

GREEN, LIVABLE, RESILIENT CITIES IN SERBIA:

Comparative analysis of 10 cities



Green, Livable, Resilient Cities in Serbia:

COMPARATIVE ANALYSIS OF 10 CITIES

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ACRONYMS

AFD	French Development Agency
AWTSE	Association for Water Technology and Sanitary Engineering
CHP	Combined heat and power
CI	Critical infrastructure
CIP	Capital Investments Plan
DH	District heating
DMC	Domestic material consumption
DRA	Disaster risk assessment
DRM	Disaster risk management
DRR	Disaster risk reduction
EBRD	European Bank for Reconstruction and Development
EC	European Commission
EE	Energy Efficiency
EIB	European Investment Bank
ESCO	Energy service company
EU	European Union
EUR	Euro
EURO	European emission standards for petrol cars
GCAP	Green City Action Plan
GDP	Gross domestic product
GFA SEE	GFA South-East Europe d.o.o., Serbia
GHG	Greenhouse gas
GHSL	Global Human Settlement Layer
GIS	Geographic information system
GIZ	German Agency for International Cooperation
GUP	General Urban Plan
ICT	Information communication technology
IDP	Internally displaced persons
IPA	Instrument for Pre-accession Assistance
IT	Information technology
ITI	Integral Territorial Investments
KfW	German KfW Development Bank
LDP	Local development plan
LED	Light-emitting diode
LIID	Local Infrastructure Institutional Development Project
LPC	Law on Planning and Construction
LSG	Local self-government

NALED	National Alliance for Local Economic Development
NGO	Non-governmental organization
NRW	Non-revenue water
OECD	Organization for Economic Co-operation and Development
PDR	Plan of detailed regulation
PET	Polyethylene Terephthalate
PIT	Personal income tax
PPP	Public-private partnership
PPS	Polyphenylene Sulfide
PUC	Public utility company
R&D	Research and Development
RDF	Residue derived fuel
RES	Renewable energy sources
RS	Republic of Serbia
RSD	Serbian dinar
RWMS	Regional Waste Management System
SCTM	Standing Conference of Towns and Municipalities
SDC	Swiss Agency for Development and Cooperation
SDG	Sustainable Development Goals
SECO	The Swiss State Secretariat for Economic Affairs
SECAP	Sustainable Energy and Climate Action Plan
SIDA	Swedish International Development Cooperation Agency
SORS	The Statistical Office of the Republic of Serbia
SPRS	Spatial Plan of the Republic of Serbia
SUDS	Sustainable Urban Development Strategy
SUMP	Sustainable Urban Mobility Plan
SWM	Solid waste management
UN	United Nations
UNDRR	United Nations Office for Disaster Risk Reduction
USAID	United States Agency for International Development
UWWTD	Urban Wastewater Treatment Directive
WB	World Bank
WMP	Waste Management Program
WWTP	Wastewater treatment plants

EXECUTIVE SUMMARY

This report is prepared within the framework of the Green, Livable and Resilient Cities Program. It is a result of a comparative analysis and performance assessment of 10 selected secondary and mid-sized¹ cities in Serbia² – Kraljevo, Kragujevac, Leskovac, Niš, Novi Pazar, Novi Sad, Šabac, Sombor, Užice, and Zrenjanin – in four broad areas of local action for green and resilient development: i) strategic planning and governance; ii) urban development; iii) communal services; and iv) local government finance. Based on the conducted analysis, the report proposes concrete measures and interventions for the 10 analyzed cities that can help the cities tackle sector-specific problems, and steer Serbia towards more productive, greener, resilient, and sustainable development. This report complements the World Bank’s analytical reports for Serbia at the national level: *Sustainable Cities Serbia, the Solid Waste Management Situation Analysis, Strengthening Sustainable Urban Development*, and a background report by COWI – all prepared within the framework of the Green, Livable and Resilient Cities Program.

The report also complements the World Bank’s *Local Infrastructure and Institutional Development (LIID)* project³ in Serbia, which aims to improve the capacity of local self-governments (LSGs) to develop and manage green, inclusive and resilient mobility infrastructure and to strengthen the technical skills of LSGs in terms of planning capabilities, operational performance and financial sustainability of their investments. Some of the recommendations presented in this report could potentially be implemented in the selected cities through the LIID project.

Cities in Serbia face many development challenges exacerbated by negative demographic trends, including the 10 selected cities

While big and small cities drive economic development worldwide – attracting investments, businesses and people – economic growth in Serbia has concentrated in major cities. With around 60 percent of the population living in urban areas, which include major, secondary and mid-sized cities, towns, and suburban/peri-urban settlements, the urbanization level in Serbia is lower than the European Union (EU) average of 72 percent, registered in 2015.⁴

Like the majority of Serbian cities, the 10 analyzed cities have not realized their full growth potential for multiple reasons, including population decline, uneven spatial growth, environmental degradation and lack of adequate communal infrastructure and services. The combination of a declining and aging national population constrains the labor markets in Serbian cities and presents a risk for future economic growth. Serbia’s population has decreased by 11.3 percent from 2002 to 2022 due to several factors, including low fertility rates, outmigration, and a rapidly aging population. Among the 10 analyzed cities, only Novi Sad and Novi Pazar have experienced a population increase in the last 10 years, by 20 and 6 percent respectively.⁵ Over the same period, Sombor experienced

¹ According to the national classification of cities.

² Cities participating in the Program were selected based on the agreed selection criteria: (i) population – secondary and medium sized cities, (ii) development category – lagging and leading regions, demographic trends – growing and shrinking cities, (iii) different city typologies, (iv) strong interest and ownership to participate in the project, (v) willingness to engage in participatory processes and follow good governance principles, (vi) capacity of municipal staff, (vii) cities more exposed to hazard conditions (floods, earthquakes, draughts), (viii) environmental conditions (climate change, waste, air quality etc. etc.), and (ix) potential investment opportunity.

³ <https://www.worldbank.org/en/news/press-release/2022/03/09/serbia-s-transition-to-more-equitable-and-greener-growth-to-benefit-from-better-local-service-delivery-with-world-bank-s>.

⁴ <https://urban.jrc.ec.europa.eu/thefutureofcities/urbanisation#the-chapter>

⁵ Migration is the key driver for the growth of Novi Sad, while Novi Pazar has had a natural population increase.

over 17 percent population decline. The depopulation trend is expected to continue over the next two decades and the number of inhabitants is expected to decrease further in the majority of the cities, except for Novi Pazar and Novi Sad. This trend is exacerbated by an aging population, with the national median age rising from 40.2 in 2002 to 42.2 years in 2011, which is higher than the EU average (average age of 41.6).

Despite declining populations, most of the analyzed cities are experiencing uncontrolled growth of their built-up areas, compromising service provision, urban sustainability and disaster resilience. Despite booming construction, based mostly on the speculative market, the supply of affordable housing for the cities' low-income populations (mostly internal migrants from rural areas, Roma people and other socially vulnerable groups) has been limited, leading to the growth of informal settlements on the outskirts of cities where basic infrastructure is lacking. Within the 10 analyzed cities, informal, uncontrolled use of land has led to disparities in access to communal services.

Underinvestment and uncontrolled development have prevented sustainable urban development. In recent decades, cities in Serbia have suffered from underinvestment and poor spatial prioritization of infrastructure, weak management of infrastructure systems, illegal construction, and negative environmental impacts. This has led to deteriorating living conditions in many cities and municipalities, increased vulnerability, and considerable variability in living standards across the country. Key challenges include, inter alia, inadequate solid waste management, significant air, soil and water pollution, disaster risks from floods and other natural hazards, often compounded by climate change, ageing and poorly maintained urban infrastructure, and inadequate land administration.

An urgent shift towards green and resilient urban development is key to making Serbian cities more livable and to fulfilling national sustainability and climate goals

Analysis of the 10 cities demonstrates a high dependence on fossil fuels, which - in conjunction with a high use of personal vehicles - contributes to air pollution as well as GHG emissions. Eight of the 10 analyzed cities (with no data available for Leskovac and Šabac) confirmed records of Category III levels of air pollution.⁶ Poor air quality, attributed to industrial emissions, transport and heating systems, poses a public health hazard across the cities. District heating systems used to heat residential buildings (in most parts of the cities) rely almost exclusively on fossil fuels such as natural gas (80 percent), coal (14 percent) and heavy fuel oil (5 percent). Use of renewable energy remains low, with only four of the analyzed cities (Užice, Novi Pazar, Novi Sad and Kraljevo) utilizing renewable energy sources for heating public buildings; only in Užice and Novi Pazar is the share of renewable energy above 10 percent. Increased use of personal vehicles poses an additional threat to air quality in Serbia and contributes to GHG emissions. Novi Sad, Šabac and Kragujevac are now above the national average of 313 vehicles per 1,000 people. Alternative modes of transportation such as public transport and cycling are falling behind. Analysis of the 10 cities shows that public transport has limited coverage, and fares often exceed the cost of parking. Cycling networks are underdeveloped in most of the cities, with the notable exception of Novi Sad.

Overall, waste management in the analyzed cities needs improvement, and significant investments are necessary to reduce the environmental impact of the cities' waste management systems. The cities face challenges with respect to the waste management institutional framework. Waste management at the regional level, although envisaged by law, has not been fully implemented due to limited inter-municipal cooperation. At the practical level, waste management system deficiencies registered in the analyzed cities mirror the challenges at the national level. The 10 analyzed cities have made limited progress with respect to waste management, with only three cities achieving fair performance,

⁶ According to the Law on Air Protection ("Official gazette RS" No. 36/2009, 10/2013 and 26/2021), Category III describes excessively polluted air where the tolerance values for one or more pollutants are exceeded.

specifically Novi Sad, Užice and Niš. In terms of promoting circularity,⁷ these three cities have demonstrated fair performance, while the other seven cities show poor circularity based on waste management indicators that assess levels of waste collection, disposal and treatment of waste, including recycling and composting. In terms of disaster resilience, the waste management systems in the majority of the analyzed cities are insufficient. Only Novi Sad and Niš consider waste management systems as critical infrastructure (CI) and have developed waste collection contingency plans, in the event of natural disasters and emergency situations.

Water supply and sanitation services and stormwater drainage systems require improvements at varying extents in the cities to improve sustainability and resilience.

The quality of water-related services varies from city to city, but significant investments are needed in each city to either increase water supply coverage, improve water quality or reduce water losses. In all 10 cities, water losses require urgent attention as non-revenue water levels are alarmingly high, especially in Novi Pazar (61 percent), Užice (55 percent), Leskovac (53 percent), Niš (48 percent), and Kragujevac (45 percent). All the analyzed cities are in need of investments to treat wastewater and to develop stormwater drainage systems to protect against increasingly intensive rain and urban flood events associated with climate change.

Improved planning and climate-informed public investment management in cities are crucial for ensuring Serbia's transition towards green, resilient and sustainable urban development

The analysis of strategic planning and governance in the 10 cities suggests that all secondary and mid-sized cities in Serbia face similar challenges. The cities are overburdened by the numerous mandatory strategic, sectoral and spatial/urban planning documents required of them, with plans often overlapping and in need to be harmonized with national policies and priorities. The Sustainable Urban Development Strategy (SUDS) provides an overarching framework to advance the central government's green, livable, and resilient cities agenda; however, the high-level SUDS objectives are not yet mainstreamed in urban planning instruments. Local development plans of seven out of the 10 analyzed cities contain elements and measures of green development; yet, disaster resilience and climate change adaptation measures have not been integrated into development plans, and actions towards green development need to be scaled up across the cities. Only four of the analyzed cities are participating in the United Nations Office for Disaster Risk Reduction's Making Cities Resilient 2030 Campaign.⁸ Insufficient technical and staff capacity serves as a major constraint to effective implementation and monitoring of urban planning and disaster risk management policies and programs at the local level. Furthermore, reforms are necessary to improve local governance, in the areas of smart services, participatory planning and budgeting, and gender equality.

The costs of meeting Serbia's environmental challenges are high, with most of the financial burden falling on local governments. Green urban development and disaster resilience-related projects require high investments: in 2019-2021, nine of the analyzed cities invested EUR 181 million in green investment projects. This included EUR 93 million invested in transport infrastructure, EUR 52 million in water supply investments, EUR 19 million in sewerage construction, and EUR 13 million in energy efficiency improvements and renewable energy investments. While significant investments have been implemented, the overall scale of investment is likely still insufficient given the magnitude of the environmental challenges confronting the analyzed cities and Serbian cities in general.

⁷ Circularity is rooted in reduced use of new materials through reuse and less resource intensive products and services, as well as recovering resources from waste.

⁸ The participating cities are Kraljevo, Užice, Zrenjanin, Kragujevac, Čačak, Kruševac, and Pirot. Only a quarter of Serbian cities are participating in the UN campaign.

Cities hold the key to unlocking Serbia's full economic potential through green, resilient and sustainable development

Based on the analysis of the national legal framework and the assessment of the 10 selected cities, this report offers a set of recommendations to support greener, more productive and resilient development in Serbia at the local level. Along with significant physical investments by the cities, the report recommends improved strategic planning, capacity building for local governments and enhanced coordination and support from the central government. The main challenges and recommendations to support green development in the 10 analyzed cities are summarized in the following table.

Summary of Recommendations

Challenges	Recommendations
<p>Planning: Capacity constraints to meet urban planning obligations and to support climate and disaster-risk informed planning</p>	<ul style="list-style-type: none"> • At the national level, streamline the planning system by simplifying administrative requirements for mandatory and optional planning documents, adjusting to realities on the ground (at the LSG level); • Support horizontal and vertical cooperation to ensure alignment between national and local plans (including spatial, urban development and sectoral plans); • Improve capacity of LSGs to integrate land use and sectoral plans to promote sustainable development through coordinated investments; • Develop and implement climate resilient and risk-informed urban plans (for all identified significant hazards, e.g., landslides, earth-quakes, floods for category II rivers); • Develop and maintain updated disaster risk assessments, disaster risk reduction plans and contingency plans to ensure the continuity of critical infrastructure in the event of disasters; and • Improve the quality of data, to support evidence-based planning and investment decision-making and to monitor performance indicators. This includes developing and enhancing GIS systems and developing a digital platform for inter-agency coordination to improve service planning and delivery.
<p>Urban development: Uncontrolled urban sprawl and poor air quality</p>	<ul style="list-style-type: none"> • Support zoning that aligns spatial growth scenarios with population projections, revising planned expansion of build-up areas where necessary; • Promote evidence-based planning and infrastructure investment taking into account demographic decline; • Strictly control informal construction and devise strategies for dealing with existing informal settlements; • Strengthen local level capacity for implementation of strategies dealing with existing informal settlements; • Support development of local air quality plans and citywide urban greening plans; • Prioritize urban regeneration and brownfield redevelopment over greenfield development; and • Promote cross-jurisdictional cooperation as a governance tool to aggregate capacity across lower capacity LSGs.
<p>Communal services and infrastructure: Underdeveloped waste management systems</p>	<ul style="list-style-type: none"> • At the national level, support the development of regional waste management plans and institutional systems for each city; • Support investments in containers and vehicles in the cities where waste collection service coverage is insufficient; • Adopt environmentally sound methods of waste treatment in the seven cities that rely on non-compliant municipal landfills and provide support to the cities to establish regional landfill arrangements; • Increase inspection controls and introduce penalties for the use of illegal dumpsites; • Increase the rate of recycling of household waste by providing convenient receptacles and offering incentives; • Promote cross-jurisdictional cooperation as a governance tool to aggregate capacity across lower capacity LSGs, and • Promote eco behavior through public campaigns.

Challenges	Recommendations
<p>Communal services and infrastructure:</p> <p>Deficiencies in <i>water supply, sewerage</i> and climate-resilient <i>drainage</i> systems</p>	<ul style="list-style-type: none"> • Prioritize infrastructure investments to expand water supply service coverage in urban areas where infrastructure is lacking; • Urgently draw and start implementing non-revenue water (NRW) reduction plans; • Implement sanitary protection of water sources as per national regulations; • Rehabilitate and expand sewerage systems and build new wastewater treatment plants in compliance with EU requirements; • Design and implement adequate urban stormwater drainage systems to cope with urban flooding; and • Develop and/or maintain an information management system to coordinate capital investment planning, service delivery, and lifecycle operation and maintenance of water systems.
<p>Communal services and infrastructure:</p> <p><i>Energy systems</i> that rely heavily on fossil fuels and are highly inefficient</p>	<ul style="list-style-type: none"> • Continue to replace fossil fuels with renewable energy sources for the generation of heat; • Rehabilitate DH transmission systems to reduce heat losses; • Expand the use of consumption-based tariffs to encourage conservation and energy-focused building rehabilitation; • Replace conventional lightbulbs with LED bulbs for public lighting; • Complete energy efficiency plans (for the cities that have not done so already) and regularly report progress to the central authorities; and • Promote cross-jurisdictional cooperation as a governance tool to aggregate capacity across lower capacity LSGs.
<p>Communal services and infrastructure:</p> <p><i>Urban mobility systems</i> that contribute significantly to carbon emissions and pose road safety concerns</p>	<ul style="list-style-type: none"> • Improve mobility data collection to support effective policy making; • Support development of integrated, multi-modal urban mobility plans and systems; • Increase investments in non-motorized transport infrastructure (e.g., sidewalks, crosswalks, bike lanes); • Convert aging public bus fleet to clean energy; • Consider local transport pricing policy reform to incentivize use of public transport; and • Establish fully functional local Road Safety Councils and invest in road infrastructure system improvements, maintenance and management to improve road safety
<p>Local finance:</p> <p>LSGs lack sufficient resources to finance needed green investments</p>	<ul style="list-style-type: none"> • At the national level, introduce a performance-based fiscal transfer system for LSGs to incentivize improved urban management and institutional performance; • Consider increasing the level of funding for general (unconditional) transfers to LSGs and the allocation of capital grants for investments that have country-wide benefits (such as sewage treatment and re-newable energy sources for district heating); • Review property tax rates and PUC tariffs and consider raising them; and • Improve LSG capacity to plan bankable projects, including compliance with capital investment planning requirements and procedures, to increase access to available external resources for green investments and utilize borrowing capacity.

1. INTRODUCTION: PURPOSE AND METHODOLOGY

Home to about 60 percent of the country's population, Serbian cities have the potential to drive green, resilient and sustainable growth. European regional and national policies support a green transition for Serbia and provide an impetus and opportunity to address Serbia's urban challenges. Regional policies include the EU's Green Deal, the Green Agenda for the Western Balkans and the Western Balkans Investment Framework.⁹ At the national level, the approval of the Sustainable Urban Development Strategy (SUDS) in 2019 marks the country's first time establishing a comprehensive and integrated program supporting the next stage of development of Serbian cities. SUDS 2030 seeks to balance socioeconomic development and improvement of communal infrastructure with environmental protection and climate action measures. However, the impact of SUDS, especially at the local level, remains limited, and SUDS and its Action Plan are currently under revision. At the same time, Serbian cities are facing challenges of urbanization and a new phase of industrialization, risking environmental degradation and contributing to inefficient and insufficient communal infrastructure and services as cities spatially expand. Exacerbated by climate change and population decline, these challenges are calling for an urgent shift towards green and resilient urban development.

