

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 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).

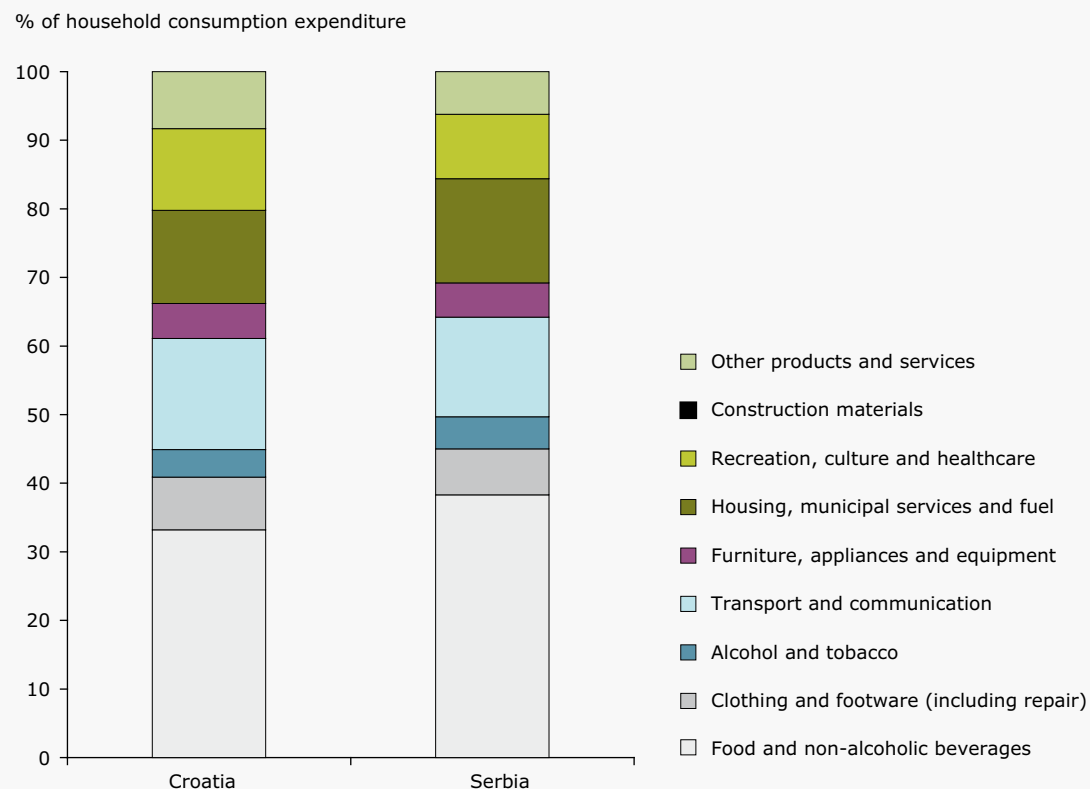
Table 3.1 Influence of the driving forces on future patterns of consumption in the Western Balkans

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

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.

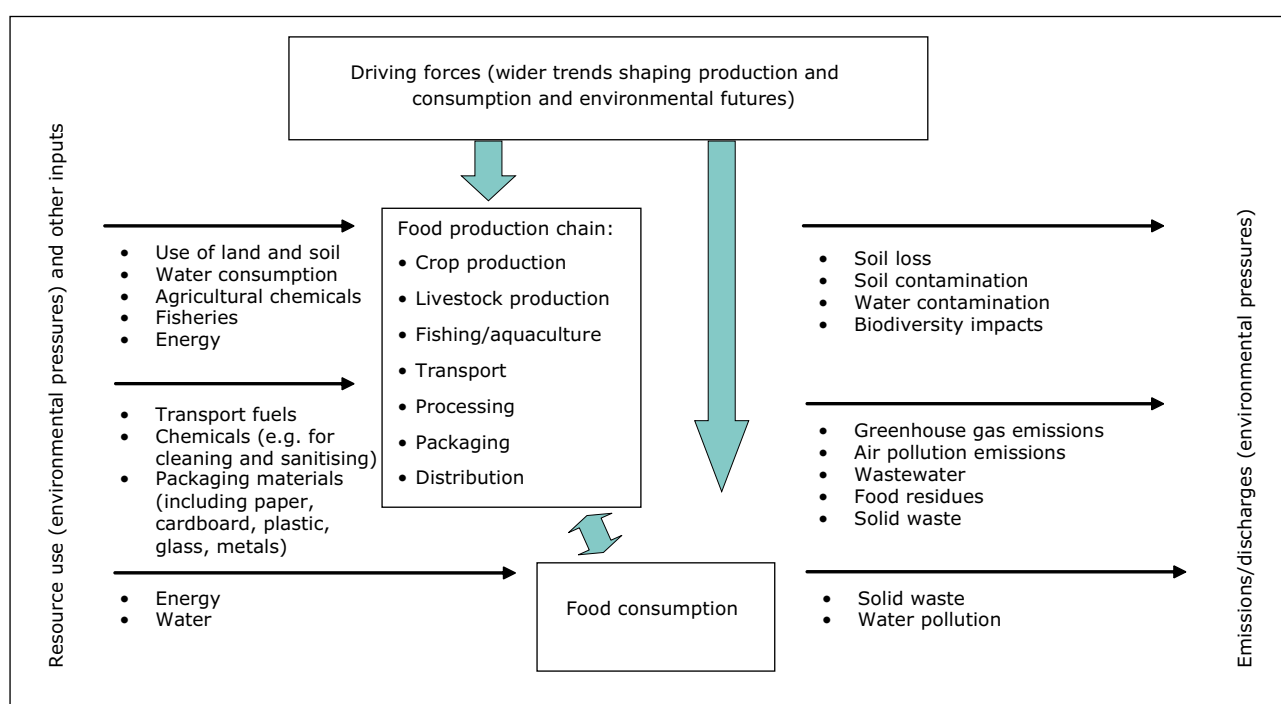
The future of food consumption patterns in the region and any related environmental and health problems will be tied to a series of drivers. One will be the evolution of cultural patterns, such as preferences for locally grown food and traditional products. Markets and business, including decisions by 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

