

7 Transport



Location of city studies covered in this chapter

Facts and figures

- Freight movement declined significantly between 1990 and 2000 after an initial rise during the period 1970–1990. Since 2000 the amount of freight transported in SEE and EE has begun to increase again. In some countries, transport, especially freight transport, has now recovered and is currently above 1990 levels. The use of transport — both freight and passenger — is expected to increase substantially in the near future.
- In EECCA, rail transport accounts for the greatest proportion of freight moved. In Eastern Europe and the Caucasus, rail freight has generally maintained a similar share of the freight market (e.g. at least 80 %) since 1970. The proportion of freight transported by rail is in decline in the SEE, although it is still generally higher than the equivalent figure in Western Europe, which was less than 15 % in 2004.
- The use of public passenger transport (rail, buses and coaches) experienced a significant increase in use between 1970 and 1990, followed by a substantial decline between 1990 and 2000. Subsequent recovery has been weak in most countries. A key factor behind the inability of public transport to recover from the decline of the 1990s has been the decrease in funding levels that many public transport systems in SEE and EECCA have experienced in the past 15 years.
- The use of private cars for transport has increased significantly over the last decade. However, the level of private car ownership, below 180 cars per thousand of the population in all EECCA countries, and below 290 in SEE, is much lower than the typical values of 400 to 600 in Western Europe.
- One of the main impacts of transport is energy use and emissions of carbon dioxide; the main greenhouse gas that causes climate change. Air pollution in the countries of SEE and EECCA is now becoming a serious problem, particularly in urban areas. Pollution is exacerbated by the age of the vehicles, poor vehicle maintenance, variable fuel quality, and the poor condition of many of the roads.
- Leaded petrol has been phased out in many SEE and EECCA countries. Where leaded petrol is still in use, plans for its phasing out will be made in the coming years. In many countries there are also plans to improve vehicle emission and fuel quality standards.

7.1 Introduction

International policy context

The Johannesburg Plan of Implementation, agreed at the 2002 World Summit on Sustainable Development, discusses consumption and production in the transport sector as it affects the provision of transport services and systems to promote sustainable development. It considers

specific social and environmental areas and refers to the need for an integrated policy at all levels:

'...including policies and planning for land use, infrastructure, public transport systems and goods delivery networks, with a view to providing safe, affordable and efficient transportation, increasing energy efficiency, reducing pollution, congestion and adverse health effects and limiting urban sprawl, taking into account national priorities and circumstances'.

The action that the Implementation Plan prescribes can be divided into two areas:

- *Implement transport strategies for sustainable development... to improve the affordability, efficiency and convenience of transport as well as urban air quality and health and to reduce greenhouse gas emissions...*
- *Promote investment and partnerships for the development of sustainable, energy efficient multi-modal transportation systems, including mass public transport systems and better transportation systems in rural areas...*

Consequently, a transport system that supports sustainable development is one in which transport is used in a way that minimises demands on non-renewable resources, e.g. fossil fuels and metals. It also minimises adverse impacts on human health and the environment, e.g. pollution and contributions to climate change, or waste generation. Likewise, it provides for affordable mobility to allow access to services, jobs and education — as we travel more and farther both for work and leisure. In fact, for many Europeans a high level of mobility is no longer just a convenience but rather a basic need.

Objectives and approach

This chapter first reviews existing transport trends in SEE and EECCA countries, within both the freight and passenger transport sectors. It then explores the reasons behind these trends and gives an overview of the adverse environmental and social consequences that result.

It then examines the role of the governments of SEE and EECCA countries, in response to these trends. This chapter gives an overview of the types of policies — including strategies, regulations and economic instruments — that are being pursued by national governments and city authorities in the region in order to make the consumption of transport more sustainable. The chapter concludes by identifying common issues and barriers faced by the countries of the region, followed by potential opportunities, given their particular circumstances.

The chapter draws on a range of sources, including information compiled by international organisations, such as the OECD, and through

questionnaire surveys of SEE and EECCA governments.

In addition to the above, specific case studies were undertaken for five cities — Almaty (Kazakhstan), Minsk (Belarus), Tbilisi (Georgia), Yerevan (Armenia), and Zagreb (Croatia) — to inform the preparation of this chapter. Reference to these case studies is made throughout this chapter. However, it should be noted that information on Almaty was also obtained from another study (i.e. Kok and de Koning, 2003) and that the Tbilisi case study was facilitated by UNECE/WHO (Georgian Ministry of Environment and Natural Resources, 2006) ⁽¹⁾.

Air transport, while growing at a steady pace, only accounts for a marginal share of overall transport in SEE and EECCA, and therefore is not covered in detail in this chapter. Furthermore, due to lack of comprehensive data and information in SEE and EECCA countries, the impact of transport on biodiversity, land use, and waste generation is not covered either.

7.2 Trends and current situation

7.2.1 Transport trends

In the past 15 years, the transport systems of SEE and EECCA have reflected the broader developments in the histories of the countries of these regions. As noted in Chapter 2, the wars in the former Yugoslavia and the economic and industrial collapse in the countries of the former Soviet Union adversely affected economic activity in these countries. The depth and duration of the recession varied significantly from one country to another but most countries suffered for much or all of the 1990s. While some have now returned to quite significant economic growth, others have barely recovered their position from 1990 in terms of GDP per capita.

In very general terms, a similar pattern is reflected in transport trends, for both passengers and freight and for most transport modes in most countries. A reduced level of freight transport was a direct consequence of economic disruption, lower employment levels led to less travel and reduced incomes left individuals with less money available for private travel.

⁽¹⁾ Thus, the authors of this chapter did not directly guide the Tbilisi case study. The report was presented at UNECE/WHO PEPTHE Sustainable Urban transport and Land Use Planning, 18–20 October 2006, Tbilisi, Georgia, funded by the Netherlands and Swiss governments.

Freight

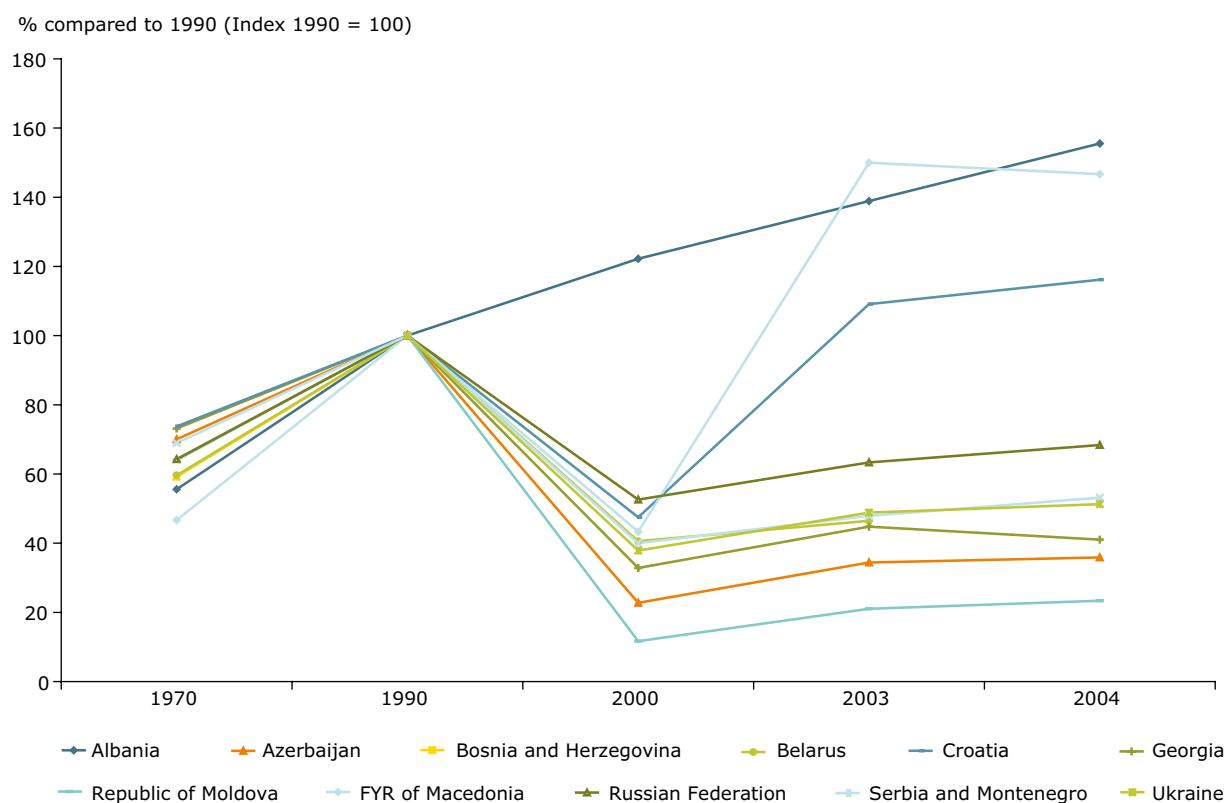
Between 1990 and 2000 freight movement (expressed in tonne-kilometres) — in all but one of the SEE and EE countries for which data are available — declined significantly after having risen between 1970 and 1990 (see Figure 7.1). Data for the total freight moved in the Central Asian republics are not as comprehensive, but the statistics suggest, at least in Kazakhstan and Kyrgyzstan, that freight transport declined by at least 65 % over this period (UNECE Statistical Database as cited in EEA, 2007).

Since 2000 the amount of freight transported in SEE and EE has begun to increase again, although for most countries the amount of freight transported in 2004 was still between 23 % and 68 % of the 1990 figure. For the Central Asian countries, the story was similar with total freight transport between 2000 and 2004 increasing by 20 % in Kyrgyzstan, 36 % in Tajikistan and 39 % in Kazakhstan. However, this activity was not enough to bring freight transport levels back up to 1990 levels (UNECE Statistical Database as cited in EEA, 2007). Notable exceptions — where the total amount of freight has passed 1990 levels — are in SEE countries (Albania, the former Yugoslav Republic

of Macedonia and Croatia) which are now largely surrounded by EU Member States. In the EE countries the effect is as yet much less marked, despite the fact that they border the EU.