This report provides a comparative analysis and assessment of the performance of 10 selected secondary and mid-sized Serbian cities (Kragujevac, Kraljevo, Leskovac, Niš, Novi Pazar, Novi Sad, Šabac, Sombor, Užice, and Zrenjanin) in four areas which play a key role in fostering green and resilient development at the local level: i) strategic planning and governance; ii) urban development; iii) communal services; and iv) local government finance. Findings presented in this report are based on the results of city assessments carried out within the scope of the World Bank's Green, Livable and Resilient Cities Program for Serbia, under the component that focuses on local level support.¹⁰ This report complements the World Bank's analytical reports for Serbia at the national level: *Sustainable Cities Serbia*, *Solid Waste Management Situation Analysis*, *Strengthening Sustainable Urban Development*, and a background report by COWI, all prepared within the Green, Resilient and Livable Cities framework. The report also complements the World Bank's *Local Infrastructure and Institutional Development (LIID)* Project in Serbia which aims is to improve the capacity of Serbian LSGs to develop and manage green, inclusive and resilient mobility infrastructure and to strengthen the technical skills of LSGs in terms of planning capabilities, operational performance and financial sustainability of investments. Some of the recommendations presented in this report could potentially be implemented through the LIID project.

This report provides a city-level assessment of the 10 selected cities and identifies targeted recommendations to address each city's specific challenges. Chapter 2 presents a brief overview of the demographic and economic profile of the 10 cities and is followed by Chapter 3 which focuses on strategic local governance and planning. Chapters 4 and 5 focus on urbanization trends of the 10 cities and discusses the performance of the

⁹ World Bank. 2023. Sustainable Cities Serbia: Unlocking the transformational potential of cities for the green transition.

¹⁰ Findings are based on information gathered from field visits and meetings with city representatives, a set of questionnaires completed by city representatives, follow-up discussions with city officials, review of documents provided by city management and staff, and desk research. The indicators for the assessments are inspired by the World Bank's Sustainable Cities Framework and the United Nations Office for Disaster Risk Reduction (UNDRR) Disaster Resilience Scorecard for Cities, adapted to the Serbian context and narrowed down to focus specifically on urban development.

cities with respect to communal services (e.g., solid waste management, water supply and sanitation, energy and urban mobility). Chapter 6 presents an analysis of the 10 cities with respect to sustainable local government finance. Disaster and climate change resilience are cross-cutting themes that are discussed within each of the four areas of analysis. Each chapter concludes with a set of recommendations to tackle the main challenges identified in the analysis of the 10 cities. Chapter 7 presents conclusions and a summary of the recommendations. The recommendations are intended to set the cities on a path towards more sustainable, green and resilient urban development to support achievement of national sustainability and climate goals.

2. DEMOGRAPHIC AND ECONOMIC PROFILE

At the national level, the population of Serbia is declining; however, decline is less significant in urban areas. For the last 10 years, Serbia's total population has declined by 7.5 percent. Over the past 20 years, the depopulation rate is more pronounced, at 11.3 percent, with decline being most striking in non-urban areas, as shown in Table 1.

Table 1. Population of Serbia 2002-2022

	Population 2002	Population 2011	Population 2022	Change 2011-2022, %	Change 2002-2022, %
Urban	4,218,479	4,271,872	4,120,782	-3.5	-2.3
Non-urban	3,279,522	2,914,990	2,526,221	-13.3	-23.0
Total	7,498,001	7,186,862	6,647,003	-7.5	-11.3

Source: Statistical Office of the Republic of Serbia (SORS)

Despite overall population decline, Serbian cities continue to be the engines for the country's economy. (See Box 1 for the formal definition of cities in Serbia.) Contributing an estimated 75 percent of the national Gross Value Added (GVA) and home to 74 percent of all jobs in the country,¹¹ indeed, urban areas are the economic hubs in Serbia. The disproportionately large role of cities in Serbia's economy can be explained by economic advantages or "agglomeration economies" fostered by the high density and spatial concentration of economic activity that manifests in urban areas.

This chapter presents a more granular analysis of demographic and economic trends in the 10 secondary and mid-sized cities to identify more precisely what the situation is on the ground. This chapter provides an understanding of demographic and economic trends as a necessary precursor for local governments to effectively plan their cities and support the development of policies to enable green, resilient and sustainable development.

Box 1. Cities as formally defined in Serbia

The Law on Territorial Organization of the Republic of Serbia (Official Gazette RS, No. 129/2007, 18/2016, 47/2018 i 9/2020) defines the administrative division of the country with Local self-governments (LSGs) as the lowest-level administrative subdivision. LSGs consist of both urban and rural (non-urban) settlements. In Serbia, cities are LSGs with a population higher than 100,000 or with specific administrative (i.e., regional centers) or historic characteristics, defined by the same law. A special characteristic in Serbia, cities consist of both urban and non-urban settlements.

The Statistical Office of the Republic of Serbia (SORS) is responsible for monitoring population changes within the following territorial units: *cities, municipalities, city municipalities and human settlements* (urban and rural). An urban settlement is a statistical unit (defined by SORS within an administrative "cadaster municipality") and differs from the EU functional urban area (used for producing SDG indicators by degree of urbanization), and from urban areas defined in planning documents.

Population data used in this report is based on information provided by SORS.

¹¹ COWI. 2023. Serbia Green, Livable and Resilient Cities.

2.1 DEMOGRAPHIC TRENDS

2.1.1 Predominantly declining city populations

Among the 10 analyzed cities, only Novi Sad and Novi Pazar have witnessed population increases (Table 2). Migration has been the key driver for the growth of Novi Sad, while Novi Pazar has had a natural population increase. Between 2011 and 2022, five cities registered a double-digit population decline.

Table 2. Population of the administrative areas of analyzed cities, 2002-2022

City	Population, 2002	Population, 2011	Population, 2022	Change 2002-2022, %	Change 2011-2022, %
Zrenjanin	132,051	123,362	105,722	-19.9	-14.3
Užice	83,022	78,040	69,997	-15.7	-10.3
Sombor	97,263	85,903	70,818	-27.2	-17.6
Šabac	122,893	115,884	105,432	-14.2	-9.0
Novi Sad	299,294	307,760	368,967	22.7	19.3
Novi Pazar	85,996	100,410	106,720	24.1	6.3
Niš	250,518	260,237	249,501	-0.4	-4.1
Leskovac	156,252	144,206	123,950	-20.7	-14.0
Kraljevo	121,707	125,488	110,196	-9.5	-12.2
Kragujevac	175,802	179,417	171,186	-2.6	-4.6

Source: SORS

Within the administrative boundaries of the cities facing population decline, non-urban settlements are witnessing greater decline than urban settlements. For the period 2011-2022, the depopulation rate was above 20 percent in non-urban settlements of four of the analyzed cities - Leskovac, Sombor, Užice, and Zrenjanin - reaching as high as 32 percent in Sombor. In the same period, the depopulation rate in urban settlements was above 10 percent in four cities, Kraljevo, Leskovac, Sombor, and Zrenjanin, while Niš and Kragujevac report lower rates of 2.5 percent and 3.0 percent, respectively. In the two growing cities (Novi Pazar and Novi Sad), the increase in the urban population was nearly twice as high or more than the increase in the rural population.

Table 3. Population dynamics in urban and other settlements of analyzed cities, 2011-2022

City	Population of the urban settlements, 2011	Population of the urban settlements, 2022	Change in urban settlements, 2011-2022, %	Population of other human settlements, 2011	Population of other human settlements, 2022	Change in other human settlements, 2011-2022, %
Zrenjanin	76,511	67,129	-12.3	46,851	38,593	-21.4
Užice	59,747	54,965	-8.0	18,293	15,032	-21.7
Sombor	47,623	41,814	-12.2	38,280	29,004	-32.0
Šabac	53,919	51,163	-5.1	61,965	54,269	-14.2
Novi Sad	250,439	306,702	22.5	57,321	62,265	7.9
Novi Pazar	66,527	71,462	7.4	33,883	35,258	3.9
Niš	187,544	182,797	-2.5	72,693	66,704	-9.0
Leskovac	65,289	58,338	-10.6	78,917	65,612	-20.3
Kraljevo	68,749	61,490	-10.6	56,739	48,706	-16.5
Kragujevac	150,835	146,315	-3.0	28,582	24,871	-14.9

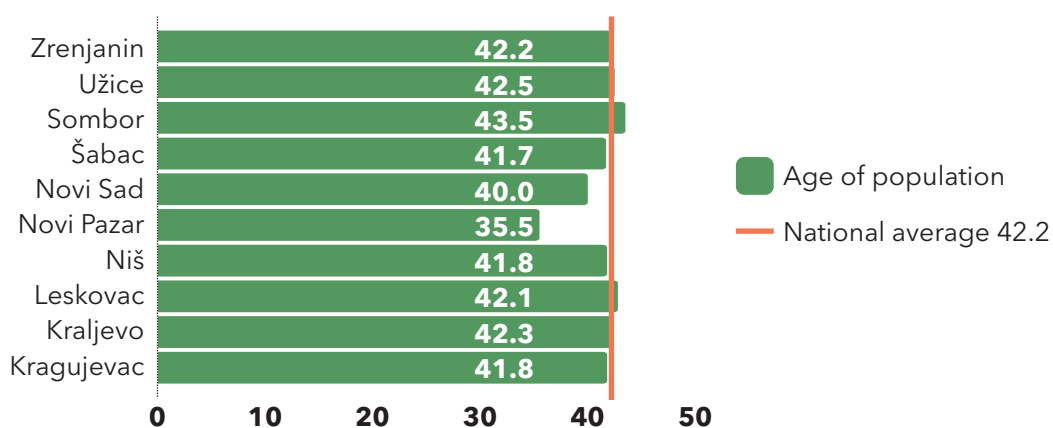
Source: SORS. Note: Urban settlement is a statistical unit defined by the SORS

The depopulation trend is expected to continue over the next two decades. According to the population projections of SORS, the number of inhabitants will continue to decrease in all analyzed cities, except for Novi Pazar and Novi Sad.

2.1.2 The average age of the population in the cities varies

At the national level, the population of Serbia is aging. The national average age rose from 40.2 years in 2002 to 42.2 in 2011, compared with the 41.6 EU average. Aging is more pronounced in suburban and rural settlements than in urban settlements with average ages of 43.6 and 41.3, respectively. The different age structures is mainly attributed to outmigration of younger populations to urban settlements.¹² The average age in five of the analyzed cities was below the national level: in Novi Pazar, Novi Sad, Niš, Kragujevac and Šabac (Figure 1).

Figure 1. Average age of population in analyzed cities

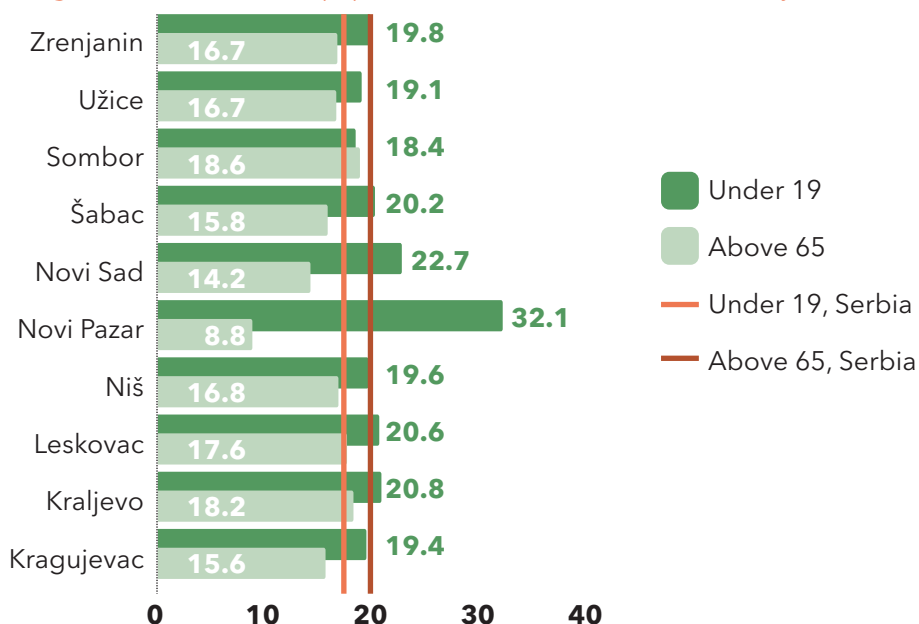


Source: SORS

The share of population above 65 years in Serbia is 17.4 percent and similar to the EU average of 17.8 percent. In combination with a declining population, an overall aging population can present a threat to the labor market and can further negatively impact economic development. In the analyzed cities, the highest shares of population above 65 years are in Sombor (18.6 percent), Kraljevo (18.2 percent) and Leskovac (17.6 percent), all three having a higher share than the national average (Figure 2). At the same time, Novi Pazar has the lowest share, at 8.8 percent. In all analyzed cities, the share of elderly people is higher in suburban and rural than in urban areas, exceeding 20 percent in Užice (24.8 percent), Kragujevac (22.1 percent), Kraljevo (20.8 percent) and Leskovac (20.1 percent). Novi Pazar has the youngest population, with 32.1 percent under the age of 19.

¹² According to data from the Statistical Office of Serbia (SORS).

Figure 2. Percent share of population under 19 and above 65 in analyzed cities

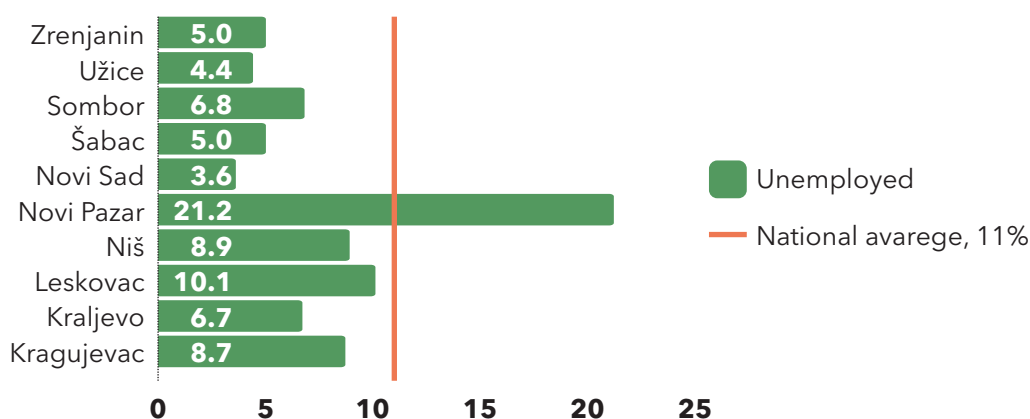


Source: SORS

2.2 CITY EMPLOYMENT STRUCTURE, SPECIALIZATION PROFILE AND PRODUCTIVITY

The 10 analyzed cities serve as economic hubs and job centers within Serbia. This is in part demonstrated by low levels of unemployment within the majority of the cities compared to the national average, with all analyzed cities but Novi Pazar below the national average of 11 percent unemployment in 2021.¹³ Novi Pazar, with the lowest share of working population, registered 21.2 percent unemployment rate in 2021 (Figure 3).

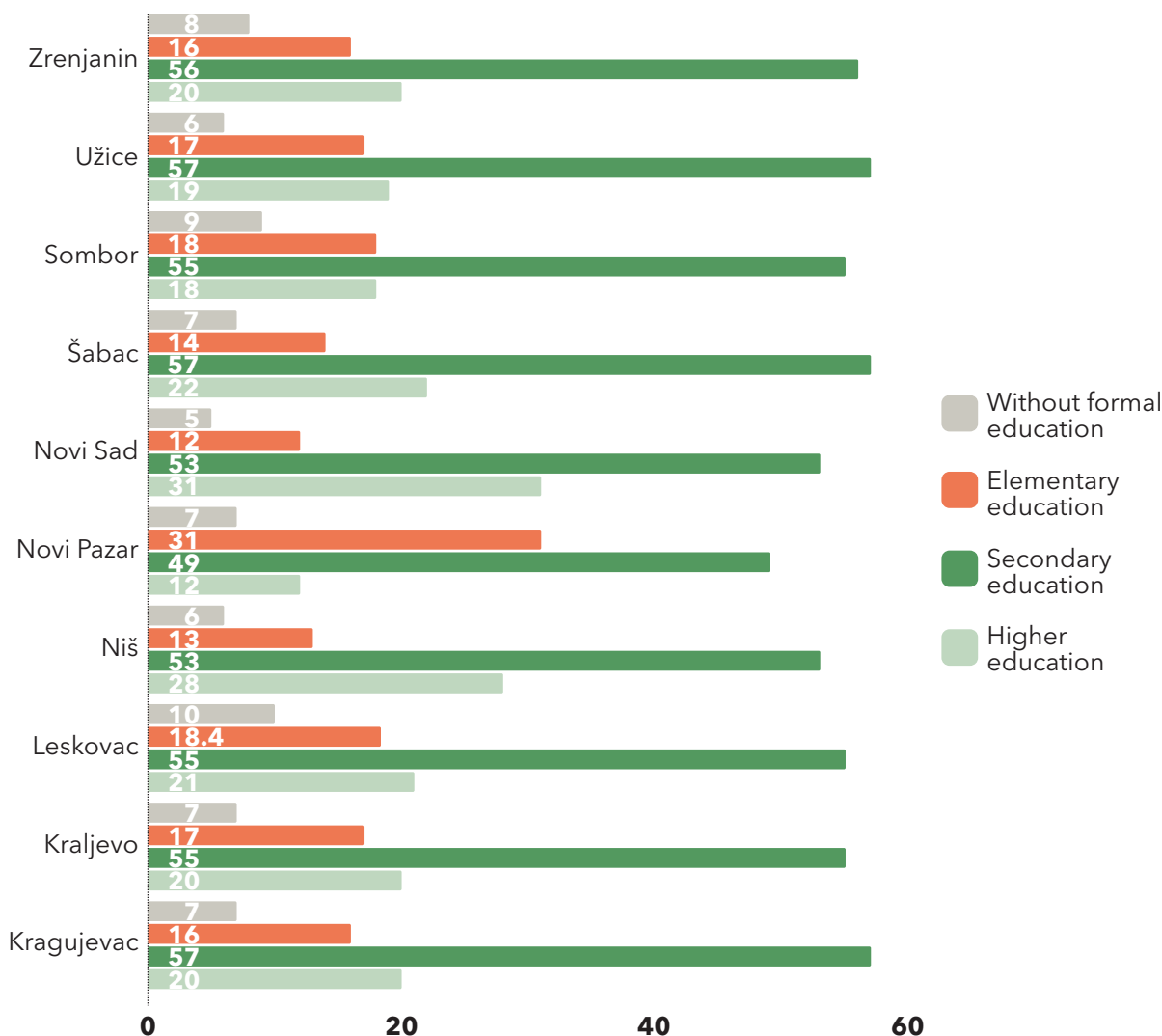
Figure 3. Unemployment rate in 10 analyzed cities, 2021



Source: SORS Analytical service, <https://rsjp.gov.rs/sr/analiticki-servis>.

The cities serve as centers for education and human capital development. In the urban settlements of all 10 analyzed cities, the share of population with secondary education is highest, followed by the share of population with higher education in all cities except for Novi Pazar and Sombor. In Novi Pazar, the share of population with elementary education is the highest among all the analyzed cities, reaching 30.7 percent. The share of population without formal education is highest in Leskovac (10.1 percent), while Kragujevac, Kraljevo, Sombor and Zrenjanin are also above the national average of 7 percent. In contrast, Novi Sad and Nis are the only two analyzed cities that have a greater share of population with higher education than the national average of 23.2 percent. (See Figure 4.)

