biodiversity. The region's natural wealth provides a series of benefits, including forests that provide timber and watershed regulation, game for hunting, wild food, medical plants and natural areas for recreation and leisure. The region thus provides a 'green lung' for Europe.

Policy goals

The Convention on Biological Diversity provides a global framework for the protection of biodiversity, its sustainable use and an equitable distribution of benefits from genetic resources. All the recognised countries in the region are parties to this Convention. In 2002, all the Parties to the Convention committed themselves to achieve a significant reduction in the rate of biodiversity loss by 2010, at global, regional and national levels. This target was endorsed at the Johannesburg World Summit on Sustainable Development and incorporated in the UN's Millennium Development Goals.

At pan-European level, the Kiev Resolution on Biodiversity, adopted at the 2003 Environment for Europe Conference, calls for a halt to biodiversity loss by 2010. The European Union has also set the goal of halting the loss of biodiversity in its territory by 2010. The EU protects species and habitats through the Birds and Habitats Directives, and it has set up the Natura 2000 network of protected areas across Member States — legislation that candidate countries in the Western Balkans are adopting.

([27]) Kars is a terrain usually characterised by barren, rocky ground, caves, sinkholes, underground rivers, and the absence of surface streams and lakes. It results from the excavating effects of underground water on massive soluble limestone. The term originally applied to the Karst, a limestone area on the coast on the North Adriatic Sea, but has been extended to mean all areas with similar features.

Governments in the region have taken other recent steps to strengthen biodiversity protection. Many have recently expanded their networks of protected areas and have set targets to continue these efforts: for example, Serbia and the former Yugoslav Republic of Macedonia have set targets to protect 10 % and 12 % of their territory respectively by 2010.

Threatened and endangered species

The countries of the Western Balkans have a wealth of animal and plant diversity. The density of species listed in the Red List of Threatened Species (by area) is two to four times larger than in the 15 older European Union Member States (this refers to the number of threatened animal species, bird species and fish species ([28]).

Many of species are endemic. For example, analyses of fish species in the EU, Western Balkans and Turkey ([29]) show that many are found only in one country. Among these:

- 14 freshwater species are found only in Albania;
- 9 freshwater species are found only in Serbia and Montenegro;
- 4 freshwater species are found only in Bosnia and Herzegovina.

Albania, for example, has an estimated 3 250 higher plant species, about 30 % of the European total, as well as 756 vertebrate animal species. The number of known species in Croatia is around 38 000, though some estimates suggest that the number could be much higher (over 100 000 species).

In Croatia, where a Red List of threatened species has been prepared, about 13 % of marine fish species and 47 % of freshwater fish fall into this category. Over 17 % mammal, 24 % reptile and 30 % amphibious species are threatened, and just over 42 % of the vascular plants species ([30]). The former Yugoslav Republic of Macedonia does not yet have a Red List — however, according to estimates based on existing sources over 10 % of flora species and almost 30 % of vertebrate fauna species are considered threatened.

Further region-wide assessment is needed, as many species are found in more than one country, but data categories and methods differ between countries.

Karstic ecosystems and old tectonic lakes need further investigation to establish the present status of their biodiversity. More generally, data are neither complete nor consistent across countries.

Pressures on biodiversity

The region's biodiversity and natural habitats have faced a series of threats, including habitat fragmentation or destruction, over-harvesting, illegal logging, deforestation, inappropriate management methods, unregulated development and unregulated exploitation of natural resources. In coastal zones, tourism construction has affected both marine and land habitats (Section 1.6). Urban sprawl has been another threat to natural areas (Section 1.5) as well as proposed energy investments (the Western Balkan countries are rich in water resources and building new hydropower plants can endanger biodiversity; another threat is also wood cutting for biomass production).

Other threats include mining, which has altered landscapes and created pollution hot spots (Chapter 3). Forests have been cut back and wetlands drained for agriculture in Vojvodina, in Serbia, as well as other parts of the region. Unregulated hunting is a problem in several countries, including Albania, the former Yugoslav Republic of Macedonia and others. Unregulated logging for timber and fuel wood has damaged forests in many parts of the region, including Kosovo under UN Security Council Resolution 1244/99 ([31]), Montenegro and Albania. In the 1990s in particular, poverty drove some hunting and logging pressures (see Box 1.1). Thus, extraction of the region's rich natural resources has harmed its biodiversity.

There are also other growing biological pressures on species, such as the introduction of alien species through aquaculture and ballast water from maritime transport and the stocking of rivers and lakes with fish for recreational angling: the latter can pose a risk to ecological quality of water bodies.

Protected areas and other actions

Since the mid-1990s, countries across the region have taken action to protect species and habitats, notably

([28]) *Background paper on biodiversity, economic restructuring and quality of life in respect to EU enlargement 2004*: Estonian Institute for Sustainable Development; SEI-Tallinn (Stockholm Environment Institute Tallinn Centre); Institute for Sustainable Development Poland, Centre for Environmental Studies, Hungary; Institute for Water of the Republic of Slovenia, 2003.
([29]) *Ibid.*
([30]) Data provided by Croatian Environment Agency, September 2009.
([31]) Regional Environment Center, *Environmental snapshot of south eastern Europe: REReP country profiles*, Szentendre, March 2006.

by increasing the share of territory designated as protected areas. The total for all countries reached about 9 % of the region's total surface area in 2007 (Figure 1.3). However, urgent actions are still needed to ensure an adequate conservation status for all endemic species; further support for scientific research is needed to better understand the rich biodiversity in specific ecosystems ([32]).

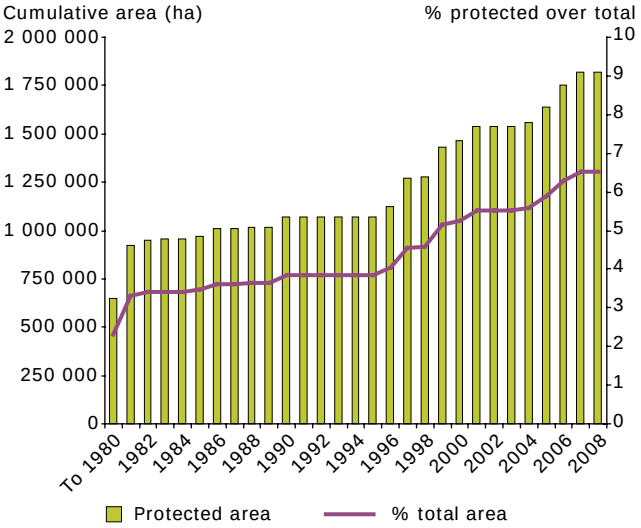
Albania in particular has increased the number and size of its protected areas, which now cover over 10 % of national territory, the highest level in the region. In Croatia as well, the number of protected areas has increased significantly since 1991. Serbia has increased its share of protected areas more slowly, reaching 6.3 % of the territory in 2007.

Countries have taken other steps to manage and protect biodiversity. For example, Croatia has developed national action plans for its large predator species: the wolf, lynx and bear.

Hopefully, some international initiatives will strengthen the cross-border protection of nature and biodiversity. One is the proposal for a legal framework for the protection and sustainable development of mountains areas in south-eastern Europe.

A number of cross-border initiatives have been launched by local and international organisations. These cross-border projects focus on resolving concrete problems and have led to an improved level of communication among project partners and stakeholders, better cooperation and local ownership and commitment. Examples include the Peace Parks (Bulgaria and Serbia) and the Dinaric Arc Initiative. The latter encompasses the whole area facing the eastern Adriatic Sea, from Trieste in north-eastern Italy to Tirana in Albania. It includes portions of the following countries: Italy, Slovenia, Croatia, Bosnia and Herzegovina, Montenegro, Serbia, the former Yugoslav Republic of Macedonia and Albania. Another initiative is the European

Figure 1.3 Cumulative national designated areas over time in the Western Balkans until 2008



Source: EEA West Balkan Project (see Annex 1 for national sources used).

Box 1.1 Illegal timber cutting in the Western Balkans

One environmental impact of poverty in the 1990s was an increase in illegal logging, which the World Bank has warned is threatening forests in Bosnia and Herzegovina, the former Yugoslav Republic of Macedonia, Serbia and Montenegro. According to one estimate, about 25 % of timber cutting in the former Yugoslav Republic of Macedonia is illegal: this timber is used mainly for fuel.

Albania has seen logging in forests and in its national parks, including the Lura and Valbona National Parks in the north of the country. Here too, the main demand is for fuel for poor rural families and export. Logging is believed to have decreased in recent years. In Montenegro, illegal logging is carried out both for fuel and for commercial purposes.

Source: European Forest Institute (EFI) and Danish Forestry Extension (DFE), *Study on the issues of illegal logging and related trade of timber and other forest products issues in Europe* (for The Ministerial Conference on the Protection of Forests in Europe — LU Warsaw), 2005.
WWF/UK, *Illegal Logging: cut it out! The UK's role in the trade in illegal timber and wood products*, January 2007.
WWF/UK, *Failing the forests: Europe's illegal timber trade*, 2005.
Papers for the Joint UNECE/FAO (Food and Agriculture Organization) workshop on illegal logging and trade of illegally-derived forest products in the UNECE region: causes and extent (16–17 September 2004, Geneva, Switzerland).

([32]) *Background paper on biodiversity, economic restructuring and quality of life in respect to EU enlargement 2004*: Estonian Institute for SD, SEI Tallinn, Institute for SD Poland, Centre for Environmental Studies, Hungary, Institute for Water of the Republic of Slovenia, 2003.

Green Belt, an IUCN (World Conservation Union) proposal to create the backbone of an ecological network running from the Barents Sea to the Black Sea. The South East European network of Important Plant Areas has been established as a focal point for contributions to the European Plant Conservation Strategy, and it covers Albania, Bulgaria, Croatia, the former Yugoslav Republic of Macedonia, Montenegro and Serbia (including Kosovo under UN Security Council Resolution 1244/99).

Despite these advances, major challenges remain. In Albania, a lack of resources has limited the effective management of newly protected areas ([33]). Across the region, it will be important to integrate protected areas into broader land-use planning and management. In many countries, forest management practices and development plans need to better incorporate biodiversity protection. There is lack of monitoring systems and methodologies to evaluate the status of and impacts on biodiversity.

Further information in this report

The next chapters describe drivers and production and consumption patterns that influence biodiversity in the Western Balkans. Chapter 5 summarises how these may affect ecosystems in the region. There are further details on indicators in Annexes 1 and 2.

([33]) REC, *Environmental snapshot of south Eastern Europe: REReP country profiles*, Szentendre, March 2006.

1.4 Greenhouse gas emissions and climate change

Key messages

Greenhouse gas emissions from the region increased rapidly in the first years of this decade, though on a per capita emissions remain lower than the EU average.

Croatia has a target to reduce its emissions under the Kyoto Protocol. Countries have also set up region-wide forums for climate change.

There is lack of recent, comparable data from the Western Balkan countries on greenhouse gas emissions, and this has limited the analysis.

Climate change is a global challenge that will affect the economy, society and environment in coming decades. For the countries of the Western Balkans, addressing greenhouse gas emissions and adapting to climate change impacts will be an important challenge in coming decades.

Policy goals

At the global scale, international responses to climate change have been taken under the UN Framework Convention on Climate Change. The Kyoto Protocol to the Convention sets binding targets on advanced economies for reducing greenhouse gas emissions. For the EU-15, this target is an 8 % reduction for the five-year period 2008–2012 compared to 1990 levels. One country in the Western Balkans, Croatia, is in this group: its target is to reduce emissions by five percent ([34]).

Current international negotiations are seeking to establish new global limits on greenhouse gas emissions for the period after 2012, and these may set new requirements on the countries in the Western Balkans. The European Union is leading the call for greater reductions in emissions. In March 2007, the EU Council set its own targets: a unilateral 20 % cut in emissions by 2020 (compared with 1990 levels) and a 30 % cut if other advanced countries join. Countries in the Western Balkans that join the EU will be affected by these commitments.

Even under the most optimistic scenario for global action to reduce greenhouse gas emissions, the process of climate change is now firmly underway. Thus, countries need to prepare measures to adapt to climate change. The EU published a White Paper in April 2009, outlining policy measures for adaptation to climate change. Countries in the Western Balkans have also started to prepare for climate change. At the Belgrade Environment for Europe Conference in October 2007, ministers from the region agreed to establish a climate change centre in Belgrade. In November 2008, the Regional Cooperation Council in Sarajevo, with the support of the Regional Environment Center in Hungary, adopted a Climate Change Framework Action Plan for Adaptation.

Greenhouse gas emissions

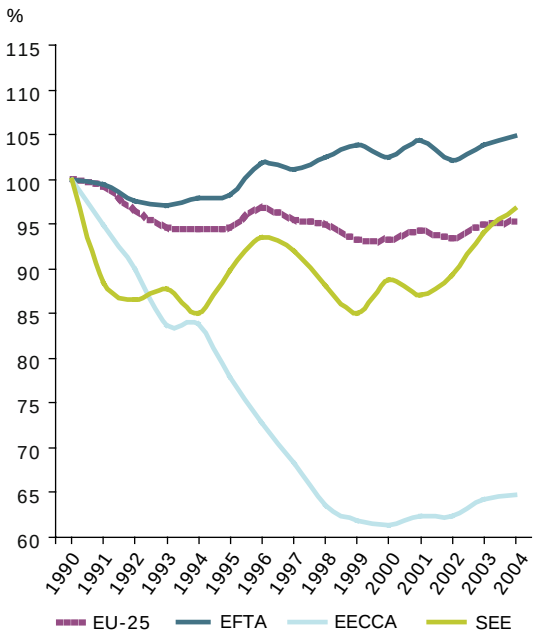
Only limited information on greenhouse gas emissions trends and projections is available from this region (see Annex 1 on the status of national communications). Regional assessment is possible using data from international sources such as the International Energy Agency (IEA) for greenhouse gas emissions from the energy sector and/or results of the GAINS model developed by the International Institute for Applied Systems Analysis (EEA, 2007, *Europe's environment — The fourth assessment*).

A review of data from 1990 to 2004 show that emissions from south-east Europe, an area that includes the Western Balkans as well as Bulgaria, Romania and Turkey, increased from 1999 to 2004, following major declines in the first half of the 1990s (Figure 1.4).

On a per capita basis, greenhouse gas emissions in the region remain below those in the EU-25 (Figure 1.5).

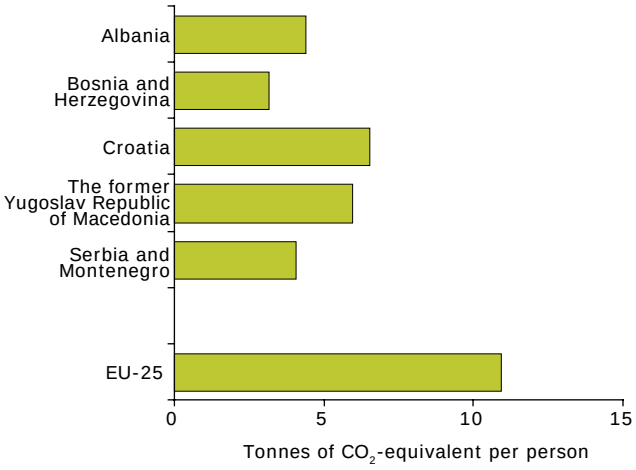
([34]) For further information, see the Secretariat of the UN Framework Convention on Climate Change at www.unfccc.int (accessed January 2010).

Figure 1.4 Trends in total greenhouse gas emissions in wider Europe



Source: EEA (2007), *Europe's environment — The fourth assessment*.

Figure 1.5 Greenhouse gas emissions per capita, 2004



Source: EEA (2007), *Europe's environment — The fourth assessment*.

Further information in this report

In the coming decades, the impacts of climate change will influence agriculture, biodiversity, hydroelectric production and many other economic and environmental sectors in the Western Balkans. The next chapter describes climate change as a driving force for the region's future. The chapters that follow describe two key sectors of production and consumption — energy and transport — that will play a key role in shaping greenhouse gas emissions from the Western Balkans. Chapter 5 summarises issues for the future. There are further details on indicators in Annexes 1 and 2.

1.5 Resource use and waste: land use

Key messages

In 2000, about 45 % of land in the Western Balkans was used for agriculture and a further 40 % was forest. In recent years, however, the proportion of land used for agriculture has decreased and much agricultural land has been abandoned. Another ongoing land-use change has been the sprawl of many urban and coastal areas.

Several countries in the region have introduced new legislation on land-use planning.

The changes in agricultural land use and consequent changes in pollution patterns have environmental impacts on, for example, forest cover and biodiversity. The changes also affect social structures (marginalisation of social groups, different consumption patterns of urban population) and economic development (changes in agricultural production and employment). All of which will be significant for the future sustainable development of the region and the region's role in the wider European area. Specific elements of these trends need further, detailed analysis.

The information base for changes in land use is much weaker than it was in the past. There is also a lack of information on drivers related to land-use change — information that is crucial for analyses of environmental impacts and for the formulation of measures for sustainable development. This needs to be addressed with some urgency.

The landscape of the Western Balkan region includes mountains, major river valleys and wetlands, farm land and forests, and urban and industrial zones. The EU has seen the expansion of urban sprawl in recent decades and this has also happened in. many parts of the Western Balkans in recent years. The abandonment of agricultural land is another problem, particularly in mountain areas.

Policy goals

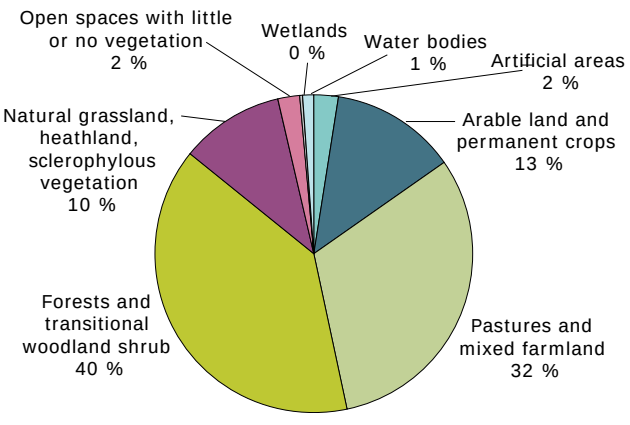
In the EU, the Directives on Environmental Impact Assessment and Strategic Environmental Assessment help to govern land-use changes. In 2006, the European Commission also prepared a Thematic Strategy on the Urban Environment, which called for a reduction in urban sprawl.

Albania, Croatia and the former Yugoslav Republic of Macedonia have introduced new legislation on physical planning and construction to cope with the problem of land take. This allows for legalisation of existing building and has enhanced effectiveness of the planning and permitting system. The reinforcement of legal controls on the development process coupled with the decentralisation of responsibilities to local authorities has already provided some opportunities for better urban management. Nevertheless, more political importance should be given to space planning, as well as to effective integration of biodiversity, natural and cultural heritage protection, and sustainable use of natural resources into all the relevant sectors.

Overview of land cover

Across the region, forests cover 40 % of land territory (Figure 1.6). Forest cover is particularly high in the former Yugoslav Republic of Macedonia, extending over almost 50 % of the country. On a regional scale, pastures and mixed farmland cover a further 32 % of the Western Balkans, and arable land 13 %. Across much of the region, the landscape is diverse and land cover can change in small distances (except for the broad Pannonian plain in the north of Croatia and Serbia, where land cover is more even).

Figure 1.6 Land cover by category in the Western Balkans, 2000



Source: See Annex 2.

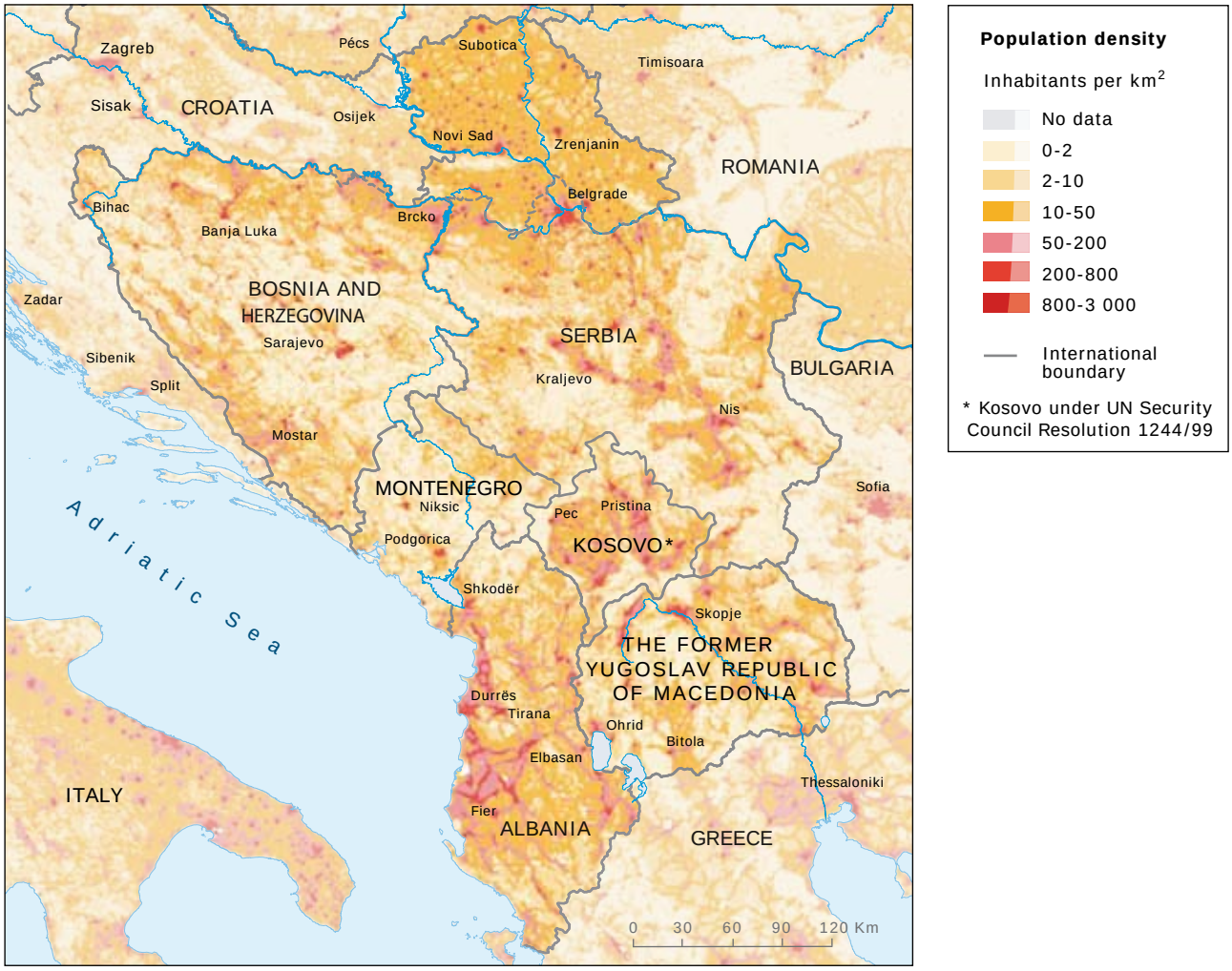
Land cover is uneven across the region. For example, population densities are high on Albania's coast and in its lowlands, in parts of Kosovo under UN Security Council Resolution 1244/99 and also in cities in Croatia, Serbia and other countries (0 below). Mountainous and karstic areas in Bosnia and Herzegovina, Montenegro as well as much of Croatia have comparatively low population densities. Settlements are small and numerous, which means that there are few large unpopulated areas — one of these is the Croatian/Bosnian Dinaric karst.

Recent trends influencing land use

Urban sprawl is one problem that has affected land use in the Western Balkans. In the former Yugoslavia, the wars in the 1990s created major displacements of the population and led to a growth of urban areas. In Albania, strict controls on personal movement and house construction were lifted in the early 1990s, and this prompted a shift in population from rural to urban areas. Many new urban areas have been constructed without planning or permits and without adequate services ([35]).

In Croatia, for example, new urban areas have taken over 4 500 hectares between 1990 and 2000, mostly from mixed farmland and pastures. In Serbia, sprawl has extended over about 4 000 hectares in this period. New residential, service and industrial areas were the main activities that expanded their surface area, followed by transport networks and mines.

Map 1.1 Population densities across the Western Balkans



Source: UNEP/GRID-Arendal (2007), *Balkans: graphic vision*.

([35]) UNDP (2007), *Environmental policy in south-eastern Europe*.

At the same time, land used for agriculture has decreased steadily over the years in most of the countries in the region, and land abandonment has accelerated sharply in recent years. This is particularly problematic in Croatia, which has seen a reported drop of more than 40 % in its agricultural land in recent years. One reason is the conflicts of the 1990s, when many people left their homes (Chapter 2). In Bosnia and Herzegovina, Serbia and Kosovo under UN Security Council Resolution 1244/99, large areas are still contaminated by land mines. Also, land reform measures broke up many large, collective agricultural enterprises, including in Albania, Bosnia and Herzegovina and Croatia. In many cases, the new small farms have been unviable and families have left farming — many have left rural areas for cities, keeping their farmland for security reasons, but leaving it uncultivated. In addition, unclear landownership, poorly functioning leases, incomplete privatisation of land used by former state agricultural companies and a lack of clarity in property laws, as well as outdated land registers have impeded the process of developing a functional land market in some countries, for example Albania ([36]). There is also a lack of clear strategies for the return of refugees, and privatisation has left land ownership uncertain ([37]).

Finally, some agricultural land may have been set aside for the region's growing protected areas (Section 1.3).

The changes in agricultural land use and consequent changes in pollution patterns have environmental impacts on, for example, forest cover and biodiversity. The changes also affect social structures (marginalisation of social groups, different consumption patterns of urban population) and economic development (changes in agricultural production and employment). All of these effects need to be addressed for the future sustainable development of the region and the region's role in the wider European area. Specific elements of these trends need further, detailed analysis.

Further information in this report

Part II and Part III describe drivers as well as production and consumption patterns that will shape land use in the region in coming decades. Chapter 5 presents a Europe-wide outlook for land use. There are further details on indicators in Annexes 1 and 2.

([36]) UNECE (2002), *Environmental performance review: Albania*, New York and Geneva.
([37]) UNDP (2008), *Environmental policy in south-eastern Europe.*

1.6 Resource use and waste: the marine and coastal environment

Key messages

Several pressures affect the environment of the Adriatic and Ionian Seas off the Western Balkans: marine transport of petroleum and natural gas, natural gas extraction in the Adriatic Sea and invasive species. Overfishing is particularly intensive throughout the Adriatic. However, the status of more than three-quarters of the fish stocks has not been assessed yet: here too, there is a lack of information to support accurate analyses.

Coastal areas in the Western Balkans face a further set of pressures that are expected to intensify due to rapid socio-economical changes in the region, such as effluents and solid waste from urban and tourism areas, eutrophication of coastal waters and urban sprawl along coastlines coupled with expected strong increase of turism.

Despite these pressures, the quality of coastal bathing water in the region remains quite good.

Seas and coastal zones hold a wealth of biodiversity and are a source of food, energy and other economic benefits. Marine and coastal environments around the world are facing severe pressures. For example, UNEP reports that 70 % of fish species worldwide are either fully exploited or depleted ([38]). Overfishing as well as high nutrient loads from land-based pollution and risks of oil spills are among the threats to Europe's seas. And across many parts of Europe, sprawl related to tourism development has affected coastal zones.

Policy goals

The Millennium Development Goals include calls for better conservation of marine areas as well as improved fisheries management to reduce the depletion of fish stocks ([39]).

The 1976 Barcelona Convention, revised in 1996, protects the Mediterranean, including the Adriatic and Ionian Seas that touch Western Balkans. The Convention seeks to monitor and control marine pollution, establish the sustainable management of marine and coastal resources and integrate these and other environmental considerations in economic and social development. The Mediterranean Action Plan (MAP) has worked to promote these goals and the sustainable development of the Mediterranean region ([40]). The Adricatic Sea Partnership was signed under this convention in 2006. Several international bodies seek to manage fisheries, including the General Fisheries Commission for the Mediterranean, whose members include Albania, Croatia and Montenegro ([41]).

In 2007, the EU launched a new, Integrated Maritime Policy that brings together its separate actions on fisheries, the marine environment, research, shipping and more. The main environmental component of this new policy is the 2008 Marine Strategy Framework Directive, which calls on Member States to ensure the 'good environmental status' of Europe's seas. Separately, the EU's Common Fisheries Policy seeks to establish sustainable fishing through requirements on annual catch levels, discards, fishing fleet capacities and other measures. A 2002 policy paper calls for the sustainable development of aquaculture in the EU.

Since 2000, Albania, Bosnia and Herzegovina, Croatia, Greece, Italy, Montenegro, Serbia and Slovenia have cooperated on political, economic and environmental issues through the Adriatic-Ionic Initiative ([42]).

Marine environment

Several pressures affect the environment of the Adriatic and Ionian Seas off the Western Balkans. Among the most important are: ([43])

- marine transport of petroleum and natural gas;
- natural gas extraction in the Adriatic Sea;

([38]) UNEP/GRID-Europe, *Overfishing: a major threat to the global marine ecology*, Environment Alert Bulletin 4, August 2004.
([39]) These objectives are part of Millennium Development Goal 7: environmental sustainability. For further information, see www.un.org/millenniumgoals (accessed January 2010).
([40]) UNEP Mediterranean Action Plan for the Barcelona Convention, available at www.unepmap.org (accessed January 2010).
([41]) General Fisheries Commission for the Mediterranean, www.gfcm.org (accessed January 2010).
([42]) Italian Ministry of Foreign Affairs, *Iniziativa Adriatico-Ionico*. www.esteri.it/MAE/IT/Politica_Estera/Aree_Geografiche/Europa/Balcani/IAI.htm (accessed January 2010).
([43]) EEA (2005), *Priority issues in the Mediterranean environment*, EEA Report No 5/2005.

- invasive species;
- overfishing.

These threats come not only from the region's four maritime countries — Croatia, Bosnia and Herzegovina, Montenegro and Albania — but also from economic activities in Italy and from other Mediterranean countries.

Overfishing is particularly intensive throughout the Mediterranean and the Adriatic. In the Adriatic and Ionian Seas that lie off the Western Balkans, the status of more than three-quarters of the fish stocks has not been assessed (Map 1.2). For the few species that have been assessed, the majority face excessive fishing pressures ([44]).

Coastal zones

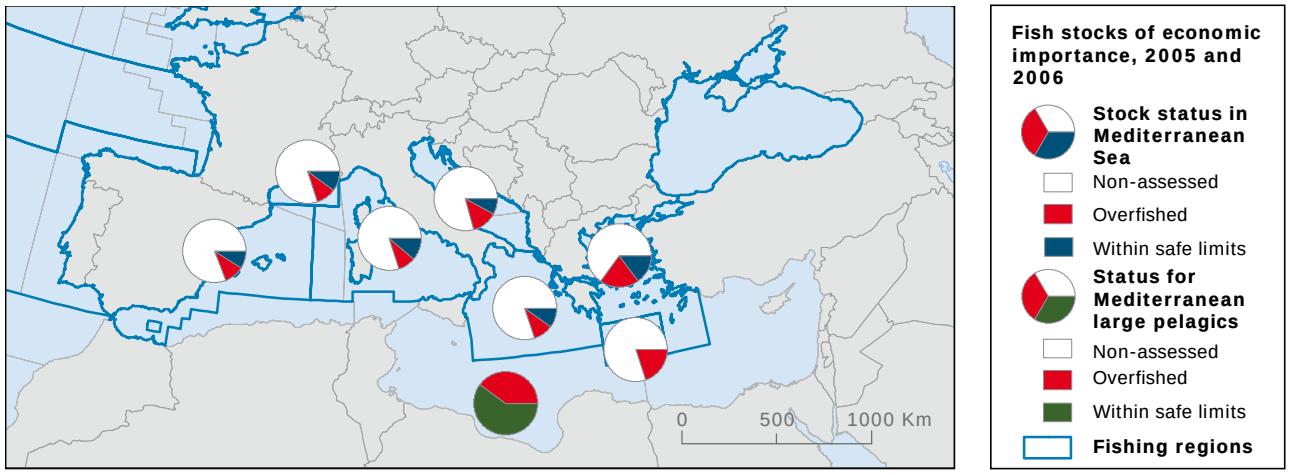
Coastal ecosystems, from coastal land to transitional waters and near-shore marine waters, are 'among the most productive yet highly threatened' ([45]). One reason is that many coastal zones are places of high population density and economic and infrastructure development.

The coastal zones in the Western Balkans have faced a series of pressures. Table 1.1 provides an overview of the problems in three of the coastal countries of the region, Albania, Bosnia and Herzegovina and Croatia (information on Montenegro is not available).

The coastlines of all the countries have been marred by sprawl, with the construction of holiday homes and small tourism developments (see also Section 1.5 on land use), which has damaged ecosystems in coastal land. In addition, inert waste from construction has often been discarded in coastal waters, altering marine ecosystems. In Albania, the process has so far been slower than in the other countries.

The coastlines of all three countries, as well as Montenegro, are affected by inadequately treated urban effluent (Section 1.2). In Croatia, 1 million

Map 1.2 Fish stocks of economic importance in the Mediterranean



Source: EEA (2007), *Europe's environment — The fourth assessment*.

Table 1.1 Pressures on coastal zones in the Western Balkans

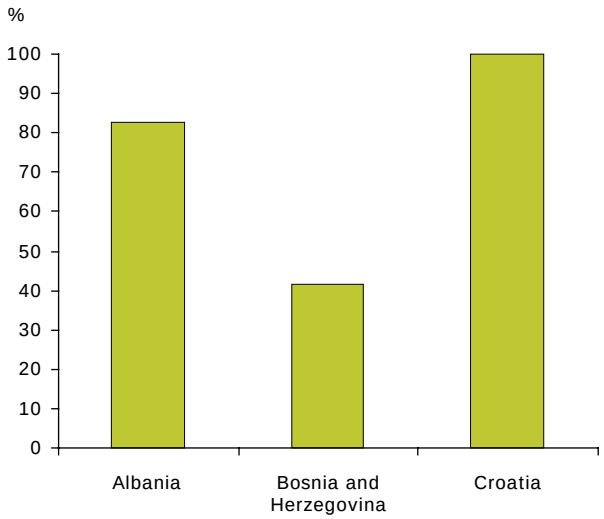
	Urban effluents	Urban solid waste	Coastal eutrophication	Coastal urbanisation
Albania	+	+	+/-	+/-
Bosnia and Herzegovina	+	+	-	+
Croatia	+	+	+	+

Source: EEA (2005), *Priority issues in the Mediterranean environment*, EEA Report No 5/2005.

([44]) EEA (2007), *Europe's environment — The fourth assessment*, p. 223.
([45]) EEA (2006), *The changing faces of Europe's coastal areas*, EEA Report No 6/2006.

people live in coastal areas. In Albania, about 60 % of the country's population of 3 million live in the coastal zone. Montenegro's coastal zone has about 400 000 inhabitants, about two-thirds of the country's total population. Tourism has grown rapidly over the past decade, adding to effluent levels in the summer.

Figure 1.7 Coastal bathing water quality in the Western Balkans, 2005



Source: EEA West Balkan Project (see Annex 1 for national sources used).

Despite these pressures, by at least one measure coastal waters in the region are still relatively clean. In Croatia, for example, almost all the 851 stations report water quality meeting national standards, as do over 80 % of those in Albania, which has 70 stations. In contrast, in Bosnia and Herzegovina, which has a much shorter coastline and fewer stations, most waters do not meet standards (Figure 1.7).

Further information in this report

Part II describes drivers that will shape the marine and coastal environment in the Western Balkans in coming decades. Chapter 3 reviews production patterns, including fisheries; Chapter 4 discusses consumption patterns and covers food consumption. There are further details on indicators in Annexes 1 and 2.

1.7 Resource use and waste: solid waste

Key messages

In recent years, the generation of municipal waste has risen steadily in the Western Balkans, and it is currently estimated to be at levels similar to those in the EU new Member States (however, data on solid waste are poor). Quantities of packaging waste, electronic waste and old cars are growing rapidly, but comprehensive recycling programmes are not in place. Landfill is still the prevailing form of waste management, and illegal dumping of waste remains a major problem.

Municipal waste collection is insufficient in most countries in the region, especially in rural areas. Many waste facilities are old. Abandoned, illegal and poorly managed landfill sites are a problem in many areas.

Both ongoing and accumulated industrial waste, and in particular mining waste, is also a serious problem in some areas.

Countries of the region have updated their waste legislation and developed new waste management plans to address these problems. However, effective implementation of these plans needs better monitoring.

Overall, there is a serious lack of information in this area, which prevents an accurate assessment of the current state and future prospects.

Levels of municipal solid waste are increasing in the EU and around the world, including the Western Balkans. Industrial, construction and mining waste are also growing problems.

Policy goals

At international level, the Basel Convention regulates trade in hazardous waste ([46]).

The EU has an extensive body of waste legislation. The 2008 Waste Framework Directive establishes a hierarchy for waste management, setting waste prevention as the first goal, followed by its reuse and recycling, and reducing the amount of waste sent to landfills. Other legislation sets requirements for waste management facilities, in particular landfills and incinerators, and rules for types of waste, such as hazardous waste and sewage sludge. The EU has also established producer responsibility schemes for specific waste streams, such as electrical and electronic waste and end-of-life vehicles.

In the Western Balkans, most countries have passed new environmental legislation covering municipal waste management, often incorporating principles of EU directives. Countries in the region have also developed waste strategies and legislation for specific waste streams. Implementation and enforcement, however, are a concern throughout the region. Few countries have quantitative targets for municipal waste reduction. However, Croatia's Waste Management Plan for 2007–2015 sets the objective of reducing the quantity of waste currently generated and minimising waste sent to landfills.

Municipal waste: recent trends

The generation of municipal waste per capita in the region is estimated to have increased sharply from 2003 to 2007 — estimated at more than 40 % from 234 to 330 kg/cap (Figure 1.8) ([47]). The increase is linked to the steady increase in GDP over these years — though the growth in waste outstripped the growth in GDP.

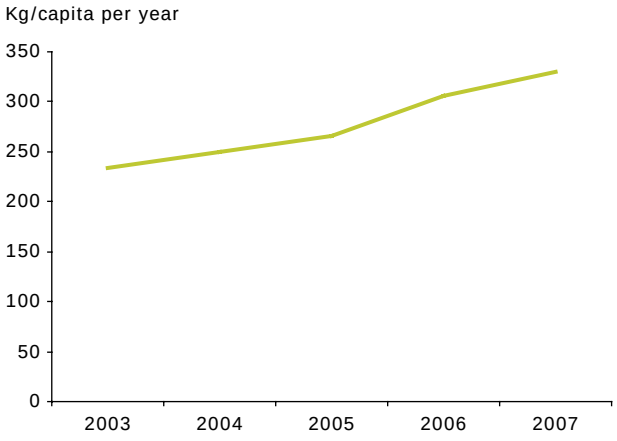
Compared with the EU average of more than 500 kg per capita per year, the figures for the West Balkan countries are considerably lower; however, these levels are quite similar to those in the EU-12, where average municipal waste generation is 344 kg per capita. Municipal waste generation is much higher in the EU-15, mostly because of more wasteful consumption patterns. These comparisons are at best tentative, however, as statistics and information on waste management are not easily available, are often inconsistent and have many information gaps.

Waste management in the region is often weak. Throughout the Western Balkans, municipal waste

([46]) The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal — for further information, see www.basel.int (accessed January 2010).

([47]) These figures are based on estimates and do not cover all countries, so they should be interpreted with caution. Indeed, few municipalities have weighing stations.

Figure 1.8 Municipal waste generation per capita in the Western Balkans from 2003–2007



Source: EEA West Balkan Project. Based on data from Albania, Bosnia and Herzegovina, Croatia and the former Yugoslav Republic of Macedonia ([48]) (see Annex 1 for national sources used).

is mostly sent to landfills, few of which meet high standards such those required by the EU. Waste management services and infrastructure in the region are weak, and the municipal companies that collect waste often use outdated vehicles.

In some parts of the region, municipal solid waste is not collected regularly. While 92 % of the population in Croatia is served by organised waste collection schemes, in Bosnia and Herzegovina, for example, only about 60 % of the population does. Throughout the region, rural areas are generally poorly covered.

Even where it is collected, recycling of municipal waste is not well developed and there are no comprehensive recycling programmes in place. Several categories of waste in particular are reportedly growing rapidly, including packaging waste, waste electronic and electric equipment and end-of-life vehicles. As yet, countries in the region do not have special programmes to address these types of waste. Moreover, many hazardous, industrial and medical wastes are sent to municipal waste landfills, due to the lack of adequate treatment and safe disposal facilities for these categories of waste.

Abandoned waste sites and uncontrolled landfills

Illegal dumping is often a problem, in part due to a lack of waste management facilities. Serbia, for example, has over 160 controlled landfills and over 1 000 uncontrolled landfills ([49]). As a result, landfills pose considerable risks to public health and the environment. A further legacy of environmental problems comes from abandoned, illegal and poorly managed landfill sites.

Croatia has started to tackle these problems, and since 2004 has undertaken the remediation of 292 landfills that did not meet standards. Kosovo under UN Security Council Resolution 1244/99 has also improved several municipal landfills, in particular through support from the European Agency for Reconstruction and other donors.

Industrial waste

Households account for only 7 % of all solid waste generated in the EU (by weight), and only 2 % of solid waste generated in the EU-12. Construction, manufacturing and mining are by far the largest sources: mining generates almost half of all solid waste in the EU-12 ([50]).

Mining waste is a significant problem in many parts of the Western Balkans, as the region is rich in lignite, bauxite, metal ores and other mineral resources. The region has been one of Europe's major sources of metals such as copper, zinc and aluminium. In the 1990s, many of these mines closed, leaving a legacy of unsolved solid waste and other environmental problems such as acid mine drainage that pollutes surface waters and groundwater ([51]).

Further information in this report

Part II and Part III describe drivers as well as production and consumption patterns that will shape waste generation in the region in coming decades. Chapter 5 discusses outlooks for municipal waste generation, using forward-looking indicators for the EU. There are further details on indicators in Annexes 1 and 2.

([48]) Data collection, monitoring and reporting in the waste sector in the region lags behind other sectors with respect to environmental monitoring, for example of water or air. Varying definitions of the concepts and the fact that some countries have reported data on municipal waste and others on household waste have introduced error. Presented municipal waste data are based on rough estimates and should be viewed with caution.

([49]) UNECE (2007), *Environmental performance review: Republic of Serbia*, New York and Geneva.

([50]) Kees Wielenga, FFact, personal communication (March 2009), based on Eurostat data.

([51]) UNEP/GRID-Arendal (2007), *Balkan: vital graphics*, 2007, Arendal, Norway.

1.8 Resource use and waste: water supply

Key messages

While water resources are abundant for much of the year, water scarcity is a problem in parts of the Western Balkans, particularly in the summer, in southern countries, coastal areas and on islands.

The countries of the region share river basins and water resources. In the Danube Basin, including in the Sava River Basin that feeds into the Danube, international cooperation is providing a basis for cooperation for the shared management of river basins and water resources.

The information base is too weak to provide a regional assessment of past trends and of prospects for the use of water resources.

The availability and quality of freshwater is a global concern. In the Western Balkans, countries share many river basins and water resources, making this an important area for concerted effort.

Policy goals

The Millennium Development Goals call for halving the percentage of the global population without access to safe drinking water by 2015. This objective has been translated into specific targets for each country, including those of the Western Balkans (these targets are listed below, along with current levels of access to safe drinking water). In addition, many Western Balkan countries have targets to improve their treatment of wastewater.

The European Union has a broad range of water legislation, capped by the Water Framework Directive which calls on Member States to establish integrated water management by river basin and to ensure that all surface water and groundwater meets 'good chemical status' (i.e. low levels of pollution) and 'good ecological status', ensuring healthy ecosystems. In addition, the EU's Urban Wastewater Treatment Directive requires the treatment of wastewaters from all urban areas with the equivalent of more than 2 500 inhabitants, and the Nitrates Directive protects surface waters and groundwater from nitrates, which arise from the use of fertilisers and manure in agriculture as well as from livestock production. The Drinking Water Directive sets standards and requirements for safe drinking water.

International agreements help to manage river basins in the Western Balkans. The Danube River Protection Convention established the river basin approach to water management for this extensive river basin. Four Western Balkan countries are parties: Bosnia and Herzegovina, Croatia, Montenegro and Serbia. These countries are also parties to the 2002 Framework Agreement on the Sava River Basin, which protects this tributary of the Danube. However, the Dinaric area, which provides for around 30 % of water resources in this area and whose landscape is mostly karstic, is not protected and managed by international or national mechanisms in a sufficient way. A new initiative is under way to fill this gap.

Freshwater water quantities and use

Taken as a whole, the Western Balkans have relatively abundant freshwater resources (Table 1.2) — but in many parts of the region, water is scarce, particularly in summer months. In Albania, for example, although human consumption uses less than 10 % of total freshwater resources, in the summer many rivers carry less than 10 % of their wintertime flow (irrigation uses are particularly significant in the summer: about 49 % of Albania's cropped land is irrigated ([52])). In the former Yugoslav Republic of Macedonia as well, summer river flows are greatly reduced. Although lakes

Table 1.2 Freshwater resources per capita, 2005 (m³/year)

Albania	8 530
Bosnia and Herzegovina	9 388
Croatia	8 485
The former Yugoslav Republic of Macedonia	2 655
Montenegro	..
Serbia	..

Source: World Bank data.

([52]) World Bank, *Water resources management in southeast Europe—volume I: issues and directions*, 2003.

provide an important water resource in the former Yugoslav Republic of Macedonia, many towns experience summer shortages in drinking water ([53]). In addition, water is scarce in the summer in some coastal areas and on islands.

Countries in the region have also been affected by droughts. Albania, for example, sees large variations between normal and drought years.

Much of the region's water resources are shared: about 60 % of Croatia's territory and over 70 % of Bosnia and Herzegovina's lie in the Danube River basin ([54]). In Serbia, over 90 % of water resources flow from neighbouring countries. The former Yugoslav Republic of Macedonia's main river basins flow through Albania into the Adriatic Sea and through Greece into the Aegean Sea.

Water consumption fell in the region in the 1990s, due in part to conflicts that reduced industrial production and agriculture. These conflicts also led to a decline in farming and a reduction in this sector's water consumption, especially in the former Yugoslavia. In Albania, large state-owned farms that used large quantities of irrigation water were split up at this time, and water consumption fell as a result ([55]).

Institutional, financial and political organisations for water management lack capacity. The involvement of stakeholders is often poor, as is the public transparency of their underlying interests. Additional threats and opportunities are emerging from the region's increasing energy needs, including proposals in new energy policies such as market opportunities for additional hydropower exploitation.

Further information in this report

The next chapters describe drivers as well as production and consumption patterns that will shape water availability, water use and water quality in the region in coming decades. Chapter 5 provides a Europe-wide outlook for water consumption. There are further details on indicators in Annexes 1 and 2.

([53]) World Bank, *Water resources management in southeast Europe — volume II: country water notes and water fact sheets*, 2003.
([54]) www.icpdr.org/icpdr-pages/countries.htm (accessed January 2010).
([55]) World Bank, *Water resources management in southeast Europe — volume II: country water notes and water fact sheets*, 2003.

Part II: Driving forces

2 Driving forces that shape environmental futures in the Western Balkans

Part I of this study provided an overview of current environmental trends in the Western Balkans. The future of the environment in the region, however, will be affected by political, social, economic and other dynamics — both those within the region itself as well as the dynamics at global and European levels. This chapter reviews the main drivers that could shape environmental change in the Western Balkans. Through these patterns, the drivers will shape human impacts on the environment in the coming decades. These drivers act on the environment in particular by changing production and consumption patterns, which are the topic of the next part of the study (Part III).

2.1 A framework for analysing driving forces

This chapter assesses the key drivers that can influence environmental change in the Western Balkans in the coming decades. It builds on analysis carried out in recent and ongoing EEA work, including the report on *The pan-European environment: glimpses into an uncertain future*, which was presented at the 2007 Environment for Europe Conference in Belgrade. The EEA's work on drivers is based on the STEEPL framework, described in Box 2.1.

The STEEPL drivers will influence production and consumption patterns, which are themselves drivers that affect the environment (consumption and production patterns are described in the following chapters). Each section of the chapter reviews dynamics and uncertainties of drivers at different geographic scales: global, European, regional and national. Figure 2.1 describes this framework.

As Figure 2.1 suggests, developments at several scales will influence consumption and production patterns in the region. Table 2.1 identifies specific drivers at

Box 2.1 The STEEP framework

The STEEP framework is frequently used to identify drivers for futures analysis. This framework classifies forces shaping the future into five broad categories:

- **S**ocial: changes in composition or attitudes of people, including trends in demographics, gender issues, and consumer values;
- **T**echnological: changes due to innovations and applications of science and technology;
- **E**nvironmental: changes in natural systems/ecology;
- **E**conomic: changes in the system of material exchange;
- **P**olitical: changes in government, related institutions, issues, and their constituents.

The EEA has developed this framework further by including one additional category:

- **L**egislative and policy: the laws that regulate and influence business and household activities in relation to the environment and determine government actions.

Thus, this chapter's analysis uses a STEEPL framework. (Some studies call this a PESTEL framework — see for example, Gillespie, 2007) ([56]).

Source: Peter Schwartz, Global Business Network (GBN) in *The art of the long view*, 1996.

([56]) Andrew Gillespie, *Foundations of Economics*, 2007 (chapter on business strategy), available at www.oup.com/uk/orc/bin/9780199296378/01student/additional/page_12.htm (accessed January 2010).

Figure 2.1 Linking drivers, production and consumption patterns and environmental futures

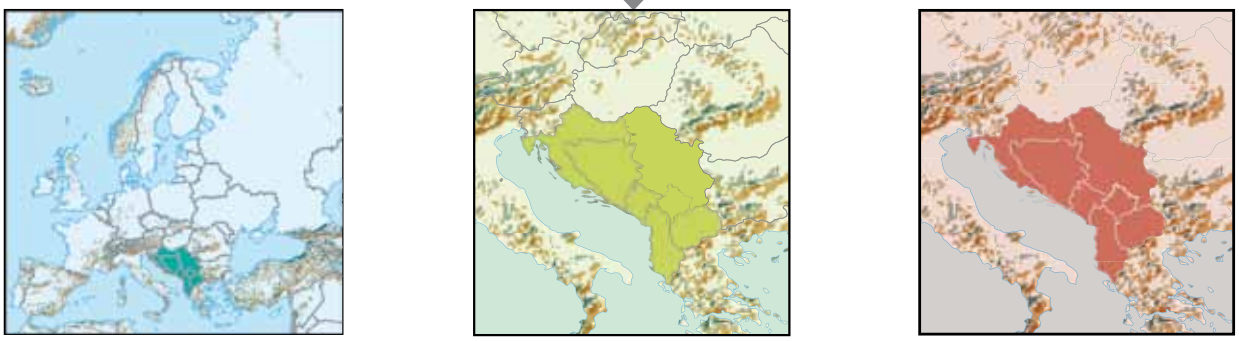
Driving forces and uncertainties shaping the future environment in the region

		Global European Regional National
Social	• Population and migration • Consumer behaviour	
Technology	• Technology	
Economics	• Globalisation and trade • Macro-economic development • Markets and business	
Environment	• Global environmental change	
Politics	• Politics	
Legislation and policy	• Legislation and policy	

Key elements of driving forces are described in Table 2.1. This chapter discusses the future trends of these forces, uncertainties, some scenarios and impacts to production and consumption.

The driving forces will change production and consumption patterns that directly affect the environment in the Western Balkans

Chapters 3 and 4 look further at the key areas of production and consumption patterns



Potential environmental futures in the Western Balkan countries

Chapter 5 discusses outlooks and alternatives for major environmental impacts: air, water pollution, greenhouse gas emissions and climate change, land use, solid waste, water use, marine and coastal environment

four geographical scales: global, European, regional (Western Balkans) and national.

At the global scale, for example, the development of new international agreements on climate change is likely to influence long-term decisions concerning energy production in the Western Balkans. Global decisions will also affect the extent of the long-term impacts of climate change, both worldwide and within the region. Similarly, prolonged global economic uncertainty may stunt growth and development in the Western Balkans and this could have wide-ranging impacts on the environment: on the one hand, production and consumption levels could decline; however, on the other hand countries will have fewer resources to invest in wastewater treatment plants and other pollution-control methods, which could cause further continuation and expansion of the unsustainable use of natural resources (forests, fisheries, water and agricultural land). Developments at European scale, such as decisions about whether and when to admit new Member States to the European Union, will also influence consumption and production patterns and the environment in the Western Balkans: accession will bring new environmental standards and new

legislation that influence agriculture, industry and many other production sectors; it will bring financing to address environmental problems in these sectors; and it will also bring new rules on products that can be placed on the market — and these requirements will then influence the environment and improve the know-how and institutional and governance framework for dealing with issues influencing the future state of the environment.

These drivers are described and analysed in further detail in the sections that follow.

The future holds many uncertainties, which policy-makers and other actors in the region will need to consider as they prepare robust, long-term actions. The sudden arrival and ferocity of the world's current economic problems show the importance of considering uncertainties and possible unexpected events. This chapter highlights some of these uncertainties and describes several plausible scenarios that have been developed and analysed in recent future-oriented studies.

The various drivers are closely interrelated. For example, political forces can influence economic development, which in turn can affect cultural values. The sections of this chapter highlight many of these interactions (Table 2.1).

Table 2.1 Key elements of driving forces at different geographical levels

		Key elements of drivers that influence consumption and production patterns in the Western Balkans			
STEEPL drivers		**Global**	**European**	**Regional (Western Balkans)**	**National**
Social	Population and migration		• Migration from and via Western Balkans to EU	• Migration within the region (e.g. resolution of 1990s refugees; migration to countries with falling populations)	• Population growth/ decline • Ageing populations • Household size • Rural/urban migration
	Culture, values and needs	• Consumer culture • Environmental non-governmental organisations and civil society	• Consumer culture • Environmental non-governmental organisations and civil society		• National cultural patterns • Individuals, non-governmental organisations, civil society
Technological	Technology	• Development of new technologies	• Innovation policies		• Innovation policies
Economic	Globalisation and trade	• Global trade flows	• Imports/exports of agricultural products and raw materials		• Imports/exports of agricultural products and raw materials • Transit of energy resources (e.g. oil, gas)
	Macro-economic development	• Global economic growth	• EU economic growth		• National growth rates • Enterprise restructuring
	Markets and business	• Business leadership for the environment	• Business leadership for the environment		• Foreign direct investment • Business leadership for the environment • Privatisation of energy, water services
Environmental	Global environmental change	• Global climate change impacts • Global biodiversity loss		• Climate change impacts in the region	
Political	Politics	• Geo-politics	• EU internal effectiveness • EU enlargement	• Cooperation among countries in the region	• Accession to the EU • National political and institutional reforms • Social and ethnic instability
Legislative	Legislation and policy	• Global environmental agreements	• Future development of EU legislation		• Implementation of environmental laws • Sustainability policies

2.2 Population and migration

Key messages

In coming decades, most of the countries in the region are projected to see declining and ageing populations; demographic growth is expected to continue only in Albania and Kosovo under UN Security Council Resolution 1244/99.

Migration patterns are less certain. The region must still resolve the legacy of migrants who in the 1990s left to escape conflict and economic problems, and these flows could change the region's demography. In coming decades, countries may see further departures to richer countries; migrants arriving from other continents and countries (including illegal migration); and domestically, further movements from rural to urban areas.

These trends will influence many aspects of consumption and production patterns and the environment. For example, it is expected that households will become smaller, resulting in higher consumption per capita: for example, energy for heating needed per person will increase. Migration patterns are likely to perpetuate rural land abandonment in rural areas, as well as pressures for sprawl in urban areas.

The influence of changes in the expected age structure to consumption and production patterns has not yet been well investigated, but it is expected that older people will have different needs and habits. The impacts of these changes in the Western Balkans are expected to be slightly different to those in other EU Member States, due to the region's different history and culture. More analysis is needed concerning the environmental impacts of migration in the region and its influence on consumption and production patterns.

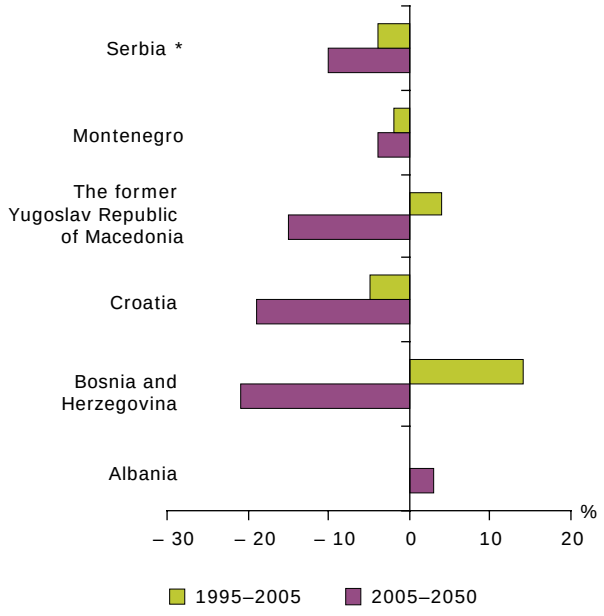
The size and structure of the population is directly linked to environmental pressures: larger populations have higher resource requirements and generate more emissions. For some areas of consumption, such as food, water and energy, the link between population size and environment is very close. Nonetheless, population is only one driving force influencing future environmental impacts: changes in production and consumption patterns due to economic conditions, technology, values and other forces could greatly change these impacts. These links needs further attention.

