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Annex 4. Urban transport - a need for safe, clean, and affordable transport

Transport Sector Review: Bosnia and Herzegovina - the road to Europe

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Table of Contents

1. BACKGROUND AND INTRODUCTION 3
2. URBAN TRANSPORT IN BOSNIA AND HERZEGOVINA 4
Institutional framework for urban transport 4
Population and urbanization 4
Vehicle ownership 6
Public transport provision 7
Financing urban transport 8
3. URBAN TRANSPORT CONDITIONS IN SARAJEVO 10
Overview 10
Public transport 12
Traffic management 18
Parking 18
The road network 19
Current GRAS plans 19
4. PROPOSED URBAN TRANSPORT STRATEGY FOR SARAJEVO 22
Institutional reorganization and strengthening 22
Public transport improvements 25
Traffic management measures 26
Parking program 26
Improvements to the road network 26
Improvements for Non-Motorized Transport (NMT) 28
The need for an urban transport master plan and investment program is clear 28
5. URBAN TRANSPORT CONDITIONS IN BANJA LUKA 29
Overview 29
Public transport 29
Traffic management 32
Parking 32
Road network 32
Road safety (non-motorized transport users) 33
6. PROPOSED URBAN TRANSPORT STRATEGY FOR BANJA LUKA 34
Public transport improvements 34
Traffic management measures 34
Preparation of a detailed urban transport master plan and investment program is recommended. 35
7. URBAN TRANSPORT CONDITIONS AND PROPOSED STRATEGY FOR SMALLER URBAN AREAS 36
Overview 36
Technical assistance support by the FBH and RS entities 36
Public transport 36
Traffic management and parking 37
Road network 37
8. PROPOSED IMMEDIATE ACTION PROGRAM 38

1. BACKGROUND AND INTRODUCTION

1.1 **Urban transport issues are becoming increasingly challenging to the authorities in Bosnia and Herzegovina (BH) as cities continue to grow and supply struggles to cope with demand**. The main urban centers in BH are: Sarajevo, Banja Luka, Tuzla, Zenica, Mostar, Doboj and Prijedor. The cities of Sarajevo (capital of both the Federation of Bosnia and Herzegovina (FBH) and of the state of BH) and Banja Luka, capital of Republika Srpska, are growing at a steady pace, and this growth is imposing increasing pressures on transport provision and quality of life. With increasing incomes has come greater motorization, which has resulted in a significant increase in congestion and air pollution, and contributed to a decline in public transport modal share and quality.

1.2 **Good urban transport strategies achieve three main objectives:** (i) they provide urban inhabitants with a safe and healthy environment in which to live, work and travel; (ii) they facilitate economic development by providing efficient means of travel to and from work to guarantee the right conditions for companies, services and businesses to operate and develop; and (iii) they provide good conditions for mobility of all residents to ensure easy access to social amenities like shops, schools, public services, community facilities and job opportunities. The ultimate aim is to move towards safer, cleaner and more affordable urban transport in a city. To this end, the discussions in this Annex focus mainly on issues of public transport provision.

1.3 **The fundamental paradox of urban transport is very clearly felt in the main cities and in many of the urban municipalities of BH**. The paradox lies in three key questions. How can a sector with excess of demand over supply fail to meet the aspirations of both politicians and citizens? Why has it not been possible to mobilize commercial initiative to yield the kind of marked improvement in service quality and cost that has been achieved in the telecommunications, water and energy sectors? And finally, why does increasing affluence seem to have the effect of reducing the quality of travel, at least for poor people?[1] This Annex seeks to achieve the following: (i) develop an understanding of urban transport problems in Bosnia and Herzegovina; and (ii) articulate possible strategies to address these problems.

[1] World Bank (2002): *Cities on the move: A World Bank Urban Transport Strategy Review.*

2. URBAN TRANSPORT IN BOSNIA AND HERZEGOVINA

Institutional framework for urban transport

2.1 **The institutional framework of BH is an important factor in the provision of urban transport**. Bosnia and Herzegovina is divided into two entities and one administrative district: the FBH, the RS, and Brčko Administrative District (BAD). The FBH is further divided into 10 cantons, which are themselves further subdivided into a total of 74 municipalities, while the RS is divided into 63 municipalities. The BH State Ministry of Communications and Transport (MOCT) is, as per the Dayton Peace Accords, concerned only with matters relating to "international" and "inter-entity" transport and communications. The entity line ministries are responsible for inter-urban transport.

2.2 **Functional matters relating to urban transport issues are the mandate of the respective canton/municipality**. In the two entities, FBH has a more complex structure than RS. Within the RS, most urban transport responsibility is delegated to the 63 municipalities. Within the FBH the division of responsibility is more complex, with substantial responsibilities assigned to each of the 10 cantonal governments (which do not exist in the RS). The 74 municipalities of FBH rank below the canton level governments, but do have urban transport responsibilities especially with regard to road maintenance. Further complicating the local administrative picture are four designated official cities which include Sarajevo, East Sarajevo, Banja Luka and Mostar. The Banja Luka and Mostar city boundaries coincide with their municipal boundaries, while Sarajevo and East Sarajevo consist of several municipalities.

2.3 **There is significant variation in institutional capacity among the municipalities and cantons in BH.** While a few large municipalities are adequately resourced in terms of human resources, most are not. Many municipalities are constrained by resource and skill limitations. Deficiencies are particularly apparent in transport and land use planning, traffic management, public transport policy planning and regulation.

2.4 **Difficult questions regarding the future urban form of cities, including residential, commercial, industrial and historical components are not being addressed**. With few exceptions, urban spatial plans date from the pre-war period.[2] Making matters worse is the fact that no comprehensive urban transport studies have been conducted since the end of the war. The recent TransSec study has developed a strategic transport model for the whole of BH. However, there are no efforts to use this model to inform any of the planning decisions being undertaken at the canton or municipality levels.

Population and urbanization

2.5 **Bosnia and Herzegovina (BH) had a population of 4.3 million in 1991, prior to the 1992-93 war**. The current population is estimated at approximately 3.8 million

[2] Sarajevo is one of few exceptions, having updated its Urban Spatial Plan in 2003.

people.[3] While the overall population has stabilized, there has been a pronounced demographic shift from rural to urban areas. Approximately forty-five (45) percent of the total national population lives in urban areas. This is partly due to poor agricultural efficiency, the after effects of the war, and the more promising economic opportunities in urban areas. The population of BH is mainly divided among the two principal entities: the Federation of Bosnia and Herzegovina (FBH) and the Republika Srpska (RS), and . Approximately sixty-one (61) percent of the total national population resides in the FBH, thirty-seven (37) percent in RS, and less than two (2) percent in Brčko Administrative District (BAD). The estimated population of the ten largest urban centers within BH is shown below:[4]

1.	Sarajevo (FBH)	421,289
2.	Banja Luka (RS)	223,641
3.	Tuzla (FBH)	131,464
4.	Zenica (FBH)	127,113
5.	Mostar (FBH)	111,116
6.	Doboj (RS)	78,388
7.	Prijedor (RS)	95,161
8.	BHac (FBH)	61,191
9.	Brčko (B)	75,643
10.	Bijeljina (RS)	107,665

2.6 **Among urban centers, Sarajevo, capital city of the FBH and of the state of BH, stands out with an estimated population of approximately 421,289**. It also dominates in terms of unit national income (GDP per capita) which is approximately twice that of the nearest political precinct and almost three times the national average.[5] The next largest city is Banja Luka, the capital city of the RS, with an estimated population of about 223,641. Mostar is the cultural and economic center of the Herzegovina region (population of about 111,116) while Zenica and Tuzla are the traditional centers of industry, mining and energy (populations of 127,113 and 131,464 respectively). The urban pattern in Bosnia and Herzegovina could be characterized as having one dominant city, one relatively large city, and several medium-size cities. Only five cities within BH have populations exceeding 100,000 persons, and only a total of seven have estimated populations exceeding 50,000 persons. Given this distribution, it would appear that primary attention in urban transport should be focused on the main urban centers (Sarajevo and Banja Luka), prior to the smaller urban centers.

2.7 **The urbanization trend is likely to continue in BH.** As the economy grows, there is likely to be a continuous increase in the demand for transport for people and goods. There are already signs that with many people migrating to the urban areas, pressures on public transport provision are increasing. While the growth in private vehicles as a result of increased affluence is likely to continue, the demand for public transport is also likely to grow at a faster rate than the authorities are able to provide, resulting in a decline in the quality of services.

[3] Population statistics are not reliable since no census has taken place within BH since 1991. According to the Federation Agency of Statistics, the population of FBH was estimated at 2,327,195 in mid-2008, excluding 521,577 refugees living abroad. Meanwhile, the Republika Srpska Institute of Statistics estimated the population in the RS at 1.4 million, while the Agency for Statistics of Bosnia and Herzegovina estimated the population in Brčko District at 75,648 in 2008.

[4] These population statistics are estimates and vary depending on the source used.

[5] GDP per capita of BAM 6.1 million at 2000 constant prices as per BHTMAP (2001).

Vehicle ownership

2.8 **Bosnia and Herzegovina has experienced rapid motorization.** As of 2008, the total number of registered vehicles in BH stood at 822,733 (with 519,690 in FBH, 276,885 in RS and 26,158 in BAD). Of the total registered fleet, over eighty (80) percent are private cars.[6] Annual growth in the number of motor vehicles has been four (4) percent on average in BH over the period 2005-2008. However, where incomes are growing faster and higher, such as in and around urban areas, growth will be undoubtedly higher than this figure. In Sarajevo Canton, the total number of registered vehicles increased by thirty eight (38) percent over the same period.[7]

2.9 **Household income is expected to grow in BH as the economy continues to expand and diversify**. In line with observed trends elsewhere in Europe, this growth is bound to fuel an increase in vehicle ownership, particularly private cars, and could accelerate if the law constraining the importation of vehicles older than seven years old is amended. Although BH has some way to go to reach the motorization levels in the upper and higher income European countries.[8] The main consideration at this time ought not to be a direct demand management approach to reduce reliance on the private car *per se,* but to make substantial improvements and investments in public transport to make it more attractive and competitive. An efficient urban transport system should be preoccupied with the efficiency of carrying a maximum number of people, not vehicles.

2.10 **The growth of the motor vehicle fleet provides mixed benefits in an urban context.** On one hand, it provides greater mobility for vehicle owners and for those industries and services relying on road transport. On the other hand, there are negative consequences such as increased traffic congestion, road traffic crashes and their concomitant, and air pollution. From an economic standpoint, many private car users are not paying the full social costs. The latter are usually defined as the sum of the individual's private costs, together with the costs imposed on society that are not considered in the private decision on whether or how to travel. These latter costs are known as external costs. To car drivers, the only costs that matter are the private costs.[9] However, these private costs do not equate with the total cost to society for the car usage since external costs remain unpaid.[10] It is important to investigate options to increase private user costs to better reflect the actual social costs. Potential measures include road pricing, increases in fuel tax, stricter emission controls and well priced parking policies and rates.