Figure 4. Level of education in urban settlements of 10 analyzed cities (%)

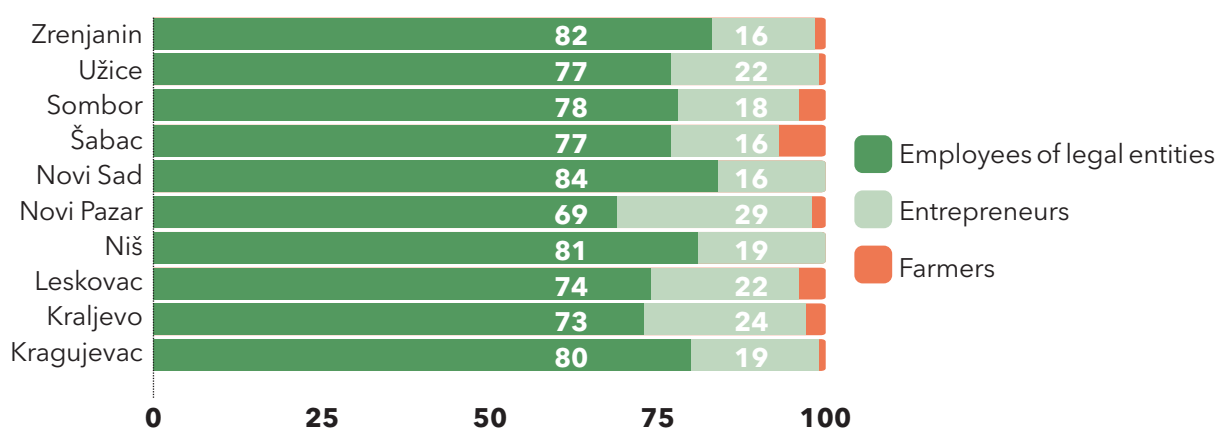


Source: SORS

The cities serve as centers for formal employment opportunities. In 2021, the majority of individuals in the analyzed cities were employed formally (by legal entities), with as low as 69 percent of formally employed individuals in Novi Pazar and as high as 84 percent in Novi Sad (Figure 5). At the same time, Novi Pazar registered the highest share of self-employed individuals, here identified as entrepreneurs and individual farmers,¹⁴ and Novi Sad registered the lowest share of self-employed. Novi Pazar registered a 28.5 percent share of entrepreneurs, followed by Kraljevo with 24.2 percent, Leskovac with 22.4 percent and Užice with 21.6 percent. The share of registered individual farmers was the highest in Šabac, at 7 percent, followed by Sombor with 4.8 percent and Leskovac with 3.5 percent.

¹⁴ Individual entrepreneurs and farmers are not considered as “legal entities” in SORS data.

Figure 5. Employment structure by percentage share, 2021



Source: SORS Analytical Service <https://rsjp.gov.rs/sr/analiticki-servis/>

The cities differ in terms of economic specialization and productivity. Five of the 10 cities specialize in labor-intensive sectors, namely Šabac, Novi Pazar, Sombor, Zrenjanin and Leskovac. Agriculture and food processing are the major economic activities in these cities. The high share of agricultural land and natural conditions are drivers for agricultural production in Šabac, Novi Pazar, Sombor and Zrenjanin, while food processing dominates in Leskovac. Three cities are specialized in the more productive knowledge intensive service sectors, namely Novi Sad, Niš and Kragujevac, with the largest shares of employees in the professional, science, innovation, and technical sectors. This could be attributed to their access to universities and a developed information technology (IT) industry within each city. Kraljevo and Užice aim to become once again industrial centers (as was the case in the Yugoslav times).

Key findings:

- All analyzed cities analyzed with the exceptions of Novi Sad and Novi Pazar have declining and aging populations. To support implementation of SUDS, cities will need to right-size infrastructure systems to support more efficient and sustainable delivery of communal services for their declining populations. Cities will also need to become “age ready” by including as part of their urban plans, services and infrastructure improvements that provide for ageing in place.
- The cities are centers of employment and differ in terms of specialization and productivity. Most of the cities have yet to fully leverage the process of structural transformation and become specialized in the more productive knowledge intensive service sectors.
- Strengthened national government support is needed to develop the cities as regional growth centers or poles based on their comparative economic advantages.

3. STRATEGIC PLANNING AND GOVERNANCE

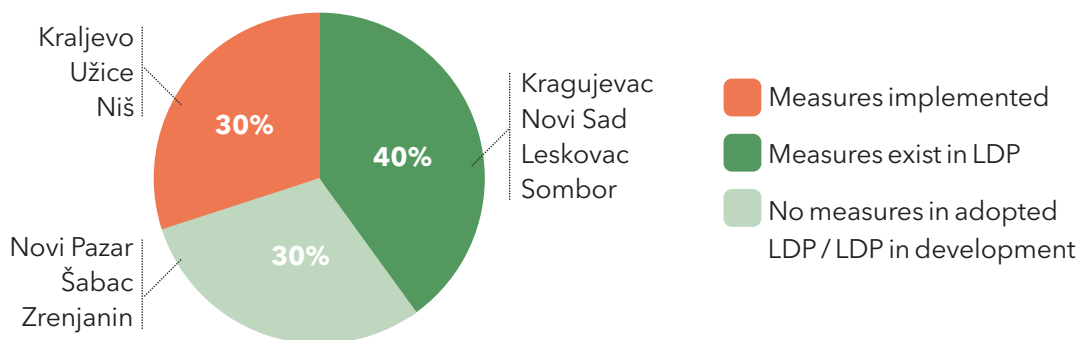
Serbia has a long tradition of spatial and urban planning reflected in its legal system.

The Law on Planning and Construction¹⁵ requires LSGs to adopt spatial and urban plans in up to 25-year cycles. The more recent Law on the Planning System (2018)¹⁶ requires LSGs to prepare local development plans (LDPs) with integrated development objectives. Each LSG with urban areas is recommended¹⁷ to prepare a local urban development strategy according to the Sustainable Urban Development Strategy (SUDS). Under SUDS, which is aligned with UN Habitat’s Agenda 2030 and the Sustainable Development Goals (SDGs), cities are expected to include specific objectives into a local urban development strategy and to monitor various indicators related to sustainable economic development, regulation of urban settlements, social well-being, and quality of the natural and urban environment. The LDPs and local urban development strategies should be consistent with local spatial and urban plans, as well as the national spatial plan.¹⁸

3.1 HARMONIZING LOCAL PLANS AND CENTRAL MANDATES

Compliance with national planning requirements and recommendations in the 10 cities is uneven. Seven of the analyzed cities have adopted (or are in the final stage of adopting) their LDPs.¹⁹ Only three cities (Novi Pazar, Šabac and Leskovac) have drafted local urban development strategies, while Kraljevo, Užice and Kragujevac have adopted their urban strategies before 2018. Niš is developing an Integrated Territorial Investments (ITI) Strategy which incorporates several smaller neighboring LSGs.

Figure 6. Green measures in the analyzed cities



Source: Authors’ interpretation based on data from analyzed

¹⁵ Law on Planning and Construction (“Official Gazette RS” No. 72/2009, 81/2009, 64/2010 - the Decision of the Constitutional Court, 24/2011, 121/2012, 42/2013 - the Decision of the Constitutional Court, 50/2013 - the Decision of the Constitutional Court, 98/2013 - the Decision of the Constitutional Court, 132/2014, 145/2014, 83/2018, 31/2019, 37/2019, laws 9/2020 and 52/2021.

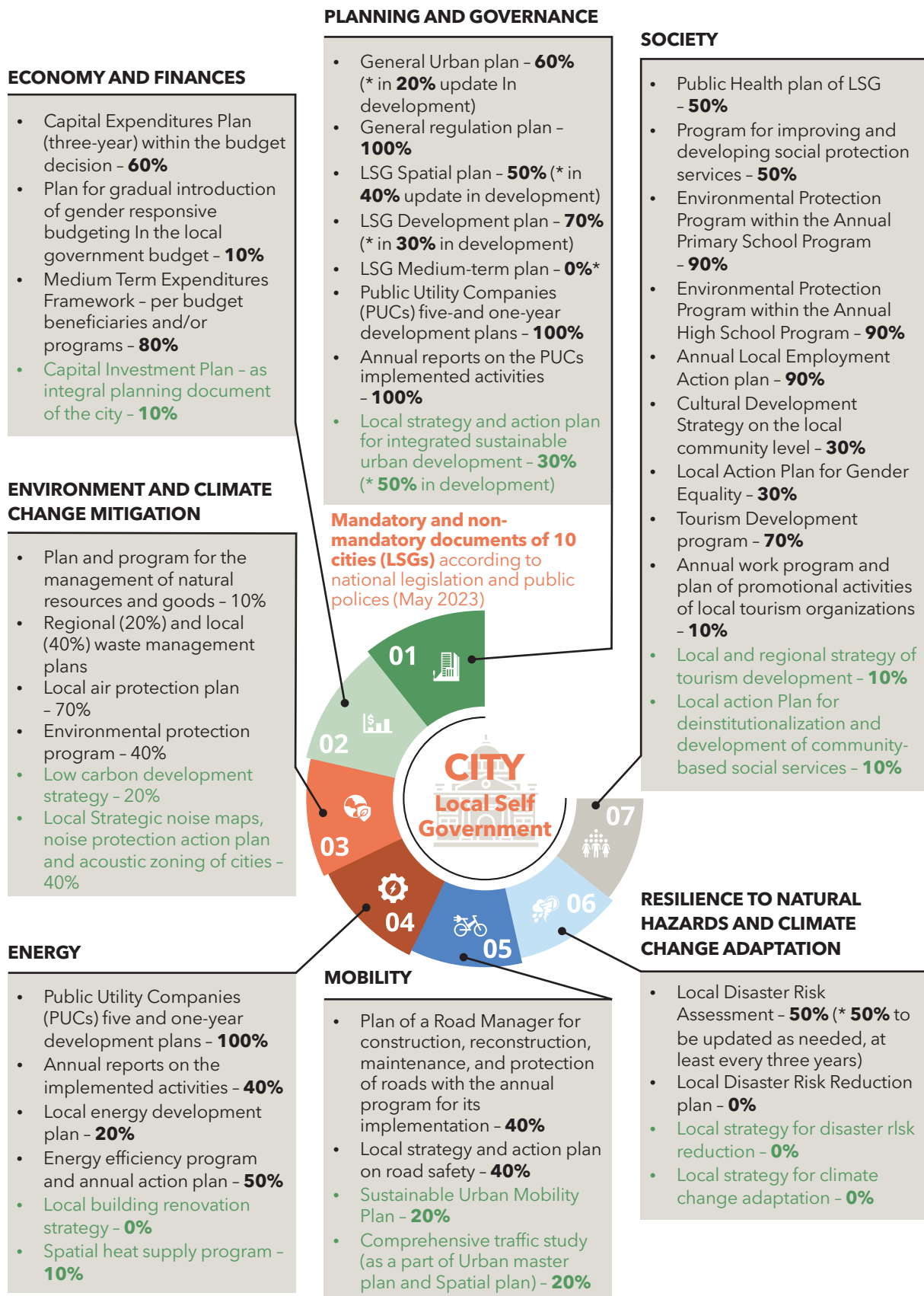
¹⁶ “Official Gazette RS” No. 30/2018.

¹⁷ Stated documents are not legally binding and are mostly donor driven as well as conducted with external technical support.

¹⁸ The Spatial Plan of the Republic of Serbia (SPRS) is expected to be adopted in 2023. The SPRS provides the long-term strategic framework for spatial development of the national territory. All other planning documents must be in accordance with the SPRS, including local spatial plans, and in theory, sectoral plans.

¹⁹ Niš, Leskovac, Kragujevac, Novi Pazar, Užice, Sombor have adopted LDPs, while Kraljevo is adjusting its draft LDP before adoption.

Figure 7. Status of completion of mandatory and non-mandatory planning documents



Mandatory documents of LSGs according to the national legislation - % of cities with valid documents (or * in development)

Non mandatory documents of LSGs according to the national policies or supply driven local policy documents - % of cities with valid documents (or * in development)

Source: Original elaboration of the GFA SEE team

Note: Mandatory documents are shown in black text and non-mandatory documents are shown in green text.

Most of the analyzed cities have nevertheless proceeded with green development projects or have incorporated such projects in their development plans. Kraljevo, Niš and Užice have already implemented some green measures, and Leskovac, Kragujevac, Sombor and Novi Sad have green measures planned (Figure 6). Green measures include planning for low carbon development, climate change adaptation and mitigation, brownfield revitalization, maintenance and improvement of green spaces and natural resources, and investments in sustainable urban mobility. Green solutions adopted in Novi Sad, Šabac and Kragujevac are detailed in Box 2 in Chapter 4.

At the same time, LSGs are overburdened by the numerous centrally imposed strategic, spatial, urban development and sectoral planning mandates, which overlap and, in some cases, contradict each other. Many of these issues arise from the EU accession process and the transposition of EU requirements into Serbian law. The national Low Carbon Development Strategy and the Climate Change Adaptation Program are a case in point: According to Serbia's 2021 Law on Climate Change, cities are required to prepare individual climate change plans.²⁰ In two of the analyzed cities, Užice and Sombor, climate change action plans have been drafted, primarily with donor support. Examples of such plans include sustainable energy and climate action plans, green city action plans, low carbon development local action plans, and local climate adaptation plans.²¹ But implementation has been poor because the various plans are not legally binding or because the LSG lacks implementation capacity. As shown in Figure 7, the central government expects LSGs to develop a multitude of mandatory and non-mandatory documents across various sectors. Figure 7 also shows that the 10 analyzed cities are not in full compliance with producing the mandatory documents let alone the non-mandatory documents.

Technical assistance would help improve the quality and coordination of the various urban plans and boost implementation capacity. Well established cooperation between LSGs within the country, and between local governments regionally and further abroad has been found to raise local capacity for strategic planning. National associations like the Standing Conference of Towns and Municipalities (SCTM) and the National Alliance for Local Economic Development (NALED), regional development agencies within Serbia, and regional initiatives for waste, water and flood management often facilitate knowledge sharing events in support of development of local strategies and project implementation, hand in hand with local governmental staff. LSGs may benefit from assistance focused on solving specific local challenges rather than preparing strategies or plans that primarily serve to obtain donor support but that do not address their city-specific needs and urban challenges. This has been observed to be the case in the 10 analyzed cities.

3.2 DISASTER RISK MANAGEMENT

In Serbia, the main local resilience planning documents are disaster risk assessments (DRAs) and disaster risk reduction (DRR) plans. All 10 analyzed cities have DRAs, although half of the cities (Kragujevac, Kraljevo, Sombor, Šabac and Zrenjanin) have not complied with the mandatory three-year DRA update; thus, their plans are outdated. None of the analyzed cities have implemented a DRR plan, even though they have been under a legal obligation to do so since 2019; only Kraljevo has a draft DRR Plan for 2021–2023, but it has not been formally adopted and implemented.

²⁰ Law on Climate Change ("Official Gazette of RS", No. 26/2021).

²¹ The City of Belgrade enacted the Sustainable Energy and Climate Action Plan (SECAP) as well as the Green City Action Plan (GCAP), while several other cities are in the process of drafting theirs: Novi Sad (SECAP and GCAP), Užice (climate change adaptation plan is being drafted), Bečej (low carbon development action plan enacted), etc.

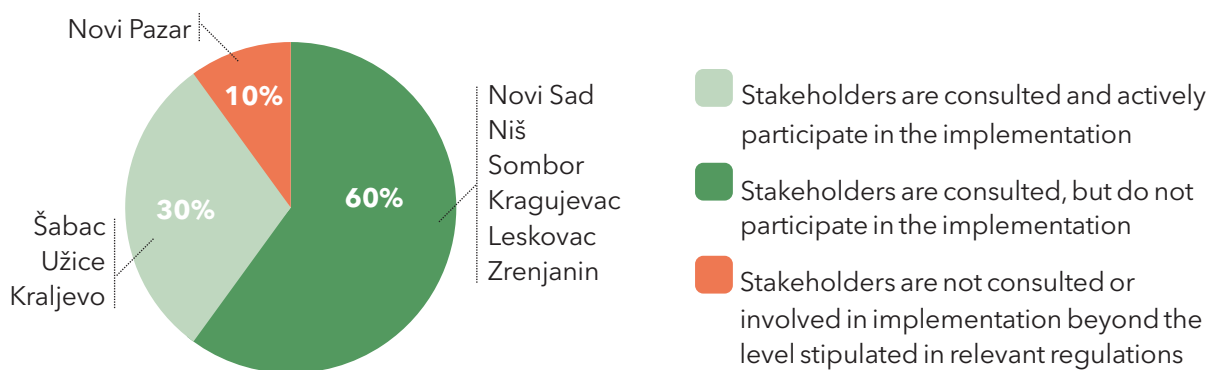
Protective river flooding infrastructure is insufficient, and measures for flood mitigation and prevention for Category II rivers²² are not included in urban planning documents in any of the analyzed cities. Only Kragujevac and Zrenjanin have reported sufficient infrastructure to match flood hazards anticipated in the most probable and most severe disaster scenarios analyzed in the DRAs. All other analyzed cities reported the need to both expand the existing protective flood infrastructure and to improve its maintenance.

The importance of resilient critical infrastructure (CI) needs further elaboration and comprehension at all levels. CI includes information communication technology (ICT), water supply and sanitation (WSS), electrical supply, and road networks. However, SWM is not considered as CI by the current legislation in Serbia. Enhancement and mutual alignment of primary and secondary legislation with clear definition of roles and responsibilities for CI at the national and local levels is urgently needed. Analysis of the 10 cities found that eight of the cities assured the functional continuity of up to two out of four CI services. Kragujevac, Leskovac, Niš, Novi Pazar, Novi Sad, Šabac, Užice and Zrenjanin assured the functional continuity of electrical supply, and six cities (Leskovac, Niš, Novi Pazar, Novi Sad, Sombor and Šabac) assured the functional continuity of WSS services. Novi Sad assured the functional continuity of all four CI services and Novi Pazar assured the functional continuity of three CI services (ICT, WSS and electrical supply).

3.3. SMART AND PARTICIPATORY GOVERNANCE

The levels of transparency and participation in the planning process in the 10 cities are in line with (or above) national legal requirements. In Užice, Kraljevo, Šabac and Novi Sad, consultations for the preparation of local plans, development strategies for central city areas, and LDPs involve citizens and local stakeholders, from public enterprises, the private sector, and professional and citizen associations (Figure 8). In Novi Pazar, consultations and involvement of local stakeholders are implemented in compliance with national planning regulations,²³ but there is willingness among city administrations to engage citizens more meaningfully in line with central government recommendations and international best practices.²⁴ LSGs are mandated to provide transparent access to information on budgetary allocations and they also encourage the public to engage and propose projects for financing through implementing a participatory strategic planning and budgeting process.

Figure 8. Public participation in the development and implementation of local plans



Source: Authors' interpretation based on data from analyzed cities

²² Mandated as LSG responsibility according to the Law on Water (Official Gazette of the RS, 30/2010, 93/2012, 95/2018)

²³ Source: Questionnaire with partner cities and from discussions during the workshop in the city of Kraljevo.

²⁴ I.e., in accordance with: the Sustainable Development Strategy formation process; the Planning System Law (2018), Regulation on the methodology of public policy governance; analysis of the effects of public policies and regulations and the content of individual public policy documents (2019); Local Self-government Law (2018); Additional Protocol to the European Charter of Local Self-Government on the right to participate in the affairs of a local authority (2018); and the Sustainable Urban Development Strategy of the RS until 2030 (2019).