The global population is expected to increase from 6.5 billion in 2005 to more than 9 billion in 2050 ([57]), and this growth will put new pressures on the world's resources. In Europe, in contrast, populations are projected to shrink by 2030, and will also age: the share of population over 65 in Western Europe is projected to increase from 17 % in 2005 to 24 % in 2030 ([58]).

Population growth and decline

In coming decades, most countries in the region are expected to see declining populations (Figure 2.2). For Croatia, Montenegro and Serbia, this trend has

Figure 2.2 Population growth and decline in the Western Balkans, 1995–2005 and projections for 2050



Note: * Figures for Serbia include Kosovo.

Source: World Bank.

([57]) Based on the medium variant projection from: United Nations, *World population prospects: the 2008 revision, population database*, available at http://esa.un.org/unpp/index.asp (accessed January 2010).

([58]) EEA (2007), *The pan-European environment: glimpses into an uncertain future*, Report No 4/2007.

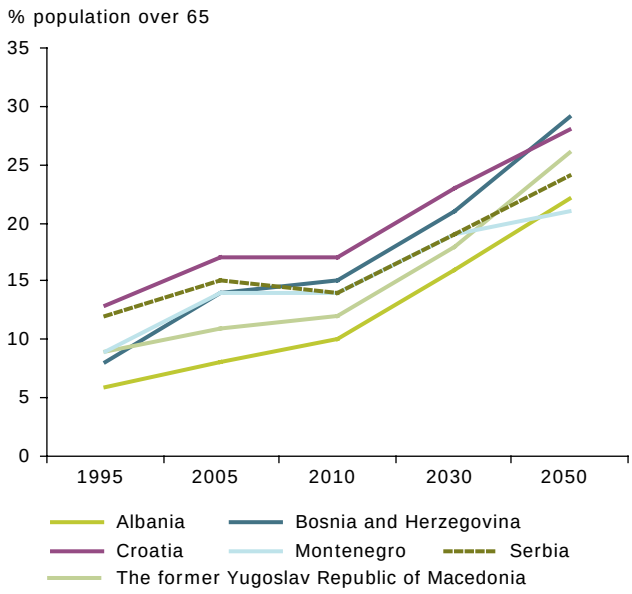
already started. Bosnia and Herzegovina and the former Yugoslav Republic of Macedonia are projected to see declines after 2010. Between 2005 and 2050, Albania will be one of only two parts of the region whose population is projected to grow — Kosovo under UN Security Council Resolution 1244/99 being the other, though it is not included in the figure.

Ageing populations

In the Western Balkans, countries will face ageing populations: by 2050, more than 20 % of inhabitants will be over 65 in all the countries of the region; in some, such as Croatia and Bosnia and Herzegovina, it is projected that close to 30 % of inhabitants will be over 65 (Figure 2.3). Ageing is an important trend for the present and future throughout Europe, including in the EU.

Ageing will pose a challenge for government finances and social programmes. On the one hand, as the proportion of individuals of working age declines, so will government revenues from employment taxes and the growing number of elderly will need health care. In many advanced economies, pension systems risk bankruptcy. These problems can be tackled by policy reforms, such as changing employment, pension and tax policies ([59]).

Figure 2.3 Ageing population in the Western Balkans in 1995–2005 and projections until 2050



Source: World Bank.

The decline in working-age populations could slow economic growth. Indeed, the Economist Intelligence Unit's economic projections for Croatia and Serbia to 2030 take this factor into account, and on this basis predict a decline in the rate of economic growth in these countries.

If countries do not face up to these problems, government budgets may come under pressure and this could lead to cuts in areas such as funding for the environment. On the other hand, a shift to green taxes on consumption might provide a double benefit, by supporting government finances while reducing environmental impacts.

The changing population structure in the EU and the Western Balkans has another element. Life spans have increased and families, and hence the size of households, are becoming smaller. This is contributing to changing consumption patterns, such as a higher use of energy per capita for heating (Chapter 3). This trend has contributed to higher environmental pressures in the EU and it could have a similar impact in the Western Balkans in coming years.

Whither migration?

While detailed demographic projections can be more certain, migration patterns are less certain.

At EU level, several migration trends have been seen in recent years. One is the arrival of people from developing countries who seek work or political asylum; this trend is expected to continue in particular for EU Member States as domestic workforces remain stable or start to decline. Another trend is that many retired Europeans have moved from northern Europe to warmer climates in southern Europe.

The countries of the Western Balkans have been greatly affected by migration. Many people in former Yugoslavia moved in the 1990s to escape conflict — over 600 000 to other European countries, and perhaps 4 million within the region (Map 2.1). Others left to seek better economic opportunities: by one estimate, over 1 million inhabitants of Albania, about one-third of the country's population, emigrated. Most migrants went to the European Union. Emigrants represent a noticeable source of investment in the domestic country, even if they live abroad.

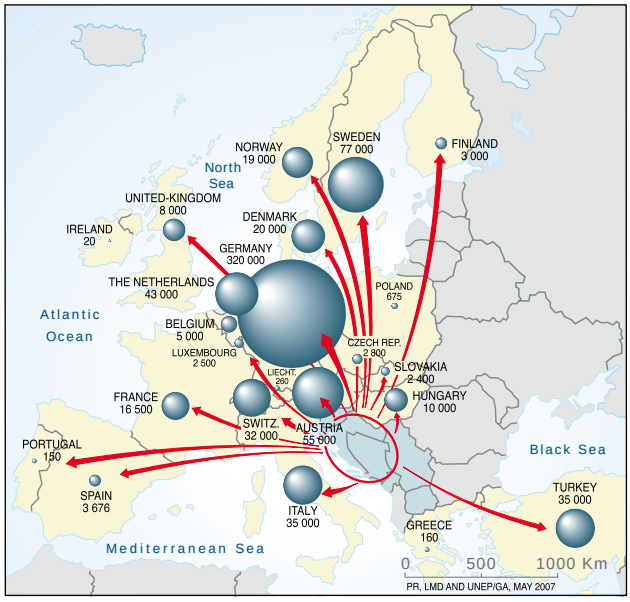
([59]) Jean-Philippe Cotis, 'Population ageing: facing the challenge', *OECD Observer*, September 2003, available at: www.oecdobserver.org/news/fullstory.php/aid/1081/Population_ageing:_Facing_the_challenge.html (accessed January 2010).

While the flow of ethnic refugees from the region largely stopped after the 1990s, many problems remain, including the resettlement of those who left. Migration out of the region for economic reasons continues ([60]). The region's current migration trends include the following:

- workers continue to leave for wealthy economies, such as those in western Europe. The young and the highly educated are among those leaving — and this can harm growth in the Western Balkans;
- the region is witnessing an ongoing movement from rural to urban areas;
- illegal immigrants from developing countries seeking to enter the EU have transited through the Western Balkans — and some have stayed in the region;
- in the 1990s, the Western Balkans saw about 5 million ethnic refugees and economic migrants move from their homes; about half have settled in new places or returned to their original homes, but the other half have not settled permanently ([61]).

In the future, people may continue to move. Within the region, countries with low or negative population growth may face a shortage of workers in coming decades. Those countries in the Western Balkans with stable or growing populations in coming years, such as Albania and Kosovo under UN Security Council Resolution 1244/99, are likely to supply migrants. Many EU Member States will also see declining populations and they may continue to draw immigrants from the Western Balkans seeking jobs.

Map 2.1 Refugees and displaced persons in the 1990s



Refugees and displaced persons from Western Balkans since 1991

Western Balkans

Some 600 000 to 800 000 people emigrated to other European countries while 10 000–15 000 sought asylum in the United States and Australia

Since 1991, between 3.7 and 4 million people have been displaced or have become refugees in Western Balkans

Population displacement in Former Yugoslavia 1991 to 2001

Croats
Muslims
Serbs
Others (Albanians, Hungarians)

Source: UNEP/GRID-Arendal (2007), *Balkans: vital graphics.*

([60]) Baldwin-Edwards, *Patterns of migration in the Balkans*, Mediterranean Migration Observatory Working Paper No. 9, January 2006, available at www.mmo.gr/pdf/publications/mmo_working_papers/mmo_wp9.pdf (accessed January 2010).

([61]) Baldwin-Edwards, 'Sustainable development and emigration: the contemporary Balkans and the European Union, www.mmo.gr/pdf/publications/publications_by_mmo_staff/SUSTAINABLE %20DEVELOPMENT %20AND %20EMIGRATIONv3.pdf. *The Political Impact of Migration Flows* held in Lagonissi, Greece, 8–10 June 2003 and organised by the Council of Europe and the Hellenic Parliament; Baldwin-Edwards, *Patterns of migrations in Western Balkans*, 2006, Mediterranean Migration Observatory: both papers are available at www.mmo.gr.

Table 2.2 Driving force: population and migration

Driving forces	Scenarios for the future	Key uncertainties	Possible influence on production and consumption patterns and the environment in the Western Balkans
Europe and Western Balkans			
Migration	• Assessments of ongoing migration patterns by Baldwin-Edwards and others	• Unresolved issues include: legacy of the 1990s migration to the EU for work; migration within region (e.g. to countries with declining populations); illegal migration into and via the Western Balkans; and migrations related to the establishment of secondary homes and retirement	• Migrants increase levels of consumption in their host countries • Their work and financial transfers can support economic growth in both host and home countries, changing consumption patterns • Returning migrants can bring new skills, new consumption patterns as well as a different awareness of environmental quality • Second homes increase environmental impacts by households
National level			
Population growth/decline and structure	• Projections (e.g. World Bank and UN) foresee declining population size and ageing populations	• Population trends appear fairly certain • Uncertainties related to migration patterns	• Ageing populations may require more government resources, reducing those available for the environment • Ageing populations will have changing consumption patterns
Household size	• With ageing populations and smaller families, average household size is expected to decrease	• Population trends appear fairly certain	• Smaller households consume more and create higher pressures on the environment per capita
In-country migration (e.g. rural to urban)	• Currently, an ongoing rural to urban shift	• Will rural to urban migration continue?	• Declining rural populations abandon farm land, especially in mountain areas • Growing urban populations can fuel sprawl

The countries surrounding the Western Balkan region (Italy, Slovenia, Austria, Hungary, Romania, Bulgaria and Greece) have a special function in the migration patterns, as they are typically the first targeted destination for emigrants. Potential immigration into the Western Balkan region is expected from the return of refugees and from illegal immigration, even though the latter trend is decreasing.

In addition to international migration, inhabitants are also moving within countries — in particular from mountains and other remote rural areas to cities to seek better opportunities. These shifts may increase economic growth, but they can create new environmental pressures by fuelling urban sprawl as well as land abandonment. The influence of these factors on the future of the region's environment — including on future consumption patterns — is examined elsewhere in this chapter as well as in the next chapter on drivers.

In addition, coastal zones and other scenic areas (mountains, spas) of the Western Balkans may become a new destination in the Europe-wide trend of elderly people seeking retirement homes in warmer climates: this could affect the region's coast in particular — though, as Section 2.8 shows, the impacts of climate change in coming decades could limit this factor.

Summary of population and migration driving forces is presented in Table 2.2.

Selected forward-looking studies from the review

Anusic, Z. *et al.* (2003). *Pension reform in Croatia*, World Bank Social Protection Discussion Paper Series No. 0304.

Blagoja, M. and Mirijanka, M. (2001). 'Момент на трансформација на селското население во градско во Република Македонија' (The transformation of the population from rural to urban in Macedonia), *Yearbook of the Geographical Institute*.

Donco, G. and Apostol, S. (2000). *Процесот на демографско стареење во Македонија* (The process of demographic ageing in Macedonia).

Grozdanovski, T. and Nospalovska, K. (2004). 'Демографски промени и стареење на населението во Македонија' (Demographic changes and ageing of the population in Macedonia), *Yearbook of the Law Faculty 'Justinian I'*.

Kulenovic, S. and Ibreljic, I. (2002). 'Migration flows from the Western Balkans in the last decade of the 20th century (with a special reflection on Bosnia and Herzegovina)', Paper presented at the *42nd ERSA Congress, August 27–31 2002*, Dortmund, Germany.

Vasa, D. (2002). 'Актуелни проблеми во вкупното движење на населението во Република Македонија' (Current problems of migration in Macedonia), *Geografski razgledi.*

2.3 Culture, values and needs

Key messages

Consumerism has become a global phenomenon, and in the Western Balkans, many households are seeking to catch up with western levels of consumption patterns. At the same time, traditional consumption patterns continue in the region. It is expected that in a scenario of rapid economic growth, traditional values and patterns will be at risk.

For coming decades, however, some global studies and other assessments see a chance — and a need — for new values and new cultural patterns that will change consumption patterns. Such a change might occur following unexpected events, but also in reaction to new ideas and to policy actions. Around the world, including the Western Balkans, individuals and non-governmental organisations can play a part in shaping social values and thus consumption patterns.

Just as culture, values and needs will shape consumption patterns, such as the food people buy, how they use energy and the extent of traffic, these consumption patterns will directly affect the environment in the Western Balkans.

A series of forces shape the choices and behaviour of consumers in society. These include personal needs, the broader culture and our values and social milieu. These different forces influence the goods that people consume — and the environmental impacts of these consumption patterns.

Personal needs

For most of human history, the most important driving force behind consumption patterns has been meeting basic human needs for food, water and shelter. Only a small elite could think about luxuries. At the global scale, meeting basic needs remains a huge challenge: worldwide in 2005, about 1.4 billion people in developing countries — one in four of all humanity — lived on less than USD 1.25 a day, a level considered by the World Bank as a basic measure of poverty ([62]).

In the EU and other wealthy parts of the world, however, most citizens have sufficient means to obtain their food and shelter. Although segments of the population in these countries, continue to face poverty and lack sufficient food and especially, decent shelter, post-materialist needs have become more important. These needs include: esteem, self-esteem, achievement, social affiliation/acceptance, respect of others, and respect by others ([63]).

Culture and consumerism

While once our consumption patterns were driven mainly by basic human needs, in wealthy societies today, these basic needs are usually satisfied. The higher needs are closely tied to the culture around us and to values, and thus these factors have a significant role in driving consumption patterns and their environmental impacts ([64]). These forces are part of the socio-cultural framework, the system of shared, beliefs, customs and behaviours. This framework, which is abbreviated as culture here, is in itself tied the personal values that each of us share.

While culture has many dimensions, a key issue for the environment is today's consumer culture. In the 1950s, John Kenneth Galbraith referred to the rise of 'consumer culture' in the US, fuelled by widespread advertising on television. However, as long as a century ago Thorstein Veblen, a Norwegian-American economist, wrote that wealthy individuals pursued 'conspicuous consumption' as a means to establish their status in society ([65]). By some interpretations, conspicuous consumption is now a common pattern at all income levels, and consumerism is not only a reaction to the availability of ever greater quantities of convenient goods, but also to individuals' efforts to establish their status in society.

([62]) Chen, S. and Ravallion, M. (2008), *The developing world is poorer than we thought, but no less successful in the fight against poverty*, World Bank Policy Research Working Paper 4703, Washington DC, available at www.worldbank.org. In 1981, according to the paper, 1 in 2 people in developing countries lived below this poverty level.
([63]) Maslow (1954) and Inglehart (1977), cited in Baedeker, C. *et al.* (2008), *Survey: public and private consumption. sub-task 1 survey on consumption behaviour and its drivers*, 2nd draft, September 2008.
([64]) Based on Baedeker, C. *et al.* (2008).
([65]) Veblen, T., *Theory of the leisure class* (1899).

Consumerism is tied to the importance given in wealthy societies to life enjoyment, which is now seen as an important value. In other and past societies, religious devotion and community had much greater roles. In this new focus, the consumption of goods and services are often seen as a path to enjoyment. At the same time, many high-income adults are quite busy with work and other activities. As a result, they increasingly focus on convenient and time-saving forms of consumption and leisure, such as eating prepared foods, frequent visits to restaurants and taking weekend holidays by plane ([66]). These activities often have high environmental impacts.

Consumerism grew slowly in wealthy market countries such as those in western Europe and North America. In contrast, most of the countries that joined the EU in 2004 and 2008 experienced over four decades of centrally planned economies in which trade and the availability of consumer goods were restricted. Their transition to free markets was accompanied by a sudden rush to consumerism. A similar process appears to be under way in the Western Balkans, and the consumption patterns of wealthy EU and North American countries are seen as an ideal.

More broadly, consumerism has become a global phenomenon, seen not only in the wealthiest countries, but also in the rising middle class of transitional and developing countries around the world. This implies that major changes to consumer culture can be global. For some, any change may seem unlikely. However, some studies have imagined scenarios where people worldwide develop new priorities. One example is the 'Sustainability first' scenario of the UNEP report *Global environment outlook — environment for development (GEO-4)*: this scenario sees a new emphasis on local communities and sustainability. Another UNEP scenario, the *Carpathians environment outlook*, translated *GEO-4*'s global vision to a region of Europe (Box 2.2).

While such a shift may seem unlikely after a visit to one of the many sprawling shopping centres in EU Member States (and which are now being built in the Western Balkans), some researcher argue that a culture shift is necessary. For example, Beddoe *et al.* (2008) argue that our current world view, together with institutions and technology, is based on a vision of an empty world, i.e. one with few people and relatively unlimited resources. They affirm that our world view has not yet caught up to the constraints created by current population levels and production and consumption patterns, and without a shift in vision — as well as in institutions and technology — our current civilisation risks disappearing just as ancient ones did ([67]).

Social groups

Modern societies are not monolithic, and different social groups can have different consumption

Box 2.2 An alternative to consumerism?

In its 'Sustainability first' scenario, the *GEO-4* report images a world where new values emerge. Civil society groups promoting approaches such as fair trade, socially responsible investment and slow food gain membership and influence and become more important actors on local as well as world stages. Governments around the world provide business and civil society with greater space for participation.

UNEP's *Carpathians environment outlook* develops scenarios for this based on the global ones in *GEO-4*. Its sustainability scenario is entitled *Carpathian dream*. In this future, community becomes more important than consumerism, competition and individualism. Carpathian region's population increases — in contrast to other scenarios — as young people move in to take advantage of its educational services as well as the quality of life. Organic and traditional farming methods increase. Houses and villages improve their energy efficiency and increasingly use renewable energy sources. The region receives strong income from summer nature and active tourism activities such as hiking, fishing and farm tourism.

Other future studies have imagined similar changes. The International Panel on Climate Change (IPCC) emission scenarios (Section 2.9) include a possible sustainability focused world. EEA's PRELUDE study includes an 'Evolved society' scenario, in which Europeans return to rural areas, choosing lifestyles that are less hectic and less consumer-oriented.

([66]) Sheate, W. *et al.*, *EEA Research Foresight for Environment and Sustainability: Final Report*, 15 November 2007. Available at: http://scenarios.ew.eea.europa.eu/fol585720/overview-available-forward-looking-studies/research-foresight-literature-review.

([67]) Beddoe, R. *et al.* (2008), 'Overcoming systemic roadblocks to sustainability: the evolutionary redesign of worldviews, institutions, and technologies', *Proceedings of the National Academy of Sciences.* 106 (8): 2483–2489. This outlook is echoed in Diamond, J. (2005), *Collapse: how societies choose to fail or succeed* (Viking, New York).

patterns. In the last century, researchers typically divided social groups into classes based on economic status. While economic means are still important, analysts now analyse groups based on their post-materialist needs and their values. In these analyses, the different groups influence their patterns of consumption (Box 2.3).

Environmental non-governmental organisations: promoting new values

Culture and values are shaped by many forces, including the level of education as well as market forces such as advertising and marketing (Section 2.7).

Civil society groups can also play an important part in influencing cultural values, among them environmental non-governmental organisations. In many countries, these groups have brought environmental issues to the attention of the public and policy makers, and they have promoted new ways of looking at the world. Their actions have helped make environmental issues part of mainstream values.

Cultural patterns in the Western Balkans

Some studies emphasise that social groups are becoming more uniform around the world as marketing, advertising, products and media all become global ([68]). Nonetheless, important differences between countries and regions remain.

In the Western Balkans, traditional cultural patterns persist — these are often closely tied to the land and to extended families. These traditional patterns influence consumption, as urban dwellers often have rural homes and value food they grow there or that rural relatives and friends grow. Extended families often celebrate special occasions with large meals — which can cost the hosts an important share of their income. Similar patterns can be seen, though now attenuated, in other southern European countries such as Italy and Spain.

On the other hand, many people in the Western Balkans seek to emulate consumption patterns in western Europe, especially since they receive idealised images from advertising, TV and films. Other countries that emerged from socialism, including those that are now EU members, have experienced a similar process of catching up with western motor vehicles, clothes and homes.

Individual values

Individual consumption patterns are shaped by wider cultural values and by social groups. At the

Box 2.3 Two studies of social groups and their consumption patterns

Many studies have looked at different social groups and their consumption patterns. Here, two recent studies are highlighted.

A multinational advertising and marketing firm, Young and Rubicam, has proposed a 'Cross Cultural Consumer Characterisation', based on Maslow's hierarchy of human needs, that they argue is valid across countries and cultures. Their scheme has seven categories of people: 'explorers' who are driven in life — and in their consumption patterns — by a need for discovery; 'aspirers' who seek status and materialistic rewards; 'succeeders' who seek control and prestige; 'reformers' who are anti-materialistic; 'mainstream' people who need security and want to fit in; 'strugglers' who seek escape and do not plan for the future; and the 'resigned', focusing on survival and often clinging to traditional values.

A study of consumers in Germany by another firm, Sinus Sociovision, proposes a different set of social groups. This study constructed a matrix showing, on the one hand, social status (low, medium and high, akin to low, middle and upper classes) as well as different basic values: traditional (duty and order); modern (individualism, self-actualisation and pleasure); or re-orientation (experimentation and paradox). The study identifies 10 social groups within this framework, together with their environmental values and consumption patterns. For example, the 'mainstream' group has some environmental awareness and in particular an interest in healthy food. 'Consumer-materialists', on the other hand, have little environmental awareness, while 'post-materialists' have high environmental awareness and are particularly interested in methods for green consumption.

Source: Young and Rubicam, *There are seven kinds of people in the world*, undated, London, www.4cs.yr.com (accessed January 2010); Baedeker, C. *et al.* (2008), Survey: public and private consumption — sub-task 1 survey on consumption behaviour and its drivers, European Topic Centre on Resource and Waste Management.

([68]) Young and Rubicam (undated), *There are seven kinds of people in the world*, London, available at www.4cs.yr.com (accessed January 2010).

Table 2.3 Driving force: culture, values and personal needs

Driving forces	Scenarios for the future	Key uncertainties	Possible influence on production and consumption patterns and the environment in the Western Balkans
Global and EU			
Consumer-oriented culture	• GEO-4: 'Sustainability first' • Beddoe *et al.*: a new world vision	• Will new priorities replace consumerism? • Will we develop a new global world vision	• Global and EU consumer culture will influence consumption patterns in the Western Balkans
Environmental non-governmental organisations and civil society	• GEO-4: 'Sustainability first'	• A stronger global role for linked NGOs and civil society	• Non-governmental organisations at global and EU level may have an indirect impact by influencing international and EU policies that change consumption and production patterns in the Western Balkans
National level			
National cultural patterns	• None identified	• Will traditional patterns continue, or be overwhelmed by groups seeking to catch up with the west?	• Direct influence on consumption patterns in the region
Individuals, non-governmental organisations, civil society	• None identified	• Will individuals be able to promote greener values?	• Direct influence on consumption patterns in the region

same time, individuals can choose their own values and lifestyle. A few individuals can influence wider trends and patterns, including those that promote more sustainable consumption patterns. Some individuals can act via civil society groups or by writing books and preparing websites. Others can be engineers, designers and entrepreneurs who develop more environmentally friendly production methods or products.

Summary of culture values and personal needs driving forces is presented in Table 2.3.

Selected forward-looking studies from the review

Global
UNEP, *Global environment outlook — environment for development (GEO-4)* (2007).

Europe
EEA, *PRELUDE (Prospective environmental analysis of land use development in Europe)* (2006).

2.4 Technology

Key messages

Some studies see the possibility of a new industrial revolution based on breakthroughs in information technology, biotechnology and nanotechnologies. New discoveries and inventions could provide ways of addressing climate change and other problems. At the same time, the development of technologies in areas such as genetically modified organisms, especially relevant for the Western Balkans, could create new threats for the environment, for example putting biodiversity at risk.

While the development of technology and new products occurs around the world, national actions could help shape the results. Innovation policies in the Western Balkans could influence which technologies are used in the region. The EU is seeking to develop technologies to tackle environmental problems. Some countries in the Western Balkans have a strong scientific tradition and could take an active role, cooperating with EU Member States in this pursuit. Moreover, much of the technology used in the region is outdated. Macro- and micro-economic policies could be adjusted to encourage the use of new environmental technologies as well as technical assistance from abroad.

The technologies that are adopted in coming decades for energy, transport, agriculture and other sectors will determine the types of impact that production and consumption have on the environment at all levels, from global to local.

Global technology revolutions?

Overall, the new technologies that affect the Western Balkans are likely to be developed and introduced first elsewhere in the world. In past decades, the US, the EU and Japan have led the world in technology. In future decades, China, India and other countries are likely to have a growing role.

While science is to a great extent an open, international endeavour, many technologies — such as radar, jet aircraft and global positioning — have been developed more secretly, as part of military research. In addition, new commercial technologies are often developed by companies and unveiled only as they go to market, and patent rights limit the actors who can use these new technologies.

Future-oriented studies, such as technology-foresight studies, have tried to identify areas where new technologies will be developed.

One important opportunity is the development of new energy technologies to combat climate change. Here, the costs could be huge. Major new research programmes will be needed in areas such as carbon sequestration, renewable energy and energy efficiency if the world is to meet stringent climate change goals. Both government and private energy research and development have decreased in recent years: the IEA warns that research and development will need to increase, perhaps more than double, if low-carbon technologies are to be used throughout the global economy. Trillions of dollars will also be needed to deploy new power plants, transport systems and more ([69]).

Some foresight studies see the possibility of a new industrial revolution in a coming synthesis between biomedical, information and nano-technologies: this could create smart materials for use in spheres ranging from medicine to energy to buildings. Others predict new developments in genetically modified crops and food that incorporate qualities appealing directly to consumers, such as providing more vitamins and nutrients, lower cholesterol and other health advantages ([70]).

A key issue will be the social and political acceptance of new technologies. The European Union has referred to the use of the precautionary principle in its Sustainable Development Strategy — this should slow the adoption of new technologies until their safety can be assured. However, other parts of the world have been less cautious — and this may be the case, especially where new technologies offer economic advantages.

Social and political acceptance of new technologies will be closely tied to perceived risks and impacts. Box 2.4 discusses potential issues related to nanotechnology.

([69]) IEA, *Energy technology perspectives 2008: scenarios and strategies to 2050*, 2008. This study looks at the technologies and investments needed to cap atmospheric carbon at 550 or at 450 parts per million (ppm).
([70]) Sheate, W. *et al.*, *EEA research foresight for environment and sustainability: final report*, November 2007.

Box 2.4 The promise — and risks — of nanotechnology

One of the most promising areas for new research and development is nanotechnology. A study for the European Commission on nanotechnology included three scenarios of how research and public acceptance might interact in coming years (to 2015).

Disaster recovery. New nanotechnologies are not regulated: governments are slow to develop policies, and the private sector does not take their place with its own codes. A disaster at a nanotechnology plant in Asia leads to a public backlash. New EU regulations are introduced. Research continues at a slower pace — and the word 'nanotechnology' is no longer used.

Now we're talking. Strong international regulations set a legal framework for the research and introduction of nanotechnologies. The regulations focus on health and safety risks. In addition, governments promote research into nanotechnology with public benefits, such as filters for safe water that can be used in developing countries.

Powering ahead. Research has moved fast, and nanotechnologies have been used to develop low-cost photovoltaic cells and other products that are close to market. Regulation has moved slowly, but in the public eye the benefits outweigh risks.

Source: Wuppertal Institute for Climate, Environment and Energy, Forum for the Future, triple innova, EMPA, *The future of nanotechnology: we need to talk* (study for the European Commission, DG Research), 2006.

One broad technology risk, however, is that modern societies are becoming more dependent on technology, and in particular on information technology and networks. Countries thus could be growing more vulnerable either to premeditated attacks such as terrorism or to unexpected accidents. In August 2003, simple line faults led to a cascade of events that cut off electricity for up to 50 million people living on the east coast of the United States of America ([71]). In the following month, another simple electrical line fault in Switzerland created a blackout in much of Italy ([72]).

Experts disagree on the risks and environmental impacts of new technologies (Box 2.4). For some, new genetically modified crops could reduce environmental impacts, for example increased productivity and a reduction in the use of chemicals; for others, such crops could harm biodiversity, perhaps in catastrophic ways.

In general, the share of GDP for research and development expenditure is small in the countries of the Western Balkans. A common problem for national economies is the weak dissemination of modern technologies in traditional industries, which still account for a considerable share of GDP. Technologies, including those for pollution control, are outdated and not the best available. Indicators show that the region's economies still use high levels of energy and natural resources compared to levels in the EU-15.

The role of information technologies is also crucial for achievement of policy goals. It is difficult to obtain concise information on the level of innovation and the penetration of information technology in the Western Balkans.

European Union: technology for the environment?

The European Union has supported research and development of environmentally friendly technology, for example through its research framework programmes. Over the six years from 2007 to 2013, the European Commission has budgeted almost EUR 2 billion for research on the environment, including new technologies to address environmental problems. Member States are providing further support in these areas.

The EU has also had a key role by seeking to apply the precautionary principle, and investigating the risks of new technologies such as genetically modified organisms before allowing their use. In coming decades, the EU may continue to follow the principle and also convince other major powers, such as the USA, to make greater use of this approach. On the other hand, the wider adoption of the precautionary principle may come only

([71]) Canada — US Power System Outage Task Force, *Final Report on the August 14th Blackout: Causes and Recommendations*, April 2004, available at https://reports.energy.gov/BlackoutFinal-Web.pdf.

([72]) Swiss Federal Office of Energy, *Report on the blackout in Italy on 28 September 2003*, November 2003, available at www.bfe.admin.ch.

after a crisis, as the 'Disaster recovery' scenario for nanotechnologies suggests.

Alternatively, the promise of new technologies may be seen to outweigh their risks — as in the 'Power ahead' scenario, especially in the face of economic and other crises.

The Western Balkans: actors for technology development?

The countries of the region are most likely to follow European and global trends in technology, Governments can nonetheless support new, environmentally friendly technology in the region by encouraging universities and businesses to cooperate with their counterparts in Europe and worldwide.

Indeed, several experts in the region see strong policy support for education and technology as one of the key elements in determining competitiveness of the region's economies (Box 2.5). National policies for innovation could help companies introduce new technologies in the region, including those for environmental protection.

Summary of technology driving forces is presented in Table 2.4.

Box 2.5 The role of new technology in the Western Balkans

Two experts in Serbia saw opportunities for strong economic development in their country and the region, through restructuring, new technologies, better education and research.

Professor Đuro Kutlača, who works on foresight in Belgrade and Novi Sad, said that with 'faster and wiser restructuring of the economy' Serbia could attain a high GDP with technology-based services as a central element of its economy.

Dr Mirsov Antevski of Belgrade's Institute of International Politics and Economics saw a similar opportunity — but he emphasised that this would require large and immediate investments in education, research and development.

Note: Interviews carried out in 2006.

Table 2.4 Driving force: technology

Driving forces	Scenarios for the future	Key uncertainties	Possible influence on the environment in the Western Balkans
Global			
Development of new technologies	• Technology foresight studies (Sheate *et al.* provides an introduction to key technologies and environmental impacts)	• Pace of technology development • Extent of environmental impacts • Public perception of risks and opportunities and acceptance of new technologies	• The use of new manufacturing technologies could reduce local and regional pollution in the Western Balkans as well as natural resource use • New energy technologies could reduce greenhouse gas emissions, both globally and in the Western Balkans • New technologies (biotechnology, nanotechnology, etc.) could also pose risks to human health and biodiversity — especially if the region becomes a testing place
EU			
Innovation policies	• Sheate *et al.* and others	• Effectiveness of the EU in developing new, environmentally friendly technologies (e.g. energy, transport) • Transfer of new technologies to the Western Balkans	• More efficient technologies developed in the EU could spread quickly to the Western Balkans, reducing environmental impacts
National			
Innovation policies	• Kutlača and Antevski interviews: national choice whether to promote technology and education strongly	• Capacities of national policies to support effectively environmentally friendly technologies transfer and development when possible (increased R&D expenditure) • Economic policies adjusted to adoption of new technologies	• Faster dissemination of more efficient technologies tailored to problems in the Western Balkans, reducing environmental impacts

Selected forward-looking studies from the review

Global

Anton, P. S. *et al. (*2001). The global technology revolution: bio/nano/materials trends and their synergies with information technology by 2015, RAND/National Defense Research Institute.

IEA. *Energy technology perspectives 2008: scenarios and strategies to 2050*.

Wuppertal Institute for Climate, Environment and Energy, Forum for the Future, triple innova, Swiss Federal Laboratories for Materials Testing and Research (EMPA), (2006). *The future of nanotechnology: we need to talk* (study for the European Commission, DG Research).

Europe

Erdmann, L. *et al.* (2004). *The future impact of ICTs on environmental sustainability*, Institute for Prospective Technological Studies, Joint Research Centre, European Commission.

Geyer, A. *et al.* (2003). *The future of manufacturing in Europe 2015–2020: the challenge for sustainability scenario report*, Institute for Prospective Technological Studies, Joint Research Centre, European Commission.

Sheate, W. *et al.* (2007). *EEA research foresight for environment and sustainability: final report*.

Western Balkans

Vrhovcak, M. B. *et al.* (2004). 'Perspectives of renewable energy use in Croatia', *Proceedings of the 12th IEEE Mediterranean*, Vol. 3, pp. 1 033–1 036.

2.5 Globalisation and trade

Key messages

Globalisation has linked the world economy through markets, investment, technology and communications.

However, links such as trade have spread the environmental impacts of production and consumption across the globe. The countries of the Western Balkans export large quantities of minerals to the EU — but suffer the environmental problems related to mining.

Neighbouring countries have a crucial role for trade issues in the Western Balkans, as they can facilitate or hinder their exchange with external markets. The future of globalisation is uncertain in the face of today's economic problems. Security fears in the future might also weaken these links.

Future trade and investment patterns will influence economic structures, production and consumption patterns and environmental pressures in the Western Balkans: for example, they will help shape the region's agricultural production as well as its exports of fuels and minerals.

World trade expanded greatly in the second half of the 20th century, and it accompanied the world's steady economic growth. The first years of the 21st century saw further growth in trade as well as in global investment patterns. This growth is part of the broader trend called globalisation, a wide-ranging process in which trade, investment, technology and communication patterns have become more international ([73]).

Through trade patterns, goods and services are transported from one part of the world to another. This directly affects the pattern of economic activities and their pressures on the environment. For example, western Europe imports food, fuels, and minerals and also manufactured products from across the globe — thus, many of the impacts from oil consumption, steel production and other activities that are part of its economic system occur in distant countries ([74]).

De-globalisation?

Today, the world is at a crossroads. The credit crunch has brought global economic uncertainty. Even before this crisis, the success of the current 'Doha Round' of negotiations to update the General Agreement on Tariffs and Trade was in doubt. In 2008, global foreign directive investment fell by about 20 %; and in 2009, global trade is predicted to decrease. The continuation of globalisation is in doubt, and some observers are already talking about de-globalisation ([75]).

Even before the current crisis, some future studies assessed the uncertainties of globalisation. A 2005 study *Shell global scenarios to 2025: the future business environment — trends, trade-offs and choices* prepared by Shell, the global oil company, looked at different scenarios for globalisation. While this study did not foresee the current economic crisis, its 'Low-trust' scenario sees globalisation slowed by legal requirements, while in its 'Flags' scenario, security concerns slow economic globalisation as well as environmental agreements (Box 2.6). The *GEO-4* 'Security first' scenario is similar (see Box 2.11): here too, security concerns slow global trade and also block environmental cooperation.

Global trends will help shape trade and investment patterns in the Western Balkans. This section considers the implications for agricultural trade in particular.

The impacts of agricultural trade in the EU and the Western Balkans

Globalisation and trade have had a wide-ranging and variable impact on Europe's economy. Germany in particular has seen growth in its high-technology manufacturing exports in recent years — and its economy is strongly affected by the current downturn in trade. Southern European countries that depended more on light manufacturing have seen imports from Asia replace domestic production.

Future trade agreements, if reached, could strongly affect Europe's agriculture and land use. The *Scenar 2020* study reviewed possible impacts on rural areas across the EU (Box 2.7). Broadly speaking, this study predicts that a global liberalisation of agricultural

([73]) OECD (2008), *Environment and globalisation: background report for Ministers*, April 2008.
([74]) EEA (2007), *Glimpses*.
([75]) 'Globalisation: turning their backs on the world', *The Economist*, 19 February 2009.

Box 2.6 What future for globalisation?

The *Shell global scenarios to 2025* describes three very different paths for globalisation and trade in coming decades.

The study warns that security concerns have grown since the beginning of the millennium and at the same time trust in business and trade has fallen. In one scenario, 'Low-trust globalisation', global trade continues, but governments (with the support of non-governmental organisations) increase the legal requirements on companies, and countries also strengthen their national security measures. While international non-governmental organisations remain active, governments address major global environmental problems only after crises erupt. In several parts of the world, conflicts over scarce water resources grow.

The 'Open doors' scenario imagines a different world where greater trust allows market incentives to combine with community forces. Globalisation continues, while business accountability, supervision by civil society institutions and strong media scrutiny provide an alternative to regulation. The precautionary principle is widely adopted. Business, universities and non-governmental organisations cooperate in tackling many global environmental problems. International agreements seek efficient mechanisms to address climate change, such as emissions trading systems.

In contrast, the 'Flags' scenario sees a world fragmented into mutually suspicious countries, ethnic groups and sectoral causes. Terrorism and conflict grow, globalisation stalls and new global environmental agreements are not reached.

Source: Shell (2005), *Shell global scenarios to 2025*.

Box 2.7 Globalisation and trade will affect agriculture and land use in the EU

The *Scenar 2020* study for the European Commission modelled the impacts of current drivers on agricultural and rural economies in the EU. The study prepared a 'Reference scenario' and two alternatives: the 'Regionalisation' scenario, in which the failure of the Doha Round leads to greater regional trade and a reduction of global trade in agricultural products; and the 'Liberalisation' scenario, which imagines a global liberalisation of agricultural trade.

In all three scenarios, the agricultural economy continues to expand, though more slowly than the rest of the economy. Agricultural employment declines, in particular in the new EU Member States. The number of farms declines in all three scenarios — and most steeply in the 'Liberalisation' scenario, in which livestock production, in particular meat production, declines markedly. The greatest changes in land use also occur in this scenario: liberalisation of agricultural markets will lead to widespread land abandonment, in particular in central Italy and southern France. In addition, arable land in many countries will shift to pasture land. In contrast, the 'Reference' and 'Regionalisation' scenarios foresee much smaller changes in land use.

Source: European Centre for Nature Conservation, Landbouw-Economisch Instituut, Leibniz-Zentrum für Agrarlandschaftsforschung, Leibniz-Institut für Länderkunde and Central European University, *Scenar 2020 — scenario study on agriculture and the rural world*, 2006 (an update of the study is currently under way).

trade will reduce farming in much of the EU, leading to land abandonment. In contrast, farming will be stronger if trade patterns become more regional — which could happen if globalisation and global trade falter. Similar impacts might be seen in the Western Balkans: for example, stronger European trade might result in expansion of the region's agricultural exports to the EU.

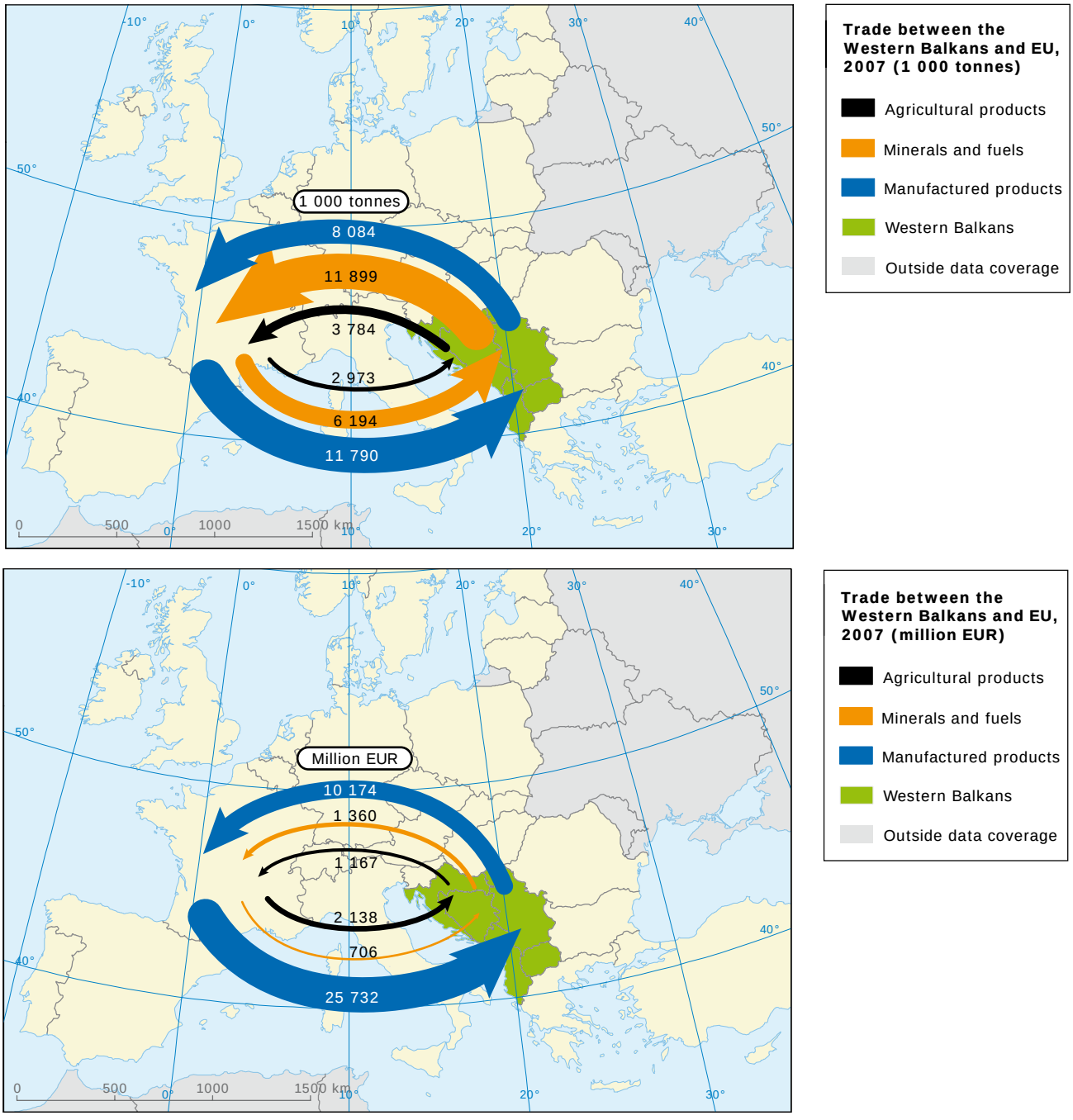
Trade patterns in the Western Balkans

Over the past decade, trade has risen rapidly in the Western Balkans. In 2007, Bosnia and Herzegovina, Croatia and Montenegro all had merchandise imports equivalent to half or more of their GDPs. The countries also had high levels of merchandise exports (they also exported services, such as tourism for visitors).

The region also had a high level of manufacturing exports and imports: for all but Montenegro, these were over half of total merchandise imports and exports. Moreover, the countries of the Western Balkans had close trade links with the EU, which accounts in most cases for over 50 % of their merchandise imports and exports (for Albania, 90 %). This dependence could influence their future competitive capacities and vulnerability.

The countries neighbouring the Western Balkans have an important role in the region's external trade exchanges: they can facilitate trade or hinder it. The countries in the region also have strong trading links among themselves (an important exception is Croatia). Indeed, trade links within the region and between the region and the EU are perhaps stronger than political links. However, regional actions for integration are rare and weak. Long-term scenarios show that development of more intensive regional links can minimise many uncertainties of political and economic nature ([76]). Other important trading partners include Russia, an important source of oil and natural gas imports.

Map 2.2 Trade between the Western Balkans and the EU (in tonnes and EUR)



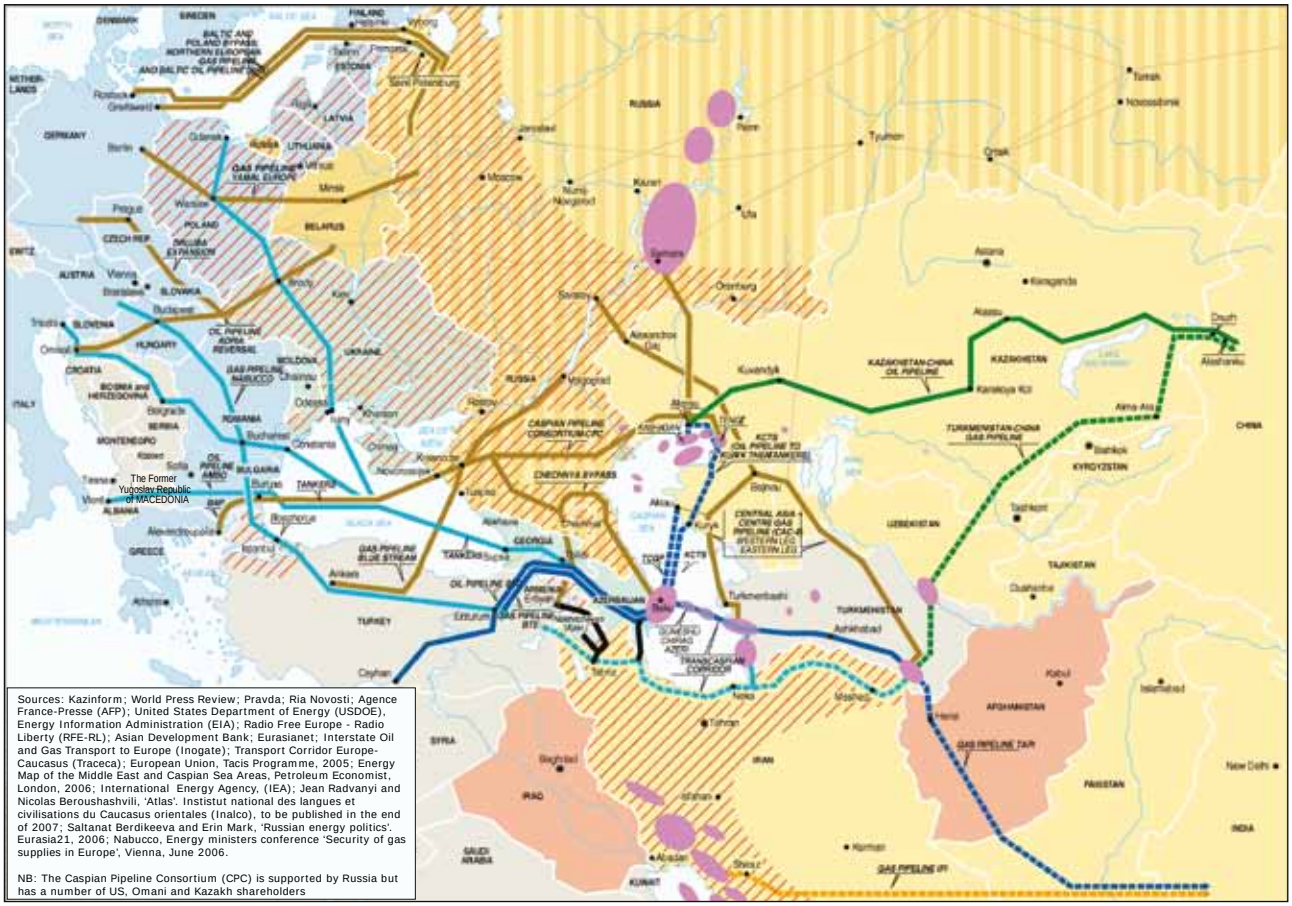
Note: Data for Montenegro are for 2006, and are incomplete.

Source: Eurostat data (accessed April 2009).

([76]) K. Stanchev, *The Balkans in 2010: economic scenarios*, Institute for Market Economics, Sofia; Western Balkan Integration and the EU: An Agenda for Trade and Growth, K. Sanjay, World bank Publication (2008); I. Krastev, European Union and the Balkans: Enlargement or Empire, Center for liberal strategies (2005).

In terms of monetary value, the region's imports from the EU in 2007 were far larger than its exports. Imports of manufactured products from the EU dominated trade between the two regions. In terms of tonnes, however, exports from the Western Balkans were larger than imports from the EU. Exports of lower value minerals and fuels largely matched the tonnage of imports of higher-value manufactured goods (Map 2.2).

Map 2.3 Current and proposed oil and gas pipelines in south-east Europe



Source: UNEP/GRID-Arendal, *Balkan Vital Graphics*, 2007.

Table 2.5 Driving force: globalisation and trade

Driving forces	Scenarios for the future	Key uncertainties	Possible influence on production and consumption patterns and the environment in the Western Balkans
Global			
Global trade flows	• GEO-4: 'Markets first' vs 'Security first' • Shell scenarios: 'Open doors'; 'Low-trust globalisation'; 'Flags'	• Global politics, including security concerns • World economy • Global trade agreements	• Global trade patterns will shape production and consumption in the region — and thus will bring a broad range of environmental impacts in the Western Balkans, including on resource use
EU and Western Balkans			
Imports and exports of agricultural products and natural resources		• Global trade patterns • Integration of the Western Balkans with the EU • The role of the 'Balkan fence' countries • Rate of international aid and investment in the Western Balkans	• These patterns will shape impacts related to production and consumption in the region, and in particular will affect land use, resource use and biodiversity
Transit of energy resources (especially oil and natural gas)		• EU energy policy decisions	• Environmental risks related to oil and gas transit • New pipelines and ports could change energy patterns and natural resource use in the region

The other side of this coin, however, is that the countries in the region are vulnerable to changes in trade patterns and prices, though the impact of the current downturn in global trade may be softened due to their high level of trade with the European Union. Long-term trends in global and European trade will thus have major impacts on the economies and the environment in the region. It is more certain that Western Balkan countries would fail without international support and it is uncertain that they will succeed with international support (Sanjay, K., 2008; Krassen, S., 1999; Krastev, I., 2005 ([76])).

For example, future global agreements could open EU markets, as well as those in the Western Balkans, to higher levels of agricultural imports from distant countries such as Argentina and Australia. This could put further pressure on agriculture in the region — perhaps driving small farmers out of business and encouraging large agricultural enterprises to use more intensive methods. Future agreements could make it harder for European countries to restrict the sale or labelling of food products using genetically modified crops — as well as lifting national restrictions on these crops.

If, on the other hand, future global trade becomes weaker, regional trading blocs may become more important. As a result, the Western Balkans may see its trade in agriculture and other goods tied ever more closely to the EU — and this could lead to stronger demand for its agricultural products and a revival of farming in the region.

The future of energy trade will also be important for the Western Balkans (Map 2.3). Here, international choices and investments for infrastructure will play a major role in determining trade flows. For example, several current proposals would build new gas pipelines from eastern Europe and central Asia across the region to the EU. Other projects would increase the traffic of oil tankers and natural gas carriers in the Adriatic. However, the recent drop in energy prices, together with a competing set of international infrastructure projects, creates uncertainty.

Selected forward-looking studies from the review

Global
Shell (2005). *Shell global scenarios to 2025: the future business environment — trends, trade-offs and choices*.

Europe
European Centre for Nature Conservation, Landbouw-Economisch Instituut, Leibniz-Zentrum für Agrarlandschaftsforschung, Leibniz-Institut für Länderkunde and Central European University, (2006). *Scenar 2020 — Scenario study on agriculture and the rural world*.

Klassen, G. *et al.* (2001). 'The future of gas infrastructures in Eurasia', *Energy Policy*, Vol. 29, Issue 5/April 2001, pp. 399–413.

2.6 Macro-economic developments

Key messages

The current global economic crisis highlights the uncertainty of economic growth. It also shows the importance of economic links: global and European economic trends directly affect economic development in the Western Balkans. Driving forces of these uncertainties include: geopolitical factors, the changing international and national environment, external and internal shocks, national commitment to and continuation of existing reforms, dependency on foreign aid and investment, import-export structure, high unemployment, property rights and market protectionism. The current crisis also offers opportunities for the future, such as seeking a new global green deal.

National economic governance will shape the economies of the Western Balkans as well, and thus could have a different influence on the environment. Economic growth can increase environmental pressures: as people in the region have higher disposable incomes, they may change their consumption patterns with greater environmental impacts. At the same time, economic growth can provide resources to address environmental issues, such as financing for investments.

Economic growth is closely linked to environmental pressures. Prosperity can bring stronger pressures for the construction of holiday homes in coastal zones, higher demand for energy, and new food consumption patterns, such as preferences for exotic, imported fruit or packaged, prepared meals.

At the same time, poverty remains an important concern in many parts of the Western Balkans — some of the countries and geographic areas in the region belong to the least developed regions in Europe. Poverty drives people to leave their homes, either moving internally from rural to urban areas — leading to land abandonment and urban sprawl — or leaving the country. In rural areas, poverty can create demand for fuel wood, reducing forests and threatening biodiversity.

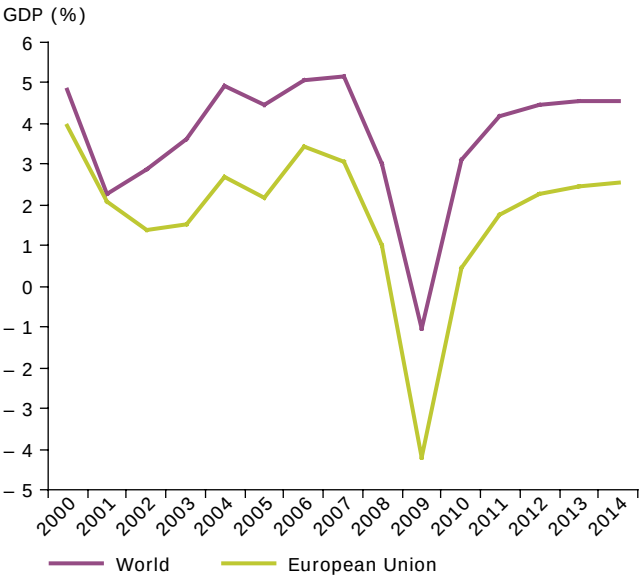
Moreover, if national and local governments lack resources, they may not be able to invest in or maintain adequate environmental infrastructure for growing urban areas, such as safe drinking water supply, sufficient wastewater treatment and effective solid waste management.

These issues have become more pressing in the face of the current global economic crisis.

The global economy: a 'green deal' for the future?

Economic forecasts typically predict steady growth into the future ([77]). The sudden arrival of the world's current economic problems shows that steady growth is not an automatic prospect. In autumn 2009, the IMF estimated that the global economy would decline by 1 % for the year as a whole, and the EU economy would decline by 4 % (Figure 2.4). According to the World Bank, this is the first decline recorded in the global economy since the start of systematic records after World War II ([78]).

Figure 2.4 After the crisis: will global economic growth return?



Source: International Monetary Fund (IMF), World Economic Outlook Database (October 2009).

([77]) For example, a decade ago, OECD published a study entitled *The future of the global economy: towards a long boom?* (OECD, Paris, 1999). The study saw ongoing globalisation and did not consider potential problems such as global conflicts or security concerns. It did, however, see the search for new technologies and methods to improve environmental sustainability as one of the three main drivers for steady global economic growth.

([78]) World Bank (2009), *Global economic prospects 2009: forecast update*, 30 March 2009.

The IMF now forecasts that by 2011, both the EU and the global economies will return to close to their former levels of growth — while emphasising that a number of economic risks remain ([79]).

A return to economic growth, however, could bring back some of the problems seen before the global economic crisis, including high demand for food and fuel as consumers in China, India and other fast-growing developing countries develop new consumption patterns closer to those in wealthy economies. Renewed demand could bring back the high food and fuel prices that particularly affected poor people worldwide. It would also renew pressures on the global environment.

These problems can be addressed if countries seek an alternative sustainable path for global development: independent thinkers such as Lester Brown have made such proposals ([80]). In late 2008, UNEP called for a 'New Global Green Deal', focusing on new energy technologies, including rural energy, sustainable agriculture, ecosystem and forest protection, and sustainable cities, especially in developing countries ([81]).