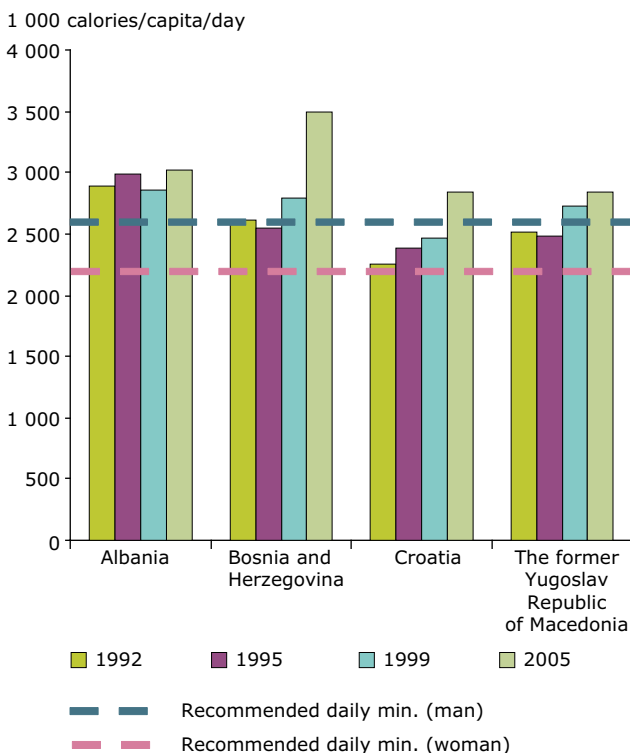
declined between 1992 and 1995, a time of war. In 2005, this country had the highest consumption levels of the four, about 3500 calories per person.

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).

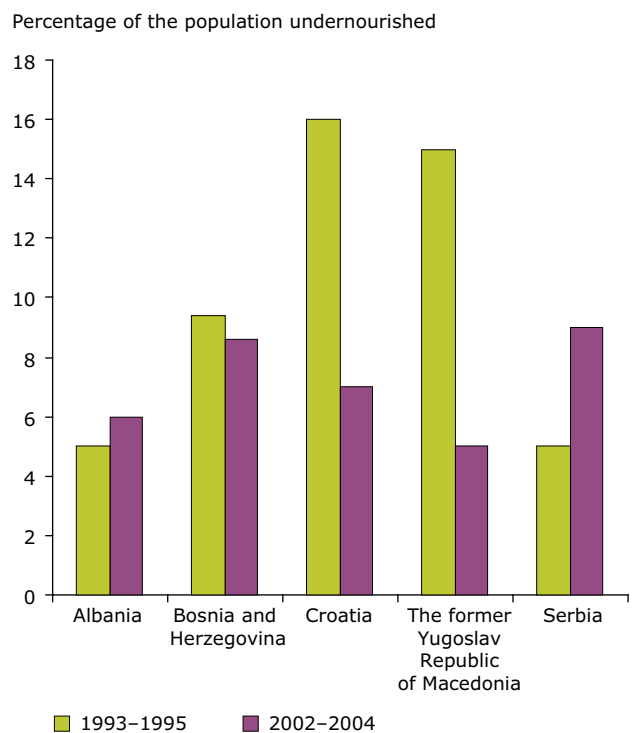
The increase in consumption levels is not necessarily good for health and the environment. While undernourishment remains a concern, another problem may become more important in coming

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



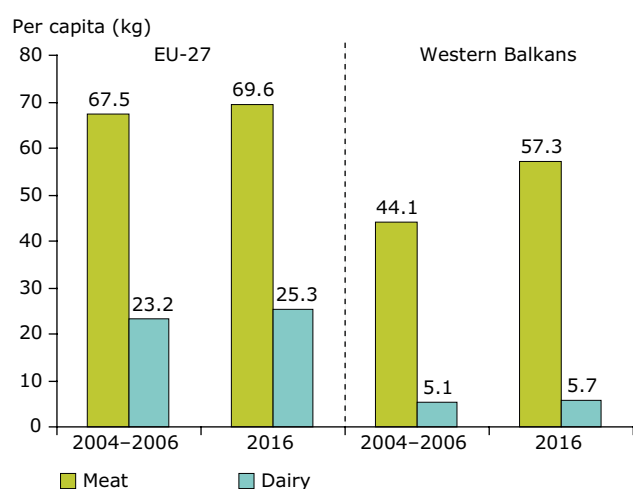
Source: UNEP/EEA SCP, Figure 5.12.

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/m²; overweight as body mass index ≥ 25 kg/m²; 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.