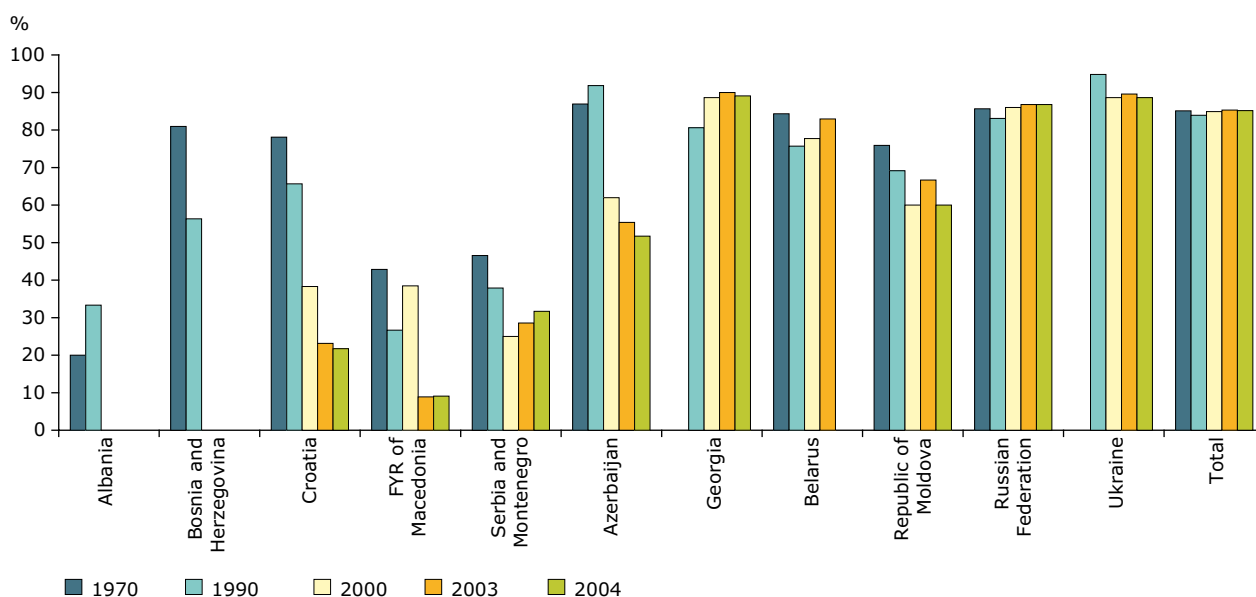
The extent to which the transport of freight by different means has increased since 2000 varies between countries. In the region as a whole, rail transport has maintained its proportion of the total freight moved since 1970 (see Figure 7.2). However, this total conceals differing trends in the countries of SEE and EECCA; the figures for Russia and Ukraine together account for almost the total rail freight moved in the region (98 % in 2004) (ECMT, 2006a). The proportion of freight transported by rail is in decline in the SEE, although it is still generally higher than the equivalent figure in Western Europe, which was less than 15 % in 2004 (ECMT, 2006a). In Eastern Europe and the Caucasus rail freight has generally maintained a similar proportion of the share of the freight market — at least 80 % — since 1970. Figures for Central Asia (see Figure 7.3) are not as comprehensive, but there appears to have been a relative decline in the proportion of freight transported by rail in the most recent years for which data are available (Note: notwithstanding a broader definition of road freight).

Figure 7.1 Freight moved, excluding pipelines (tkm)



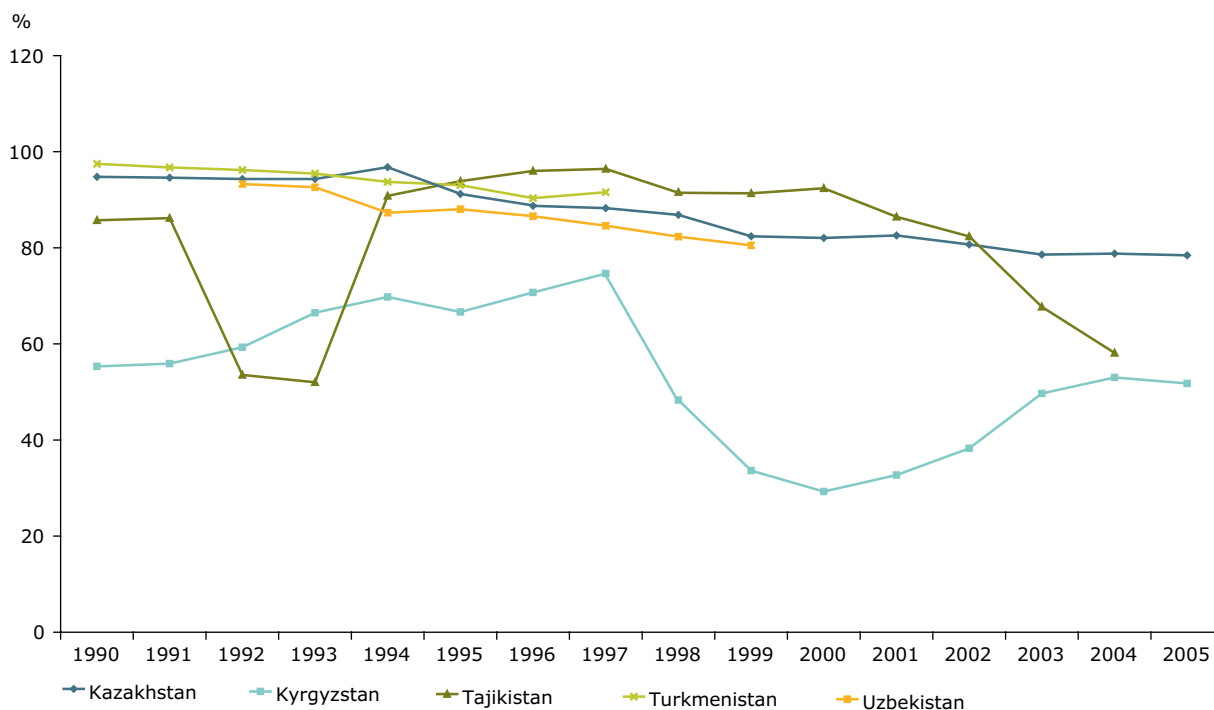
Source: Developed from ECMT (2006a) data.

Figure 7.2 Rail as a proportion of total freight moved in selected SEE and EECCA countries (excluding pipelines)



Source: Developed from ECMT (2006a) data.

Figure 7.3 Rail freight as a proportion of total freight moved in Central Asia (tkm)



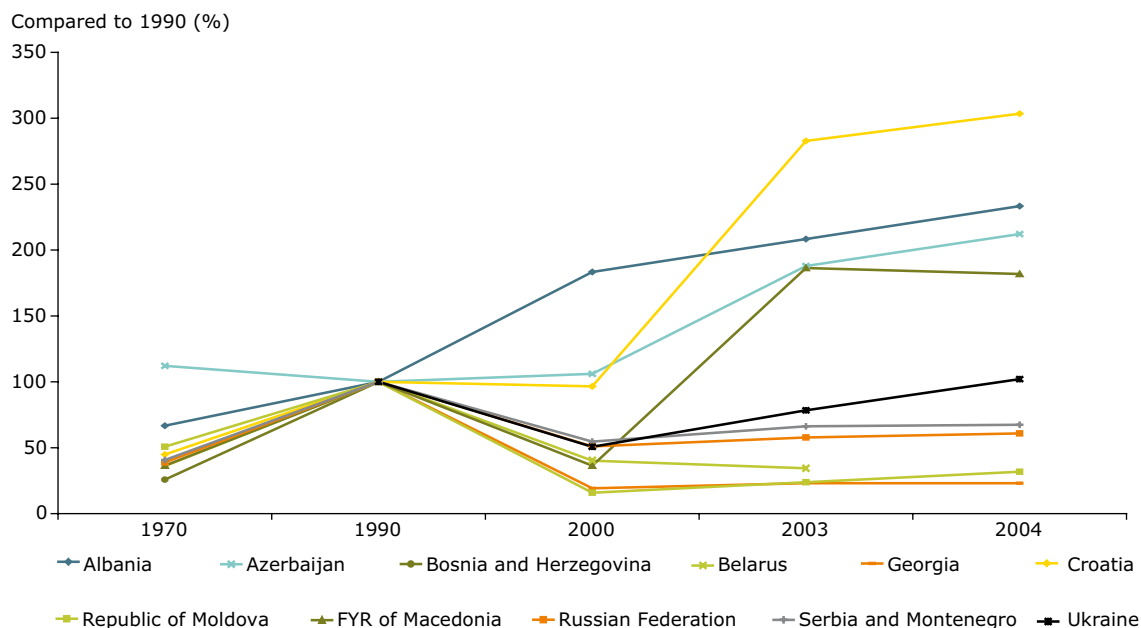
Note: Figures for later years based on a broader definition of road freight moved (as above); breaks in trends indicate where measurement methodology changed.

Source: Interstate Statistical Committee of the Commonwealth of Independent States, 2006.

Figures 7.4 and 7.5 show that the amount of freight moved by road has followed a similar percentage pattern to total freight movement in many countries (see Figure 7.1), i.e. a post-1990 decline. In turn this was followed by increasing amounts of use. But in some of the SEE countries

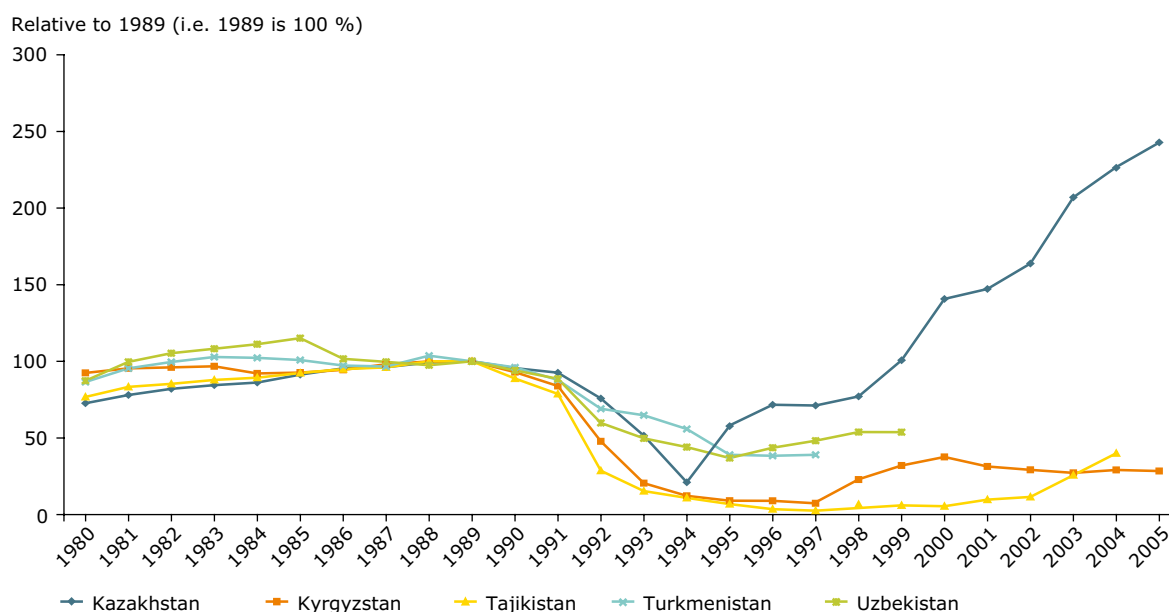
the quantity of freight transported by road has increased significantly since 2000, reflecting the decline in the use of rail (see Figure 7.3). In the EECCA countries, on the other hand, the levels of road freight in 2004 were lower — with the exceptions of Ukraine, Azerbaijan and Kazakhstan

Figure 7.4 Road freight moved in selected SEE and EECCA countries (tkm)



Source: Developed from ECMT (2006a) data.

Figure 7.5 Road freight moved in Central Asia (tkm)



Note: Figures for Kazakhstan (after 1995), Kyrgyzstan and Tajikistan (both after 1998) include estimates for freight transported by non-transport operators; breaks in trends indicate where measurement methodology changed.

Source: Interstate Statistical Committee of the Commonwealth of Independent States, 2006.

— and remained between 23 % and 67 % of those of 1990.

Passenger transport

As noted above, both freight and passenger transport use declined in the SEE and EECCA countries in the 1990s. Unfortunately, comprehensive data on trends in total passenger transport use (i.e. travel by private car, public transport, bicycle and on foot) are not available. However, based on available statistics, it can be expected that the use of all passenger transport declined in the 1990s. The use of public passenger transport (rail, buses and coaches) followed a pattern similar to freight transport in SEE and EECCA after 1970, namely, that a significant increase in use between 1970 and 1990 was followed by a marked decline between 1990 and 2000. Subsequently, however, there has been little recovery in most countries (see Figure 7.6). The story is very different in Central Asia, where a post-1990 decline has been reversed in the three countries for which recent data are available (see Figure 7.7).