The choice between business as usual and a greener global economy will influence economic choices and the environment in Europe and in the Western Balkans. In particular, a greener economy is likely to promote new consumption patterns for food, energy and mobility.

Uncertainty concerning globalisation, shifting political international environment and trade patterns and external shocks all add to uncertainties for economic prosperity in the region.

Europe's economy: growth or decline?

In March 2000, EU leaders endorsed the Lisbon Strategy to promote economic growth and competitiveness across the European Union. This strategy originally sought to make the EU the 'most dynamic and competitive knowledge-based economy in the world' by 2010 ([82]). A review in 2004 and 2005 found that little progress had been made, and EU leaders revised the broad-based strategy to focus on growth and jobs ([83]).

At present, the global economic crisis makes Europe's economic growth in the short term uncertain. Also, in the longer term, the dynamism of the EU economy remains in doubt. For example, among scenarios developed several years ago by the US National Intelligence Council one foresees 'reforms to economic growth' in Europe but another proposes the opposite: 'from stagnation to decline', in which the EU does not make economic and social reforms, and as a result countries start to consider leaving the union. A third scenario — 'multi-speed Europe' — falls between the two. In this scenario, new EU Member States grow quickly but EU-15 economies stagnate, (NIC, 2005).

As we have seen in the previous section, the countries of the Western Balkans are becoming increasingly linked to the EU economy through trade. Thus, the future of the EU economy will greatly influence economic development in the Western Balkans, and thus indirectly, the region's environmental future. In addition, enlargement policy may be linked to economic conditions in the EU — if the coming years and decades see ongoing economic uncertainty, enlargement halted. This will affect the implementation of EU environmental legislation in the Western Balkans, as well as the availability of European finance for environmental investments (Box 2.8).

The Western Balkans: a return to economic growth?

Forecasts in mid-2008 saw the region's economic growth continuing steadily into the future, though declining populations will slow overall growth rates (Figure 2.5). Just before the credit crunch and global economic downturn in late 2008, the Economist Intelligence Unit forecast that both Croatia and Serbia would see over 4 % GDP per capita growth through 2010.

([79]) IMF, *World economic outlook*, October 2009.

([80]) Brown, L.R. (2003), *Plan B: rescuing a planet under stress and a civilization in trouble*, Earth Policy Institute, Washington, available at www.earth-policy.org/Books/PlanB_contents.htm (accessed January 2010).

([81]) UNEP (2008), *Global green new deal — environmentally focused investment historic opportunity for 21st-century prosperity and job generation — UNEP launches green economy initiative to get the global markets back to work*, London and Nairobi, 22 October 2008, available at www.unep.org/greeneconomy (accessed January 2010).

([82]) Council of the European Union, European Council Brussels: 23 and 24 March 2000 — *Presidency conclusions*. Available at www.consilium.europa.eu/ueDocs/cms_Data/docs/pressData/en/ec/00100-r1.en0.htm.

([83]) Kok, W. *et al.* (2004), *Facing the challenge: the Lisbon strategy for growth and employment*, November 2004, available at http://ec.europa.eu/growthandjobs/pdf/2004-1866-EN-complet.pdf (accessed January 2010); Council of the European Union, European Council Brussels: 22 and 23 March 2005 — *Presidency conclusions*, 7619/1/05REV1, available at www.consilium.europa.eu/ueDocs/cms_Data/docs/pressData/en/ec/84335.pdf (accessed January 2010).

Box 2.8 The economy of the Western Balkans: looking backward to the present

A study prepared in Bulgaria at the turn of the millennium looked ahead to the economy of the Western Balkans, as well as Bulgaria and Romania, in 2010. This study proposed three scenarios:

In '**Monumental economic disasters**', institutional constraints, the legacy of war and a lack of engagement by external powers such as the EU block progress. The countries in the region do not reach peace agreements, and renewed conflict threatens. The pace of economic reform varies significantly across the region.

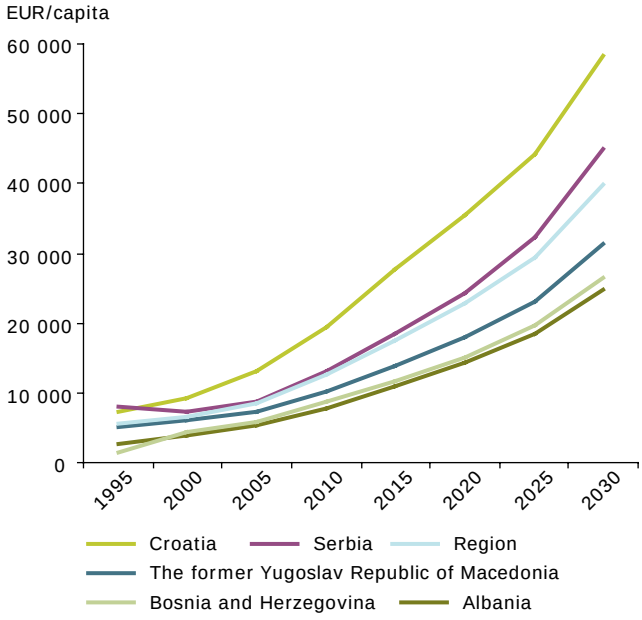
'**Balkan valleys**', in contrast, foresees steady progress towards regional cooperation as well economic reform. Reforms will build trade and investment links among the countries of the region, as well as common, regional infrastructure.

In the '**Balkan basement**' scenario, the region instead adopts ready-made solutions provided by the EU and international organisation. While this scenario could establish the foundations for a new economic and political order, it could also keep these countries in an under-qualified status.

The study is interesting as its time frame is now almost over. Do any of these scenarios bear a resemblance to current economic structures, or are elements of each scenario in place? Countries in the region have largely avoided economic disaster. On the other hand, the study refers to calls a decade ago for a 'Marshall Plan' for south-east Europe similar to the US programme of economic assistance for the reconstruction of Western Europe after World War II. The various sides had different visions of this — politicians in the region imagined finance at their disposal, while those in the EU imagined a plan they would make. In the years since the study was prepared, however, no Marshall Plan has materialised.

Source: Stanchev, K., *The Balkans in 2010: economic scenarios*, Institute for Market Economics, Sofia.

Figure 2.5 Economic trends (GDP) in the Western Balkans until 2030



Source: IMF (trends to 2005); projections are based on forecasts by the IMF and Economist Intelligence Unit.

Many national and regional uncertainties threaten the positive scenario, especially the shifting political environment and separatist groups looking for opportunities for liberalisation, possibilities of internal shocks, high unemployment, dependency on foreign aid and investment, and an import-export structure highly dependent on the EU and domestic market.

The Western Balkans: how long a 'transition'?

Transition means on the one hand a shift from centrally planned to free market economics. It is also a process of modernisation, with economies developing a capacity to adapt and compete successfully in a globalised world. This means the process should foster conditions for future development — nonetheless, it can be difficult in social terms.

The countries of the region have been in transition for over two decades. They have followed the path of economic transition away from central planning at various speeds; except for Albania, conflict interrupted economic reforms.

By 2008, all the countries in the region had advanced significantly in terms of the privatisation of state-owned enterprises, according to the European Bank for Reconstruction and Development (EBRD). Several countries, including Albania, Bosnia and Herzegovina, Montenegro and Serbia, still had to take difficult steps in terms of restructuring enterprises, a process that can involve cutting staff, closing plants and even bankruptcy.

Table 2.6 presents the EBRD's transition indicators for three key elements of economic reform: the privatisation of large state-owned enterprises; the privatisation of smaller state-owned enterprises; and the restructuring of these enterprises (which often occurs after privatisation).

While some countries, and notably Croatia, have progressed far on the road to a market-based economy, further reforms are needed across the region. These may prove difficult in the short term in the face of the current economic crisis.

Will countries in the region continue the path of reform and better economic governance? A scenario study prepared a decade ago looked at this question. The issues for coming decades may be the same (Box 2.8).

Table 2.6 Transition indicators: privatisation and enterprise restructuring, 2008

	Large-scale privatisation	Small-scale privatisation	Enterprise restructuring
Albania	3.67	4.00	2.33
Bosnia and Herzegovina	3.00	3.00	2.00
Croatia	3.33	4.33	3.00
The former Yugoslav Republic of Macedonia	3.33	4.00	2.67
Montenegro	3.00	3.67	2.00
Serbia	2.67	3.67	2.33

Note: Scale from 1 to 4+, with 1 equivalent to central planning and 4 to the level of advanced market economies (the scoring method can be found at www.ebrd.com/country/sector/econo/stats/timeth.htm (accessed January 2010)

Source: EBRD.

Table 2.7 Driving force: macro-economic development

Driving forces	Scenarios for the future	Key uncertainties	Possible influence on production and consumption patterns and the environment in the Western Balkans
Global and EU			
Economic growth	• National Intelligence Council (NIC) scenarios for the EU: stagnation to decline; multi-speed Europe; reforms to economic growth	• Global politics • Global trade agreements • EU effectiveness • Aid and investment in the region	• Global and EU growth will affect growth in the Western Balkans — and thus influence employment and income levels and consumption and production patterns in the region
National			
Economic growth	• Economist Intelligence Unit (EIU) and IMF projections (now outdated)	• Growth rates in coming years/decades	• Direct influence on production and consumption levels
Enterprise restructuring (N)	• Stanchev, The Balkans in 2010: economic scenarios, Institute for Market Economics, Sofia	• Extent to which national governments make reforms • Unemployment • Export–import structure	• Restructuring could lead to short-term unemployment; in the longer term, it could encourage enterprises in the Western Balkans to be more efficient, reducing the environmental impacts of production patterns

Selected forward-looking studies from the review

Global

OECD (2000). *The Future of the global economy: towards a long boom?*

World Bank (2007). *Global economic prospects — managing the next wave of globalization*.

Europe

US National Intelligence Council. *NIC Europe, 2020: scenarios* (outcome of the April 2004 Budapest workshop). Available at: www.dni.gov/nic/NIC_2020_2004_04_28_intro.html (accessed January 2010).

Western Balkans

EIU, *Country forecasts*, various editions.

UNDP (2004). *Bosnia and Herzegovina human development report/millennium development goals 2003: Where will I be in 2015?* UNDP Bosnia and Herzegovina.

Popov, D. (2004). 'Privatization and foreign investments: the case of Serbia and Montenegro', *Transition Studies Review*, Vol. 11, No. 4.

Mihaljek, D. (2001). *Toward a long-term strategy of economic development of Croatia: where to begin, what to do and how to do it*?, Institute of Public Finance Occasional Paper no. 11.

Stanchev, K. *The Balkans in 2010: economic scenarios*, Institute for Market Economics, Sofia.

2.7 Markets and business

Key messages

In recent decades, free markets have had a growing role in the global economy. Around the world, enterprises have encouraged consumption patterns that use high amounts of natural resources. At the same time, some enterprises have adopted environmental management systems and sought to reduce their pressures on the environment. The future role of the global business sector is likely to remain complex: enterprises will continue to be a source of environmental problems and also of solutions.

In the Western Balkans, markets and business have taken some environmental initiatives, and they could play an important part in supporting environmental solutions in the future.

Government policy can also influence the extent of markets. One important policy choice in coming decades will be whether to privatise water services such as water supply, sewerage and treatment, and perhaps energy services: privatisation could provide new financial resources to invest in better plants, reducing environmental impacts and improve efficiency, but would impose higher prices on households and other users.

The business sector today plays a key role in shaping production and consumption patterns around the world. When enterprises innovate, they can bring new environmental technologies to market. At the same time, markets have brought more and cheaper consumer products, often produced in developing countries, to consumers — and the resulting growth in consumption has increased pressures on the environment.

This is in marked contrast to the enterprises under former centrally planned economies. Their pollution and resource use per unit of production were typically much higher than those of market enterprises; overall, however, there were fewer consumer goods available and less variety ([84]).

A market world?

Until 2008, global markets grew steadily more integrated through globalisation patterns such as increasing trade, foreign investment and communications. As a result, some analysts saw a future where the world would be dominated by business, as in the *GEO-4* 'Markets first' scenario (Box 2.9). The Shell scenarios (Section 2.4) sees a future where business and civil society work together to tackle global environmental problems.

A strong role for business and markets may seem unlikely in the face of today's economic problems brought by an unregulated, global financial sector. However, business is likely to remain an important actor — for example by promoting and diffusing environmental management in production.

In Europe and worldwide, enterprises have created an ever-wider choice in consumer products, and they have helped induce demand for their products through marketing and advertising. Companies have also developed new ways of producing, distributing and selling products more efficiently — in many cases, by repeating a basic model throughout the world. For example, supermarket

Box 2.9 Markets first?

In *GEO-4*'s 'Markets first' scenario, the world places faith in business and markets as the best path for rapid economic growth. Foreign direct investment and private donations grow further to become the main avenues of financial support for developing countries. Water and other services are increasingly privatised. While wealthy countries continue to address local and regional environmental problems, pollution levels grow in most developing countries. Climate change pressures also continue, as do global biodiversity losses.

UNEP's recent *Carpathian environmental outlook* includes scenarios based on those in *GEO-4*. The 'Business as usual' scenario for the Carpathians is based on a global pursuit of markets first. In this scenario, the Carpathians region sees traditional values disappear, and regional disparities increase. Rural areas face sharp declines in their population. Overall, air and water pollution increase. Could a focus on markets lead to a similar set of impacts in the Western Balkans? Here too, rural areas are losing population.

([84]) See for example, OECD, *Environment in the transition to a market economy*, 1999. These differences were seen also in the more flexible socialist economy of the former Yugoslavia.

and retail chains — many of them from western Europe — opened stores in the new EU Member States in the 1990s. In this decade, they have expanded to many parts of the Western Balkans. Companies such as McDonald's have spread rapidly through locally owned franchises.

Business action for the environment

At the same time, a growing number of European and global businesses have sought to play a part in seeking solutions to environmental problems.

A growing number of companies have adopted management systems to better evaluate, monitor and reduce their environmental impacts, thus going beyond compliance with environmental legislation. Such systems include the ISO 14000 series and EMAS, the EU Eco-Management and Audit Scheme. EMAS, which is also open to public authorities, can be adopted by enterprises and organisations in EU candidate countries, i.e. Croatia and the former Yugoslav Republic of Macedonia in the Western Balkans. Large companies that adopt such environmental management systems often require their suppliers to establish similar mechanisms, thus diffusing this approach.

By mid-2008, about 4 000 companies and other organisations in the EU-27 had adopted EMAS. Over 50 000 companies had adopted ISO 14000 systems, which are typically less onerous in terms of reporting and other requirements. These environmental management systems often call on companies to ensure that their suppliers also undertake environmental management initiatives. Through this mechanism, EU companies are likely to help disseminate environmental management practices to supplier companies in the Western Balkans.

Other companies have gone further by advocating and encouraging new policies and innovations for the environment. The World Business Council for Sustainable Development was founded just before the 1992 Rio Earth Summit. It brings together about 200 companies to support approaches for sustainable development.

Companies have also sought to address social issues together with environmental ones by adopting corporate policies for social responsibility. Companies worldwide have subscribed to the UN Global Compact, which sets principles for environment, human rights, labour rights and anti-corruption practices ([85]).

A growing number of companies see environmental issues as a business opportunity. This is the case for climate change: the IEA estimates that reshaping global energy and transport systems in order to reduce greenhouse gas emissions and maintain atmospheric carbon levels below 450 ppm will require an additional USD 10.5 trillion in investments to 2030 — a 40 % increase over the USD 26 trillion required in its reference scenario ([86]). Many enterprises are seeking to develop the technologies that will be needed.

Governments can play an important part in supporting innovation of environmental technologies and products, through support for research and tests as well as for the introduction of new technologies. Mechanisms that can help introduce new technologies include guaranteed tariffs for renewable energy, a mechanism used by many EU Member States. Another is through green public procurement: in 2008, the European Commission proposed setting targets for green public procurement in Member States ([87]).

Western Balkans: foreign investment

One important dynamic in the Western Balkans has been the arrival of western investors opening new supermarkets, fast-food restaurants and other shops — and this has brought new consumption patterns to the region. Table 2.8 presents an overview of foreign direct investment earlier in this decade.

Western Balkans: can business be an actor for change?

At the same time, business groups have taken several initatives to address environment and social issues. A study in Croatia found that all the large businesses interviewed undertook some form of environmental management action, including business activities — such as improving eco-efficiency and undertaking environmental accounting — or through community investment activities. While the study did not cover small and medium enterprises (SMEs), it appears that these lag behind large businesses ([88]).

([85]) www.unglobalcompact.org (accessed January 2010).
([86]) IEA (2009), *World energy outlook 2009*, Paris, available at www.worldenergyoutlook.org (accessed January 2010).
([87]) http://ec.europa.eu/environment/gpp/index_en.htm.
([88]) Bagic, A., *et al.* (2004), *An overview of corporate social responsibility in Croatia*, Academy for Educational Development, Prince of Wales International Business Leaders Forum, Map Consulting Inc., Zagreb.

Table 2.8 Net foreign direct investment inflows to the countries of the Western Balkans, 2004

Country/territory	Net foreign direct investment inflows, 2004 (% of GDP)
Albania	5.6
Bosnia and Herzegovina	7.2
Croatia	3.6
The former Yugoslav Republic of Macedonia	2.9
Montenegro	3.3
Serbia	4.0
Kosovo under UN Security Council Resolution 1244/99	1.0

Source: UNDP (2007), *Environmental policy in South East Europe* for all data except Serbia: Republic Development Bureau, Republic of Serbia.

Table 2.9 Driving force: markets and business

Driving forces	Scenarios for the future	Key uncertainties	Possible influence on production and consumption patterns and the environment in the Western Balkans
Global and EU			
Business leadership for the environment	• One GEO-4 scenario, 'Markets first', imagines a global future shaped by markets.	• Extent of business action for the environment	• Business initiatives at global and EU scale could influence enterprises in the region, encouraging them to reduce environmental impacts of production
National			
Foreign direct investment (FDI)	• No studies identified	• Extent of FDI in coming years	• FDI can transform industrial production by bringing financial and technical resources • FDI in retail will directly influence consumption patterns
Privatisation of energy, water services	• No studies identified	• Extent to which national governments make reforms (see Section 2.10 on policy)	• By privatising water and energy services, countries will receive new investments to improve production methods — but consumers are likely to face higher tariffs
Business leadership for the environment	• No studies identified	• Extent of business action for the environment	• Enterprises in the region — both foreign and national investors — could become actors for environmental improvement, reducing the impacts of production patterns and developing new, greener products

Governments can support these efforts. In 2007, for example, the Serbian government together with the UN Industrial Development Organization (UNIDO) created a Cleaner Production Centre at the University of Belgrade. Fourteen companies signed agreements with the Centre to undertake cleaner production initiatives in 2008, and a further eleven did so in 2009 ([89]). Other groups are working to support corporate social responsibility, such as the non-profit Smart Kolektiv, also based in Belgrade ([90]).

Privatising infrastructure?

The countries in the region face ongoing choices about how they structure their private markets. The countries of the Western Balkans are still engaged in a transition to market-based systems. While the privatisation of large and small enterprises has progressed significantly in recent years (Section 2.6), key choices still need to be made regarding the energy sector as well as water services. Here, privatisation could bring new investors that could finance improvements. However, the new investors are likely to recover the full costs for water extraction and provision, including the costs of their new investments, through higher tariffs on users, including households.

Summary of markets and businees driving forces is presented in Table 2.9.

Selected forward-looking studies from the review

Global
UNEP (2007). *Global environment outlook 4 (GEO-4)*.

Western Balkans
Business Monitor International, *The business forecast reports: emerging Europe*, various editions.

Stanchev, K. *The Balkans in 2010: economic scenarios*, Institute for Market Economics, Sofia.

Other
UNEP, (2007). *Carpathian environmental outlook*.

([89]) Cleaner Production Centre of Serbia, www.cpc-serbia.org (accessed January 2010).
([90]) Smart Kolektiv, www.smartkolektiv.org/cms/item/aboutus/en.html (accessed January 2010).

2.8 Global environmental change

Key messages

Global environmental changes will affect the environment in the Western Balkans. Climate change is expected to bring higher summer temperatures and lower rainfall; it will shape agriculture (especially in the countries with extensive irrigation such as Albania, Kosovo under UN Security Council Resolution 1244/99 and the former Yugoslav Republic of Macedonia), hydroelectricity production and energy use in the future, as well as coastal tourist areas. And climate change will have an important impact on the region's biodiversity.

Another global change under way is the widespread decline in biodiversity. Global losses can affect the rich biodiversity in the Western Balkans (increase of invasive species); moreover, threats to biodiversity in the region can affect biodiversity in other parts of Europe as well as broader global patterns.

There is the lack of information and analysis about the links between the Western Balkan environment and global environmental changes i.e. climate change and biodiversity loss.

The impacts of global environmental changes will also affect the environment in the Western Balkans over the coming decades, as well as its economy and society. Climate change, biodiversity loss, nutrient loading in oceans and seas and land degradation are among the ongoing changes at global scale. This section focuses on the impacts of two global changes under way: climate change and biodiversity loss.

Global climate change impacts

A key question for the future will be the extent of climate change and its impacts. IPCC developed a series of global emission scenarios (Table 2.10). The scenario that sees the smallest increase in global temperature, 1.8 °C, is a world where markets and policy work together for sustainability. In contrast, in a market-focused world where future technologies focus on fossil fuels, global temperatures could rise by 4 °C by the end of this century.

Since the IPCC report was published, some scientists have warned that climate impacts may be even greater than it predicted, and that the earth is close to a 'tipping point' of irreversible changes ([91]).

Table 2.10 IPCC emission scenarios for climate change

Scenario	Overview	Description	Best estimate of global temperature increase *
A1B	Market-driven world	A world of rapid economic growth and integration. Future technology focuses on both fossil-fuel and alternative energy	2.8
A1FI		A world of rapid economic growth and integration. Future technology focuses on fossil fuels.	4.0
A1T		A world of rapid economic growth and integration. Future technology focuses on non-fossil-fuel energy	2.4
A2	Fragmented world	A world where regional differences persist and grow. Population rises faster than in the A1 scenarios, but technological change is slower	3.4
B1	Markets and policy	An integrated world that focuses on sustainability and resource-efficient technologies	1.8
B2	Local sustainability	Regional and local focus on sustainability. Slow economic growth, faster population growth. Resource-efficient technologies are adopted — but slowly	2.4

Note: * Increase in temperature in °C at 2090–2099 relative to 1980–1999. The estimates represent an average based on the results of different climate change models.

Source: IPCC, *Climate change 2007: synthesis report*, 2007.

([91]) See for example Hansen, J. *et al.* (2007), 'Dangerous human-made interference with climate: a GISS modelE study', *Atmospheric chemistry and physics* (7, 2287–2312, 2007); available at http://pubs.giss.nasa.gov/docs/2007/2007_Hansen_etal_1.pdf (accessed January 2010).

Climate change impacts in the Western Balkans

By 2005, the pan-Europe region (i.e. including Eastern Europe, the Caucasus and Central Asia countries) had experienced a 1.4 °C increase in temperatures over pre-industrial levels — higher than the global average. Southern Europe, including the Western Balkans, experienced even stronger warming than the European average.

Over the course of this century, climate change is projected to increase. The IPCC reported in 2007 that ongoing emissions of carbon dioxide and other greenhouse gases will contribute to an increase of about 0.2 °C over the next two decades. As shown in Table 2.10, global temperatures are expected to increase further through the end of the century ([92]).

In the Western Balkans, climate change is expected to bring:

- higher temperatures, in particular in summer months;
- an increase in extreme events, including summer heat waves and both droughts and flooding;
- a reduction in precipitation, and thus of water run-off (according to estimates gathered by the IPCC, total water run-off in southern Europe could decrease by up to 23 % in the 2020s and by up to 37 % by 50 years later — though the specific impacts in the Western Balkans may vary).

Table 2.11 summarises the impacts estimated by three countries of the region in their recent reports under the UN Framework Convention on Climate Change. Most of these reports were prepared at the beginning of the current decade, and their estimates are less drastic than those in the most recent IPCC report — in their upcoming communications, the countries may revise these forecasts upwards.

These changes will affect ecosystems in the region further. Reduced water flows will affect freshwater ecosystems and in mountain areas, higher average temperatures will shift the tree line upwards. Across ecosystems, climate change could encourage invasive species. By one estimate, up to 25 % of endemic plant species in southern European countries may disappear ([93]).

In coastal zones, sea-level rise and erosion driven by increased storms will put human settlements and ecosystems at risk. Globally, sea levels rose about 10 cm during the 20th century. The IPCC estimates that sea levels could increase by a further 60 cm in the 21st century if greenhouse gas emissions continue unabated. However, predictions of sea-level rise are not definite and the IPCC warns that understanding of the factors involved is still limited (IPCC, 2007).

The effects of climate change on economies in the region will need to be studied further. The IPCC suggests that summer tourism in southern Europe could decline as summer temperatures there become uncomfortable while they also increase in northern Europe. Energy patterns are likely

Table 2.11 Climate change impacts in the Western Balkans: forecasts in national communications

Country	Observed temperatures (in °C)	Temperature increase forecast (in °C)		Observed precipitation (mm/year)	Precipitation change forecast (in %)	
		2050	2080/2100		2050	2080/2100
Albania	6 to 17	1.2 to 1.8	2.1 to 3.6	1 485	– 6.1 to – 3.8	– 12.5 to – 6.0
Croatia	– 3 to 22	1.0 to 2.1	2.4 to 3.2	600 to 3 500	2.4 to 6.5	6 to 10
The former Yugoslav Republic of Macedonia	11–14	1.3 to 1.7	1.7 to 3.2	500 to 1 000	– 1.8 to – 2.4	– 2.4 to – 4.4

Source: National Communications on Climate Change for Albania (2002), Croatia (2001) and the former Yugoslav Republic of Macedonia (2003).

([92]) IPCC (2007), *Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, available at: www.ipcc.ch/publications_and_data/ar4/syr/en/contents.html.

([93]) EEA (2007), *Europe's environment — The fourth assessment*, available at: www.eea.europa.eu/themes/regions/pan-european/fourth-assessment.

to change: while demand for energy for winter heating may fall, demand for summer cooling could increase. Croatian, Serbian and Montenegro economies are heavily based on tourism.

Lower rainfall could reduce hydropower generation in Albania, Bosnia and Herzegovina and Serbia — countries that rely heavily on this energy source ([94]).

Biodiversity loss: a global and a local dilemma

Biodiversity loss is a global problem — and one that generates high costs for human societies ([95]). The loss of biodiversity threatens ecosystem services, ranging from fisheries that provide food and income, to forests, fields and wetlands that help store water, protect water basins from flooding and provide resources during droughts. Ecosystems also provide nutrient cycling for agriculture and forestry.

The Millennium Ecosystem Assessment developed four scenarios for possible global futures (Box 2.10).

Biodiversity in the Western Balkans is also under threat (Chapter 1). Western Balkan biodiversity trends are also an important element in global changes, as many species and habitats are of wider importance (freshwater fish species, karstic underground species and old tectonic lakes habitats). While many of the pressures and problems are local, they often follow continent-wide and global patterns. Across Europe, including the Western Balkans, the pressures that threaten biodiversity include urban sprawl and the abandonment of extensive, high-nature-value farming. Invasive species threaten endemic ones in land, freshwater and marine ecosystems. The loss of habitat in Africa and western Europe can affect the populations of migratory birds that pass through the Western Balkans. Overfishing and invasive species threaten marine ecosystems throughout the Mediterranean, including the Adriatic.

Climate change will put additional pressure on ecosystems. For example, reduced water flows could threaten freshwater ecosystems. Warmer sea

Box 2.10 Millennium Ecosystem Assessment scenarios: biodiversity and economic growth

The Millennium Ecosystem Assessment developed four scenarios to explore possible futures for ecosystems at the global scale. All four scenarios project a loss of global biodiversity, but its extent varies as do the impacts on human well-being.

'Order from strength' — A world focused on security and protection, fragmented on a regional basis. Ecosystem problems are dealt with on a reactive basis. Of the four scenarios, this one predicts the lowest economic growth (annual incomes reach just USD 6 000 per capita in EECCA in 2050) while population growth and biodiversity loss are the highest.

'Global orchestration' — A global society that focuses on trade and economic liberalisation. Economic growth is strong (EECCA income reaches USD 15 000 per capita by 2050). While steps are taken to reduce poverty and inequality, ecosystem problems are dealt with on a reactive basis.

'Adapting mosaic' — Regional, water basin-scale ecosystems are the focus of political and economic activity.

Power shifts to local institutions, many of which take the lead for ecosystem management. Economic growth rates are low, but increase with time; population is nearly as high as in the 'Order from strength' scenario.

'TechnoGarden' — This globally connected world relies on environmentally sound technology. There is close attention to ecosystem problems — often using highly managed, engineered ecosystems to provide services. Economic growth is high, population is in the mid-range of the four scenarios and biodiversity loss is low.

Land-use changes are expected to have the largest impact on biodiversity in all the scenarios, followed by climate change (a threat in particular for river ecosystems) and nitrogen deposition.

([94]) World Bank, Albanian Ministry of Environment, Forestry and Water Administration and Global Water Partnership—Mediterranean, 'Information note', *International Workshop on Water and Climate Change in Southeastern Europe: Understanding Impacts & Planning for Adaptation*, Tirana, June 2008.

([95]) Millennium Ecosystems Assessment (2005), *Ecosystems and human well-being: scenarios, volume 2*, Island press, Washington DC.

Table 2.12 Driving force: global environmental change

Driving forces	Scenarios for the future	Key uncertainties	Possible influence on production and consumption patterns and the environment in the Western Balkans
Global			
Climate change impacts	• IPCC reports and scenarios	• Level of future global climate change emissions • Impacts of climate change at regional level	• Climate change could have a broad range of global impacts: e.g. changing global agricultural production patterns and encouraging migration. These could have an indirect influence on production and consumption in the Western Balkans
Nature and biodiversity loss	• Millennium Ecosystem Assessment	• Future global economic systems and their impact on biodiversity, both worldwide and in the region • Loss of biodiversity in the Western Balkans of wider importance	• Global biodiversity loss could also affect production and consumption patterns worldwide, influencing changes in the region • Global biodiversity loss could increase biodiversity loss in the Western Balkans, which may harm agriculture, fisheries, forestry in particular
Western Balkans			
Climate change impacts	• IPCC reports and scenarios	• Level of future global climate change emissions • Impacts of climate change at regional level	• Climate change will have a broad range of direct environmental impacts in the Western Balkans, including higher summer temperatures, lower summer rainfall that will reduce freshwater flows, and increased pressures on ecosystems • Climate change will have a range of effects on production and consumption patterns: for example, it may reduce hydroelectricity production in the region and it could increase demand for energy for home cooling in the summer

temperatures will allow new invasive species to prosper in the Adriatic and Ionian Seas.

Selected forward-looking studies from the review

Global

IPCC (2007). *Climate Change 2007*, Geneva.

Millennium Ecosystem Assessment Board (2005). *Ecosystems and human well-being: scenarios, volume 2*, Island Press, Washington DC.

Europe

Bakkenes, M. *et al.* (2002). *Assessing effects of forecasted climate change on the diversity and distribution of European higher plants for 2050*, Planbureau voor de Leefomgeving, Bilthoven, Netherlands.

Parry, M. (2000). *Assessment of the potential effects and adaptations for climate change in Europe: the Europe ACACIA project*, Jackson Environment Institute (JEI), University of East Anglia, United Kingdom.

Rotmans J. and van Asselt, M. (2001). *Integrated visions for a sustainable Europe*, International Centre for Integrated Studies (ICIS), Maastricht University.

2.9 Politics: from global to national

Key messages

Politics at all levels — global, EU, regional and national — will set the scene for environmental policies, laws and actions in the coming decades, and thus will have a strong influence on environmental trends.

Political futures are by nature uncertain. At global level, the extent of cooperation or conflict among nations will be vital in terms of determining the world's economic and social framework in coming decades. This choice between conflict and cooperation will affect the extent and effectiveness of international environmental agreements.

The future of the European Union — both its internal effectiveness and its enlargement policies — is also uncertain: and its future will however greatly influence Western Balkan politics as well as environmental laws and policies in the region. Enhanced regional cooperation is crucial for minimising political risks in the future.

In the region itself, many problems remaining from the conflicts of the 1990s still need to be resolved: while Western Balkan countries have taken important steps towards greater regional and European cooperation, the path forward is far from certain.

Internally as well, countries in the region need to resolve a number of problems, including the poor level of public governance, which hinders effective implementation of all policies, including those for environment and sustainability.

In the 1990s, conflict engulfed much of the Western Balkans. As those events show, the extent of conflict or cooperation will play a central role in shaping the economy, society and environment of the Western Balkans in the coming decades.

Long-term analyses for the Balkan region identify three cross-cutting issues that are important for minimising the risks of unfavourable future political developments: establishment of good economic policies across the region, conducted by both international and national institutions; minimisation of the risk of war and other shocks; promotion of common security measures. For all these issues, additional scenario analysis is needed to explore options and their impacts on the environment.

Global cooperation or conflict?

The extent of conflict or cooperation at global scale will be just as important for the region. The future of global politics presents a series of fundamental uncertainties for all humanity. UNEP's *GEO-4* report explores this through a scenario entitled 'Security first' (Box 2.11).

The coming decades may see a major change in the balance of global powers. A recent study prepared by the US National Intelligence Council (NIC) sets out four very different possible pathways for the future. The study also identifies what are seen as more certain trends: in particular, the role of current world powers — the US and Europe in particular — is likely to decline in coming decades as China, India and

Box 2.11 A world dominated by security concerns ignores the environment

UNEP's fourth *Global environment outlook* (*GEO-4*) presents four scenarios for the world's future. These are entitled: 'Markets first', 'Policy first', 'Security first' and 'Sustainability first'.

In the 'Security first' scenario, governments limit global migration as well as trade, and increase military spending. Environmental governance suffers, and few new technologies seek to solve environmental problems. Countries do not agree on ways to tackle climate change. Environmental problems spread, especially in developing countries: in much of Africa, climate change reduces water resources in coming decades, while water quality declines significantly. Climate change and other pressures continue to reduce global biodiversity.

Source: UNEP (2007), *Global environment outlook 4*, Nairobi, available at www.unep.org/geo/geo4 (accessed January 2010).

others take a larger role on the world stage. How will this shift in power influence world politics? The NIC study explored this question in some of its scenarios, such as the one entitled 'World without the west'. Energy resources are a common international interest in all scenarios ([96]).

Global politics will set the scene and determine the conditions for agreements to tackle major environmental problems, such as climate change. If global conflicts increase, such agreements will be difficult to reach let alone fulfil. On the other hand, if the coming decades see greater global cooperation, such agreements, as well as international institutions to manage environmental issues, will likely be strengthened. Indeed, environment is one of the most important areas for international agreement, and agreements here can pave the way for cooperation in other areas.

Two of the NIC scenarios focus on actions to address climate change (Box 2.12). The study is notable because it sees climate change as a potential driving force for international politics: in the 'October surprise' scenario, for example, a severe weather event rather than terrorism or war pushes global action. Moreover, in its scenario entitled 'Politics is not always local', the NIC study also sees non-governmental organisations and other civil society actors as a potential driving force for change in the future.

Europe revived or unravelled?

In Europe, one central question will be the future of the European Union, which today provides shared economic, social and environmental rules for its 27 Member States.

In 50 years, the development of what is now the European Union has transformed western Europe, bringing once-warring countries together. The countries of central Europe, as well as Bulgaria and Romania, have now joined. Two countries in the Western Balkans — Croatia and the former Yugoslav Republic of Macedonia — have accession agreements with the EU, putting them in line for future accession. Albania, Bosnia and Herzegovina, Montenegro and Serbia have all signed stabilisation and association agreements, a first step in the integration process.

Despite the EU's steady growth over the past 50 years in terms of its membership, its political role and its legislative framework, the continuation of these trends is not guaranteed.

Today, the expansion of the EU has been called into question by both politicians and public opinion. In a 2006 survey, over 60 % of EU citizens agreed with key principles behind the Union's enlargement, such as the goal of uniting Europe and strengthening the European Union. However, when asked about the possible accession of countries in the Western

Box 2.12 2025: a world transformed?

The US National Intelligence Council, a government body, developed four striking scenarios for world developments to 2025.

'**A world without the west**' — The US feels overburdened and withdraws from central Asia; Europe will not take the lead; Russia, China, and other non-western powers gain ascendancy. The lack of any stable bloc adds to growing world instability.

'**October surprise**' — After a period of global growth-first mentality, New York City is hit by a major hurricane linked to global climate change. In the face of this calamity, world leaders begin to work on drastic measures to address global environmental problems.

'**BRICs bust-up**' — A steady period of growth has slowed as states struggle to cope with energy and resource shortages. Conflict breaks out between China and India over access to vital resources, including energy supplies. Outside powers intervene before the conflict escalates into a global conflagration.

'**Politics is not always local**' **—** Non-governmental organisations, religious groups, business leaders, and local activists work together to set the international agenda on the environment — through their influence, they choose the UN Secretary General. This coalition plays a crucial role in ensuring a new worldwide climate change agreement.

Source: US National Intelligence Council (2008), *Global trends 2025: a transformed world*, Washington DC, available at www.dni.gov/nic/NIC_2025_project.html (accessed January 2010).

([96]) Canada — US Power System Outage Task Force, *Final Report on the August 14th Blackout: Causes and Recommendations*, April 2004, available at https://reports.energy.gov/BlackoutFinal-Web.pdf.

Balkans, 45 % of respondents thought that this would be primarily in the interest of these countries — and not in the interest of the EU. If these opinions persist, enlargement to the countries of the region may be politically difficult ([97]).

The future of the EU will directly affect environmental policies in the Western Balkans (Box 2.13). In Europe, an 'unbinding' or an 'unravelling' of the EU — as seen in two of the Economic Intelligence Unit (EIU) scenarios — is likely to weaken or dismantle the EU's current environmental rules and policy. The process of integration and accession — if it continues — could support economic growth and regional cooperation in the region, as well as the introduction of stronger environmental laws and policies (see the next section on legislation and policy), as accession involves harmonising national legislation with that of the EU. In coming years, those countries embarking on EU accession and the legal harmonisation process will take on a much stronger legal basis for environmental management, though a costly one.

Moreover, the EU has become a key power for Balkan security and stability, and has a wide-ranging influence on the region's economy and society, as well as its environment. The EU has also played a central role in supporting environment agreements across wider regions, such as those for the protection of the Danube river basin and the Mediterranean Sea. These agreements directly affect participating countries in the Western Balkans. Here too, a strong EU could support further action in coming decades — but if the EU weakens, progress in implementing these agreements may also stall.

Western Balkans: cooperation or mistrust?

Twenty years ago, all the countries of this region except Albania were part of the Socialist Federal Republic of Yugoslavia (see Map 2.4). Today, this region has split into six countries, plus Kosovo under UN Security Council Resolution 1244/99 — a territory whose declaration of independence from Serbia is broadly but not universally recognised (another country that emerged from Yugoslavia, Slovenia, is an EU Member State). Today's political map emerged after a series of conflicts engulfed the former Yugoslavia in the 1990s. International agreements have ended the fighting, but the legacy of these conflicts still divides the countries of the region.

A key issue for coming decades is the region's integration with the European Union. Two countries — Croatia and the former Yugoslav Republic of Macedonia — are candidates for membership. While discussions between Croatia and the EU are already quite advanced, those with the former Yugoslav Republic of Macedonia are at an early stage. The EU has signed Stabilisation and Association Agreements — a significant step in closer relations — with all the other countries of the region.

At present, accession appears to be very popular in the two candidate countries. In a poll published in late 2008, an overwhelming majority of Macedonians

Box 2.13 EU futures: five scenarios

Despite the growth of the EU's political and economic role, its future appears uncertain. A study by the Economist Intelligence Unit suggests five scenarios for the EU to 2025 ([98]).

'Status quo' — implying little progress for further membership or the EU's political role.

'Europe unbound', with powers returning to the national level, though with Turkey and the Western Balkans joining by 2020.

'Europe unravelled' by increasing conflicts among Member States and a collapse of the euro.

'Back to the core', a split between a core of 'inner' countries and a less integrated 'outer ring', though enlargement continues.

'Europe revived', with both economic integration and enlargement continuing.

Source: Kekic, L., (2005), *Long-term prospects for the European transition economies and some implications for the tourism industry*, Economic Intelligence Unit.

([97]) European Commission, (2006), *Special Eurobarometer: attitudes towards European Union enlargement*, July 2006.

([98]) Kekic, L., 'Long-term prospects for the European transition economies and some implications for the tourism industry', Economic Intelligence Unit. Presentation to the *UN World Tourism Organization's European Meeting on Tourism: A Tool for Sustainable Development in Transition Economies, 20 June 2005*.

Map 2.4 Political maps of the Western Balkans: 1987, 1996 and 2007

Political map, 1987

- State
- Federal Republic within the state
- Autonomous province
- Western Balkan countries

Political map, 1996

- State
- Federal Republic within the state
- Autonomous province
- Western Balkan countries

Political map, 2007

- State
- Potential candidate countries
- Candidate countries
- Not covered in the report: EU countries

* Kosovo under UN Security Council Resolution 1244/99

(94 %) said that they were in favour of their country joining the European Union, as did seven out of ten Croats (71 %) ([99]). Accession will bring many economic, social and environmental benefits — and also costs. An example can be seen in the need to meet the EU's stringent requirements for drinking water and wastewater treatment. These rules will cost countries in the region billions of euros (Chapter 1), but will improve human health and the environment.

The countries of the region, together with the EU, the USA and several European countries took a step towards cooperation in 2008, when they transformed the Stability Pact for South Eastern Europe into a permanent Regional Cooperation Council (RCC), with its secretariat in Sarajevo. This Council promotes cooperation in the Western Balkans, as well as the region's integration with Europe and the USA ([100]).

International environmental initiatives have built cooperation in the region. One is the Environment and Security Initiative (ENVSEC), which has brought together several international organisations — including the North Atlantic Treaty Organization (NATO), the Organization for Security and Co-operation in Europe (OSCE), REC, UNDP, UNECE and UNEP — to address environmental problems between countries and pave the way for improved cooperation. ENVSEC has worked in south-eastern Europe, including the Western Balkans, and also in eastern Europe, central Asia and the southern Caucasus ([101]).

The countries in the region have also created the Dinaric Arc Initiative to establish a network of protected areas in the Dinaric Alps and to cooperate on biodiversity protection. Other partners in the initiative include Germany, Italy, Slovenia, UNEP, the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the World Wide Fund for Nature (WWF) ([102]).

National politics: politics and governance

Countries in the region face two linked challenges: modernising national politics and reforming governance.

In interviews carried out in 2006, experts in the region all emphasised that the resolution of recent conflicts and current issues, such as the status of Kosovo under UN Security Council Resolution 1244/99, would be a central question for regional cooperation and will also be closely linked to national political development in coming decades (Box 2.14).

All the countries in the region have established democratic systems. Some major questions need to be resolved, however, including the status of Kosovo under UN Security Council Resolution 1244/99 and cooperation between the political units that make up Bosnia and Herzegovina.

Internally, the countries in the region have strengthened their governance over the past decade — but all countries need further improvements. The World Bank measures governance in over 200 countries, using indicators for six themes: voice and accountability, political stability, government effectiveness, regulatory quality, rule of law and control of corruption. These indicators are based on measurements taken by other organisations, as well

Box 2.14 The future of politics in the Western Balkans

A series of experts from the region were interviewed in 2006 for this project on questions concerning the region's political and economic future.

These experts saw the future of national politics as a choice between two broad paths — either the continuation of closed political systems, or an opening to Europe, along with the development of more transparent decision making. At country level, the continuation of these disputes could fuel nationalistic forces opposed to cooperation with the EU and with neighbouring countries. Internally, this is a choice whether or not to improve governance; externally, it is a choice between cooperation and mistrust.

Interviews with: Dr Miroslav Antevski, Institute of International Politics and Economics, Belgrade; Prof Bosko Bojovic, Professor of Balkan History, École des Hautes Études en Sciences Sociales, Paris; Prof Dr Đuro Kutlača, Mihajlo Pupin Institute, Belgrade and University of Novi Sad.

([99]) European Commission, *Eurobarometer 69: 5. The European Union today and tomorrow*, November 2008.
([100]) See www.rcc.int. In early 2009, Kosovo under UN Security Council Resolution 1244/99 was represented on the Council by the United Nations Interim Administration Mission in Kosovo under UN Security Council Resolution 1244/99 (UNMIK).
([101]) See www.envsec.org.
([102]) WWF Mediterranean Programme Office, Big win for Dinaric Arc, 2008, available at www.cbddinaricarc.com/content/view/28/41 (accessed January 2010).

as surveys of individuals and firms. The indicators are presented in Figure 2.6 and explained in Box 2.15.

Overall, the countries in the region saw improvements compared to previous estimates. All the countries in the Western Balkans scored above the global median — which is set at 0 — for one component of governance; voice and accountability. However, most countries fell below the world median for other governance scores. The data show that the rule of law and the control of corruption are both major problems in the region: all countries except Croatia fell below the global median for these two indicators.

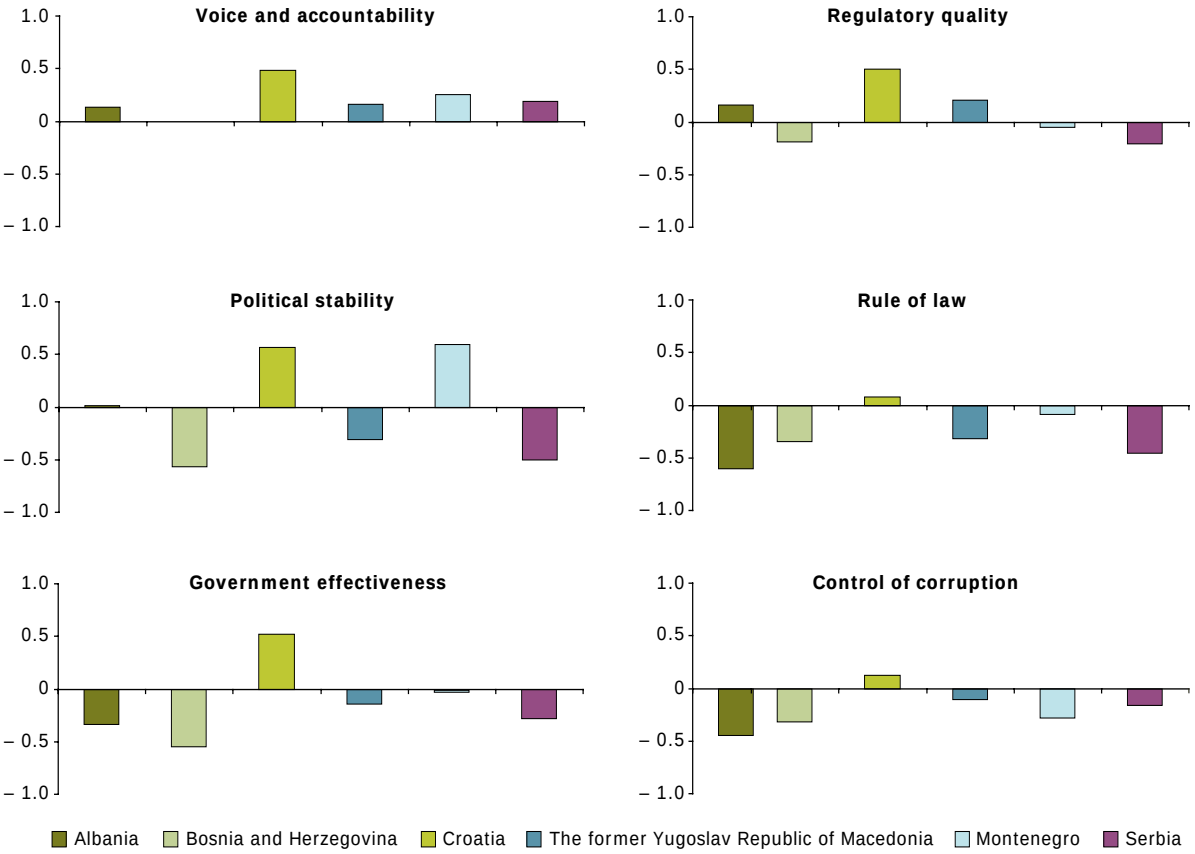
Governance is important for both economic and environmental management. The EIU looked at different scenarios for the accession of Balkan countries to the European Union. In a 'malign accession' scenario, a combination of poor economic governance in the region (and also in the EU) leads to low economic growth in the Western Balkans — the same levels as in a scenario without accession. In contrast, 'benign accession' depends on good economic governance.

Poor governance is a problem for environmental management in the region. The 2007 UNDP report, *Environmental policy in southeastern Europe,* concluded that, despite recent progress, the environmental institutions in the countries of the Western Balkans remain weak. The countries need to strengthen environmental ministries, agencies and inspectorates to implement EU legislation and pursue effective policies. It seems that improving overall governance will be an important step in terms of strengthening governance for the environment

According to UNDP, when environmental institutions are weak, environmental considerations are rarely considered in policy-making for other policy areas, such as agriculture, energy and fishing. Better policy integration will be needed if countries are to improve the environment in key areas such as promoting more sustainable consumption and production or protecting coastal zones.

Summary of driving forces related to politics is presented in Table 2.13.

Figure 2.6 The World Bank's governance indicators for the Western Balkans, 2007



Note: 0 = world median score; standard deviation of worldwide scores = +/– 1.

Source: World Bank (accessed November 2009).

Box 2.15 The World Bank's governance indicators

The World Bank defines its six governance indicators as follows:

1. '**Voice and accountability**' — measuring perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media.
2. '**Political stability and absence of violence**' — measuring perceptions of the likelihood that the government will be destabilised or overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism.
3. '**Government effectiveness**' — measuring perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.
4. '**Regulatory quality**' — measuring perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.
5. '**Rule of law**' — measuring perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.
6. '**Control of corruption**' — measuring perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as 'capture' of the state by elites and private interests.

The indicators are based on 35 separate sources prepared by international organisations, national governments, research institutes, non-governmental organisations and credit risk agencies. In presenting the results, the scores are re-scaled so that the mean of all country scores for each governance indicator is set at 0, and the standard deviation is set at 1. As a result, nearly all country scores fall between + 2.5 and – 2.5, with the higher scores indicating better performance. The methodology is described in: Kaufman, D.; Kraay, A. and Mastruzzi, M., (2008), *Governance matters VII: aggregate and individual governance indicators 1996–2007*, World Bank Policy Research Working Paper 4654, June 2008.

Table 2.13 Driving force: politics

Driving forces	Scenarios and uncertainties for the future	Key uncertainties	Possible influence on production and consumption patterns and the environment in the Western Balkans
Global			
Geo-politics	• US NIC: • 'A world without the west'; • 'October surprise'; • 'BRICs bust-up'; • 'Politics is not always local'	• Global cooperation in multilateral institutions • Conflict in Middle East and southwest Asia • Climate change impacts • Democracy in Russia and China	• The global political future will have a profound influence on consumption and production and the environment in the region, via its impacts on the global economy, society and environment
	• UNEP GEO-4 report:' Markets first', 'Policy first', 'Security first' — or 'Sustainability first'	• Dominant feature of global politics, economy and society	
Europe			
EU internal effectiveness	• EIU scenarios: • 'Status quo'; • 'Europe unbound'; • 'Europe unravelled'; • 'Back to the core'; • 'Europe revived'	• Strength of the EU as a political unit	• A strong EU will engage Balkan countries, including on environment, and encourage accession; a weak EU might withdraw from active engagement in the region — the path chosen will greatly influence production patterns and environmental policy in the region
EU enlargement		• Extent and pace of future EU enlargement	• Ongoing enlargement will mean accession for Balkan countries: this will influence their environmental legislation as well as EU financing for the environment — thus changing production and consumption patterns
Western Balkans			
Cooperation among countries in the region	• Experts interviewed for this project saw a basic choice facing politics. The path to reform includes greater regional cooperation	• Reform vs nationalist politics	• Cooperation can help address common environmental problems. • Link energy systems, making them more efficient • Highway links could lead to increased road traffic
National level			
Accession to the EU	• Experts interviewed for this project saw a basic choice facing politics: openness and reform, vs a return to the nationalist approaches that dominated in the 1990s	• Reform vs nationalist politics	• Accession will affect environmental legislation and bring EU financing for the environment
National political and institutional reforms			• Political commitment to improve governance will strengthen the implementation of environmental laws and policies — thus changing production and consumption patterns and protecting the environment
Social and ethnic instability			

Selected studies from the review

Global
Shell (2005). *Shell global scenarios to 2025: the future business environment — trends, trade-offs and choices*.

US National Intelligence Council (2004). *Mapping the global future*.

US National Intelligence Council (2008). *Global trends 2025: a transformed world*.

UNEP (2007). *Global environment outlook 4 (GEO-4)*.

Europe
Langer, J. (2005) *Four future scenarios for the European Union — reflections from the perspective of 'Path Dependence', Europe2020*.

Western Balkans
Dobbert, M. (2000). 'Anticipatory anthropology and world peace: a view from 2050', *Futures*, Vol. 32, Issue 8/I 26 October 2000, pp. 793–807.

Gelazis, N., and Slezinger, M. (2005). *Bosnia on the road to European integration: a status report*, Woodrow Wilson Center, Princeton University.

Kekic, L. (2005). *Long-term prospects for the European transition economies and some implications for the tourism industry*, Economic Intelligence Unit.

Massari, M. (2005). 'Do all roads lead to Brussels? Analysis of the different trajectories of Croatia, Serbia-Montenegro and Bosnia-Herzegovina', *Cambridge Review of International Affairs*, Vol.18, No. 2, July 2005, pp. 259–273.

Zoran, M. (2004). 'The Future of Croatia', *South-East Europe Review*.

2.10 Legislation and policy

Key messages

The number of global environmental agreements has increased steadily in recent decades. In the future, a strong global agreement to tackle climate change could change transport and energy systems around the world, including those in the Western Balkans (Sections 4.3 and 4.4). It remains uncertain, however, whether such an agreement can be reached.

The EU has extended and strengthened its environmental laws and policies in recent decades. However, further progress is not certain. For example, progress depends on a strong and effective EU, which is uncertain as described in the section on politics.

In the Western Balkans, countries can strengthen their environmental legislation by aligning it with EU requirements. However, for such measures to be effective, governments need to improve their implementation and enforcement of environmental policy.

More importantly, governments in the region (and around the world) have to make a strategic choice in coming decades as to whether or not to put environment and sustainability at the centre of their policy-making.

Legislation sets the rules for managing the environment. Policies work together with legislation by setting goals — for example, reductions in emissions of pollutants that threaten human health — and by bringing together various instruments, including regulations, taxes and financing to achieve these goals. The laws and policies that affect the environment include cross-sectoral issues such as: privatisation and economic reform; sectoral policies such as energy and, agriculture; as well as fiscal issues such as the tax structure, government subsidies and financing mechanisms.

Environmental laws and policies may lead enterprises to change their mode of operating and consumers to modify their actions; while creating new markets and a better quality of life.

For the countries of the Western Balkans, adopting EU legislation may be a central challenge for the future that will directly affect their environment and their economies.

Global environmental agreements

The number of global environmental agreements has grown steadily in recent decades. A key issue for the near future is whether a strong agreement on climate change can be reached — for example, one that will set binding actions to meet the political commitment reached in December 2009 in Copenhagen to limit global warming to 2 °C. Climate change poses a huge challenge to humanity and it needs to be addressed also to stem the world's ongoing loss of biodiversity.

The EU has sought to lead efforts against climate change and has pledged to reduce its overall emissions to at least 20 % below 1990 levels by 2020. It has also pledged to make a 30 % reduction under a new global climate change agreement, if other developed countries make comparable efforts ([103]). A 30 % reduction, together with any possible future reductions to tackle climate change, would require major changes in Europe's energy and transport systems, and these are likely to have a strong influence also in the Western Balkans, in particular in countries that become Member States in the future.

Europe: a new wave of environmental measures?

The European Union's legislation for environment, energy and related areas has evolved greatly over the past three decades to become a comprehensive framework of laws and will probably continue to evolve in coming years. The European Union has ambitious goals to address climate change and it may decide to continue taking actions that go beyond global agreements.

Also, the EU has pledged to end the loss of biodiversity in its territory by 2010. Here too, further action may be needed as this goal currently will not be met (see Section 1.3).

A comprehensive global agreement to address climate change and stronger European legislation could both change energy systems in the Western Balkans in future decades. Such an agreement might also

([103]) European Commission (DG Environment), Climate Action: http://ec.europa.eu/environment/climat/climate_action.htm (accessed March 2009).

change the types of cars people drive in Europe, the appliances they use and also the ways in which they heat and cool their homes.

The EU policies for sustainable development and sustainable consumption and production could also have far-reaching effects. Western Balkan countries that become EU Member States will be the first to be affected, but EU-wide standards will influence the whole region.

These present initiatives and future actions could bring a new wave of environmental change to Europe. Will the EU be able to put innovative new environmental policies in place? A recent study focusing on health and consumer policy included possible scenarios where future crises change the EU's role in legislation and policy (Box 2.16).