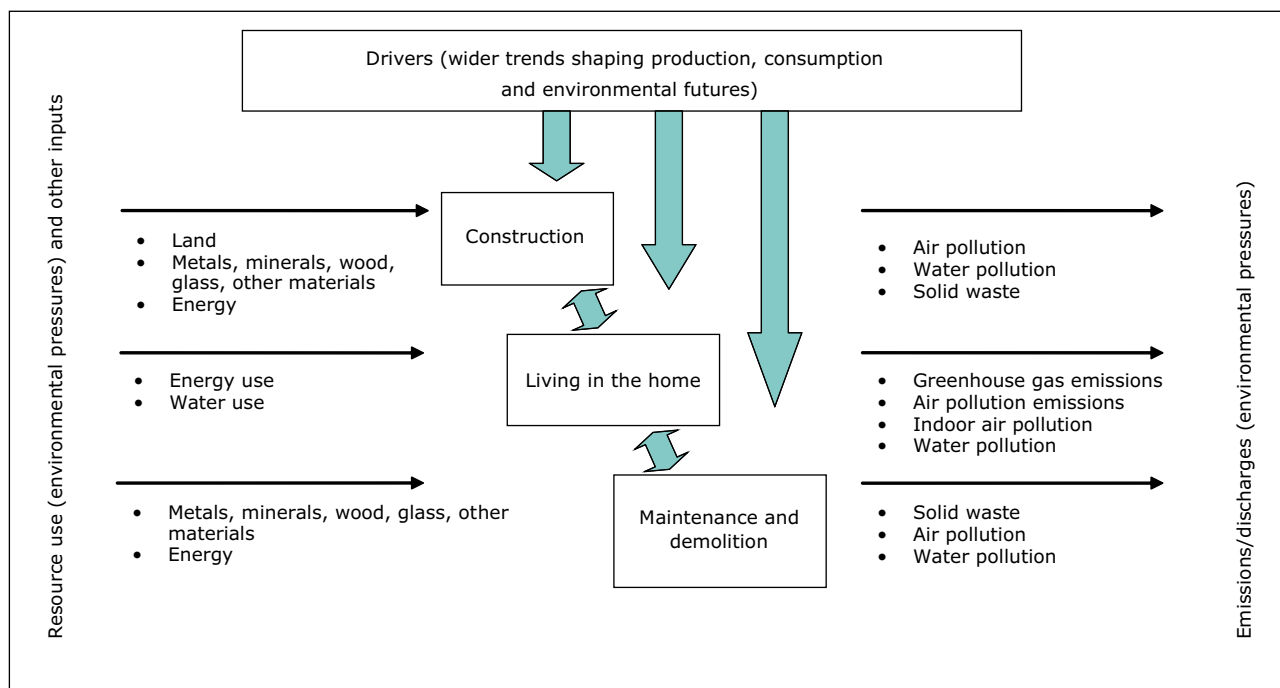
Building construction and demolition is also an important source of waste, and construction has fuelled sprawl in urban and coastal areas.

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).

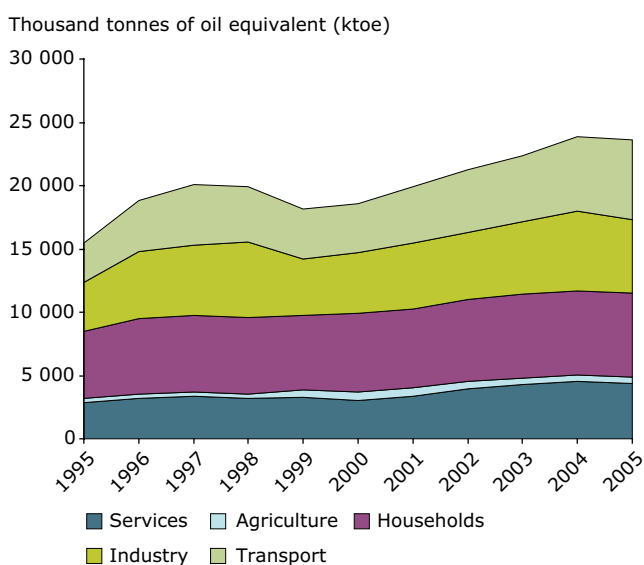
Household energy consumption in the Western Balkans

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).

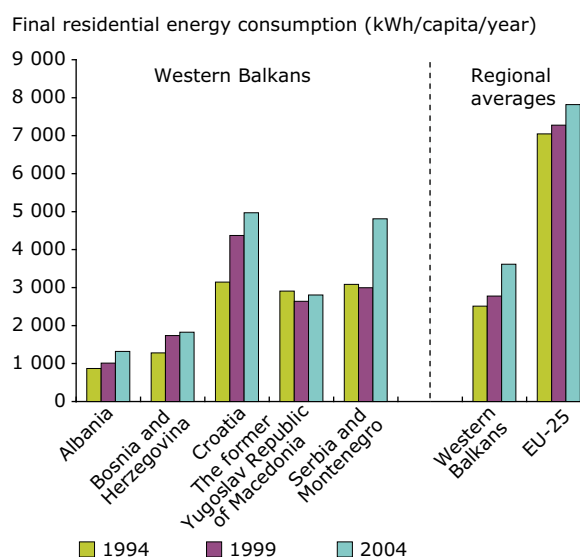
In per capita terms, residential energy consumption rose rapidly in several countries between 1994 and 2004, including Croatia and Serbia and Montenegro (Figure 3.8). Consumption varies significantly among the countries of the region, with levels in Croatia and Serbia and Montenegro more than double 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⁾.