Public transport in urban areas

Urban areas in both SEE and EECCA have generally seen a decline in the use of public

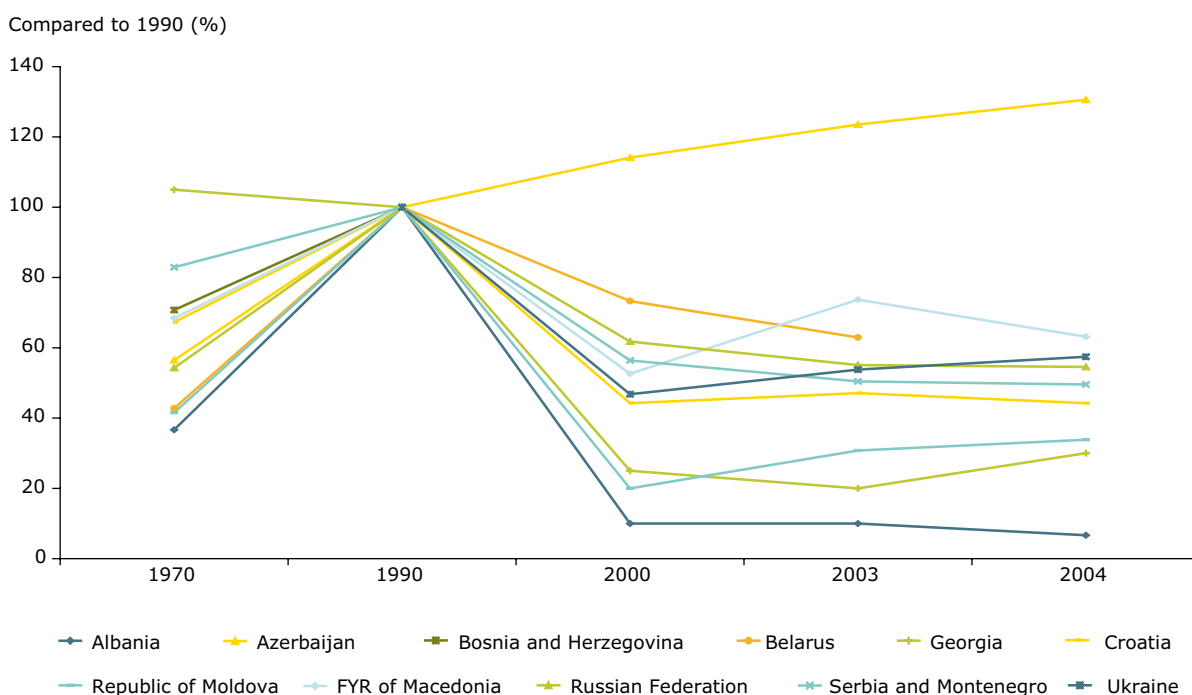
transport in recent years, although there are some positive developments (see Box 7.1). In some cities, such as those in the Caucasus, under-investment in public transport infrastructure and services has been the cause of the sharp decline in use. In these cities the road space that had been allocated to public transport is being *de facto* reallocated to cater for the increase in private road transport. Even in cities that have seen an investment in public transport after the 1990s slump, e.g. Zagreb, there have been declines. These have usually been caused by increases in automobile traffic and the effect of congested roads on the efficiency of the public transport system.

The situation is even worse in rural areas, where public transportation networks have declined significantly since the early 1990s. The withdrawal of subsidies, privatisation of transport services, rising fares and more limited schedules have all contributed to the decline. One additional effect of this is the increased use of private cars for personal transportation (see next section).

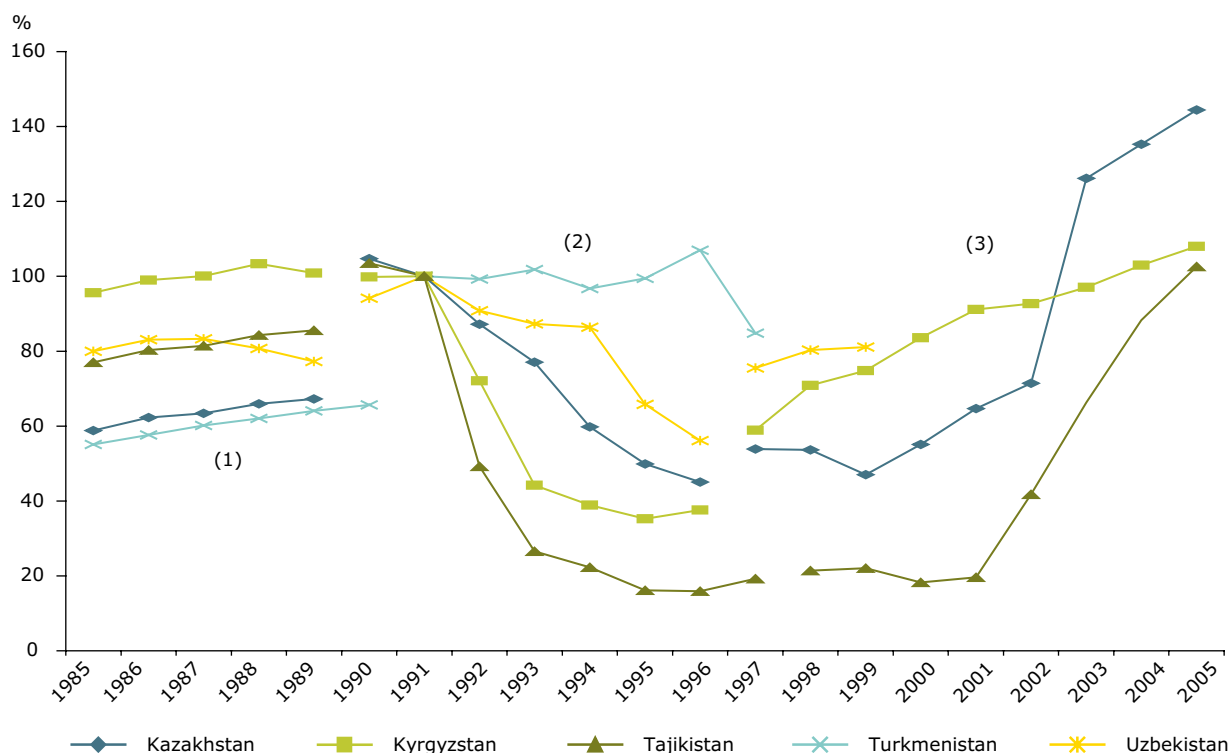
The use of private transport: cars, bicycles and walking

Data for passenger travel by car and 'soft' modes, i.e. walking and cycling, are far less comprehensive and in some cases virtually non-existent. Figures

Figure 7.6 Total public transport (passenger km)



Source: Developed from ECMT (2006a) data.

Figure 7.7 Land-based public transport use in Central Asia

Note: (1) Bus only prior to 1989/1990, (2) Bus and rail from 1989/1990, (3) Private bus operators included from 1997/1998; in each case breaks in trends indicate a change of measurement methodology.

Source: Interstate Statistical Committee of the Commonwealth of Independent States, 2006.

for Serbia and Montenegro suggest that by 2004, car use had nearly recovered to 1990 levels (an increase of 58 % above 2000 levels), after a decline between 1990 and 2000. Recent data for Albania suggest that car travel increased by 24 % between 2000 and

2004 (ECMT, 2006a). Elsewhere, there are few data on trends in passenger car use, although anecdotal evidence suggests that these trends are increasing significantly, especially in urban areas. For example, all of the case studies used in this chapter,

Box 7.1 Trends in urban public transport

In Zagreb in 1990 139 million passengers used buses. After a decline in the early 1990s, passenger numbers were revived to reach a peak of 105 million in 2002, only to drop in 2004 to less than 80 million. This has occurred in spite of recent investments in new buses. Tram use in the city, however, is on the rise. In 2004, 173 million passengers travelled on the city's trams. Although this figure is 25 % below the peak of 1985, it is still approximately 10 % higher than in the early 1990s. The length of the network was expanded in 2000 and is now longer than it has ever been in the city. There has also been extensive restoration of the associated infrastructure, e.g. rails and stops (Case study on Zagreb).

The decline of urban tram systems in the Caucasus has been particularly striking. As recently as 1998, Armenia and Azerbaijan each had over 40 km of tramways in their major cities. However, passenger numbers peaked at, respectively, 30 and 40 million people a year a decade earlier. Subsequently, declining services had brought about a steady decrease in tram use, which led to the trams halting all operations by 2005. In Georgia, the tram system is also declining, as the length of tramways in operation has fallen by 60 % in the past 20 years, while passenger numbers have declined by 94 % over the same period (Interstate Statistical Committee of the Commonwealth of Independent States, 2006).

e.g. Yerevan, Minsk, Almaty and Zagreb, noted that increasing car use was a problem in these cities as it led to congestion. Cities such as these were not designed to accommodate large numbers of private cars, and problems of congestion, road safety, etc., can be particularly acute for this reason.

Data on cycling and walking are even more difficult to calculate. In Zagreb it is estimated that at least every second household owns a bicycle and that bicycles make up 5 % of the city's traffic (Green Action, 2006). In other cities, e.g. Yerevan and Almaty, the level of cycling and walking is not considered to be high, and these transport modes are not seen as a solution by many people (Tsarukyan, 2006; Abenova, 2006).

Even though data on trends in passenger car use are not widely available, it is clear that in many countries the number of cars in use is on the increase. In Belarus and the Russian Federation, for example, the number of cars per head has doubled in the last 10 years (see Figure 7.8), whereas in other EECCA countries the growth in car ownership has not been as high. This probably reflects the relatively low incomes of the majority of the population of these countries. The number of passenger cars in SEE countries is mostly higher than in EECCA

(see Table 7.1), while the rates of growth vary significantly. Nevertheless, the levels are still significantly lower than in many Western European countries — i.e. still below 200 cars per thousand population in contrast to typical ratios of 400 to 600 in Western Europe.