Western Balkans: reforming environmental management

In recent years the countries of the Western Balkans have taken major steps to strengthen their environmental legislation. This process is continuing, in particular in EU candidate countries, which face the task of adopting the European directives for the environment, as well as in many other sectors.

The Western Balkans: alternative paths

The countries in the region are in the midst of reviewing and strengthening their legislation for the environment as in other areas. Here, the EU environmental directives provide a reference point. For Croatia and the former Yugoslav Republic of Macedonia, this work is part of the formal process as candidate countries to the European Union, and they are harmonizing national laws with those of the EU, across areas from environment to food safety to energy sector competition. Other countries of the region are also amending their legislation to bring it closer in line with EU requirements.

This process involves intense effort. For some countries, the process of putting new legislation in place will be a major administrative task in coming years.

The new legislation will also require considerable investment to bring environmental infrastructure, such as waste water treatment plants and solid waste landfills, up to EU standards.

EU laws will also require regular monitoring of environmental conditions, as well as inspections to ensure that industrial plants and other facilities meet new requirements. One concern is that efforts to strengthen enforcement have lagged behind. Many inspectorates lack trained staff, including in those working on legal issues. Programmes such as ECENA, managed by the Regional Environment Center, have provided training in enforcement to countries in the region, but further efforts will be needed in the future ([104]).

Laws and policies in other sectors will have an important influence on the environment and on

Box 2.16 Will the EU body of legislation continue to grow — or be washed away?

A recent study for the European Commission explored future challenges, including possible alternative scenarios to the EU's current role in setting and implementing European (and global) policies in the area of health and consumer affairs. The experts proposed three scenarios:

Coral reef. The EU is a 'living organism' with a strong European identity on the surface. Formal regulations and targeted tax rises continue to be accepted as effective tools to produce policy goals.

Galapagos. The EU faces crises as the Commission can no longer coordinate and reconcile the many different interests of Member States and stakeholders. The multiplicity of views in Europe has left it weak and divided on the world stage — its high regulatory standards are not followed elsewhere, and a global 'race to the bottom' threatens to undo them.

Wave. European regulation becomes increasingly complex until two major crises in 2012 (the breaking wave) result in a radical simplification of its rules and requirements. After the crises, pragmatic solutions are established through negotiations between the private sector, key non-governmental organisations and Member States, rather than in legislation.

Source: European Commission (Health and Consumer Protection Secretariat), *Future Challenges Paper: 2009–2014 — Annex 5: The SANCO scenarios developed by RAND Europe*, 2008.

([104]) Regional Environment Center (20020, Environmental Enforcement and Compliance in South Eastern Europe, available at: www.rec.org/REC/Programs/environmental_policy/ecena/.

Box 2.17 Alternative policy paths: a sustainable future for the Mediterranean?

The Blue Plan warns that the **baseline scenario** for the Mediterranean predicts increased social, economic and environmental disparities among the countries around this sea. Inland, rural areas in countries such as Albania will become marginalised, leading to further migration to urban areas and abroad. Urban growth and sprawl will continue. The excessive growth of seaside tourism throughout the Mediterranean could lead to a drop in tourist revenues, putting economies at risk. Environmental problems will worsen.

An **alternative scenario** requires a policy approach whereby economic growth in Mediterranean countries is based on the quality of the region's environment. Governments, as well as business and other stakeholders, need to take a forward-looking approach. In addition, countries need to cooperate more strongly. This scenario sees the region's heritage as an investment, and seeks economic development policies to protect natural and cultural heritage. In this scenario, growth is decoupled from environmental pressures and also reduces internal disparities among and within countries.

Source: Benoit, G. and Comeau, A. (eds.), *A Sustainable Future for the Mediterranean: The Blue Plan's Environment and Development Outlook*, Earthscan, London, 2005.

Table 2.14 Driving force: legislation and policy

Driving forces	Scenarios and uncertainties for the future	Key uncertainties	Possible influence on production and consumption patterns and the environment in the Western Balkans
Global			
Global environmental agreements	• Will depend strongly on geopolitics (see previous section)	• Extent of global cooperation or conflict	• Global climate change agreements could lead to a major change in the region's energy and transport systems
Europe			
Future development of EU legislation	• RAND scenarios: coral reef, Galapagos, or wave	• Member State, stakeholder acceptance of new EU legislation; its complexity and effectiveness	• The future of EU legislation will affect environmental legislation in the region, as well as EU actions in key areas such as agricultural subsidies and regional funds: EU actions in all these areas could influence production and consumption patterns in the region
National level			
Implementation of environmental laws	• No scenarios identified	• Closely tied to progress on political reforms and governance	• The countries in the region are reforming their environmental legislation and harmonizing it with EU legislation: its implementation and enforcement, however, will play a key role in terms of the impact on production and consumption patterns
Sustainability policies	• Blue Plan scenarios for the Mediterranean: baselines vs. alternative scenario	• Will governments put environment and sustainability at the centre of policy-making?	• The introduction and implementation of these policies would have a wide-ranging and direct impact on production and consumption patterns and their environmental impacts

society. For example, food safety rules will protect consumers but place new restrictions on farmers. If small, traditional farmers do not receive assistance they may not be able to implement the new requirements and may be forced to close. As a result, rural communities could suffer and land may be abandoned. On the other hand, provisions for organic farming may provide new exports for farmers and new opportunities for consumers in the region. Energy policies will have a strong impact on the environment, including on greenhouse gas emissions.

A recent study on the future of the Mediterranean Basin by UNEP's Blue Plan highlights the policy choices that countries in the Western Balkans face. The Blue Plan's study presents two scenarios: the baseline (or business as usual) against an alternative whereby countries pursue policies for sustainability (Box 2.17).

Selected forward-looking studies from the review

Global

UNEP (2007), *Global Environment Outlook 4 (GEO-4)*.

OECD (2008), *OECD Environmental Outlook to 2030*.

Europe

European Commission (Health and Consumer Protection Secretariat) (2008). *Future Challenges Paper: 2009–2014*, Annex 5: The SANCO scenarios developed by RAND Europe.

Other geographic areas

G. Benoit and A. Comeau (eds.) (2005). *A Sustainable Future for the Mediterranean: The Blue Plan's Environment and Development Outlook*, Earthscan, London.

Part III: Consumption and production patterns, trends and outlooks

3 Key areas of household consumption

Unsustainable patterns of consumption around the world are a major cause of environmental problems, from climate change to resource degradation and biodiversity loss. Worldwide, humanity's ecological footprint has almost tripled since 1980, and consumption patterns have played a key role in this change. Consumption by households is one of the most important components of consumption patterns.

In the Western Balkan countries, household consumption patterns are of key interest as they have changed rapidly in recent years. This chapter describes recent trends for three areas of household consumption that are among the most important in terms of their environmental impacts: food and drink; housing and infrastructure including energy; and mobility.

Consumption patterns in the region are evolving in response to the drivers described in Chapter 2. Table 3.1 provides an overview of the links between drivers and production patterns, showing which drivers might have the strongest influence in terms of shaping future consumption patterns in the region. The table is summarises the analysis in Chapter 2 and in this chapter.

Each of these areas of household consumption is closely linked to production patterns that have major environmental impacts. As we shall see, many of the most important impacts related to consumption occur when the goods we consume are produced (production patterns are the topic of the next chapter). These impacts can include greenhouse gas emissions; air and water pollution and other environmental pressures that arise from the production of those goods, the chain of processing, transportation and retail that brings them to consumers, and the solid waste that is generated at the end of their lives. Thus, consumption choices can influence environmental pressures over a long cycle from the 'cradle to the grave' of goods. The chapter also describes some of the ways in which changes in consumption can affect the future of the region's environment, the topic of Chapter 5.

Household consumption patterns in the Western Balkans have changed rapidly in recent years. The chapter focuses on three areas that account for about two-thirds of all environmental pressures from consumption in EU Member States ([105]). These are:

1. food and drink;
2. housing and infrastructure (the chapter looks at residential energy use in particular);
3. transport of persons and goods.

In the EU-15 Member States, each of these three consumption areas accounts for about 2–3 tonnes of greenhouse gas emissions per capita, or about a quarter of total national emissions (the share varies by country), if the relevant production patterns are also included ([106]).

These are also the three most important areas for domestic household consumption expenditure in the Western Balkans (Box 3.1). Other types of consumption can also be important, in particular in specific parts of the Western Balkans: for example one key topic not explored here is tourism, which has had a profound impact on coastal zones in the region.

([105]) EEA (2005), *Household consumption and the environment*, EEA Report No 11/2005. In EU Member States, tourism is a fourth key consumption area in terms of environmental pressures, and this is a key area also for some parts of the Western Balkans, in particular coastal zones.

([106]) Pawel Kazmierczyk, 'Environmental impacts of European consumption and production patterns: Highlights from ongoing EEA–ETC/RWM analysis based on NAMEA' (Presentation to the Conference on Environmental Accounts for Policy Makers, Brussels, 1 October 2008).

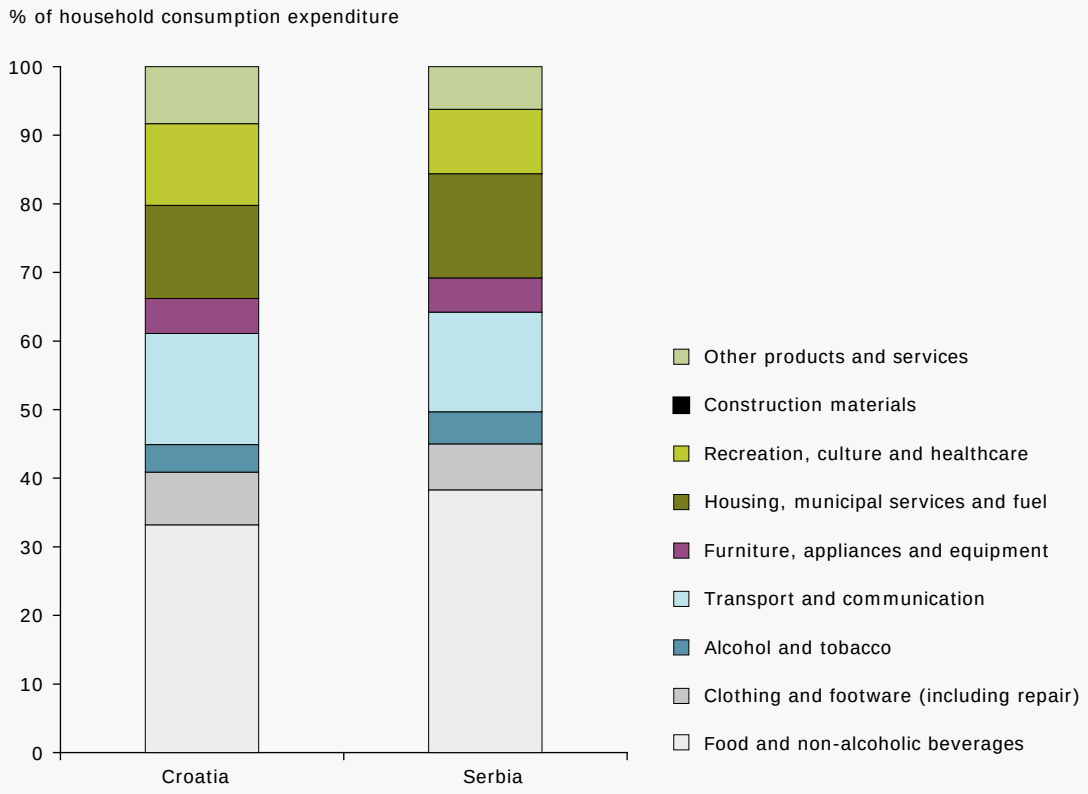
Table 3.1 Influence of the driving forces on future patterns of consumption in the Western Balkans

STEEPL driving forces that will influence the Western Balkans		The geographic scale of the most important driving forces				How these driving forces can shape future consumption patterns in the Western Balkans (focusing on food, energy, transport)
		Global	EU	WB	National	
S	**Population and migration** Key trends: ageing populations, declining household size Key uncertainties: patterns and extent of migration			√	√	**Strong, direct influence:** Smaller, ageing households may buy more processed foods and consume more energy per person In-migration will increase consumption Rural to urban migration will increase sprawl
	Culture, values and needs Key uncertainties: consumerism and 'catching up with west' vs. traditional and green values		√	√		**Strong, direct influence:** Culture and values will influence the types of food people consume and their preferences for personal mobility
T	**Technology** Key trend: influence of technology low in short term; will grow over time Key uncertainties: introduction of new technologies vs. public fears of risks; EU and Western Balkan efforts to develop and implement 'greener' technologies	√	√			**Direct influence:** Technology will create new food products for consumers Transport technologies will change impacts of personal mobility Influence on environment could be both positive and negative
E	**Globalisation and trade** Key trend: EU expected to remain main trade partner for Western Balkans Key uncertainty: will globalisation continue in coming decades?	√	√			**Direct influence:** Extent of import of exotic foods for consumption in region Global prices of oil and other fuels will influence energy use, personal mobility
	Macro-econonic development Key uncertainties: levels of economic growth at global, EU and regional scales	√	√	√	√	**Strong, direct influence:** Economic growth is closely linked to household incomes and spending on consumption
	Markets and business Key uncertainties: extent of business action for the environment at global, EU and regional scales; food retailing sector in Western Balkans		√	√	√	**Direct influence:** Future retail sector will influence food products available Automobile industry can develop, promote lower emissions vehicles
E	**Global environmental change** Key trends and uncertainties: pace of global warming and biodiversity loss	√				**Indirect influence:** Global warming will affect energy consumption in the region
P	**Politics** Key uncertainties: global cooperation vs. conflict; EU effectiveness and enlargement; cooperation and national reforms in W. Balkans	√	√	√	√	**Strong, indirect influence:** Political developments will determine many other driving forces; e.g. joining EU will affect legislation and policy influencing consumption
L	**Legislation and policy** Key uncertainties: strength of global environmental agreements; future EU legislation; national implementation of environmental laws	√	√		√	**Direct influence:** EU and national legislation can affect many areas: e.g. influence food products; promote energy efficiency; set requirements on motor vehicles

Box 3.1 Consumption patterns in Serbia and Croatia

In both Serbia and Croatia, food and non-alcoholic beverages are the largest area of household expenditure for consumption, accounting for over 30 % of all spending (Figure 3.1). The areas that follow are: transport and communication; housing, municipal services and fuel; and construction materials. This chapter thus focuses on the three areas of consumption where households make their largest expenditures.

Figure 3.1 Main areas of household consumption in Croatia and Serbia (2005)



Source: UNEP/EEA, 2007.

3.1 Food consumption

Key messages

Food consumption patterns will influence environmental impacts throughout the food production chain, and in particular impacts arising from agriculture and fisheries.

In the Western Balkans, traditional patterns continue to influence household food choices — for example, strong ties to rural areas and family farms. New consumption patterns, facilitated by new supermarkets and processed food products, are spreading quickly and are expected to raise environmental impacts related to food.

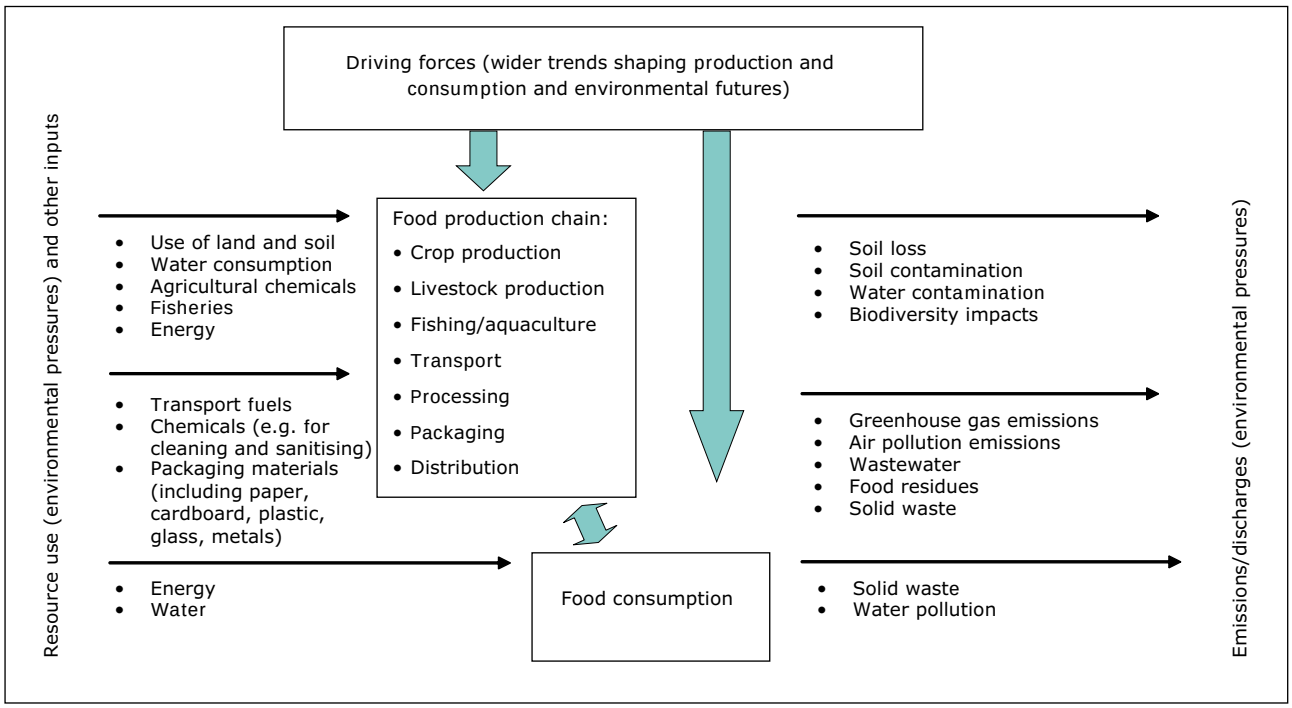
Across the region, malnourishment has declined since the 1990s, most likely due to the end of conflicts and a return to broad economic growth (with some exceptions). Current economic problems could reverse this trend. Another health problem, however, has grown in recent years: the proportion of overweight and obese adults in the region.

The future of food consumption patterns in the region and any related environmental and health problems will be tied to a series of drivers. One will be the evolution of cultural patterns, such as preferences for locally grown food and traditional products. Markets and business, including decisions by large retailers and advertising by food companies, will be another important force. Government policies and individual actions and can also play a key role.

Because of the lack of information in terms of data and qualitative information, an in-depth analysis of the links between food consumption patterns and the environment is not possible. Key information gaps include: a breakdown of food consumption patterns in different countries, together with information on the sources and types of food products; cross-country information on retail food markets; forward-looking data on retail markets.

In the cities of the Western Balkans, some families purchase packaged foods and exotic fruits and vegetables in new, sprawling supermarkets. In rural areas, many families grow a large share of their own food. These contrasts illustrate the great differences in the region's consumption patterns for food and drink.

Figure 3.2 Links between drivers, food consumption, the food life-cycle chain and the environment



Note: Adapted from UNEP/EEA, *Sustainable consumption and production in South East Europe and Eastern Europe, Caucasus and Central Asia,* 2007, Figure 5.1, p. 75; and from EEA (2005), *Household consumption and the environment*, EEA Report No 11/2005.

They also show how these patterns have changed rapidly in recent years, especially in modern, urban areas.

Consumption patterns are closely connected to production patterns, and these two in turn create a wide range of environmental impacts. Figure 3.2 provides an overview of these links. Many of the environmental impacts occur in the phases of agricultural production, fishing and food preparation (Sections 4.1 and 4.2 describe agriculture and fisheries and their environmental impacts).

Consumption levels: trends and short-term outlook

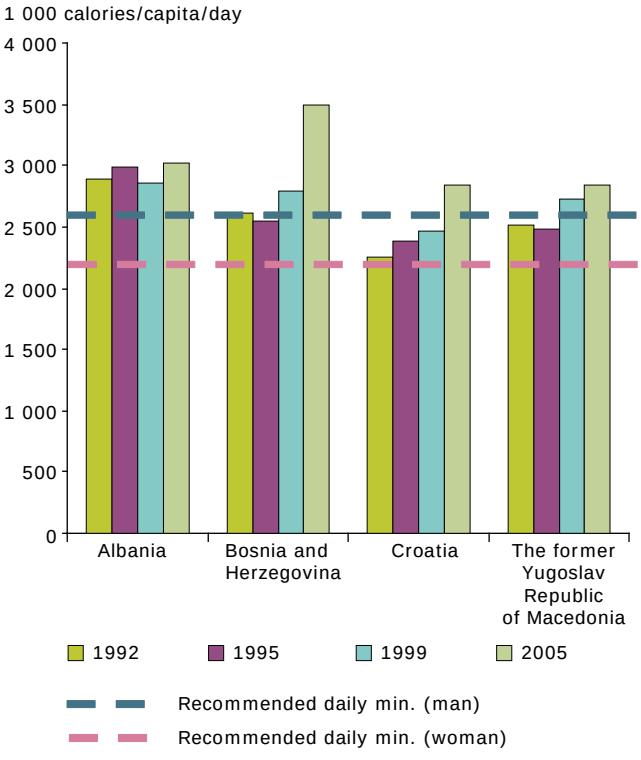
Data are available on average daily calorie consumption for four countries in the region — Albania, Bosnia and Herzegovina, Croatia and the former Yugoslav Republic of Macedonia (Figure 3.3). In all four, daily food and drink consumption provided over 2500 calories per person in 2005. Since the early 1990s, calorie consumption has remained largely stable in Albania. In contrast, it has risen in other Western Balkan countries and notably in Bosnia and Herzegovina, where calorie consumption declined between 1992 and 1995, a time of war. In 2005, this country had the highest consumption levels of the four, about 3500 calories per person.

While average consumption levels are now over 2 500 calories in the above four countries, in the early part of this decade between 5 and 10 % of the region's inhabitants were undernourished, with the highest levels seen in Bosnia and Herzegovina and Serbia and Montenegro (Figure 3.4). Croatia and the former Yugoslav Republic of Macedonia saw significant decreases in the level of undernourishment, compared to the 1990s. In contrast, undernourishment increased in Serbia, Montenegro and Albania.

In FAO's forecasts, the consumption of meat and dairy productions in the region is expected to increase between 2004–2006 and 2016 (Figure 3.5). While dairy consumption will remain significantly lower than EU averages, meat consumption in the Western Balkans is forecast to increase to close to EU levels. This is an important factor in terms of the environmental impacts of food consumption (see the next chapter).

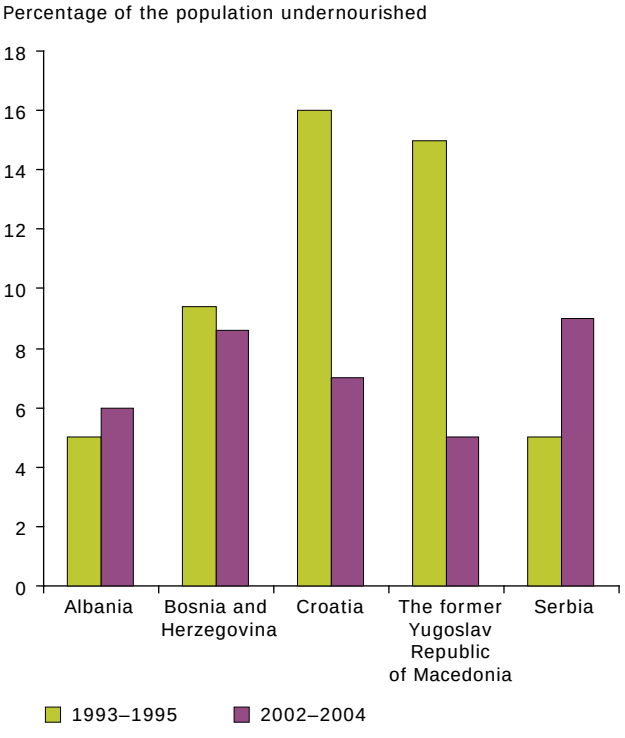
The increase in consumption levels is not necessarily good for health and the environment. While undernourishment remains a concern, another problem may become more important in coming

Figure 3.3 Average dietary energy consumption in four Western Balkan countries, 1992–2005



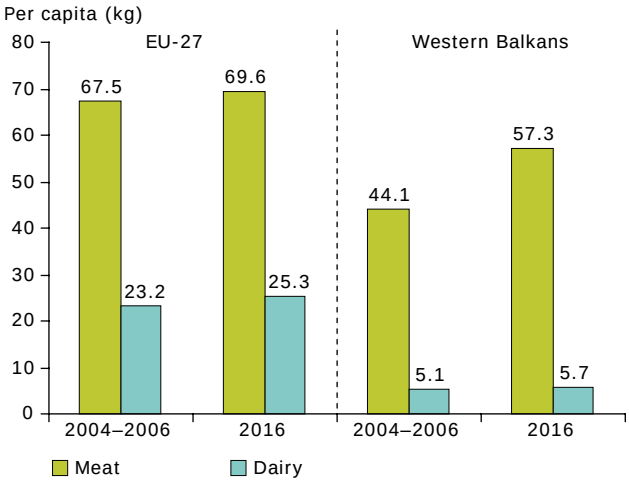
Source: UNEP/EEA SCP, Figure 5.12.

Figure 3.4 Prevalence of undernourishment in the Western Balkans, 1993–1995 and 2002–2004



Source: UNEP/EEA SCP, Figure 5.12.

Figure 3.5 Annual consumption of meat and dairy products, 2004–2006 levels and 2016 projections



Source: FAOSTAT.

years — obesity. An increasing number of people in both wealthy and developing countries are overweight or obese (Box 3.2). At the beginning of this decade, a large share of the adult population in the Western Balkans was obese: more than one-fifth in three of the four countries for which WHO data are available (Table 3.2). More are overweight, and as a result more than half of all adults are either overweight or obese in all these countries of the region, as is the case in many EU-27 Member States.

The links from consumer to producer: transport, processing, packaging and distribution

Some households in the Western Balkans have a direct link with producers, some eat fruits and vegetables they grow themselves in their gardens, or obtain these from relatives and friends from the rural areas. Other households buy food in supermarkets that is grown in other parts of Europe or around the world, and processed in other countries on its long journey to the retail shelf and then the kitchen. While this has long been the case for products such as coffee and tea, drinks that use the products of shrubs grown in tropical countries, a growing share of food in the Western Balkans now comes from afar.

The choice of retailer can play an important role in determining the link between food consumer and food producer and processor. In a survey of consumers in Belgrade, small, local shops accounted for most food purchases (42 %), followed by large supermarkets (33 %). Traditional markets made up the remaining 25 %. Many of those surveyed

Box 3.2 Obesity: a growing worldwide problem

In the EU-27, over 40 % of adult males are overweight, and more than 15 % are obese. In total, a minority of the adult male population in the EU is at or below a proper weight. A growing number of children are overweight and obese, (Delpeuch, F., *et al*. (2009), *Globesity: A Planet Out of Control?* Earthscan Books, London).

The problem is global: WHO estimates that 1.6 billion adults worldwide were overweight or obese in 2005 — more than the number of people living in dire poverty (see Chapter 2). Moreover, WHO forecasts that the number will increase to 2.3 billion adults by 2015. Obesity and excess weight are linked to serious health problems, including cardiovascular diseases and diabetes, (WHO, 'Obesity and overweight', Fact sheet no. 311, September 2006, accessed in April 2009 at: www.who.int/mediacentre/factsheets/fs311/en/index.html).

In 2007, the European Commission released a Strategy for Europe on Nutrition, Overweight and Obesity related health issues, which calls for a series of actions. Providing nutritional information is an important element. Another is to ensure that EU agricultural policy provides sufficient fruit and vegetables, and that their consumption is encouraged in particular in school. The Strategy also calls on the EU food industry to reformulate products to reduce their salt and fat contents, (COM(2007) 279).

In the United Kingdom, one of the EU Member States where a majority of both men and women are overweight or obese, this problem is seen as an important health care threat. To study it, the government prepared a foresight study that included the preparation of scenarios for the future. On the basis of this analysis, the study concludes that a shift in government and society is needed to tackle obesity, just as a major shift is needed to address global warming. The study found that levels of obesity and excess weight are reduced most strongly in a future scenario where preventative action for health, and government plays a strong role in many areas, such as regulating the food industry to ensure more healthy products in stores; and encouraging individuals to cycle and walk more, including to work (UK Government Office for Science (2007), Tackling Obesities: Future Choices — Project Report, London).

Table 3.2 Prevalence of obesity in adult populations in the Western Balkans

Country	Data year	Population	Obese: share of total	Overweight: share of total
Albania	2001	Tirana only, ages 25+	29.5 %	49.0 %
Bosnia and Herzegovina	2002	Ages 25–64	21.7 %	41.2 %
Croatia	2003	Ages 18+	22.3 %	39.1 %
Serbia and Montenegro	2000	Ages 20+	17.4 %	36.6 %

Note: Obesity is defined as a body mass index ≥ 30 kg/m^2; overweight as body mass index ≥ 25 kg/m^2; data not available for the former Yugoslav Republic of Macedonia.

Source: WHO Global Infobase (https://apps.who.int/infobase/report.aspx).

stated a strong preference for nationally produced goods ([107]).

These three types of food retailers thus have relatively similar shares in the city. In the future, however, the balance may shift. The Western Balkans has seen a rapid growth of supermarkets and western-style fast food restaurants in large cities. These new retail structures have brought western brands and convenience foods, such as pre-prepared meals, many sold at low prices and supported by advertising. The supermarkets and fast food restaurants reflect a broader trend whereby agriculture and food processing in these countries are increasingly tied into the European and global economies.

At the same time, demand for organic produce has grown in some Western Balkan cities. Of course, fruit and vegetables grown by families are 'organic' in that they use few agricultural chemicals.

One impact is growing municipal solid waste. A study of in several cities found that organic material, including food waste, made up about 40 % of municipal waste in Serbia and Montenegro, over 50 % in Albania and over 75 % in Croatia ([108]). Food purchased in supermarkets and in fast food restaurants typically has a great amount of packaging as well, which contributes to municipal waste loads.

Outlook

The future of food consumption patterns is far from certain. In particular, a series of drivers will influence these patterns in coming decades. Drawing on the analysis in Chapter 2, the following factors may play a strong role:

- *Population and migration* — as populations in the region grow older and households become smaller, the elderly, small families and others may buy more easy-to-prepare processed foods. Migration to urban areas is likely to fuel these trends, as people lose their connection to local farm products and consume more processed and imported foods.
- *Culture, values and needs* will also play a central role in determining to what extent people in the region continue to prefer traditional foods and buy them directly from farmers, buy organic food, or switch to more convenient foods found in supermarkets. Individuals and civil society groups in the region may influence these choices. For example, Dr Rajendra Pachauri, head of the IPCC, recently encouraged people around the world to reduce climate change pressures by eating less meat ([109]).
- *Globalisation and trade* will influence the imported food that consumers in the Western Balkans will find in supermarkets and other stores.
- *Macroeconomic development* will affect the future incomes of consumers and thus their ability to buy exotic and processed foods, or to eat out more often. A related factor will be the number of women employed: as more women work, they may prefer to buy convenient foods that can be quickly prepared.
- *Markets and business*, and in particular foreign investments, have helped to fuel the spread of supermarkets and processed food in the region.

([107]) EEA and UNEP (2007), *Sustainable consumption and production in South East Europe and Eastern Europe, Caucasus and Central Asia*, EEA Report No 3/2007.
([108]) EEA and UNEP (2007), *Sustainable consumption and production in South East Europe and Eastern Europe, Caucasus and Central Asia*, EEA Report No 3/2007.
([109]) Juliette Jowit, 'UN says eat less meat to curb global warming', *The Observer*, 7 September 2008, London.

- *Policies* can also influence future consumption patterns. These can include policies at local level: for example, local governments can restrict the size of supermarkets, and can maintain open-air markets for local food and support them in the face of growing competition from new shops.

How will these different drivers — together with changes in agricultural production and fishing — influence future consumption patterns? A UK NGO, Forum for the Future together with a large supermarket chain, Tesco, and a consumer goods producer, Unilever UK recently produced a study on the future of retail food (Box 3.3). While the study focused on the United Kingdom, one of Europe's wealthiest economies, its results can provide some interesting thoughts on how and where people might buy their food in the Western Balkans in coming years. Key issues include whether the role of supermarkets will continue to grow, whether consumers will continue to buy local and traditional foods, and whether they will consider the environmental impacts of foods they buy.

Box 3.3 Supermarkets or local networks?

A study of food retailing in the United Kingdom looked at a broad range of forces shaping the future. The study identified two main areas of uncertainty. The first is whether economic growth is strong, or instead slows and becomes uncertain in the next 15 years. The second is the relationship between consumers and business: whether consumers trust business to address societal issues, or prefer to act themselves. From this analysis, the study constructed four possible scenarios for 2022.

My way. In a dynamic, growing economy, consumers increasingly bypass large retailers and deal directly, often via Internet, with local producers. While international trade remains strong, the use of air freight to ship foods has become costly and socially unacceptable. Local communities grow stronger.

Sell it to me. In this dynamic economy, consumers allow large retailers to play a strong role in providing food. Large shopping centres continue to grow, and provide entertainment and transport services for consumers. Overall, large businesses have taken a greater role in the economy, and local communities are weak.

From me to you. In an uncertain economy, people seek to buy local food where possible and also grow more of their own food. Local consumers' cooperatives spread, and even large retailers shift to smaller, local shops.

I'm in your hands. Here, government and large business play central roles in an uncertain economy. Large companies increasingly run all operations, from food production to processing to retail and delivery. Their shops focus on providing low-cost products.

Source: Forum for the Future (2007), *Retail Futures 2022*, London.

3.2 Residential energy consumption

Key messages

Residential buildings are the largest single consumer of energy in the Western Balkans. Energy is used mainly for heating, though use of electricity for air conditioning and appliances is growing. Thus, household energy consumption will play an important role in shaping environmental impacts, in particular those arising from energy production.

In Albania, the former Yugoslav Republic of Macedonia and other parts of the region, many households use inefficient electric heaters. Fuel wood and coal is also widely used for heating in some countries, usually by poorer households in both urban and rural areas: these fuels contribute to both indoor and local air pollution. Unregulated cutting of fuelwood can contribute to deforestation and biodiversity loss.

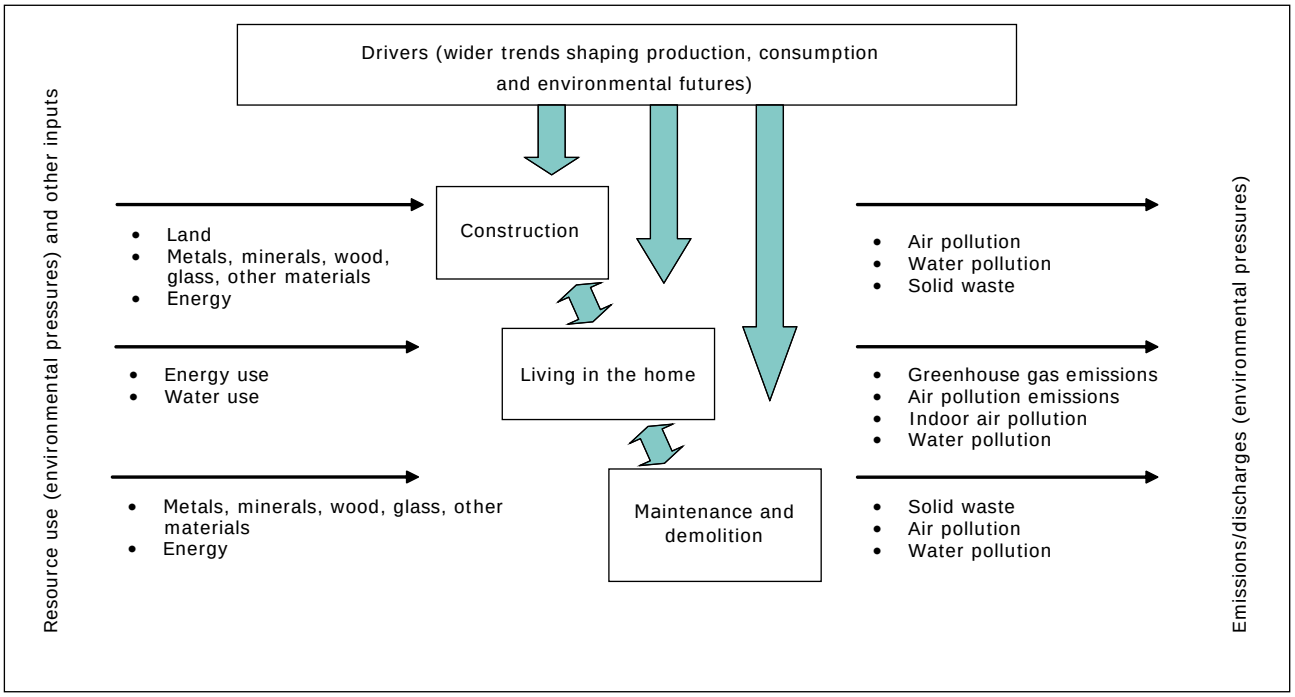
Building construction and demolition is also an important source of waste, and construction has fuelled sprawl in urban and coastal areas.

Future demographic changes are likely to influence household energy consumption as well as building construction: households are becoming smaller and floor space per capita is growing. Macroeconomic development and cultural patterns can combine in terms of fuelling demand for new houses. Policy can encourage energy efficiency for heating or cooling, for example via setting standards. Moreover, few towns and cities have district heating plants that can provide efficient heating.

Residential buildings are linked to a variety of environmental impacts (Figure 3.6). Their construction uses land and raw materials such as stone, wood and metals; their maintenance and eventual demolition creates solid waste. Other impacts come from household consumption of drinking water and the generation of waste water.

One major source of environmental impacts is household energy consumption for heating (and cooling) homes and cooking. This section focuses on residential energy consumption and it is closely linked to the review of energy production in the Western Balkans presented in the next chapter.

Figure 3.6 Links between drivers, the life-cycle of residential buildings and the environment



Source: Adapted from EEA (2005), *Household consumption and the environment*, EEA Report No 11/2005.

Construction

In EU Member States, older buildings are frequently abandoned and replaced by the construction of new homes, apartment buildings, offices and shopping malls. This requires a much greater quantity of materials and energy than the refurbishment of old buildings. In EU Member States, construction accounts for over 25 % of all materials consumed ([110]). When buildings are destroyed or refurbished, large amounts of solid waste are created accounting for about one-third of all solid waste in the EU-15 ([111]).

Many parts of the Western Balkan countries have seen a boom in construction in recent years. In many cases, houses remain unfinished, as owners construct one piece at a time as their income allows. The construction of new buildings is also tied to urban sprawl, which fuels other trends that increase environmental impacts, such as the conversion of land to urban areas and increased transport use. New construction and sprawl have also taken root both in urban areas and along coastlines in the Western Balkans (see Sections 1.4 and 1.5).

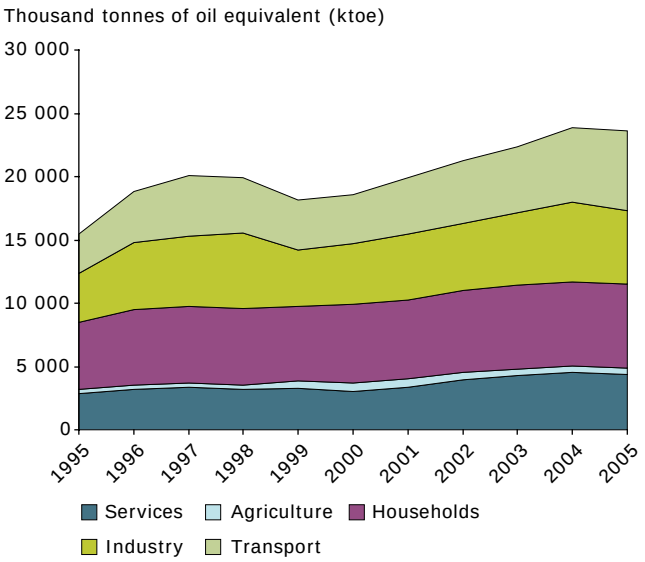
Household energy consumption in the Western Balkans

Households have been the region's largest energy user accounting for 28 % of the region's total energy consumption in 2005 (Figure 3.7).

Total final energy consumption in the region increased by 53 % between 1995 and 2005, despite an abrupt fall of 9 %, in 1999 (due in large part to the Kosovo war under UN Security Council Resolution 1244/99). The proportion of energy consumed by households decreased over this period while other sectors have grown more quickly, in particular transport, whose energy use doubled during this period, to reach a total share of 27 % (see the following section on mobility).

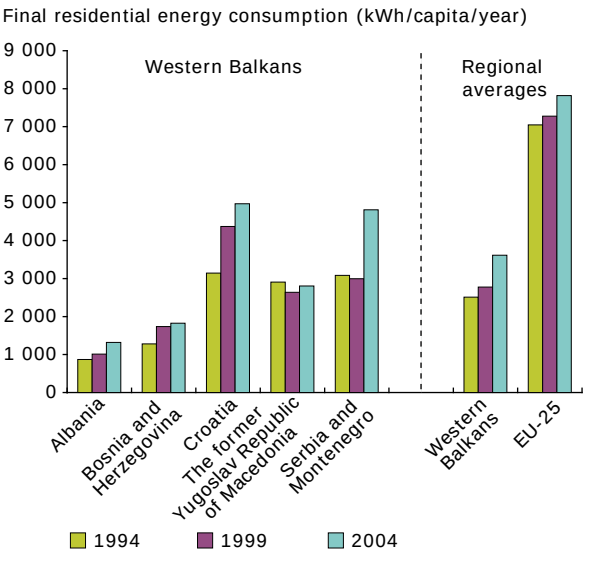
In per capita terms, residential energy consumption rose rapidly in several countries between 1994 and 2004, including Croatia and Serbia and Montenegro (Figure 3.8). Consumption varies significantly among the countries of the region, with levels in Croatia and Serbia and Montenegro more than double those in Albania and Bosnia and Herzegovina. The region's average remains less than half that of the EU-25.

Figure 3.7 Final energy consumption by sector in the Western Balkans, 1995–2005



Source: See Annex 2.

Figure 3.8 Residential final energy consumption per capita in the Western Balkans, 1994–2004



Source: EEA-UNEP report.

([110]) Pawel Kazmierczyk (2008), Environmental impacts of European consumption and production patterns: Highlights from ongoing EEA — ETC/RWM analysis based on NAMEA, Presentation to the Conference on Environmental Accounts for Policy Makers, Brussels, 1 October 2008.

([111]) Kees Wielenga (2009), FFact Management Consultants, personal communication, April 2009 (calculated using Eurostat data).

Home heating is the most important type of residential energy use. In the former Yugoslav Republic of Macedonia, heating (and cooling, which is less common) accounts for 71 % of energy consumed in residential buildings; hot water for 17 %; and appliances the remaining 12 %.

In all the countries, electricity is an important energy carrier (Figure 3.7). In Albania, Bosnia and Herzegovina and the former Yugoslav Republic of Macedonia, electricity supplies about half of all residential energy consumption. A large share of households in the region uses electric heaters, which are relatively inefficient compared to other forms of heating such as natural gas. This means that the environmental impacts of residential energy use are closely tied to those of the power sector, described in the previous paragraph.

In Serbia, a large proportion of households burn coal for heat, which contributes to poor local air quality in winter months.

District heating provides a relatively low proportion of energy in the region, and is important only in Croatia, where over 20 % of urban households are connected, in Serbia, where 36 % of urban households are connected (over 20 % of all households), and in the former Yugoslav Republic of Macedonia ([112]). District heating can be very efficient, in particular when plants generate both heat and electricity. However, in much of the region district heating plants need to be refurbished. For example, in Serbia, over 50 cities and towns have district heating, but since 1990 most of their plants have been poorly maintained and inefficient due to a lack of investment. Recently, some cities have started to refurbish these plants, but this process is costly and is progressing slowly ([113]).

In all countries of the region, an important share of residential energy comes from biomass, typically from fuel wood, which is widely used in rural areas (Box 3.4). Some parts of the region, notably Kosovo under UN Security Council Resolution 1244/99, have experienced frequent interruptions to electricity supply, during which fuel wood is often used in both urban and rural areas as a back-up to electric heating ([114]).

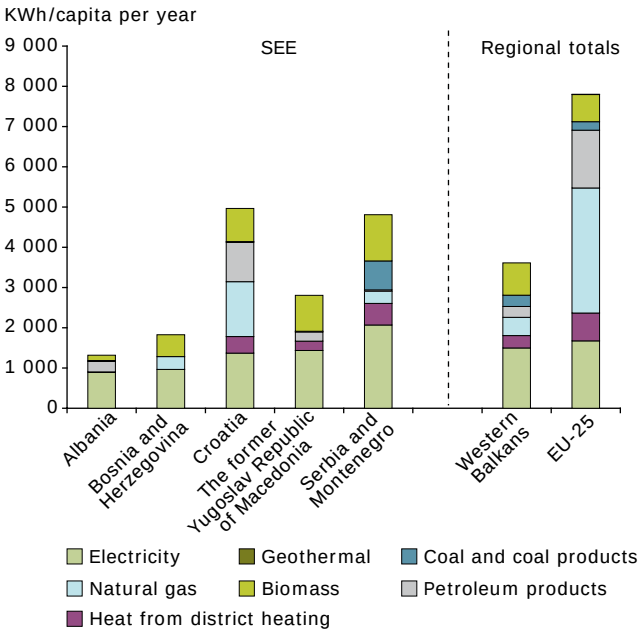
On average, residential energy consumption in the region is half of the level of that in the EU-25 (Figure 3.9). However, 'energy poverty' arising from a lack of access to energy and the use of low quality energy sources affects poor households in the region. A 2004 UNDP report detailed these problems in Serbia and Montenegro. While some of the problems identified may have decreased with rising incomes in the region, the current economic crisis may bring a return.

While this overview has focused on energy consumption for home heating, other forms of household energy consumption have grown in recent years. In urban areas in particular, the use of air conditioning has grown rapidly, and many middle and upper-income households have purchased other new appliances thereby increasing household electricity demand.

Outlook

Without any change in policies, energy consumption is expected to grow across the region in coming years.

Figure 3.9 Residential energy consumption in the Western Balkans by energy carrier, 2004



Source: EEAP-UNEP report.

([112]) EEA and UNEP (2007), *Sustainable consumption and production in South East Europe and Eastern Europe, Caucasus and Central Asia*, EEA Report No 3/2007; and Study of Living Standards (Studija o zivotnom standardu) — Republic of Serbia 2002–2007, Statistical Office of the Republic of Serbia.
([113]) UNECE (2007), *Environmental Performance Review: Republic of Serbia*, New York and Geneva.
([114]) Regional Environmental Center (2006), *Environmental Snapshot of South Eastern Europe: REReP Country Profiles*, Szentendre, Hungary.

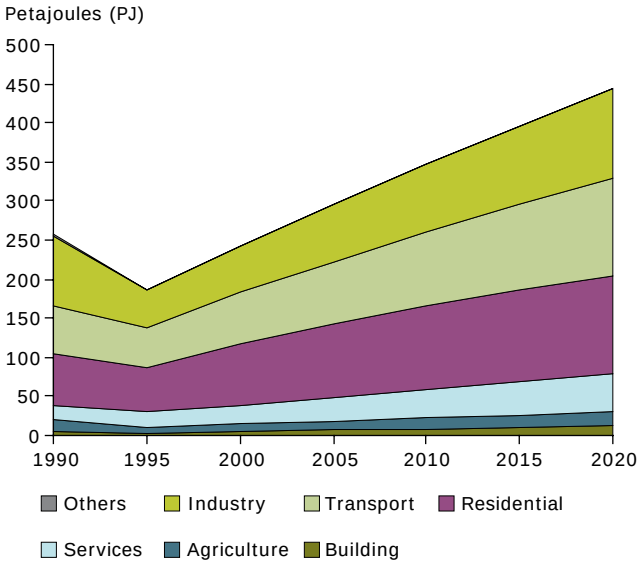
Box 3.4 Energy poverty in Serbia and Montenegro

In the first half of this decade, many poor households in Serbia and Montenegro heated only half or less of their living space. More than half of the population burned wood and lignite as their major fuels for heating and domestic hot water, and suffered from high levels of indoor air pollution as a result. A related problem is that many homes were poorly insulated: average household energy consumption per square metre was two and a half times higher than in northern Europe and consumption was even higher in many poor households. Partly due to these problems, mortality was 30 % higher than the yearly average in winter months.

Source: UNDP Country Office in Serbia and Montenegro (2004), *Stuck in the Past: Energy, Environment and Poverty in Serbia and Montenegro*, Belgrade. Available at: www.undp.org/energy/docs/Stuck_in_the_Past.pdf.

In Croatia's baseline scenario for its 2002 Communication on Climate Change, final energy consumption is projected to grow slightly over 50 % from 2005 to 2020 (Figure 3.10) ([115]). Residential consumption will continue to be the largest user of energy (still ahead of the fast-growing demand by transport). This scenario foresees the construction of new hydropower plants and a doubling in electricity production from coal to meet the rising demand.

Figure 3.10 Final energy consumption in Croatia per sector, 1990–2020



Note: Based on historical data up to 1995.

A series of drivers will influence future household energy consumption patterns. These include the following:

- *Population*: with a greater number of smaller households, energy consumption per person and per square metre of dwelling area is likely to increase in future.
- *Culture and values* may play an important role in determining whether people in the region prefer to refurbish and improve existing houses and building or seek to live in newly built suburbs.
- *Markets and business* can play an important role. For example, construction companies can develop techniques to build new homes that are well insulated, as well as techniques to insulate existing housing.
- *Policy* choices will also play a key role. These will include standards for energy efficiency in new buildings, initiatives to make existing buildings more efficient, as well as the use of standards (such as EU labels) for the energy efficiency of appliances. Land use policies can play an important role in terms of the patterns of new construction. National and local energy policies can support district heating plants and other systems that improve the efficiency of heating.

([115]) First National Communication of Croatia under UNFCCC (2002). The data are from Croatia's first National Communication (NC) under UNFCCC (2001). Historical data ends in 1995. The annual growth rate in final energy demand is 2 % according to this NC from 2001. The total energy consumption growth per annum projected in the NC from 2006 is 1.6 % for the period from 2004 to 2030. This can either indicate increased energy efficiency (Croatia does have an energy efficiency programme) or a discrepancy in projections. No underlying data are provided in the NC from 2006.

3.3 Personal mobility

Key messages

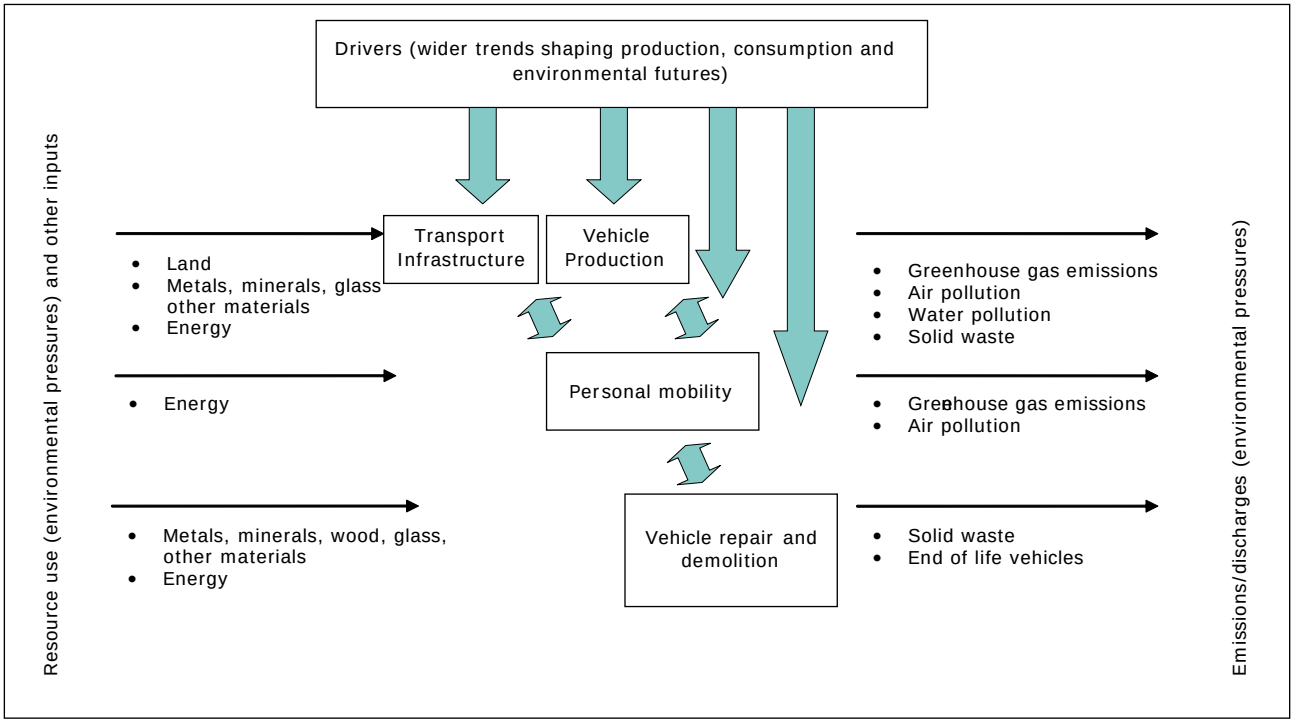
Passenger transport in the Western Balkans rose by 40 % between 2000 and 2007. The volume of air travel tripled, and road travel also increased. Along with the miles driven, the number of private motor vehicles increased rapidly in this period, for example doubling in Albania. These trends affect air pollution, especially in urban areas. The fact that many private automobiles in the region are old and highly polluting increases pollution problems. Moreover, roads fragment natural areas.

The outlook for the larger Eurasian area sees an ongoing increase in private road and air transport to 2050 — and if current trends continue, mobility will increase in the Western Balkans as well. Future mobility in this region will be influenced by a series of drivers, including globalisation and its effect on future fuel prices. Cultural values in the Western Balkans can play a key role. In the long-term, technology can play a role in improving the efficiency of vehicle engines and more. Finally, the policies of national and local governments will be important, for example in improving public transport as an alternative to motor vehicle use.

Motorised mobility is an essential part of modern life. People travel to reach their jobs and schools, to buy goods and to go on vacation. Personal mobility is seen as a part of personal freedom. In many EU Member States, however, growing sprawl and reductions in public transport mean that people must spend more and more time stuck in traffic — a problem seen more frequently in the Western Balkans as well.

The environmental impacts of this mobility start from the natural resources used, including fuels to power vehicles as well as metals and mineral to build them and the land for roads. Driving automobiles releases local air pollutants as well as greenhouse gases. In EU Member States, household transport emits over 10 % of the greenhouse gases ([116]). Furthermore, vehicles must be discarded

Figure 3.11 Links between personal mobility, the transport life-cycle and environmental impacts



Source: Adapted from EEA (2005), *Household consumption and the environment*, EEA Report No 11/2005.

([116]) Pawel Kazmierczyk, 'Environmental impacts of European consumption and production patterns: Highlights from ongoing EEA — ETC/RWM analysis based on NAMEA' (Presentation to the Conference on Environmental Accounts for Policy Makers, Brussels, 1 October 2008).

at the end of their lives, creating a solid waste problem.

Passenger transport: trends and outlooks

In the 1990s, transport levels declined in much of the Western Balkans due to conflict and economic uncertainty (an important exception was Albania) ([117]). Since 2000, however, transport levels have grown rapidly with passenger transport of all forms rising by over 40 % (Figure 3.12). Indeed, transport accounts for much of the region's increase in oil consumption over this period (see Section 3.3).

Road transport accounted for the largest share of total passenger transport in 2007, over 60 %. Air travel, which makes up about 20 %, has grown quickly, its volume tripling since 2000. The share of railroad transport in contrast changed little at less than 20 % of the total. In Serbia, rail use declined significantly, falling to only 5 % of all passenger transport. In Bosnia and Herzegovina, rail makes up an even lower share of the total.

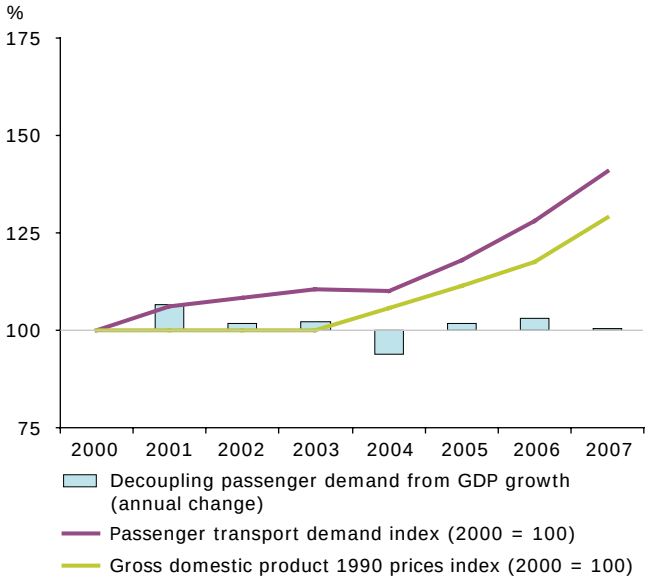
Just as passenger travel by road has grown, so have the number of motor vehicles in the region (Figure 3.13). Since 2000 car ownership has increased steadily in all countries of the region except the former Yugoslav Republic of Macedonia. In Albania, the number of passenger cars per capita more than doubled between 2000 and 2007.