With respect to gender equality in planning and governance, not all cities have fulfilled their responsibilities. Most of the analyzed cities have adopted or are preparing a Local Action Plan for Gender Equality, and gender-responsible budgeting is partially implemented in seven of the 10 cities (Novi Sad, Niš, Užice, Kragujevac, Zrenjanin, Sombor, and Šabac).

Smart services are being implemented in half of the analyzed cities either by respective LSGs or by local public utility companies. While there is no legal obligation for LSGs to implement smart e-services, they have been introduced on an ad-hoc basis, according to local needs and available budget. However, their implementation is often fragmented across local services. Kragujevac, Kraljevo, Niš, Novi Sad and Zrenjanin have local smart city services available both online and as mobile applications primarily for e-government services and for “System 48h,”²⁵ which enables direct communication with citizens. Smart services in these cities also include weather, air pollution, and waste management information provided by public utility companies (PUC) or collected from citizens via mobile applications.

In the 10 analyzed cities, geographic information systems (GIS) are mainly used as the open source of planning documents. Under the Law on Planning and Construction, LSGs must establish spatial information systems, but GIS development has mainly been initiated and implemented with the support of donors and only approximately one-third of Serbia’s LSGs utilize GIS. However, 9 out of the analyzed cities utilize GIS. Novi Pazar is the only city without a system. Leskovac, Kraljevo, Kragujevac, Zrenjanin, Novi Sad, and Šabac utilize GIS primarily internally for the preparation and analysis of planning documentation, while Niš, Užice, and Šabac utilize GIS for both internal and external purposes, including for resolving issues raised by the public.²⁶ While geographic information systems have been developed to a certain extent in the majority of the analyzed cities and have adequate technical support (both in software and staff), LSGs lack centralized city databases due to poor cooperation among city administration sectors and public enterprises. A centralized digital platform for inter-agency coordination would improve service planning and delivery.

Monitoring and publishing indicators for local urban development introduced by such national acts as the SUDS seems to be difficult for LSGs. Guidelines for local data gathering would help LSGs not only to provide nationally mandated information but also increase transparency and make it easier to evaluate results at the local level. Support for LSG staff to acquire relevant data and knowledge sharing skills is vital.

3.4 RECOMMENDATIONS

Strategic planning and governance challenges and reform priorities vary among the 10 analyzed cities. Mandatory long-term local spatial and urban plans do not take into account sectoral plans and results of disaster risk assessments, either due to lack of coordination and integrated planning among sectors, or due to different implementation timelines or capacity limitations. The following recommendations therefore apply selectively according to local conditions.

- At the national level, streamline the planning system by simplifying administrative requirements for mandatory and optional planning documents, adjusting to realities on the ground (at the LSG level).
- Support horizontal and vertical cooperation to ensure alignment between national and local plans (including spatial, urban development and sectoral plans).

²⁵ System 48h is a grievance redressal mechanism that elicits the first response from city authorities within 48 hours and supports swiftly addressing issues raised by citizens across all public companies in the city.

²⁶ In Niš, Užice, and Šabac, GIS is utilized for management of communal infrastructure and the land cadaster, as well as for urban planning purposes.

- Improve capacity of LSGs to integrate land use and sectoral plans to promote sustainable development through coordinated investments.
- Develop and implement climate resilient and risk-informed urban plans.
- Develop and maintain updated disaster risk assessments and disaster risk reduction plans and take steps to ensure the continuity of critical infrastructure in the event of disasters.
- Improve the quality of data, to support evidence-based planning and investment decision-making and to monitor performance indicators. This includes developing and enhancing GIS systems and developing a digital platform for inter-agency coordination to improve service planning and delivery.

4. GREEN URBAN DEVELOPMENT

Serbia's urban development goals are primarily defined in the Sustainable Urban Development Strategy to 2030 (SUDS) and its Action Plan, currently under revision.

SUDS seeks a balance between environmental protection and economic and social development by promoting the improvement of communal infrastructure, introducing renewable energy sources, and increasing energy efficiency and climate change adaptation measures. A large-scale program of brownfield revitalization and reuse of neglected urban land, together with the prevention of illegal construction, are proposed to limit the expansion of urbanized areas and retain valuable unbuilt and agricultural land. SUDS promotes the historic preservation and rehabilitation of urban centers, the maintenance of public and green spaces and the establishment of functional connections between built-up areas and green spaces.

While SUDS demonstrates Serbia's commitment to green urban development, analysis of the 10 cities reveals challenges to achieving the goals under the national strategy.

Among the main challenges are unsustainable growth of built-up areas and air quality, which negatively impact urban livability. This chapter provides an overview of the green urban development challenges in the analyzed cities and recommendations to address the challenges.

4.1 GREEN URBAN DEVELOPMENT CHALLENGES

4.1.1 Unsustainable and unequitable spatial growth

While most of the analyzed cities are experiencing population decline, data shows that significant development is taking place in the cities, signaling imbalanced urban growth. Between 2018 and 2022, the number of construction permits issued in the 10 cities has increased significantly while the majority of the cities have been losing population (Figure 9).²⁷ Eight of the 10 cities have witnessed significant residential and infrastructure construction.

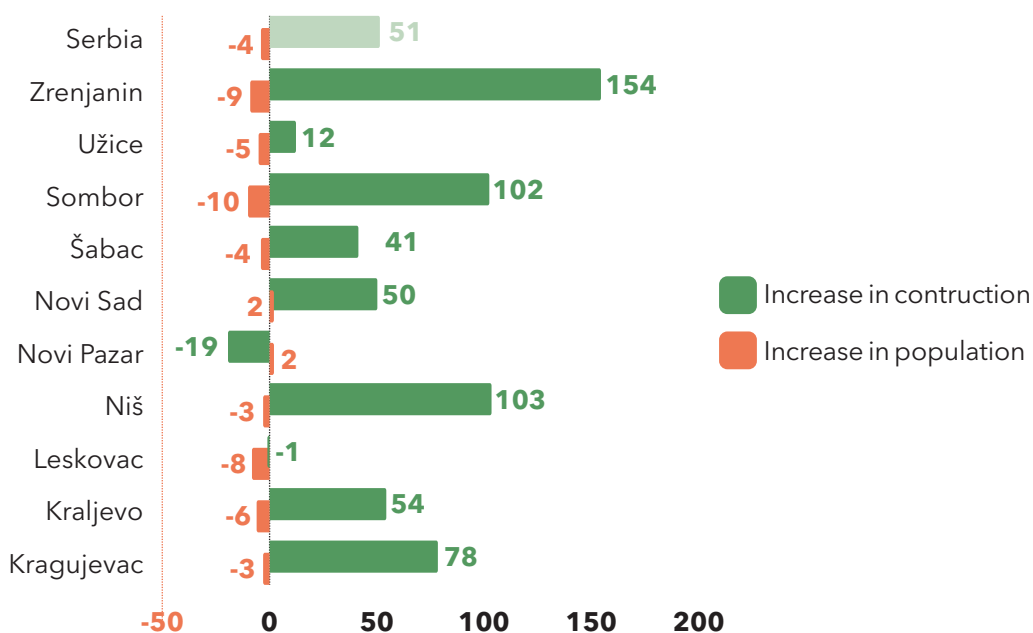
Additional data demonstrates that local governments are planning for expansion of their built-up areas, despite declining population growth. Figure 10 shows a 10 percent or higher increase in land zoned for urban uses in eight of the 10 analyzed cities over the period 2010 to 2022. The newly zoned urban areas tend to sprawl and have low-density settlements that are not adequately served by physical and social infrastructure. In Novi Pazar, the amount of land zoned for urban uses more than doubled.²⁸

Unsustainable spatial growth of cities is attributed to several factors, including the promotion of greenfield development over infill development. Several of the analyzed cities have incorporated and converted agricultural land to land for development per existing zoning plans. In Kragujevac and Novi Pazar, the boundaries of the new areas zoned for development have been significantly expanded around the perimeter of urban settlements or along local roads, to formalize informal settlements and provide locations for future greenfield development. According to planning documents, industrial production is still an argument for rezoning undeveloped land on the outskirts of cities. Cities are competing in attracting foreign investment to greenfield sites but most of the planned industrial sites lack roads and infrastructure (e.g., in Novi Pazar, Kragujevac, Kraljevo, and Užice).

²⁷ Between 2018 and 2022, the number of construction permits issued in the 10 cities totaled 27,290 (22.1 percent of all permits in Serbia) with most permits issued for buildings (78.3 percent). During the same period, the population in assessed cities declined by 3 percent (46,232) which is slower than national trend of 4.2 percent. This contrast is particularly striking in some of the analyzed cities, such as Zrenjanin, Niš and Sombor, where 6,571 building permits were issued while the cities' total populations shrank by 5.5 percent.

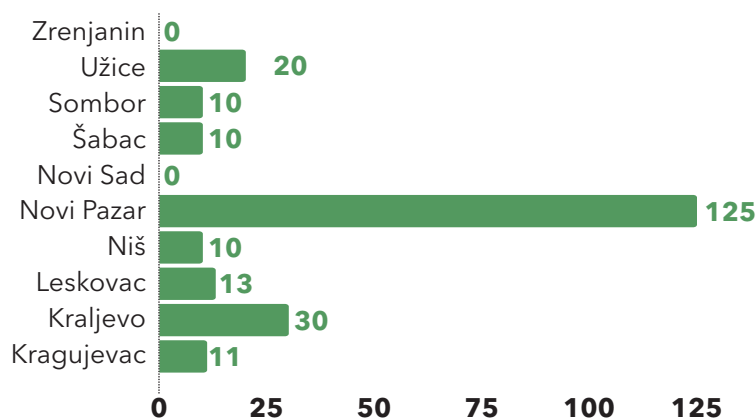
²⁸ Note that the figures include land rezoned for industrial purposes.

Figure 9. Percent change of construction permits and population in 2018-2022 period



Source: SORS

Figure 10. Planned percentage increase in construction land area in GUP in period 2009-2022



Source: Authors' elaboration based on GUPs

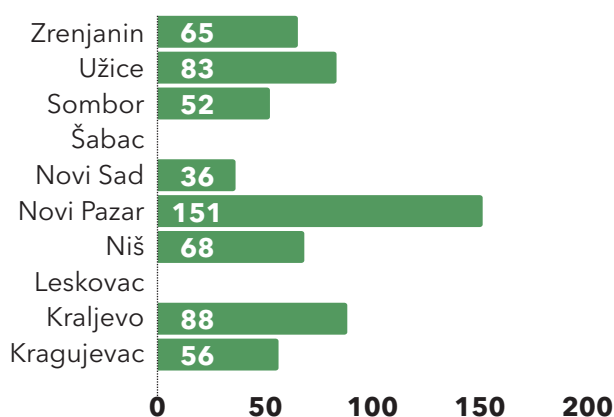
A contributing factor to unsustainable and unequitable spatial growth in the analyzed cities is a lack of affordable housing. Serbian cities have been beset by rampant illegal construction of homes since the 1990s, due to the limited supply of affordable housing. Informal settlements (mostly located on publicly-owned parcels in peripheral urban areas), with residents lacking title, often lack access to drinking water, electricity and sewerage. Over one third of the country's population that lives in substandard settlements is concentrated in three cities: Belgrade (43,944), Leskovac (11,830) and Niš (8,409). While the total population in the majority of the analyzed cities is declining, the cities have seen an influx of low-income households from rural areas, along with internally displaced persons (IDPs) and other socially vulnerable groups, while the supply of affordable housing is deficient. Much of the new housing is priced beyond the means of the local population.²⁹

²⁹ In the year 2022, the average price of a square meter of newly constructed apartment was 2.8 times the average net salary.

4.1.2 Deteriorating air quality

In addition to unsustainable spatial growth, deteriorating air quality in the analyzed cities also impedes green urban development. Poor air quality has become one of the major environmental challenges in the analyzed cities, with eight of the cities confirming records of Category III-level air pollution,³⁰ and all of the cities exceeding the maximum allowed levels of suspended particles PM_{2.5} and PM₁₀ are exceeded in all cities, particularly during the heating season (Figure 11). The main sources of air pollution are attributed to a lack of climate-smart communal services, discussed further in Chapter 5. Major sources of air pollution include solid heating fuel sources (i.e., coal, wood, etc.), automobile emissions (exacerbated by traffic congestion and the age of the car fleet) and inadequate solid waste management (for example, dumping of waste via illegal landfills).

Figure 11. Number of days with PM₁₀ in excess of 50 micrograms/m³ in period 2009-2022



Source: SEPA (Annual Report on the Air Quality in Serbia, 2022)

Note: Data for Šabac and Leskovac not available

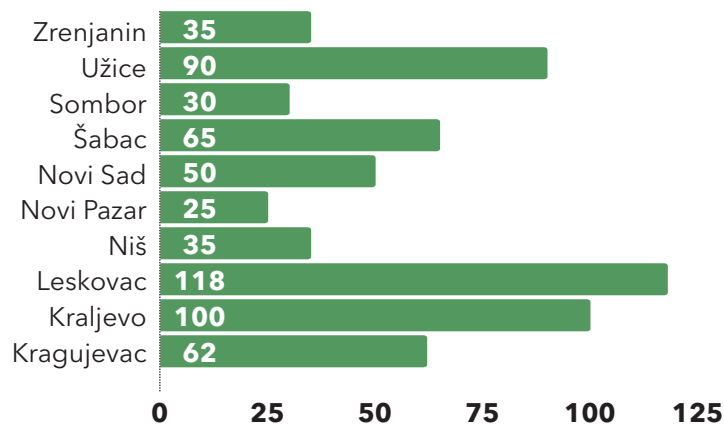
At the local level, actions to address poor air quality in the 10 analyzed cities has been minimal thus far. To monitor air quality, the cities currently rely on the national network of air quality control stations. Only Novi Sad and Kragujevac have adopted local air quality plans. A few cities, such as Užice and Novi Sad, have started awareness raising campaigns and adopted measures supporting non-motorized transport, while Kraljevo and Šabac have started increasing and expanding green spaces as another measure to improve air quality and livability in cities, which is described in the next section.

4.2 GREEN URBAN DEVELOPMENT MEASURES

Given the spatial and air quality challenges, some of the analyzed cities have taken measures to tackle the challenges and foster greener urban development. Several of the analyzed cities are planning to expand parks and improve their green transport infrastructure, which would serve to improve air quality. According to their respective planning documents, Užice and Leskovac plan to increase their green areas by more than 90 percent, while Šabac, Kragujevac and Novi Sad plan to increase public and green spaces by at least 50 percent (see Figure 12). The other five analyzed cities plan for increases between 25 and 50 percent. Two cities are implementing their measures that support improved air quality and green urban development: Kraljevo is developing green belts along riverbanks linked to the main city square and pedestrian zones, while Šabac is focused on improvement of intra-block greenery and had introduced green corridors. As described in Box 2, several of the cities have ambitious plans to expand bike paths and turn former military sites and landfills into parks.

³⁰ According to the Law on Air Protection ("Official gazette RS" No. 36/2009, 10/2013 and 26/2021), category III of air pollution describes excessively polluted air where the tolerance values for one or more pollutants are exceeded.

Figure 12. Planned increase in public and green spaces in construction land area in GUPs (%)

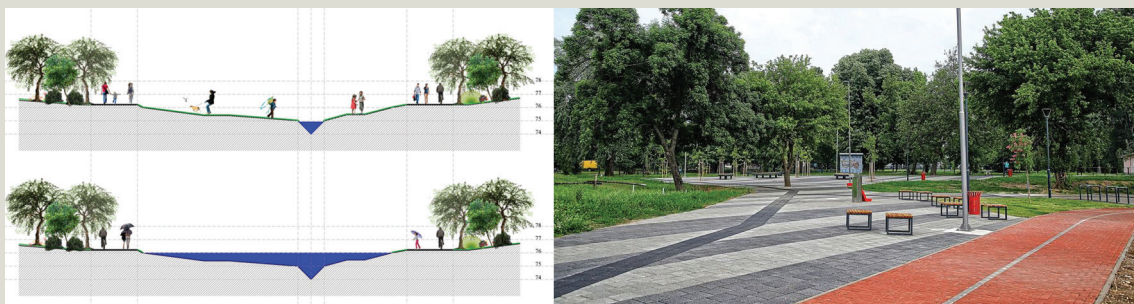


Source: Authors' interpretation based on data from analyzed cities (%)

Box 2. Greening of Cities

Novi Sad is constructing a Botanical Garden in Petrovaradin which will be connected to the city by a new pedestrian and bicycle bridge on the pillars of the former Franz Josef Railway Bridge. The City also plans to build 200 km of new bike paths complementing the existing 100 km of paths and connecting them to international bicycle routes. Three new city parks are planned and existing parks will be connected by pedestrian walkways. Under the "Let's turn the neighborhood into a park" program, greenery in apartment block areas have been improved in cooperation with residents and the Institute for Nature Protection.

Šabac has applied nature-based solutions to raise city resilience in the Plan of Detailed Regulation (PDR) for Sava Park. The city turned 294 ha of the floodplain between the city and the Sava River into a park to accumulate water through a system of canals, pumps and artificial lakes. A former landfill, military barracks and a railway line were regenerated, with expected positive impacts on climate. Roads were transformed into green corridors to extend the park into the urban fabric and the city core.



Canals of the Sava Park. Source: PDR of the Sava Park, Šabac New pedestrian and biking paths in Šabac

Kragujevac is the first city in Serbia that has restricted the construction of buildings without planting trees. Investors must plant 10 new trees for every newly built building of up to 1,000 square meters and 10 more trees for every additional 500 square meters. The requirements were made upon the initiative of the city mayor as part of the "Restore the breath to nature - plant a tree" program which took effect in September 2022.

To support more sustainable spatial development and improved urban livability, the cities are taking steps to support urban regeneration and brownfield development. All 10 analyzed cities have plans and programs for the rehabilitation of urban centers and other public spaces. The focus has been on the regeneration of historic central city areas, where efforts include the rehabilitation of old dilapidated buildings, the expansion of green areas

as well as re-routing traffic from the urban core. Niš, Užice and Šabac have also focused on revitalizing their riverbank areas. All 10 cities are encouraging economic growth through urban regeneration and brownfield development. In University cities with R&D and IT sectors, like Kragujevac, Niš and Novi Sad, between 4 and 7.4 percent of employees in new industries are contributing to urban renewal and use existing built resources for economic development. Former industrial sites are planned for conversion to new development in the wider urban area in Sombor, and transformation and reuse of former factory complexes have been planned in urban areas of Niš, Kraljevo and Zrenjanin. Some examples are described in Box 3.

Box 3. Steps toward better brownfield revitalization

The **City of Kragujevac** organized an international design competition for the urban renewal and rehabilitation of the cultural-historical complex “Military Technical Institute in Kragujevac” (Knežev arsenal area). The city has already implemented the revitalization of the northwest of the central city zone and the former “Zastava” car factory complex.

Leskovac (through the company Leskovac Fair Ltd.) has been implementing a large-scale revitalization project, building a business complex, shopping center, Garni Hotel and other commercial facilities on a former Fair site with a total area of over 21,000 m².

Novi Sad has revitalized three industrial heritage sites as part of the European Capital of Culture project (Network of Culture Stations, figures below show two of the sites, Svilara and Liman) and is considering former military complexes for their urban regeneration potential.