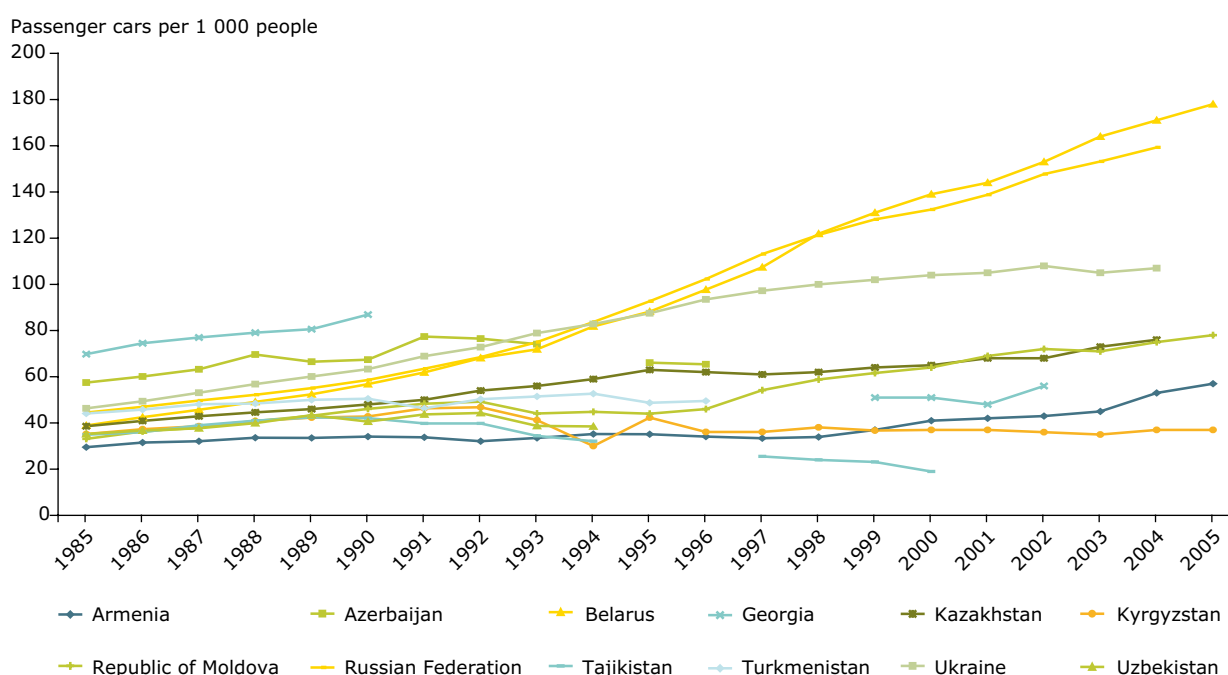
In urban areas, particularly capital cities, car ownership tends to be higher than elsewhere in the country (see Table 7.2). This pattern can be explained largely by the underlying economic circumstances. A recent report by the World Bank emphasises that

Table 7.1 Passenger car ownership in SEE countries (2003)

	Car ownership per 1 000 people	% growth (1990–2003)
Croatia	289	61 %
Serbia and Montenegro	184	7 %
FYR of Macedonia	148	30 %
Albania	57	n/a
Germany	546	
Italy	596	

Source: UNECE Statistical Database as cited in EEA, 2007.

Figure 7.8 Ownership of passenger cars in EECCA



Note: The registration system for motor vehicles in Georgia was revised in the late 1990s — a process that removed many cars that were no longer in use from the system. Hence, the numbers of vehicles registered declined significantly.

Source: Interstate Statistical Committee of the Commonwealth of Independent States, 2006.

Table 7.2 Passenger car ownership (per 1 000 people) in capital cities

Capital city	Car ownership	Country	Car ownership
Moscow	240	Russian Federation	160
Zagreb	357	Croatia	289
Tblisi	100	Georgia	79

Sources: Dimitrov, 2004; Green Action, 2006/UNECE; Georgian Ministry of Environment and Natural Resources, 2006.

strong economic growth is commonly concentrated in capital cities, while urban areas away from the capital often do not benefit to the same extent (World Bank, 2006). More detailed information on travel behaviour, e.g. the mode used for the journey to work, is generally not available in SEE and EECCA countries.

Air transport

Based on the limited information available, passenger air travel accounts for approximately 14 % in EECCA and 5 % in SEE countries and enjoys modest annual growth. In addition, air freight transport accounts for a marginal share (fraction of a percent) of total freight in EECCA and SEE countries. Between 1993 and 2003 air freight showed an average annual growth of 4 % in EECCA and 7 % in SEE. However, the initial amount of air freight was low from the outset.

Therefore, the topic of air transport will not be covered in this chapter, although it should be recognised as a significant concern for the future.

Future projections

Inevitably, it is anticipated that the use of transport – both freight and passenger – will increase

substantially in the near future. A study of transport infrastructure needs in the Balkans, for example, estimated that road traffic would grow by between 200 % and 300 % in the region during the period of 2001 to 2025, with the predicted growth in some countries, such as Albania, even higher. Rail use was also predicted to increase, but more slowly with an expected growth of between 60 % and 140 % over the same period. Meanwhile, the use of inland waterways is expected to grow by up to 215 %, while air travel might increase by anything between 315 % and 830 % (COWI, 2003).

Whether anticipated increases in the use of infrastructure on this scale occur or not, it can be expected that increased economic growth coupled with the likely accession of many SEE countries to the EU in the next 20 years, will increase the demand for transport, both for freight and passenger travel.

7.2.2 The reasons behind changing consumption patterns

Freight transport

As noted above, transport trends have broadly followed trends in GDP. The decline and recovery of economic activity was reflected in the level of

Box 7.2 Growth in air traffic versus aviation safety

Commercial aviation has experienced enormous growth over the last few decades. After the 1991 break-up of the Soviet Union, about 500 local airlines were set up as a spin-off from the national carrier Aeroflot. Today, 180 remain in operation.

Despite bringing socio-economic benefits, this has led to increased environmental impacts. The problems in SEE and EECCA are compounded by the high number of small local carriers and the fact that older, more highly-polluting aircraft remain in service.

The rapid growth of small carriers also raises safety concerns. In 2006, Russia and the other former Soviet republics had the world's worst air traffic safety record. According to the International Air Transport Association (IATA), the accident rate in EECCA region was 13 times the world average.

goods transported. As the bulk of the population became rapidly impoverished and then gradually picked up, the level of demand for goods followed a similar pattern. Many of the countries have become substantial importers of manufactured goods from the EU. Consequently, some now have negative net trade balances with Western Europe, whereas countries that are rich in mineral resources, including oil and gas reserves, have become major exporters to Western Europe. All this has led to a recent increase in trans-European bulk freight activity, where recovering economies have seen rises in freight transport.

Passenger transport

Economic recovery has also meant that standards of living have improved and spending on goods and services, including transport has risen. Some of this will entail additional journeys to work. In addition, greater wealth leads to more travel for either tourism or recreational activities. Perhaps the single most outstanding and important trend over the past 15 years has been the dramatic rise in car ownership. To some extent the recent increase in car ownership only satisfies a latent demand. Previously people in many EECCA countries had to wait many years before being able to purchase cars. As wealth has increased and imported second-hand cars have become more readily available, car ownership has soared. Owing to supply problems for private cars under the former socialist regimes, car ownership has traditionally been a symbol of high social status; a key factor in rapidly increasing ownership rates today. This situation is particularly pertinent for SEE and EECCA countries. Finally, cars are a necessity in rural areas, where the quality of public transport has declined. However, even in cities, bus and tram services are often of poor quality. Moreover, the growing popularity of retail outlets on the outskirts of towns may also be driving the demand for cars (see Chapter 5).

Investment in public transport

A key factor behind the inability of public transport to recover from the decline of the 1990s has been the decrease in funding levels in SEE and EECCA in the past 15 years. For example, the public transport systems of the EECCA countries were previously state-owned and heavily subsidised. The subsequent transfer of ownership of much local public transport to municipalities was not accompanied by sufficient levels of funding. Consequently, the quality and quantity of public transport has declined, as has investment in the maintenance of the fleet and infrastructure.

Hence, public transport has become less attractive compared to private transport.

However, in EECCA countries, the development of informal, privately-operated public transport has increased. This tends to be more competitive than publicly-run public transport, but it has caused additional problems (Dimitrov, 2004; see also Box 7.3). SEE countries have seen greater investment in public transport, as networks have been maintained, and in some cases, e.g. in Zagreb (see Box 7.1), even expanded.

National rail networks have also suffered. For example, the quality of railway infrastructure in SEE is relatively poor with only 10 % of the network being in good condition. In spite of some recent investment, most of the railway lines in the region need modernisation and are suffering from neglect, both of which are the result of insufficient investment in previous years. This problem is exacerbated by the fact that the locomotives and rolling stock are old and in poor condition. All of these factors contribute to a reduction in the operational capacity of the network and in the speed of operations (World Bank, 2004). In the EECCA countries, the situation is often similar, e.g. in Armenia the railway infrastructure is also in a relatively poor condition (Tsarukyan, 2006).

The previously state-owned national rail networks and services are now the subject of reform in an effort to make up for the lack of investment since 1990. In SEE railway reform has progressed significantly in some countries, whereas in others it has not yet begun, e.g. in Albania (World Bank, 2004). The separation of the management of infrastructure and operations is often a key element of this reform (e.g. in the Russian Federation; Pittman, 2004).

Investment in roads

Road networks in SEE and EECCA countries also lack investment, despite the fact that they have attracted far more investment than railways or any other forms of public transport. For example, the World Bank (2004) estimates that the overall condition of the road network in SEE was poor. Citing an earlier study (COWI, 2003), it suggested that only 28 % of the core road network in the region is in good condition, whereas 28 % needs resurfacing, 24 % repairs and 23 % reconstruction in one form or another. Within the SEE region, there are also significant differences between countries. For example, Croatia's road network is in a relatively good condition, whereas only 10 %

Box 7.3 The decline of state-owned public transport and the rise of private operators

In the Russian Federation, public transport still has an 85 % to 90 % share of the market in urban areas despite recent increases in car ownership. The Russian public transport system is one of the largest in the world, but the system is currently suffering in the same way as elsewhere in EECCA. The level of service is declining, due to a lack of investment in vehicles both to replace older vehicles and also to meet new demand. It is estimated that only 25 % of the required annual investment in new vehicles is being funded. Other issues which contribute to the poor state of the system include: the number of users who are exempt from paying; the relatively low fares; poor fare collection; and inefficient service. Under the previous centrally-planned system, public transport was supported by a generous level of public subsidy, which proved to be unsustainable in a market-led system. Statistics suggest that the level of public transport subsidy in the Russian Federation is still significant — around EUR 351 million in 2000 — and increasing compared to recent years. But it is also estimated that the subsidy is still less than what is needed to cover operational costs, not to mention investment in new vehicles.

The relative decline of the state-owned public transport system has given rise to a growing number of private operators, usually operating minibuses, in many Russian cities. Such operators make up for the shortfall in the publicly-operated system and are a positive new element in many cities' public transport systems, as they can run more frequently and are particularly popular in the evenings. Additionally, such minibuses tend to be well utilised and thus more environmentally efficient than private car use. Nevertheless, the increased use of minibuses has led to concerns about the safety of the vehicles and the quality of the driving, as the sector tends to be poorly regulated (ECMT, 2005).

The rise of privately-owned public transport services is not a development limited to Russian cities. In Yerevan, for example, publicly-owned bus and tram services have declined due to a lack of financial support and poor infrastructure. Some of the shortfall has been compensated for by increases in the numbers of smaller privately-owned buses and taxis. As in Russian cities, these privately-owned buses have been beneficial in facilitating transport of citizens, but their relatively unregulated nature has contributed to worsening traffic problems in the city (Tsarukyan, 2006).

In Tbilisi, it is a similar story. A public transport system from the Soviet period, which focused on large buses and electric public transport (trolleybuses, underground subway and trams), collapsed post-1990 due to financial constraints. While bus services have begun to recover, the use of the metro and trams continues to decline. This decline has also led to an increase in privately-owned services which use mini-buses and can be more flexible and frequent than the state system. However, similar concerns have been raised about the lack of regulation of the sector (Georgian Ministry of Environment and Natural Resources, 2006).

of Albania's national road network was considered to meet this standard and 68 % was judged to be poor. In Armenia, major roads of national and regional importance are in relatively good condition, while local roads tend to be in a much poorer state (Tsarukyan, 2006).