2.11 **These issues have been exacerbated by the post-conflict setting.** The limited resources available after the conflict resulted in certain compromises that have

[6] Pacific Consultants International (2007) *Interim Report 4: Task C Road sector.*
[7] From 87,445 vehicles in 2005 to 120,288 vehicles in 2008.
[8] For FBH and RS combined, the number of passenger cars per 1,000 people stands at 185 compared to 464 per 1,000 people for the EU-27 countries in 2008.
[9] Private costs of driving a car typically include fuel and oil, maintenance, tax and insurance and the time of the driver and passenger (s) in the vehicle.
[10] Here, external costs include the delays caused to others and more importantly the negative environmental effects of using the car, such as noise, air pollution, and the increased safety risks.

undoubtedly exacerbated the problem of urban air pollution: from the end of the conflict until 1999, the importing of vehicles without any age restrictions was allowed and necessary. It ensured the renewal of the vehicle fleet at low cost, but there was an unfortunate concomitant: a significant increase in emissions from the older vehicles. The fleets of freight and public transport vehicles were renewed in a similar manner, with the same outcome. While the importing of vehicles older than seven years was prohibited in 1999, alleviating the problem, there is now discussion that this constraint should be relaxed. Any decision of this nature should carefully weigh the benefits against the prospective increase in external costs, such as increased emissions, public health and road safety detriments, and increased congestion.

Public transport provision

2.12 **In global terms, the main BH cities are of modest size.** Sarajevo and Banja Luka are the largest cities, with metropolitan population levels of 421,289 and 223,641 respectively, modest in terms of city size in some lower middle income countries. In public transport terms, Sarajevo is absolutely dominant. GRAS, the only public transport provider (tram, trolley bus, bus, minibus) in Sarajevo carried some 127 million persons in 2008, equating to about 80 percent of the total urban public transport demand in the seven major cities. Banja Luka, BHac, Doboj, Mostar, Tuzla and Zenica all offer the bus mode only. Banja Luka is in the process of investigating options for implementing LRT. The Association of Urban Public Transport in BH was formed in 2004 to provide a unified voice for public transport operators**.** Some of its key objectives are: to influence political decisions which impact the industry (e.g., fare setting by the cantons/municipalities); achieve economies of scale in provision of services and to institute a framework for unified standards, operating practices and training.

2.13 **The other major trend is a shift from public to private provision of passenger transport services in all the cities with the exception of Sarajevo.**[11] Publicly owned operations have declined while the private sector has grown. At present the only significant public sector urban passenger transport operator in the BH is GRAS in Sarajevo. In Banja Luka, an operator was purchased by a combination of pensioner and restitution funds, private companies and small stakeholders. More recently, Banja Luka municipality has awarded a series of route concessions. Mostar is served by a private and a public company (the latter largely accruing from a donation of buses from JICA some five years ago). Public transport providers in Bijeljina and Tuzla are private too. In Zenica, suburban transport has been privatized but city transport remains under public control (canton-run). The overview of the main cities' public transport providers is as shown in Table 1.

[11] In Zenica, suburban transport has been privatized but urban transport provision is still under the public company Zenicatrans.

Table 1. Overview of main public transport operators in the main cities of BH (2006)

Location	Operator	Ownership		Activity	
		Public	Private	Passengers (millions)	Fleet (Vehicles)
Sarajevo (2008)	GRAS	X		127.24	240
Banja Luka	Autoprez		X	5.97	95
	Bocaturs		X	0.98	34
Mostar	Mostarbus			1.70	36
	Bregava-trans	X	X	n/a	16
	Autoprevoz		X	n/a	27
Tuzla	GPST		X	14.75	132
Zenica	Zenicatrans	X		4.39	55
Bhac	Unatransport		X	0.02	6
	Unatrans		X	0.05	6
Doboj	Bosnaexpres		X	0.25	5
	Bosnaprevoz		X	n/a	n/a
	PP Kim		X	n/a	n/a
Total				155.35	652

Sources: PCI (2007) and study data.

Financing urban transport

2.14 **The dominant source of funding for urban roads comes from the fuel tax**. The tax on fuel in BH, despite the recent increase, remains low by European standards.[12] Whether there is scope to increase the fuel tax to permit increased funding for urban transport is an important question. However, this issue needs to be addressed within a wider context of overall road finance as well as overall government budget priorities.

2.15 **Local authorities have proceeded with privatizing most urban passenger transport services.** To this end, the expectation has been that the services are to be provided without subsidy. As a result, passenger transport services are generally of modest quality and in some cases have declined. Transit fares are also subject to the standard eighteen (18) percent VAT which is high for public transport services. Within a wider assessment of overall public finances, a determination on whether possibilities exist to reduce or remove the VAT element on public transport to make it more affordable, and encourage the use of public transport over private transport, would be welcome.

2.16 **There are very restrictive controls on local government borrowing for urban transport purposes**. While some local governments have adequate capacity, both the FBH and the RS entities have restrained local borrowing largely due to the absence of

[12] BH currently imposes a tax on fuel of BAM 0.25 or euro 0.077 (US$0.112) per liter compared to the minimum required under EU Directive 2003/96/EC of October 27th 2003 of euro 0.359 (US$0.522) per liter of unleaded gasoline. However, EU Council Directive 2003/96/EC was amended in 2004 to provide transitional arrangements for new accession countries—permitting on a temporary basis exemptions from or reduced levels of taxation—through Council Directive 2004/74/EC and 2004/75/EC. For example, Poland has until January 1, 2012 to apply the 2003 directive, suggesting that for a country like BH the reference point should not be euro 0.359 per liter.

clear rules guiding local borrowing and the lack of an agency with the authority and capacity to regulate borrowing.

3. URBAN TRANSPORT CONDITIONS IN SARAJEVO

Overview

3.1 **Sarajevo is the dominant city in BH, and deserves the highest priority attention in addressing urban transport issues and needs**. The city is located in a valley, surrounded by the Dinaric Alps and situated around the Miljacka River. There are many steeply inclined streets and settlements on the hillsides. The Miljacka River is one of the city's chief geographic features. It flows through the city from the east through the center of Sarajevo to the western part of city where it eventually meets up with the Bosna River. The city's location in a valley between high mountains gives it a compact nature. But, as such, most of the streets are narrow and restrain automobile traffic with limited room for parking; conversely, this potentially serves to facilitate easier movement of pedestrians and cyclists. The main issues giving Sarajevo added urban transport prominence in BH include:

- The city has by far the largest population;
- It has the highest per capita income and consequently the highest rate of vehicle ownership;
- It is experiencing the most serious traffic congestion;
- Development is constrained in a narrow valley making transport solutions more difficult (see Figure 1);
- It is experiencing significant air and noise pollution; and
- The public transport fleet is aging and not serving the needs of the population at an acceptable standard.

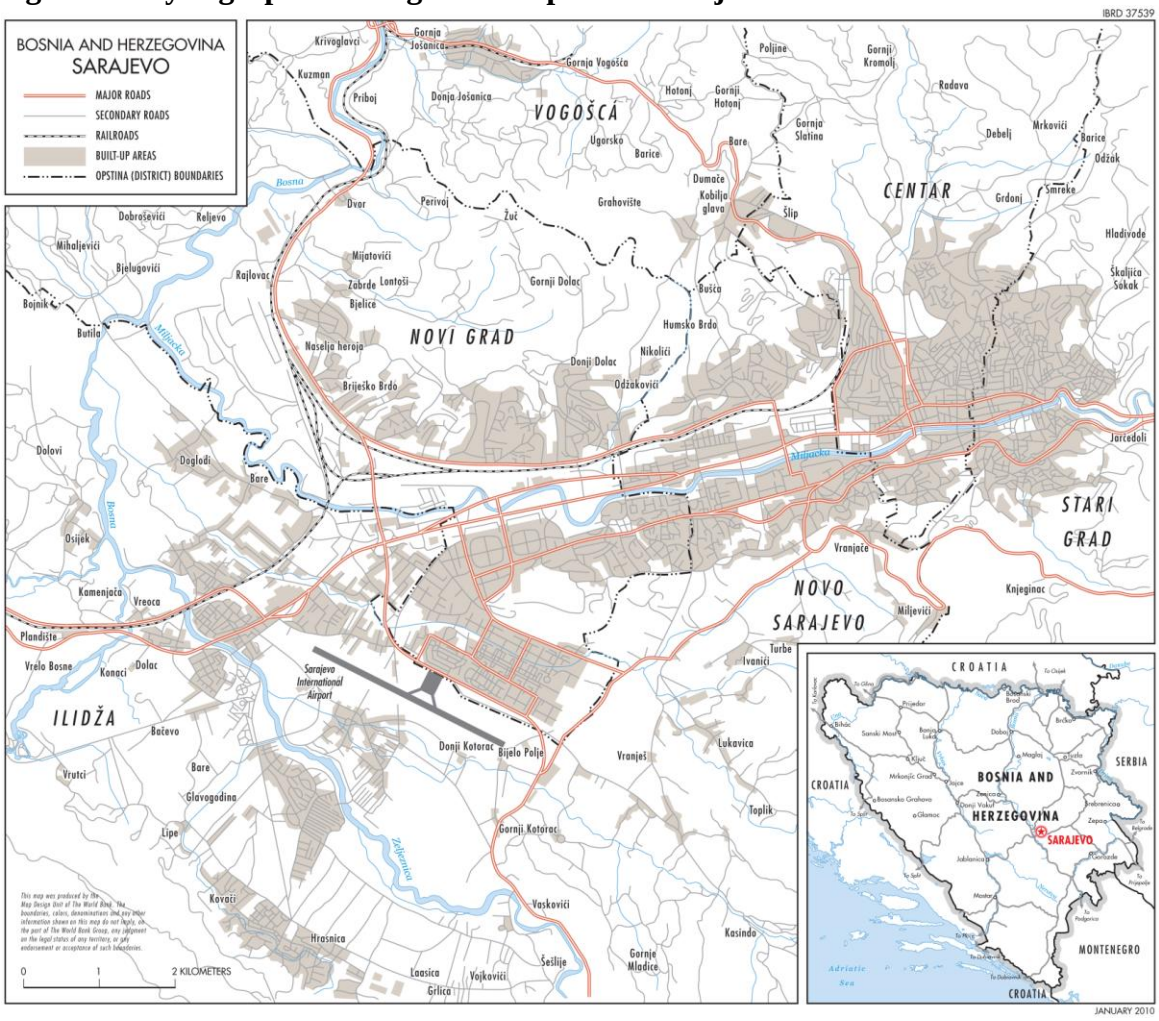
3.2 **Urban transport conditions are deteriorating in metropolitan Sarajevo, in large part due to the rapid increase in private motor vehicle ownership in recent years**. In 2008, vehicle ownership stood at 106,593 for a population estimated at 421,289. The fleet has increased rapidly in the last three years: up nearly eight (7.8) percent in 2007, and just under seven (6.8) percent in 2007, and over twenty (21.7) percent in 2008. However, passenger cars stood at 100,411 in 2000 and went down sharply in 2001 to 79,102, and only exceeded the 100,000 mark in 2008. This may reflect the 1999 law that prohibits importing cars more than seven (7) years old, which is strictly enforced by customs. However, there are discussions now to increase the maximum allowable age of imported cars, as the age profile has improved in recent years. However, there are potentially significant environmental implications of such a decision.