Novi Sad Culture Stations Svilara and Liman



Source: <https://opens.kulturnestanice.rs>

There is room to expand brownfield development as a tool to support sustainable urban development in the analyzed cities. While new brownfield sites are being identified and included in planning documents, only Kragujevac and Leskovac have up-to-date brownfield databases. Sombor and Novi Sad are in the process of updating their databases. Improved data management would support a more robust and strategic brownfield development program in the cities. The national brownfield sites database proposed in the Draft Amendments to the Law on Planning and Construction is expected to make LSG inputs mandatory, requiring them to take stock of their brownfield sites to enhance opportunities for investment and revitalization in all Serbian cities.

4.3 RECOMMENDATIONS

Analysis of the 10 cities shows that in large part, the cities are experiencing unsustainable spatial growth despite population decline, as well as deteriorating air quality. Reforms are necessary to limit further spatial expansion and to support infill development. National level contributions in this area may include a stricter policy and prompt implementation of restrictions on any illegal construction (and further legalization), but also the introduction of an affordable housing strategy and stronger support to LSGs to implement sustainable urban development measures such as brownfield revitalization. The cities should extend infrastructure services to existing informal settlements wherever this is feasible. The LSGs should continue to support increasing the supply of housing and ensure that land that is zoned for housing is equipped with infrastructure and is only in areas where development is appropriate, limiting further spatial expansion as much as possible.

The priority recommendations for the analyzed cities to support green urban development are:

- Support zoning that aligns spatial growth scenarios with population projections, revising planned expansion of build-up areas where necessary;
- Support affordable housing policy at the local level that would complement strategies for dealing with existing informal settlements;
- Support development of local air quality plans and citywide urban greening plans; and
- Prioritize urban regeneration and brownfield redevelopment over greenfield development.

5. CLIMATE-SMART COMMUNAL SERVICES AND INFRASTRUCTURE

Sustainable urban development of Serbian cities is directly related to the quality and efficiency of communal infrastructure and services. City mandates are quite broad but exclude energy supply, construction and maintenance of regional roads and air quality control. In these areas, cities are obliged to align local measures with policies and decisions of the central government. Cities are responsible for solid waste management, water supply and sanitation, stormwater drainage, district heating, local road construction and maintenance, and public transport. In managing and providing communal services, cities insufficiently address disaster and climate-related impacts on services through climate change adaptation and disaster risk reduction plans, which are required of cities by law.

This chapter provides an assessment of communal infrastructure systems and services with the highest impact on the environment in the 10 analyzed cities: solid waste management, water supply and sanitation, energy and urban mobility. A deep dive on each communal service sector compares the quality of services in the analyzed cities in the context of climate resilience and provides recommendations for more climate-smart systems and services.

5.1 SOLID WASTE MANAGEMENT

Serbia has endorsed the Green Agenda for the Western Balkans,³¹ which focuses on promoting carbon neutrality and a circular economy; but the mainstreaming, enforcement and implementation of circularity remain a challenge. Circularity is rooted in reduced use of new materials through reuse and less resource intensive products and services, as well as recovering resources from waste. In 2021, resource productivity in Serbia, which quantifies the relation between economic activity (expressed by the gross domestic product, GDP) and the consumption of material resources (measured as domestic material consumption, DMC), equaled 0.7 PPS³² per kilogram, was significantly lower than the EU average of 2.3 PPS per kilogram.³³ In 2022, Serbia adopted the Program for Circular Economy 2022-2024 to improve the efficiency of resource use in its mostly linear economy, where raw materials are collected and transformed into products that consumers use until discarding them as waste, with little concern for their ecological footprint and consequences. In 2021, the circular material use rate, which measures the contribution of recycled materials to the overall materials used, was just 1.7 percent for Serbia's economy, while the EU average was 11.7 percent.³⁴ Implementation of circular practices is expected to reduce the amount of waste generated by the processing industry, currently at 0.26 kg per euro of GDP.

³¹ <https://www.rcc.int/download/docs/Leaders%20Declaration%20on%20the%20Green%20Agenda%20for%20the%20WB.pdf/196c92cf0534f629d43c460079809b20.pdf>

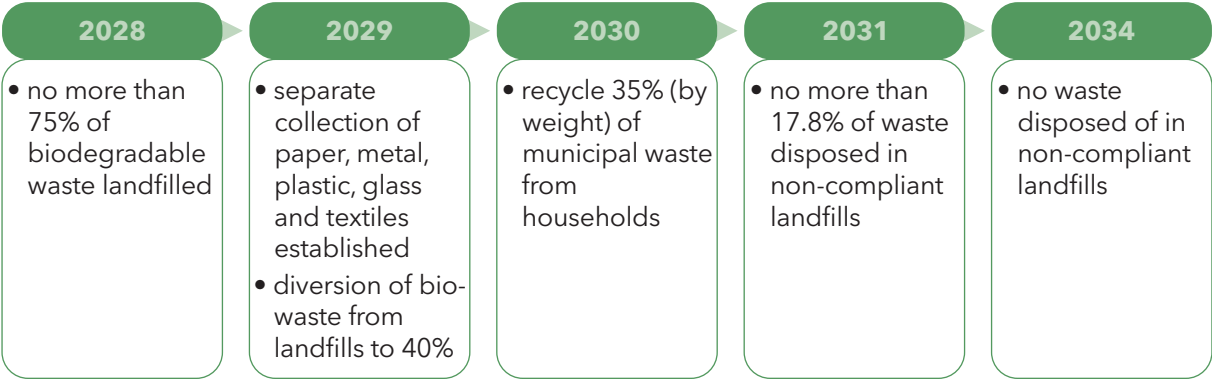
³² PPS stands for purchasing power standards, which is the technical term used by Eurostat for the common currency in which national accounts are aggregated are expressed when adjusted for price level differences using purchasing power parity (PPP).

³³ https://ec.europa.eu/eurostat/statistics-explained/index.php?title=File:Resource_productivity,_GDP_and_DMC,_by_country,_2021.png.

³⁴ <https://publikacije.stat.gov.rs/G2022/pdf/G20225688.pdf>, page 41-42.

Serbia generates 2.87 million tons of municipal waste annually, only a fraction of which is disposed of in an environmentally safe manner. The national Waste Management Program 2022-2031³⁵ and its Action Plan³⁶ provide guidance for municipal waste management and set national targets for waste separation and landfill compliance, which are summarized in Figure 13. The strategic program envisaged 26 regional sanitary landfills; however, only 10 sanitary landfills have been constructed to date which collected just 30 percent of generated municipal waste in 2021. More than 40 percent³⁷ of waste is disposed of in non-compliant municipal landfills, while 12 percent of municipal waste is not collected and disposed of by public utility companies (PUCs) but instead ends up in illegal dumpsites. The national average recycling rate of municipal waste in 2021 was 16.8 percent,³⁸ but less than 2 percent of recycled waste came from households.³⁹

Figure 13. National targets in waste management



Source: WMP 2021-2030

Insufficient waste treatment infrastructure is also problematic in Serbia, with more than 80 percent of generated waste disposed of in landfills without any pretreatment, which is unsustainable in the medium term. There are only a few municipal waste separation plants, one composting plant in Subotica, and a new incineration plant in Belgrade that is under trial operation at the time of writing this report (February 2023). Given that the disposal of one ton of untreated waste results in the emission of 0.83 tons CO2 eq, the projected emissions of Serbia’s 29.2 million tons of waste disposed in the baseline scenario in 2030 is 24.2 million tons CO2 eq.⁴⁰ Serbia’s current waste management system is, therefore, unsustainable, considering the high and increasing negative impact it has on the environment and climate change. The urgent need to improve the waste management system is further highlighted by the 1,715 registered fires at the non-compliant landfills and dumpsites in 2021.

5.1.1 Institutional framework

The achievement of national waste management objectives is highly dependent on the performance of LSGs as they are responsible for planning and implementing municipal waste collection, transport, as well as primary separation. Waste management is facilitated through mandatory local and regional waste management plans. However, most

³⁵ https://www.ekologija.gov.rs/sites/default/files/2022-02/program_upravljanja_otpadom_u_rs_za_period_2022-2031._god_0_2.pdf.

³⁶ https://www.ekologija.gov.rs/sites/default/files/inline-files/akcioni_plan_2022-2024_sprovođenje_prog_uprav_otpadom_RS_2022-2031_131_cyr_0.pdf.

³⁷ 50 percent of waste is likely disposed in non-compliant municipal landfills.

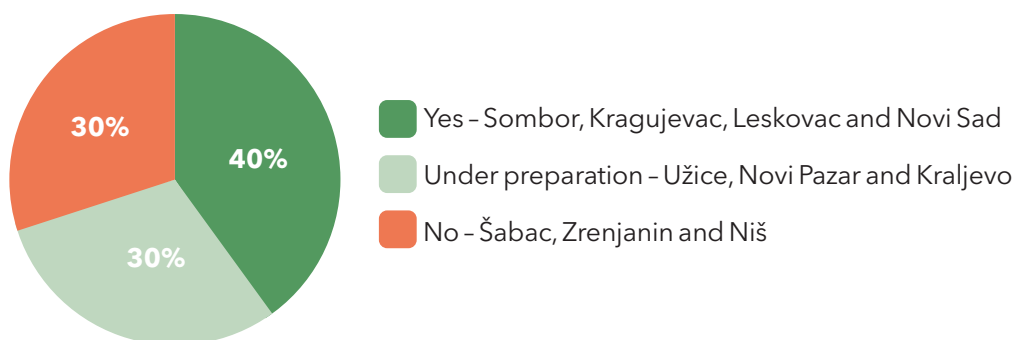
³⁸ https://www.sepa.gov.rs/download/IZVESTAJ_2021.pdf, page 93.

³⁹ <https://neighbourhood-enlargement.ec.europa.eu/system/files/2022-10/Serbia%20Report%202022.pdf>, page 124.

⁴⁰ Waste Management Program of the Republic of Serbia for the Period 2022-2031.

of the local waste management plans in Serbia are not up to date or need to be aligned with the national Waste Management Program. Similarly, only four of the analyzed cities have current local waste management plans: Novi Sad, Sombor, Leskovac and Kragujevac (Figure 14).

Figure 14. Percentage of cities with local waste management plans aligned with WMP 2022-2031



Source: Authors' interpretation based on data collected from analyzed cities

Waste management at the regional level, although envisaged by law, has not been fully implemented due to limited intermunicipal cooperation. The Law on Waste Management envisages the establishment of waste management regions with more than 250,000 inhabitants⁴¹ and the development of corresponding regional waste management plans. Out of the 10 analyzed cities, only two, Užice and Novi Sad, have current regional waste management plans. Regional companies for waste management are operational in Užice, Šabac and Leskovac, and are being established in Novi Sad, Niš and Sombor, while Novi Pazar has initiated the process of establishing a regional waste management company. There are no regional companies in Kraljevo, Zrenjanin and Kragujevac.

5.1.2 Waste management practices

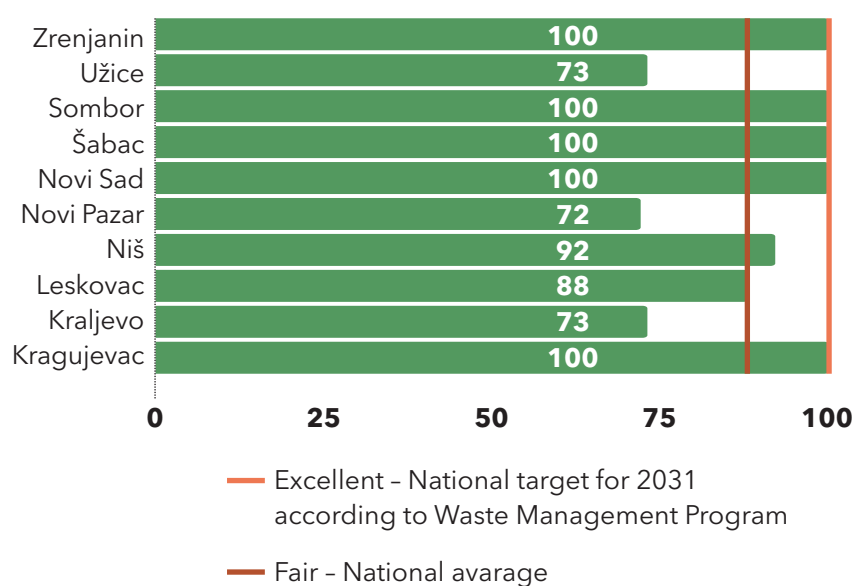
Common deficiencies of the waste management system registered in the analyzed cities mirror the situation on the national level. The 10 analyzed cities have made limited progress in the waste management sector with only three cities (Novi Sad, Užice and Niš) achieving fair performance based on waste management indicators that assess waste collection, disposal and treatment (including recycling and composting). The other seven cities show poor performance. Snapshot assessments of the waste management systems in three of the analyzed cities are presented in Box 4.

In terms of waste collection, the analyzed cities register rather high rates of collection, but there is room for improvement in most cities. Five of the 10 analyzed cities reported 100 percent collection (Kragujevac, Novi Sad, Šabac, Sombor and Zrenjanin), while Niš and Leskovac collect less than 100 percent but more than the national average of 88 percent (Figure 15). Kraljevo, Užice and Novi Pazar collect approximately 70 percent of waste. One of the barriers to full collection is lack of equipment: six cities (Novi Sad, Zrenjanin, Niš, Kraljevo, Užice and Novi Pazar) reported lack of containers and vehicles.

With respect to disposal and treatment, most of the generated waste in the analyzed cities is disposed of in non-compliant landfills and waste treatment is either at a very low level or does not exist. Landfilling of waste is still the predominant method of waste management, while the goal is to gradually reduce the share of landfilled waste and increase reuse and recycling. While national law envisaged the development of regional waste management systems, only three out of the 10 cities have access to regional sanitary landfills - Užice, Šabac and Leskovac. The other seven cities currently rely on registered but non-compliant municipal landfills with sufficient capacity to receive municipal waste until regional sanitary landfills come into operation.

⁴¹ In case of fewer inhabitants, the sustainability of a regional waste management has to be proved.

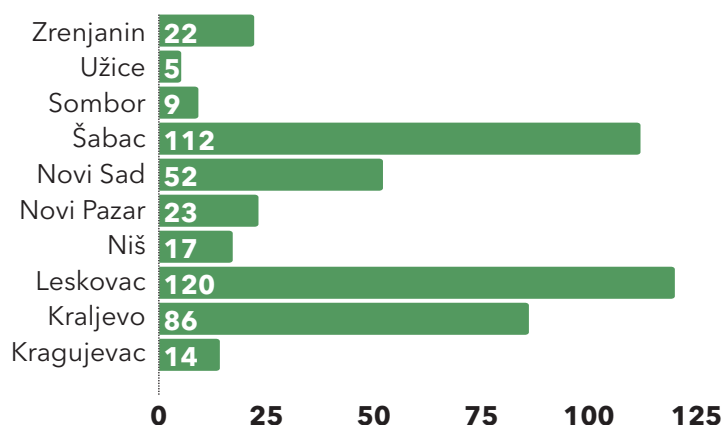
Figure 15. Percentage of city population with regular solid waste collection



Source: Authors' analysis based on data collected from analyzed cities

A high number of illegal dumpsites reflects insufficient proper waste management and inadequate penalty measures. The LSGs are required by law to keep records of illegal dumpsites, reduce their number, and clean up and rehabilitate the sites. LSG records show that illegal dumpsites often re-appear in the same location after cleanup takes place. The dumpsites vary in size from several cubic meters to several hundred cubic meters, and there is no direct relation between the size of dumpsites and the rate of waste collection in the city. Leskovac reported 120 illegal dumpsites, Šabac 112, Kraljevo 86, while in Užice there were only 5 illegal dumpsites in 2021 (Figure 16). There was a total of 3,044 registered illegal dumpsites in Serbia in May 2022.

Figure 16. Number of registered illegal dumpsites in 2021



Source: Data collected from analyzed cities

Recycling infrastructure in the analyzed cities is rudimentary and waste recycling rates are low. Primary separation, mainly of packaging waste, is conducted only in Užice (Figure 17), Novi Sad, Niš and Šabac. Recycling rates in the analyzed cities range from 2 to 5 percent, except for Novi Sad which achieved a rate of 12 percent (Figure 18). For comparison, the average recycling rate in Serbia is 16.8 percent while the EU average is 49 percent.⁴² LSGs or PUCs are responsible for operating recycling yards for collecting household hazardous waste (e.g., electronic/electric waste, waste oil, batteries), old furniture, and other items, while businesses are expected to engage licensed operators for the collection of recyclable

⁴² <https://www.eea.europa.eu/ims/waste-recycling-in-europe>.

waste. Recycling yards exist in Kragujevac, Šabac, Niš and Novi Sad. According to the national Waste Management Program, LSGs must establish separate collection of household hazardous waste by 2029.

Composting of green waste is in the initial stage.

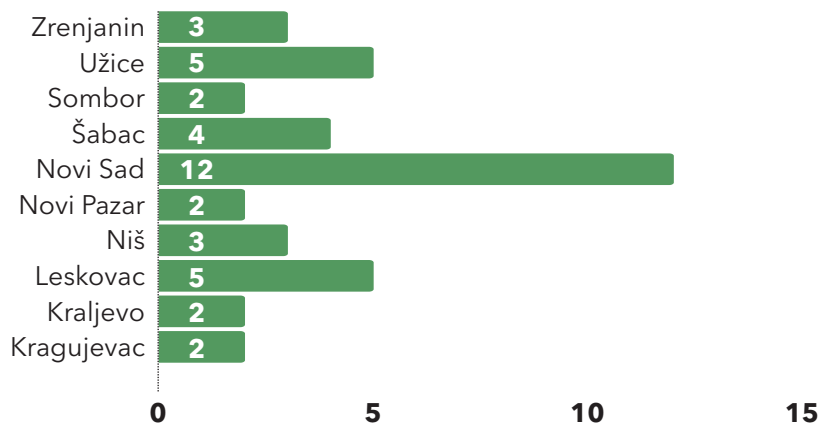
While organic waste makes up approximately half of generated waste, no large-scale, centralized composting of such waste exists in the analyzed cities. However, Novi Sad, Niš, Kraljevo and Užice are composting green waste at a small scale (Figure 19), primarily in the maintenance of public areas, by reusing green waste for soil conditioning.

Figure 17. Secondary separation of municipal waste in Duboko Regional center, Užice



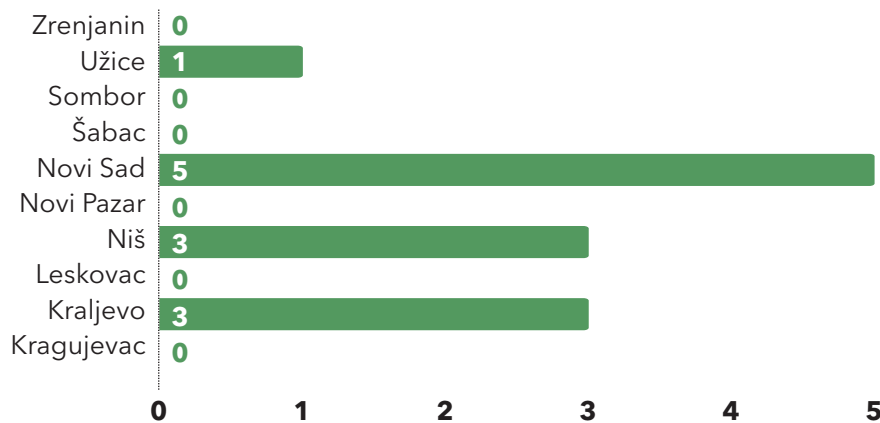
Source: Photo credit GFA SEE

Figure 18. Percent of waste that is recycled



Source: Data collected from analyzed cities

Figure 19. Percentage of green waste that is composted



Source: Data collected from analyzed cities

In terms of climate and disaster resilience, the waste management systems in the majority of the analyzed cities are insufficient. Current legislation does not consider waste management as critical infrastructure (CI). As such, only two cities, Novi Sad and Niš, have identified waste management as CI and have developed waste collection contingency plans in the event of a disaster or emergency situation,⁴³ leaving the majority of the analyzed cities unprepared in terms of disaster and climate resilience.