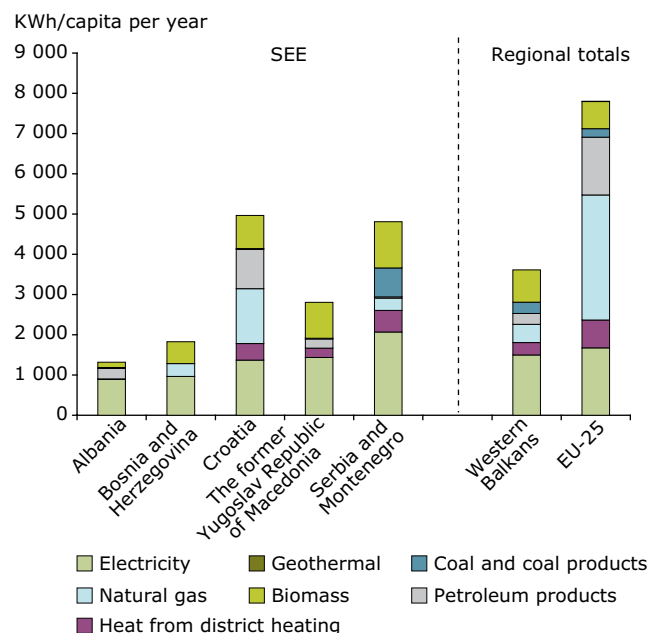
On average, residential energy consumption in the region is half of the level of that in the EU-25 (Figure 3.9). However, 'energy poverty' arising from a lack of access to energy and the use of low quality energy sources affects poor households in the region. A 2004 UNDP report detailed these problems 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 životnom 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.

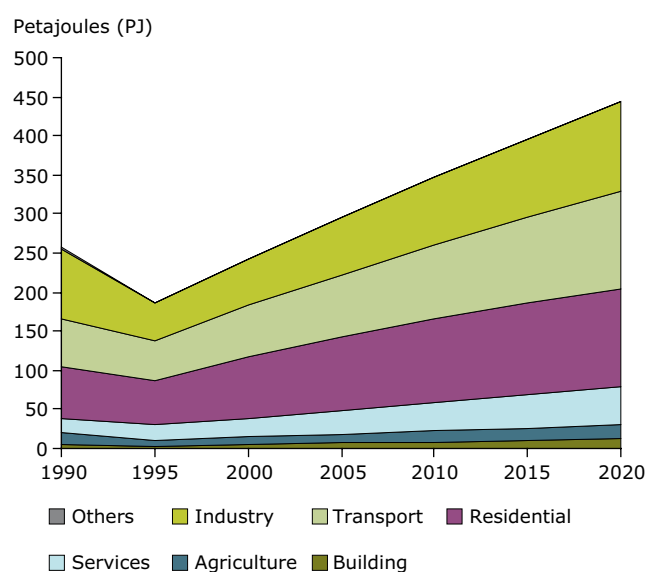
In Croatia's baseline scenario for its 2002 Communication on Climate Change, final energy consumption is projected to grow slightly over 50 % from 2005 to 2020 (Figure 3.10)⁽¹¹⁵⁾. Residential consumption will continue to be the largest user of energy (still ahead of the fast-growing demand by transport). This scenario

foresees the construction of new hydropower plants and a doubling in electricity production from coal to meet the rising demand.

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.

Figure 3.10 Final energy consumption in Croatia per sector, 1990–2020



Note: Based on historical data up to 1995.

⁽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

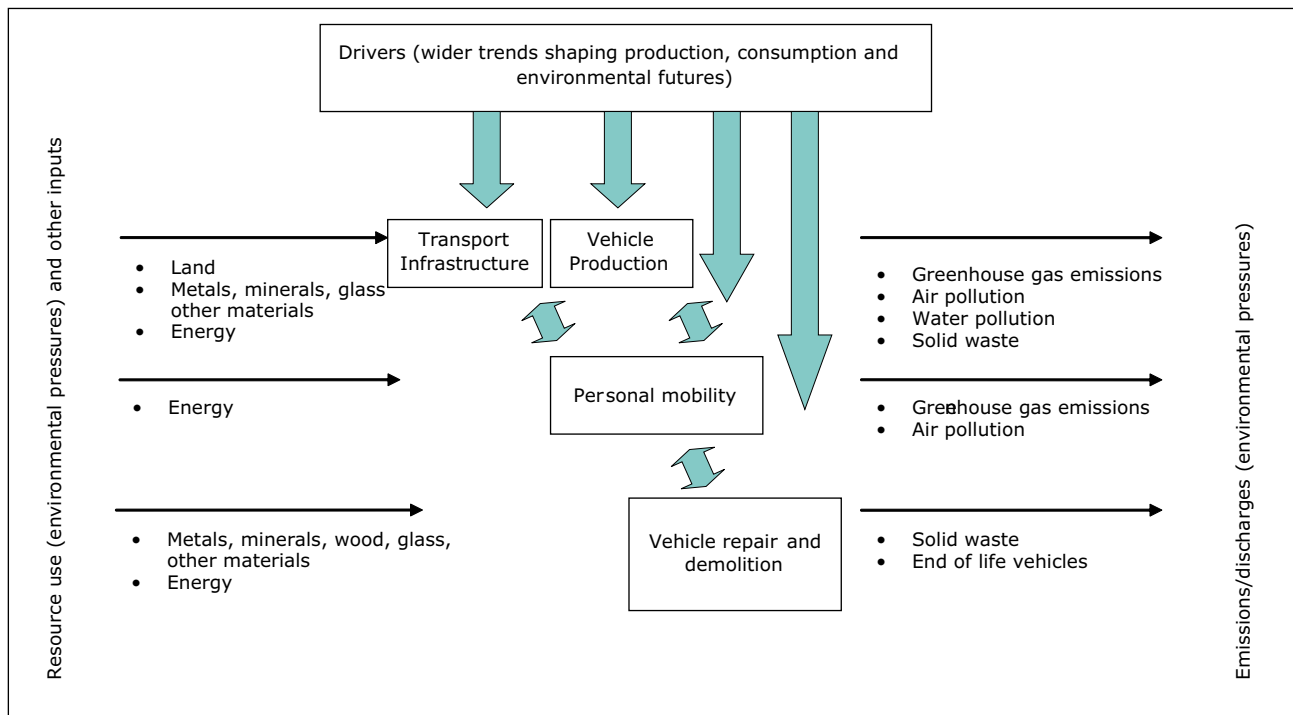
Passenger transport in the Western Balkans rose by 40 % between 2000 and 2007. The volume of air travel tripled, and road travel also increased. Along with the miles driven, the number of private motor vehicles increased rapidly in this period, for example doubling in Albania. These trends affect air 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