3.3 **Traffic congestion is increasing, parking spaces are limited, and an aging passenger transport system is not serving the needs of the population**. Traffic congestion has emerged as a serious problem in the city, particularly in the Stari Grad and Centar municipalities and also along Kurta Shorka (Route 18) in the Ilidza and Novo Grad portions of the Sarajevo metropolitan area, due primarily to a poor intersection connection between Zmaja od Bosne (Dzemala Bijedica) and Kurta Shorka in the municipality of Ilidza.[13]

[13] The backup along Kurta Shorka (Route 18) typically extends for several kilometers every day due to an inadequate interchange design (see Figure 4) for accommodating the high traffic volumes at this location.

3.4 **Canton Sarajevo is in charge of the urban transport policy aspects for the city of Sarajevo.** Transport planning is handled by its Planning Department; and GRAS Sarajevo is the dominant provider of public transport operations and services.

Figure 1. Physiographic setting of metropolitan Sarajevo



Source: based on a map from Sarajevo Canton.

3.5 **As a consequence of the complex governmental structure, the jurisdictional allocation of responsibility for Sarajevo roads and streets is complex**. Responsibility for urban roads in Sarajevo is divided among the Federation of Bosnia and Herzegovina Road Directorate (FBHRD), Sarajevo Canton, and the 4 municipalities (Stari Grad, Centar, Novo Sarajevo, and Novi Grad) that are officially part of Sarajevo city (see Table 2). In addition, the "suburban" municipalities of Ilidza and Vogosca also have significant kilometers of roads which could be considered part of metropolitan Sarajevo.

Table 2. Jurisdictional allocation of roads in Sarajevo Canton (km)

	National Roads	Regional Roads	Canton Roads	Local Roads	Unimproved Roads	Total
Sarajevo City Municipalities						
Stari Grad	4.5	7.9	30.8	10.4	151.0	**204.6**
Centar	7.3	0.0	47.0	28.3	85.4	**167.9**
Novo Sarajevo	8.7	0.6	29.2	14.2	54.0	**106.7**
Novi Grad	12.3	0.0	59.2	25.5	196.7	**293.7**
Suburban Sarajevo Municipalities						
Llidza	14.6	15.6	39.1	51.6	309.3	**430.2**
Vogosca	23.9	2.4	10.6	33.4	152.0	**222.3**
Rural Municipalities						
Hadzici	26.0	18.7	49.2	48.3	387.2	**529.3**
Llijas	33.8	12.1	50.9	27.4	441.0	**565.2**
Trnovo	5.8	25.8	25.4	43.3	324.5	**424.8**
Total	**136.9**	**83.1**	**341.4**	**282.3**	**2101.0**	**2944.8**
Current Jurisdictional Allocation	Federal	Canton	Canton	Municipalities	Municipalities	
Proposed Jurisdictional Allocation	Federal	Federal	Municipalities	Municipalities	Municipalities	

Source: Sarajevo Canton.

3.6 **FBH is considering proposals to reallocate responsibility of regional and cantonal roads.** Under the proposals, Sarajevo Canton (as well as other cantons in the FBH) would relinquish the regional roads to the FBH Roads Company and the cantonal roads to the respective municipalities (see Table 2), but a decision has not been taken yet.[14] The effect of the proposals for road development and traffic management in metropolitan Sarajevo deserves serious consideration. In the urban context, Sarajevo Canton currently has the most developed staff and institutions for addressing urban transport problems.

Public transport

3.7 **Passenger transport in Sarajevo is dominated by GRAS, a limited liability company fully owned by Sarajevo Canton**. Private sector operations constitute a very small proportion of services and these are limited to buses. GRAS operates a full complement of public transport modes including trams, trolley buses, buses and minibuses. In 2008, the public transport modal share was forty-one (41.4) percent tram, thirty-three (32.8) percent bus, seventeen (17) percent trolley, and nine (8.7) percent minibus, and these shares have not changed significantly over the last four years. Total daily passenger transport reached 348,630 in 2008, up from 334,411 in 2004. GRAS

[14] This is expected in February 2010.

employs approximately 2,000 persons for the purposes of operating and maintaining the passenger transport system. Internal reorganization reforms are underway though progress is slow. The bus and minibus services are at the forefront of these initiatives. In 2008, GRAS carried a total of 127 million passengers along 102 lines extending to 1,008 line kilometers. Prior to the war, GRAS carried about 250 million passengers.

Table 3. Key GRAS indicators, 2005-2008

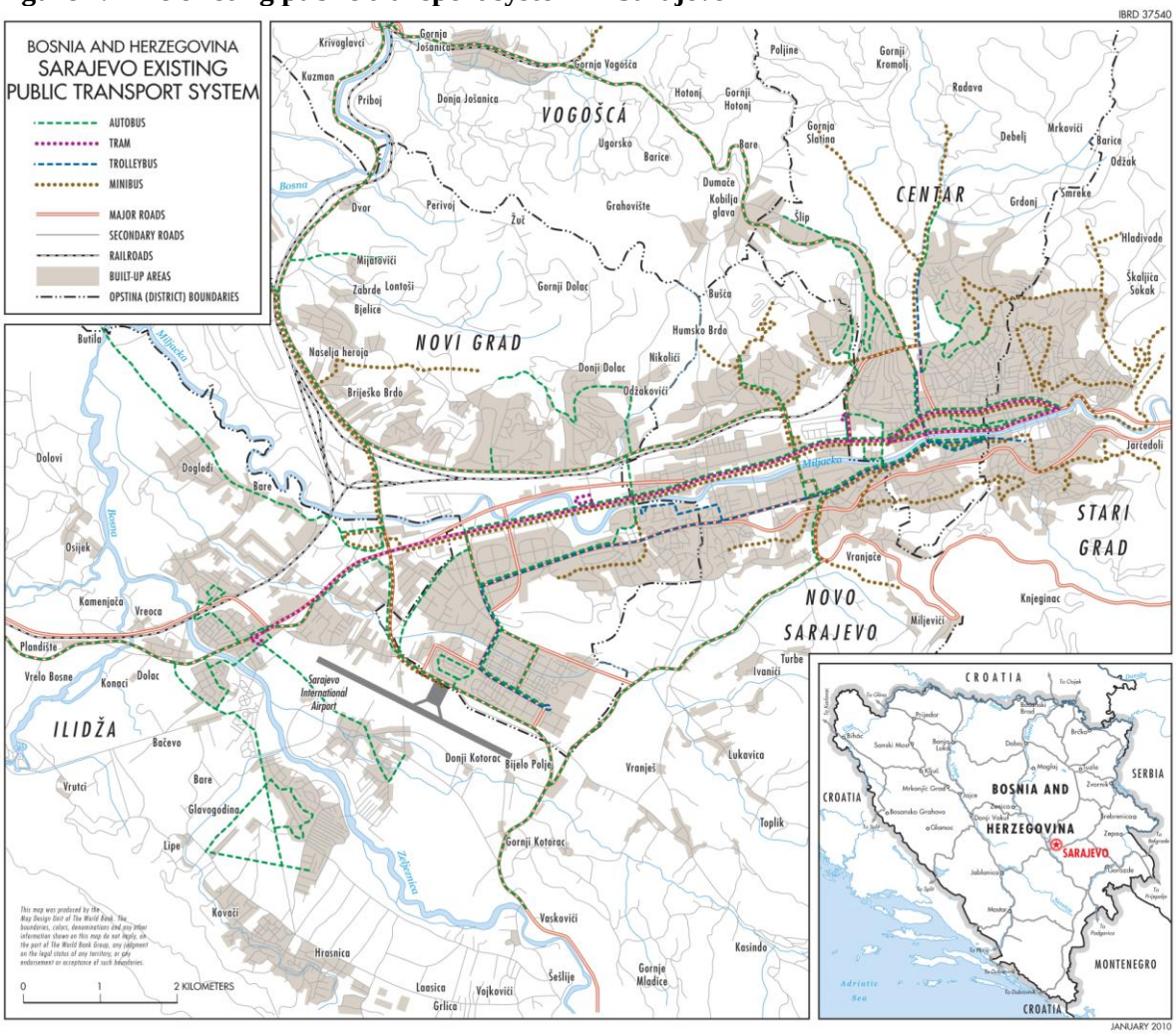
	2005	2006	2007	2008
Number of passengers (millions)				
Bus	40.37	41.11	41.44	41.75
Tram	51.00	51.11	51.98	52.72
Trolley	20.36	21.12	21.43	21.65
Mini-bus	10.33	11.11	11.03	11.13
Fleet size				
Bus	114	111	96	97
Tram	50	50	50	50
Trolley	42	40	38	35
Mini-bus	56	58	58	58
Average fleet age				
Bus	13	13	12	12
Tram	29	28	25	29
Trolley	18	20	21	22
Mini-bus	6	7	8	9
Number of lines				
Bus	45	44	43	44
Tram	6	6	6	6
Trolley	5	5	5	5
Mini-bus	44	47	47	47
Line-kilometers				
Bus	542	538	486	508
Tram	51	45	45	45
Trolley	42	42	42	42
Mini-bus	360	406	413	413
Average commercial operating speed (km)				
Bus	18.50	19.19	19.30	19.51
Tram	14.70	14.48	14.59	14.62
Trolley	11.53	11.32	10.63	14.81
Mini-bus	15.80	15.47	15.54	16.05

Source: GRAS.