⁴³ A contingency plan is a written emergency procedures plan which describes what actions must be taken to minimize hazards from fires, explosions or unplanned releases of hazardous waste or hazardous waste constituents to air, soil or water. The plan may be combined with other emergency plans at the facility.

Box 4. Overview of waste management practices in Leskovac, Novi Sad and Užice

Leskovac

Leskovac established a regional waste management system in 2007 by signing a PPP contract with the Austrian company Porr-Werner & Weber for the period of 25 years. The regional sanitary landfill serves the City of Leskovac and five other LSGs that encompass the Jablanica district. However, about 12 percent of Leskovac's rural population is not currently being served by the regional waste management system with respect to waste collection. The primary and secondary separation of recyclable waste prior to landfilling has been carried out since the construction of the Recycling Center in 2010, however, the recycling rate is still low at approximately 5 percent (Figure 20).

Figure 20. Snapshot of waste management indicators of Leskovac



Source: Authors' interpretation based on data collected from analyzed cities

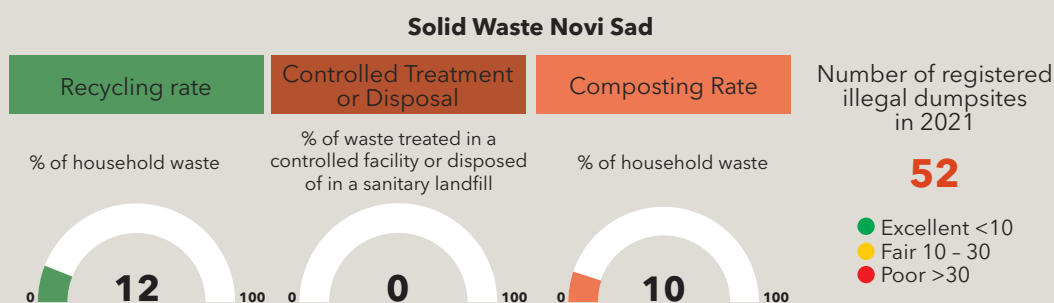
There are still no measures for reducing the amounts of biodegradable waste through composting. The former local municipal waste landfill is closed but still not rehabilitated and recultivated. Although the city has been regularly monitoring and cleaning up illegal dumpsites, especially the ones located near flood-risk areas and access roads, there were still roughly 120 illegal dumpsites registered in 2021.

Novi Sad

Continuous investments in smart waste management solutions in Novi Sad have resulted in a 12 percent recycling rate (Figure 21). Novi Sad's waste management system includes primary separation of packaging waste, and the city plans to purchase more containers to support a three-bin separate waste collection system for recyclables, green (organic) waste, and mixed waste (remaining waste). In addition, residents receive discount vouchers (that include free use of public transport or other services) in return for recycling aluminum cans, glass and PET packaging through collection machines. Three recycling yards and a Recycling Center (for the final separation of recyclables, packaging and shipping) are expected to start operating in 2023 at the location of the new landfill (currently under construction). A facility for recycling construction and demolition waste is planned near one of the recycling yards. Novi Sad has also developed a composting plant for green waste (supported by a GIZ grant) and separate collection of glass (supported by GIZ and NALED). The city has 50 recycling containers for glass, funded by the private companies, Sekopak and Apatinska pivara.

Novi Sad is one of the few cities that has adopted local and regional waste management plans. Together with seven neighboring municipalities, Novi Sad signed an inter-municipal agreement to form a municipal waste management region in 2010; however, the regional waste management system is yet to be established. Currently, the existing municipal landfill is non-compliant, and technical documentation is being prepared for the construction of the regional waste management center, with financial support from the EU IPA fund (2022).

Figure 21. Snapshot of waste management indicators of Novi Sad

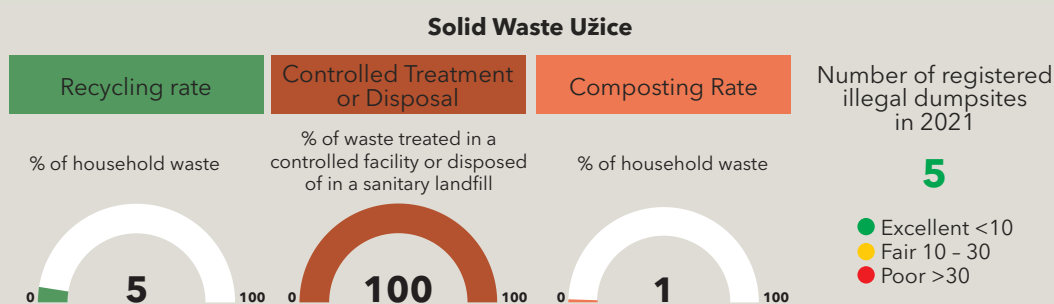


Source: Authors 'interpretation based on data collected from analyzed cities

Užice

Užice is a leader in regional waste management in Serbia, with Duboko regional waste management center in operation since 2011 and long-standing consistent efforts to improve collection and promote recycling. The City signed an agreement with eight LSGs to form a regional waste management system in October 2005 whereby all nine LSGs committed to the establishment of the Duboko PUC to provide waste management services for the region. The recycling rate in Užice is about 5 percent, higher than in other cities, and the city is making efforts to increase recycling practices (Figure 22). Chosen for support by the EU Green Agenda project in primary separation and recycling in 2022, Užice will receive several containers and bins for primary separation, waste collection vehicles and funding for a publicity campaign to promote recycling.

Figure 22. Snapshot of waste management indicators of Užice



Source: Authors 'interpretation based on data collected from analyzed cities

Užice continues to develop and improve its waste management infrastructure. The regional waste management center (RWMC) is to be upgraded with the support of an European Bank for Reconstruction and Development (EBRD) loan for the construction of a leachate treatment plant, landfill gas treatment and composting plant, as well as modernization of the existing recycling center. Supported by the EU, the City of Užice received a donation of 400 home composters for the reduction of biodegradable waste disposed of in the landfill. Following the distribution of waste containers in 34 rural locations in 2020, an additional 848 tons of municipal waste were collected, and only five illegal dumpsites were registered in 2021.

Communication is a key component of Užice's success. The city is engaged in public campaigns on waste management, tackling topics such as primary separation and recycling. The Green Council established by the LSG facilitates public participation processes in the development and adoption of environmental policies.

Consistent efforts, readiness to embrace new approaches and continuity of investments have made Užice an example of good waste management practice in Serbia. The Women's Center Užice represents an innovative program for waste treatment and social inclusion. The Center, founded in 1998, collects textile waste for use in creative sewing workshops, while non-reusable textile waste is submitted to the RWMC, which produces residue derived fuel for a cement factory.

5.1.3 Recommendations

Overall, waste management in the analyzed cities needs improvement, and significant investments are necessary to promote circularity and improve resilience of waste management systems. Planned investments in the cities are positive steps towards reducing the environmental impact of waste, including GHG emissions. Waste management infrastructure investments are imminent in all 10 analyzed cities. Loans from EBRD and the French Development Agency (for Sombor, Užice, Novi Pazar and Šabac), through the “Clean Serbia” program (for Kragujevac, Kraljevo, Niš), and through the EU Instrument for Pre-accession Assistance (for Novi Sad) are being negotiated for implementing regional waste management systems, in line with the national Waste Management Program. In Zrenjanin, a public-private investment is planned, and Leskovac has already implemented a public-private partnership with the Austrian company Porr-Werner & Weber. Construction of facilities for the thermal treatment of non-recyclable waste is foreseen for Niš and Kragujevac, with the production of electrical and heating energy, and utilization of landfill gas is planned in Užice and Šabac.

The following additional actions are recommended to support the development of climate-smart waste management systems in the cities:

- At the national level, support the development of regional waste management plans and institutional systems for each city;
- Support investments in containers and vehicles in the cities where waste collection service coverage is insufficient;
- Adopt environmentally sound methods of waste treatment in the seven cities that rely on non-compliant municipal landfills and develop technical documentation for the implementation of the regional waste management centers. At the same time, the national government should further support the seven cities to establish regional landfill arrangements;
- Increase inspection controls and introduce penalties for those who dump waste in illegal dumpsites;
- Increase recycling of household waste by providing convenient receptacles and consider offering incentives as, for example, in Novi Sad; and
- Promote eco behavior through public campaigns.

5.2 WATER SUPPLY AND SANITATION SERVICES

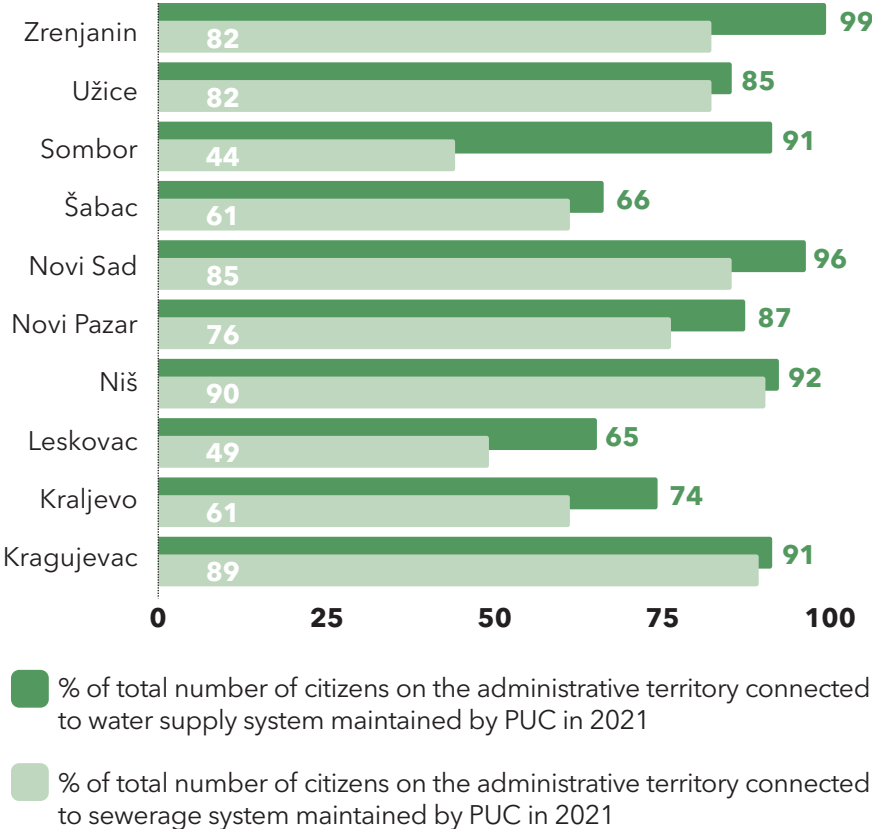
Central and local governments share responsibility for water supply and sanitation (WSS) services in Serbia. The overall management of water resources is the responsibility of the national government, with most administrative functions delegated to the Republic Water Directorate within the Ministry of Agriculture, Forestry and Water Management. The key strategic document governing water resources management is the National Strategy for Water Management on the Territory of the Republic of Serbia until 2034.⁴⁴ LSGs are responsible for the treatment and distribution of drinking water and the collection and treatment of wastewater. They typically provide these services through municipal PUCs.

5.2.1 Water supply

The coverage and quality of drinking water supply is fairly high in Serbia as a whole, with PUCs providing drinking water to about 87 percent of the national population; however, drinking water coverage in the 10 analyzed cities is uneven. While seven of the cities provide piped water supply to at least 80 percent of the population within

their respective administrative territory, Šabac, Kraljevo and Leskovac have lower coverage rates (Figure 23).⁴⁵ In the areas of the cities where the populations are not served by PUCs, drinking water supply is provided through schemes operated by local LSG communities or individual wells, with water quality being problematic. In such cases, LSGs often request their PUCs to assume responsibility for operation and maintenance. However, as these water supply assets lack official usage permits, PUCs are reluctant to do so.

Figure 23. Percentage of citizens connected to PUC water supply and wastewater system, 2021



Source: AWTSE, RS

The quality of drinking water provided by PUCs in the 10 analyzed cities is however generally high. The Institute for Public Health published data on drinking water quality in 2021, with Novi Sad, Leskovac, Niš, Novi Pazar, Kraljevo, Kragujevac and Šabac having less than 5 percent microbiologically noncompliant samples and less than 20 percent physically and chemically noncompliant samples. Užice and Sombor reported physically and chemically compliant samples, but not microbiologically compliant samples (Užice 5.1 percent, Sombor 5.7 percent of noncompliant samples), while Zrenjanin reported 95.6 percent of physically and chemically noncompliant samples, but not microbiologically compliant samples.

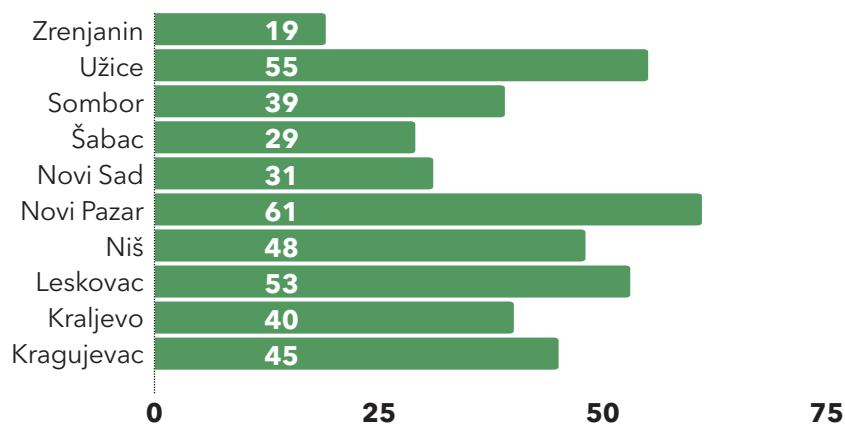
Water quality at some water sources is endangered because the sources are outside of properly defined and managed sanitary protection zones. A national database on sanitary protection of existing water sources is not established. However, analysis of the 10 cities found that water pollution at some water sources appears to be due to non-existent or outdated wastewater treatment, inadequate storage and disposal of industrial production materials, untreated industrial and municipal wastewater, drainage of polluted water from agriculture, and leachate from landfills.

Technical and administrative water losses have a major impact on PUC revenues and result in wasted water resources. The rate of non-revenue water (NRW) – the difference between the amount of water produced and the amount invoiced to customers – is than the

⁴⁵ WB Danube Water Program, Water and Wastewater Services in the Danube Region, A State of the Sector 2018 Update, June 2018.

national average of 35 percent⁴⁶ (and the average of the EU candidates in the Danube River basin, which is 33 percent) in seven of the 10 cities (Figure 24). The NRW rate is alarmingly higher in three of the cities: 61 percent in Novi Pazar, 55 percent in Užice, and 53 percent in Leskovac. The levels of NRW in Novi Sad, Šabac, and potentially Zrenjanin are better than the national average but still high. These losses are a financial drain on the PUCs and significantly limit their ability to improve coverage and quality of service.

Figure 24. Percentage of non-revenue water, 2021



Source: AWTSE, RS

Note: The value for Zrenjanin is not verified

5.2.2 Sewerage

All 10 analyzed cities have sewerage systems maintained by local PUCs, but coverage varies and most of the collected wastewater is not treated. Šabac, Sombor, Kraljevo and Leskovac have lower wastewater collection coverage than the national average (63 percent) while the other six cities have coverage between 76 percent and 96 percent (Figure 23). Only four of the cities have operating wastewater treatment plants - Kragujevac, Leskovac, Sombor and Šabac. However, the treatment plants in Sombor and Kragujevac are over 30 years old and require reconstruction and extension.

Adequate sewage treatment requires substantial investments across the cities. The Directive Specific Implementation Plan for the EU Urban Wastewater Treatment Directive (UWWTD) of 2018 estimates that the total cost to address Serbia's sewage treatment challenges was EUR 3.82 billion. Of this, EUR 2.55 billion would be required for the reconstruction of 1,052 km of existing collection pipes and the construction of 10,369 km of new pipes, and EUR 1.27 billion would be required for the rehabilitation and construction of sewage treatment plants.

5.2.3 Stormwater drainage systems

Underdeveloped urban stormwater drainage systems in all 10 analyzed cities fail to mitigate urban flood risks. The analyzed cities increasingly suffer from urban flooding, with more intensive rain events as a result of climate change and with lack of adequate stormwater drainage systems. LSGs are responsible for stormwater drainage systems, typically relying on their PUCs for operation and maintenance.⁴⁷ The analysis found that drainage infrastructure investments are needed in all 10 cities.

⁴⁶ World Bank Danube Water Program, Water and Wastewater Services in the Danube Region, A State of the Sector 2018 Update, June 2018.

⁴⁷ In Kragujevac, Leskovac and Šabac, urban stormwater drainage operation and maintenance are entirely under PUC mandates, while Novi Sad has subcontracted the operation and maintenance of urban stormwater collection to the public water management company, Vode Vojvodine, and to a private water management company, Šajkaška. For the remaining six of the 10 analyzed cities, maintenance is carried out by local PUCs, but only upon request by the respective LSG.

5.2.4 Recommendations

Overall, WSS services in the 10 analyzed cities require improvements in varying aspects and extents. The assessment of the quality of water services in each city varies, but significant institutional changes and investments are needed to either increase water supply, improve water quality, or reduce water losses. All 10 cities are in need of investments to treat wastewater and to develop stormwater drainage systems to protect against urban flooding. The priority recommendations for the 10 cities are the following:

- Prioritize infrastructure investments to expand water supply service coverage in urban areas where infrastructure is lacking;
- Urgently draw and start implementing NRW reduction plans;
- Implement sanitary protection of water sources as per national regulations;
- Rehabilitate and expand sewerage systems and build new WWTPs aiming to meet the EU requirements;
- Design and implement adequate urban stormwater drainage systems; and
- Develop and/or maintain information management systems to coordinate capital investment planning, service delivery, and lifecycle operations and maintenance of WSS systems.

5.3 DECARBONIZATION OF ENERGY SERVICES

Serbia is committed to scaling up its clean energy and climate efforts. Since Serbian cities contribute more than 70 percent of the country's total GHG emissions,⁴⁸ local-level action is necessary for decarbonization and the achievement of national targets. LSGs can contribute to national decarbonization efforts by expanding the use of renewable energy sources and improving the efficiency of their district heating (DH) systems, enhancing energy efficiency of public and residential buildings, promoting renewable energy investments for individual electricity and heat production, and modernizing public lighting.

The 10 analyzed cities are only partially engaged in decarbonization efforts. LSGs are legally obligated to develop and maintain an energy management system; however, the majority of the analyzed cities have so far failed to comply with planning and reporting requirements with respect to energy management. The provision of district heating services in most of the cities is more efficient than the national average, however, the share of renewable energy in each city is still very low. The energy status of the 10 analyzed cities is presented in this section.