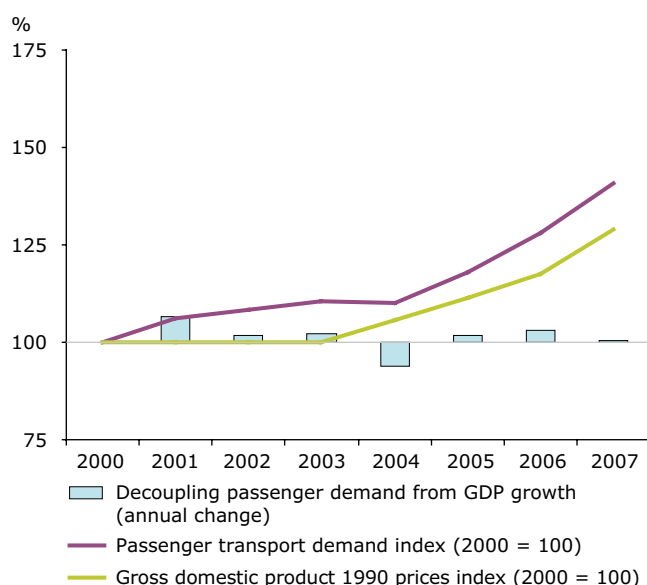
(Figure 3.13). Since 2000 car ownership has increased steadily in all countries of the region except the former Yugoslav Republic of Macedonia. In Albania, the number of passenger cars per capita more than doubled between 2000 and 2007.

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⁾.

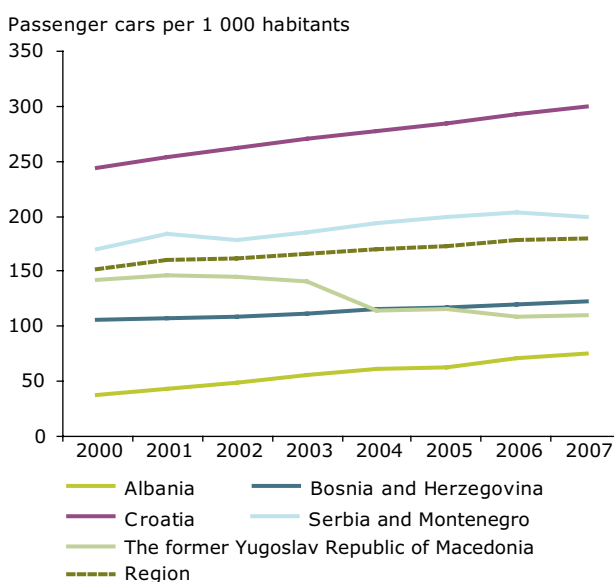
Data on other modes of travel are less available. In Zagreb, bicycles make up an estimated 5 % of city traffic. A survey in Belgrade, found that 84 % of respondents walked to local shops, while only 16 % used cars and half that many used public