3.8 **Following the war, some considerable investments were made to re-invigorate GRAS but no major modernization efforts have been undertaken since 1996**. While demand approaches pre-war levels, the supply is not following the same pace. In fact, the

fleet size in 2008 was lower than in 2005, as older vehicles are removed from circulation. Average commercial operating speeds have improved somewhat over the same period, with the exception of trams, where it has declined slightly. The bus network brings passengers to the tram network, and covers mostly flat, low hilly parts, while the mini-buses are used for the very steep parts of Sarajevo. The tram mode is the only one of its operations that was noted as returning a profit for the year. GRAS is economically constrained to carry out much needed overhauls of its public transport fleet and infrastructure. The quality of service has suffered in part due to an aging fleet and infrastructure, outdated depots and workshops and the inability to extend services to the rapidly expanding metropolitan areas. The existing public transport system is as shown in Figure 2 below.

Figure 2. The existing public transport system in Sarajevo



Source: Based on a map from Sarajevo Canton.

3.9 **GRAS is operating at a loss, despite receiving significant compensation from Sarajevo Canton for discounted fares**. In 2008, GRAS made a loss of BAM 16.8 million (US$12.4 million), up from a loss of BAM 6.8 million (US$5.0 million) in 2007, reflecting a large increase in expenditure on salaries and benefits (Table 4). The rising loss

occurred despite a rise in Sarajevo Canton support which equaled BAM 7.6 million (US$5.6 million) for subsidizing monthly tickets, and BAM 10.2 million (US$7.5 million) to support business. In the first half of 2009, the operating loss equaled BAM 10.4 million (US$7.7 million)—higher than the annual operating loss in 2007—largely reflecting a sharp fall in cantonal support to the two categories mentioned above.

Table 3. GRAS income statement, 2007-2009 (BAM millions, excluding VAT)

	2007	2008	2009 First Half
Expenditures			
Cost of raw materials, spare parts, fittings, and other items	5.1	4.9	2.0
Electric energy costs	2.5	2.7	1.4
Fuel costs	5.9	7.6	2.7
Costs of natural gas, heating oil, water	0.4	0.4	0.2
Depreciation	5.9	6.1	2.7
Salaries and benefits	34.4	43.2	22.7
Interest rate	1.0	1.8	0.8
Other costs	4.5	4.7	1.4
TOTAL	60.4	71.6	33.8
Revenues			
Sale of inidivual tickets	8.8	9.8	4.3
Sale of monthly tickets (users)	19.6	19.2	7.2
Citizen tickets	14.3	14.3	7.2
Income from school student tickets	1.6	1.2	0.6
Income from senior citizen tickets	1.6	1.8	0.8
University study tickets	1.2	1.0	0.6
Cantonal Ministry of Interior	0.6	0.6	0.2
Disabled veterans, families of fallen soldiers	0.2	0.0	0.0
Income from other users	0.2	0.2	0.0
Cantonal subsidies for monthly tickets	7.4	7.6	4.1
Subsidies for senior citizens	4.7	4.9	2.7
Subsidies for school students	1.6	2.0	1.0
Subsidies for disabled veterans, families of fallen soldiers	1.4	2.0	1.0
Sale of 3 month, 6 month and 1 year tickets	2.2	1.8	1.6
Total revenue from passenger transport	37.9	38.3	19.6
Cantonal budget funds to support current business	7.6	10.2	1.6
Other revenue	4.9	3.1	1.0
TOTAL	53.6	54.8	23.5
Net income			
With Subsidies	-6.8	-16.8	-10.4
Without Subsidies	-25.0	-37.7	-19.8
Operating Ratio			
With Subsidies	1.1	1.3	1.4
Without Subsidies	1.7	2.1	2.4
Working Ratio			
With Subsidies	1.0	1.2	1.3
Without Subsidies	1.5	1.9	2.2

Source: GRAS.

3.10 **Financial performance appears to have been deteriorating even before the economic crisis**. Table 3 reveals that there has been a marked deterioration in both the operating ratio and the working ratio in the last few years.[15] The proportion of revenue necessary to cover expenses in the first six months of 2009 was over 140 percent, including operating subsidies, up from 110 percent in 2007. Without subsidy, it was over 240 percent, up from 170 percent in 2007. The working ratio displays a similar decline over the same period. Given the poor financial performance, one worrying sign is that salaries and benefits increased by over twenty-five (25.5) percent 2007 to 2008, whereas total revenues increased by just over two (2.2) percent over the same period.

3.11 **One of the factors explaining the large losses are the number of passengers traveling with discounts, which are not fully compensated by cantonal transfers.** An estimated forty (40) percent of passengers do not pay the full the cost of the ticket[16]—the monthly pass without discounts is BAM 53 (US$39), but there are many categories of passengers receiving discounts which are not full covered by cantonal subsidies. For example, there are 31,000 pensioners earning less than BAM 299 (US$222)—there are 53,000 pensioners receiving discounts—who do not pay for the monthly pass, but the cantonal subsidy only covers BAM 15, with the rest of the subsidy provided by GRAS. University students pay BAM 33 and GRAS receives no cantonal subsidy for this category, which includes about 30,000 passengers. GRAS makes proposals for the level of discounts, but these need to be approved by the cantonal government.

3.12 **Fares for passenger transport rides are relatively expensive at BAM 1.5** (US$1.12) for a single trip. However, fares have not been raised since 2005.[17] There are four zones and a different price per zone, with single, return, five, daily, monthly, three-month, six-month and annual passes available. Tickets are validated upon boarding the vehicle, and changing tram or bus requires validation of a new ticket. The research division of GRAS estimates that about 10 percent of passengers do not pay for tickets or passes, and although there are inspections, the cases cannot be processed, as what is missing are regulations or a rule book at the canton level with regard to the rights of inspectors to collect fines.[18] At present, for a single ride costing BAM 1.5, the fine is

[15] The operating ratio is defined as the proportion of revenue necessary to cover expenses, including depreciation. The working ratio is defined as the total operating expenses, less depreciation and debt service, divided by revenues.

[16] At present, passenger categories receiving discounts include the unemployed, students (primary, secondary, tertiary), pensioners, military police, children, veterans, and families of fallen soldiers, among others.

[17] The fare is BAM 1.6 if paying the driver. A day card valid for unlimited travel on all local public transport in zone A is available for about BAM 5 (US$3.7). There are private bus companies operating in the suburban area in Sarajevo. The largest of these is Centrotrans Eurolines, which takes passengers from the suburbs to Sarajevo at fares below those of GRAS.

[18] GRAS is under the Ministry of Transport and Communications of Sarajevo Canton and as a cantonal public utility enterprise must comply with the FBH road law, Cantonal law, and the FBH law concerning limited liability companies.

BAM 28 (US$21.50), but there are difficulties collecting fines. There is a need to establish an improved system to address fare evasion, including possibly a smart card system plus better information and sensitization campaigns. In 1999 a new electronic system was introduced in the trams, for the use of magnetic tickets for one, two, and five rides only. Recently, GRAS has submitted to the Cantonal government a proposal for introducing smart cards for trolley buses, buses and mini-buses, with a provisional cost estimate of BAM 2.5 million (US$1.89 million).

3.13 **Trams are a special mode of public transport in Sarajevo**. The tram line network is the spine of the GRAS route structure, with 6 lines and 45.4 km. It forms a semi-continuous loop around the central district and penetrates some areas in the suburbs and the old town. A distinct advantage lies in the fact that considerable portions of the tram line network lie along a segregated central meridian alignment; and it is only in the old town that trams travel as part of mixed traffic. Despite its importance, little has been done to enhance this vital component of the urban transport portfolio. The tram system is heavily used all day and is especially crowded during rush hours. This system, running down the central road spine of the city (Zmaja od Bosne) could be considered the core public transit system element. Overall the system is aging with the average vehicle fleet age at 29 years. Tram commercial operating speed is 14.6 km per hour, which is understandable in a mixed traffic non-segregated environment.

3.14 **Any action to increase tram commercial speeds will be taken in the context of weighing proposals for introducing Light Rail Transit (LRT) systems**. An LRT system with newer vehicles would be able to operate at much higher speeds on segregated lines. The relocation of the main train station on the west side of the city where the main intercity line runs, would require the construction of 700 meters of track and is part of GRAS' long-term investment plan.[19] This would avoid the spur into the city with no turn around. The idea would then be to have the LRT trains ferry passengers into town, but an important issue is how these investments could be financed, at a time when cantonal budget funds have been reduced. In 2005, 5 km of light track were modernized, and an additional 14 km (two-track) are under consideration by the cantonal government, at a cost of an estimated BAM 2.9 (US$2.2) million per km.

3.15 **Bus and trolley bus services combined accommodate even more passengers than the tram system.** These two mode systems are more extensive, serving both central and outlying portions of the metropolitan area. The bus complement has also benefited in the past few years from a donation of 130 buses from Japan. There is a need to modernize the bus and trolley bus fleet; in 1998 GRAS bought 80 buses with Japanese grant funds, but these are in need of an overhaul or replacement. GRAS plans for the acquisition of 50 new buses, of which 14 buses have already been delivered, and 10 more expected by the end of 2009, which are financed from cantonal budget funds. Trolley buses are in poor condition—according to GRAS fifty (50) percent are in very poor condition—and an international call for bids was issued in September 2009 for the acquisition of 17 second-hand, two-segment vehicles.

[19] The tram rail gauge is 1.435 meters which is the same as the railway.

3.16 **Taxis are currently limited to one per 700 persons residing in Sarajevo, but this regulation is not enforced**.[20] There are several taxi companies and individual owners; and taxis are metered. In 2004, a decision was made at the cantonal level that there should be one taxi for every seven hundred persons in Sarajevo, although whether there was any empirical evidence to support the decision is unknown. As of 2009, there are 1,470 licensed taxis in Sarajevo Canton, which is one for every 287 persons. As of September 1, 2009, there are new regulations for the registration of taxi vehicles, with new license plates from September 28, 2009. As a result of these changes, taxi drivers will have to change license plates and the number of taxis in Sarajevo is expected to decline.

Traffic management

3.17 **There are approximately 130 signalized intersections in the city.** However, the system is outmoded as the signals are capable of only one timing plan and consequently cannot adequately be timed to different travel patterns during the course of a day or day of the week. In addition, there is no central control of the system to enable real time modifications in settings or facilitate incident interventions. Instead, there are two centralized traffic signal systems, but these are not integrated at present and there are no immediate plans to do so given the high costs—the cost of a proposed system upgrade has been estimated in the range of BAM 20 million (US$14.8 million).[21] In addition, the placement of signal heads is generally inadequate, especially along wider streets. A centralized traffic signal system along with speed and red light cameras is being proposed.