5.3.1 District heating

Local DH systems remain limited and heavily reliant on fossil fuels. According to the Annual Report of the Association of District Heating Plants, only 26 percent of all households in Serbia were connected to a DH system in 2020, while the remaining 74 percent of households used other sources such as wood fuels, coal or gas for energy. The most common fuel for DH systems was natural gas (80 percent), followed by coal (14 percent) and heavy fuel oil (5 percent). The share of renewables (biomass) was only 1.5 percent. Among the 10 analyzed cities, only Novi Pazar has a high share of renewables (60 percent) due to recent donor-financed investments (see Box 5). Novi Sad is in the advanced stage of planning the use of solar and geothermal energy for its DH system.

⁴⁸ World Bank Climate Change Action Plan 2021-2025, p.29, <https://openknowledge.worldbank.org/bitstream/handle/10986/35799/CCAP-2021-25.pdf?sequence=2&isAllowed=y>.

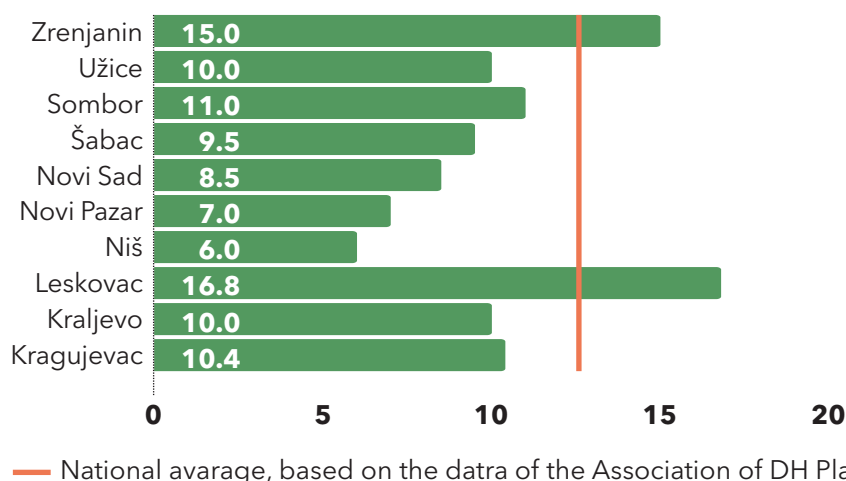
Box 5. Good Decarbonization Practices in Novi Pazar, Novi Sad and Šabac

Novi Pazar has increased the use of renewable energy in its DH system with the commissioning of a new biomass heating plant that uses 60 percent biomass, 20 percent natural gas and 20 percent coal. The realization of this project led to the reduction of CO₂ emissions in DH by 87 percent, while the emissions of SO₂ reached zero. The new heating plant has an overall capacity of 20.3 MW, with one biomass (wood) boiler with a capacity of 8 MW, and two backup natural gas boilers with the total capacity of 12.3 MW (7.8 MW and 4.5 MW). This project also included the construction of 1,800 meters of new heating pipelines and the reconstruction of 700 meters of the existing DH network, as well as the modernization and automatization of heating substations, which resulted in a significant reduction of losses from approximately 20 percent to 8 percent. The introduction of consumption-based billing for all consumers is also planned.

Novi Sad has developed combined heat and power (CHP) plants to improve efficiency of its DH system. Under the local PUC, two modern high-efficiency CHP plants have been operating since 2016, with a total capacity of 14 MW electric and 14 MW thermal. These two power plants produce over 120,000 MWh of electricity per year for the entire city and the same amount of waste heat energy is used to supply the sanitary hot water system. More than one-third of consumers connected to the DH system are using waste heat energy for the preparation of sanitary hot water. All boilers within the DH system primarily use natural gas for heat and electricity production.

Šabac established the energy service company (ESCO) model for the reconstruction of apartment buildings in 2019. The local PUC and EBRD signed a contract to provide financing for DH customers interested in applying energy efficiency measures to their home to reduce residential heating costs. About EUR 2.5 million will be provided for energy efficiency measures in around 30 apartment buildings. The business model envisages the repayment of investment costs through monthly installments over 12 years.

Figure 25. Percentage of energy losses in DH systems

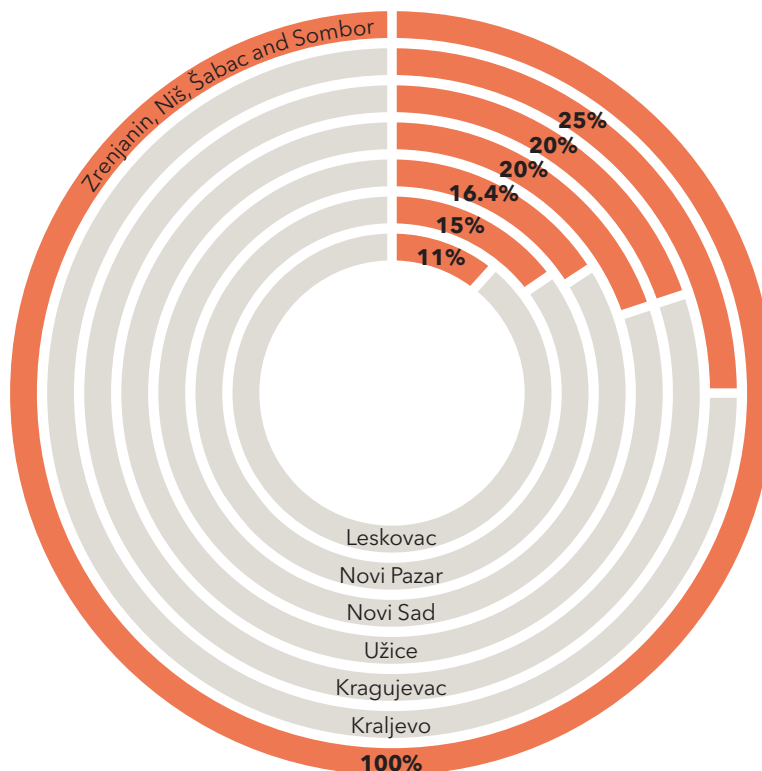


Source: Association of DH Plants and Annual reports of DH plants

Losses in transmission and excessive consumption increase the carbon footprint of DH plants. As shown in Figure 25, the national average transmission loss in DH systems is 12.4 percent, a figure that largely reflects the average age of DH systems in the country, which is 29 years. Consumption is also excessive, as billing is generally not based on the actual consumption of individual consumers. In the absence of consumption-based billing, individual households have little incentive to conserve heat or invest in energy-saving

building improvements. Only four cities - Zrenjanin, Sombor, Niš and Šabac - bill 100 percent of their consumers on the basis of actual consumption (Figure 26). In the other cities, the proportion of customers billed based on actual consumption is below 25 percent.

Figure 26. Percentage share of consumption-based billing in DH

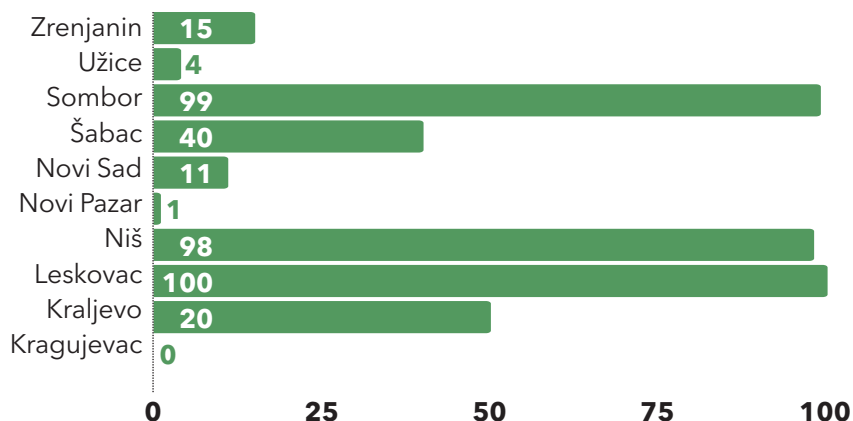


Source: Annual reports of DH plants

5.3.2 Decarbonization measures

In addition to improving the efficiency of DH systems, there is room to support decarbonization by increasing the use of LED lighting in most of the analyzed cities. LED lights are 40 to 60 percent more energy efficient than traditional lighting technologies and are associated with considerably lower carbon emissions. Among the analyzed cities, the cities with close to 100 percent use of LED lamps for public lighting are Sombor, Leskovac and Niš. These cities have introduced LED lighting based on an energy performance contracting approach with a private partner financing the modernization and guaranteeing the energy savings for repayment of the investment (Figure 27).

Figure 27. Percent share of LED lamps in public lighting



Source: Data collected from analyzed cities

Another decarbonization measure that most cities have yet to implement is expanding the use of renewable energy sources (RES). This includes increasing the use of renewable energy for heating public buildings, which is currently very low in the analyzed cities. Only four cities (Užice, Novi Pazar, Novi Sad and Kraljevo) utilize RES for heating public buildings, and only in Užice and Novi Pazar is the share of RES above 10 percent. Novi Pazar stands out amongst the cities, with a 70 percent share of RES for the heating of public buildings, largely attributed to its long-standing tradition of using locally available wood biomass for heating.

To support decarbonization reforms, cities will need to improve their energy management systems. Central regulations already require each LSG with more than 20,000 inhabitants to: (1) appoint a licensed municipal energy manager, (2) plan energy efficiency measures, (3) monitor and report on energy consumption, and (4) achieve energy saving targets. All 10 analyzed cities except Sombor have appointed an energy manager, but progress on the other three requirements is mixed. Five cities—Novi Sad, Niš, Užice, Leskovac and Kragujevac—have valid and up-to-date energy efficiency programs, while Novi Pazar’s program is under preparation. Only four cities, Novi Sad, Užice, Kragujevac and Niš, have met their obligatory annual reporting requirements, and only Niš and Kragujevac achieved the 1 percent energy reduction target set by the central government in 2021.⁴⁹

5.3.3 Recommendations

The following energy reforms are critical to reducing the carbon footprints of cities:

- Continue to replace fossil fuels with renewable energy sources for the generation of heat;
- Rehabilitate DH transmission systems to reduce heat losses;
- Expand the use of consumption-based tariffs to encourage conservation and energy-focused building rehabilitation;
- Replace conventional lightbulbs with LED bulbs for public lighting;
- Complete energy efficiency plans (for the cities that have not done so already) and regularly report progress to the central authorities.

5.4 SUSTAINABLE URBAN MOBILITY

While Serbian cities are not obligated to prepare a sustainable urban mobility plan (SUMP), as recommended by the European Commission,⁵⁰ the importance of sustainable urban transport and the need to integrate transport policies into physical planning are getting more recognition. Partnerships between governments, local authorities, business sector, NGOs and interested public and stakeholders are supporting implementation of activities that support green and healthy lifestyles in cities, including physical activities (e.g., walking and cycling to prevent illnesses and obesity). Šabac is the first of the 10 analyzed cities that has developed a SUMP in 2020 (with the support of the GIZ Open Regional Fund-EE Program) but the LSG lacks capacity for its implementation. Niš, with technical assistance of the European Investment Bank (EIB), is developing a SUMP that will be the basis for funding local transport projects. The development and implementation of SUMPs and the participation of 25 Serbian cities in European Mobility Week - the European Commission’s flagship awareness-raising campaign on sustainable urban mobility - in 2022, are positive first steps within Serbia. However, the analysis of the 10 cities shows that the cities have much room for improvement to support sustainable urban mobility, which is discussed in this section.

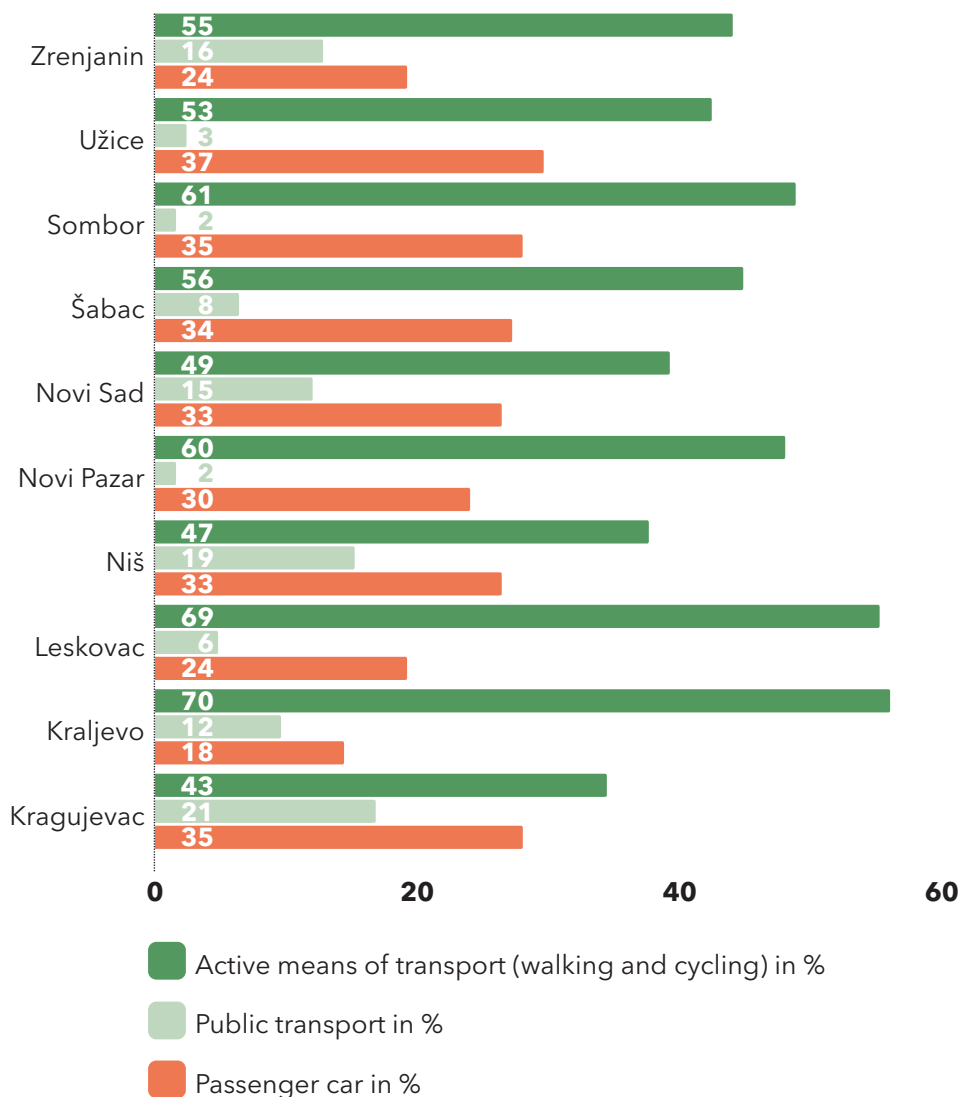
⁴⁹ According to the Law on Energy Efficiency and Rational Use of Energy (Official Gazette of RS 40/2021), Ministry of Mining and Energy.

⁵⁰ Planning sustainable urban mobility is not required by the Serbian legislation and Sustainable Urban Mobility Plans (SUMP) are not obligatory planning documents. The preparation of SUMPs in Serbian cities is done on voluntary basis, supported by international donor assistance.

5.4.1 Limited transport data at the city level

Limited mobility data serves as a major constraint to effective policy making with respect to promoting sustainable urban mobility. In the past 10 years, only Novi Sad and Kragujevac (both in 2018) produced comprehensive city-wide traffic studies, while other cities have either produced more narrow studies focused on selected traffic subsystems or rely on outdated comprehensive studies (Šabac, Kraljevo, Leskovac). Considering the limited availability of mobility data, the data on modal splits used in this report comes from surveys conducted in the past 20 years, the most recent in Novi Sad in 2018 and the oldest in Novi Pazar in 2002 (Figure 28).

Figure 28. Modal split characteristics in 10 analyzed cities according to available data



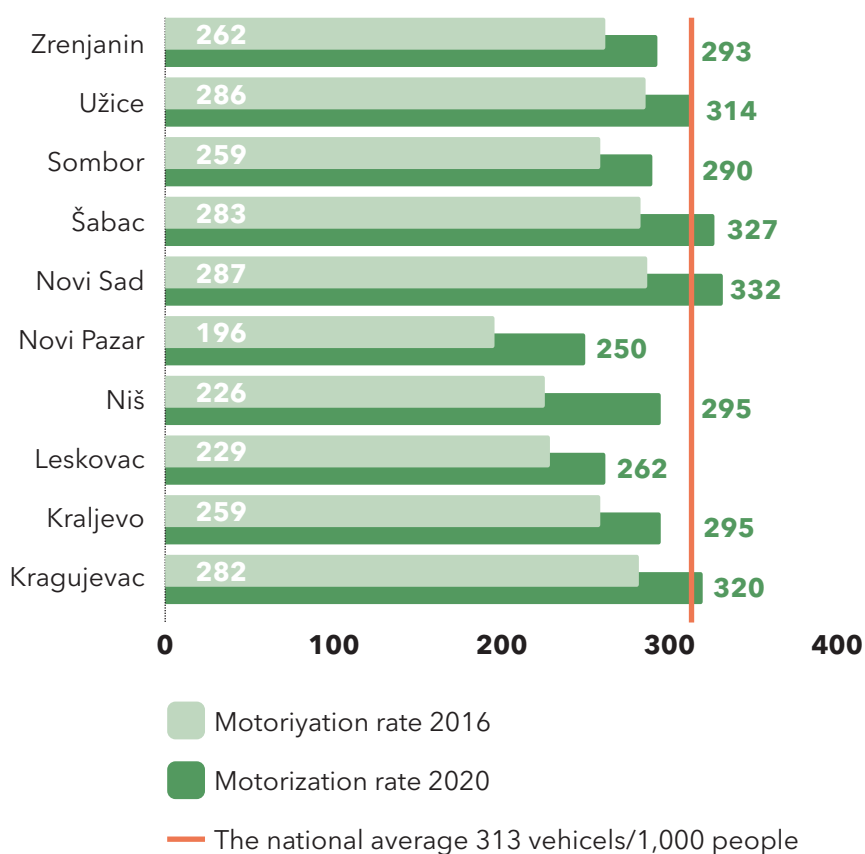
Source: Data collected from analyzed cities

5.4.2 Heavy reliance on carbon-emitting vehicles

The population of each of the 10 analyzed cities is increasingly reliant on personal passenger cars for mobility. Passenger cars account for 30 percent of trips on average in the analyzed cities, where car ownership increased significantly between 2016 and 2020 (17.7 percent on average in whole Serbia). Novi Sad, Šabac and Kragujevac are now above the national average of 313 vehicles per 1,000 people (Figure 29).⁵¹

⁵¹ Statistical Office of the Republic of Serbia.