Compared to public transport, it is much easier to attract investment for roads. For example, plans to develop the Albanian international road network have succeeded in attracting financial support from international financial organisations, whereas it has proved difficult to attract similar support for upgrading Albania's railway system (UNECE, 2002a).

Some of the reasons for this lie in the importance of international trade, the geographical location of many of the countries, and the agenda of

the organisations financing such investments. Given the geographical position of SEE and EE in particular, the transport infrastructure of many of the countries in these regions is likely to become increasingly important to international freight companies for the purposes of transit, particularly where neighbours have joined the European Union. In Eastern Europe, Ukraine and Belarus also seem likely to experience an increase in the amount of transit traffic as trade increases between the Russian Federation and the EU.

7.2.3 The impacts of transport

This section reviews some of the key environmental impacts originating in the transport sector, as well as one dramatic social aspect — road accidents. Transport depends on fossil fuels, particularly oil products, which account for more than 98 % of

energy consumption by the transport sector. Hence, emissions of air pollutants and greenhouse gases are the key impacts from the transport sector. Problems related to traffic noise, land take and fragmentation by transport infrastructure, or management of transport waste also pose challenges. However, at present the magnitude of these problems cannot be quantified, and they are therefore not treated in depth in this chapter.

Transport's emissions of air pollutants and greenhouse gases

Mechanised transport gives rise to pollution in a number of forms, including emissions of carbon dioxide; one of the main greenhouse gases associated with the combustion of fossil fuels. Other forms of pollution include exhaust gases and particulates that contribute to local and regional pollution, dust from tyres and brakes, noise etc. Local and regional air pollution have impacts on human health, e.g. emissions of particulates, emitted in large numbers from older diesel engines, have impacts on respiratory systems. Generally speaking, more modern vehicles tend to be less polluting than older ones owing to more sophisticated pollution control technology and the use of cleaner fuels. Well-utilised mass transit vehicles tend to produce less pollution on a passenger-kilometre basis, although older public transport vehicles are sometimes highly polluting on a vehicle-kilometre basis.

Transport's impact on climate change

One of the main impacts of rising transport levels, particularly the use of private transport, is increased fuel use and therefore increased emissions of carbon dioxide – the main greenhouse gas that causes climate change. In the EECCA countries the transport sector uses an increasingly large proportion of energy – averaging around 17 %. However, this is still much

Table 7.3 Transport energy consumption per capita (tonnes of oil equivalent) in SEE and EECCA countries (2004)

South Eastern Europe	0.27
Eastern Europe (excluding Russian Federation)	0.18
Russian Federation	0.66
Caucasus	0.13
Central Asia	0.16
Portugal (lowest in the EU-15)	0.71
Ireland	1.16

Source: EEA, 2007.

less than Western Europe's 30 % (Dimitrov, 2004). IEA figures (EEA, 2007) suggest that transport energy consumption per capita in SEE and EECCA countries is still significantly lower than typical values for the EU-15 (see Table 7.3).

The consumption of transport energy per capita declined in all the EECCA countries (except Azerbaijan and Uzbekistan) between 1995 and 2004. However, in SEE, there was a growth of at least 22 % in all countries for which there were data (excluding Serbia and Montenegro), including an approximate doubling in Croatia and Bosnia and a significantly higher growth still in Albania (at least 500 %).

Air pollution

Air pollution in the countries of SEE and EECCA is more and more of a problem, particularly in urban areas. To some extent, the situation improved in the 1990s, principally as a result of the decline of the economy in EECCA and the subsequent reduction in emissions from both industry and transport. However, the growth of road transport in recent years has seen urban air quality deteriorate once again.

Box 7.4 Air quality in the cities of SEE and EECCA

In Almaty reported ozone levels were more than four times higher than national and international standards, while fine dust was 1.25 times above international standards (Kok and de Koning, 2003). In the Russian Federation in 2002, average annual concentrations of air pollutants exceeded permissible levels in 201 Russian cities with over 60 % of the country's urban population (ECMT, 2005). In Yerevan in 2005 the permissible average annual levels of many pollutants were exceeded by significant amounts: dust (by 100 %), SO₂ (140 %), NO₂ (180 %), benzene (40 %), ozone (120 %) (Tsarukyan, 2006).

Not all capital cities in the region suffer from poor air quality. For example, air pollution in Minsk is considered to be low, as measured on an integrated pollution index used in many EECCA countries. The same cannot be said of other cities in Belarus – pollution levels in Vitebsk and Gomel are considered to be high (Narkevitch, 2006).

Pollution is exacerbated by vehicle age, poor vehicle maintenance, variable fuel quality, and the poor state of many of the roads (see Box 7.4).

End-of-life vehicles

At the end of their useful life large numbers of vehicles are discarded. Some are left abandoned, others are cannibalised for parts, while a significant proportion is recycled.

Transport vehicles are an attractive proposition for recycling since vehicles tend to be made largely out of steel, and it is generally economical to recycle them even without special requirements to do so. However, other elements of more complex vehicles, such as passenger cars, can be more difficult to recycle. Modern construction methods, for example, the use of plastics, laminated compounds and other novel materials, can complicate these problems.

A recent report for the European Parliament (Fergusson, 2007) indicated that the non-metal components of cars present particular difficulties in implementing the End-of-Life Vehicles Directive in the 'newer' Member States or the EU, and will likely cause similar problems in SEE and EECCA countries. Here, there can be a trade-off between recyclability and the use of lighter materials to reduce fuel consumption. In addition, some toxic materials including heavy metals are used in vehicle construction and need to be disposed of with due care.

Impacts of transport infrastructure

Transport infrastructure can also make significant demands upon non-renewable resources, especially in situations, such as those now occurring in some SEE and EECCA countries, where major new infrastructure is under construction. New infrastructure requires significant quantities of mineral resources, including concrete, aggregates, and steel. Roads, and to a lesser extent railways, can fragment natural habitats by acting as a significant barrier to the movement of small animals, while noise and other impacts of transport activities can disturb wild animals. In urban areas heavily-used new infrastructure can also have a negative impact on the mobility of people within cities. Transport infrastructure also takes land — a natural resource — that could be used for other

purposes. In urban areas, transport infrastructure in particular consumes a significant proportion of the available land. The competition for land with residential, commercial and recreational demands, as well as between transport modes, can be fierce. In this context, it is worth noting that roads require significantly more land area to provide the same capacity as railway lines, while air and water transport make far smaller demands upon land area.

Noise

Transport noise is also recognised as a growing problem, but there is often little information on the extent and impact of noise. As a result, there are few examples of action taken specifically to reduce noise from transport. The problem of noise is made worse by similar factors that contribute to excessive emissions, i.e. the age of the vehicles and poor maintenance of vehicles and roads. For example, in Moscow 70 to 80 % of the population live in conditions of high noise pollution that cause discomfort, while in Yerevan at least 30 % of the population are exposed to noise levels that cause serious annoyance and sleep disturbance (Dimitrov, 2004).

Road accidents

In 2004 there were 344 100 accidents resulting in 45 400 deaths on the roads of SEE and EECCA ⁽²⁾. In recent years, these figures have been increasing again after a decline in the 1990s that saw both figures drop to around 80 % of 1990 levels by the end of the decade. While the number of accidents has increased to levels comparable to those of the early 1990s, the number of road deaths is still lower than it was in 1990. Indeed, in 2004 the number of deaths actually declined in the region, thanks largely to decreases in the Russian Federation and Ukraine, which together accounted for 91 % of the region's road deaths. In spite of the regional decrease, there were significant increases in road deaths in some countries, e.g. 21.2 % in Albania and 11.4 % in Croatia (ECMT, 2006a).

In terms of safety, roads in the Russian Federation are the most dangerous in Europe with around 240 deaths per million people in 2004, while Belarus had around 175 deaths per million people. Figures in other SEE and EECCA countries are lower and comparable to those in other European countries, e.g. Serbia and Montenegro had

⁽²⁾ Figures cover the nine countries — Albania, Azerbaijan, Georgia, Croatia, Republic of Moldova, former Yugoslav Republic of Macedonia, Russian Federation, Serbia and Montenegro and Ukraine — for which comparable data were available.

approximately 120 road deaths per million people in 2004 (comparable to the figure in Spain), while the equivalent figure in Armenia was 75 (comparable to that of Germany) (ECMT, 2006a).

7.2.4 Other factors determining impacts of transport

Mobility is essential for the functioning of modern societies. It enables free movement of people, goods and services and offers possibilities for trade, living, leisure, learning and retail shopping. A well-developed transport system is the ambition of all societies. However, a number of technology-related factors determine how environmentally sustainable transport is in the SEE and EECCA countries.

From a socio-economic point of view, mobility patterns are becoming more unsustainable. Congestion makes urban areas less and less easily accessible, and leads to significant costs in terms of delivery delays and lost working hours. At the same time, declining public transport restricts the mobility of those who do not have a personal car.

Ageing vehicle fleets

Among the reasons for severe air quality problems in the major cities of EECCA countries are the age and engine technology of the vehicles. The current vehicle fleets in many EECCA countries consist of older

vehicles manufactured in the former Soviet Union, and of newer vehicles, many of them second-hand and imported from Germany and elsewhere (see Box 7.5). Vehicles produced in the former Soviet Union tend to use petrol and are not fitted with emission control systems, such as catalytic converters. So, from a technological perspective they are similar to those used in Western Europe and North America before the mid-1980s, when emissions standards significantly improved (Canadian International Development Agency, 2000).

Cleaner fuels

The use of cleaner fuels can reduce emissions from vehicles and therefore air pollution. As well as being a pollutant in its own right, the presence of lead in petrol inhibits the functioning of catalytic converters which help reduce other emissions. Hence, the phasing-out of leaded petrol has been a priority in many SEE and EECCA countries and has been achieved in many of them. Currently, leaded petrol has not been phased out in Bosnia and Herzegovina, the former Yugoslav Republic of Macedonia, Montenegro and Serbia. A ban on leaded petrol in Bosnia and Herzegovina is scheduled for 1 January 2010 (PCFV, 2007). In EECCA Georgia, Tajikistan and Turkmenistan have not yet phased out leaded petrol (EAP Task Force Secretariat, 2006; PCVF, 2007). In many countries of the SEE region progress is being made to align fuel quality and emissions

Box 7.5 Vehicles of SEE and EECCA: age and origins

In Armenia the car fleet is old: 30 % are more than 20 years old and over 70 % of the cars imported into the country are second-hand. Ninety-five per cent of the existing car fleet were imported from the former Soviet Union or Russian Federation, but the origin of new imports is changing, with only half of the cars imported in 2004 manufactured in the Russian Federation (Tsarukyan, 2006).

In the Belarusian capital of Minsk, around 53 % of the buses are more than 10 years old, while in the country as a whole 86 % of the cars are over 10 years old (78 % in Minsk). As there is no domestic production in Belarus, vehicles are imported from elsewhere, mainly from the Russian Federation, but increasingly from Germany and other non-CIS countries (Narkevitch, 2006). In Kazakhstan most cars are second-hand and imported from Germany, although cars are also imported from Japan and South Korea (Abenova, 2006; Dimitrov, 2004).

In Georgia most vehicles are between 10 and 15 years old and imported second-hand cars from Western Europe, although the proportion of Soviet-made cars is still high (Georgian Ministry of Environment and Natural Resources, 2006). In Moldova most of the fleet was manufactured in the Soviet era, although in recent years many second-hand cars, which were often built in the 1980s, have been imported from elsewhere in Europe (Dimitrov, 2004).