Parking

3.18 **There is a serious parking shortage in Sarajevo.** This is both in the congested commercial part of the old city as well in housing blocks which were not adequately designed for the higher levels of private vehicle ownership The city has about 1,200 parking spaces in the city center and public garages with a capacity of about 4,000 cars in the new part of the city near the airport. Additional capacity is being planned, with an additional floor to an existing lot which will create 156 new parking spaces, and an additional parking garage of between 2,000 to 3,000 spaces, with three to four levels, which will probably be open for bidding under a concession to build and operate. The detailed design for this new public garage already exists. Parking is critical in that it gives policy makers traction in balancing the need for demand management with the need for supporting economic development activities (like providing parking spaces for shoppers). If well designed as part of an overall transport strategy, parking can also be a ready and convenient source of much needed revenues.

3.19 **There are three parking fee zones in Sarajevo Canton, with the highest fees in the city center**. These include: (i) zone one in the center where the rate is BAM 2 (US$ 1.34) per hour; (ii) zone two where the fee is BAM 1 (US$0.74) per hour; and (iii) zone three where the fee is BAM 0.5 (US$0.37) per hour. These fees were set 10 years ago at a relatively high level, and have remained unchanged since, in order to discourage passenger vehicle usage. Sarajevo Canton is in the process of drafting new regulations

[20] This implies a maximum fleet of 600 taxis based on an assumed Sarajevo population of 420,000.
[21] Amount unsubstantiated at this stage.

regarding how fees are determined, and draft regulations are expected to be ready by 2010—it is likely that parking fees will be revised upwards. A public utility company (RAD)[22] manages the parking system, with the enterprise retaining 60 percent of the revenues and the canton receiving the remaining 40 percent.

The road network

3.20 **Sarajevo Canton has invested heavily in improving the street system.** Sarajevo Canton is responsible for 460 km of roads, of which 74 km are regional roads and 16 km are magistral roads. Seven companies are responsible for road maintenance, of which two are public and five are private. Cantonal revenue for road work is financed from the fuel tax, advertising along roads, vehicle registration fees, and funds from the Federation Directorate of Roads. In spite of heavy investments in the road system, developing a satisfactory road network in Sarajevo represents a considerable challenge due to the severe topographic constraints of being surrounded by hilly terrain. The major east-west "spine" (Zmaja od Bosne) serving as a vital east-west road link, is heavily used and in need of relief.

Current GRAS plans

3.21 **GRAS has undertaken an analysis of the public transport situation (current versus future).** Its analysis of the urban transport situation in Sarajevo in the context of their projections for demand and current capacity raises the following issues:

1. ***The overall system*** should be expanded, based on the available forecasts, to deal with almost double the number of passengers. Although this could be an overly optimistic target as one recent study predicted passenger volumes would increase by fifty (50) percent by 2025;
2. ***Trams*** are forecast to have the highest demand**.** The tram infrastructure ought to be upgraded and modernized to achieve LRT-standard service;
3. ***The trolley bus network*** ought to be expanded to accommodate a demand of 170,000 passengers per day, amounting to fifty (50) percent more than maximum pre-war levels;
4. ***Buses*** ought to be oriented toward serving the expanding and new developing parts of the metropolitan area, and should act as feeder systems to the LRT in an efficient integrated transport system. The needs of this fleet are estimated as growing at ***30 percent*** in line with demand, with a need to introduce bus priority treatments along arterial routes and at intersections; and
5. ***Minibuses*** ought to be directed and concentrated towards streets of lower capacity (narrow widths, hillier terrain) and also to serving lower density areas of the metropolitan region. Demand for these is expected to increase by over thirty (33) percent.

3.22 **GRAS has also developed a year 2025-horizon expansion program that aligns with the foregoing analysis**. The key elements thereof are discussed below:

[22] RAD also disposes waste and is involved in the reconstruction of roads in Sarajevo Canton.

1. ***Fleet***. Increasing the composite fleet from present 413 to 600 units by 2025. This includes rehabilitation of existing units and purchase of new vehicles. Vehicles reaching the end of their service lives would be replaced while new vehicles would be bought to enhance services on existing routes or expand into new demand catchments.

2. ***Tram Network.*** Overhaul of tracks to account for the lack of regular maintenance. Maintenance to be carried out where needed with gradual upgrades to LRT standard. New construction of track through Stjepan Radic Street foreseen to allow for traffic option through the city center. New track construction also planned for Nedzarici-Dobrinja and Ilidza-Hranisca. It is understood that the Cantonal authorities have reserved and to a large extent cleared the land required for the extensions/upgrades but are only facing funding constraints.

3. ***Trolley Bus Network.*** Plans exist to extend the trolley bus network from Dobrinja to Eastern Sarajevo (3.5 km) thus linking Sarajevo Canton with Eastern Sarajevo. The Sarajevo-Vogosca line (12 km) is also scheduled to be rehabilitated. Further developments will be dependent on planning, demand and financial resources.

4. ***Bus and Trolley Bus Depots.*** There is also a plan for a new bus and trolley bus depot in Halolovici (approximately 120,000 square meters size), accommodating 300 diesel buses and 200 trolley buses. After relocation, the existing depot on Alipasin Street would be converted to a maintenance and storage facility for tram/LRT rolling stock. If minibuses are privatized, the existing minibus depot could be sold or leased to third parties or new operators.

5. ***Public Transport Improvements.*** Aside from improvements in rolling stock and infrastructure, complementary measures being planned include: (i) limiting or making safer the interactions between pedestrians and oncoming bus/tram traffic e.g. improved designs or even grade separation for pedestrians at stops/stations where appropriate; (ii) limiting number of left turns; (iii) implementing public transport transit priority systems where the trams/buses operate in non-segregated mixed traffic environments; (iv) enhancing station areas to achieve higher levels of passenger comfort and safety; and (v) implementing more modern and efficient ticketing systems and technologies.

6. ***Central Traffic Management and Control Center.*** This is considered important to ensure the smooth coordination of public transport service delivery including: optimum allocation of fleet, reacting to unforeseen events and managing and monitoring the services at the stations and on the network in "real time". This is critical for providing a safer and more efficient public transport system in any model city.

3.23 **In the short-term (2008-2010), GRAS has planned financing efforts to address the rehabilitation of the most dilapidated infrastructure (trams and trolleybuses)**. One project currently under implementation is to transform heavy tram into a light modular system, low-floor, 3-segment trams. Fifteen of these new trams are currently in use and GRAS foresees an additional 5 of these trams and

improvements of the existing fleet at a cost of BAM 40 million (US$29.7 million), financed from the cantonal budget, GRAS, and loans, the latter serviced by the government through GRAS. No domestic funds have been set aside for the medium-term and long-term financing needs. These needs are intricately linked to the realization for the projected demand volumes. Higher volumes would justify the need for additional rehabilitation, purchases and extensions of tram and trolleybus systems. GRAS has estimated its medium-term (2010-2015) plans for infrastructure improvements at BAM 78.2 million (US$58 million) and for the long term (2015-2020) at BAM 61.6 million (US$45.7 million). The authorities should seek to secure financing for elements in the investment plans that offer high returns on investment and are justified by social and economic feasibility studies. This should not only be limited to infrastructure improvements but include financing for traffic management, parking and other public transport enhancements.

4. PROPOSED URBAN TRANSPORT STRATEGY FOR SARAJEVO

4.1 **Sarajevo is experiencing a range of urban transport challenges.** Interventions are needed to adequately address the needs of the Sarajevo residents, and to provide the needed support to the local economy. The following strategy is recommended to address these challenges:

- Pursuing institutional reorganization and strengthening;
- Directing highest priority investments at improving the public transport system;
- Placing greater emphasis on low-cost and high-payoff traffic management measures;
- Making selective improvements to the road system as the budget permits; and
- Improvements in non-motorized transport.

Institutional reorganization and strengthening

Current and proposed institutional arrangements

4.2 **Institutional arrangements for Sarajevo are particularly important**. The FBH government, the Sarajevo Canton, several municipalities, and the City of Sarajevo have, or potentially could have, a role in urban transport within the metropolitan area. Currently there is a proposal for the Sarajevo Canton to relinquish control of the regional road system and lesser roads as well, with the former being transferred to the FBH Ministry of Transport and the latter to each of the municipalities within the Sarajevo Canton. This proposal, which would limit canton responsibility to 200 km—only the primary city network—was submitted for consideration in September 2009.[23] Should this devolution occur, the canton would in effect have to relinquish responsibility for associated traffic management measures on the street and road system within the city.

4.3 **The proposed devolution of responsibility for urban transport away from the canton poses concern**. Until today, Sarajevo Canton has acted as the principal entity in charge of urban transport in the Sarajevo metropolitan area. The metropolitan region is comprised of four municipalities that comprise the City of Sarajevo (Stari Grad, Centar, Novo Sarajevo, and Novi Grad). In addition the municipalities of Llidza and Vogosca are in effect suburban areas of metropolitan Sarajevo and are likely to absorb a high percentage of total metropolitan area population growth. These six municipalities are not well staffed and equipped to maintain the road system, much less complex urban transport problems. Perhaps more importantly, they do not have sufficient geographic coverage to address metropolitan transport problems that transcend their limited municipal boundaries. Similarly, the City of Sarajevo, whose parliament is comprised of representatives of the

[23] Municipalities are now receiving a larger share of the fuel tax than before, and the new categorization would shift responsibility for roads to the wealthier municipalities. In 2006, the allocation of fuel tax to FBH was reduced from 4.9 percent of total FBH revenues to 3.9 percent, with the difference being given to municipalities.

four constituent municipalities, has very limited authority to address urban transport needs and issues.

4.4 **The most logical alternatives for urban transport governance within metropolitan Sarajevo appear to be:** either retention of this function at the Sarajevo Canton level or, alternatively, to devolve some urban transport responsibilities to a metropolitan transport authority. The possibility of creating such an authority merits serious study given the following considerations:

- The Sarajevo metropolitan area extends across different municipalities and even beyond FBH boundaries into RS (especially east of the airport);
- All units of government within the metropolitan area would be involved in making key transport decisions by virtue of being represented on the board of the authority; and
- The weak capacity of individual municipalities both on technical and financial grounds renders them incapable of effectively running urban transport issues.

4.5 **The functions of the authority could include:**

- Preparation and updating the urban transport plan for the metropolitan region (Some of this work could be contracted out under the direction of the authority);
- Preparation of capital investment budgets for passenger transport and for major road investments. (This is an especially crucial function, as needs for urban transport investments far outstrip available funds);
- Planning public transport service networks and transit system integration;
- Contracting for passenger transport services with the public sector operator (GRAS); and
- Regulating and contracting for services by private sector bus operators.