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

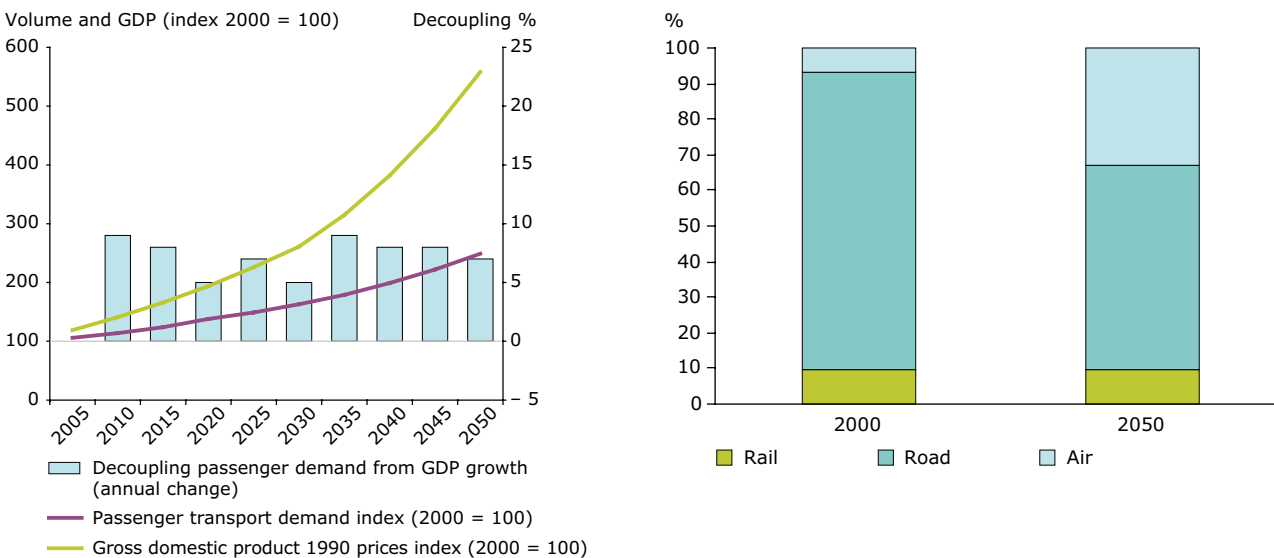
Member States and the former USSR, suggests that total passenger travel in this larger area will increase by 250 % from 2000 to 2050 (Figure 3.14). The study predicts that GDP will grow even faster, creating a relative decoupling. At the same time, the region's population is expected to be relatively 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 Culture, values and needs Key uncertainties: consumerism and 'catching up with west' vs. traditional and green values			✓	✓	Indirect influence: With ageing rural populations and migration to urban areas, farmland will be abandoned (esp. in mountain areas)
			✓	✓	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? Macro-economic development Key uncertainties: levels of economic growth at global, EU and regional scales 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: 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
	✓	✓	✓	✓	Strong, direct influence: Economic growth closely linked to enterprise investments Enterprise restructuring in the region could lead to greater efficiencies
			✓	✓	✓
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 agriculture 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.

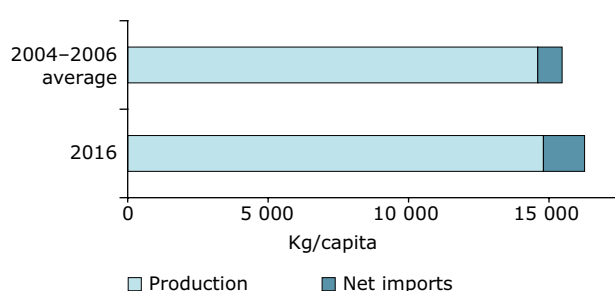
Agriculture uses a large share of the region's land, about 45 % in 2000, though this proportion is decreasing (Section 1.5). In Albania, agriculture represented almost a quarter of GDP in 2005 (Table 4.2). In the former Yugoslav Republic of Macedonia, 20 % of all those employed worked in farming, and 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).

Figure 4.1 Production and net imports of grains in the Western Balkans



Note: Grains include: wheat, rice, coarse grain, oilseeds

Source: FAOSTAT.

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

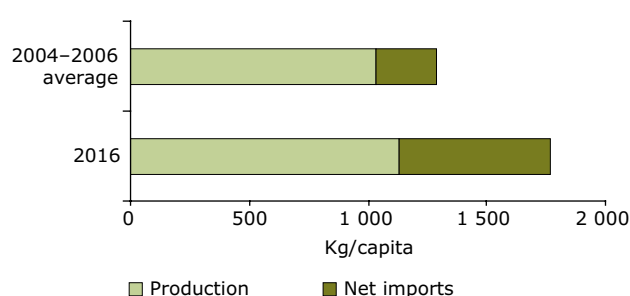
Note: 2005 data except for: * 2007 data.

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 4.2 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.

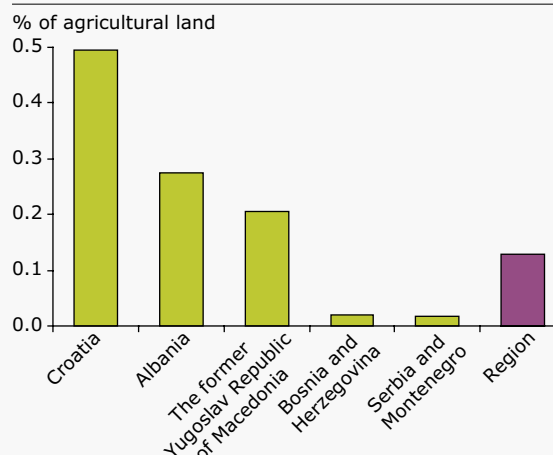
Box 4.1 Organic farming

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' 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

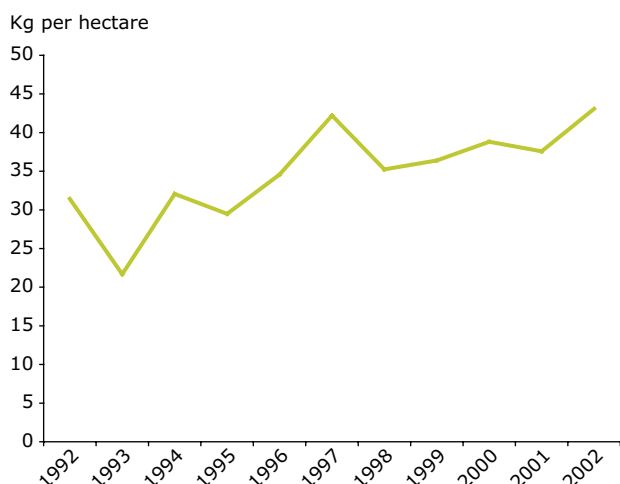
⁽¹³⁰⁾ Regional Environmental Center (2006), *Environmental Snapshot of South Eastern Europe: REReP Country Profiles*, Szentendre, Hungary.