In SEE the vast majority of newly registered cars in most countries are imported second-hand vehicles, e.g. 70 % of the cars in Bosnia and 96 % in Montenegro in 2003. Car fleets are often old: in 2003, 65 % of the passenger cars were over 16 years old in Montenegro (REC, 2006).

legislation with that of the EU, although progress is more advanced in some countries, particularly those that aim to accede to the EU. In many EECCA countries Russian fuel quality standards are used, and they are stricter than some of those previously applied in SEE, but are not as stringent as those of the EU (REC, 2006). In most countries petrol and diesel still dominate the transport market, but the use of alternative fuels is increasing in some countries (see Box 7.6).

Fuel smuggling and adulteration are quite common activities across Europe, and these can adversely affect fuel quality and vehicle emissions. The scale of such activities varies enormously from one country to another according to circumstances, and by its very nature is difficult to quantify.

Vehicle maintenance

Poor maintenance of vehicles also contributes to air pollution. In EECCA countries there is usually no systematic inspection of vehicles and authorities are often poorly equipped for measuring technical vehicle requirements and fuel quality. Where emission controls do exist, they are frequently based on outdated standards (Dimitrov, 2004), and the requirements are often not enforced rigorously. For example, an independent survey undertaken in 2002 in Almaty found that 46 % of the vehicles tested did not meet at least one aspect of the emissions standards (Kok and de Koning, 2003).

Congestion

Congestion in major SEE and EECCA cities is turning into a problem as a result of the increasing use of private motorised transport and the decline in the

use of public transport. In many cases the problems are exacerbated by the fact that cities, especially the centres of cities such as Yerevan, Almaty and Tbilisi, were not designed to take the levels of traffic that they are now experiencing. The increasing number of minibuses and private taxis, which are replacing larger, publicly-operated buses, are adding to the congestion problems. Generally, however, there is as yet little congestion on interurban roads.

Reduced accessibility for those without access to private motorised transport

The decline of public transport at the expense of private transport also reduces the potential mobility of those who previously relied on public transport and who do not have access to private cars. This reduced access to transport potentially reduces the ability of these people to have access to key services, jobs and education as well as personal travel. This has potentially adverse effects on them, from both an economic and a social perspective.

In general, the sustainable use of transport promotes walking and cycling wherever possible for short journeys and encourages most forms of public transport rather than private cars wherever it is sensible to do so. For freight, similarly, rail and water transport tend to be more resource-efficient than road transport. Consequently, where public transport facilities exist and where fixed infrastructure, such as railways or trams, are in place, it makes good sense to make maximum use of them. It has to be recognised, however that these modes are not suitable for all journeys, and that more affluent societies tend to demand greater flexibility in individual transport, at least for certain purposes. Significant differences in modes of transport in developed countries suggests that there is some possibility of influencing or challenging these trends, but coping with these changing demands and expectations represents a special challenge for transport policies in SEE and EECCA countries.

Box 7.6 Increasing use of alternative fuels

The use of alternative fuels can contribute to improving local air quality through reducing emissions of certain pollutants. In Belarus while the use of compressed natural gas (CNG) still remains relatively low — less than 1 % of transport fuels — its use has quadrupled since 2000 (Narkevitch, 2006). In Armenia the use of CNG increased by 230 % between 2001 and 2005 and now accounts for 24 % of the market. This is due to the increased use of the fuel by minibuses, buses and light-duty trucks and has been stimulated by the fact that CNG costs about one-third of the price of petrol (Tsarukyan, 2006).

7.3 Policy initiatives

A mixture of various policy instruments will have to be used to address effectively problems of sustainable consumption and production in transport.

In the context of efficiency and environmental impacts of transport, there is clearly a hierarchy of 'desirable' kinds of transport. The most energy-efficient and affordable modes are, of course, walking and cycling as they entail virtually no use of fossil fuels or other non-renewable resources, and are,

in this respect, the most desirable means of transport for short journeys. Some types of mechanised transport, most obviously water transport and to a lesser extent rail, are, generally speaking, significantly more energy-efficient than motorised road transport or aviation.

However, within each mode there is a considerable variation between the energy efficiency of different types of vehicles. For example, large public transport vehicles tend to be more energy-efficient per passenger kilometre than small individual vehicles, provided always that they are well utilised. Electric trains usually are appreciably more fuel-efficient than diesel trains, while diesel cars and trucks tend to be more efficient than petrol ones. There is an enormous variation between vehicles according to size, age, and type of construction. Newer vehicles tend to be more energy-efficient than older ones, but often this benefit is overshadowed by their greater size, weight or power, and they might actually use more fuel than the older cars.

Maximising the *efficiency of transport* use is also important for moving towards SCP. As noted above, there is a hierarchy of transport modes, based on their energy-efficiency. But utilisation rates are also important. For example, public transport vehicles do not make efficient use of resources if they carry few passengers. The passenger car is relatively efficient if it carries four or more passengers, but this is not usually the case.

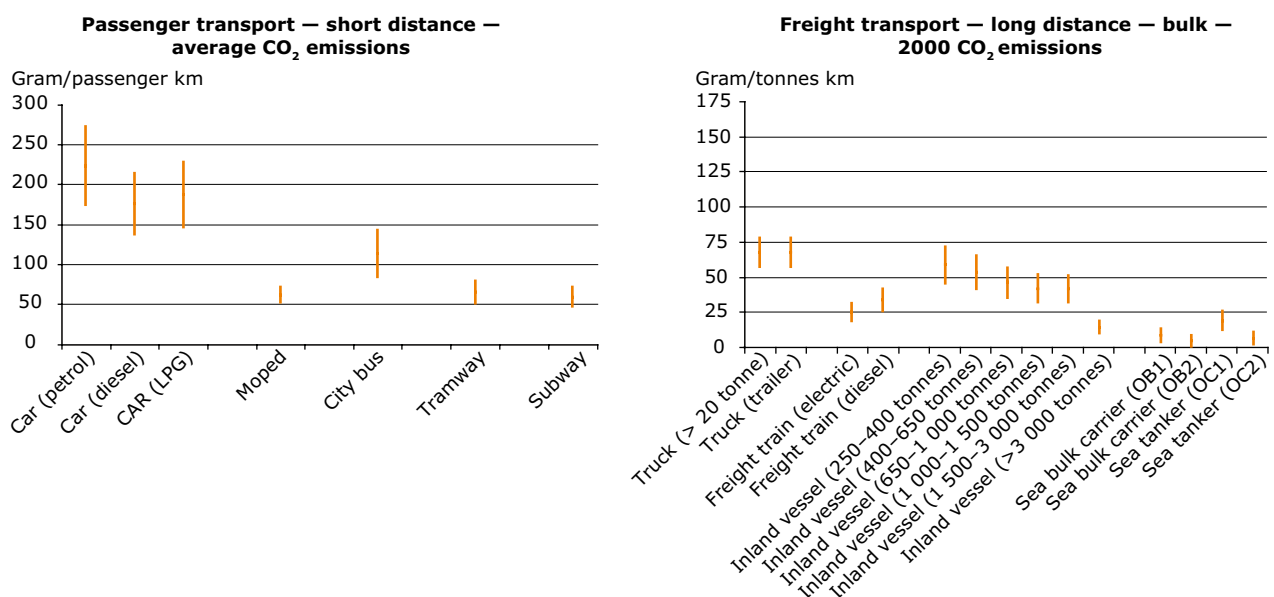
Efficient utilisation also implies patterns of transport that are themselves efficient. For instance, it makes little sense in resource terms to transport materials or goods over long distances when similar products are available locally, even if it makes economic sense to do so. Efficient passenger transport also implies land-use patterns that minimise the need to travel long distances for goods, services, jobs and the use of public transport. This includes maintaining densely-populated and thriving urban centres, well served by public transport, while avoiding urban sprawl and out-of-town developments.

This section looks in more detail at strategic programmes and policies in EECCA and SEE, infrastructure and traffic management, and the use of economic instruments and regulations.

7.3.1 Strategic programmes policies and planning

Many of the countries of SEE and EECCA have some kind of strategic plan for the environment, which includes an aspect often of direct relevance to transport. For several of the EECCA countries, the National Environmental Action Programme (NEAP), developed in the late 1990s, remains the most strategic environmental document, e.g. in Uzbekistan and the three countries of the Caucasus. For example, the Azeri NEAP, which dates from 1998, identifies five priority challenges, one of which is pollution from transport, while the 2000 Georgian NEAP also includes air pollution as one of its priorities (EAP Task Force Secretariat, 2006).

Figure 7.9 CO₂ emissions in transport



Source: Essen, H. van, *et al.*, 2003.

In other countries, policies that address some of transport's adverse environmental impacts, e.g. air pollution, are set out in more strategic environmental documents, such as the Moldovan 2002 Environmental Policy Concept and the Ukrainian Government Policy on Environmental Protection, Use of Natural Resources and Environmental Safety (from 1998), both of which include the integration of environmental concerns into the transport sector. Elsewhere, e.g. in Tajikistan and Georgia, environmental issues are identified as priorities in national Poverty Reduction Strategies. More recent strategic documents tend to make a more explicit reference to climate change issues, in addition to those of air quality. For example, climate change is one of the main priorities of the Belarus National Action Plan on the Rational Use of Natural Resources and Environmental Protection for 2006–2010, and mitigating climate change is explicitly part of the Kazakh Environmental Safety Concept for 2004–2015 and Environmental Protection Programme for 2005–2007 (OECD, 2007).

Many EECCA countries have also set up procedures or processes to improve the integration of environmental concerns into transport policies. For example, in some countries, transport and environment issues are discussed in inter-ministerial working groups and the relevant ministries have regular contacts. In around half of the EECCA countries transport ministry staff have received environmental training and there is a specialised unit in the transport ministry to deal with environmental issues (EAP Task Force Secretariat, 2006).

By no means do all of the SEE and EECCA countries have a transport strategy. Where these do exist, they tend to focus on infrastructure development rather than on other aspects of transport policies. Often they have an environmental dimension or at least a recognition of the environmental impacts of transport, but the focus is often on developing infrastructure to support economic development in order to integrate national infrastructure with that of other countries. In a number of EECCA countries the latest transport strategy has been subject to some form of environmental assessment (e.g. in Kyrgyzstan, Tajikistan and Uzbekistan), while the transport strategies of Azerbaijan, Belarus, Moldova, Kyrgyzstan and Tajikistan have environmental targets.

The potential of spatial planning to benefit the environment is noted in many strategic plans, e.g. Kazakhstan's Environmental Protection Programme for 2005–2007. In many SEE countries there are spatial plans, which take into consideration transport

issues, such as the Croatian spatial planning strategy of 1997. In Montenegro the national Spatial Plan for 2020 sets out strategic considerations on accessibility and travel generation, while the Transport Development Plan complements the Spatial Plan and considers the more detailed issues. Transport plans include provisions on reducing congestion and encouraging public transport use for both passenger and freight travel.

However, transport concerns are still not integrated as well as they might be into spatial planning policies, and this is vital given that land-use patterns have such a fundamental effect in determining the shape of transport demand. In the SEE countries the need for better urban and regional planning has been recognised in both Serbia and the former Yugoslav Republic of Macedonia (UNECE, 2002c and 2002b). In this context insufficient use is often made of strategic environmental assessment. The countries of SEE and EECCA are also beginning to experience some of the same development pressures that are already common in the EU — for example, urban sprawl, out-of-town shopping facilities and other features that undermine the provision of sustainable transport systems.