4.6 **The authority would not have an operational role, leaving this to operational entities (including GRAS and the private sector operators).** Its primary functions would be to assist in setting urban transport investment priorities according to a rational transport plan, establishing inter-modal transport coordination and integration within the metropolitan region, and contracting for and regulating passenger transport services. It is also considered necessary that the authority take the lead in pushing for more commercial initiatives from operators, including more efficient fare ticketing systems, public transport information dissemination and central management and control of services.

4.7 **The authority would need to report to a high level Metropolitan Sarajevo Board**. This board could consist of representatives of FBH, Sarajevo Canton, Sarajevo City, local municipalities, and other key stakeholders that would meet periodically to review and endorse proposals made by the transport authority staff.

4.8 **Institutional strengthening of GRAS would also be very important, especially the definition and implementation of restructuring proposals on a staged and**

progress-sensitive basis.[24] This includes, among others, possibilities for privatizing some or all assets including route concessions for bus and minibus services. Possible stratification of GRAS into 12 profit centers has been recommended in the past as follows:

- Tram operations;
- Trolleybus operations;
- Energy and power;
- Bus operations;
- Minibus operations;
- Maintenance and overhaul;
- Ancillary services;
- Technical and administrative management;
- Logistics management and procedures;
- Technical standards and EU accession requirements;
- Traffic management and control; and
- Ticketing, revenue and finance.

4.9 **In line with best practice in many cities, it is important to separate transport operations from planning and regulation**. While GRAS is the logical entity to retain responsibility for providing electric transport (tram and trolley bus) services, the emergence of private sector operators in Sarajevo and other cities of the BH suggests that there is a greater role for the private sector in providing bus services within Sarajevo. This being the case, it will be appropriate for GRAS to concentrate on the efficient provision of electric transport services leaving the planning and regulation of passenger transport services to a separate body, preferably either a separate metropolitan level transport authority or a separate unit within the Sarajevo Canton government.

4.10 **Commensurate with the emergence of the private sector in the provision of bus services, it will be important to establish better mechanisms to improve these services**. Experience in other cities suggests that this can be done through carefully developed route structure planning combined with enhanced competition among operators for exclusive provision of services "on the route" or within prescribed districts of the city. Longer term concessions and possibly modest subsidies may be required to secure higher quality service than is currently provided.

4.11 **The discount policies should be reviewed to ascertain whether they are meeting their objectives**. There are extensive options for discounted tickets to travel on the GRAS system, and as a result a considerable proportion of passengers travel using one form of discounted ticket or another. As the subsidy provided by Sarajevo Canton falls short of the full cost incurred by each journey, GRAS is essentially subsidizing each passenger on a discount ticket. In light of the affordability of these schemes, it would appear appropriate to review the current range and scope of the discount schemes, and ascertain whether improved targeting would realize the objectives at lower cost.

[24] UK assisted study recommendations from "*Projektat Restruktuiranja, Kantonalnog Javnog Komulanlnog Preduzeca GRAS Sarajevo"* by PPERP/IMC Consulting, IPSA Sarajevo, June 2004.

4.12 **The fare levels and financing of GRAS needs to be reviewed.** GRAS is currently operating at a loss, reflecting the fact that the fare structure of tickets and passes is infrequently adjusted and because GRAS does not receive full compensation from Sarajevo Canton for the sale of discounted tickets and passes. An explicit subsidy for passenger services provided at a discount would eliminate the subsidy that GRAS currently provides and raise the level of revenue for improvements in services.

4.13 **There is a need to establish an improved system to address fare evasion, including possibly a smart card system plus better information and sensitization campaigns**. In 1999 a new electronic system was introduced in the trams, for the use of magnetic tickets for one, two, and five rides only. Recently, GRAS has submitted to the cantonal government a proposal for introducing smart cards for trolley buses, buses and mini-buses, with a provisional cost estimate of BAM 2.5 million (US$1.89 million).

Public transport improvements

Public transport system upgrading

4.14 **Given the narrow valley in which Sarajevo is located, and the relatively high population density, development of a high grade public transport system deserves highest priority**. This program would entail the modernization of the dilapidated elements of the tram and trolleybus systems. Elements of improvement could include: improvement of tram tracks and catenary systems, rehabilitation of tram and bus stock, rehabilitation of stations and implementation of a central management and control center. Upgrading the existing tram service over time into a higher quality light rail transit (LRT) system with better speed and comfort is an important consideration. Beyond this core improvement, continued upgrading of the bus and trolley bus passenger transport system both as a feeder to the tram system, and as line haul service, will also continue to be important. Other improvements like enhanced access for persons with disabilities and tram signal priority treatments at key at-grade intersections are also worthy of consideration.

Public transport information

4.15 **At present, there is limited access to information on public transport services**. A key element in the success of any public transport system is the ready and efficient provision of information to the public. This provides users with clear choices and alternatives for travel and removes the stress and anxiety in deciding travel plans. Information provision is also important in engendering efficient adherence to timetables, reducing waiting times at stops and increased confidence in the reliability of public transport services. Measures in this direction could include: preparation of leaflets with bus route and timetable on each bus, providing timetables at stops, internet timetables, preparation of city public transport maps including all modes available and distributing at stations. In the longer term, improvements could go as far as providing real time public transport information at bus/tram stops showing when the next bus/tram is due.

A more systematic approach is required

4.16 **For more efficient transport and land use planning, public transport studies are necessary for Sarajevo to address the following issues**:

- Building a transport model for Sarajevo based on an established existing operational and demand profile (from passenger trip origin and destination surveys);
- Developing a financial plan that balances the estimated costs with projected revenues; including considerations for setting the appropriate fare pricing structures;
- Performing feasibility reviews (operational, economic and financial) for public transport enhancement options;
- Formulating development plans that will guide the operational and financing strategy in the medium to long term (2010-2015; 2015-2020).

Traffic management measures

Traffic Signal System Upgrade

4.17 **The most cost effective short term improvement to traffic and transport conditions in Sarajevo is perhaps through improvements to the traffic signal system**. The cost of improving this system would be relatively low and improvements in traffic flow would be immediate. Moreover, an improved traffic signal system could be used to improve public transport operations, by affording priority treatment of tram services at intersections.

Parking program

4.18 **The need for a comprehensive parking policy and program is particularly important in Sarajevo**. The lack of adequate parking spaces in the city is serious from several standpoints as both residential and commercial parking spaces are in short supply. Moreover, a comprehensive parking policy is needed as a means for addressing traffic problems. It will be important to establish parking charges in the central area of the city that discourage all day parking by employees and to encourage them to take public transport as an alternative. Conversely, it will be helpful to encourage parking turnover in commercial areas to assist businesses. Park and ride facilities at outlying locations on the public transport system are another consideration. The city should also actively seek private sector investment in off street parking facilities by charging high enough on-street parking fees (and enforcing illegal parking) to create an improved basis for private investment.

Improvements to the road network

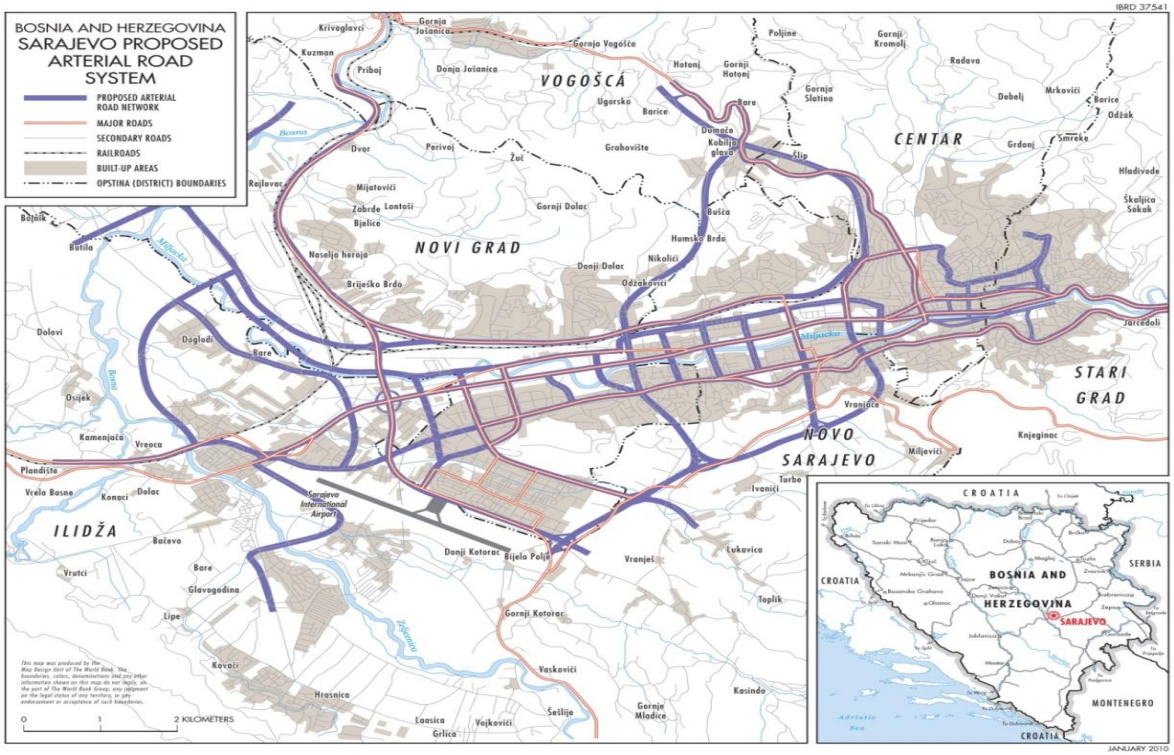
Improvements to the arterial road system

4.19 **While more emphasis is recommended on improving the public transport system, improvements to the arterial road system are also important**. The Sarajevo Canton Roads Directorate has prepared a road plan that if adequately funded should assist

in strengthening the overall road network in the city which is heavily reliant on the Zmaja od Bosne road corridor running down the center of the valley. The proposed road network improvements should help to balance east-west travel volumes (see Figure 3).

4.20 **Sarajevo Canton has three priority road projects**, **which are parallel and traversal roads in the city of Sarajevo, as a means to relieve traffic pressure.** These include: (i) the first transversal; (ii) the seventh transversal; and (iii) the south longitudinal. The first section of the first transversal is 3.1 km long, running from S.S. Kranjčevića to Kobilja Glava and estimated to cost BAM 51.2 million (US$38.1 million). Project documentation has been completed and the cost of expropriation is estimated at BAM 36 million (US$26.7 million). The first section of the seventh transversal from Stupska petlja the to entity border is 3.5 km long and is estimated to cost BAM 5.8 million (US$18.9 million), with an estimated cost of expropriation of BAM 11.3 (US$10.4 million). Finally, the first section of the south longitudinal is 3.5 km long, running from the zero to seventh transversal, and estimated at BAM 12.3 million (US$9.1 million), with an estimated cost of expropriation at BAM 9.9 million (US$7.4 million). In all three cases, there are no secured funds and the canton is expecting to finance these projects entirely by loans. These improvements will have to be carefully staged in relation to available funds.