⁽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 CO₂-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).

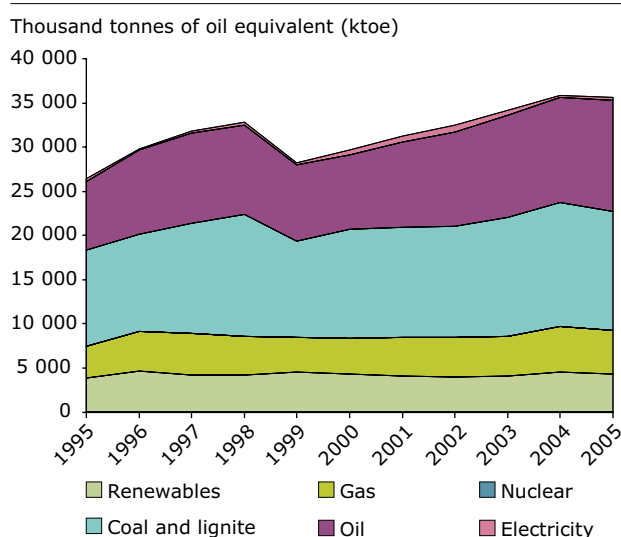
Fossil fuels provided almost 88 % of all energy consumed in 2005 in the West Balkans (Figure 4.5). Coal, and in particular low-quality lignite, remains the most important fuel, providing almost 40 % of the region's energy. Lignite is mined and used in power plants in Serbia, Bosnia and Herzegovina, the 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

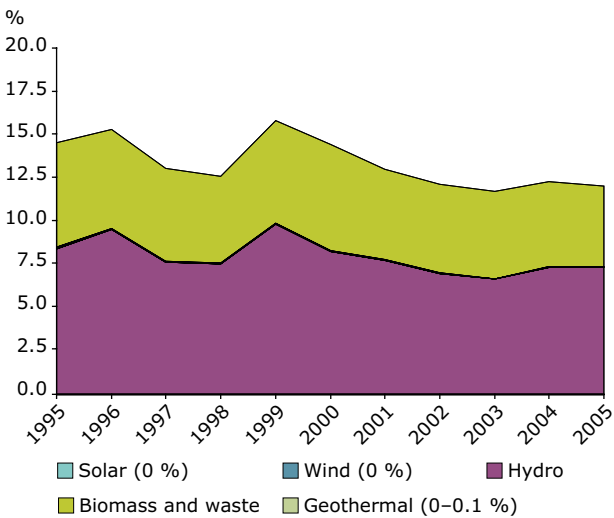


Source: International Energy Agency.

⁽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.

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).

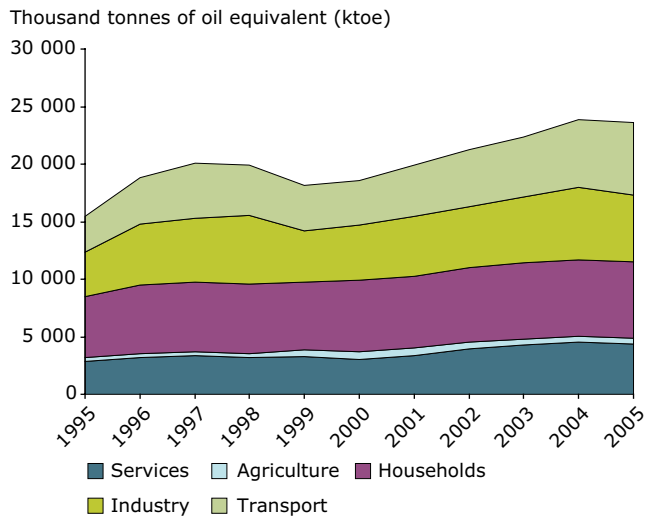
Between 1995 and 2005, the region's energy intensity in terms of GDP fell by 13 % (Figure 4.8). The region uses more than twice the amount of energy per unit of GDP as the EU-27, and more than three times more than the EU-15. On a per capita basis, however, the Western Balkan countries use about half 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.