7.3.2 *Investment in infrastructure and traffic management*

There is recognition both by national governments and institutions that action is needed to develop the transport infrastructure of SEE and EECCA countries. As discussed above, however, larger international projects, particularly roads, often prove more attractive for potential investments than for more local infrastructure. Many countries are attempting to put more investment into local infrastructure, particularly in urban areas.

In Belarus expenditure on urban public transport has been significantly increased in recent years. Other countries, e.g. Albania and Armenia, are also committing funds to public transport infrastructure. In Croatia the development of inter-modal freight terminals is supported by the national transport development strategy, and a range of subsidies for rail freight, from direct grants to reduced tariffs, is provided. The Montenegrin national transport strategy also backs the development of inter-modality and the integration of transport chains, while in Belarus, there are plans to increase freight efficiency by improving logistics.

The economic situation of the countries limits the amount of money that can be devoted to such expenditures, especially on the local networks.

Furthermore, the increased use of road transport in most countries, and the resulting congestion and air quality problems, create additional problems that require solutions and increase competition for the already limited transport budget.

Many countries are also beginning to recognise the importance of improved traffic management. For many cities, e.g. Minsk, Belgrade and Skopje, the first step is the diversion of through traffic to city ring roads in order to alleviate congestion problems in city centres. In some cities, e.g. Tbilisi and Almaty, restrictions are placed on the use of main roads by freight traffic in order to alleviate congestion. In Minsk there are plans to improve traffic management by introducing one-way systems, creating favourable conditions for the development of public transport and the metro, particularly during the rush hour, and restricting freight traffic in the centre. The development of urban public transport is to be supported in the former Yugoslav Republic of Macedonia through investment, priority measures, such as dedicated bus lanes and a parking policy, as well as by improved traffic management and control. In Moscow, the START project has improved the coordination of traffic lights and the traffic flow in the city, in this way increasing the capacity of the network by an estimated 10 to 12 % (Dimitrov, 2004).

7.3.3 Economic instruments

A number of the strategic policy documents cited in Section 7.3.1 identify the reform of economic instruments as one way of integrating environmental concerns into sectoral policy. For

example, the reform of economic instruments is identified as an area of environmental action in the Georgian Economic Development and Poverty Reduction Strategy (from 2000). The 1998 Armenian NEAP and the Kazakh Environmental Protection Programme for 2005–2007 also both mention improving environmental management through the use of economic instruments (EAP Task Force Secretariat, 2006). The recognition of the need to determine prices in a fair manner is also a feature of the transport development strategy in Montenegro. However, the potential use of taxation to encourage environmentally less damaging behaviour is far from being fully exploited and in some cases works against the encouragement of more environmentally-friendly behaviour.

Dimitrov (2004) noted that the use of economic instruments in EECCA countries to influence demand and modal share is limited, although fuel fees have sometimes been differentiated between leaded and unleaded petrol. The World Bank mentions that the level of 'cost recovery' for infrastructure in SEE is poor (World Bank, 2004). In the absence of road pricing the report makes its assessment on the basis of annual vehicle fees and fuel fees, and emphasises that these are significantly lower than the equivalent charges in the EU.

In some countries taxes on transport fuels have increased in recent years, e.g. in Belarus, where they have at least trebled since 2003. In other countries, for example, Kyrgyzstan and Armenia, taxes on transport fuels have declined in recent

Box 7.7 Import tax differentiation

In Belarus import taxes for older cars are relatively high (EUR 2 per cc for cars more than 14 years old; EUR 0.75 per cc for cars more than 10 years old) to discourage their import. The import taxes for older vehicles were increased in 2005. These represented an increase of 25 % on previous levels for cars that were more than 10 years old and a trebling of taxes for cars more than 14 years old. The import tax rates on newer cars (i.e. those less than 3 years old) are higher than those on cars between three and ten years old in order to increase tax revenue. Additionally, within the two newer age groups, there is a slight differentiation in favour of cars with smaller engines, as the rates increase for cars larger than 1 500 cc and then again for cars larger than 2 500 cc for all cars less than ten years old (Narkevitch, 2006).

Similarly, in Armenia a draft law is currently being considered, which would differentiate the charges, or environmental payments, payable on imported vehicles according to their vehicle type, fuel used and the presence (or not) of a catalytic converter (Tsarukyan, 2006). In the former Yugoslav Republic of Macedonia custom duties of 10 % apply to new vehicles compared to a duty of 13.3 % for second-hand vehicles (REC, 2006).

In Georgia, on the other hand, the import tax on newer light duty vehicles is higher than that on older vehicles. The annual vehicle tax is differentiated in the same way: it is based on age and engine capacity and it decreases for older vehicles (Georgian Ministry of Environment and Natural Resources, 2006).

Box 7.8 The use of economic instruments

Kazakhstan's annual car taxation system has some positive elements from an environmental perspective. Its annual car taxes are based on engine capacity (measured in cc), which is a reasonable proxy for a car's carbon dioxide emissions and age: the higher the engine capacity the higher the tax — e.g. the tax for a vehicle of 2000 cc is around 150 % more than that for a car of 1 000 cc. However, for cars of the same engine capacity, newer cars (e.g. one less than 6 years old) are generally taxed at levels twice those of older cars produced outside the EECCA. The taxation level on older cars that are produced in the EECCA is even lower — for the same engine capacity — than the tax for older non-EECCA produced cars. Taxes on lorries are based on weight and age — the tax on a vehicle less than seven years old is around twice that of an older vehicle of the same weight (Abenova, 2006).

Other countries have been considering adopting higher taxes on cars that pollute more. For example, Albania has considered increasing taxes for second-hand cars. In the former Yugoslav Republic of Macedonia fiscal incentives, such as tax and custom discounts for new vehicles (cars, buses and commercial vehicles), have also been considered to encourage the purchase of more fuel-efficient vehicles (ECMT, 2006b). In Armenia the use of funds raised from environmental charges, such as that on imported cars noted above, will go towards financing environmental projects, such as the development of electric transport and support for non-motorised modes (Tsarukyan, 2006).

years (OECD, 2007). Since many cars used in the countries of the region are imported, import taxes have a significant influence on the make-up of the car fleet (see Box 7.7). Ownership taxes, which decline with the age of the vehicle, are a feature of the tax systems in other countries. There are also other more innovative uses of economic instruments (see Box 7.8).

However, the use of economic instruments to influence transport demand is still very limited. In Croatia tolls are in place on the country's motorways, but these have been introduced in order to recover the costs of the construction of the roads, rather than for the purposes of managing demand (Green Action, 2005).

7.3.4 Regulation

As noted above, leaded petrol has been phased out in many SEE and EECCA countries. Where leaded petrol is still in use, there are plans to phase it out soon in the coming years. Fuel quality and vehicle emission standards exist in most EECCA countries. In Kazakhstan local vehicle emission standards are in place, whereas in Ukraine Euro II standards have been applied since 2006 and Belarus is planning to introduce Euro II/III standards. In many countries there are also plans to improve vehicle emission and fuel quality standards, out of a recognition that vehicle emissions contribute significantly to worsening air pollution problems. In Belarus, for instance, the Sectoral (transport) Programme on Environmental Protection for

2006–2010 foresees the improvement of emission standards to bring them up to international standards. In many SEE countries EU vehicle emission and fuel quality standards are motivated by hopes of eventual accession to the EU.

Most EECCA and SEE countries have vehicle inspection programmes in place which consist of annual tests, and often random roadside checks. Vehicle inspection programmes in many countries are not as effective as they might be, e.g. in Albania, Serbia, Montenegro and Bosnia, but efforts are being made to improve inspections and enforcement (UNECE, 2002a; 2002b; and 2004).

Box 7.9 Renewing the Belarussian state fleet

In Belarus the transport ministry has been taking a variety of actions to save energy and the fuel consumed by its 15 000 vehicles (trucks, buses, taxis and boats) including reducing the idling time of road vehicles, maximising truck capacity, using gas as a fuel, replacing older vehicles and enforcing vehicle emission standards through annual and random roadside checks. It is anticipated that additional measures will be introduced to encourage or restrict the import of older, more polluting cars. Consideration is also being given to retrofitting existing cars with catalytic converters, and importing more cars with already fitted converters (Narkevitch, 2006).

In some countries there is an active policy of replacing older vehicles, particularly in publicly-owned fleets, with newer less environmentally damaging vehicles (see Box 7.9).

Bans on older vehicles, or vehicles without certain technological features, have also been put in place. In an effort to reduce emissions from cars, from 1 January 2007, Armenia banned the import of cars without catalytic converters. Laws are also being introduced to create air quality monitoring points and to introduce revised emission standards for vehicles. The intention is to introduce EU standards gradually (Tsarukyan, 2006). Legislation is currently being developed in Montenegro to address the problems arising from the import and use of second-hand vehicles, while in the former Yugoslav Republic of Macedonia and Serbia the import of second-hand cars more than six years old is banned. In many EECCA countries, e.g. in Kazakhstan, there are no restrictions on the import and use of older cars.

7.4 Conclusions

Given the diversity of countries covered in this report, it is difficult to generalise about transport solutions in the SEE and EECCA regions. Many SEE countries aspire to join the EU, while the economies of the Central Asian Republics are still linked to other countries of the former Soviet Union. However, it is possible to identify some common issues, barriers and opportunities that exist — at least to some extent — in most countries of the region.

7.4.1 Common issues

The transport sectors of the SEE and EECCA countries have reflected the economies of these countries for the last 20 years: gradual increases to 1990, then a sharp decline in the early and mid-1990s, followed by a recovery. In some countries transport, especially freight transport, has now recovered to above 1990 levels. The recovery of the transport sector has been fuelled by an increase in private road use, both for freight and passenger transport. Public transport has not been able to benefit from the increased demand in many countries, as a result of relatively poor levels of infrastructure, rolling stock and services, and due to a decline in investment in the 1990s. Investments have not risen to anything approaching pre-1990 levels, so the decline in infrastructure and service quality has not been reversed.

Car ownership and use are increasing in many countries. Even though the levels are still significantly below those of Western Europe, many cities in SEE and EECCA are suffering from congestion and air pollution, resulting from the increased use of automobiles. Consequently, municipal authorities are faced with local transport problems caused by increased car use and a decline in the use of public transport. In the absence of firm policy action, growing car traffic can literally crowd out public transport, while at the same time reducing demand for its services. This can lead to a downward spiral in what were in most cases historically very good levels of public transport availability.

The policy decisions taken in response to these problems are often not implemented in an integrated manner and are undertaken by different institutions. The fact that the problems caused by increased car travel are evident in cities has often led municipal authorities to channel limited resources into developing infrastructure for private transport, e.g. roads and car parks. Given the limited space for transport development in often-compact city centres, the result is that new roads and parking spaces are frequently replacing well-developed public transport networks, as well as urban green space, in order to meet the demand for car use. This investment in road infrastructure is further boosting car use to the detriment of the softer transport modes — walking and cycling — and of urban green spaces (Dimitrov, 2004). Worsening air pollution, particularly in urban areas, is exacerbated by an old vehicle stock, poorly maintained vehicles and poor testing systems. In addition, poor enforcement, e.g. with respect to fuel quality and the roadworthiness of vehicles, makes the problem worse.