Figure 3. The proposed arterial road system



Source: Based on a map provided by Sarajevo Canton.

Western bypass of Sarajevo

4.21 **Beyond internal road improvements, the importance of constructing the proposed C-5 as a by-pass around the west side of the Sarajevo metropolitan area cannot be underestimated**. This road link would provide much needed relief to Routes

17 and 18 within Sarajevo by removing a significant percentage of traffic that wishes to bypass Sarajevo. It should also be recognized that the C-5 road link will affect development of the western portion of the Sarajevo metropolitan area by providing much improved accessibility to this area.

Improvements for Non-Motorized Transport (NMT)

4.22 **It is equally important to address the needs of non-motorized transport users as a matter of priority in a bid to provide more environmentally friendly means of transport.** Improving the environment for non-motorized users including pedestrians and cyclists is an important step in affecting the modal share imbalance and reducing reliance on the private car. Investigations can be made into possibilities for increased pedestrian and cycle safety. Provision of better crossing facilities at junctions is one consideration. Provision of more conducive walking and cycling environments that take advantage of available spaces and scenery (e.g., river banks) are among other possible avenues for interventions.

The need for an urban transport master plan and investment program is clear

4.23 **Given the serious urban transport problems in Sarajevo, it is strongly recommended that a comprehensive urban transport master plan b prepared**. At present, an urban transport plan has been drafted, and if adopted it will replace existing regulations and will define new city public transport lines. However, plans focus on individual sectors, but there is no coherent integrated urban transport plan currently under preparation in Sarajevo Canton. Despite the urban transport plan, the need for a master plan remains and it can be structured to investigate the urban transport problems in Sarajevo in greater depth, quantify the same, suggest appropriate remedial measures and stipulate how the intervention programs are to be carried out in the short to medium term (0-5 and 5-10 year timeframes). Failure to address and plan for these problems will be costly in the long run. While development of an agreed upon plan is important, equally important will be the development of realistic 5 and 10 year capital improvement plans covering all candidate urban transport investments. These time based investment programs should be updated on a yearly basis to reflect current transport priorities within available budget resources.

5. URBAN TRANSPORT CONDITIONS IN BANJA LUKA

Overview

5.1 **Banja Luka is the administrative capital and largest city in the Republika Srpska (RS).** The corporate boundaries extend well beyond the current limits of urbanization and into some of the surrounding villages. The city was thrust in the post-war transition from a simple municipal town into being the capital of the RS. Existing spatial planning from the pre-war years has thus proved largely inadequate in light of the city's new role. Motorization is increasing rapidly in Banja Luka. There were 16,000 registered vehicles in 1995, but since then there has been a marked increase to 45,328 passenger vehicles and 51,937 registered vehicles in 2008. Ongoing intensification of demographic and economic patterns within the metropolitan area is likely to continue. In the face of these challenges, urban transport issues, while not so pressing at the moment take on an added meaning in planning for the future. An orderly growth pattern and development strategy with clear linkages between transport and land use is considered vital. Urban transport matters within Banja Luka are managed by the Banja Luka city administration's Department of Public Works and Housing. The Department has five staff working on urban public transport issues, and is also in charge of traffic management, including the traffic signal system, road signing and marking.

5.2 **A linear development pattern has emerged as a result of the physiological constraints posed by surrounding mountains and the Vrbas River.** The city has evolved in a north-south direction along the western bank of the Vrbas River causing a north-south bias for traffic flow. Rapid post-war expansion has resulted in unplanned growth along the eastern bank of the river causing increase in demand for East-West connections. There are few bridges available for these cross-river connections, thus adding to the capacity constraint problems. The available bridges are concentrated in the traditional center of the city, causing undesirable effects of congestion and environmental degradation.

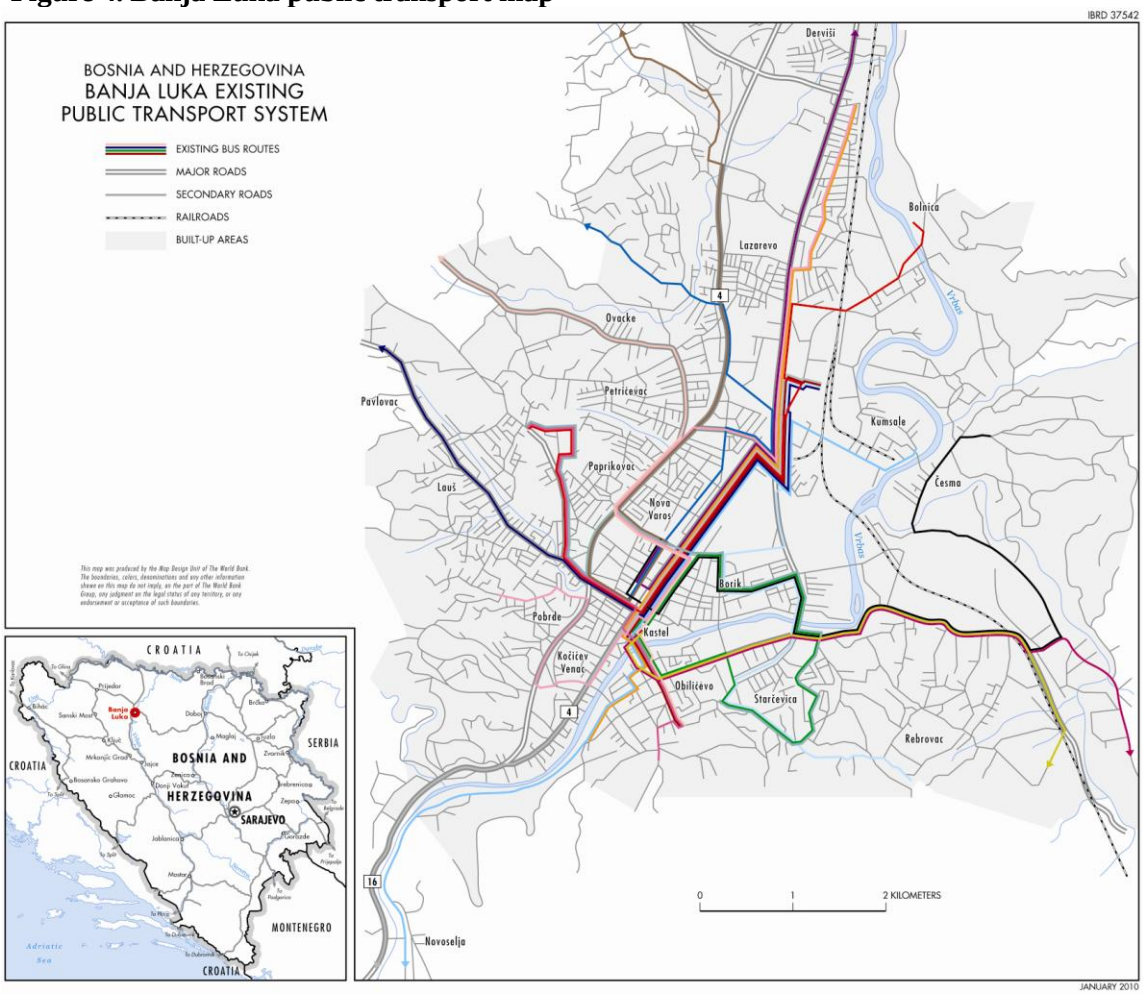
5.3 **A number of studies have been carried out to examine the urban transport issues in Banja Luka over the past years**. Studies have recommended the introduction of more modern and more economical urban transport measures including the construction of bypasses, providing connections between bigger urban settlements with preferably tram and trolley bus networks (arguing this on the basis of the area configuration and size of the urban space). However, all these studies note the major constraint as the scale of financing required.

Public transport

5.4 **In Banja Luka, urban and suburban public transport is provided by bus services.** There are a number of private public transport companies operating on 23 lines in the urban center and 30 lines in the suburban area. The public sector operator was privatized in 2000. There is a lack of an organized body in charge of reinforcing fares and ensuring the integration of operations to improve efficiency of the public transport system.

The city has an integrated fare system. The city collects all fares (which are sold off-vehicle) and distributes the proceeds to the providers of service according to vehicle kilometers of service provided. The system is self financing, with four companies and four associated partners paying the city for the privilege of providing services on selected routes. The public transport map for Banja Luka is shown in Figure 4 below.

Figure 4. Banja Luka public transport map



Source: Based on a map provided by Banja Luka Municipality.

5.5 **Passenger transport satisfaction surveys have indicated a relatively high level of satisfaction with passenger transport services**. However one source has argued that this positive assessment might be due to improvements over a very poor base case.[25] It is also likely that service to outlying areas of the city is deficient, as the system is highly focused on the north-south main corridor of the city. As a result many of the western and eastern areas remain without adequate public transport service. Concern has also been indicated that the present arrangement is not sustainable as the bus fleets are aging, with the average bus being 15 years old.

[25] Head of the Department of Public Works and Housing.

5.6 **The main challenge facing local officials is what to do to upgrade passenger transport services.** A number of recent studies have advocated the introduction of electric transport (trolley buses and trams). In addition to improving urban passenger services within Banja Luka, there is a desire to improve bus services to outlying suburban areas and nearby settlements which are less well served. However, any decisions on the appropriateness of recommendations for Banja Luka should carefully consider current and projected demand and the feasibility of the proposals. The Banja Luka municipality is currently evaluating two options[26]:

- Option A, with electric trolley buses gradually replacing service on eight bus lines in three phases. Typical planned headways are 20 minutes or less. Since existing services are provided by diesel buses, this option would require provision of new infrastructure: catenaries, transformers, depot facilities, stations and turnarounds. The option would include rolling stock provision of an estimated 29 diesel buses and 73 trolley buses. Total cost: BAM 75.88 million (US$56.2 million).
- Option B, with staged approach to implementation as in Option A above but using buses, trolley buses and trams/LRT with selection by corridor depending on demand and physical constraints. This option offers the benefit of evolving an integrated transport system. As with Option A, costs for new infrastructure would have to be incurred. Total cost: BAM 210 million (US$155.7 million).

5.7 **The outlays for Option B, which includes introduction of a tram system, are significantly higher than for Option A**. In addition to requisite vehicles and depots for the trams, extra costs arise due to construction of new routes for the trams, remodeling of the street profile, and relocation of public utilities. Option A, with the trolley bus network would only require the introduction of power infrastructure along the existing bus routes. The justification for choosing a particular option or indeed of determining which modes to utilize necessitates more comprehensive study. In 2008 a transport study was prepared, which will be the basis of the urban regulation plan which is currently under discussion and is expected to be adopted in the first half of 2010. This study also reviewed the public transport options. At present the city administration is leaning toward Option B.