A further problem is that in many countries, motor vehicles are currently old and highly polluting. In Serbia, for example, 70 % of cars were over 10 years old in 2008 ([118]).

In contrast with the rise in motor vehicle use, public transport systems in urban areas have generally declined. One factor is that cities in the 1990s had few resources to invest in upgrading their public transport system. However, even in Zagreb, a city that has invested in new buses and extended its tram network, the use of public transport has fallen since peak levels in the 1980s ([119]).

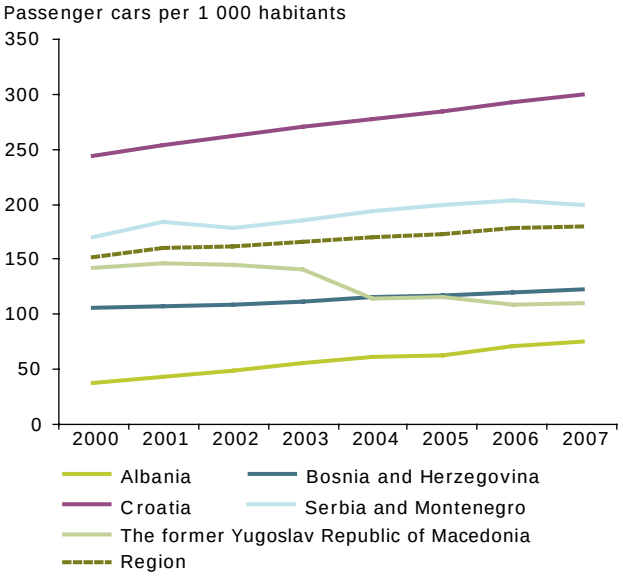
Data on other modes of travel are less available. In Zagreb, bicycles make up an estimated 5 % of city traffic. A survey in Belgrade, found that 84 % of respondents walked to local shops, while only 16 % used cars and half that many used public

Figure 3.12 Decoupling of passenger transport demand in the Western Balkans, 2000–2007



Source: See Annex 2.

Figure 3.13 Growth in the number of passenger cars in the Western Balkans, 2000–2007



Source: See Annex 2.

([117]) EEA and UNEP (2007), *Sustainable consumption and production in South East Europe and Eastern Europe, Caucasus and Central Asia*, EEA Report No 3/2007.
([118]) Statistical Office of the Republic of Serbia.
([119]) EEA and UNEP (2007), *Sustainable consumption and production in South East Europe and Eastern Europe, Caucasus and Central Asia*, EEA Report No 3/2007.

transport ([120]). These data show that alternatives to automobile use remain important, at least in large cities.

Environmental impacts

Personal mobility and private car use in particular, will directly affect *air pollution* in the region as well as *greenhouse gas emissions*. Air travel also will have a strong impact on emissions.

The construction of new roads can fragment natural areas, thus affecting *biodiversity*.

Outlook

Passenger road transport is expected to increase significantly across the region in coming years. The former Yugoslav Republic of Macedonia's 2003 climate change communication, for example, forecasts that the number of motor vehicles in the country will more than double from about 400 000 in 2005 to about 900 000 in 2025. In addition, the distance driven by each private car will nearly double ([121]). In Serbia, there are currently about 1.7 million motor vehicles, and this number is expected to double in the near future ([122]).

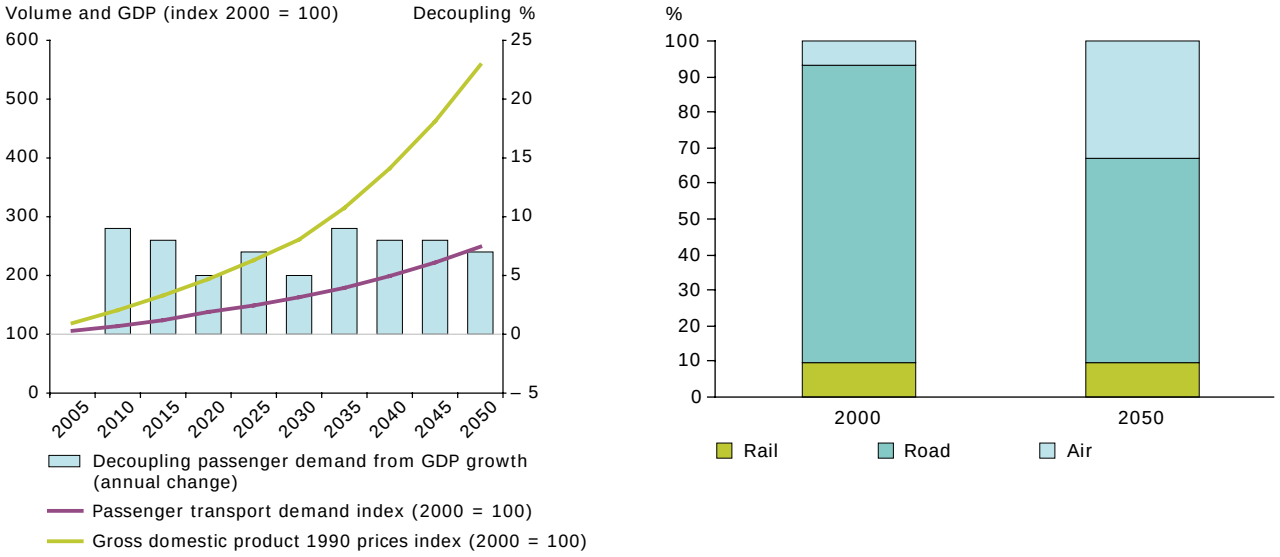
A forecast for Eastern Europe, including the Western Balkans and also the much more extensive new EU Member States and the former USSR, suggests that total passenger travel in this larger area will increase by 250 % from 2000 to 2050 (Figure 3.14). The study predicts that GDP will grow even faster, creating a relative decoupling. At the same time, the region's population is expected to be relatively stable or to decrease, so travel per person will increase rapidly.

Air transport is forecast to grow from its current share of 7 % to about 33 % of passenger kilometres travelled by 2050. While road travel is projected to decline from 83 % to 57 % of the total share of passenger transport, it will remain the dominant form of travel with car ownership increasing by 174 % over the projected period. Rail passenger transport is expected to remain steady at a share of slightly below 10 %.

Due to the extended geographical coverage of this indicator it may only be partly indicative for the Balkan countries. The non-Western Balkan countries in this indicator outweigh the Western Balkans in land mass and population and may present other transport patterns and trends and thereby dilute the applicability of the data as a reliable forecaster of trends in the Western Balkans.

The future of personal mobility and the resulting environmental impacts are uncertain, as these will be shaped by a series of drivers including:

Figure 3.14 Passenger transport demand in Eastern Europe, 2000 and projections until 2050



Source: WBCSD (2004), Mobility 2030.

([120]) EEA and UNEP (2007), *Sustainable consumption and production in South East Europe and Eastern Europe, Caucasus and Central Asia*, EEA Report No 3/2007.
([121]) Ministry of Environment and Physical Planning, the former Yugoslav Republic of Macedonia (2003), First National Communication on Climate Change.
([122]) Statistical Office of the Republic of Serbia.

- *Population trends*: smaller households may lead to an increase in the demand for individual mobility in coming decades.
- *Culture, values and needs* will influence whether or not households seek to buy newer and larger automobiles, for example for personal status and to catch up with EU-15 consumption patterns. These factors will also influence driving habits: for example, whether people use automobiles to make trips that are as convenient by other means of transport.
- In the longer term, *technology* may provide much more efficient and less polluting motor vehicles in coming decades.
- *Globalisation and trade* can influence the costs of fuel in the future, which will affect driving habits and automobile purchases. Renewed global growth could bring a return to higher prices in future decades.
- *Policy decisions* can play a very important role in shaping future mobility patterns. European policies to regulate transport, such as ensuring lower greenhouse gas emissions from vehicles, will directly affect countries in the region that join the EU and will likely influence other parts of the Western Balkans as well. National and local governments in the region have the choice of investing in improved public transport infrastructure, which in many cities and town has been decaying. Local governments can also put in place restrictions on private car use.

Selected future studies from the review

P. Christidis *et al. (*2003). *Trends in Vehicle and Fuel Technologies: Scenarios for Future Trends*, Institute for Prospective Technological Studies, Joint Research Centre, European Commission.

A. Curry *et al. (*2006). *Intelligent Infrastructure Futures: The Scenarios — Towards 2055*, UK Government: Foresight Programme, Office of Science and Technology.

NEA Transport research and training (2004). *TEN-STAC: Scenarios, Traffic Forecasts, and Analyses of Corridors on the Trans-European Transport Network.*

4 Key sectors of production

Production patterns in agriculture, mining and industry directly affect the environment in the Western Balkans. This chapter provides a brief overview of current patterns in several areas of production: agriculture and fisheries; energy production (and related mining and other activities); and freight transport, which is linked to these and other areas of production.

Production patterns are closely linked to the consumption patterns described in the previous chapter, as the two influence each other. In addition, the drivers described in Chapter 2 will help to shape the future of the region's production patterns in coming decades. Table 4.1 links the results in that chapter with the analysis this one, providing an overview of the links between drivers and production patterns.

This analysis does not cover all major areas of production: for example, one key area not addressed is manufacturing. The analysis nonetheless covers a series of production patterns that have extensive environmental impacts in the region.

Changes in production and consumption patterns in the region will, in turn, shape the future of the environment in the Western Balkans, the topic of Chapter 5.

Table 4.1 Influence of driving forces on future patterns of production in the Western Balkans

STEEPL driving forces that will influence the Western Balkans		The geographic scale of the most important driving forces				How these driving forces can shape future patterns of production in the Western Balkans (focusing on food, energy, transport)
		Global	EU	WB	National	
S	**Population and migration** Key trends: ageing populations, declining household size Key uncertainties: patterns and extent of migration			√	√	**Indirect influence:** With ageing rural populations and migration to urban areas, farmland will be abandoned (esp. in mountain areas)
	Culture, values and needs Key uncertainties: consumerism and 'catching up with west' vs. traditional and green values		√	√		**Indirect influence:** Can influence business awareness of environment
T	**Technology** Key trend: influence of technology low in short term; will grow over time Key uncertainties: introduction of new technologies vs. public fears of risks; EU and Western Balkan efforts to develop and implement 'greener' technologies	√	√			**Strong, direct influence:** Technology will influence agriculture, energy production and freight methods Can reduce environmental impacts of production New technologies (e.g. nano and bio-technologies) can bring new risks
E	**Globalisation and trade** Key trend: EU expected to remain main trade partner for Western Balkans Key uncertainty: will globalisation continue in coming decades?	√	√			**Strong, direct influence:** Global and EU agricultural trade patterns will affect farming in the Western Balkans International demand for marine fish (esp. tuna) Global prices of oil and other fuels will influence energy, freight investments Oil and gas transit will bring environmental risks
	Macro-economic development Key uncertainties: levels of economic growth at global, EU and regional scales	√	√	√	√	**Strong, direct influence:** Economic growth closely linked to enterprise investments Enterprise restructuring in the region could lead to greater efficiencies
	Markets and business Key uncertainties: extent of business action for the environment at global, EU and regional scales; food retailing sector in Western Balkans		√	√	√	**Strong, direct influence:** Food retailers will influence regional farming methods Enterprises and manufacturing methods will determine levels of freight transport
E	**Global environmental change** Key trends and uncertainties: pace of global warming and biodiversity loss	√				**Strong, direct influence:** Global warming and biodiversity loss will directly influence agriculture and fisheries Changing precipitation levels will affect hydropower
P	**Politics** Key uncertainties: global cooperation vs. conflict; EU effectiveness and enlargement; cooperation and national reforms in Western Balkans	√	√	√	√	**Strong, indirect influence:** Political developments will determine many other forces, from global economic growth to EU legislation Regional cooperation for energy, environment can influence production
L	**Legislation and policy** Key uncertainties: strength of global environmental agreements; future EU legislation; national implementation of environmental laws	√	√		√	**Strong, direct influence:** Global climate agreements and EU laws can change energy production EU environmental legislation and its national implementation will affect production methods

4.1 Agriculture

Key messages

Small farms make up the bulk of the agricultural sector in the Western Balkans. However, many of these are being abandoned — especially in mountain areas — as people move from rural to urban areas, and also as populations age. Conflict in the 1990s also led to farm abandonment.

Overall, agricultural production is increasing — and fertiliser use increased in the 1990s. This trend indicates that farming in the region has become more intensive. On the other hand, organic farming is a small but growing sector. In Croatia, the leading country for organic farming, it has reached up to 0.5 % of farm land.

Agriculture in the region has a broad range of environmental impacts, from water use to water pollution, in particular from agriculture chemicals, to greenhouse gas emissions (the latter in particular from animal husbandry).

A series of driving forces could transform Western Balkan agriculture in coming years. On the one hand, current trends are moving the region towards more intensive agriculture. On the other hand, developments such as climate change impacts, globalisation trends, and trade and policy actions could lead to different outcomes. Food consumption patterns could also play an important role in changing the sector.

There is a lack of information to make a consistent assessment of existing and forward looking trends in agricultural intensification and organic farming practices in the region.

The production and consumption of food create a series of environmental pressures. The most important environmental impacts arise during production, including farming, food processing and transport. This section presents a brief overview of farming in the Western Balkans and the following section discusses fisheries.

Agricultural production: trends and outlook

In general, agriculture and the food processing industry is characterised by structural imbalances (fragmentation and small units), outdated technology and a lack of capital for investment, leading to low productivity and lack of competitiveness. Liberalisation of prices of agricultural goods and diversified means of production have allowed for better economic effectiveness but as a result only a small number of farmers can gain adequate profits from their activities. Rural incomes are considerably lower than those in urban areas, and employment dependence on agricultural is still a serious problem. Rural areas need to diversify activities and employment opportunities. Inadequate environmental infrastructure (sewage systems, waste water treatment plants), communications and transport infrastructure add to the problem.

The Western Balkans covers a great variety of climates and landscapes, allowing a diversity of crops and farming (as well as rich biodiversity — see Section 1.3). In plains and river valleys, major crops include wheat and corn. Across the region's mountainous areas, there are fruit orchards and vineyards on many lower slopes and the higher and less favourable areas are used for livestock, in particular sheep and goats. Irrigation is important in particular in the southern parts of the region, notably Albania and the former Yugoslav Republic of Macedonia. In the former Yugoslav Republic of Macedonia, where irrigation is extensively used, infrastructure is often old and in poor repair, reducing its effectiveness ([123]).

Today, small farms make up most of the region's agricultural sector. In the countries that were once part of Yugoslavia, this is a legacy of the socialist economy that allowed small, private farming. The exceptions are a few large farming enterprises, in particular in the plains of eastern Croatia and northern Serbia. In Albania, the government split the country's large farming cooperatives into smallholdings early in the political transition.

As a result, the area of about 80 % of Serbia's farms is now less than five hectares ([124]). In Bosnia and Herzegovina and other parts of former Yugoslavia,

([123]) Regional Environmental Center (2006), *Environmental Snapshot of South Eastern Europe: REReP Country Profiles*, Szentendre, Hungary.
([124]) Ministry of Agriculture, Forestry and Water Management, Serbia.

many farms cover two hectares or less ([125]), whereas those in Albania are typically less than one hectare.

Agriculture uses a large share of the region's land, about 45 % in 2000, though this proportion is decreasing (Section 1.5). In Albania, agriculture represented almost a quarter of GDP in 2005 (Table 4.2). In the former Yugoslav Republic of Macedonia, 20 % of all those employed worked in farming, and even in Croatia, agriculture accounts for 16 % of employment ([126]).

Many urban residents in the Western Balkans retain close links with rural areas. When they have the opportunity, many consumers prefer to buy food directly from small farmers, and numerous city dwellers own rural properties where they continue to grow their own produce.

From the early 1990s to the early part of this decade, agricultural production fell in the former Yugoslav countries of the region. Bosnia and Herzegovina, for example, saw about a 25 % decline in production per capita between 1992 and 2003, though in Albania, which was not affected by war, agricultural production per capita rose about 40 % in the same period ([127]).

Despite these declines, the region's production of grains per capita in 2004–2006 was similar to average levels in the EU-27 ([128]). FAO has forecast that the Western Balkans will see a rise in grain production to 2016 — though net imports of grain are projected to increase by about 50 % (Figure 4.1).

Table 4.2 Agricultural indicators for the Western Balkans

	Share of total land area	Share of GDP
Albania	41	23
Bosnia and Herzegovina	42	10 *
Croatia	48	7 *
Kosovo under UN Security Council Resolution 1244/99	n.a.	n.a.
The former Yugoslav Republic of Macedonia	49	12 *
Montenegro	n.a.	10
Serbia	58	13

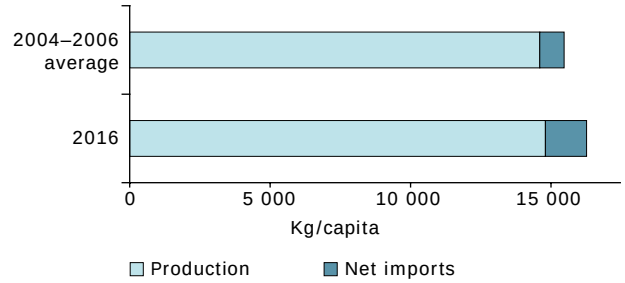
Note: 2005 data except for: * 2007 data.

Source: World Bank statistics except for Serbia: Statistical Office of the Republic of Serbia.

The production of meat products in the countries of the region was each about one-third below the levels in the EU-27 in 2004–2006 ([129]). While FAO forecasts a small increase in production in the region up to 2016, net imports are projected to more than double (Figure 4.2). This is tied to a sharp increase in the consumption of meat in the region (Figure 4.2), which will lead to higher environmental impacts, as described in Box 4.1.

The region is a net importer of both grains and meat Figures 4.1 and 4.2. Imports provided over 20 % of the region's meat consumption in 2004–2006 (based on average for these years), and FAO forecasts that

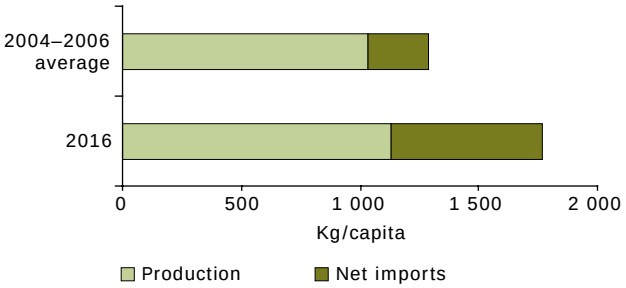
Figure 4.1 Production and net imports of grains in the Western Balkans



Note: Grains include: wheat, rice, coarse grain, oilseeds

Source: FAOSTAT.

Figure 4.2 Production and net imports of meat in the Western Balkans



Source: FAOSTAT.

([125]) Regional Environmental Center (2006), *Environmental Snapshot of South Eastern Europe: REReP Country Profiles*, Szentendre, Hungary.
([126]) World Bank statistics.
([127]) EEA and UNEP (2007), *Sustainable consumption and production in South East Europe and Eastern Europe, Caucasus and Central Asia*, EEA Report No 3/2007.
([128]) According to FAO statistics.
([129]) According to FAO statistics.

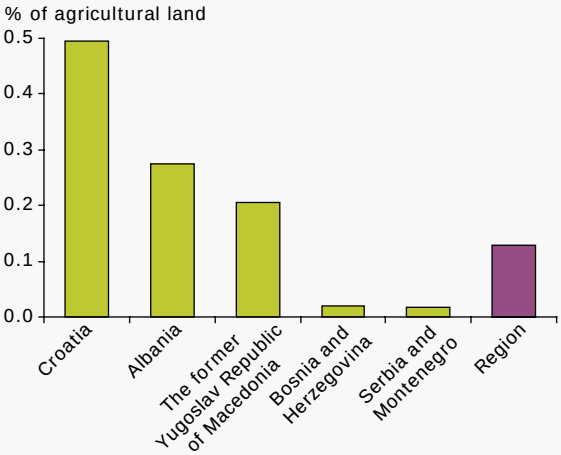
Box 4.1 Organic farming

Several countries in the region have introduced laws to support organic farming, including Albania, Croatia, the former Yugoslav Republic of Macedonia and Serbia. Under Croatia's *National strategy of environmental protection*, the country set a goal of bringing 10 % of all farmland under organic production by 2010. Countries in the Western Balkans have not set goals for organic farming.

These national laws are influenced by EU policies and legislation: a regulation establishes a common legal framework for organic farming across the EU, and the sector's development is promoted by the 2004 *European Action Plan for Organic Food and Farming*. Several EU Member States have set targets of reaching 10 % or more of all farmland by 2010.

So far, the proportion of Western Balkans's farmland used for organic agricultural is very small: only about 0.13 % across the entire region. For comparison, organic farming reached about 0.5 % of the farmland area of the EU-10 Member States by the end of 1990s. In Croatia, in fact, the share has reached 0.5 % following strong growth: from 2003 to 2006, the number of organic farms rose from 130 to over 340. Albania and the former Yugoslav Republic of Macedonia have also seen growth in the number and area of organic farms.

Figure 4.3 Organic farming in the Western Balkans, 2006



Source: See Annex 1.

this will rise to 36 % by 2016. Imports supplied lower shares of other categories: for example, imports of grains were just under 10 % of the region's consumption in 2004–2006, and this will rise modestly to less than 13 % in 2006.

Organic agriculture is a small but growing part of total production in the Western Balkans (Box 4.1). Organic products have been grown mainly for export. However, demand for organic products is an emerging new trend in urban areas

Environmental impacts

Agricultural production can have a wide range of impacts on the environment, including: salinization of irrigated land; soil erosion, in particular on slopes; contamination of groundwater and surface waters; eutrophication of surface waters from fertiliser and manure run-off; loss of soil fertility from the application of agricultural chemicals; biodiversity loss, due to both the impacts of intensive agriculture and also the effects of land abandonment; and the emission of methane from cattle.

The use of agricultural chemicals in the Western Balkans has grown in recent years (Figure 4.4). Fertiliser use, together with high nutrient loads from livestock manure, is polluting water bodies in many parts of the region, including the plains of eastern Croatia and northern Serbia, Shkoder Lake in Montenegro and areas of the southern parts of the former Yugoslav Republic of Macedonia ([130]).

The use of agricultural chemicals in the Western Balkans could be expected to grow in coming years, as in the EU-15 Member States (Box 4.2). This would threaten water quality as well as biodiversity.

Agriculture is also a major consumer of freshwater resources. Raising livestock is a particularly high consumer: WWF has calculated that over 15 000 litres of water are needed to produce one kilo of beef. This estimate includes the water needed for the grain, corn or other feed used. Globally, milk, leather and other livestock products account for 23 % of global water use in agriculture ([131]).

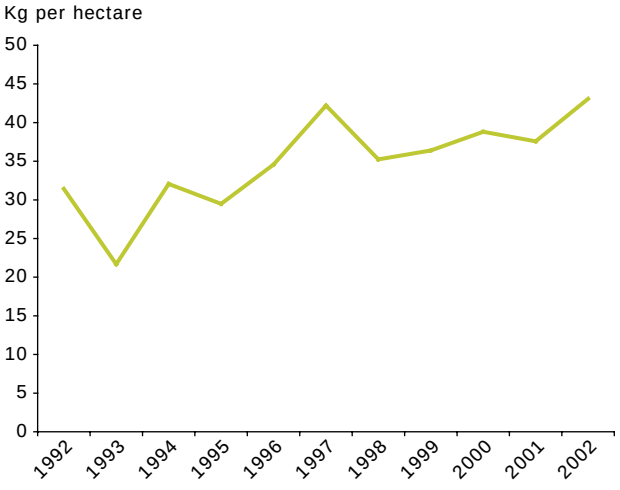
Irrigation is used particularly in southern countries. While less than five % of agricultural land in Serbia

([130]) Regional Environmental Center (2006), *Environmental Snapshot of South Eastern Europe: REReP Country Profiles*, Szentendre, Hungary.
([131]) WWF International, Zoological Society of London, Global Footprint Network, University of Twente Water Centre, *Living Planet Report 2008*.

Box 4.2 Projections of fertiliser use in the EU-12

Under a business as usual scenario, the use of mineral fertilisers in the new Member States is expected to increase significantly through 2020 — though total use per hectare may remain below levels in the EU-15. As a result, nutrient surpluses on agricultural land will also increase. In an alternate scenario, where best practices are used for fertiliser handling, the increase in nutrient surplus could be largely contained ([132]).

Figure 4.4 Trends in fertiliser input per hectare (1992–2002)



Source: UNEP/EEA SCP report.

is irrigated, and only slightly more in the former Yugoslav Republic of Macedonia, water for irrigation is provided to over 30 % of farmland in Albania ([133]).

Soil erosion is a problem in many mountainous areas of the Western Balkans. In Albania, there is an annual loss of between 20 and 70 tonnes of soil per hectare, and in Serbia and Montenegro, erosion, which is also linked to intensive agriculture, affects about 20 % of the territory ([134]).

Agriculture is also an important contributor to global warming. In part, this is due to the sector's use of fuel and electricity in production. As FAO has recently highlighted, livestock production is a major source of greenhouse gases as well as other environmental impacts (Box 4.3).

Specific impacts in the Western Balkans are less known. However, as livestock and meat production are projected to increase in coming years, these issues need to be assessed more closely.

While agriculture can create various environmental problems, farming can also bring some benefits. Extensive farming practices often provide a resource for biodiversity, including for species-rich grasslands ([135]). Extensive farms are declining in the region, often those in mountainous areas, and

Box 4.3 The environmental impacts of livestock

A recent FAO report highlighted the environmental impacts of global livestock production. Notably, livestock produce over one-third of worldwide emissions of methane from anthropogenic sources as well as two-thirds of nitrous oxide, both greenhouse gases. In total, livestock contribute about 18 % of total emissions (in CO_2-equivalent), more than global transport. Livestock production also leads to local and regional air pollution from ammonia, largely released from manure.

Livestock also account for almost 10 % of anthropogenic water consumption, most from the water used for feed crops. Run-off from manure as well as from fertilisers used on feed crops is an important source of water pollution. Among the other impacts, rising livestock production has reduced forests and other natural areas and biodiversity in many parts of the world.

FAO concludes that the environmental impacts from livestock demand strong policies that can ensure more efficient use of natural resources.

Source: FAO (2006), *Livestock's long shadow.*

([132]) EEA (2008), *Catalogue of forward-looking indicators from selected sources*, EEA Technical report No 8/2008.
([133]) Regional Environmental Center (2006), *Environmental Snapshot of South Eastern Europe: REReP Country Profiles*, Szentendre, Hungary.
([134]) EEA and UNEP (2007), *Sustainable consumption and production in South East Europe and Eastern Europe, Caucasus and Central Asia*, EEA Report No 3/2007.
([135]) EEA (2004), *High nature value farmland — Characteristics, trends and policy challenges*, EEA Report No 1/2004.

the resulting abandonment of land can reduce biodiversity.

Outlook for the future

FAO predicts that both agricultural production and food imports will increase in the years to come. However, developments in the drivers described in the previous chapter could easily change this scenario. For example, the FAO forecasts were made before the outbreak of the credit crunch, which may influence production levels.

Among the key drivers identified in the previous chapter are the following:

- *Population and migration*, the region has already seen migration from rural to urban areas and the abandonment of small farms. As rural populations grow older in the future, more of the region's small farms are likely to be abandoned, particularly in mountainous and remote areas. Over the past 20 years, Albania has seen a large shift of population from rural, mountain areas to cities in coastal zones and the plains; as a result, urban areas have expanded greatly, often taking over some of the country's best farmland ([136]).
- *Globalisation and trade* will also affect farming: for example, a move to more open world trade in agriculture may force the closure of many smaller farms in the region. In addition, major increases in global energy prices could change the nature of agriculture in the region.
- *Markets and business* can have a major impact: for example, if the market for organic food in the EU (and the Western Balkans) continues to expand in the future, it could become an important sector of agricultural production, thus reducing environmental pressures in the region.
- *Climate change* could have far-reaching impacts on agriculture in the region. Higher summer temperatures and less rainfall may increase the need for irrigation and could reduce crop production. In addition, crop ranges may change.
- The development of new *technology* such as GMOs may provide new economic opportunities and environmental risks. Countries in the region have largely rejected the use of GMOs, but global trade competition may force a choice between allowing new technologies and losing competitiveness.
- *Policies* for agriculture, for organic products and in a host of other areas will also influence the future.

The evolution of *consumption* — and in particular household food consumption patterns — will play a central role in influencing the future of farming in the region, and is described in the next chapter.

How will these different forces influence the future of agriculture in the Western Balkans?

This study does not pretend to make an in-depth assessment. However, a review of the future of food in Europe captures some of these drivers in four scenarios that look quite different from the continuation of current trends (Box 4.4). These futures focus on the food chain in the EU; however, the same driver may have different effects in the Western Balkans. For example, small farms remain a much stronger part of the agricultural sector. Possibly, the Western Balkans may be able to adapt more quickly to an energy crisis or a change in consumption to more natural foods — indeed, such drivers could help to revive the small farms that are now disappearing.

([136]) UNECE, *EPR Albania*, 2002.

Box 4.4 The future of European food chain

Thomas Ohlsson of the Swedish Institute for Food, has suggested four scenarios for the future of food chains in Europe, and thus for the future of food consumption. The main drivers in the first two scenarios are external disruptive events and in the last two are consumer choices.

1. Climate shock. Global warming accelerates, leading to a rapid degradation of ecological systems. There are water shortages in the southern part of Europe. Climate change affects migration patterns in Europe and leads to a rapid deterioration of the quality of life. The technical solution, however, is to continue with business as usual.
2. Energy shortage. Following a large increase in energy prices, transporting food over long distances becomes too costly and as a result supply chains become much shorter: in other words, with locally grown foods increasing in importance. Moreover, people move back to rural communities and greatly reduce their use of fuel for commuting.
3. We are what we eat. Consumers prefer high-quality foods, though some cannot afford to do so — reflecting a wider division between rich and poor. People will move from areas of poor environmental conditions to those with good food and a good quality of life. There will be much stronger competition for land use, in particular between food, fuel and timber production.
4. Cooperation with nature. The public becomes more aware of the benefits of good food and also how their food is produced: thus, consumers consider sustainability issues when making their purchases. Local production grows dramatically. The integration of the food chain is very strong, as is economic integration along the food chain.

Source: Thomas Ohlsson (2007), SIK, Sweden, presented at Perspectives for Food 2030 (Brussels, April 2007).

Selected forward-looking studies from the review

Borch, K. (2007). *Emerging technologies in favour of sustainable agriculture*. Risø National Laboratory, Denmark (available at: www.risoe.dk/rispubl/art/2007_62.pdf).

Klimont, Z. and C. Brink (2004). *Modelling of Emissions of Air Pollutants and Greenhouse Gases from Agricultural Sources in Europe*. IIASA.

4.2 Fisheries

Key messages

Fleets of numerous small boats dominate marine fishing in the Adriatic and Ionian Seas, though it is hard to sketch an accurate picture. Data on the fleets in Western Balkan countries has not been available, moreover, countries outside the region — notably Italy and Greece — have major fleets in these seas.

Data on the current status of fish stocks are also incomplete, though overfishing is a major concern throughout the Mediterranean.

Aquaculture is a growing activity in the coastal zones of the Western Balkans. It brings a range of environmental impacts; for example, where wild species are used as feed, aquaculture can increase overfishing. Other problems include the eutrophication of coastal waters and possible release of exotic species.

Globalisation and trade will be a key driving force shaping future fishing and aquaculture in the region. Policy choices can have a major impact in terms of establishing more sustainable fishing and here the EU could play a major role in ensuring agreement among countries. Effective national implementation across all the countries will also be needed.

There is a lack of information on commercial fishing, aquaculture and fish stocks, in terms of both recent trends and forward-looking data.

Current trends and environmental impacts

Fishing is also an important source of food in the Western Balkans and is an important pressure on fish stocks. UNEP reports that 70 % of global fish species are either fully exploited or depleted ([137]), and overfishing is a concern throughout the Mediterranean and the Adriatic ([138]).

Good data on fish stocks are not available for the Adriatic and the Ionian seas of the Western Balkans. The status of more than three-quarters of fish species has not been assessed; for those species that have been assessed, at least half are overfished (see Chapter 1, Map 1.2). Fishing fleets from the Western Balkans share both seas with boats from other countries and in particular with fleets from two EU Member States, Italy and Greece.

Fish catches in Western Balkans plus Bulgaria, Romania and Turkey fell almost 20 % between 2000 and 2005, as did catches in other regions of Europe, including the EU ([139]). The data do not include illegal, unreported and unregulated catches, which are important for species such as tuna and swordfish in the Mediterranean. Fishing down the food chain is a particular concern, as fishing first depletes larger predator species and then shifts to smaller species that are their prey. In the Adriatic, the fishing of undersized specimens, especially red mullet, is reportedly harming the species growth.

In the Adriatic, fleets of numerous small boats dominate fishing and provide an often important source of local employment. Recent data are not available on the size of fishing fleets in the region, though fleets have reportedly grown in recent years.

The main demand for fish is local, although there are important exceptions. Notably, much of the tuna caught in the Adriatic is sold abroad and shipped by air, often around the world: Japan is an important customer.

The lack of current data on fish stocks is matched by a lack of outlooks. A study for the Black Sea assessed possible futures (Box 4.5). While conditions in that sea can be quite different, the study points to difficulty of addressing fishing pressures. Only two of the five scenarios reduce fishing pressures, and even in these two favourable scenarios, pressures on fish stocks remain high.

Production from marine aquaculture is growing in the Western Balkans. Key marine aquaculture species across the Western Balkans and other parts of the Mediterranean include sea bass and sea bream, which are sold across Europe.

([137]) UNEP (2006), 'Overfishing: a threat to marine biodiversity', press release.
([138]) EEA (2006), *Priority issues in the Mediterranean environment*, EEA Report No 4/2006.
([139]) EEA (2007), *Europe's environment — The fourth assessment*, p. 221.

Aquaculture is sometimes seen as a way of reducing pressures on overtaxed fisheries, but in fact the two are closely linked. The use of wild fish to feed farmed fish and of wild-caught fish for fry and rearing in fish farms contribute to overfishing. In the Mediterranean, aquaculture of fish species such as bass and sea bream typically uses wild fish as feed ([140]).

Of particular concern in Croatia, as in several other Mediterranean countries, is the practice of catching bluefin tuna (*Thunnus thynnus*) in the wild as juveniles and then raising them in aquaculture pens. This is seen as particularly damaging, as it depletes wild tuna stocks as well as fish caught to feed the farmed tuna. Production expanded rapidly from the mid-1990s until the early part of this decade. In Croatia, the capacity of tuna farms has grown and exceeded 5 000 tonnes in 2006 ([141]). The impacts of tuna farming on the country's coastal waters have been the subject of heated debate in recent years ([142]). More recently, however, tuna production in Croatia has reportedly stagnated ([143]).

Aquaculture has other impacts on the marine environment. Dead fish and other nutrients can contribute to local eutrophication. In addition, aquaculture can accidentally introduce alien species. Moreover, it increasingly occupies space in coastal waters that have become crowded for recreational and other uses, reducing the extent of natural areas ([144]).

The impacts of fish farming are of particular concern, and the impacts of shellfish aquaculture, such as mussel farms, are less severe.

Drivers and outlooks for the future

According to one projection by the UN, marine aquaculture across the Mediterranean could double between 2005 and 2025. This growth, however, could lead to a series of problems; conflicts with other coastal activities; the risk of oversupply, falling prices, a boom-and-bust cycle that will harm employment and local economic development; and threats to the stocks of wild fish ([145]).

The previous chapter indicated a series of drivers that can influence the future of fishing and aquaculture in the region. These include:

- *Globalisation and trade*: demand in Japan and other distant countries already influences fishing of stocks such as tuna.
- *Policy* could make an important difference. As several nations, including Italy and Greece, border the Adriatic, strong agreements will be needed to protect fisheries. The EU could play a strong role here by establishing common agreement on rules for more sustainable fishing and aquaculture. Indeed, the EU's Marine Strategy Framework Directive calls for the good environmental status of European marine regions, and this involves the protection of marine ecosystem. However, a swift decommissioning of fleets without the development of alternative employment for local communities would cause social and economic imbalances.
- *Consumption patterns* can also influence fisheries if consumers pay attention to environmental problems. For example a global certification system such as that of the Marine Stewardship Council can be used to label fish caught sustainably.

Can these drivers combine to make fisheries more sustainable?

An assessment of possible scenarios for the Black Sea is pessimistic — even with major policy changes pressures on fish stocks will remain high (Box 4.5). The Adriatic Sea is different in many ways, including the greater role of the EU as well as the strong links between its fisheries and those of the Mediterranean where the outlook for the future is equally uncertain.

([140]) EEA (2007), *Europe's environment — The fourth assessment*, pp. 227–228.
([141]) Greenpeace (2006), *Where have all the tuna gone?* 2006.
([142]) EEA (2006), *Priority issues in the Mediterranean environment*, EEA Report No 4/2006.
([143]) Croatian Environment Agency, September 2008.
([144]) EEA, *Europe's environment — The fourth assessment*, pp. 227–228.
([145]) G. Benoit and A. Comeau, *A Sustainable Future for the Mediterranean: The Blue Plan's Environment and Development Outlook*, Earthscan, p. 334.

Box 4.5 Insights from an assessment of the Black Sea's Ecosystem and Fisheries

The European Lifestyles and Marine Ecosystems (ELME) project studied the future of Europe's marine ecosystems, including the Black Sea and the Mediterranean. The project developed five overall scenarios, based on two broad sets of drivers: the first set is 'consumerism versus Community' and the second, 'international interdependence versus national autonomy'. The five scenarios are:

- Business as usual — ongoing overfishing
- National Enterprise — protectionist policies undermine economic growth, with little concern for the environment
- World Markets — rapid growth but limited attention paid to the environment
- Local responsibility — local governance, slow economic growth but strong attention paid to the environment
- Global community — balancing economy, society and the environment

The first three scenarios bring a growth in fishing pressures as well as others, such as land-based pollution and invasive species that harm ecosystems in the Black Sea. In the last two scenarios, fishing remains at current levels over the coming decades, so while it does not grow, pressures on fish stocks remain high.

Source: European Lifestyles and Marine Ecosystems (ELME) Project.

4.3 Energy production

Key messages

Locally mined coal and lignite supply a large share of energy in the Western Balkans. This creates air pollution, greenhouse gas emissions, and solid waste and water pollution from mines. Hydroelectricity is another important source, although it impacts freshwater ecosystems. Other renewable sources are little used in the region. Forward-looking assessments suggest that there are trends to rely further on coal and nuclear energy in the mix for the region; however lack of information prevents a more comprehensive assessment.

In terms of GDP, the region's overall energy intensity has improved slightly in recent years, though it remains much higher than in EU Member States. Energy use per capita, however, is lower, thus a key task for the countries of the region is to continue reducing energy intensity as their GDP increases.

Policy can have a key influence on future energy systems and their environmental impacts. Here global and European actions to reduce greenhouse gases could have a major impact. Countries choices also matter: for example, whether or not to continue using high levels of coal and lignite for power. Climate change will be an important driving force, as its impacts could reduce precipitation and thus the capacity for hydroelectricity generation.

There is a lack of forward-looking information on the region's energy trends.

Energy sector: current trends

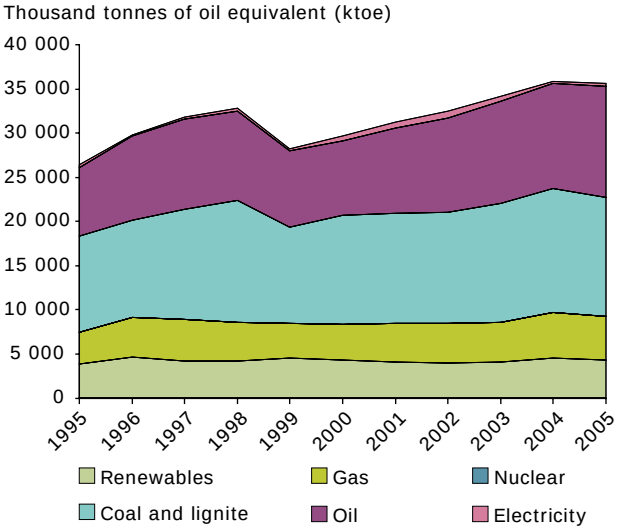
Total primary energy supply in the Western Balkans increased by 35 %, while GDP increased by 54 % between 1995 and 2005 (both fell in 1999, however, due to political turmoil).

Fossil fuels provided almost 88 % of all energy consumed in 2005 in the West Balkans (Figure 4.5). Coal, and in particular low-quality lignite, remains the most important fuel, providing almost 40 % of the region's energy. Lignite is mined and used in power plants in Serbia, Bosnia and Herzegovina, the former Yugoslav Republic of Macedonia and Kosovo under UN Security Council Resolution 1244/99 (the latter relies almost entirely on lignite for electricity generation).

Oil consumption grew rapidly over this period. Oil is used mainly for transport (see the following section on mobility) and is mainly imported, apart from some production in Albania, Croatia and Serbia. Croatia produces almost 80 % of its natural gas, much from offshore installations. Albania and Serbia have lower levels of natural gas production. The region does not have nuclear power plants ([146]).

Renewables provided more than 12 % of the region's energy in 2005 and hydroelectricity provided more than half of this (Figure 4.6). Hydropower is particularly important in Albania, where it supplies almost all the country's electricity. In Croatia, Bosnia and Herzegovina and Montenegro, hydropower supplies about half of electricity consumption ([147]). However, hydropower production is strongly affected by the availability of water and fell between

Figure 4.5 Final energy consumption by fuel in the Western Balkans, 1995–2005

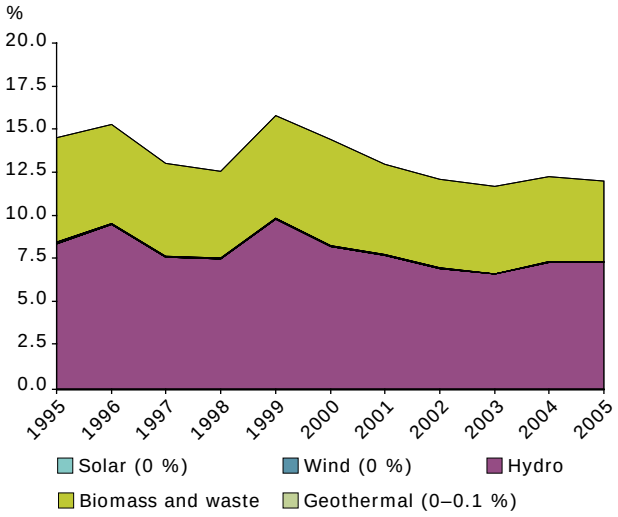


Source: International Energy Agency.

([146]) The data may exclude imports and exports of electricity, which can include imports from the Krško nuclear power plant jointly owned by Slovenia and Croatia.

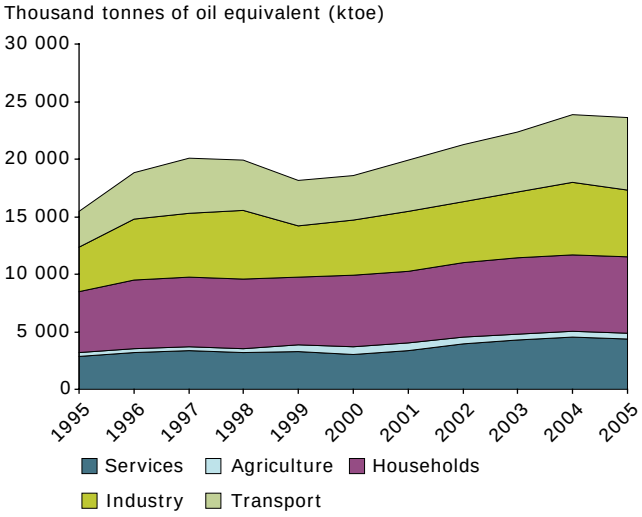
([147]) Speck, S. (2006), *Financial aspects of water supply and sanitation in transboundary waters of South-Eastern Europe*, Report for the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (available at: www.bmu.de/files/pdfs/allgemein/application/pdf/financial_aspect_water_investment.pdf).

Figure 4.6 Share of renewable sources in total primary energy consumption in the Western Balkans, 1995–2005



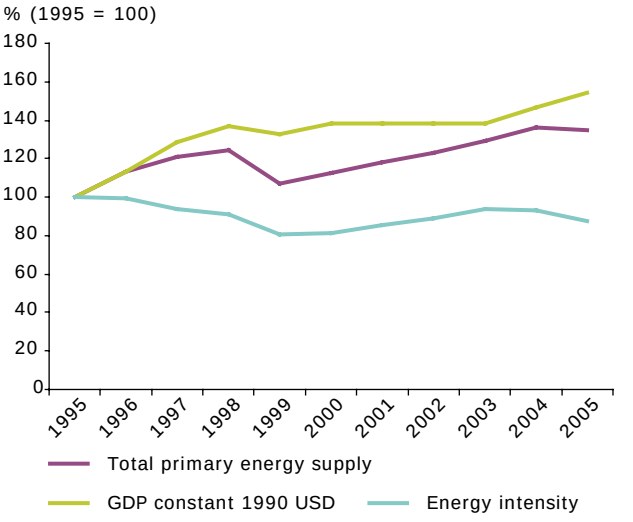
Source: See Annex 2.

Figure 4.7 Final energy consumption by sector in the Western Balkans, 1995–2005



Source: See Annex 2.

Figure 4.8 Energy intensity in the Western Balkans, 1995–2005



Source: See Annex 2.

1999 and 2005 when the amount of precipitation decreased.

The other major source of renewable energy is biomass, which is used mainly for home heating in winter. Other renewable sources such as wind, geothermal and solar power currently are hardly used in the region.

In 2005, the two largest energy consuming sectors in the region were households (28 %) and transport (27 %). Between 1995 and 2005, however, consumption grew in all sectors, with transport showing the fastest increase (Figure 4.7).

Between 1995 and 2005, the region's energy intensity in terms of GDP fell by 13 % (Figure 4.8). The region uses more than twice the amount of energy per unit of GDP as the EU-27, and more than three times more than the EU-15. On a per capita basis, however, the Western Balkan countries use about half as much energy as the EU average: 1.12 toe/cap compared to 2.4 toe/cap in the EU-27.

Environmental impacts

Energy production creates a series of environmental impacts in the region.

Mining of coal and lignite for energy production has scarred the landscape in several countries of the region, including Kosovo under UN Security Council Resolution 1244/99, Serbia and Montenegro. Mining has polluted water and has also created huge amounts of solid waste in the form of mine tailings (see Section 1.7).

The combustion of coal and lignite as well as oil used in transport has polluted the air in these industrial 'hot spot' regions as well as in urban areas. The use of these fossil fuels, together with natural gas, is the main source of the region's greenhouse gas emissions. Thus, choices regarding coal and lignite power plants will have a major impact on future greenhouse gas emissions from the region.

Fuelwood used for home heating has affected forests and biodiversity in the region. Hydroelectricity

can disrupt freshwater ecosystems and, through the creation of reservoirs, has changed mountain landscapes. Other forms of renewable energy such as solar and wind power are little used in the region as yet, but, although they have lower impacts, they may affect landscapes and land use patterns. Furthermore, wind turbines can be a hazard for migratory birds.

Outlooks for the energy sector: focus on global climate change policies

Many of the drivers described in Chapter 2 will influence the future of energy production in the region, including:

- *Technology*, especially in the longer term
- *Globalisation and trade* (e.g. future global demand for fossil fuels and the resulting prices), and
- *Macroeconomic developments*.

One of the most important drivers will be global policy, particularly the extent of international agreement on measures to address climate change. In the 2008 edition of its *World Energy Outlook*, the IEA mapped out both current global energy trends as well as the implications of a strong international agreement on climate change. In the IEA's reference scenario — without a strong climate change agreement — world primary energy demand will increase by 1.6 % a year, from under 12 000 Mtoe in 2006 to over 17 000 Mtoe in 2030. Fossil fuels will account for 80 % of the global energy mix in 2030 — a small reduction from current levels ([148]).

Under this scenario, the Eurasia region — defined to include the Western Balkans, Eastern Europe, Caucasus, Central Asia but not Russia, and some new EU Member States — would see only a small growth in the use of renewable energy and a decline in the share of coal (Box 4.5).

Box 4.5 Energy outlook for Eurasia: IEA reference scenario

In the IEA reference scenario, current energy trends are largely expected to continue in current decades. This outlook sees a slow increase in the use of renewable energy sources in Eurasia, a region defined to include the Western Balkans, Eastern Europe, Caucasus, Central Asia but not Russia, and some new EU Member States (Figure 4.9).

Hydropower, which is used in many of these countries, is projected to remain the most important single source of renewable electricity in Eurasia for the foreseeable future. Wind, geothermal electricity and biomass (including waste) will be the fastest growing renewable energy sources, mainly because of their relatively small contribution in 2006 (Figure 4.10), and their combined share will remain below that of hydroelectricity.

The use of nuclear power, natural gas and coal will increase slowly in this period, while oil consumption will decline by almost 3 % a year to 2030.

Figure 4.9 Energy production by fuel in Eurasia without Russia, 2006, and projections until 2030

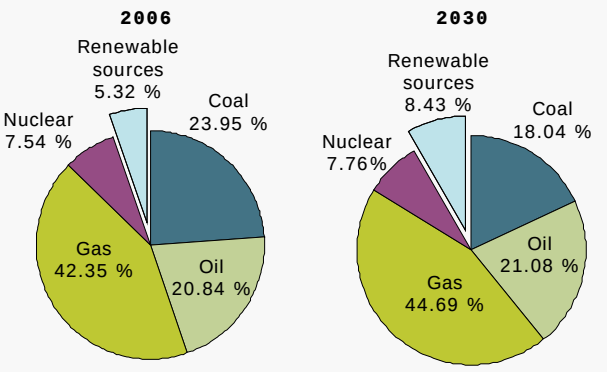
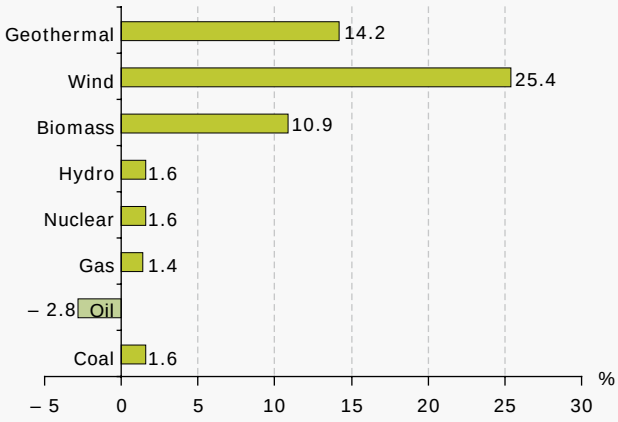


Figure 4.10 Projected growth of energy sources in Eurasia without Russia, 2006, and projections until 2030



Source: IEA (2008); for further details, see Annex 2.

([148]) IEA (2008), *World Energy Outlook 2008*, Paris.

The IEA also presented two alternative scenarios under which countries worldwide act to address climate change. In the '550 ppm' scenario, a global agreement keeps the level of carbon dioxide in the atmosphere below this level; the '450 ppm' scenario requires even further efforts for a lower level of atmospheric carbon.

These scenarios foresee a slower growth in primary energy demand. In the 550 scenario, it is 1 500 Mtoe lower in 2030 than the reference scenario; in the 450 scenario, it is lower still. In addition, countries around the world will reduce their energy consumption compared to the reference scenario through aggressive energy efficiency measures. Moreover, they will cut their consumption of fossil fuels and in particular coal, while increasing energy production from nuclear plants and renewable sources.

In Western Balkan countries, current energy strategies (where available) foresee building new hydropower plants; increasing coal use (this is also an element in bilateral agreements, such as Albania's cooperation with Italy); building new nuclear power plants (in February 2009 talks were undertaken on a new nuclear power plant in Albania which could serve the needs of other countries in the region as well); and establishing possible transit routs. The future energy supply mix is a major uncertainty for the whole region.

While the IEA's analysis focuses on major global economies, a global climate change agreement will surely influence the Western Balkans as well. One country (Croatia) has undertaken to reduce its CO_2 emissions under the Kyoto Protocol. An agreement to significantly reduce CO_2 emissions may require further reductions by Croatia and may also affect other countries in the region, either through binding targets or through other mechanisms. On the production side, the result is likely to be a reduction in the use of coal and lignite, in particular in those Western Balkan countries that rely strongly on this energy source , and a significant increase in the production of renewable energy across the region. On the consumption side, the region will likely see efforts to significantly improve energy efficiency.

While an international agreement does not yet exist, the EU has made a commitment to reduce its own greenhouse gas emissions by 20 %, improve energy efficiency by 20 % and increase the use of renewable energy, all by 2020. These goals will affect any Western Balkan countries that join the EU. Already, the European Energy Community links the EU energy systems to those in the Western Balkans and other countries ([149]). As a result, EU policy goals will directly influence energy systems in the region.

Energy and environmental policies in Western Balkan countries will also play a key role in shaping the region's energy future. One example can be seen in Kosovo under UN Security Council Resolution 1244/99, where the government is evaluating the construction of a new lignite-fired power plant. By doing so, Kosovo under UN Security Council Resolution 1244/99 would use local lignite reserves, which are estimated to be the fifth-largest in the world and which currently fuel ageing power plants. Construction of a new power plant, however, would continue environmental impacts of lignite mining such as water pollution, though new investments would be expected to bring higher standards. Local air pollution might also be reduced. On the other hand, a new plant would continue to emit high levels of CO_2 ([150]).

For the countries of the Western Balkans, addressing climate change will present the great challenge of reconstructing economies while reducing greenhouse gas (GHG) emissions.

Selected forward-looking studies

Blinc, R. *et al. (*2005). Sustainable development after Johannesburg and Iraq: The global situation and the cases of Slovenia and Croatia, *Energy Policy*, Vol. 33, Issue 7/May, pp. 839–855.

Ekonerg (2004). *Projections of Greenhouse Gas Emissions*, Croatia.

M. Šúri *et al.* (2007). Potential of solar electricity generation in the European Union Member States and candidate countries, *Solar Energy*.

Varadarajan A. and Kennedy, D. (2003). *Review of electricity supply and demand in Southeast Europe*, World Bank.

World Energy Council (2000). *Restructuring and Privatizing the Coal Industries in Central and Eastern Europe and the CIS.*

([149]) For further information, see the website of the European Energy Community: www.energy-community.org.
([150]) UNEP GRID/Arendal (2007), *Balkans: Vital Graphics*, Arendal, Norway.

4.4 Freight transport

Key messages

Freight transport has increased rapidly in the Western Balkans, rising by about 100 % between 2000 and 2007 — far faster than GDP.

Freight transport contributes to air pollution in the region and the roads fragment natural areas. The Danube River provides an important alternative to road transport, though works to increase navigation on the Danube and its tributaries could harm the basin's freshwater ecosystems.

An outlook for the wider geographic area of Eastern Europe sees an ongoing increase of freight transport, in particular by road, in the future. Several drivers may influence the growth of freight transport in the Western Balkans. Here too, policy measures will be important, in particular those that provide alternatives to road transport. So will the impact of globalisation and trade, including future fuel prices. In the long term, motor vehicle technology could reduce air pollution and other impacts from road transport, but gains can be offset by increased volume of transport due to economic growth.

There is a lack of information on current levels of transit traffic in the region, and also on forward-looking trends for freight transport.

Freight transport supports industrial production in the region, and it also supplies the goods for consumption. In addition, an important share of freight transport transits the region from one EU country to another.

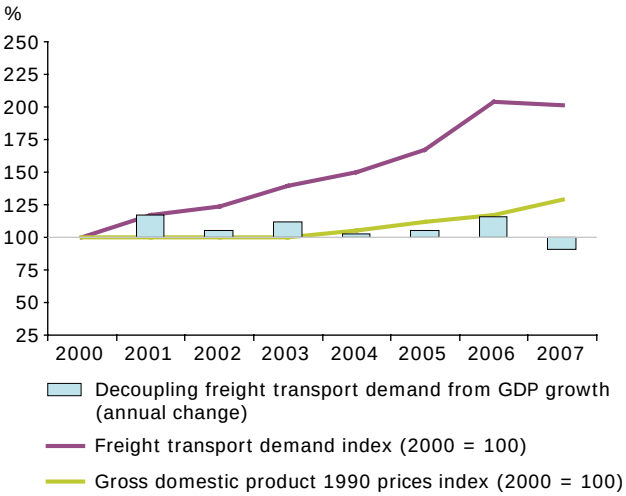
Freight transport: trends and outlook

Freight transport in the Western Balkans has risen even more rapidly than passenger transport, doubling between 2000 and 2007 (Figure 4.11). This increase was far greater than the growth in GDP.