7.4.2 Common barriers

Some of the principal barriers to a more sustainable transport system are financial. There are competing demands at national, regional and local levels for often limited financial resources. This has consequences both for the type of infrastructure that is constructed and where it is constructed. For example, investments in larger, inter-urban road projects are often more attractive to investors than smaller, local, public transport schemes or investment in infrastructure for the softer modes of cycling and walking. Even reliable statistics on walking, cycling and public transport use are often unavailable, reflecting the lack of priority or resources allocated to these modes.

In addition to financial barriers, there can be other obstacles to the maintenance of an integrated transport system. Public institutions may have been weakened by reduced funding, restructuring or the departure of key staff, and the privatisation of public transport services can reduce the ability of public authorities to control the quality or levels of the services provided.

In delivering freight services, private operators can often offer a more flexible and cheaper service than traditional rail transporters. These rail operators are often not sufficiently flexible to meet changing demands for their services. The rail infrastructure itself, having been designed in many cases around the needs of a centrally planned economy, is often poorly set up for dealing with new trade flows, for instance, from Eastern to Western Europe and vice versa. In contrast, a small road freight carrier with just one truck or a small fleet can offer a door-to-door service anywhere in Europe relatively cheaply and with a minimum of bureaucracy.

The vehicle stock is also in need of renewal. While some state and city authorities are investing in newer, cleaner vehicles, the economic situation of the general population means that they hold on to older, higher polluting cars. Furthermore, for those seeking to buy cars, when these are purchased, they tend to be older second-hand vehicles that pollute more and are imported from abroad. Financial restrictions, coupled with a lack of technical expertise, also mean that vehicles are frequently poorly maintained, and that emissions controls and fuel quality checks are either poorly or rarely performed.

While there is recognition of the problems of the supply side of transport, and measures are being taken to address this wherever possible, less attention is still being paid to the demand side. Institutional structures that might deliver a more integrated and coordinated approach are being developed, but are often still in their early stages and still do not exist at all administrative levels. The knowledge and understanding of the role of policy instruments, particularly the potential impact of economic instruments, are developing, but not appreciated as widely as they might be (ECMT, 2005). The lack of attention paid to the demand side of transport is reflected in a lack of public awareness of the issues. This situation is not helped by the fact that few non-governmental organisations are working on transport policy and contributing to an increased awareness of the problems.

At strategic level, a real vision of a future transport system in which both demand and supply considerations are taken into account is often lacking. In the shorter-term the regulatory framework is not developing as fast as the situation on the ground, where the regulation of the increasing number of privately-owned public transport operators is currently weak (ECMT, 2005).

7.4.3 Opportunities for the sustainable consumption of transport

On average, mobility in SEE and EECCA countries is not yet anywhere near that of Western Europe. In SEE the situation is closer to Western Europe, with the proportion of public transport used for both freight and passenger transport on the decline, while car ownership and use increases. In EECCA countries the proportion of travel undertaken on public transport is still relatively high, although the use of private road transport is increasing. The problems associated with an increasing use of cars, e.g. urban air pollution and congestion, are being experienced in many cities of the region from Zagreb in the west to Almaty in the east. In view of the relatively low level of car ownership and use, there is the potential for the countries of the region to make the consumption of the increased mobility that will no doubt accompany the economic revival as sustainable as possible. In terms of policies, the key to this is ensuring that the retention, development and improvement of public transport and demand measures are not neglected by, and are indeed integrated into, the evolving policy framework. However, for this to happen, institutional capacity needs to be increased and policy frameworks need to be developed.

Within these frameworks, concerted action will be needed to influence individual behaviour both directly and indirectly. A range of policy instruments such as pricing can be used to reinforce sustainable behaviour, but this should be reinforced by demand management and a wide range of measures to improve public awareness and information regarding the environmental impacts of transport.

Regarding freight transport, the freight intensity in the SEE and EECCA countries is likely to be much higher than it is in the older EU member states (e.g. EEA, 2002). That is to say, it is likely that at present it takes significantly more freight movements to generate a given amount of GDP in these countries than it does in the more developed economies. So, as these economies themselves

develop, a combination of greater efficiency and economic restructuring may lead to improvements in freight intensity.

A coordinated, integrated strategic approach

At strategic level, therefore, where national or city-wide transport strategies are being developed, these need to contain a long-term vision of the transport system of the country or city, with a view to managing the increasing demands for mobility that will accompany economic recovery (e.g. ECMT, 2005). Where such transport strategies do not exist, they should be developed to ensure that new problems, e.g. climate change, are integrated into transport policies. On the supply side, the provision of infrastructure must recognise the potential benefits of public transport services to the sustainable consumption of transport and ensure that this is maintained and developed in coordination with the provision of infrastructure for private road transport. New road construction must also take into account the needs of pedestrians and cyclists, both in urban and rural areas. The key to this is a better integration of transport considerations into urban planning and broader spatial development. It is also important to recognise that investment in transport infrastructure, for private and public transport, will increase the capacity of the transport network and thus increase transport use and potentially the adverse environmental and social impacts of transport. Hence, parallel measures must be taken to mitigate potential adverse effects.

The implementation of such transport strategies will require the existence of supportive institutional and administrative structures to ensure that policies are integrated and coordinated, vertically and horizontally, well implemented and resourced, and well enforced. Better statistics will also be needed to help to monitor transport trends and the impact of policy interventions. There needs to be a better understanding among policy-makers of the links between transport, environment and health. In this context the ongoing work around the development of the UNECE/WHO-led pan European Programme on Transport, Health and the Environment (also known as the PEP) ⁽³⁾ could be a valuable resource and opportunity (e.g. Dimitrov, 2004). More use could also be made of policy assessments, whether they are integrated environmental and health impact assessments or strategic environmental assessments, to ensure that policies and programmes do take

wider environmental and health considerations into account (e.g. ECMT, 2005).

The importance of public support for policies, especially those aimed at managing transport demand, should not be overlooked. The awareness of the public, in relation to the links between transport, the environment and health, also needs to be increased through better communication of the issues and the potential solutions. One means of doing this is through the measurement and dissemination, by press and internet, of air quality monitoring information accompanied by a clear explanation of the potential adverse impacts on health. This will help build public support for the necessary measures to improve air quality (e.g. Kok and de Koning, 2003). This requires air quality monitoring networks to be adequately financed. In the longer term similar action could be taken concerning noise.

Maximising the potential for public transport

Public transport receives significantly less investment than it did in the centrally-planned economies of the 1980s. To make matters worse, it now has to compete for limited financial resources with the increasing demand for an expanded infrastructure for private transport. However, public transport has a potentially significant role to play in the sustainable use of transport. This potential should be maximised by integrating the development of the public transport infrastructure within the development of the wider transport system — in other words, ensuring that the development of the public transport infrastructure is complementary to the infrastructure for private transport.

The first step in this process is simply to preserve the public transport systems that still exist and to ensure that these are sufficiently funded to retain existing and to attract new users. The development of a public transport infrastructure should then be considered as an integral part of a general transport plan, so that it is developed to complement the road network, rather than be replaced by it. In the longer-term public transport operations must be put on a more sustainable basis, from the financial and administrative points of view, with reforms to ensure that services can be maintained, developed and delivered well into the future.

⁽³⁾ For more details see <http://www.thepep.org/en/welcome.htm>.

Traffic management is also a tool that can be used to support public transport. Priority measures, including dedicated lanes and traffic light settings, can favour trams and buses over private transport. Computerised traffic management systems can likewise help to improve traffic flow and to ease congestion. The recent proliferation of privately-owned buses is potentially complementary to the state-owned public transport systems, although concerns about the safety of these privately-owned buses will need to be addressed. Finally, in order to ensure that environmental considerations are taken into account in the construction of infrastructures, wider, better and more consistent use of environmental impact assessments is essential.

Influencing demand

Demand can be influenced by a range of different measures — from encouraging the use of more sustainable modes of transport ('carrots') to discouraging the use of more environmentally-damaging modes of transport ('sticks'). Again, the maintenance and development of public transport services is crucial to providing the capacity and quality of services to attract people to use public transport and therefore maximise its contribution to the sustainable consumption of transport. In this context, it is not just the quality of the infrastructure that is important, but the services, including the quality of the vehicles and ticketing systems (e.g. Dimitrov, 2004).

On the other hand, private car transport remains relatively cheap to use as the costs of the numerous environmental impacts listed in this chapter have not been fully internalised. Meeting these costs through higher fuel prices or some form of road fees could also be an important component of traffic demand management.

While developing urban transport systems, it is important neither to forget nor to neglect the potential that the use of the softer modes have in the sustainable consumption of transport. The needs of pedestrians and cyclists should also be taken into account when developing transport systems, particularly those in urban areas (e.g. ECMT, 2005).

Greening the vehicle fleet

Finally, in order that transport consumption be handled more sustainably, it is important to ensure that the adverse environmental impact of the

vehicles that are used be minimised as much as possible. In this respect measures need to be put in place to improve the environmental performance of the vehicle fleet.

Much of the vehicle fleet in SEE and EECCA countries is relatively old and therefore the fleet is in need of renewal. Given that many countries in the region have little or no domestic vehicle production, policies focusing on controlling the characteristics of the vehicles imported into the country can be a useful tool to improve the environmental performance of the vehicle fleet. This should, of course, be supported by national legislation, establishing emissions standards for newly registered vehicles, that effectively require certain technologies, i.e. catalytic converters, to be fitted in newly-registered cars. Bans on the import and registration of older vehicles or vehicles without catalytic converters might be considered. Where there is domestic production of vehicles, emission standards should be introduced that require the use of more advanced technologies. Emission standards for domestically-produced and imported vehicles should be regularly updated, and eventually brought into line with stricter international standards, to ensure that the adverse environmental and health impact of new vehicles is minimised.

Fiscal instruments could be used to influence the type of car that is imported. For instance, import taxes could be differentiated to encourage the import of smaller, newer and less polluting vehicles. Annual road taxes could also be differentiated to encourage the purchase and use of such vehicles. Tax reductions for older vehicles should be phased out. Active policies involving scrapping incentives could also be put in place to phase out and then to ban the use of the oldest, most polluting vehicles. Consideration, of course, would have to be given to the potential economic and social implications of such a measure, but these could be addressed by phasing in the policy, communicating it to the public well in advance, and providing incentives towards the purchase of newer, less polluting vehicles.

It is important to ensure that vehicles, once in use, maintain their environmental performance. So, regular inspections of passenger and freight vehicles, including their emissions performance, need to be carried out, and where such programmes are already in place, properly enforced. These programmes and their enforcement have to be adequately funded and be undertaken by personnel with sufficient technical expertise.

Where vehicles fail such tests, it is fundamentally important that the required remedial action be undertaken or the vehicle have its licence withdrawn (e.g. Kok and de Koning, 2003). Given the poor quality of much of the vehicle fleet in some countries, a phased introduction of these requirements, allowing some time for remedial action to be implemented for those vehicles that narrowly fail to meet the requirements, might be a useful way forward. Once operational, inspection standards could be tightened so that the average performance of the vehicle fleet continues to improve over time.

Finally, the quality of the fuel used in the transport sector is also extremely important to the environmental performance of the vehicle fleet. Fuel quality can be improved in the same way as vehicle technology: by regulating the content of imported or domestically-produced fuel; by banning the use of lead and reducing the sulphur content of fuels; by using fiscal instruments to encourage the use of cleaner or alternative fuels; by differentiating fuel duties in favour of cleaner fuels; and by regularly testing fuel to ensure its quality.

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