5.8 **A project for monitoring public transport is currently under preparation**. This project aims to (i) monitor buses and compliance with the timetable; (ii) provide a more realistic assessment of public transport and needs; (iii) provide information on buses running late, which will be necessary for the planned center for traffic management; (iv) explore options for electronic tickets in order to obtain more reliable data; and (v) review public transport revenue by network line and time of day. The bidding process for this project has yet to be issued, and financing remains an issue.

[26] With the assistance of Sudok Consultants from the Czech Republic.

Traffic management

Traffic signal system

5.9 **Banja Luka has 40 signalized intersections, but these are not centrally synchronized**. With the exception of 9 intersections with newer traffic signal installations, the traffic signal installations can provide only one timing plan. The city plans to signalize 15 additional intersections and to add central control. An international call for bids for project design documentation for the centralized management system, including a center for traffic management, is ongoing, with the bid period having closed at end-September 2009. This is a priority project for the city and will be financed through loans from commercial banks. The estimated budget for this is in the range of BAM 4.8 million (US$3.6 million). The city had planned approximately 10 traffic circles, of which one has been built and three traffic circle designs have been finalized.

Parking

5.10 **The city has installed parking meters and is planning to add more**. Presently parking is being handled by a section within the administrative service of the city. The city is exploring the possibility of creating a company dedicated to parking, but has yet to make a decision. The law on public/private partnerships, which was adopted in 2009, will facilitate private participation in a range of activities. The city is currently in the early phases of discussions with the private sector under which the city would provide land, with the private sector constructing and operating the facility. There have been issues over land acquisition and this has delayed this project. However, there are 100 new spaces in the city center. Overall, there is a parking shortage and parking violations are apparent, but parking has not yet reached the tipping point.

Road network

5.11 **The city has undertaken a major road program in recent years**. There were only 75km of sealed roads in the city during 2002, but an additional 150km have been asphalted since then.[27] The city is responsible for 314km of local roads and 1,070 km of non-categorized roads; it has completed work on local roads and fifty (50) percent of non-classified roads. This program needs to continue as there are new settlements, some of them illegal, which require sealed roads. The peri-urban road network is not meeting the requirements of the traffic load, and the city has prepared project documentation for 26 km of local roads to be reconstructed to become urban streets. Project preparation has been prepared, and land expropriation has been estimated to cost BAM 9.7 million (US$7.3 million) and an additional BAM 29.3 million (US$21.8 million) will be required, which is likely to be financed by loans. There is also a need for a bypass road on the west side of the city to accommodate a major north-south traffic movement. Although the bypass is the first best solution, the city is also exploring the possibility of building a BAM 1.9 million (US$1.5 million) traffic circle instead, in order to increase safety and reduce congestion at a lower cost. A key priority for the city is how to channel reduced

[27] A significant portion of this road upgrading was financed under the World Bank financed Urban Infrastructure Project.

funding for marginal improvements. This road will need to be financed and constructed by the Republic Srpska Roads (RSR) Company.

5.12 **The city has proceeded with an extensive street lighting upgrading program**. This program has been successful from both a traffic safety as well as from an energy savings perspective.[28]

Road safety (non-motorized transport users)

5.13 **City officials expressed concern about road safety.** It has been mentioned in particular that pedestrians suffer a high proportion of injuries in Banja Luka, followed by cyclists. There is a pedestrian street in the city which is heavily used. The city is considering expansion of this system.

[28] This program was also financed in part under the Urban Infrastructure Project.

6. PROPOSED URBAN TRANSPORT STRATEGY FOR BANJA LUKA

Public transport improvements

6.1 **Banja Luka appears to have only modest transport problems compared to Sarajevo.** It currently appears to be well on the way to adequately addressing outstanding issues. The most pressing issues appear to be what to do to improve the quality and sustainability of passenger transport services within the city, and how to improve services to suburban areas and to nearby communities.

Traffic management measures

Traffic signal program

6.2 **A traffic signal program including signalization of additional intersections and upgrading the existing system would be a cost-effective solution**. This would provide coordinated traffic signal control and also include possibilities for multiple timing plans all in a bid to ensure the smoother movement of traffic.

Parking program

6.3 **The continuation of the current program of (i) increasing on-street paid parking; and (ii) seeking private sector funding for construction and operation of off-street parking lots is considered a prudent approach at this time**. Revenue from the off-street parking facilities would then be shared under an agreed upon formula.

Improvements to the road network

6.4 **A by-pass road west of the city to accommodate through north-south traffic will be an important investment.** A continuation of the recent program of street surfacing is also desirable to reduce current and future maintenance costs and to reduce vehicle operating costs. Although it may be difficult to finance.

Improvements for non-motorized transport

6.5 **The situation of poor safety for pedestrians has to be addressed as a matter of urgent concern**. Safety investigations into trouble spots, junctions or routes followed by recommendations for improvements need to be made. The consideration for expanding the existing pedestrian mall in the city is another positive development that ought to be acted upon. Increased pedestrianization helps in recapturing part of the urban space for the most environmentally sensitive transport mode (walking). Experience in other cities has also found that pedestrianization can be an important stimulant in contributing to economic development especially through increases observed in the retail shopping sector.

Preparation of a detailed urban transport master plan and investment program is recommended.

6.6 **An urban transport master plan for Banja Luka is recommended, to:** (i) follow up on the recent studies on options for public transport investments; (ii) review and address the other pertinent urban transport issues; and (iii) stipulate how the investment programs of interventions are to be carried out in the short to medium term (0-5 and 5-10 year timeframes), discussing issues of financing and feasibility.

7. URBAN TRANSPORT CONDITIONS AND PROPOSED STRATEGY FOR SMALLER URBAN AREAS

Overview

7.1 **Urban transport conditions are less critical in smaller urban areas of BH**. Only four areas have populations exceeding 100,000 (Tuzla, Zenica, Mostar, and Bijeljina), and only three have populations exceeding 50,000 (Doboj, BHac, Brčko and Prijedor). However, motorization is also increasing in these areas, and will continue to increase in line with economic growth. In many of these smaller cities, the roads are in poor condition, yet the municipalities do not have sufficient resources to plan, or implement the necessary rehabilitation and maintenance.[29] Another issue of importance is the lack of institutional capacities to address emerging challenges.

Technical assistance support by the FBH and RS entities

7.2 **Recognizing that urban transport problems and issues will become more pronounced over time, there is a need for technical assistance to the smaller urban areas**. It would be helpful to establish small units in the transport ministries of the FBH and RS to provide technical assistance to these smaller cities. It is unlikely that most of the smaller municipalities will be able to adequately provide staff in the short run to address the full range professional services needed to adequately address urban transport needs. The entity road directorates, in particular, could provide technical advice to local governments until such time as local capabilities reach satisfactory levels.

Public transport

Improved contracting for public transport service provision

7.3 **While the private sector has emerged as a serious provider of urban passenger transport services in recent years, the quality of these services could be substantially enhanced**. A key element in achieving this objective will be improved competitive bidding on these services. The FBH and RS transport ministries might provide standard contract documents and related technical assistance to local governments to advance this proposed reform.

Bus services to outlying areas

7.4 **Beyond providing adequate passenger transport services within each of the larger urban centers of BH, there remains the need to adequately provide passenger transport services to outlying communities**. This is particularly important to enable persons living outside the urban central district areas to have an easier commute to work and also obtain access to services in these centers. This element of the strategy for smaller urban communities might require modest financial assistance (operating subsidies) from

[29] Background paper by Ibrahim Jusufranic; *Appendix A of PCI (2007) Interim Report 8: Task E: Urban Transport.*

the FBH and RS entities as part of a national policy to encourage small community development.

Traffic management and parking

7.5 **The need for improved traffic management and parking measures such as the installation of traffic signals or instituting paid on-street parking is not as pressing in the secondary cities of BH**. However, there are places where these traffic management measures could be applied. Particularly important will be the progressive upgrading and expansion of traffic signal systems and initiation and expansion of paid parking systems, especially in the larger of these secondary cities.

Road network

Paving and maintenance

7.6 **Several communities in the smaller urban areas have extensive unpaved or poorly paved roads.** An ongoing program of street paving is recommended to reduce road maintenance costs and to reduce vehicle operating costs.

Road bypasses

7.7 **Heavy motor vehicle traffic, particularly trucks with neither origins nor destinations within these urban areas, should ideally be routed around these settlements**. A number of urban bypasses have been proposed and should be implemented as funds become available. This responsibility will principally rest with the transport ministries of FBH and RS.

8. PROPOSED IMMEDIATE ACTION PROGRAM

8.1 Financing of the previously discussed urban transport interventions is ideal in the medium to long term. In the interim, a set of immediate actions in the urban transport sector can be of benefit, and would lay the ground for more concrete and appropriately targeted actions. Immediate actions, especially studies that could be advanced to address pressing urban transport issues, are summarized in Table 4 below.

Table 4. Proposed immediate action plan—urban transport in Bosnia & Herzegovina

Urban Area	Issues	Proposed immediate actions
Sarajevo	Complex governmental structure	• **Studies to address institutional issues including:** (i) future role of Sarajevo Canton in the road sector and in urban transport; (ii) possible separation of passenger transport operations from planning and regulation; (iii) proposals for creation of a metropolitan transport authority.
	Service quality provision	• **Study on improved bidding and competition for the provision of passenger transport services**. Focus could be on requiring higher quality services with longer term concession periods.
	Inadequate parking	• **Parking Concession Study**: examine ways and means of securing private sector participation in providing off-street parking.
	Transport & Investment Plans	• **Study to update urban transport and capital investment plans:** update the urban transport investment plan for metropolitan Sarajevo and compile a capital investment plan; take into greater consideration the viability of proposals, including the introduction of smart card ticketing systems, available budgeting resources and likely financing options.
	Discount Schemes	• **Study to review the nature and scope of the current discount schemes**
Banja Luka	Transport & Investment Plans	• **Study to evaluate feasibility of current urban transport proposals.** This study would analyze current proposals for introducing tram or trolley bus services, taking into account issues of demand, available financing as well as review of the alternative of improving standard autobus services. The study would also include proposals for improving overall services through longer term concessions in the provision of services.
Other Urban Areas	Weak Capacity	• **Study on institutional arrangements for technical assistance to smaller urban areas.** This study would examine the options of staffing up local governments and/or the alternative of providing assistance to local governments by outreach from the transport ministries of the FBH and RS on urban transport planning issues.