Road transport accounted for 75 % of the all freight transport in 2006 — a small decrease over the period, as the proportion of rail and air transport rose.

Freight transport may continue to grow rapidly. One forecast predicts that freight transport in Eastern Europe (including the Western Balkans) will continue to rise sharply in coming years (Figure 4.11). This increase will be slightly slower than the forecast for GDP growth.

Figure 4.11 Decoupling of freight transport demand in the Western Balkans, 2000–2007



Source: See Annex 2.

Environmental impacts

Freight transport, especially by road, is a major source of air pollution and greenhouse gas emissions. In addition, both road and rail networks fragment habitats, harming biodiversity.

The Danube River and other inland waters provide an important avenue for freight traffic. Ships and boats can navigate over 2400 kilometres of the Danube, almost 90 % of its total length. However, works to ease and expand boat traffic on the Danube and other rivers can change natural river structures, disrupt wetlands and harm fish migration. Moreover, boat traffic can pollute waters through both intentional and accidental releases of bilge water, waste water and fuel, and can also serve as a vehicle for invasive species Inland navigation on the Danube is likely to increase in the future: the European Union has in fact designated the river as one of its Trans-European Networks for Transport (TEN-T).

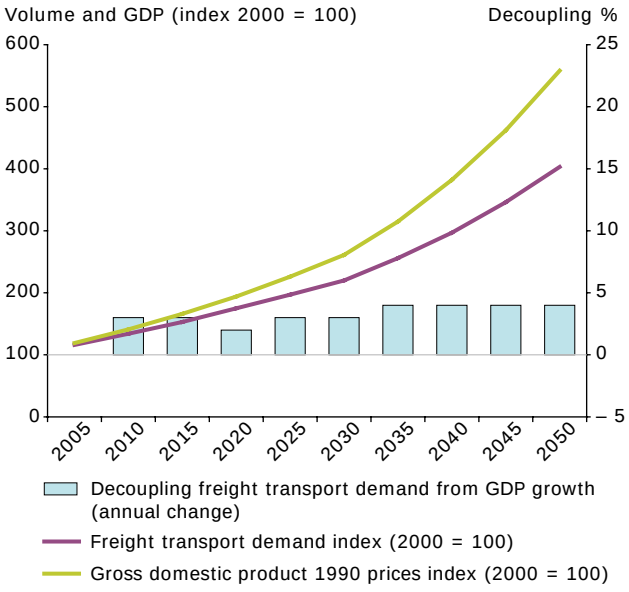
Outlook

Long-term forecasts for freight transport in the Western Balkans have not been identified. However,

a projection for Eastern Europe — a larger area that includes the Western Balkans as well as part of the EU-12 and EECCA countries — forecasts a relative decoupling between GDP and freight transport growth in the period 2000 to 2050 (Figure 4.12).

For this larger region, road transport currently accounts for one-third and rail covering two-thirds of the total. However, the quantity of freight transported by road is expected to grow faster than that transported by rail and the two should be roughly equal by 2050.

Figure 4.12 Projected decoupling of freight transport demand in Eastern Europe until 2050



Source: WBCSD (2004), Mobility 2030; for further details see Annex 2.

Due to the large geographical coverage of this indicator, the forecast may only be partly indicative for the Balkan countries. The non-Western Balkan countries in this indicator outweigh the Western Balkans in land mass and population and may have other transport patterns and trends, thereby diluting the effectiveness of this data as a forecaster for trends in the Western Balkans.

The previous chapter identified a series of drivers that can influence future freight transport in the region. These include:

- *Technology* could provide more efficient motor vehicles for freight; a greater use of information technology could make rail transport more efficient.
- *Globalisation and trade* will influence the costs of fuel, which will affect transport choices. Future trade patterns will play a major role in determining the level of freight transport in the region.
- *European and national policies* for transport will play an important role in shaping future patterns. The European Commission has recently issued a White Paper for a *Sustainable future for transport*, which calls for a major shift in EU policy and spending in favour of environmentally favourable transport methods ([151]).

Selected forward-looking studies from the review

World Business Council for Sustainable Development (WBCSD) (2004). *Mobility 2030: Meeting the challenges to sustainability*, Conches (Geneva).

([151]) European Commission (2009), *A sustainable future for transport: Towards an integrated, technology-led and user friendly system*, June 2009.

Part IV: Glimpses of environmental futures

5 Impacts on the region's environment: a glimpse of possible futures

Key messages

A few predictions are available for the Western Balkan environment. These, together with predictions for wider geographic areas in Europe sketch out the expected impacts if current trends continue into the future.

Among these impacts, pollution and health will remain important concerns in the region:

- emissions of some air pollutants should decline over the coming decade, though it is not clear if this will improve local air quality;
- the countries in the region face a major challenge in terms of improving drinking water and waste water treatment services

Greenhouse gas emissions from the Western Balkans are projected to increase. Climate change impacts are expected to become stronger. Moreover, the region's rich ecosystems will face ongoing threats.

Other problems will affect natural resources in the region:

- coastal and urban sprawl threaten to continue, along with depopulation and land abandonment in rural areas, especially in the mountains
- overfishing is likely to remain a threat in local seas
- municipal solid waste is growing, and the management of other waste streams remains a problem.

These trends and their outcomes are not inevitable. Policy choices can play a key role in shaping consumption and production patterns and waste levels. For example, implementation of national plans as a response to EU legislation for waste could lead to reduction in levels of waste if designed in more innovative ways. Countries would also incur bigger implementation costs to manage waste. The previous chapters have shown that many drivers are uncertain and will influence future consumption and production patterns and thereby changing the region's environmental futures. Some of these alternative possible futures could take shape in response to sudden, unexpected changes, such as an energy crisis or new technology. Different scenarios might arise if trends currently projected for the region — such as European integration and ongoing economic growth — are not realised. Or governments, business and other actors in the region might lead the way to a different path.

The information base for the assessment of the possible or expected future environmental situation is very poor. Most of the information is available from international sources, and only for larger geographical areas. Indeed, past and present trends for the Western Balkans are difficult to assess accurately.

This chapter summarises the implications of various drivers for the environment of the Western Balkans and for consumption and production patterns, as described in previous chapters. The chapter briefly reviews recent trends for each of the themes described in Chapter 1 (Part I). This chapter groups environmental issues into four main themes: pollution and health (including air and water pollution); climate change; ecosystems and biodiversity; and resources and waste. The last category includes land use, marine and coastal zones, water resources, and waste generation.

Where data are available each section presents — predictive indicators for the region or for wider geographic areas that include the Western Balkans, such as Eastern Europe (as yet, few environmental indicators have been prepared for the region). In most cases, these reviews provide a 'reference scenario', based on existing trends.

As we have seen, a series of drivers will influence the future. For each environmental theme, the chapter reviews some of the key consumption and production patterns (based on Chapters 3 and 4) as well as the drivers that may shape environmental futures. Where relevant, scenarios highlighting future alternatives are also presented.

Table 5.1 summarises the links between consumption and production patterns and the environment. These links are described in the following sections of this chapter.

Table 5.1 Linking production and consumption patterns and environmental futures in the Western Balkans

Consumption	Production	Environmental pollution [a] and human health	Climate change: greenhouse gas emissions	Ecosystems and biodiversity	Resource use and waste generation [b]
Food consumption	Agriculture and fisheries	••	••	•••	•••
Household energy consumption	Energy production	•••	•••	•	••
Personal mobility	Freight transport	•••	•••	••	••

Notes: [a] including air and water pollution
[b] including land use, freshwater consumption, marine ecosystems and waste

Strength of the links: • Weak influence; •• Medium influence; ••• Strong influence

The scores are based on the assessment in Chapters 3, 4 and 5 of this report.

5.1 Pollution and environmental health: air pollution

Recent trends

Overall atmospheric emissions of acidifying substances (SO_2, NO_2, NH_3 and NMVOC) in the region did not change significantly from 1992 to 2003, though this overview masks a variety of trends in individual countries (see Section 1.1). Motor vehicles have been an important and growing source of air pollution, while industrial emissions did not increase significantly during this period. Poor air quality has been a serious problem, in particular in cities and industrial areas.

Outlook for the region

Projections of air pollution emissions for European countries prepared by IIASA for EMEP are based on the RAINS model and include the Western Balkans. These projections forecast a decline in the region's emissions of fine particulates, PM_{10} and $PM_{2.5}$, between 2000 and 2010, followed by a slight increase in the period to 2020 (Figure 5.1). Trends are forecast to differ among the countries of the Western Balkans, however: for example, Croatia's emissions of both PM_{10} and $PM_{2.5}$ are projected to rise steadily to 2020; those in other countries will see a net decrease ([152]).

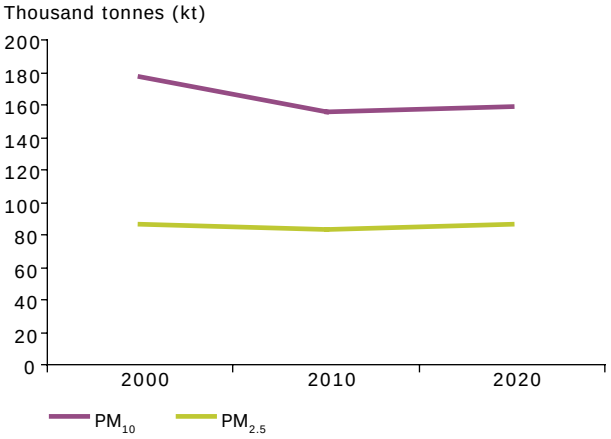
For acidifying substances, EMEP forecasts that the region's high level of SO_2 emissions will decline steadily from 2000 to 2020, falling by a total of 30 % (Figure 5.2). For NH_3, emissions should decline by a total of 21 %, though most of this change is projected to occur between 2000 and 2010, after which emission levels will largely stagnate. In contrast, NO_2 and NMVOC emissions are forecast to grow by 19 % and 31 % respectively over the period.

Alternative paths

These forecasts provide a reference scenario based largely on a continuation of trends seen in the early part of this decade: for example, rising incomes and rising motor vehicles numbers and traffic. The forecasts do not take into account fluctuations in economic growth such as the impact of the current credit crisis.

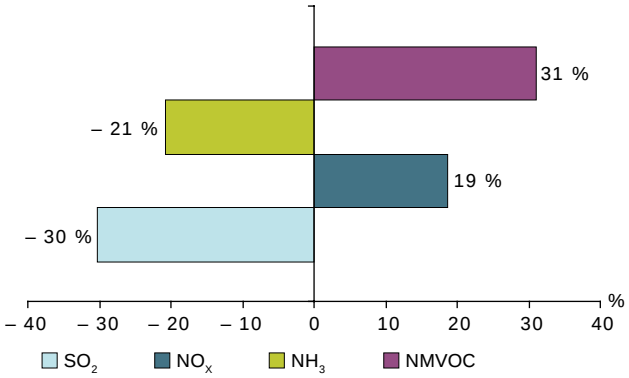
Several key areas of the consumption and production patterns described in the previous chapters will play a key role in influencing future levels of air pollution. These include household choices for personal mobility, especially in terms of motor vehicle use; and the level of freight transport on the production side particularly by road. Energy production and consumption will also affect air pollution levels; and in particular decisions regarding the use of coal, lignite and fuel wood for home heating. Other areas will also be important: in agriculture, for example, livestock production influences air pollution, in particular emissions of ammonia from manure.

Figure 5.1 Projected PM_{10} and $PM_{2.5}$ emissions from the Western Balkans until 2020



Source: See Annexes 1 and 2.

Figure 5.2 Projected change in emissions of acidifying substances in the Western Balkans, 2000–2020



Source: See Annexes 1 and 2.

([152]) Based on estimates of emissions for recent years and projections to 2020. See Annexes 1 and 2 for further information.

In turn, the drivers forces described in Chapter 2 will shape the future production and consumption patterns in the region. Globalisation and trade will play a key role in determining prices of oil and other fuels, and also the patterns of imports and exports of the countries in the region, thus shaping many sectors, including agriculture. Macroeconomic developments will determine the amount of income people in the region have available to purchase motor vehicles.

Policy decisions will be quite important, including those concerning: vehicle and industrial emissions; public transport; rail, river and marine freight transport; energy investments; and energy efficiency programmes. For example, national government support for public transport and the implementation of stricter vehicle emissions could reduce urban air pollution levels. While European legislation sets many requirements in these areas that are being adopted in the Western Balkans, it will be governments in the region that implement them.

Existing forward-looking indicators

Table 5.2 lists the forward-looking indicators prepared by IIASA, as well as one other indicator for air pollution in Europe, prepared by the World Business Council on Sustainable Development (WBCSD) ([153]).

Selected forward-looking studies from the review

Cofala, J., *et al* (2005). *Scenarios of World Anthropogenic Emissions of Air Pollutants and Methane up to 2030*, IIASA, Laxenberg (Austria).

Amman, M., *et al.* (2005). *Baseline Scenarios for the Clean Air for Europe (CAFE) Programme*, IIASA, Austria.

Table 5.2 Forward-looking indicators for air pollution

Indicator	Geographic coverage	Temporal scale	Sources
Emissions of acidifying substances	Pan-European	2010, 2020, 2030	IIASA
Emissions of ozone Precursors	Pan-European	2010, 2020, 2030	IIASA
	OECD, Former Soviet Union, India, China	2050	WBCSD (NO_x from transport)
Emissions of primary particles	Pan-European	2010, 2020, 2030	IIASA

Source: Annex 1; *Catalogue of forward-looking indicators from selected sources*, EEA Technical report No 8/2008.

([153]) For some countries forward-looking indicators are also available at a national level. For example, projections for SO_x, NO_x and NH_3 under current legislation scenario and current reduction plans scenario with the temporal coverage for 2010, 2015 and 2020 are available for Croatia (Eionet data flows, status October 2009).

5.2 Pollution and health: water pollution and water services

Recent trends

Urban areas, manufacturing and mining are all important sources of water pollution. Agricultural run-off is a problem in many parts of the Western Balkans (see Section 1.2). Waste water treatment is often poor or nonexistent. Overall, levels of water quality did not changed significantly between 2000 and 2006. A large majority of the population throughout the region has access to safe drinking water.

Outlook for the region

Forward-looking indicators of water pollution have not been identified for the region.

Future patterns and practices in agriculture have a major impact on water quality in the region. So will the practices used in energy production, in related mining activities and in other areas of industry. Industrial plants can take a series of actions, including the improvement of pretreatment facilities for their waste water. Households will also influence these patterns, for example by their food consumption choices.

One key question will be the future of drinking water supply and waste water treatment services, which are in poor condition in many parts of the region (see Section 1.2). Here, policy decisions will play a key role in shaping the future. As countries in the region move towards adoption of EU legislation such as the Drinking Water Directive and the Urban Waste water Treatment Directive, they will need to meet higher standards for both drinking water supply and waste water treatment, which will involve costs (Box 5.1).

Box 5.1 Estimates of the cost of improving water services

Many drinking water supply systems in the region are poorly maintained. In some countries, access to safe drinking water remains limited. Waste water treatment systems function badly and many urban areas do not have a system at all. Improving water services will be a major challenge for Western Balkan countries for the future. An important goal will be to achieve the stringent EU standards for drinking water supply and waste water treatment.

The cost of these actions will be high. According to recent estimates made in Albania, for example, about USD 1.7 billion will be needed in the coming decade to establish adequate services ([154]). In Croatia, the national Water Management Strategy estimates that almost EUR 4.5 billion will be needed to meet EU water standards.

The experience of the 12 new EU Member States provides another indication of the level of costs required. Some of these countries already had an extensive water infrastructure before accession but will need to spend an estimated EUR 35 billion to meet EU requirements for waste water treatment alone ([155]). While the cost in the Western Balkans has not been determined accurately, it is clear that this work will require major investment the in coming decades.

([154]) Speck, S. (2006), *Financial aspects of water supply and sanitation in transboundary waters of South-Eastern Europe*, Report for the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (available at: www.bmu.de/files/pdfs/allgemein/application/pdf/financial_aspect_water_investment.pdf).

([155]) European Commission (2009), Integrating Water Policy — Linking all EU Water Legislation within a Single Framework, Water Note no. 9, Brussels.

5.3 Greenhouse gas emissions and climate change

Recent trends

Greenhouse gas emissions from south-eastern Europe rose sharply in the first years of this decade.

Outlook for the region

Only limited information on greenhouse gas emissions trends and projections is available from this region (see Annex 1 on the status of national communications). Table 5.3 lists available forward-looking indicators for wider geographic areas.

Consumption patterns, in particular those regarding energy use and mobility, will play a key role in determining these emissions in coming decades. So will *energy production* choices (such as those regarding continued use of coal and lignite, as we have seen in Chapter 3), along with the future of other areas of production. In *agriculture,* livestock production is an important source of greenhouse gas emissions.

A series of *driving forces* will influence the consumption and production patterns and their greenhouse gas emissions in the coming decades (Chapter 2). These include the following:

- international politics and legislation, and in particular possible future emission-reduction agreements at national and European levels;
- national legislation to implement these measures in the region;
- macroeconomic developments, which will influence future levels of industrial production, economic restructuring and motor vehicle use;
- technology, including both possible breakthroughs in low-carbon technological as well as the adoption of renewable energy and energy efficiency technologies in the region;
- markets and business, which can adopt new, less polluting technologies.

Selected forward-lookimg studies from the review

Bollen, J. *et al. (*2004). *Four Futures for Energy Markets and Climate Change*, Netherlands Bureau for Economic Policy Analysis (CPB).

Ecologic *et al. (*2006). *Analysis of economic opportunities & challenges of future climate change policies for the Accession and Candidate Countries* (Background paper for Workshop in Sofia, 14 and 15 June 2006 on Future Climate Change Policy in the Accession and Candidate Countries: Looking beyond 2012).

Intergovernmental Panel on Climate Change (2007). *Fourth Assessment Report* (several volumes), Geneva.

Bates, B. C. *et al. (*2008). *Climate change and water*, IPCC Technical Paper.

Table 5.3 Key forward-looking indicators for greenhouse gas emission

Indicator	Geographic coverage	Temporal scale	Sources
Greenhouse gas emissions			
	EU, EECCA	2020	EEA based on national communications (UNFCC)
	EU	2030	EEA (PRIMES and other models)
	OECD, Russia, other transition countries, India, China	2030	IEA
	Pan-European	2030	IIASA
	OECD Europe, EECCA, SEE	2050	WBCSD (CO_2 from transport)
Global and European temperature			
Trends	Global	2000 onwards	EEA
Outlook	Global	2100	EEA
Atmospheric greenhouse gas concentrations			
Trends	Global	2000 onwards	EEA
Outlook	Global	2100	EEA

Source: Annex 1; *Catalogue of forward-looking indicators from selected sources*, EEA Technical report No 8/2008.

5.4 Ecosystems and biodiversity

Recent trends

The Western Balkans has a wealth of animal and plant diversity, including many endemic species and habitats. This biodiversity has faced a series of threats, including a sprawl of built-up areas in urban and coastal zones, mining activities and unregulated hunting and timber cutting. At the same time, governments in the region have a taken a series of steps to protect species and habitats, and in particular they have increased the share of their territory designated as protected (see Section 1.3).

Outlooks

In the near term, it is not likely that the global objective of reducing biodiversity loss by 2010 will be met; moreover, the EU-wide goal of halting biodiversity loss is also in danger of being missed ([156]).

Predictive indicators for ecosystems and biodiversity in the region are not available, though EEA has prepared an indicator for the impact of climate change in most of its member countries (Table 5.4).

In the future, agriculture and fishing will play a key role in shaping the health of ecosystems and biodiversity. Due in part to declines in rural population and migration to urban areas, and reduced economic prospects, pastures and other extensive agricultural lands may continue to be abandoned, especially in mountain areas. This can harm biodiversity by shrinking the area of farmland of high natural value and thus the mosaic of habitats for wildlife. At the same time, intensive agriculture is expanding, which also threatens biodiversity.

Food consumption patterns can influence these trends: household choices of local, traditional and organic products could support more small, high natural value farms.

Globalisation and trade may support opposing trends: more open trade may encourage more intensive agriculture that uses higher levels of pesticides and fertilisers; at the same time, the Balkans may find good export markets for organic products, though these are likely to cover only a small part of total farmland.

Another important driving force will be climate change, which will put pressure on existing habitats and species and will provide opportunities for invasive species in the region (see Sections 1.3 and 2.8).

Finally, legislation and policy initiatives could play a key role in managing these threats. Better planning controls could limit urban sprawl in natural and agricultural areas. Conservation programmes can help to protect the region's rich biodiversity and reduce the impacts on biodiversity from farming and fishing.

Selected forward-looking studies from the review

Millennium Ecosystem Assessment (2005). *Ecosystems and Human Well-being: Scenarios, Volume 2*.

Table 5.4 Key forward-looking indicators for the impact of climate change on species diversity

Indicator	Geographic coverage	Temporal scale	Sources
Change in species diversity as a result of climate change			
Outlook	EU + Liechtenstein, Norway, Switzerland	2100	EEA

Source: Annex 1; *Catalogue of forward-looking indicators from selected sources*, EEA Technical report No 8/2008.

([156]) EEA (2007), T*he pan-European environment: glimpses into an uncertain future*, EEA Report No 4/2007.

5.5 Resource use and waste: land use

Recent trends

The landscape in the Western Balkans is very diverse and includes mountains, major river valleys and wetlands, large farming areas, Mediterranean coastal zones and urban and industrial areas. In recent years, key trends seen in the Western Balkans include a decline in farmland and growing sprawl in both urban and coastal areas.

In several countries, including the former Yugoslav Republic of Macedonia, Montenegro and Serbia, mining remains a major economic activity. Mines have scarred the landscape and created air and water pollution as well as solid waste. Many mines in the region have closed and at many of these sites, a legacy of accumulated waste, open pits and other environmental problems remains. Despite these closures, minerals and fuels continue to make up the largest share of the region's exports by weight.

Possible outlooks

Studies of future land use in the Western Balkans are not available for assessment. Box 5.2 presents results from reviews for the EU.

Alternative paths

Major changes in consumption and production patterns could lead to very different outcomes. The future of agriculture in the region will play a key role — this is the most important use of land in the region but farmland is now being rapidly abandoned. Agriculture will, as we have seen, be influenced by patterns of food consumption, and also by population and migration. Rural populations are expected to age and younger people to move from rural to urban areas, fuelling both land abandonment and urban sprawl. Technology and macroeconomic development could also influence these trends.

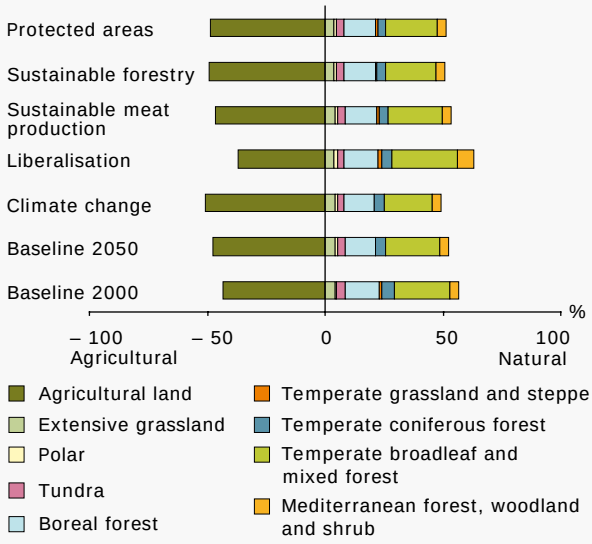
Globalisation and trade could play a key role: in the projections described. For example, in Box 5.2,

Box 5.2 Future land use patterns: projections

Several recent studies have looked at future changes in land use across the EU. A recent projection of land use and biodiversity prepared by the Netherlands Environmental Assessment Agency for the Convention on Biological Diversity prepared a baseline projection for 2050 together with five alternative scenarios (Figure 5.3). In the baseline projection, agricultural land use will increase slightly in the EU (plus Norway, Switzerland and Liechtenstein). In a scenario where global agricultural markets are liberalised, however, the area of agricultural land in Europe will fall.

By way of contrast, the Scenar 2020 study ([157]) sees a decrease in agriculture land between 2000 and 2020: in its baseline scenario, the area of arable land will fall by 5 % across the EU. Forest land, urban land and recently abandoned land will all increase. This result is not totally at odds with the Netherlands study: rather, the Scenar 2020 foresees significant steps for market liberalisation in coming years and thus is closer to the liberalisation scenario of the Dutch projections.

Figure 5.3 Land cover distribution in Europe in 2000 and 2050



Source: Netherlands Environmental Assessment Agency, presented in *Catalogue of forward-looking indicators from selected sources*, EEA Technical report No 8/2008.

([157]) European Centre for Nature Conservation *et al.* (2007), *Scenar 2020 — Scenario study on agriculture and the rural world: Objectives and conclusions of Scenario 2020*, available on: http://ec.europa.eu/agriculture/publi/reports/scenar2020/index_en.htm.

the 'liberalisation' scenario leads to the greatest difference in land use patterns.

Major changes in cultural values could change household consumption patterns and thus influence land use. Choices to build new homes or to refurbish existing houses could make a major difference either to the degree of urban sprawl or, in the case of refurbishment, to revitalising rural towns and villages. Policy and legislation will also play an important role, including both EU and national policies for agriculture and forestry. National and local policies for land use planning will affect the extent of urban sprawl.

The outcomes produced by these drivers could yield radically different futures for agricultural land in the Western Balkans. The possible range of outcomes can be seen in the scenarios generated by EEA's PRELUDE project, which investigated possible futures for Europe's rural areas. Box 5.3 describes these scenarios developed by PRELUDE.

Key indicators

The key forward-looking indicators for land cover and use of arable land are set out in Table 5.5.

Box 5.3 Europe's rural landscapes: are major changes coming?

The European Environment Agency's PRELUDE project focused on possible changes in rural landscapes over the coming 30 years. The project developed five scenarios for the future. These investigate both structural changes and disruptive events that could shape the future of agriculture and landscapes. Each scenario estimates the changes that will be seen across Europe for land use, which is divided into nine types: dense urban areas; diffuse urban areas; rural crop-land; rural mosaic; rural grasslands; natural mosaic; forest; other natural areas; and abandoned rural land.

- In the *Great escapes* scenario, the future is driven by financial competition. Agriculture becomes yet more intensified and further land is abandoned. Agricultural intensification and urban sprawl change the rural landscape. While some nature reserves are lost, the area of natural mosaic increases.
- *Evolved society*: following an energy crisis, Europeans change their lifestyles and many return to rural living and community involvement. Agriculture is high-tech and at the same time increasingly organic. The proportionality of major land uses does not change greatly — rather, this scenario sees a change in quality.
- In the *Clustered networks* scenario, the forces of globalisation, the needs of an ageing society and policies for strong land-use planning combine. While older rural communities struggle, new urban areas are developed in the countryside. Overall, however, new and old urban areas are dense and sprawl decreases. Agriculture is marginalised and many agriculture areas are abandoned. Natural habitats develop throughout the countryside, but high natural-value farmland largely disappears.
- In *Lettuce surprise U*, a decentralised and high-tech Europe evolves following a major food security crisis. Agriculture is advanced but non-polluting and relatively small-scale. Total crop-land decreases and the rural mosaic of small farms and forests grow. In addition, biodiversity and soil and water quality improve across Europe.
- *Cohesion* ('*Big crisis*'). Environmental disasters lead to strong, centralised policy responses. Agriculture reduces its surpluses and focuses on environmental stewardship. Europe sees a small decrease in crop-land and a growth in natural mosaic areas. Soil, water and air quality all improve.

Table 5.5 Key forward-looking indicators for land use

Indicator	Geographic coverage	Temporal scale	Sources
Land cover distribution and change			
Outlook	Pan-European region	2000–2050	Netherlands Environmental Assessment Agency
Land cover, use of arable land			
Outlook	Most of the EU	2020	EEA

Source: Annex 1; *Catalogue of forward-looking indicators from selected sources*, EEA Technical report No 8/2008.

Selected forward-looking studies from the review

Alterra, Eururalis project, Wageningen University, Netherlands (reports and other information available at: www.eururalis.eu).

ESPON (2007). *Scenarios on the territorial future of Europe.*

ESPON (2007). *Territorial futures*.

Knickel, K. and Kok, K. (2003). Future Land Use in Europe (scoping study), International Centre for Integrative Studies, University of Maastricht.

Mitchley, J. *et al. (2006).* 'Integrated futures for Europe's mountain regions: Reconciling biodiversity conservation and human livelihoods', *Journal of Mountain Science*, Vol. 3, No. 4 / Dec. 2006.

Nabuurs, G. *et al.* (2001). 'Sustainable management regimes for Europe's forests: a projection with EFISCEN until 2050', *Forest Policy and Economics*, Vol. 3, pp. 155–173.

UNECE/FAO (2005). *European Forest Sector Outlook Study*, Geneva.

5.6 Resource use and waste: solid waste

Recent trends

The generation of municipal solid waste in the Western Balkans increased sharply from 2003 to 2007, by an estimated 40 % in per capita terms (see Section 1.7). Although data are partially incomplete, levels of waste per capita appear to be on a par with those in the EU-12. The region also has many abandoned waste sites and uncontrolled landfills.

The volume of mining and industrial waste in the region is most likely far greater than that of municipal waste, but data are not available. Accumulated mining and industrial waste is a further problem, including at factories and mines that have been closed.

Outlook for the future

While outlook data are not available for the Western Balkans, comparisons can be drawn with projections for the EU-12. In a recent assessment prepared for EEA, municipal waste generation in the EU-12 is predicted to increase by about 33 % between 2005 and 2020, if economic growth is strong, and by about 22 % if economic growth remains weak (Figure 5.4).

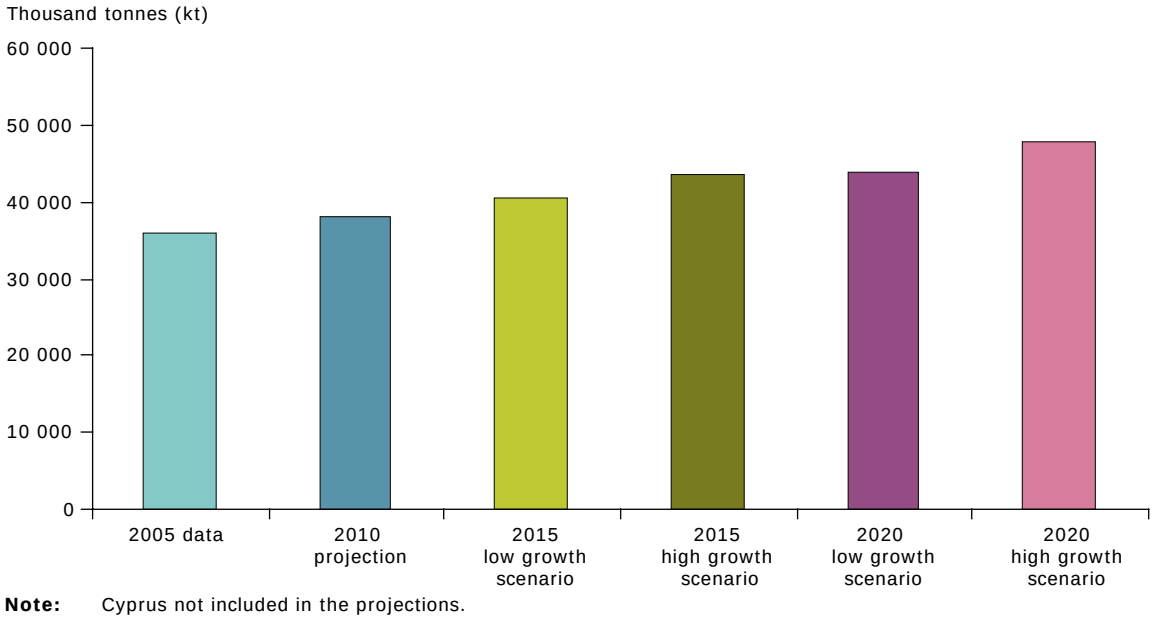
The OECD has made projections of municipal waste generation in its member countries: in its reference scenario, the level of municipal waste is projected to grow steadily to 2030 unless new policies are put in place.

Household consumption will play a key role in driving municipal waste levels. Food consumption patterns will play a key role in shaping future municipal waste levels. Currently, food waste accounts for at least one-third of municipal waste in the region (Section 4.l). This includes a growing amount of packaging waste used for food. Decisions on domestic house building, in particular choices for new construction instead of refurbishment of existing houses, will determine the amount of construction waste. As the EEA projections indicate, macroeconomic developments will also play a key role in driving future waste levels.

Mining waste from energy production and metal smelters is also an important type of waste in the region, and the future of these areas of production will influence waste levels and actions to clean up accumulated waste.

Policy choices can play a key role in shaping consumption and production patterns and waste levels. The OECD, for example, calls on its member countries to take stronger policy measures that can stem the rising levels of municipal waste in its member countries, such as user charges for waste as well as new initiatives to promote recycling ([158]).

Figure 5.4 Generation of municipal waste in the EU-12, 2005, 2010, 2015 and 2020



Note: Cyprus not included in the projections.

Source: ETC-RWM.

([158]) OECD (2008), *OECD Environmental Outlook to 2008*, Paris.

Table 5.6 Key forward-looking indicators for waste generation and management

Indicator	Geographic coverage	Temporal scale	Sources
Municipal waste generation			
Trends	Western Balkans	Varies	Some national sources (see Annex 1)
Outlook	EU-25	2000–2020	EEA
	OECD countries	2000–2020	OECD
	Varies	2020	Some national communications under UNFCC
Progress in management of contaminated sites			
Trends	Western Balkans	Varies	Some national sources (see Annex 1)
Outlook			
Generation and recycling of packaging waste			
Trends	Western Balkans	Varies	Some national sources (see Annex 1)
Outlook	EU-25	2000–2020	EEA

Source: Annex 1; *Catalogue of forward-looking indicators from selected sources*, EEA Technical report No 8/2008.

For the countries of the Western Balkans, addressing these issues can play a key role in supporting growth and innovation, and in avoiding future costs. For example, national strategies to implement EU policies and legislation in innovative ways could move countries towards advanced levels of waste reduction and recycling. Such measures may require new and innovative initiatives. On the other hand, if the national and local governments in the region do not seek to stem rising levels of waste, they may need to make major investments in new landfills and other waste management facilities.

For other waste problems, such as mining and construction waste, markets and business can play a key role by changing production patterns and also addressing past problems. For example, new investors in mines and smelters in the Western Balkans can bring resources and technical capacity to address waste problems although in recent privatisations, investors have been exempted from past liabilities, such as accumulated mining waste ([159]).

Key indicators

The key forward-looking indicators for trends in waste generation and management are set out in Table 5.6.

Selected forward-looking studies from the review

Tukker, A. *et al.* (2003). *Scenarios of household waste generation in 2020*, Institute for Prospective Technological Studies, Joint Research Centre, European Commission.

European Topic Centre on Resources and Waste Management (2008). *Municipal waste management and greenhouse gases*, Copenhagen.

OECD (2008). *OECD Environmental Outlook to 2030*, Paris.

([159]) GRID/Arendal (2007), *Balkans: Vital Graphics*, Arendal, Norway.

5.7 Resource use and waste: water consumption

Recent trends

Water scarcity is a problem, particularly in the summer and in southern parts of the Western Balkans, as well as in coastal zones and on islands. Countries in the region share many river basins and much of their water resources.

Outlook for region

The EEA has forecast that demand for irrigation water for agriculture will increase in southern Europe, as countries in this region experience the impacts of climate change, including water scarcity in summer months (Box 5.4) ([160]). A similar trend may be seen in many parts of the Western Balkans and especially in Albania and the former Yugoslav Republic of Macedonia, which already depend heavily on irrigation.

These forecasts also see a decline in water use for electricity generation, a trend that may also be seen in the Western Balkans as power stations are modernised. Available projections of water withdrawals for different scenarios are presented in the Box 5.4.

Box 5.4 Scenarios of water withdrawals in different sectors for the Western Balkans

The table below presents the fast track results for Western Balkans countries obtained based on the WaterGAP model and GEO-4 scenarios in the first phase of the SCENES project 'Water Scenarios for Europe and Neighboring States'. Under the Security first scenario an increase of more than 10 % in the water withdrawals for irrigation is expected all Western Balkans countries. The biggest changes (more than 50 %) are expected in domestic sector for Serbia and Montenegro; and in manufacturing and electricity generation for Bosnia and Herzegovina and the Former Yugoslav Republic of Macedonia. Under the sustainability First Scenario a decrease of water withdrawals for more than 50 % is expected for electricity and domestic purposes and smaller decrease for irrigation and manufacturing.

The new sets of refined projections for 'enriched' scenarios will be available in early 2011 as a result of participatory scenarios process the second phase of the SCENES project.

Table 5.7 Percentage change in water withdrawals for the Western Balkans countries as compared to the base year (2000), realised with two different scenarios for 2030

Country	Sector							
	Electricity		Manufacturing		Irrigation		Domestic	
	Security first	Sustainability first	Security first	Sustainability first	Security first	Sustainability first	Security first	Sustainability first
Albania	No or slight changes +/– 10 %	Decrease > 50 %	Increase > 10 %	Decrease > 10 %	Increase > 10 %	No or slight changes +/– 10 %	Increase > 10 %	Decrease > 50 %
Bosnia and Herzegovina	Increase > 50 %	Decrease > 50 %	Increase > 50 %	Increase > 25 %	Increase > 10 %	Increase > 10 %	No or slight changes +/– 10 %	Decrease > 50 %
Croatia	Increase > 10 %	Decrease > 50 %	Increase > 50 %	Increase > 50 %	Increase > 10 %	No or slight changes +/– 10 %	No or slight changes +/– 10 %	Decrease > 50 %
The Former Yugoslav Republic of Macedonia	Increase > 50 %	Decrease > 25 %	Increase > 25 %	Increase > 25 %	Increase > 10 %	No or slight changes +/– 10 %	No or slight changes +/– 10 %	Decrease > 50 %
Serbia and Montenegro	Increase > 25 %	Decrease > 50 % %	Decrease > 50 %	Decrease < 50 %	Increase > 10 %	No or slight changes +/– 10 %	Increase > 50 %	Decrease > 50 %

Source: CESR (2007), SCENES — Water Scenarios for Europe and for Neighboring States. D 3.1. Fast track modeling results, Kassel.

([160]) EEA (2005), *European environment outlook*, EEA Report No 4/2005.

Table 5.8 Key forward-looking indicators for freshwater

Indicator	Geographic coverage	Temporal scale	Sources
Use of freshwater resources			
Trends	Western Balkans	Varies	Some national sources (see Annex 1)
Outlook	EU-25 + Liechtenstein, Norway, Romania, Switzerland	2000–2030	EEA
Oxygen-consuming substances in rivers			
Trends	Western Balkans	Varies	National sources (see Annex 1)
Nutrients in freshwater			
Trends	Western Balkans	Varies	National sources (see Annex 1)
Urban wastewater treatment			
Trends	Western Balkans	Varies	Some national sources (see Annex 1)
Outlook	EU-15 and selected EU-12 Member States	2005, 2008–2015	EEA
Floods and droughts			
Outlook	EU-25 + Liechtenstein, Norway, Switzerland	1961–1990, 2020, 2070	University of Kassel

Source: Annex 1; *Catalogue of forward-looking indicators from selected sources*, EEA Technical report No 8/2008.

Other influences on water consumption

A series of drivers will influence water trends in the region (Chapter 2). As we have seen, climate change will have a major impact on the availability of water in the region.

Future trends in agriculture in the region will also play a key role, along with food consumption patterns. Moreover, households consume water directly, and this will be another important factor for water demand. Energy production will play a key role — a key question is whether power plants in the region will move to greater recycling of their cooling waters, as is expected in other parts of Europe.

European legislation and policy will encourage river basin approaches to water management based on the Water Framework Directive. International frameworks for the Danube and Sava river basins are also promoting this approach. EU and national legislation will establish new requirements for drinking water quality and waste water treatment. Other policy areas will have an important influence. For example, agricultural policy will affect this sector's demand for water. In several countries, energy policies propose an increase in hydropower, and this will affect freshwater systems.

Key indicators

The key forward-looking indicators for freshwater are set out in Table 5.8.

Selected forward-looking studies from the review

Finnish Environment Institute and University of Kassel, Water Scenarios for Europe and for Neighbouring States — SCENES (ongoing research project), www.environment.fi/syke/scenes.

International Water Management Institute (2007). *Water for food, Water for life — A Comprehensive Assessment of Water Management in Agriculture*.

IFPRI (2002). *Global Water Outlook to 2025: Averting an Impending Crisis*, Washington DC.

5.8 Resource use and waste: marine and coastal environment

Recent trends

The Adriatic and Ionian seas face a series of pressures, including marine transport of petroleum and natural gas, natural gas extraction and overfishing. While several key fish stocks are depleted data on the status of many others are not available.

Coastal zones also face important pressures, including waste water and solid waste from urban and tourist areas, eutrophication of coastal waters and sprawl in many coastal areas.

Outlook

While no relevant forward-looking information has been identified for the region, studies in other regions, such as the Black Sea, forecast ongoing pressures on fisheries.

A series of drivers will influence the marine and coastal environment of the Western Balkans in the future.

Markets and business will play an important role in terms of tourism pressures in the region. While these are quite developed in most countries there is room for further growth in Albania. European and global markets for fish will shape pressures on fisheries in the Adriatic and the Ionian seas.

Climate change could play an important role, first in affecting marine and coastal biodiversity. In addition, climate change could affect water availability and, more generally, summer tourism — if summer temperatures increase significantly, tourists from northern Europe may prefer to spend their vacations closer to home.

Legislation and policy will play an important role. A new EU directive protects the marine environment, and the EU's efforts for strong fisheries management in the Mediterranean could make a difference in coming years. So will national efforts to manage fishing. National legislation to protect coastal zones and for land use planning will help to determine whether the current coastal sprawl will continue.

Consumption patterns will also influence the future of this environment (Chapter 3). Tastes for food will shape local and national demand for marine fish. Building and construction decisions will influence sprawl in coastal areas. And international mobility will influence the levels of future tourism and its impacts.

Selected forward-looking studies from the review

IFPRI (2002). *Fish as food: projections to 2020 under different scenarios*, Washington DC, www.ifpri.org/.

IFPRI (2003). *Fish to 2020: Supply and Demand in Changing Global Markets*, Washington DC, www.ifpri.org/.

6 The role of key actors in shaping environmental futures in the Western Balkans

Key messages

Actors in the Western Balkans, including governments, business, NGOs and others, have a key role to play in shaping the region's environmental future. These actors could explore uncertainties and possibilities through future studies and other predictive analyses. The key step will then be to pursue far-sighted actions.

The previous chapters review environmental trends in the region and the drivers that will shape these trends in the future. They show how these drivers will influence some of the key consumption and production patterns in the region, and in turn how these patterns will affect the environment in the Western Balkans.

Among the drivers influencing the regions environment are actors who can choose their strategies and policies. Key actors are in the region itself: the future of the environment in the Western Balkans is important first for those who live there. Actors in the region, including governments, business and non-governmental organisations, can play a key role in influencing future production and consumption patterns and thus, helping to shape future environmental trends and conditions in the region. Future-oriented and predictive analysis can assist these actors by providing a long-term perspective on environmental problems and by identifying key issues and uncertainties.

6.1 Preparing for an uncertain future

The previous chapters reviewed drivers as well as production and consumption patterns that will influence the future of the region's environment. One message is that future developments are not inevitable; indeed, the direction in which many of the drivers identified here will act is uncertain.

Future analysis can help actors in the Western Balkans face these uncertainties. This study provides an initial analysis, drawing on work on futures carried out at regional, European and global scales. As we have seen in the previous chapter, some of these studies have made quantitative forecasts of future developments. Others explore uncertainties using a set of alternative scenarios.

Both approaches are valuable, and further work focused on the Western Balkans could provide further insights into the region's future, building on studies already prepared. For example, the introduction to this report shows that almost three dozen future-oriented studies across all themes have been carried out in the region.

6.2 Taking action

The analysis has shown that many drivers operating at global and European levels will influence environmental futures in the Western Balkans. For example, European policies and legislation will shape environmental laws and actions in the region. In fact, this process is already under way, in particular in Croatia and the former Yugoslav Republic of Macedonia, which are both candidate countries and are adopting many European requirements.

It would be a mistake, however, to see the region's environmental future as dependent on outside forces. The decisions and actions taken by politicians, governments, businesses and individuals in Western Balkan countries will be vital in shaping the future of the region's environment. The assessment of drivers underlines the importance of regional politics, policies and legislation in influencing production and consumption patterns and thus shaping the environment.

It would also be a mistake to focus on the role of government alone in resolving environmental

problems. Enterprises also play a key role in determining production patterns, as well as the goods and services that influence them. Moreover, independent actors, including environmental NGOs, other civil society groups as well as individuals can influence consumption patterns, policy actions and more. Some notes on the roles of these different actors, drawing on the analysis in the previous chapters are developed below.

Governments

National governments in the region can work on policies to address long-term challenges, such as climate change, ageing populations and European integration. In these and other areas, cooperation with EU institutions and Member State governments as well as other countries can support this work.

Governments can also take action to influence consumption patterns. Here, there are few quick fixes: objectives and policies need to look at the long term. For example, policies can encourage lower impact production of food and fish through a variety of instruments, including information and support to farmers as well as labels to inform consumers. Energy policies can support work to improve the energy efficiency of buildings.

Local governments can play an important role. In the area of food consumption, for example, local governments can support local farmers and traditional products by providing space for food markets, improving existing markets, thus helping local products, farmers and sellers compete with supermarkets and imported products. Local governments can also address traffic problems and improve urban transport as an alternative to automobile use. These are only initial examples: here too, the experience of cities in the EU that are tackling these issues may help local authorities in the region.

Enterprise and business

Enterprise and business also can play an important role, mainly by improving production methods. Some enterprises in the Western Balkans have improved their environmental management, and more can be done.

Far-sighted enterprises may find export markets for environmental goods and services, such as organic foods as well as renewable energy. Here, the Energy Community that links the EU and Western Balkan countries can provide a major opportunity in the future. Enterprises in the region can also use marketing and information to shape local consumption patterns.

Individuals, NGOs and civil society

Environmental groups, far-sighted individuals and other elements of civil society can also play important roles.

As we have seen, many aspects of politics and public governance in the region are at present an obstacle to the effective implementation of new environmental policies. Pressure from civil society is needed to increase the transparency of politics and government in the Western Balkans. Civil society groups can also help to address some of the legacy of the recent conflicts in the region, and some are doing so, for example by promoting greater contacts and exchange among people in different countries and ethnic groups. These efforts, though not focused on environment, can play a key role in setting the stage for more far-sighted and sustainable policies for the region's environment.

Environmental groups, individuals and others can also play a key role in proposing better environmental policies for government, encouraging industry to put in place more efficient production methods and encouraging consumers to adopt new patterns of consumption.

Next steps

This chapter has provided a brief set of thoughts and avenues for action. The next steps to assess and prepare for the region's future need to be taken in the Western Balkans.

Annexes — Introduction

The following two annexes present data for the Western Balkans and related regions.

Annex 1 presents availability of data for past and forward-looking trends for all EEA core set of indicators. The availability of data in the Annex was assessed based on the results of a) the EEA West Balkan's projects carried out since 2006 as a part of the CARDS Programme, b) review of the availability of forward looking indicators from international sources carried out in 2006–2008, c) national consultations held from July to September 2009 and Eionet data flow.

Annex 1 includes several categories of data available, such as:

- data are available and comparable among the countries;
- data are available, but not comparable, as countries use different methodologies for data collection;
- data are not available or indicator is not relevant for a particular country.

References for each indicator are provided in a table at the end of Annex 1.

Annex 2 presents regional assessments for past and present trends and for outlook trends, using the EEA core set of indicators where data are available. Where possible, Annex 2 is based on comparable data collected across the countries in the region: for the most part, this data were assembled and common indicators were produced through a series of projects conducted from 2006 and described below. Where comparable data were not available, the work sought data from across countries in the region. Thus, the data presented here reflect a 'common denominator' for the Western Balkans. Some of the forward-looking indicators present data for wider geographic areas than the Western Balkans, due to the lack of relevant data and information for this region itself. These wider regional assessments are presented to indicate trends which might be seen also in Western Balkan countries. Individual countries will have more detailed and more extensive national data sets for the past trends and to some extend for the future trends. It should be noted that for various reasons (e.g. indicators not updated, indicators prepared with methodologies different to those of the EEA CSI, incomparable or incomplete data, time constraints) not all of the assessments which are marked in Annex 1 as potentially possible to produce are included in Annex 2.

The two annexes together provide an overview on the data and assessments currently available for the countries of the Western Balkan region based on 37 EEA core set of indicators. The Western Balkan countries include Albania, Bosnia and Herzegovina, Croatia, the former Yugoslav Republic of Macedonia, Montenegro and Serbia. Kosovo under UN Security Council Resolution 1244/99, a newly declared state only since 17 of February 2008, was not analysed.

As mentioned earlier, the past trend information presented here has been collected through the following EEA regional projects carried out since 2006 as a part of the CARDS Programme:

- assistance to Albania, Bosnia and Herzegovina, Croatia, the former Yugoslav Republic of Macedonia, and Serbia and Montenegro for implementation of the EEA core set of indicators and reporting system as input to the fourth pan-European assessment report (Belgrade report) (2006–2007);
- production of 12 fact sheets for regional core set of indicators (CSIs) for Western Balkan countries (2007);
- building up of a regular environment reporting system according to the EEA core set of indicators for the West Balkan countries (2008).

The objective of these projects was to provide support to the Western Balkan countries in order to assist the development of a regular reporting process based on the EEA core set of indicators. So far, the process has included collection of data, an analysis of available data in the countries and the production of national and regional indicators based on EEA methodologies. The production of national indicators was based on the longest data time-series available, while aggregates at the regional level have

been limited to the shortest time-series available at national level among the countries of the region.

The projects have been carried out in close cooperation with the EEA national focal points (NFPs) in the region and with the following institutions: the Ministry of Environment, Forest and Water Administration (MoEFWA) and Agency of Environment and Forestry in Albania; the Federal Ministry of Environment and Tourism in Bosnia and Herzegovina; the Croatian Environment Agency; the Macedonian Environmental Information Centre within the Ministry of the Environment and Physical Planning; the Ministry of Tourism and Environment in Montenegro; and the Serbian Environment Protection Agency. Furthermore, a number of other institutions — such as hydro-meteorological institutes; energy, transport and agriculture ministries; health institutes; and statistical offices in most of the countries — have been involved in the indicators process and have helped provide accurate and up-to-date information (see the list of references by indicator in Annex 1).

In some cases where data are not comparable or monitoring data are not available for past trends, international sources have been consulted (e.g. IEA, UNEP Ozone Secretariat, other conventions), including both data and expert estimations (e.g. EMEP). Additionally to this, it was used also all data sources provided by countries in the consultation process.

The *forward-looking indicators* used in this report are made on the basis of reported data from countries for the purposes of international conventions or international institutions. Also, where past trends data are not available on a country level, international sources were used (i.e. LRTAP for air emissions and IEA for energy). Only a limited number of forward-looking indicators at national level was identified during the preparation of this report. Many of the forward-looking indicators are based on projections were made for wider regions in which Western Balkan countries are included such as: 'transition economies' or 'Eurasia without Russia' (25 countries including the Western Balkans); 'Central Europe' (17 countries including the Western Balkans); or 'Eastern Europe' (10 countries including the Western Balkans). Annex 2 includes maps that identify the area covered for each forward-looking indicator.

Annex 1 Overview of available data for past and forward-looking trends of EEA core set of indicators in the Western Balkan countries

The following table presents the availability of data for each EEA core set indicator in the region of Western Balkans and provides an overview of the possibility of conducting regional, indicator-based assessments for past (blue highlights) and forward-looking trends (yellow highlights).

It should be noted that Montenegro and Kosovo under UN Security Council Resolution 1244/99 have not been included in the analysis. The institution in Montenegro responsible for data collection and reporting — the Environment Protection Agency — was in the process of establishment during the data projects. Data for Kosovo under UN Security Council Resolution 1244/99 has not yet been collected.

Availability of past trend data		**Availability of data for forward-looking trends**	
+	Data are available in Western Balkan countries and is compatible	+	Data are available and forward-looking assessment can be build for the Western Balkan region
/+	No monitoring data are available , therefore expert estimates and projection data available in EMEP databases is used	Δ	Data are available from the models of international organisations where Western Balkan region is part of a broader region
≈	Data are available at the national level, but not compatible, as countries use different methodologies for data collection or calculation of the indicator		
–	Data are not available	–	Data are not available
n/r	Indicator is not relevant for the particular country	n/r	Not relevant as a forward-looking indicator

EEA core set of indicator [1]		**Past trends**							**Forward-looking trends**						
		Available past data						**Assessment for the region possible** [2]	**Available forward-looking data**						**Assessment for the region possible** [2]
		Albania	Bosnia and Herzegovina	Croatia	The former Yugoslav Republic of Macedonia	Serbia	Western Balkan region		Albania	Bosnia and Herzegovina	Croatia	The former Yugoslav Republic of Macedonia	Serbia and Montenegro	Western Balkan region	
CSI 001	Emissions of acidifying substances	/+	/+	+	+	+	/+	Yes	+	+	+	+	+	+	Yes
CSI 002	Emissions of ozone precursors	/+	/+	+	+	+	/+	Yes	+ NO_X, CO, NMVOCs (CH_4 not included)						Yes
									+	+	+	+	+	+	
CSI 003	Emissions of primary particles and secondary particulate matter precursors	/+	/+	+	+	+	/+	Yes	+	+	+	+	+	+	Yes
CSI 004	Exceedance of air quality limit values in urban areas	≈	≈	–	≈	≈	–	No	–	–	–	–	–	–	No

EEA core set of indicator [1]		Past trends							Forward-looking trends						
		Available past data						Assessment for the region possible [2]	Available forward-looking data						Assessment for the region possible [2]
		Albania	Bosnia and Herzegovina	Croatia	The former Yugoslav Republic of Macedonia	Serbia	Western Balkan region		Albania	Bosnia and Herzegovina	Croatia	The former Yugoslav Republic of Macedonia	Serbia and Montenegro	Western Balkan region	
CSI 005	Exposure of ecosystems to acidification, eutrophication and ozone	/+	/+	+	/+	/+	/+	Yes [2]	+	+	+	+	+	–	Yes [2]
CSI 006	Production and consumption of ozone depleting substances	+	+	+	+	+	+	Yes	–	–	–	–	–	–	No
CSI 007	Threatened and protected species	≈	–	≈	≈	≈	≈	Yes [2], but only specific assessments per country	–	–	–	–	–	–	No
CSI 008	Designated areas	≈	≈	≈	≈	≈	≈	Yes, but only cumulative designated areas	–	–	–	–	–	–	No
CSI 009	Species diversity	–	–	–	≈	≈	–	No	–	–	–	–	–	–	No
CSI 010	Greenhouse gas emissions trends	+	– [4]	+	+	– [4]	– [5]	Yes [5]	See CSI 011 for projections						
CSI 011	Greenhouse gas emission projections	See CSI 010							+	–	+	+	–	+	Yes [2]
CSI 012	Global and European temperature	Global and European indicator shows the global (land and ocean) and European (land) average temperature. For Western Balkan measurements on country level are available and for some countries also projections.													
CSI 013	Atmospheric greenhouse gas concentrations	Global annual averages of GHG concentrations in the atmosphere are subject of this indicator.													
CSI 014	Land take	+	+	+	+	+	+	Yes	–	–	–	–	–	–	No
CSI 015	Progress in management of contaminated sites	–	–	≈	≈	≈	–	No	–	–	–	–	–	–	No
CSI 016	Municipal waste generation	+	≈	+	≈	–	≈	Yes	–	–	–	–	–	–	No
CSI 017	Generation and recycling of packaging waste	–	–	≈	–	–	–	No	–	–	–	–	–	–	No
CSI 018	Use of freshwater resources	–	–	≈	≈	≈	–	No	–	–	–	–	–	Δ [3]	Yes [2]
CSI 019	Oxygen consuming substances in rivers	≈	≈	≈	≈	≈	≈	Yes [2] using modified eea methodology	–	–	–	–	–	–	No
CSI 020	Nutrients in freshwater	≈	≈	≈	≈	≈	≈	Yes [2] using modified eea methodology	–	–	–	–	–	–	No
CSI 021	Nutrients in transitional, coastal and marine waters	≈	≈	≈	n/r	n/r	≈	Yes [2] using modified eea methodology	–	–	–	–	–	–	No
CSI 022	Bathing water quality	≈	≈	+	≈	≈	≈	Yes [2]	–	–	–	–	–	–	No
CSI 023	Chlorophyll in transitional, coastal and marine waters	≈	–	≈	n/r	n/r	≈	Yes [2] using modified eea methodology	–	–	–	–	–	–	No
CSI 024	Urban waste water treatment	–	–	≈	≈	≈	–	No	–	–	–	–	–	–	No

EEA core set of indicator [1]		Past trends							Forward-looking trends						
		Available past data						Assessment for the region possible [2]	Available forward-looking data						Assessment for the region possible [2]
		Albania	Bosnia and Herzegovina	Croatia	The former Yugoslav Republic of Macedonia	Serbia	Western Balkan region		Albania	Bosnia and Herzegovina	Croatia	The former Yugoslav Republic of Macedonia	Serbia and Montenegro	Western Balkan region	
CSI 025	Gross nutrient balance	–	–	–	≈	–	–	No	–	–	–	–	–	–	No
CSI 026	Area under organic farming	+	≈	+	+	+	+	Yes	–	–	–	–	–	–	No
CSI 027	Final energy consumption by sector	+	+	+	+	+	+	Yes	–	–	–	–	–	Δ [6]	Yes
CSI 028	Total energy intensity	+	+	+	+	+	+	Yes	–	–	–	–	–	Δ [6]	Yes [2]
CSI 029	Primary energy consumption by fuel	+	+	+	+	+	+	Yes	–	–	–	–	–	Δ [6]	Yes
CSI 030	Renewable primary energy consumption	+	+	+	+	+	+	Yes	–	–	–	–	–	Δ [6]	Yes[2]
CSI 031	Renewable electricity	+	+	+	+	+	+	Yes	–	–	–	–	–	Δ [6]	Yes
CSI 032	Status of marine fish stocks	+	–	–	n/r	n/r	–	No	–	–	–	–	–	–	No
CSI 033	Aquaculture production	≈	–	≈	n/r	n/r	–	No	–	–	–	–	–	–	No
CSI 034	Fishing fleet capacity	+	n/r	+	n/r	n/r	+	Yes[2]	–	–	–	–	–	–	No
CSI 035	Passenger transport demand	+	+	+	+	+	+	Yes	–	–	–	–	–	Δ [6]	Yes
CSI 036	Freight transport demand	+	+	+	+	+	+	Yes	–	–	–	–	–	Δ [6]	Yes
CSI 037	Use of cleaner and alternative fuels	≈	–	–	–	–	–	No	–	–	–	–	–	Δ [6]	Yes [2]

Note:
1. EEA core set of indicators: http://themes.eea.europa.eu/IMS/CSI.
2. See available assessments in the Annex 2. It should be noted that for various reasons (e.g. indicators not updated, indicators prepared with methodologies different to those of the EEA CSI, incomparable or incomplete data, time constraints) not all of the assessments which are marked in Annex 1 as potentially possible to produce are included in Annex 2.
3. Available as water withdrawals. Western Balkans are presented as part of a larger region together with the 12 new EU Member States.
4. Data are under preparation as part of the development of the Initial National Communication under the UN Framework Convention on Climate Change, with assistance of the National Communication Support Programme jointly implemented by UNDP and UNEP.
5. Regional assessment is possible using data from international sources such as IEA for the GHG emissions from energy sector (see EEA (2007) *Europe's environment — The fourth assessment*) and/or results of the GAINS model developed by the International Institute for Applied Systems Analysis (IIASA).
6. Western Balkans are presented as part of a larger region — together with Bulgaria, Poland, Romania, Slovenia and Slovakia.