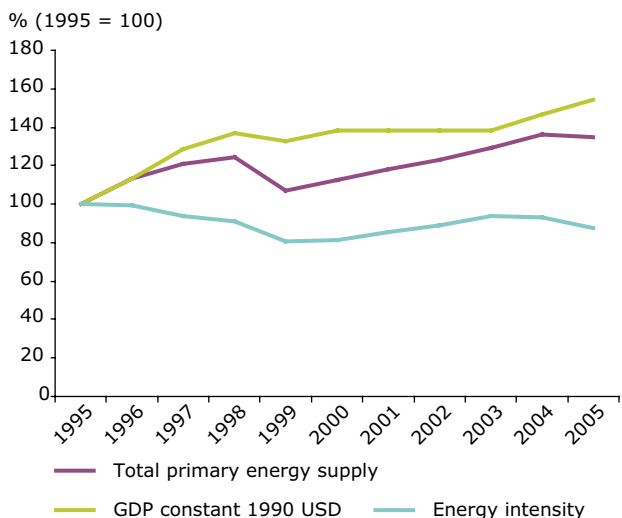
Mining of coal and lignite for energy production has scarred the landscape in several countries of the region, including Kosovo under UN Security Council Resolution 1244/99, Serbia and Montenegro. Mining has polluted water and has also created

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.

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

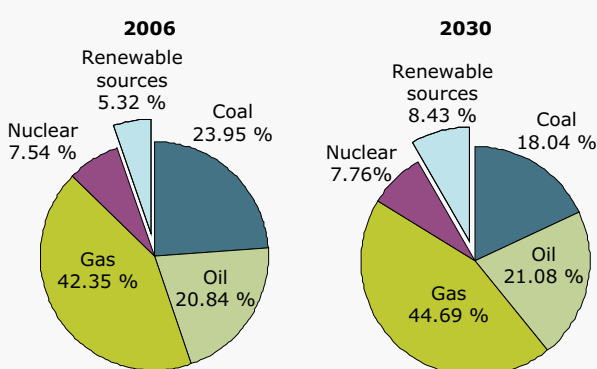
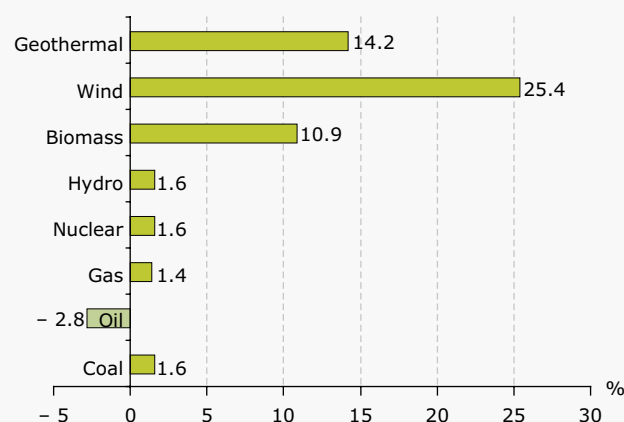


Figure 4.10 Projected growth of energy sources in Eurasia without Russia, 2006, and projections until 2030



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 CO₂ emissions under the Kyoto Protocol. An agreement to significantly reduce CO₂ 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 CO₂⁽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

Blinic, 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. Šuri *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.

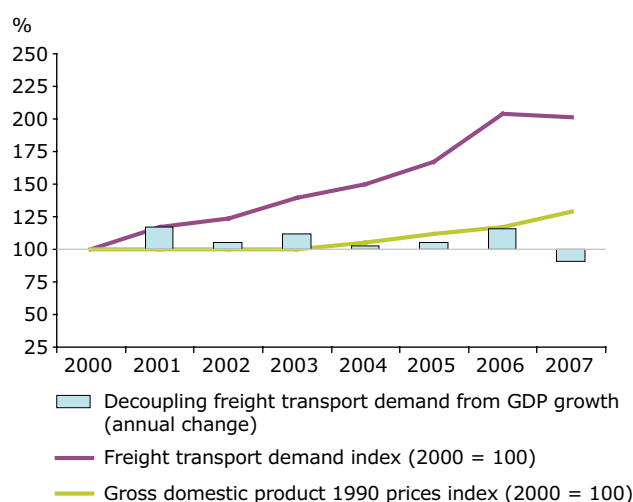
Freight transport may continue to grow rapidly. One forecast predicts that freight transport in Eastern Europe (including the Western Balkans) will continue to rise sharply in coming years (Figure 4.11). This increase will be slightly slower than the forecast for GDP growth.

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

Figure 4.11 Decoupling of freight transport demand in the Western Balkans, 2000–2007



Source: See Annex 2.

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).

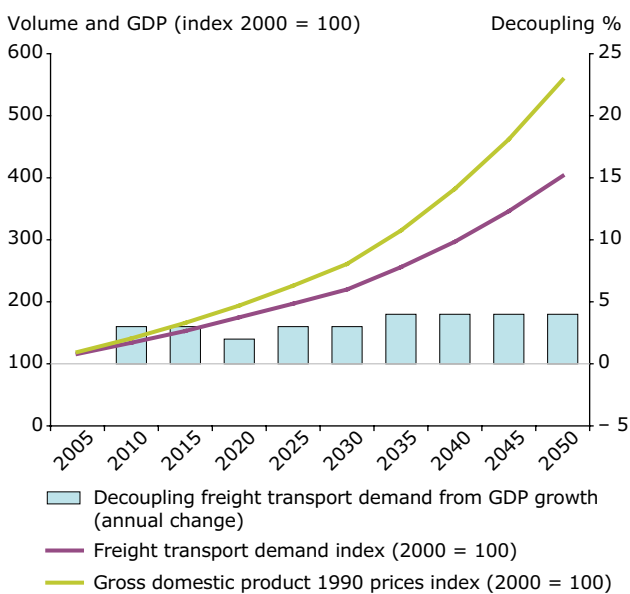
Outlook

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.