List of references for past and forward-looking indicators

EEA core set of indicator		Past trends — References	Forward-looking trends — References
CSI 001	Emissions of acidifying substances	The former Yugoslav Republic of Macedonia: Eionet data flow Serbia: Eionet data flow Croatia: Eionet data flow Inventory Review 2005, Emission Data reported to LRTAP Convention and NEC Directive. ISSN 0804-2446.	Croatia: Eionet data flow For all countries: Inventory Review 2005, Emission Data reported to LRTAP Convention and NEC Directive ISSN 0804-2446. New set of national projections is to be available in December 2009 from IIASA's GAINS-Europe model as part of the revision of the Gothenburg Protocol.
CSI 002	Emissions of ozone precursors	The former Yugoslav Republic of Macedonia: Eionet data flow Serbia: Eionet data flow Croatia: Eionet data flow Inventory Review 2005, Emission Data reported to LRTAP Convention and NEC Directive. ISSN 0804-2446.	Inventory Review 2005, Emission Data reported to LRTAP Convention and NEC Directive ISSN 0804-2446. New set of national projections is to be available in December 2009 from IIASA's GAINS-Europe model as part of the revision of the Gothenburg Protocol.
CSI 003	Emissions of primary particles and secondary particulate matter precursors	Croatia: Eionet data flow Inventory Review 2005, Emission Data reported to LRTAP Convention and NEC Directive. ISSN 0804-2446.	Inventory Review 2005, Emission Data reported to LRTAP Convention and NEC Directive ISSN 0804-2446. New set of national projections is to be available in December 2009 from IIASA's GAINS-Europe model as part of the revision of the Gothenburg Protocol.
CSI 004	Exceedance of air quality limit values in urban areas	Albania: Institute of Environmental Studies. Bosnia and Herzegovina: Federal Hydro-meteorological Institute. The former Yugoslav Republic of Macedonia: Ministry of Environment and Physical Planning. Serbia: Republic Hydro-meteorological Service of Serbia; Ministry of Environmental Protection; Provincial Secretariat for Environmental Protection and Sustainable Development Novi Sad; Institute of Public Health of Serbia 'Dr Milan Jovanovic — BATUT'; Public Health Institute of Belgrade; Municipal Directorate of Panceveo; Copper Institute Bor.	
CSI 005	Exposure of ecosystems to acidification, eutrophication and ozone	Data for this indicator was not collected in the countries due to the scope of the CARDS projects, but it is available at the Coordination Centre for Effects (CCE)1, European Critical Loads Database 2008.	Coordination Centre for Effects (CCE *), European Critical Loads Database 2008.
CSI 006	Production and consumption of ozone depleting substances	Albania: UNEP Ozone Secretariat. Bosnia and Herzegovina: Ozone Unit, Ministry of Foreign Trade and Economic Relations (MoFTER). Croatia: Department for Climate and Ozone Layer Protection, The Ministry of Environmental Protection, Physical Planning and Construction (MEPPPC). The former Yugoslav Republic of Macedonia: Ozone Unit, Ministry of Environment and Physical Planning (MEPP). Serbia: UNEP Ozone Secretariat.	
CSI 007	Threatened and protected species	Albania: Ministry of Environment, Forests and Water Administration. Croatia: Ministry of Culture, State Institute for Nation protection. The former Yugoslav Republic of Macedonia: Study on the Statust of Biological Diverstiy in the Republic of Macedonia; Strategy and Action Plan for Bilogical Diversity Protection in the Republic of Macedonia. Serbia: Institute for Nature Conservation of Serbia; Institute for Biological Research 'Sinisa Stankovic'; Regulation on Protection of Natural Rarities, Stevanovic, V., Vasic, V.: Biodiversity in Yugoslavia — with view of international species, Simonovic, P.; Ribe Srbije.	

EEA core set of indicator		Past trends — References	Forward-looking trends — References
CSI 008	Designated areas	Albania: the Ministry of Environment, Forests and Water Administration. Bosnia and Herzegovina: EEA, CDDA, 7.5 v. Croatia: Registry of protected natural values, Ministry of Culture. The former Yugoslav Republic of Macedonia: CDDA; Emerald database. Serbia: EEA, CDDA, 7.5 v.	
CSI 009	Species diversity	The former Yugoslav Republic of Macedonia: Ministry of Environment and Physical Planning. Serbia: Institute for Nature Conservation of Serbia; Institute for Biological Research 'Sinisa Stankovic', Jaksic, P.: Red Data Book of Serbian Butterflies, Lepidoptera, Puzovic, S.et all.: Conservation Series No. 12. Birds in Europe. Population estimates, trend and conservation status, Puzovic, S. et al.: Birds of Serbia and Montenegro — sizes of nesting populations and trends: 1991–2002.	
CSI 010	Greenhouse gas emissions trends	Albania: a. UNDP, Climate Change Unit. b. The First National Communication of Albania to the United Nations Framework Convention on Climate Change, 2002. c. Update of data is to be available from the Second National Communication of Albania to the United Nations Framework Convention on Climate Change (forthcoming end of 2009). Bosnia and Herzegovina: Data are under preparation as part of the development of the Initial National Communication with assistance of the National Communication Support Programme jointly implemented by UNDP and UNEP. Croatia: a. Ministry of Environmental Protection Physical Planning and Construction (MEPPPC); Ekonerg. b. The Fourth National Communication of the Republic of Croatia to the United Nations Framework Convention on Climate Change. 2006. The former Yugoslav Republic of Macedonia: a. Ministry of Environment and Physical Planning, Climate Change Unit. b. The Second National Communication of the former Yugoslav Republic of Macedonia to the United Nations Framework Convention on Climate Change. 2008. Serbia: Data are under preparation as part of the development of the Initial National Communication with assistance of the National Communication Support Programme jointly implemented by UNDP and UNEP. For all countries: International Energy Agency, database International Institute for Applied Systems Analysis (IIASA), GAINS model.	
CSI 011	Greenhouse gas emission projections		Albania: The First National Communication of Albania to the United Nations Framework Convention on Climate Change, 2002. Update of data are to be available from the Second National Communication of Albania to the United Nations Framework Convention on Climate Change. Bosnia and Herzegovina: Data are under preparation as part of the development of the Initial National Communication with assistance of the National Communication Support Programme jointly implemented by UNDP and UNEP. Croatia: The Fourth National Communication of the Republic of Croatia to the United Nations Framework Convention on Climate Change. 2006. The former Yugoslav Republic of Macedonia: The Second National Communication of the former Yugoslav Republic of Macedonia to the United Nations Framework Convention on Climate Change, 2008. Serbia: Data are under preparation as part of the development of the Initial National Communication with assistance of the National Communication Support Programme jointly implemented by UNDP and UNEP.

EEA core set of indicator		Past trends — References	Forward-looking trends — References
CSI 012	Global and European temperature	Global and European indicator, see EEA CSI 012 at: http://ims.eionet.europa.eu/IMS/ISpecs/ISpecification20041006175027/full_spec. Measurements on country level are available: Albania: Hydro-meteorological Institute. Bosnia and Herzegovina: Federal Hydro-meteorological Institute. Croatia: Croatian Hydro-Meteorological Institute. The former Yugoslav Republic of Macedonia: Administration of Hydro-meteorological Matters. Serbia: Republic Hydro-meteorological Service of Serbia.	Global and European indicator, see EEA SCI 012 at: http://ims.eionet.europa.eu/IMS/ISpecs/ISpecification20041006175027/full_spec). Some projections on country level are available: Albania: The First National Communication of the Republic of Croatia to the United Nations Framework Convention on Climate Change. Croatia: The Fourth National Communication of the Republic of Croatia to the United Nations Framework Convention on Climate Change. The former Yugoslav Republic of Macedonia: The Second National Communication of the former Yugoslav Republic of Macedonia to the United Nations Framework Convention on Climate Change.
CSI 013	Atmospheric greenhouse gas concentrations	Global annual averages are subject of this indicator. See EEA CSI 013 at: http://ims.eionet.europa.eu/IMS/ISpecs/ISpecification20041007131717/full_spec.	
CSI 014	Land take	Albania: CLC 2000, CLC changes 1990-2000. Bosnia and Herzegovina: CLC 2000, CLC changes 1990-2000. Croatia: CLC 2000, Croatian Environment Agency (CEA). The former Yugoslav Republic of Macedonia: CLC 2000; Ministry of Environment and Physical Planning. Serbia: CLC 2000, CLC90-00 ETC/TE; 'Corine Land Cover mapping — Serbian experience' study, 2007, Ivan Nestorov, Ph.D., M.Sc.,Geod. Eng. Dragutin Protić, Geod. Eng.	
CSI 015	Progress in management of contaminated sites	Croatia: Annual Environment Inspection reports (2002–2005) — Ministry of Environment Protection, Physical Planning and Construction; EIS databases; Risk and Potentially Risk Installation Inventory, Environmental Emission Register, CORINE Land Cover, Landfill Inventory Database, Potential Contaminated and Contaminated Sites Database — Croatian Environment Agency; Legal persons-potential source of contamination (questionnaires); Croatian Environment Agency (CEA). The former Yugoslav Republic of Macedonia: Macedonian Environmental Information Center, Ministry of Environment and Physical Planning. Serbia: Secretariat for Environmental Protection and Sustainable Development of Vojvodina Province; Ministry of Environmental Protection; Monitoring data from big industrial factories; Environmental assessment reports of enterprises in restoration.	
CSI 016	Municipal waste generation	Albania: Ministry of Public Works, Transport and Telecommunication — Annual Reports on waste generation for years 2003, 2004, 2005, 2006 and 2007. Bosnia and Herzegovina: Data obtained within project 'Setting up an Operational Unit under the ESC', 2003; Environmental Protection Strategy/ Waste Management Strategy of the Federation of Bosnia and Herzegovina (pending official adoption) 2007; FBiH/BiH Recycling Association (at Chamber of Commerce FBiH/Chamber of Foreign Trade BiH); Ministry of Physical Planning and Environmental Protection of Sarajevo Canton. Croatia: Waste Management Plan of the Republic of Croatia for 2007–2015 (OG No. 85/07); Environmental Emission Register (KEO/ROO) and other databases maintained by Croatian Environment Agency 2005; Statistical Yearbook of the Croatian Bureau of Statistics 2005. The former Yugoslav Republic of Macedonia: The National Waste Management Plan for 2004–2005; the Ministry of Environment and Physical Planning.	
CSI 017	Generation and recycling of packaging waste	Croatia: Croatian Chamber of Economy, Central bureau of statistics (2001–2004), Environment Protection and Energy Efficiency Fund (2006–2007).	

EEA core set of indicator		Past trends — References	Forward-looking trends — References
CSI 018	Use of freshwater resources	Croatia: Croatian Bureau of Statistics (CBS). The former Yugoslav Republic of Macedonia: State Statistical Office. Serbia: Statistical Office of the Republic of Serbia; Water Directorate; Republic of Serbia Water Resources Development Master Plan (SWRDMP)(OGRS No. 11/02).	
CSI 019	Oxygen consuming substances in rivers	EEA, Waterbase v.5.	
CSI 020	Nutrients in freshwater	EEA, Waterbase v.5.	
CSI 021	Nutrients in transitional, coastal and marine waters	Albania: EEA, Waterbase v.5. Bosnia and Herzegovina: EEA, Waterbase v.5. Croatia: EEA, Waterbase v.5.	
CSI 022	Bathing water quality	Albania: Annual Reports on Sea Water Quality, the Ministry of Environment Protection Forestry and Water Administration; the Department for Pollution Prevention and Ministry of Health; the Directorate of Public Health and Sanitary Inspectorate. Bosnia and Herzegovina: the Federal Meteorological Institute; the Hydrological Sector. Croatia: Annual Reports on Sea Water Quality; the Ministry of Environment Protection and Physical Planning; the Department for the Protection of the Sea and the Coast. The former Yugoslav Republic of Macedonia: Public Health Institute; Ministry of Health.	
CSI 023	Chlorophyll in transitional, coastal and marine waters	Croatia: EEA, Waterbase v.5	
CSI 024	Urban waste water treatment	Croatia: Croatian Bureau of Statistics (CBS). The former Yugoslav Republic of Macedonia: Public Health Institute. Serbia: 'Global Waste Water Study in Serbia and Pre-feasibility Sutdy for Belgrade Waste Water Management', EAR — CARDS programme, 2003.	
CSI 025	Gross nutrient balance	The former Yugoslav Republic of Macedonia: State Statistical Office.	
CSI 026	Area under organic farming	Albania: Ministry of Agriculture, Food and Consumer Production (MoAFCP); Organic Agriculture Association (OAA); BioAdria Association; Review 'Monitor'. Bosnia and Herzegovina: State Agency of Statistics of Bosnia and Herzegovina. Croatia: National Bureau of Statistics; Ministry of Agriculture, Fisheries and Rural Development. The former Yugoslav Republic of Macedonia: Statistical Yearbook, 2005, State Statistical Office; Ministry of Agriculture, Forestry and Water Economy, Division of Organic farming. Serbia: Controlling Organization of Organic Production; Ministry of Agriculture, Forestry and Water Management.	
CSI 027	Final energy consumption by sector	International Energy Agency (IEA)	IEA — World Energy Outlook 2008. The National Communications of the Republic of Croatia to the United Nations Framework Convention on Climate Change.
CSI 028	Total energy intensity	International Energy Agency (IEA)	IEA — World Energy Outlook 2008. IEA — World Energy Outlook 2007.
CSI 029	Primary energy consumption by fuel	International Energy Agency (IEA)	IEA — World Energy Outlook 2008.
CSI 030	Renewable primary energy consumption	International Energy Agency (IEA)	IEA — World Energy Outlook 2008.

EEA core set of indicator		Past trends — References	Forward-looking trends — References
CSI 031	Renewable electricity	Albania: Albanian National Agency of Natural Resources, based on Albania Power Corporation (KESH) data. Bosnia and Herzegovina: private company Bosna-S, based on the Study on Energy Sector in Bosnia and Herzegovina. Croatia: Energy Institute Hrvoje Požar, Ministry of Economy, Labour and Entrepreneurship. The former Yugoslav Republic of Macedonia: State Statistical Office, 'Energy balances of The Republic of Macedonia' — Ministry of Economy. Serbia: Energy balances of the Republic of Serbia, Ministry of Mining and Energy (Ref: www.mem.gov.rs/), Electric Power Industry of Serbia, (Ref: www.eps.co.rs/)	IEA — World Energy Outlook 2008.
CSI 032	Status of marine fish stocks	Albania: Fisheries Policies Directorate, Ministry of Environment, Forestry and Water Management (MoEFWM)	
CSI 033	Aquaculture production	Albania: Fisheries Policies Directorate, Ministry of Environment, Forestry and Water Management (MoEFWM). Croatia: Ministry of Agriculture, Forestry, and Water Management.	
CSI 034	Fishing fleet capacity	Albania: Fisheries Policies Directorate, Ministry of Environment, Forestry and Water Management (MoEFWM). Croatia: Central Bureau of Statistics (CBS).	
CSI 035	Passenger transport demand	Albania: Albanian Institutioe of Statistics (INSTAT). Bosnia and Herzegovina: State Agency of Statistics of Bosnia and Herzegovina. Croatia: Central Bureau of Statistics (CBS). The former Yugoslav Republic of Macedonia: State Statistical Office. Serbia: Serbian Statistical Office.	WBCSD (2004), Mobility 2030. Spreadsheets at: www.wbcsd.org/web/publications/mobility/smp-model-spreadsheet.xls.
CSI 036	Freight transport demand	Albania: Albanian Institutioe of Statistics (INSTAT). Bosnia and Herzegovina: State Agency of Statistics of Bosnia and Herzegovina. Croatia: Central Bureau of Statistics (CBS). The former Yugoslav Republic of Macedonia: State Statistical Office. Serbia: Serbian Statistical Office.	WBCSD (2004), Mobility 2030. Spreadsheets at: www.wbcsd.org/web/publications/mobility/smp-model-spreadsheet.xls.
CSI 037	Use of cleaner and alternative fuels	Albania: Ministry of Economy, Trade and Energy.	

Note: * Coordination Centre for Effects (CCE) is a data centre of the International Cooperative Programme for the Modelling & Mapping (ICP M&MP) of Critical Levels and Loads and Air Pollution Effects, Risks and Trends under the Convention on Long-range Transboundary Air Pollution (LRTAP Convention) at the UNECE.

Annex 2 EEA core set of indicators — assessments for the Western Balkan region

This annex presents regional assessments for past/present trends and for forward-looking trends based on the EEA core set of indicators methodology.

The following table provides an overview of data availability for past/present and for outlook trends. It should be noted that for various reasons (e.g. indicators not updated, indicators prepared with methodologies different to those of the EEA CSI, incomparable or incomplete data, time constraints) not all of the assessments which are marked in Annex 1 as feasible have been produced for Annex 2.

The information provided below gives a brief definition of each indicator and a description of the key policy questions for past/present and outlook trends. Each trend is supported by an assessment and by a graph presenting indicator data. In addition, the data sources and time and spatial coverage are listed.

EEA CSI	Past/present trends	Forward-looking trends
CSI 001 Emissions of acidifying substances	Yes	Yes
CSI 002 Ozone precursors	Yes	Yes
CSI 003 Emissions of primary particles	Yes	Yes
CSI 006 Production and consumption of ozone-depleting substances	Yes	No
CSI 026 Area under organic farming	Yes	No
CSI 008 Designated areas	Yes	No
CSI 027 Final energy consumption by sector	Yes	Yes *
CSI 028 Total energy intensity	Yes	Yes **
CSI 029 Primary energy consumption by fuel	Yes	Yes *
CSI 030 Renewable primary energy consumption	Yes	No
CSI 031 Renewable electricity	Yes	Yes *
CSI 014 Land take	Yes	No
CSI 035 Passenger transport demand	Yes	Yes *
CSI 036 Freight transport demand	Yes	Yes *
CSI 016 Municipal waste generation	Yes	No

Note: * Due to the lack of region-specific data, the outlook assessment is available only for a wider spatial coverage that includes the Western Balkan region.
** Not included in the Annex 2 as GDP projections are needed for calculation on the level of the wider region.

Air

CSI 001 Emissions of acidifying substances

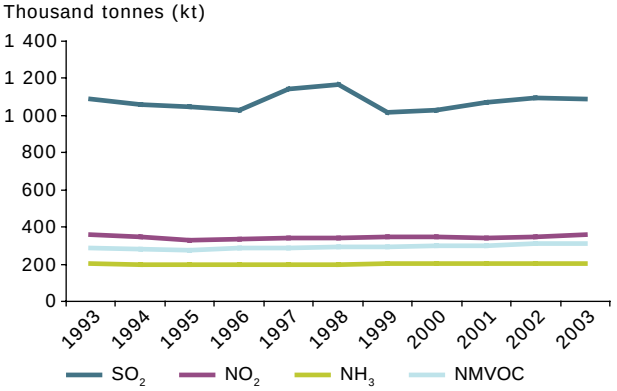
Indicator definition:
Emissions of acidifying pollutants tracks trends in anthropogenic emissions of acidifying substances such as nitrogen oxides, ammonia, and sulphur dioxide, each weighted by their acidifying potential. Projections of emissions of acidifying pollutants present results of the RAINS and EMEP models for nitrogen oxides, sulphur dioxide and ammonia.

Key policy question:
What progress is being made and what are the prospects in reducing the emission of acidifying pollutants in the Western Balkans?

Past and present trends

Key message:
Comparing emissions of acidifying pollutants from 1993 to 2003 *, most ended the time period at levels to those at the start, with minor variations in between. SO_2 and NO_2 show similar levels in 1993 and 2003, and while NH_3 emissions register a reduction of 2 % over the 10-year timeframe, and NMVOC emissions show an increase of 8.4 %.

Emissions of acidifying substances in the Western Balkans, 1993–2003



Assessment:
SO_2 emissions remained stable in the Western Balkan region as a whole from 1993 to 2003, but significantly different trends were registered in the countries. While Croatia managed to reduce emissions by 41 % (from 114 kt to 67 kt) emissions in the former Yugoslav Republic of Macedonia increased by 42 % (from 105 kt to 150 kt), though the country registered their first decrease in SO_2 emissions in 2003, breaking that trend. Bosnia and Herzegovina and Serbia and Montenegro together accounted for ca 75 % of total SO_2 emissions with roughly equally equal shares in 2003.
Similar to SO_2, NO_2 emissions remained at a stable level from 1993 to 2003, also with different trends within individual countries. Albania, Croatia and the former Yugoslav Republic of Macedonia registered increased emissions (by 21 %, 17 % and 47 % respectively), while Bosnia and Herzegovina and Serbia and Montenegro saw reductions in their emissions of 14 % and 11 %.
NH_3 showed an overall reduction of 2 % in Western Balkan between 1993 and 2003. Albania is the only country which registered an increase in NH_3 emissions (+ 10 %) while the other Western Balkan states where able to reduce or at least stabilise their NH_3 emissions. In 2003 Serbia was responsible for 39% of NH_3 emissions in the region, followed by Croatia with 25 %.
Emissions of NMVOC increased in all Western Balkan states other than Bosnia and Herzegovina (– 4.5 %) amounting to a total 8.4 % increase between 1993 and 2003. The most significant increases were registered in Croatia with 27.5 % (from 69 kt to 88 kt) and in Albania with 17.2 % (from 29 kt to 32 kt). Serbia has been able to hold emissions stable, but was nevertheless responsible for 41 % of total Western Balkan NMVOC emissions in 2003.

Source: Inventory Review 2005, Emission Data reported to LRTAP Convention and NEC Directive ISSN 0804-2446.

Temporal coverage: 1993–2003.

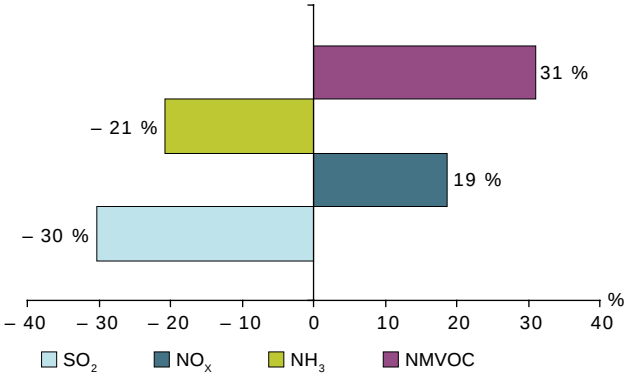
Spatial coverage: Albania, Bosnia and Herzegovina, Croatia, the former Yugoslav Republic of Macedonia, Serbia and Montenegro.

* It should be noted that for some of the Western Balkan countries (Croatia, the former Yugoslav Republic of Macedonia, Serbia) updated national data sets until 2007 are available at Eionet as part of the reporting obligations for the LRTAP Convention. However, construction of an update for the regional indicator was not possible due to lack of updated data for some of the pollutants and lack of updates for the other countries in the region.

Outlook trends

Key message:
Outlook trends under the baseline scenario in Western Balkans indicate that while SO_2 emissions are projected to decline by 30 % between 2000 and 2020 and NH_3 emissions could fall by 21 %; NO_2 and NMVOC emissions are forecast to grow by 19 % and 31 % respectively *.

Projected change in emissions of acidifying substances in the Western Balkans, 2000–2020



Assessment:
Bosnia and Herzegovina, despite a projected reduction of 9% between 2000 and 2020, will likely stay the biggest emitter of SO_2, accounting for 53 % (380 kt) of all SO_2 emissions in the region in 2020. Serbia and Montenegro projects the biggest reduction in emissions with 57 % down to 167 kt. Croatia is projected to increase SO_2 emissions between 2000 and 2020 (by 12 %), at the same time the emission ceiling target set for 2010 under the Gothenburg Protocol (70 kt) is not expected to be exceeded **.
All Western Balkan countries are projected to increase their NO_2 emissions between 2000 and 2020. Increases vary from state to state with so little as a 5 % in Bosnia and Herzegovina and as much as 35 % in Croatia and 43 % in the former Yugoslav Republic of Macedonia.
As opposed to NO_2, between 2000 and 2020 NH_3 emissions are projected to decline in all countries with reductions ranging from 6 % in the former Yugoslav Republic of Macedonia to 37 % in Croatia.
NMVOC will likely present significant growth in emissions in all Western Balkan countries from 2000 to 2020, growing with 31 % overall. Emission growth rates for the individual countries are projected to be between 21 % and 33 % with the exception of the former Yugoslav Republic of Macedonia where a growth of 124 % is forecast.

Source: Inventory Review 2005, Emission Data reported to LRTAP Convention and NEC Directive, ISSN 0804-2446 **.

Temporal coverage: 2000–2020.

Spatial coverage: Albania, Bosnia and Herzegovina, Croatia, the former Yugoslav Republic of Macedonia, Serbia and Montenegro.

* New projections will be available in December 2009 from IIASA's model GAINS-Europe as part of the work dedicated to the revision of the Gothenburg Protocol.
** Available national projections from Croatia are different from these projections and suggest a decrease of SO_2 emission in 2010 and 2020 (Eionet data flow, Status October 2009).

CSI 002 Ozone precursors

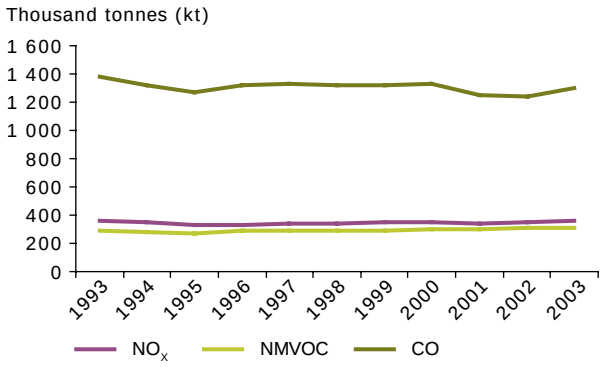
Indicator definition:
Generally, the indicator 'emissions of ozone precursors' tracks trends in anthropogenic emissions of ozone precursors such as nitrogen oxides, carbon monoxide, methane and non methane volatile organic compounds, each weighted by their tropospheric ozone-forming potential. Projections of emissions of ozone precursors present results of the RAINS and EMEP models for only three ozone precursors: nitrogen oxides (NO_x), carbon monoxide (CO) and non-methane volatile organic compounds (NMVOCs) *.

Key policy question:
What progress is being made and what are the prospects for reducing the emission of ozone precursors in the Western Balkans?

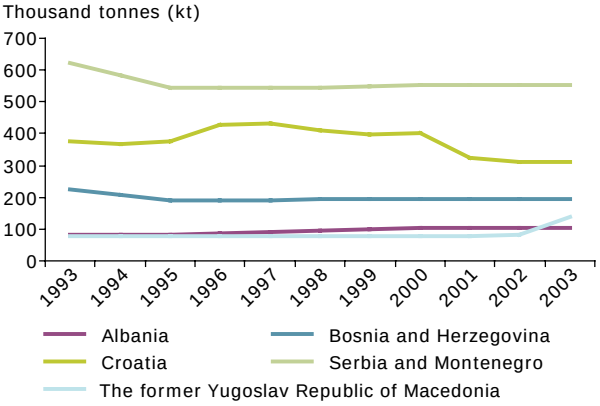
Past and present trends

Key message:
Emissions of ozone precursors in Western Balkans from 1993 to 2003 **, have stayed relatively stable over this time period with an initial decline from 1993 to 1995 followed by increases until 2003. Emissions over the ten-year period increased by less then 1 % for NO_x and about 8.4 % for NMVOC while CO emissions decreased by 6 %.

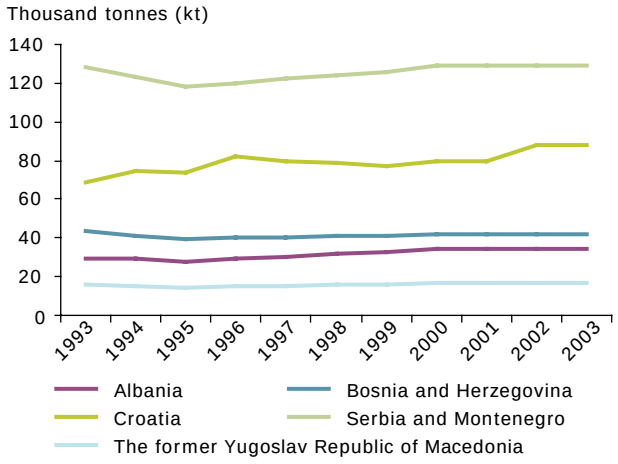
Ozone precursors in the Western Balkans, 1993–2003



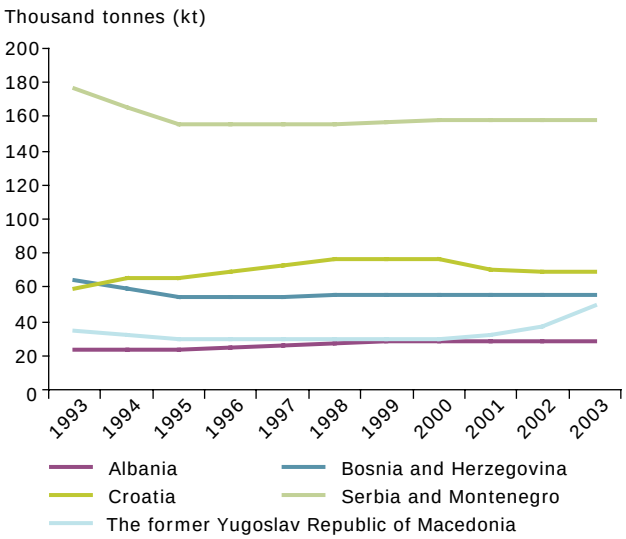
CO emissions in the Western Balkans, 1993–2003



NMVOC emissions in the Western Balkans, 1993–2003



NO_2 emissions in the Western Balkans, 1993–2003



Assessment:
NO_2 emissions remained at a stable level from 1993 to 2003, with different trends in the Western Balkan countries. Albania, Croatia and the former Yugoslav Republic of Macedonia registered increased emissions (by 21 %, 17 % and 47 % respectively), while Bosnia and Herzegovina and Serbia and Montenegro saw reductions by 14 % and 11 %.
Emissions of NMVOC increased in all Western Balkan states other than Bosnia and Herzegovina (– 4.5 %) amounting to a total of plus 8.4 % between 1993 and 2003. The most significant increases were registered in Croatia with 27.5 % (from 69 kt to 88 kt) and in Albania with 17.2 % (from 29 kt to 32 kt). Serbia has seen stable emissions levels, but was nevertheless responsible for 41 % of total Western Balkan NMVOC emissions in 2003. While CO emissions in the Western Balkan states overall declined by 6 %, development differs considerably from country o country. Bosnia and Herzegovina, Serbia and Montenegro and Croatia registered a decline of emissions between 11 % and 17 % whereas Albania and the former Yugoslav Republic of Macedonia show increases of 21 % and 81 % respectively.

Source: Inventory Review 2005, Emission Data reported to LRTAP Convention and NEC Directive, ISSN 0804-2446.

Temporal coverage: 1993–2003.

Spatial coverage: Albania, Bosnia and Herzegovina, Croatia, the former Yugoslav Republic of Macedonia, Serbia and Montenegro.

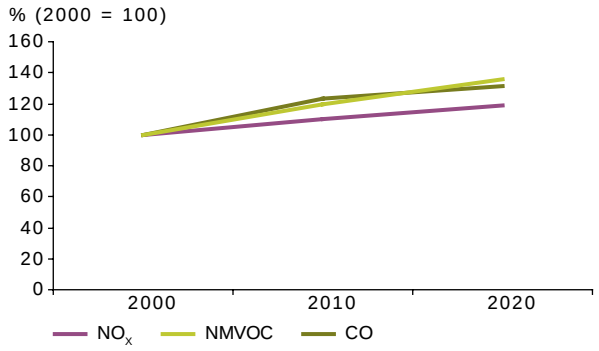
* This indicator is based on the results of RAINS and EMEP models presented in the Inventory Review 2005, Emission Data reported to LRTAP Convention and NEC Directive ISSN 0804-2446. GAINS model (a successor of RAINS model) include also projections for all ozone precursors: nitrogen oxides, carbon monoxide, methane and non methane volatile organic compounds.

** It should be noted that for some of the Western Balkan countries (Croatia, the former Yugoslav Republic of Macedonia, Serbia) updated national data sets until 2007 are available at Eionet as part of the reporting obligations for the LRTAP convention. However, construction of an update for the regional indicator was not possible due to lack of updated data for some of the pollutants and lack of updates for the other countries in the region.

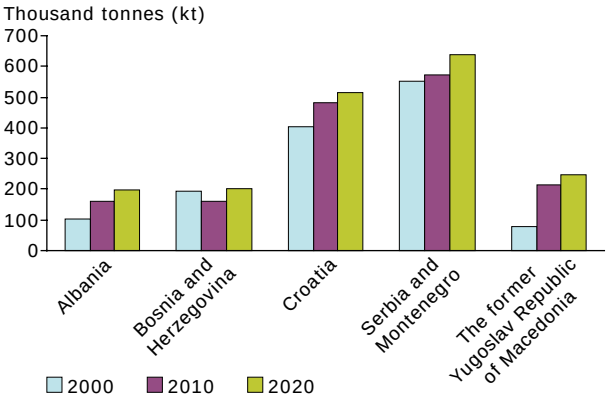
Outlook trends

Key message:
Although some slight reduction of emissions of ozone precursors was registered in the Western Balkans since 1990, the baseline scenario projections suggest that from 2000 to 2020 NO_2, CO and NMVOC emissions are expected to grow by 19 %, 36 % and 31 % respectively with not a single country in the region expected to see a reduction in either of these emissions *.

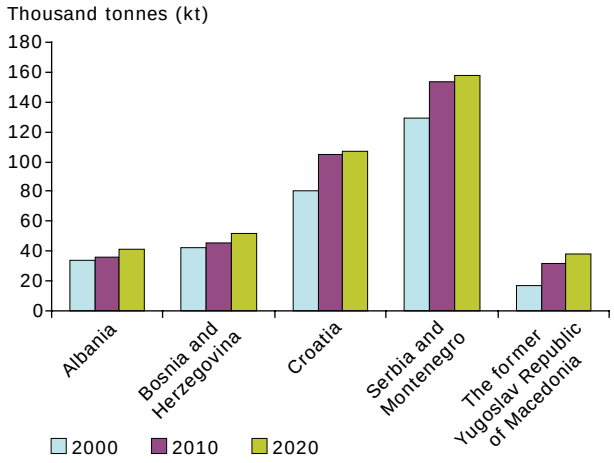
Total projected ozone precursors in the Western Balkans until 2020



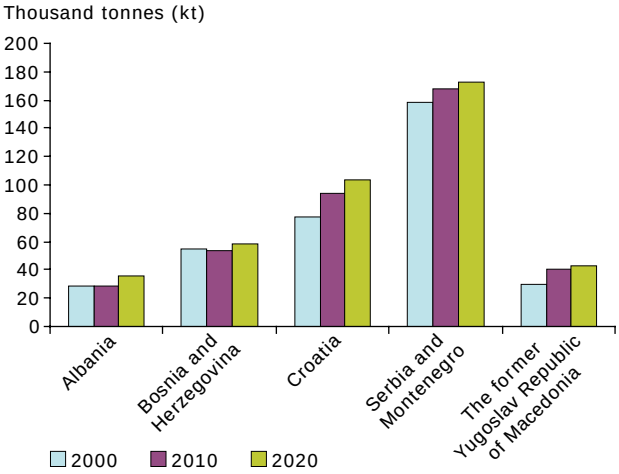
Projected CO emissions in the Western Balkans until 2020



Projected NMVOC emissions in the Western Balkans until 2020



Projected NO_2 emissions in the Western Balkans until 2020



Assessment:
All Western Balkan countries are projected to increase their NO_2 emissions between 2000 and 2020. Increases vary, from as little as 5 % in Bosnia and Herzegovina to as much as 35 % in Croatia and 43 % in the former Yugoslav Republic of Macedonia.
NMVOC emissions will likely see a significant growth in all Western Balkan countries, rising by 31 % overall. Emission growth rates for the individual countries are projected to be between 21 % and 33 % with the exception of the former Yugoslav Republic of Macedonia where a growth of 124 % is forecast.
Although a significant reduction of emissions from 1990 to 2000 is registered in all the Western Balkans countries CO emissions are expected to grow between 5 % (Bosnia and Herzegovina) and over 200 % (the former Yugoslav Republic of Macedonia) from 2000 to 2020. The biggest emitters in the region currently are Serbia and Croatia which are likely to stay that way in 2020 as well.

Source: Inventory Review 2005, Emission Data reported to LRTAP Convention and NEC Directive, ISSN 0804-2446.

Temporal coverage: 2000–2020.

Spatial coverage: Albania, Bosnia and Herzegovina, Croatia, the former Yugoslav Republic of Macedonia, Serbia and Montenegro.

* New set of projections will be available in December 2009 from IIASA's model GAINS-Europe as part of the work dedicated to the revision of the Gothenburg Protocol.

CSI 003 Emissions of primary particles

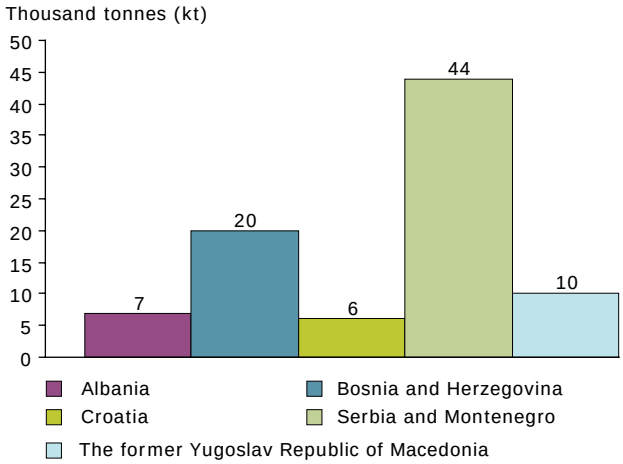
Indicator definition:
This indicator tracks trends in emissions of primary particulate matter PM_{10} and $PM_{2.5}$. 'PM_{10}' means particulate matter which passes through a size-selective inlet with a 50 % efficiency cut-off at 10 mm aerodynamic diameter;
'$PM_{2.5}$' means particulate matter which passes through a size-selective inlet with a 50 % efficiency cut-off at 2.5 mm aerodynamic diameter.
Projections of emissions of primary particulates present results of the RAINS and EMEP models for both PM_{10} and $PM_{2.5}$ *.

Key policy question:
What progress is being made and what are the prospects for reducing particulate matter in the Western Balkans?

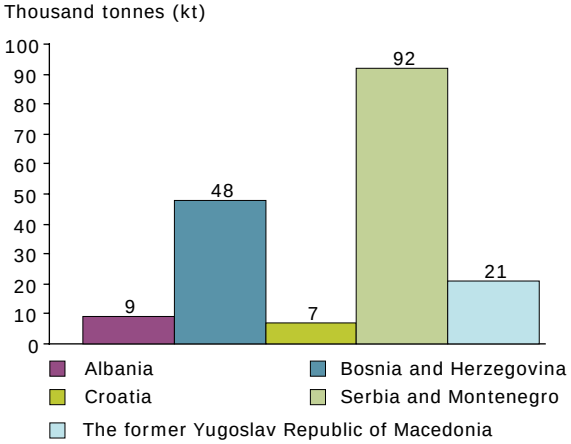
Past and present trends

Key message:
The limited past trends data available shows no change in emissions between 2000 and 2003 **.

Annual emissions of $PM_{2.5}$ in the Western Balkans, 2000–2003



Annual emissions of PM_{10} in the Western Balkans, 2000–2003



Assessment:
The data available for the years from 2000 to 2003 are identical, indicating no or only minor variations of emissions during this time period.

Source: Inventory Review 2005, Emission Data reported to LRTAP Convention and NEC Directive ISSN 0804-2446.

Temporal coverage: 1993–2003.

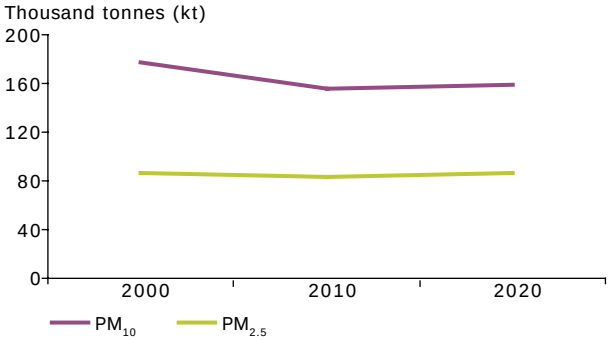
Spatial coverage: Albania, Bosnia and Herzegovina, Croatia, the former Yugoslav Republic of Macedonia, Serbia and Montenegro.

* In contrast to EEA CSI 003, this indicator only include PM and does not include secondary particulate matter precusors (NO_x, NH_3 and SO_2).
** It should be noted that for some of the Western Balkan countries (HR) updated national data sets for PM_{10} and $PM_{2.5}$ until 2007 are available at Eionet as part of the reporting obligations for the LRTAP convention. However, construction of an update for the regional indicator was not possible due to lack of the updates for the other countries in the region. The available data for Croatia show a decrease of 23.7 % as compared to 1990, and 3 % compared to 2000 for $PM_{2.5}$ and a decrease of 23.9 % compared to 1990 and 2,7 compared to 2006 for PM_{10}.

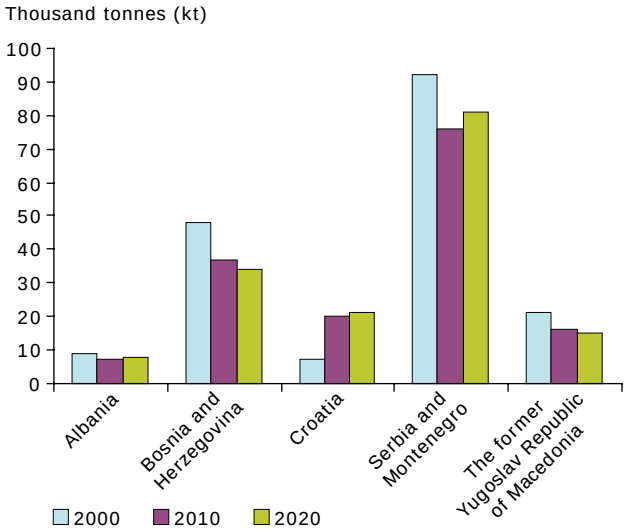
Outlook trends

Key message:
Under the baseline scenario PM_{10} emissions are projected to decrease somewhat over the 2000–2020 period, while $PM_{2.5}$ emissions are expected to stagnate. Both are forecast to decline initially but to increase slightly between 2010 and 2020 *.

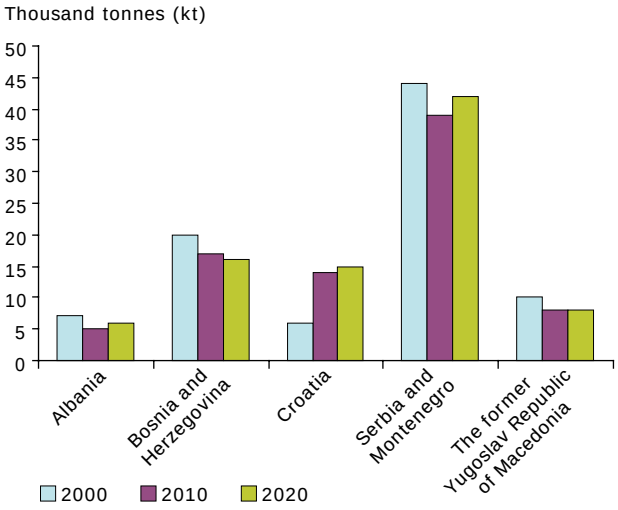
Projected PM_{10} and $PM_{2.5}$ emissions in the Western Balkans until 2020



Projected PM_{10} emissions in the Western Balkans until 2020



Projected $PM_{2.5}$ emissions in the Western Balkans until 2020



Assessment:
Overall PM_{10} emissions in the Western Balkans are projected to decrease by 10% between 2000 and 2020, even though the 2010 to 2020 period could show a slight increase in emissions.

On country level, PM_{10} emissions are projected to decline in most of Western Balkan countries during the 2000 to 2020 period. Emissions in Bosnia and Herzegovina and the former Yugoslav Republic of Macedonia are forecast to decline by around 29 % while Serbia and Montenegro and Albania see their emissions decline with 12 % and 11 % respectively. Croatia, however, is expected to see its PM_{10} output triple.
$PM_{2.5}$ emissions in the Western Balkans are expected to be the same in 2020 as they were in 2000. Forecasts indicate a slight dip between 2000 and 2010 which is then regained until 2020. Declines in emissions are expected in most countries of the region: between 14 % and 20 % in Albania, Bosnia and Herzegovina and the former Yugoslav Republic of Macedonia and a reduction of almost 5 % in Serbia and Montenegro. A significant increase in emissions (150 %) is projected for Croatia. For both PM_{10} and $PM_{2.5}$ Serbia and Montenegro was the biggest total emitter followed by Bosnia and Herzegovina.

Source: Inventory Review 2005, Emission Data reported to LRTAP Convention and NEC Directive ISSN 0804-2446.

Temporal coverage: 2000–2020.

Spatial coverage: Albania, Bosnia and Herzegovina, Croatia, the former Yugoslav Republic of Macedonia, Serbia and Montenegro.

* New set of projections will be available in December 2009 from IIASA's model GAINS-Europe as part of the work dedicated to the revision of the Gothenburg Protocol.

Agriculture

CSI 026 Area under organic farming

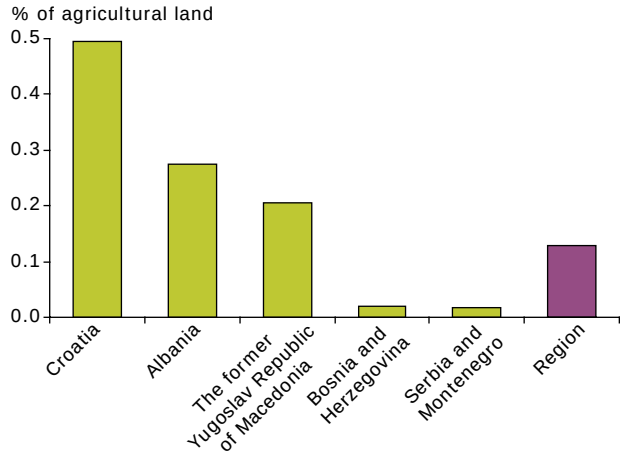
Indicator definition:
The share of organic farming area (i.e. the sum of existing organically farmed areas and areas in process of conversion) is presented as a proportion of total utilised agricultural area (UAA).

Key policy question:
What are the environmentally-relevant key trends in agricultural production systems in the Western Balkans?

Past and present trends

Key message:
The share of organic farming in the Western Balkan countries is at the moment negligible. In 2006 only 0.13 % of the total agricultural land was utilised for this purpose.

Organic farming in the Western Balkans, 2006



Note: Data on area under organic farming for Bosnia and Herzegovina have been estimated.

Assessment:
The organic farming sector is currently under development in the Western Balkan countries (with the exception of Bosnia and Herzegovina) and new strategies and policies are being prepared and implemented. The 2006 figure could be compared with the similar level, below 0.5 % share of organic farming, seen in the EU-10 Member States at the end of 1990s.
Due to gaps in time series it is difficult to assess the changes over the past years at regional level; as new data becomes available, the quality of this indicator should improve in the future.

Source: Albania: Ministry of Agriculture, Food and Consumer Production (MoAFCP).
Bosnia and Herzegovina: State Agency of Statistics of Bosnia and Herzegovina.
Croatia: National Bureau of Statistics; Ministry of Agriculture, Fisheries and Rural Development.
The former Yugoslav Republic of Macedonia: Statistical Yearbook, 2005, State Statistical Office; Ministry of Agriculture, Forestry and Water Economy, Division of Organic farming.
Serbia: Controlling Organization of Organic Production; Ministry of Agriculture, Forestry and Water Management.

Temporal coverage: 2006.

Spatial coverage: Albania, Bosnia and Herzegovina, Croatia, the former Yugoslav Republic of Macedonia, Serbia.

Biodiversity

CSI 008 Designated areas

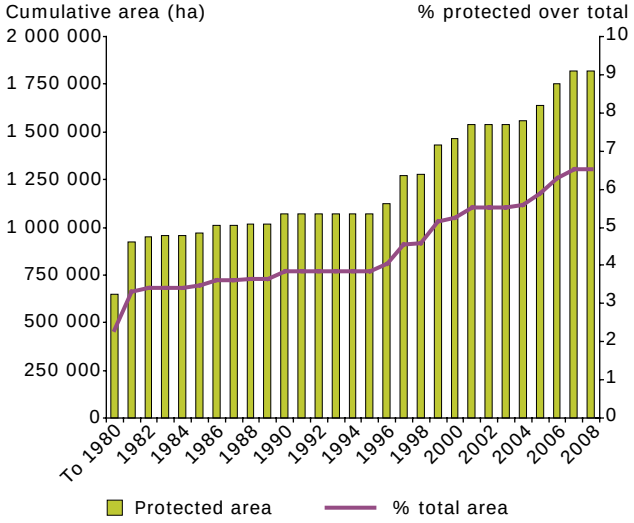
Indicator definition:
The indicator is defined as the cumulative area of designated areas according to national legislation over time expressed in hectares (ha) and in the percentage of national land area.

Key policy question:
What measures are being taken to ensure the *in situ* conservation of biodiversity components in the Western Balkans?

Past and present trends

Key message:
The Western Balkan region has seen an increase in total area under national protection since the 1980s, reaching 6.5 % in 2007. Figures vary from country to country with the highest percentage recorded in Albania with 10.4 %, followed by Croatia 8.5 %, the former Yugoslav Republic of Macedonia 7.4 %, Serbia 6.3 %, Bosnia and Herzegovina 0.8 %.

Cumulative national designated areas over time in the West Balkan region until 2008



Note: Overlap may exist due to multiple designations for a same site. * Data for Croatia in 2007 actually correspond to 2008.

Assessment:
The Western Balkan region has seen an increase in total area under national protection since the 1980s. The total reached 1 816 846 ha in 2007. The highest percentage of total land area is recorded in Albania (10.4 %) and the lowest in Bosnia and Herzegovina (of 0.77 %), due to a switch to a new IUCN classification scheme.
IUCN categorisation has been integrated in national legislation in only three countries Albania, Croatia and the former Yugoslav Republic of Macedonia.
Some of the countries have introduced national targets for protected areas. For example, Serbia is targeting to protect 10 % of the territory by 2010, while the former Yugoslav Republic of Macedonia has an even higher target of 12 %.

Source: Albania: the Ministry of Environment, Forests and Water Administration.
Bosnia and Herzegovina and Serbia: CDDA, 7.5 v.
Croatia: Registry of protected natural values, Ministry of Culture.
The former Yugoslav Republic of Macedonia: CDDA; Emerald database.

Temporal coverage: 1980s–2007.

Spatial coverage: Albania, Bosnia and Herzegovina, Croatia, the former Yugoslav Republic of Macedonia, Serbia.

Climate change

CSI 006 Production and consumption of ozone-depleting substances

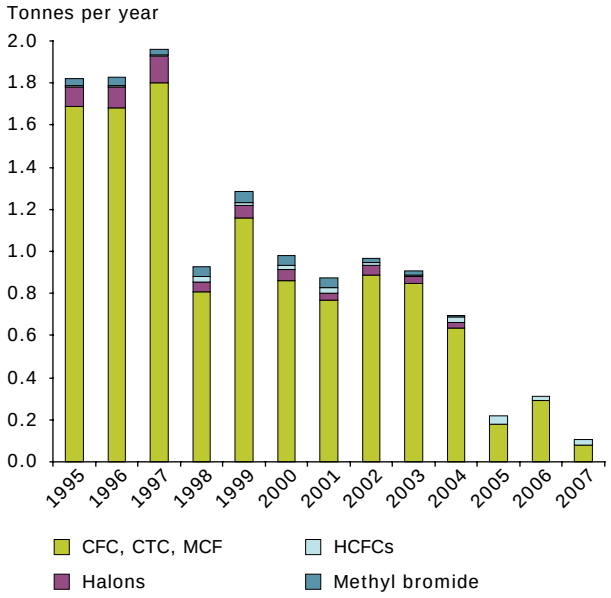
Indicator definition:
This indicator quantifies the production and consumption of ozone-depleting substances (ODSs) per year, weighted by their ozone depletion potential (ODP). ODSs are long-lived chemicals that contain chlorine or/and bromine and that destroy the stratospheric ozone layer.

Key policy question:
Are ozone-depleting substances being phased out in accordance with the agreed schedule?

Past and present trends

Key message:
The total consumption of ozone-depleting substance in the Western Balkan countries has decreased as a result of the implementation of international policies and in accordance with the agreed schedule. There is no production of ODSs in the region.

Production of ozone depleting substances in the Western Balkans, 1995–2007



Note: CFC: Chloro-fluoro-carbon; CTC: Carbon-tetra-chloride; MCF: Methyl-chloro-form and HCFC: Hydro-chloro-fluoro-carbon.
The data before 1995 for some countries are incomplete; the time series are therefore presented for the period from 1995 to 2007 only.

Assessment:
The total consumption of ODSs in the Western Balkan region decreased by almost 95 % between 1995 and 2007 in accordance with the international regulations and the agreed schedules. The largest share of ODS consumption in the region originates from the refrigeration and foam sectors. Serbia, as the most populous country in the region, had the largest share of ODS consumption with almost 60 % in 2007, followed by Bosnia and Herzegovina with 26 %.

Source: Albania and Serbia: UNEP Ozone Secretariat, http://ozone.unep.org/Data_Reporting/Data_Access/.
Bosnia and Herzegovina: Ozone Unit, the Ministry of Foreign Trade and Economic Relations (MoFTER).
Croatia: the Ministry of Environmental Protection, Physical Planning and Construction (MEPPPC).
The former Yugoslav Republic of Macedonia: Ozone Unit, the Ministry of Environment and Physical Planning (MEPP).

Temporal coverage: 1995–2007.

Spatial coverage: Albania, Bosnia and Herzegovina, Croatia, the former Yugoslav Republic of Macedonia, Serbia.

Energy

CSI 027 Final energy consumption by sector

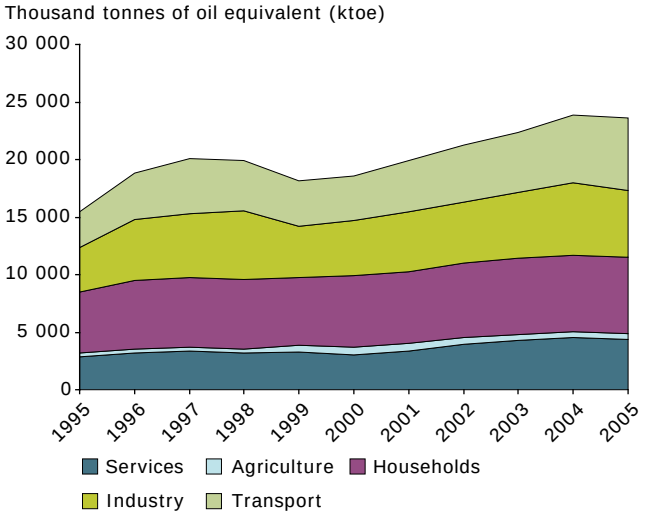
Indicator definition:
Final energy consumption covers energy supplied to the final consumer's door for all energy uses. It is calculated as the sum of final energy consumption from all sectors. These are disaggregated to cover industry, transport, households, services and agriculture.

Key policy question:
Are we using less energy?

Past and present trends

Key message:
Final energy consumption in the Western Balkan countries has increased since 1995, despite an abrupt annual fall in 1999. Transport, the fastest-growing sector, doubled over the past decade. Household consumption, although losing share to transport, remained as the largest consumer of final energy in 2005.

Final energy consumption by sector in the Western Balkans, 1995–2005



Assessment:
Final energy consumption in the Western Balkan region has increased by 53 % between 1995 and 2005, with an abrupt annual fall in 1999 of 9 % due to the political turmoils in the region.
The fastest-growing sector is transport, whose energy consumption doubled since 1995, reaching a total share of 27 % in 2005, while the largest sector remains households, with 28 %.
Final energy intensity per capita in 2005 for the Western Balkan region was 1.12 toe/cap, which is more than half of the energy intensity for the EU-27 of 2.4 toe/cap.

Source: Data on final energy consumption by sector and by country: Data Services, International Energy Agency, http://wds.iea.org/WDS/Common/Login/login.aspx.
Data on population: National Accounts Main Aggregates Database, United Nations Statistics Division, http://unstats.un.org/unsd/snaama/selectionbasicFast.asp.

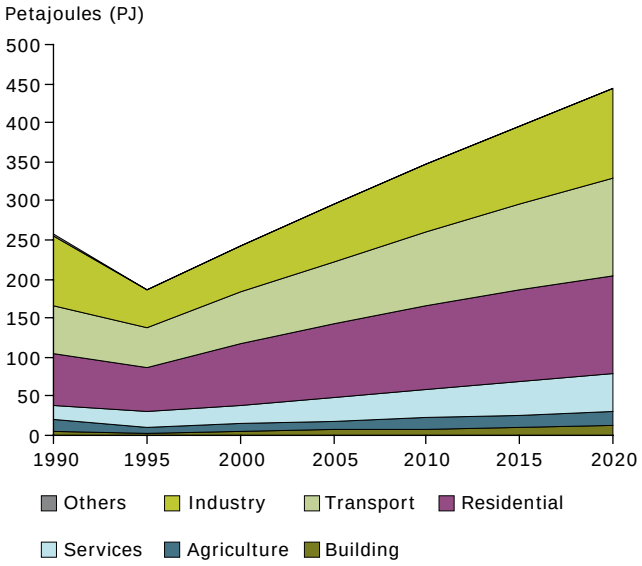
Temporal coverage: 1995–2005.

Spatial coverage: Albania, Bosnia and Herzegovina, Croatia, the former Yugoslav Republic of Macedonia, Serbia.

Outlook trends in Croatia

Key message:
Final energy consumption in Croatia is projected to grow over 50% from 2005 to 2020. Transport presents the highest growth rate, closely followed by services and industry. Residential consumption is forecast to grow more slowly, but should in 2020 still be the largest consumer of final energy ahead of transport, albeit by a small margin.

Final energy consumption in Croatia per sector, 1990–2020



Note: Based on historical data up to 1995.

Assessment:
Final Energy Consumption in Croatia is projected to grow ca 50 % from 2005 to 2020. That corresponds to 2 % growth per annum for this period.
The strongest drivers of consumption growth are transport, services and industry with 58 %, 56% and 54 % respectively
In 2020, Residential consumption is projected to remain the largest consumer of energy with 28.4 % (down from 31.3 % in 2005), closely followed by the faster growing transport sector with 28.3 % (up from 27 % in 2005). The share of industrial energy consumption increases to 25.5 % (from 24.9 % in 2005).

Source: First National Communication of Croatia under UNFCCC (2002).

Temporal coverage: 1990–2020.

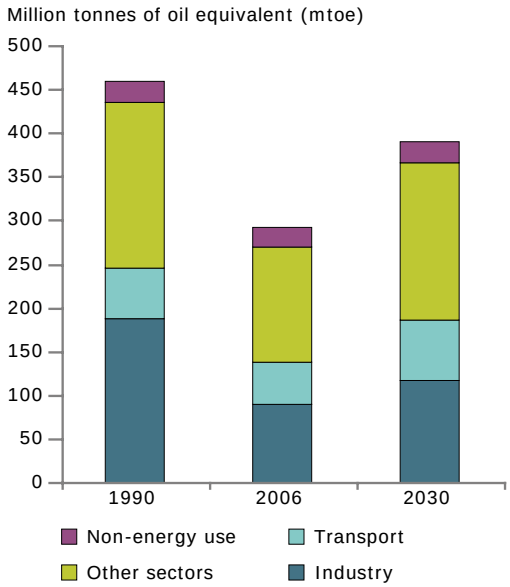
Spatial coverage: Croatia.

Outlook trends — Eurasia without Russia

The outlook below is based on data for a larger region that includes the Western Balkans. It should therefore be used with care and only seen as an indication of trends.

Key message:
If current technological trends continue and government policies that have been adopted are implemented, final energy consumption is expected to grow almost 34 % from 2006 to 2030. The fastest growing sector is projected to be transport with an increase of 42 % over this period while energy consumption by industry is forecast to increase by 31 % and other sectors, (including household consumption) grow by 36 % and thereby collectively remain the largest consumer of final energy through 2030.

Final energy consumption by sector in Eurasia without Russia, 1990, 2006 and projections for 2030

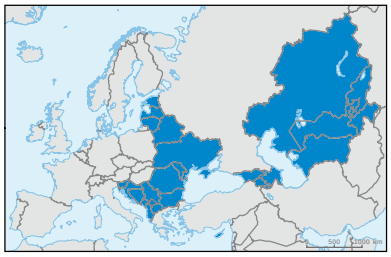


Assessment:
Final energy consumption in Eurasia without Russia is expected to grow with almost 34 % over the covered time period. Transport continues to have the strongest growth in energy consumption. It is also projected to have its dependence on oil based energy sources increase from 67 % in 2006 to 70 % in 2030. Biofuels are expected to account for only 1 % of energy use in the transport sector in 2030, up from 0 % in 2006.

Source: IEA — World Energy Outlook 2008.

Temporal coverage: 1990–2030.

Spatial coverage: Eurasia — Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Republic of Moldova, Tajikistan, Turkmenistan, Ukraine, Uzbekistan, Albania, Bosnia and Herzegovina, Croatia, Montenegro, the former Yugoslav Republic of Macedonia, Serbia, Bulgaria, Cyprus, Malta, Latvia, Lithuania, Romania, Slovenia, Estonia, Gibraltar.



CSI 028 Total energy intensity

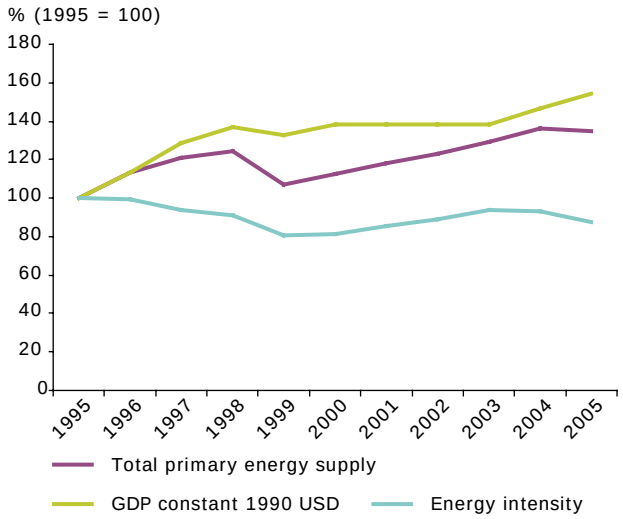
Indicator definition:
Total energy intensity is the ratio between Gross Inland Consumption of Energy (or total primary energy consumption) and Gross Domestic Product calculated for a calendar year.
Gross Inland Consumption of Energy is calculated as the sum of the primary energy consumption of the five types of energy: solid fuels, oil, gas, nuclear and renewable sources.
The time series of GDP is taken in constant prices to avoid the impact of the inflation (in million USD at constant 1990 prices).
The energy intensity ratio is the result of dividing Gross Inland Energy Consumption by GDP.

Key policy question:
Are we decoupling energy consumption from economic growth?

Past and present trends

Key message:
Total primary energy supply and GDP have both increased gradually in the Western Balkan countries since 1995. However, total energy intensity overall has decreased in the same period. This could be associated with the increase in GDP rather than with improvements in energy efficiency.

Energy intensity in the Western Balkans, 1995–2005



Assessment:
Total primary energy supply and GDP increased by 35 % and 54 %, respectively between 1995 and 2005. The total energy intensity overall has decreased in the same period as a result of the faster increase in GDP rather than improvements in energy efficiency. All three trends saw a sharp fall in 1999 as a result of political turmoil in the region. Serbia, as the biggest country, is the biggest energy consumer in the region.

Source: Data on total primary energy supply by country: Data Services, International Energy Agency, http://wds.iea.org/WDS/Common/Login/login.aspx.
Data on GDP constant 1990 USD: National Accounts Main Aggregates Database, United Nations Statistics Division, http://unstats.un.org/unsd/snaama/selectionbasicFast.asp.

Temporal coverage: 1995–2005.

Spatial coverage: Albania, Bosnia and Herzegovina, Croatia, the former Yugoslav Republic of Macedonia, Serbia.

CSI 029 Primary energy consumption by fuel

Indicator definition:
Total energy consumption by fuel is made up of production plus imports, minus exports, minus international marine bunkers plus/minus stock changes. It is also called 'total primary energy supply' or 'gross inland energy consumption' and represents the quantity of all energy necessary to satisfy inland consumption.

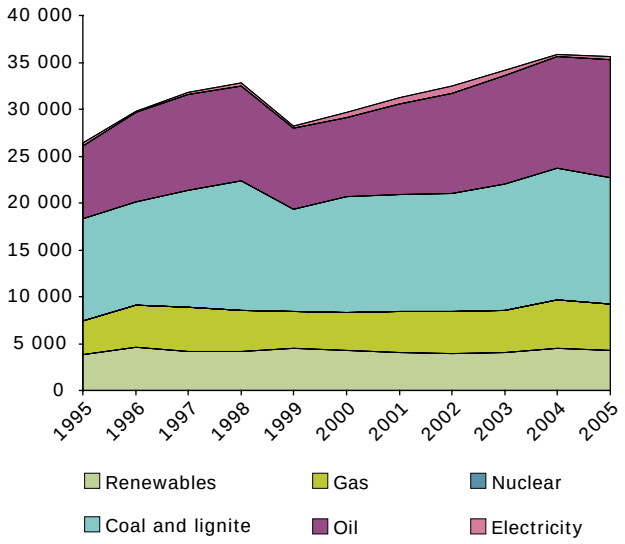
Key policy question:
Are we switching to less polluting fuels to meet our energy consumption?

Past and present trends

Key message:
Fossil fuels in the Western Balkans are dominant in the total energy consumption. Renewable energy sources provided 12 % of the region's energy in 2005, somewhat higher than the EU-27 average, mainly due to abundant water resources and hydroelectric production in the region.

Primary energy consumption by fuel in the Western Balkans, 1995–2005

Thousand tonnes of oil equivalent (ktoe)



Assessment:
In the Western Balkan region, fossil fuels provided almost 87 % of energy consumed in 2005. Renewable energy sources accounted for 12 %, almost twice the EU-27 average of 6.7 %, mainly due to the rich water resources in the region. Total primary energy consumption increased by 35 % over the period from 1995 to 2005.
The countries in the region are establishing new legislation and strategies to address energy efficiency, reduce the consumption of fossil fuels and promote the usage of renewable sources.

Source: Data on primary energy consumption by fuel: Data Services, International Energy Agency, http://wds.iea.org/WDS/Common/Login/login.aspx.

Temporal coverage: 1995–2005.

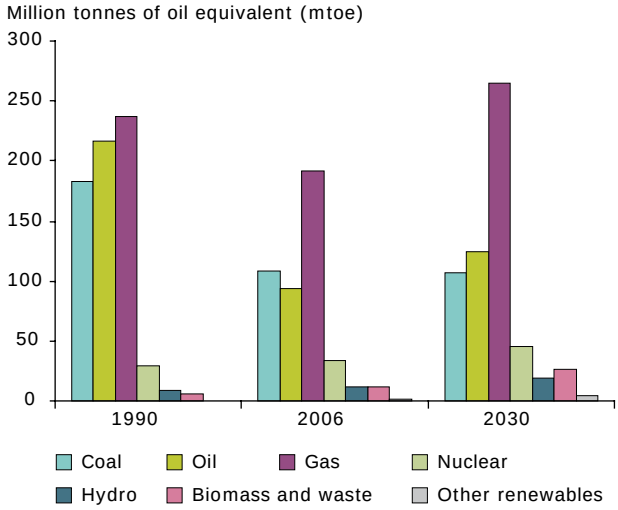
Spatial coverage: Albania, Bosnia and Herzegovina, Croatia, the former Yugoslav Republic of Macedonia, Serbia.

Outlook trends — Eurasia without Russia

The outlook below is based on data for a larger region that includes the Western Balkans. It should therefore be used with care and only seen as an indication of trends.

Key message:
If current technological trends continue and government policies that have been adopted are implemented, overall energy consumption will grow and fossil fuels are projected to remain dominant in the Eurasian region throughout 2030. The share of renewable energy sources should however increase.

Total primary energy consumption by fuel in Eurasia without Russia, 1990, 2006 and projections for 2030

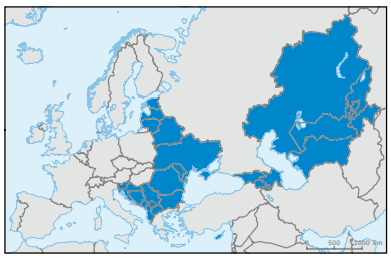


Assessment:
Based on current trends and policies, coal is projected to decrease its share in Primary Energy Consumption from 24 % to 18 % and gas to increase its share from 42 % to almost 45 % while oil hovers around the 21 % mark. Fossil fuels are projected to remain the major source of primary energy in Eurasia.
Renewable energy sources are forecast to increase their share considerably, with biomass and hydroelectricity leading this growth. Projections for Total Energy Consumption in Eurasia indicate a 32 % increase over the 2006-2030 timeline.

Source: IEA — World Energy Outlook 2008.

Temporal coverage: 1990–2030.

Spatial coverage: Eurasia — Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Republic of Moldova, Tajikistan, Turkmenistan, Ukraine, Uzbekistan, Albania, Bosnia and Herzegovina, Croatia, Montenegro, the former Yugoslav Republic of Macedonia, Serbia, Bulgaria, Cyprus, Malta, Latvia, Lithuania, Romania, Slovenia, Estonia, Gibraltar.



CSI 030 Renewable primary energy consumption

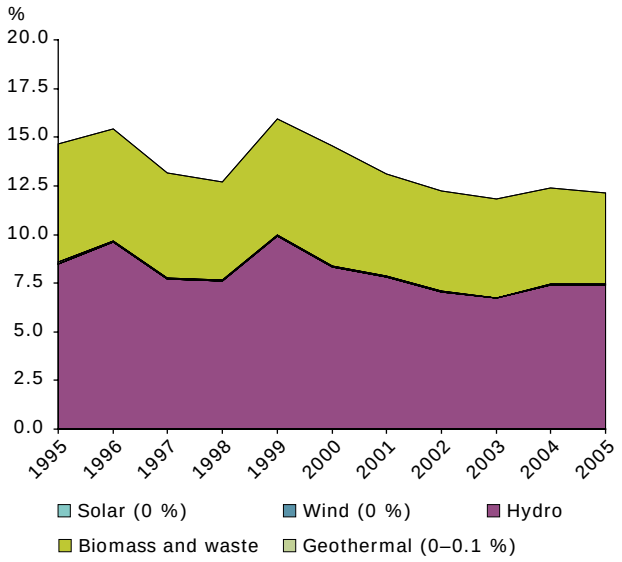
Indicator definition:
Renewable energy consumption is the ratio between the gross inland consumption of energy from renewable sources and the total (primary) gross inland energy consumption calculated for a calendar year. It is usually expressed as a percentage of the former to the latter. It measures the contribution of renewable energy sources to the total primary consumption of energy.
Renewable energy sources are defined as renewable non-fossil energy sources: wind, solar, geothermal, wave, tidal, hydropower, biomass, landfill gas, sewage treatment plant gas and biogases.

Key policy question:
Are we switching to renewable energy sources to meet our energy consumption?

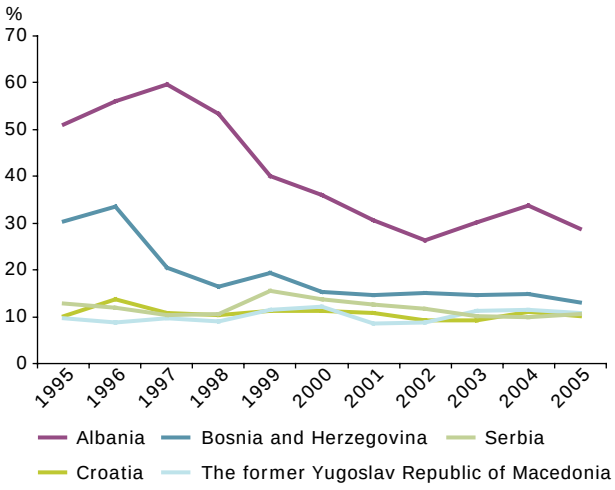
Past and present trends

Key message:
The share of renewable energy sources, mainly hydropower and biomass, in primary energy consumption declined slowly between 1995 and 2005. Other renewable sources of energy — e.g. wind, solar and geothermal sources — remained negligible with less than 1 % of the total.

Share of renewable sources in total primary energy consumption in the Western Balkans, 1995–2005



Share of renewable sources in primary energy consumption in the Western Balkans by country, 1995–2005



Assessment:
A gradual decline of renewable energy sources in primary energy consumption since 1995 could be explained through the increase in total primary energy consumption of 35 %. The West Balkan region has already achieved the EU indicative target of 12 % share of renewable energies in 'primary energy consumption in the EU by 2010', but the future trend should be closely monitored due to the visible decline in the last decade.

Source: Data Services, International Energy Agency, http://wds.iea.org/WDS/Common/Login/login.aspx.

Temporal coverage: 1995–2005.

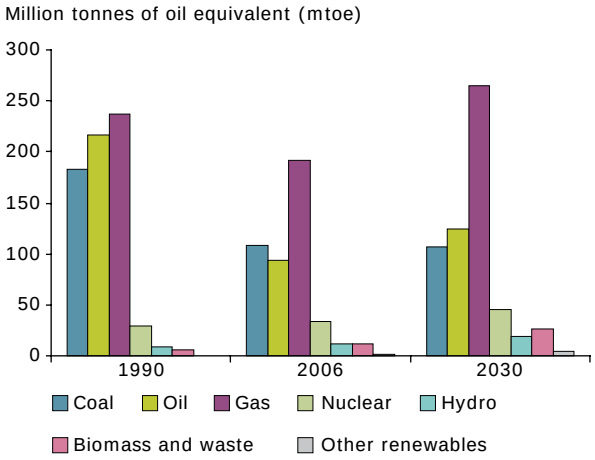
Spatial coverage: Albania, Bosnia and Herzegovina, Croatia, the former Yugoslav Republic of Macedonia, Serbia.

Outlook trends — Eurasia without Russia

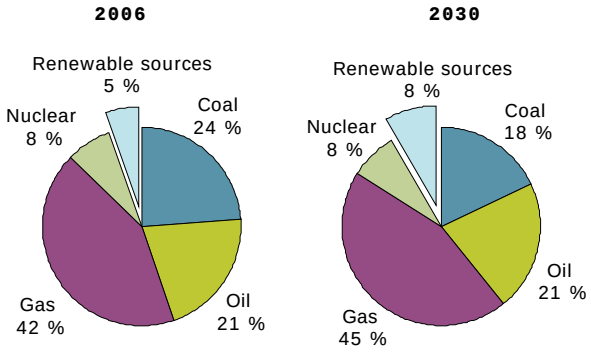
The outlook below is based on data for a larger region containing the Western Balkans data. It should therefore be used with care and only seen as an indication of trends.

Key message:
If current technological trends continue and government policies that have been adopted are implemented, the share of renewable primary energy consumption is projected to increase slightly in Eurasia in the coming years.

Total primary energy consumption by fuel in Eurasia without Russia, 1990, 2006 and projections for 2030



Energy production by fuel in Eurasia without Russia, 2006 and projections for 2030

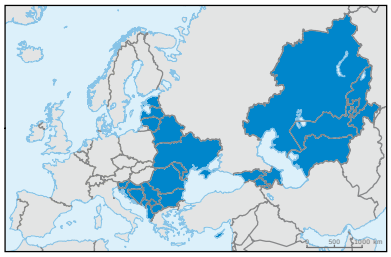


Assessment:
The share of renewable energy sources in the Eurasian region is projected to rise from 5.3 % in 2006 to 8.4 % in 2030 taking over market share from coal which is projected to see a decrease in its share of primary energy consumption from 24 % to 18 % over the same period of time.
Biomass is projected to be the strongest growing source of renewable energy, with an increase from 2.7 % of overall energy consumption in 2006 to 4.4 % in 2030.
Projections for primary energy consumption in Eurasia indicate a 32 % increase over the 2006–2030 timeline.

Source: IEA — World Energy Outlook 2008.

Temporal coverage: 1990–2030.

Spatial coverage: Eurasia without Russia — Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Republic of Moldova, Tajikistan, Turkmenistan, Ukraine, Uzbekistan, Albania, Bosnia and Herzegovina, Croatia, Montenegro, the former Yugoslav Republic of Macedonia, Serbia, Bulgaria, Cyprus, Malta, Latvia, Lithuania, Romania, Slovenia, Estonia, Gibraltar.



CSI 031 Renewable electricity

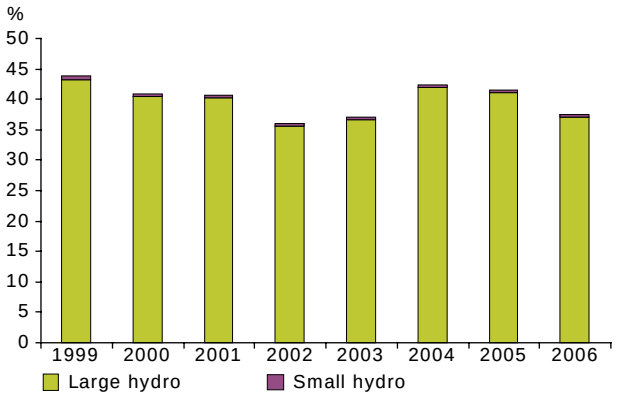
Indicator definition:
The share of renewable electricity is the ratio between the amount of electricity produced from renewable sources (e.g. wind, solar, geothermal, wave, tidal, hydropower, biomass, landfill gas, sewage treatment plant gas and biogases) and gross national electricity consumption calculated for a calendar year. It is usually expressed as a percentage.

Key policy question:
Are we switching to renewable energy sources to meet electricity consumption in the region?

Past and present trends

Key message:
Renewable electricity generation provides a significant share of the consumption of electricity in the Western Balkan countries. Almost all the renewable electricity in the region comes from large hydropower plants. Hydropower production is strongly affected by climate factors such as low rainfall — which occurred in 2002, 2003 and 2006. The production of electricity from other renewable sources in this region is insignificant at the moment. The Western Balkan countries as a whole have a higher share of renewable electricity compared with the EU-27 (14 %) and have already exceeded the EU target of 21 % for 2010.

Share of renewable electricity in total national electricity consumption in the Western Balkans, 1999–2006



Share of renewable electricity (%) in the Western Balkans, 1999–2006

	1999	2000	2001	2002	2003	2004	2005	2006
Albania	94	81	67	58	84	92	91	86
Bosnia and Herzegovina	61	63	71	53	53	67	62	52
Croatia	45	40	43	34	30	42	37	34
The former Yugoslav Republic of Macedonia	21	17	9	11	18	19	17	21
Serbia	34	34	34	34	32	33	35	30
Region	44	41	41	36	37	42	42	37

Note: Facilities with installed capacity exceeding 10 MW are considered as large hydropower plants.
The indicator includes Albania, Bosnia and Herzegovina, Croatia, the former Yugoslav Republic of Macedonia and Serbia. Nevertheless, data for some countries is not available or based on estimates. For the former Yugoslav Republic of Macedonia, the split between large and small hydro for 2003 and 2005 is missing and was estimated, and the figures for 2006 were also based on estimates. Data for Serbia was collected every four years between 1990 and 2002, so rough estimates were used for the period from 1999 to 2001.

Assessment:
Renewable electricity generation provided 37 % of electricity consumption in the Western Balkan region in 2006. The share of renewable electricity production ranges from 21 % in the former Yugoslav Republic of Macedonia to 86 % in Albania.
The share of renewable electricity produced declined by 7 percentage points over the period 1999–2006, which saw a 21 % increase in total amount of electricity consumption in the same period.

Source: Albania: Albanian National Agency of Natural Resources, based on Albania Power Corporation (KESH) data; Bosnia and Herzegovina: private company Bosna-S, based on the Study on Energy Sector in Bosnia and Herzegovina; Croatia: Energy Institute Hrvoje Požar, Ministry of Economy, Labour and Entrepreneurship; the former Yugoslav Republic of Macedonia: the State Statistical Office, 'Energy balances of The Republic of Macedonia' — Ministry of Economy; Serbia: the Energy balances of the Republic of Serbia, Ministry of Mining and Energy (Ref: www.mem.gov.rs/), Electric Power Industry of Serbia, (Ref: www.eps.co.rs/).

Temporal coverage: 1999–2006.

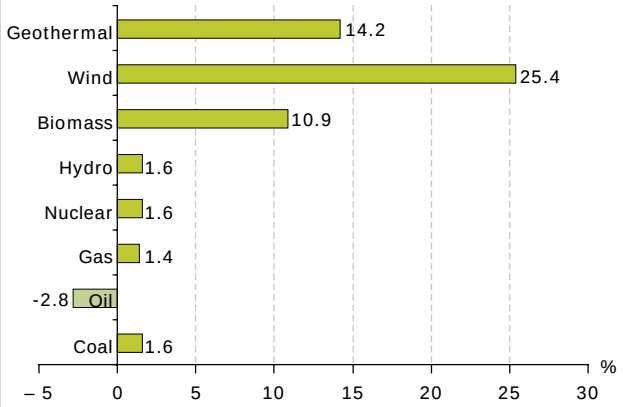
Spatial coverage: Albania, Bosnia and Herzegovina, Croatia, the former Yugoslav Republic of Macedonia, Serbia.

Outlook trends — Eurasia without Russia

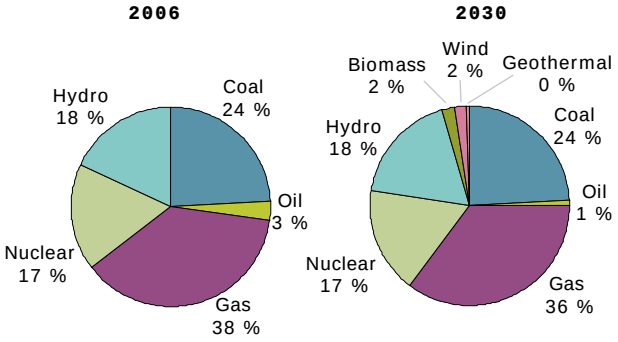
The outlook below is based on data for a larger region containing the Western Balkans data. It should therefore be used with care and only seen as an indication of trends.

Key message:
If current technological trends continue and government policies that have been adopted are implemented, the share of renewable electricity in overall electricity production is forecast to increase from 18 % in 2006 to about 22.5 % in 2030.

Projected growth of energy sources in Eurasia without Russia, 2006–2030



Fuel shares in electricity generation in Eurasia without Russia, 2006 and projections for 2030

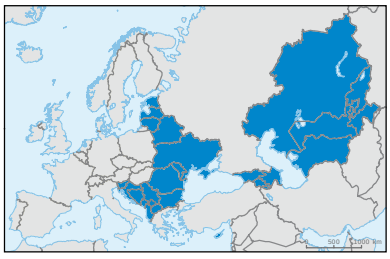


Assessment:
Hydropower is projected to remain the most important source of renewable electricity in Eurasia for the foreseeable future with a steady 18 % share of electricity generation.
The shares of wind, geothermal electricity and biomass/waste grow significantly; this however to their relatively small importance in 2006. By 2030 they are expected to reach 2 %, 0.45 % and 1.5 % of overall electricity generation respectively.
Solar power will grow but is only projected to reach a negligible contribution to electricity generation (0.16 %)

Source: IEA — World Energy Outlook 2008.

Temporal coverage: 1990–2030.

Spatial coverage: Eurasia — Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Republic of Moldova, Tajikistan, Turkmenistan, Ukraine, Uzbekistan, Albania, Bosnia and Herzegovina, Croatia, Montenegro, the former Yugoslav Republic of Macedonia, Serbia, Bulgaria, Cyprus, Malta, Latvia, Lithuania, Romania, Slovenia, Estonia, Gibraltar.



Terrestrial

CSI 014 Land take

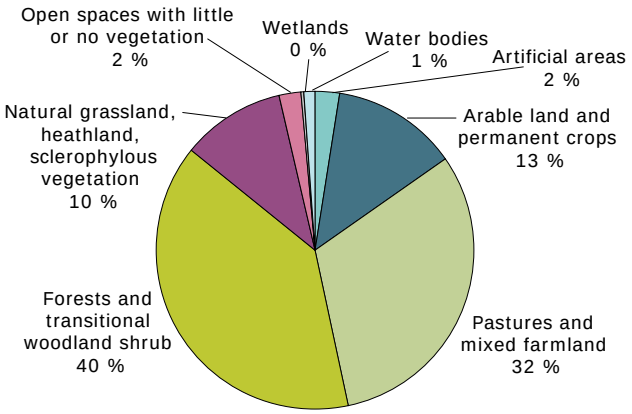
Indicator definition:
Increase in the amount of agriculture, forest and other semi-natural and natural land taken by urban and other artificial land development. It includes areas where soil is sealed by construction and urban infrastructure as well as urban green areas and sport and leisure facilities.

Key policy question:
How much and in what proportions is agricultural, forest and other semi-natural and natural land being taken for urban and other artificial land development?

Past and present trends

Key message:
The Western Balkans regional data indicates that in 2000, according to the Corine Land Cover (CLC) methodology, 39 % of the land was covered by forests and transitional woodland shrub, while 31 % was covered by mixed farmland. Arable land and permanent crops accounted for 13 % in the same year, while artificial areas covered 2 %.

Land cover by category in the Western Balkans, 2000



Note: The figures presented do not show the change in land taken by urban and other artificial areas, but the proportion of land-cover categories as a result of a single series of satellite images by the Corine Land Cover (CLC) studies in 2000. The information for Albania and Bosnia and Herzegovina has been estimated by performing a rudimentary colour pixel count over the 2000 pre-processed CLC images of the countries in order to be able to include them in the land cover study along with Croatia, the former Yugoslav Republic of Macedonia and Serbia.

Assessment:
In the last 15 years, a major human migration was observed in Western Balkans countries, caused by war and economic restructuring. The countries have experienced a shift from the countryside to urban and coastal areas, thus creating pressure on public services and infrastructure.
Across the Western Balkans, the figures indicate that 39 % of the land was covered by forests and transitional woodland shrub, while 31 % was covered by mixed farmland in 2000 according to the CLC 2000. Arable land and permanent crops accounted for 13 % of land that year, while artificial areas covered 2 %.
New legislation for physical planning and construction has been put in place in Albania, Croatia and the former Yugoslav Republic of Macedonia, however enforcement is often poor. Physical planning needs to gain importance on political agendas and should include attention to key elements such as biodiversity, natural and cultural heritage conservation, and sustainable use of natural resources.

Source: Albania, Bosnia and Herzegovina: CLC 2000, CLC changes 1990–2000; the Croatian Environment Agency (CEA). Year 2000 pre-processed CLC images, along with a color code list: http://dataservice.eea.europa.eu/atlas/viewdata/viewpub.asp?id=3211.
Croatia: CLC 2000, the Croatian Environment Agency (CEA).
The former Yugoslav Republic of Macedonia: CLC 2000; the Ministry of Environment and Physical Planning.
Serbia: CLC 2000, CLC90-00 ETC/TE; 'Corine Land Cover mapping - Serbian experience' study, 2007, Ivan Nestorov, Ph.D., M.Sc.,Geod. Eng. Dragutin Protić, Geod. Eng.

Temporal coverage: 2000.

Spatial coverage: Albania, Bosnia and Herzegovina, Croatia, the former Yugoslav Republic of Macedonia, Serbia.

Transport

CSI 035 Passenger transport demand

Indicator definition:
The indicator can be presented in two different ways:
- The volume of passenger transport relative to GDP, including separate trends for its two components in order to measure decoupling of passenger demand from economic growth.
- The percentage share of transport by passenger car in total inland transport (including road, railway and air transport) providing information on modal split share of passenger transport.

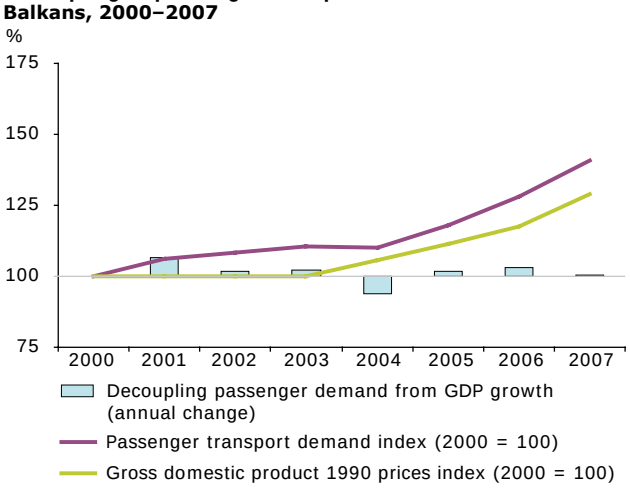
Key policy question:
Is passenger transport demand being decoupled from economic growth?

Specific policy question:
Is the share of passenger car transport in total inland transport being reduced relative to other transport modes?

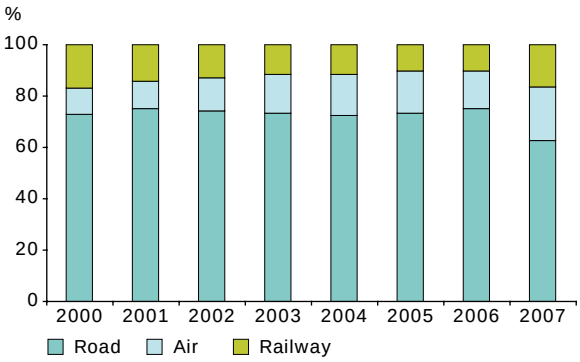
Past and present trends

Key message:
The fluctuations in passenger transport demand trend are attributable both to restructuring efforts following political turmoil's in the region as well as to gaps in passenger transport data as opposed to precise GDP figures in some countries. Although road transport remained as the dominant mode of travel in the region, air transport achieved the largest growth, more than 200 % during the period analysed.

Decoupling of passenger transport demand in the Western Balkans, 2000–2007



Passenger transport demand by mode in the Western Balkans, 2000–2007



Note: If the decoupling indicator (vertical bars) is above 100 transport demand is outpacing GDP growth (i.e. positive bar = no decoupling) whereas a value below 100 means transport demand is growing less rapidly than GDP (i.e. negative bar = decoupling). The actual data for Bosnia and Herzegovina covers only the period between 2004 and 2007; the time series between 2000 and 2003 was estimated. For Serbia, the value for 2007 has been estimated.
Data on air transport was not provided for Albania and Bosnia and Herzegovina.

Assessment:
Passenger transport demand outpaced the increase in GDP between 2000 and 2007, with the exception of 2004 when decoupling occurred. Transport demand exceeded GDP growth by 6 percentage points in 2001, the highest gap during the overall period. The fluctuation is attributable both to restructuring following political turmoils in the region as well as to gaps in passenger transport data and precise GDP figures in some countries. Although road transport remained as the dominant mode of travel in the region, air transport saw the largest growth, more than 200% over the period analysed.
It should be noted that air transport data for Albania and Bosnia and Herzegovina were not available.

Source: Passenger transport demand data: National Statistical Offices; GDP constant 1990 USD data: National Accounts Main Aggregates Database, United Nations Statistics Division, http://unstats.un.org/unsd/snaama/selectionbasicFast.asp.

Temporal coverage: 2000–2007.

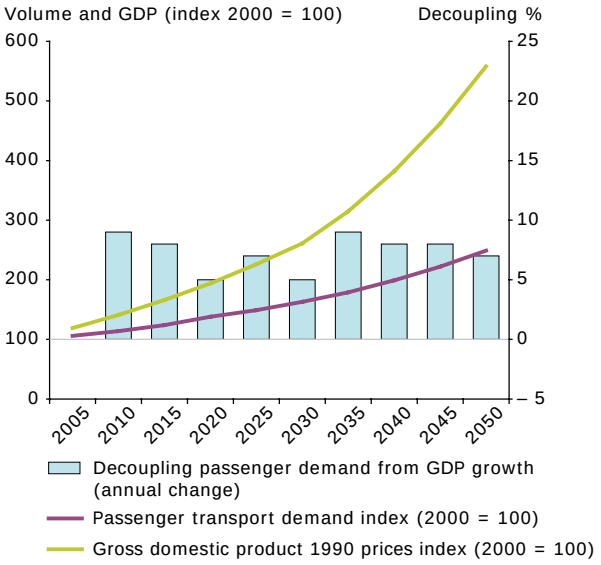
Spatial coverage: Albania, Bosnia and Herzegovina, Croatia, the former Yugoslav Republic of Macedonia, Serbia.

Outlook trends — Eastern Europe

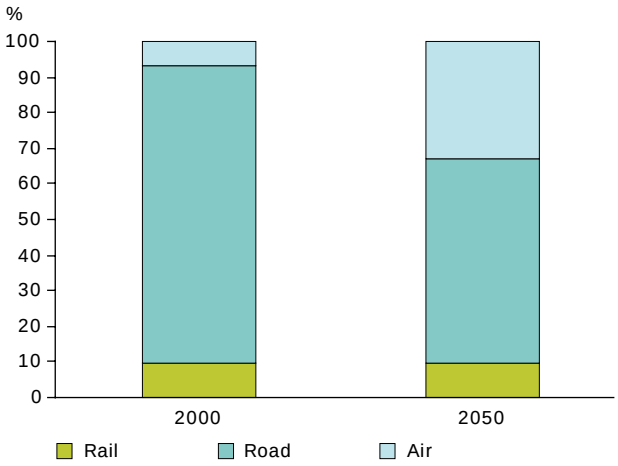
The outlook below is based on data for a larger region containing the Western Balkans data. It should therefore be used with care and only seen as an indication of trends.

Key message:
GDP in Eastern Europe is expected to grow faster than passenger travel, indicating a relative decoupling of GDP and passenger transport growth. Air travel is expected to continue its current trend of growing faster than other transport means.

Projected decoupling of passenger transport demand in Eastern Europe until 2050



Projected passenger transport demand by mode in Eastern Europe for 2050

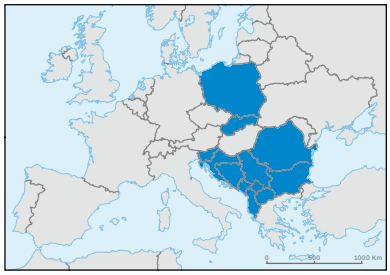


Assessment:
In the timeframe from 2000 to 2050, GDP in Eastern Europe is forecast to grow by ca 460 % while passenger transport kilometers would grow by ca 250 %, indicating a relative decoupling of the two.
Air transport is forecast to grow from its current share off 7 % to about 33 % of total passenger kilometers traveled by 2050.
While road travel is projected to decline from 83 % to 57 % in the total share of passenger transport, it will remain the dominant form of travel with car ownership increasing by 174 % over the projection period.
Rail passenger transport is expected to remain steady at a share of slightly below 10 %.

Source: WBCSD (2004), Mobility 2030. Spreadsheets at: www.wbcsd.org/web/publications/mobility/smp-model-spreadsheet.xls.

Temporal coverage: 2000–2050.

Spatial coverage: Albania, Bosnia and Herzegovina, Bulgaria, Croatia, the former Yugoslav Republic of Macedonia, Poland, Romania, Slovakia, Slovenia, Serbia and Montenegro.



CSI 036 Freight transport demand

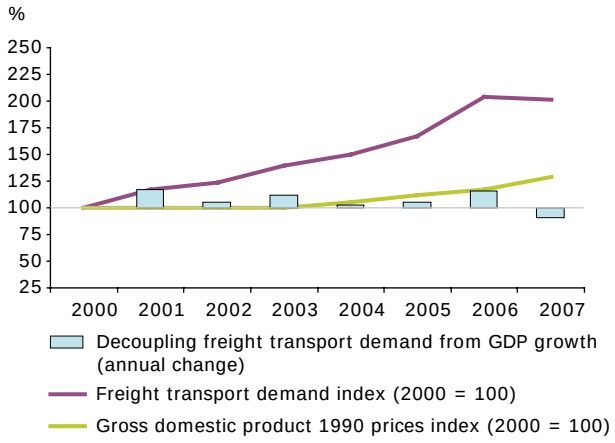
Indicator definition:
Decoupling of freight demand from economic growth can be expressed by using the volume of freight transport relative to GDP, including separate trends for its two components.

Key policy question:
Is freight transport demand being decoupled from economic growth?

Past and present trends

Key message:
Freight transport growth has outpaced GDP growth in the Western Balkan region by nearly 70 percentage points between 2000 and 2007. Decoupling of 10 % occurred in 2007 only. These results should be taken with caution, due to the different national approaches used in data collection as well as several data gaps.

Decoupling of freight transport demand in the Western Balkans, 2000–2007



Note: The decoupling indicator is calculated as the ratio of freight transport demand to GDP measured in 1990 USD market prices. The bars depict the intensity of transport demand in the current year in relation to the intensity in the previous year. An index above 100 results from transport demand outpacing GDP growth (i.e. positive bar = no decoupling) whereas an index below 100 results from transport demand growing less rapidly than GDP (i.e. negative bar = decoupling).

Assessment:
Freight transport demand almost doubled between 2000 and 2007 in the Western Balkan region, indicating a growth in environmental impacts. The increase exceeded GDP growth significantly in this period, reaching a gap of 16 percentage points in 2006. Nevertheless, the figures for 2007 indicate a decoupling of 10 percentage points. The average annual gap of 10 percentage points between 2000 and 2006 is close to that in EU-10 countries of 15 %.
The modal split in the region shows that road transport, although being the prevailing mode of transport, declined from 81 % in 2003 to 75 % in 2006. On the other hand rail transport increased from 15 % to 20 % during the same period. Air transport has slowly increased from 4 % to 6 % of the total. It is difficult to outline trends in the split by transport mode by country due to the incomplete time series and limited data on transport modes for certain countries.

Source: Freight transport demand data: National Statistical Offices.
GDP constant 1990 USD data: National Accounts Main Aggregates Database, United Nations Statistics Division, http://unstats.un.org/unsd/snaama/selectionbasicFast.asp.

Temporal coverage: 2000–2007.

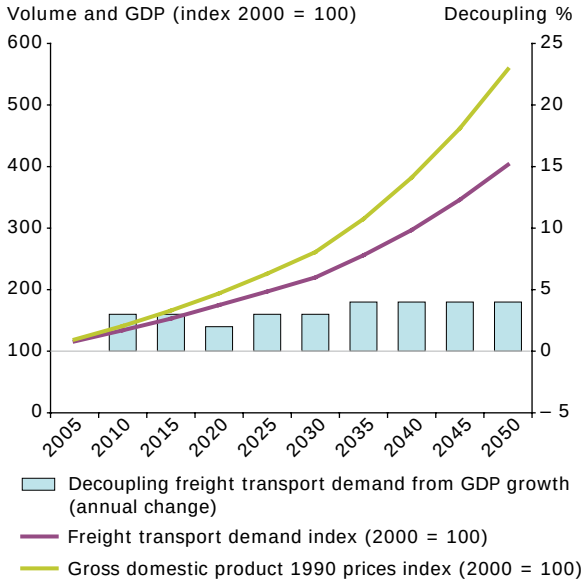
Spatial coverage: Albania, Bosnia and Herzegovina, Croatia, the former Yugoslav Republic of Macedonia, Serbia.

Outlook trends — Eastern Europe

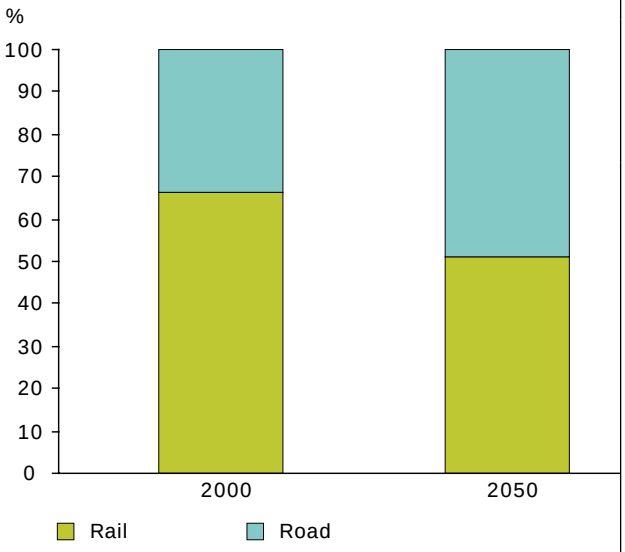
The outlook is based on data for a larger region containing the Western Balkans data. It should therefore be used with care and only seen as an indication of trends.

Key message:
Projections indicate a relative decoupling of GDP and freight transport growth for Eastern Europe in the period 2000 to 2050. The share of road freight transport in freight is set to increase over rail freight transport.

Projected decoupling of freight transport demand in Eastern Europe until 2050



Projected freight transport demand by mode in Eastern Europe for 2050

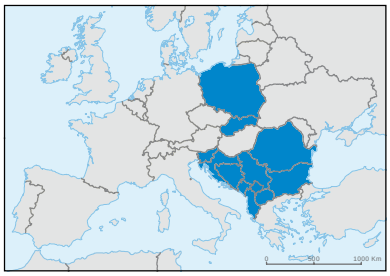


Assessment:
While a relative decoupling between GDP and freight transport is projected for the period between 2000 and 2050, this process is expected to be slow at first and to accelerate in the later years.
Road transport, which in 2000 accounted for one-third of the total, is expected to grow faster than rail transport and should consequently reach an equal share to rail transport by 2050.

Source: WBCSD (2004), Mobility 2030. Spreadsheets at: www.wbcsd.org/web/publications/mobility/smp-model-spreadsheet.xls.

Temporal coverage: 2000–2050.

Spatial coverage: Albania, Bosnia and Herzegovina, Bulgaria, Croatia, the former Yugoslav Republic of Macedonia, Poland, Romania, Slovakia, Slovenia, Serbia and Montenegro.



Waste

CSI 016 Municipal waste generation

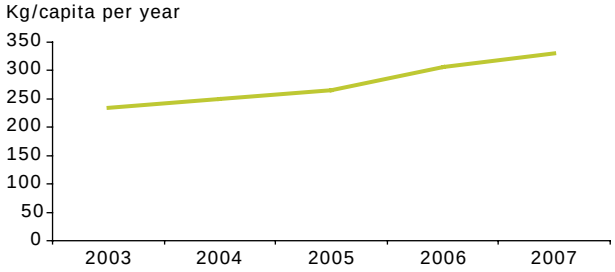
Indicator definition:
The indicator for municipal waste generation is expressed in kg per person and year, and the method of treatment (recycling, composting, landfill and incineration) is expressed as a percentage of total municipal waste treatment. Municipal waste refers to waste collected by or on behalf of municipalities; the main part originates from households, but waste from commerce and trade, office buildings, institutions and small businesses is also included.

Key policy question:
Waste prevention: are we reducing the generation of municipal waste?

Past and present trends

Key message:
The generation of municipal waste per capita in the Western Balkan region has been increasing since 2003. The increase is attributed mainly to rapid economic growth following the adoption of a free market economic system and the consequent steady increase in GDP. The trend is projected to continue due to the further economic growth of the countries expected as their economies become integrated with the EU in the lead-up to accession to the EU.

Municipal waste generation per capita in the Western Balkans, 2003–2007



Municipal waste generation by country

Kg/capita per year	2003	2004	2005	2006	2007
Albania	184	200	202	229	229
Bosnia and Herzegovina	232	250	257	250	260
Croatia	288	295	326	373	388
The former Yugoslav Republic of Macedonia	197	229	245	271	291
Regional	234	250	265	289	300

Note: The former Yugoslav Republic of Macedonia data for 2006–2007, and Croatian data for 2003 have been estimated. Bosnia and Herzegovina provided rough estimations, therefore presented results should be taken with caution.

Assessment:
Generation of municipal waste per capita in the region showed an increase of almost 41 % from 234 kg/cap in 2003 to 330 kg/cap in 2007, following the increases in population and GDP. A further significant increase is expected as a result of continuing economic growth, increase in consumption, and expansion of tourism (the latter especially in Croatia). Compared with the EU average of more than 500 kg per capita per year, the figures for the Western Balkan countries are considerably lower, mainly as a result of an underdeveloped municipal waste collection and disposal systems as well as different consumption patterns.
The main option for disposal of municipal waste in all countries is still landfilling: in many cases existing facilities are inadequate, posing considerable risks to public health and the environment. Hazardous, industrial and medical wastes are very often sent to municipal waste landfills, due to the lack of adequate treatment and safe disposal facilities.
New environmental legislation including municipal waste management is already in place in most of the countries in the region; however, it is poorly enforced and implemented.

Source: Municipal waste generation data.
Albania: Ministry of Public Works, Transport and Telecommunication — Annual Reports on waste generation for years 2003, 2004, 2005, 2006 and 2007.
Bosnia and Herzegovina: Data obtained within project Setting up an Operational Unit under the ESC, 2003. Environmental Protection Strategy/Waste Management Strategy of the Federation of Bosnia and Herzegovina (pending official adoption) 2007. FBiH/BiH Recycling Association (at Chamber of Commerce FBiH/Chamber of Foreign Trade BiH). Ministry of Physical Planning and Environmental Protection of Sarajevo Canton.
Croatia: Waste Management Plan of the Republic of Croatia for 2007–2015 (OG No. 85/07). Environmental Emission Register (KEO/ROO) and other databases maintained by Croatian Environment Agency 2005. Statistical Yearbook of the Croatian Bureau of Statistics 2005.
The former Yugoslav Republic of Macedonia: The National Waste Management Plan for 2004–2005; the Ministry of Environment and Physical Planning.

Temporal coverage: 2003–2007.

Spatial coverage: Albania, Bosnia and Herzegovina, Croatia and the former Yugoslav Republic of Macedonia.

List of countries covered by each indicator

Indicator including names	Past trends	Future trends
CSI 001 Emissions of acidifying substances	Albania, Bosnia and Herzegovina, Croatia, The former Yugoslav Republic of Macedonia, Serbia and Montenegro	Albania, Bosnia and Herzegovina, Croatia, the former Yugoslav Republic of Macedonia, Serbia and Montenegro [1]
CSI 002 Emissions of ozone precursors	Albania, Bosnia and Herzegovina, Croatia, the former Yugoslav Republic of Macedonia, Serbia and Montenegro	Albania, Bosnia and Herzegovina, Croatia, the former Yugoslav Republic of Macedonia, Serbia and Montenegro [1]
CSI 003 Emissions of primary particles and secondary particulate matter precursors	Albania, Bosnia and Herzegovina, Croatia, the former Yugoslav Republic of Macedonia, Serbia and Montenegro	Albania, Bosnia and Herzegovina, Croatia, the former Yugoslav Republic of Macedonia, Serbia and Montenegro [1]
CSI 006 Production and consumption of ozone depleting substances	Albania, Bosnia and Herzegovina, Croatia, the former Yugoslav Republic of Macedonia, Serbia	
CSI 008 Designated areas	Albania, Bosnia and Herzegovina, Croatia, the former Yugoslav Republic of Macedonia, Serbia	
CSI 026 Area under organic farming	Albania, Bosnia and Herzegovina, Croatia, the former Yugoslav Republic of Macedonia, Serbia	
CSI 014 Land take	Albania, Bosnia and Herzegovina, Croatia, the former Yugoslav Republic of Macedonia, Serbia	
CSI 016 Municipal waste generation	Albania, Bosnia and Herzegovina, Croatia and the former Yugoslav Republic of Macedonia	
CSI 027 Final energy consumption by sector	Albania, Bosnia and Herzegovina, Croatia, the former Yugoslav Republic of Macedonia, Serbia [2]	**Eurasia without Russia** — Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Republic of Moldova, Tajikistan, Turkmenistan, Ukraine, Uzbekistan, Albania, Bosnia and Herzegovina, Croatia, Montenegro, the former Yugoslav Republic of Macedonia, Serbia, Bulgaria, Cyprus, Malta, Latvia, Lithuania, Romania, Slovenia, Estonia, Gibraltar **Croatia**
CSI 028 Total energy intensity	Albania, Bosnia and Herzegovina, Croatia, the former Yugoslav Republic of Macedonia, Serbia [2]	
CSI 029 Primary energy consumption by fuel	Albania, Bosnia and Herzegovina, Croatia, the former Yugoslav Republic of Macedonia, Serbia [2]	**Eurasia without Russia** — Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Republic of Moldova, Tajikistan, Turkmenistan, Ukraine, Uzbekistan, Albania, Bosnia and Herzegovina, Croatia, Montenegro, the former Yugoslav Republic of Macedonia, Serbia, Bulgaria, Cyprus, Malta, Latvia, Lithuania, Romania, Slovenia, Estonia, Gibraltar
CSI 030 Renewable primary energy consumption	Albania, Bosnia and Herzegovina, Croatia, the former Yugoslav Republic of Macedonia, Serbia [2]	**Eurasia without Russia** — Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Republic of Moldova, Tajikistan, Turkmenistan, Ukraine, Uzbekistan, Albania, Bosnia and Herzegovina, Croatia, Montenegro, the former Yugoslav Republic of Macedonia, Serbia, Bulgaria, Cyprus, Malta, Latvia, Lithuania, Romania, Slovenia, Estonia, Gibraltar
CSI 031 Renewable electricity	Albania, Bosnia and Herzegovina, Croatia, the former Yugoslav Republic of Macedonia, Serbia [2]	**Eurasia without Russia** — Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Republic of Moldova, Tajikistan, Turkmenistan, Ukraine, Uzbekistan, Albania, Bosnia and Herzegovina, Croatia, Montenegro, the former Yugoslav Republic of Macedonia, Serbia, Bulgaria, Cyprus, Malta, Latvia, Lithuania, Romania, Slovenia, Estonia, Gibraltar
CSI 035 Passenger transport demand	Albania, Bosnia and Herzegovina, Croatia, the former Yugoslav Republic of Macedonia, Serbia	**Eastern Europe —** Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Macedonia, Poland, Romania, Slovakia, Slovenia, Serbia and Montenegro [1]
CSI 036 Freight transport demand	Albania, Bosnia and Herzegovina, Croatia, the former Yugoslav Republic of Macedonia, Serbia	**Eastern Europe —** Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Macedonia, Poland, Romania, Slovakia, Slovenia, Serbia and Montenegro [1]

Note:
1. The territory of Serbia and Montenegro is treated as one in the source, including Kosovo under UN Security Council Resolution 1244/99.
2. Data for Montenegro are available from the International Energy Agency, but are not included in the calculation of the indicator due to the scope of CARDS 2008 Project.

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