Figure 29. Motorization rate in 2016 and 2020, vehicles per 1,000 people



Source: <https://www.stat.gov.rs/srcyrl/publikacije/publication/?p=10855>

High motorization rates, the reliance on an aging fleet of passenger cars and performance enhancing practices negatively impact air quality in cities. In 2022, the average age of registered vehicles in Serbia was 16.4 years in 2022 and ranged from 13.6 (Belgrade) to 19.6 (Piroć).⁵² With 96 percent of passenger cars in Serbia not meeting current EURO 6 standards,⁵³ older cars are a major source of air pollution, while current regulations continue to allow the import of used vehicles with EURO 3 and 4 emissions standards until 1 January 2024. At the same time, mandatory emissions testing for registered vehicles, required by law, has been postponed until June 2023 and the practice of removing the catalytic converters/DPFs from vehicles to enhance performance exacerbates the levels of air pollution attributed to automobiles. Promotion of electric vehicle (EV) use, for example, electric buses and light commercial EVs, could potentially help reduce air pollution and emissions in Serbian cities. Several cities (e.g., Novi Sad, Raška, Belgrade) have started to upgrade their public bus fleets to fully electric vehicles. These programs could potentially be rolled out in additional cities, generating decarbonization benefits on a nation-wide level.

5.4.3 Limited use of alternative modes of transport

At the same time, alternative non-motorized modes of transport are falling behind motorized transport. Despite significant shares of cycling in the modal split in some of the analyzed cities (e.g., 16 percent in Šabac and 30 percent in Sombor), cycling infrastructure is largely deficient within the majority of the cities. The density of bike paths depends on local traditions, housing density and topography of cities. The larger cities with higher housing density (Kragujevac, Nis and Novi Sad) tend to have lower bike path density. However, Novi

⁵² Illustration: average age of the Serbian fleet 2022

<https://www.abs.gov.rs/admin/upload/documents/20230306101954--starost-putnickih-automobila-2022.pdf>.

⁵³ World Bank. 2021. Serbia: A Pathway to Electric Mobility.

Sad has a long cycling tradition and boasts a cycling network of 90 km, whereas Niš has only 12 km of bike paths and Kragujevac has none. Topography plays a role in other cities such as Zrenjanin which is relatively flat and thus facilitates good cycling conditions. The city has 35 km of cycling paths. By contrast, the urban form in Užice and Novi Pazar is not suitable for cycling; studies are needed to explore adequate solutions for cycling in central and recreational areas and along riverbanks. Development of cycling infrastructure may make cycling safer and promote the use of bicycles by city dwellers as an alternative mode of transport, thereby supporting green and more sustainable urban mobility (see the example of Sombor in Box 6).

Box 6. Sombor invests in cycling infrastructure

The share of cycling in the modal split in Sombor is more than 30 percent, according to a survey conducted during European Mobility Week in 2020. More than 20 km of bicycle paths have been developed throughout the city while the LSG has prepared technical studies for the construction of 8 km of additional bike paths and the conversion of over 25 km of old railway towards the Hungarian border to further extend the cycling network, connecting to the village of Bezdán and to the Eurovelo 6 international cycling road. The Traffic Safety Council of Sombor also supports bicycle use by providing bicycle seats for children.



The share of trips by public transport, primarily bus transport, is generally small and varies considerably among the 10 analyzed cities. In Sombor, Novi Pazar, and Užice, the share is less than 5 percent, partly due to limited public transport network coverage.⁵⁴ The larger cities (Novi Sad, Niš and Kragujevac) provide better network coverage resulting in a higher share of trips by public transport.⁵⁵ Typically in the analyzed cities, public transportation is used to provide mobility only to specific passenger groups (like school children), resulting in the low share of public transport trips.

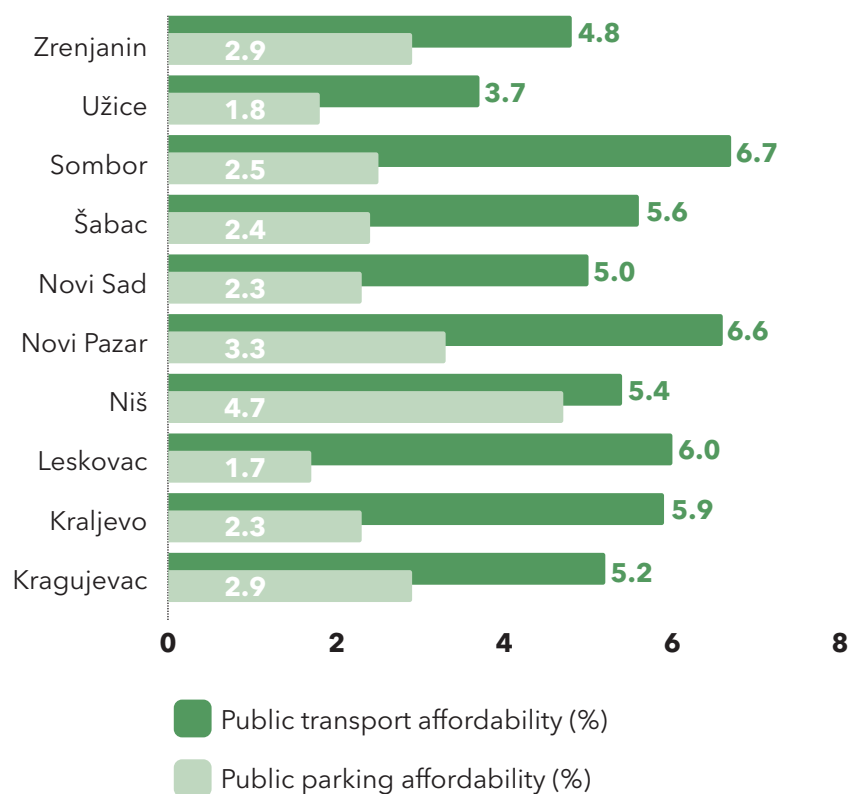
The high cost of public transport compared to the cost of parking serves as a disincentive. The ratio between the price of parking a car for one hour and the price of a single ride ticket in public transport should be around 2:1, according to international good practices.⁵⁶ However, in Serbian cities, this ratio is reversed: the cost of a single ride on public transport is two or three times the cost of parking. Figure 30 compares the cost of using public transport and parking a vehicle in the 10 analyzed cities. Even though Užice has some of the lowest public transport fares, its parking prices are even lower, while Niš has somewhat balanced the prices of parking and public transport fares. Cities can consider using the parking affordability to public transport affordability ratio as an instrument to support local transport pricing policy reform and incentivize the use of public transport over passenger cars.

⁵⁴ For this analysis the coverage of public transport was quantified as a number of vehicle journeys per 1,000 inhabitants.

⁵⁵ Novi Sad with the share of 15 percent has the coverage of about 9 vehicle journeys per 1,000 inhabitants, Niš with the share of 19 percent has the coverage of about 10 journeys per 1,000 inhabitants, and Kragujevac with the share of 21 percent has the coverage of about 6 journeys per 1,000 inhabitants.

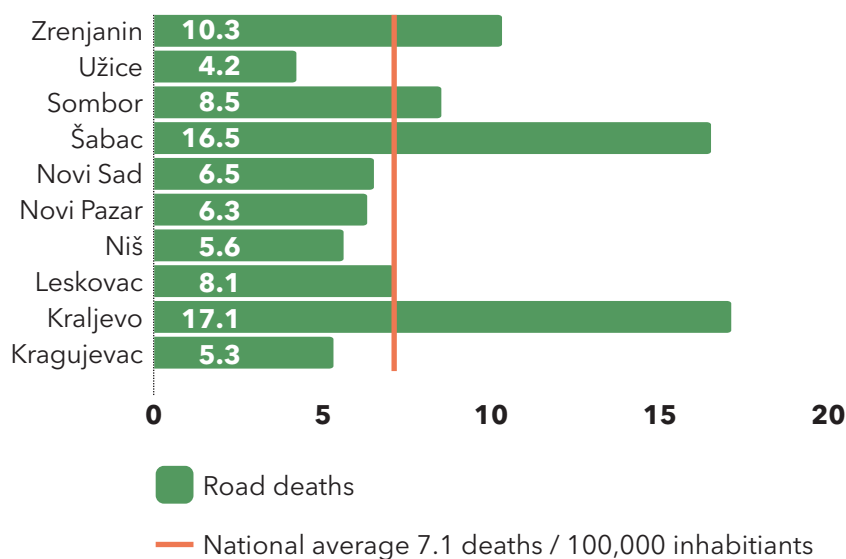
⁵⁶ <https://www.vtpi.org/tdm/tdm26.htm> and <https://www.sf.bg.ac.rs/images/download/culjkovic/Vladimir%20Culjkovic,%20doktorska%20disertacija.pdf>

Figure 30. Prices of public transport and parking as a percent share of income



5.4.4 Road safety poses an additional concern in cities

Figure 31. Road death rates



Source: Road Transport Safety Agency of Republic of Serbia

Road safety in Serbia is considerably lower than the EU average. The number of road deaths per 100,000 people in Serbia is 7.1. This rate is higher than the EU average of 4.2.⁵⁷ In five of the 10 analyzed cities, the road deaths rate is higher than the national average, with as high as 17.1 road deaths in Kraljevo (Figure 31). To address road safety, national law⁵⁸ requires cities to establish a local Road Safety Council. All analyzed cities except Leskovac

⁵⁷ <https://www.abs.gov.rs/sr/analize-i-istrazivanja/statistika-i-analize>.

⁵⁸ Law on traffic safety on roads ("Official Gazette RS", No. 41/2009, 53/2010, 101/2011, 32/2013 - odluka US, 55/2014, 96/2015 - dr. zakon, 9/2016 - odluka US, 24/2018, 41/2018, 41/2018 - dr. zakon, 87/2018, 23/2019 i 128/2020 - dr. zakon).

have established a local council; however, they are mostly functioning within the minimum mandate. To improve road safety across the analyzed cities, local Road Safety Councils should be strengthened to address the main causes of road deaths, which include poor road quality and maintenance, improper vehicle maintenance which threatens general safety, insufficient traffic control and lack of penalty enforcement for reckless drivers.

5.4.5 Recommendations

Considering the urban transport trends in the 10 analyzed cities, with a heavy reliance on passenger cars, limited use of alternative modes of transport and road safety issues, significant investments are needed to support more sustainable urban mobility. The priority recommendations for the analyzed cities are the following:

- Improve data collection to support effective mobility policy making, planning and management;
- Support development of integrated, multi-modal urban mobility plans and systems, which would serve to alleviate traffic, reduce travel costs, improve air quality and reduce carbon emissions;
- Increase investments in non-motorized transport infrastructure (e.g., sidewalks, crosswalks, bike paths);
- Convert aging public bus fleet to clean energy to reduce emissions and air pollution;
- Consider local transport pricing policy reform to increase use of public transport as an alternative to private vehicle use;
- Establish fully functional local Road Safety Councils and invest in road infrastructure improvements and maintenance to improve road safety.

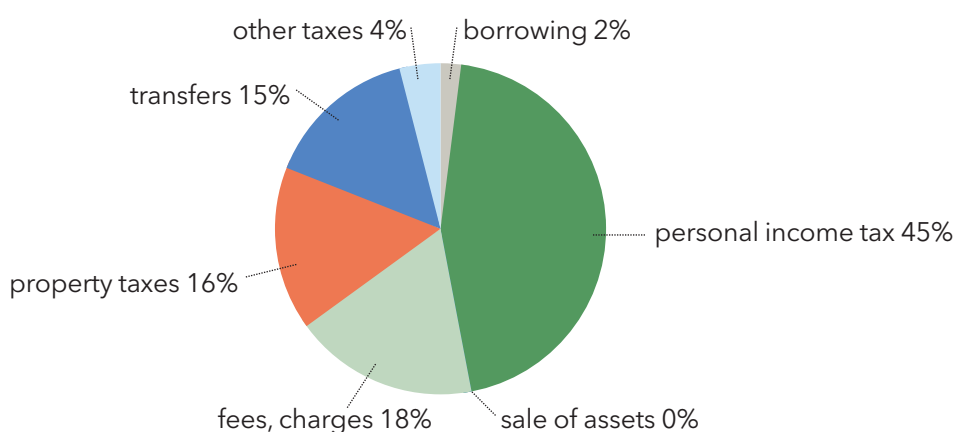
6. SUSTAINABLE LOCAL GOVERNMENT FINANCE

Considering the current urban development trends in the analyzed cities, the cost of meeting local environmental challenges will be high. In Serbia, 1 percent of GDP is dedicated to local public investments which is below the EU and Central and Eastern European average (1.4 and 1.5% GDP, respectively).⁵⁹ As discussed in previous chapters, the analyzed cities suffer from serious deficiencies in planning and communal services and infrastructure, which hamper green urban development. Climate change will increase the cities' vulnerability to extreme weather events and will require increased spending on stormwater drainage, flood control and emergency contingency plans. Much of the burden of financing these measures falls on local governments (LSGs), since they are responsible for most communal services. While municipal functions are typically performed by LSG-owned public utility companies (PUCs), LSGs are responsible for financing needed capital investments to increase and improve service delivery. This chapter presents an analysis of the local government finance system in Serbia, the limitations of the system with respect to the ability of LSGs to finance needed green investments, and actions that the analyzed cities could take to raise financial resources.

6.1 REVENUES

In general, Serbian LSGs obtain their revenues from four principal sources: personal income tax (PIT), property tax, local fees and charges, and transfers from the central government; the largest of these is PIT. Personal income taxes are centrally administered and levied at a nationally uniform rate. Most PIT revenues are derived from taxes on employed individuals, i.e., on payrolls.⁶⁰ A portion of PIT is retained by the central government, but a large share is transferred to LSGs based on origin (i.e., where PIT is collected). Over the last decade, the share of PIT that gets transferred to LSGs has varied widely. In 2022, PIT generally accounted for approximately 45 percent of LSG revenues (Figure 32).⁶¹

Figure 32. LSG revenue sources by percentage share in 2022



Source: MOF Bulletin of Public Finances, 2022

⁵⁹ S. Randjelovic and S. Vukanovic, Fiscal decentralization and local public investment policy in the Republic of Serbia, p206.

⁶⁰ The personal income tax is also imposed on income from agriculture, forestry and certain other sources. LSGs are allowed to retain 100 percent of the taxes derived from these sources.

⁶¹ This is based on aggregate data of all Serbia, according to data from the Ministry of Finance: <https://www.mfin.gov.rs/en/documents2-2/macro-economic-and-fiscal-data2>. Data on the revenue structure of individual LSGs was not available for this report.

Property taxes account for about 16 percent of LSG revenues. According to the current Property Tax Law (2021), property taxes are levied on land (urban and rural) as well as residential and other types of buildings. The law sets out the method to be used to value individual plots and buildings, mandating mass-appraisal techniques in most cases. LSGs have the authority to set property tax rates, subject to ceilings set out in the law. The ceilings are quite low,⁶² particularly for owner-occupied residential properties which are subject to a 50 percent tax rate reduction. LSGs are also entitled to national taxes on the transfer of property through sale or inheritance.

Local fees and charges represent approximately 18 percent of LSG revenues. These include charges for the provision of infrastructure associated with new developments and various administrative and regulatory fees. Fees and charges that go towards LSG revenues typically do not include service tariffs.⁶³ While LSGs set the tariffs of local PUCs that provide water and sewerage services, solid waste management, district heating, and public transport, revenues from tariffs are solely income of the PUCs, and are not reflected in the income statements of LSG budgets. Tariffs are deliberately set below cost recovery as a social policy measure. For example, the annual water bill for a typical household is around EUR 35, or 1.4 percent of per capita household income,⁶⁴ while the average bill for solid waste management is 0.5 percent of per capita household income.⁶⁵ In most cases, tariffs do not cover operating costs of the PUCs.⁶⁶ As a result, the budgets of LSGs must, therefore, cover both recurrent subsidies to PUCs and capital expenditures to increase and improve service delivery.

Central government transfers represent approximately 15 percent of LSG revenues. Serbia's budget transfer system is complex and has been revised frequently over the last few years. The largest transfer, by far, is the general transfer. This is an unconditional transfer (i.e., not earmarked) intended to provide support to poorer LSGs. The LSGs classified as 'most developed' thus receive a smaller proportion of the general transfer, regardless of their population size, total land area, school enrollment, etc. The City of Belgrade is not supposed to receive any general transfers at all. Instead, the central government is to distribute the transfers that would otherwise go to Belgrade among all other LSGs, based on their level of development. However, the transfer allocation system has not been strictly observed for over a decade. In the central government's 2022 budget, the amount allocated for general transfers was equal to only 0.5 percent of Serbia's GDP in the previous year, which is far below the level stipulated by law, which is 1.7 percent.⁶⁷

Other sources of revenue, on average, contribute 4 percent or less to LSG budgets.⁶⁸ Capital receipts contribute only a very small proportion of local revenues. Proceeds from borrowing varied widely between 2015 and 2022 but averaged only 2 percent of total

⁶² The property tax rate for corporations is 0.4 percent maximum, while for physical persons, the maximum rate on land is 0.3 percent. The rate on buildings is progressive, ranging from 0.4 percent of the first RSD 10 million of value to 2 percent on any value over RSD 30 million. Owner-occupied residential property is subject to a 50 percent reduction. In addition, all properties with a value of less than RSD 400,000 are entirely exempt.

⁶³ Public transport tariffs in Belgrade are the exception.

⁶⁴ The annual water bill for a household consuming 6m³ of water per month through a household connection or shared yard tap. For household income see: <https://www.ceicdata.com/en/indicator/serbia/annual-household-income-per-capita>.

⁶⁵ Official Gazette of the RS, No.12 January 28, 2022.

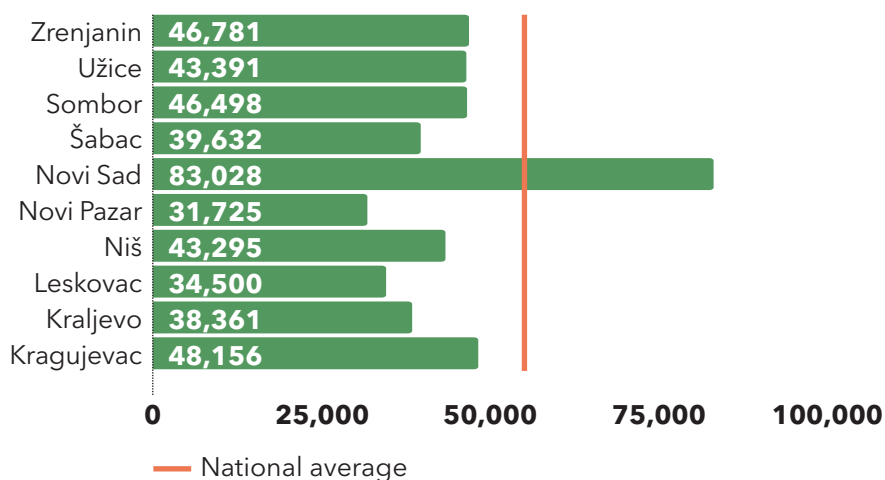
⁶⁶ In 2021, operating revenues in the water supply and sanitation sector were, on average, barely sufficient to cover operating costs, while cost recovery data for the solid waste management sector are not available. 6

⁶⁷ Article 37 of The Law on Local Government Financing (Official Gazette of RS No. 62/06, 47/11, 93/12, 99/13 - other regulation, 125/14 - other regulation, 95/15 - other regulation, 83/16, 91/16 - other regulation, 104/16 - other law, 96/17 - other regulation, 89/18 - other regulation, 95/18 - other law, 86/19 - other regulation, 126/20 - other regulation)

⁶⁸ Republic of Serbia, Ministry of Finance. Bulletin Public Finance. Available at: <https://www.mfin.gov.rs/en/activities/bulletin-public-finance-2>.

revenues and receipts over the period. Proceeds from the sale of assets contributed on average less than 1 percent. Local per capita revenues averaged about RSD 55,0006 (EUR 470) in 2021,⁶⁹ which is very low compared to the EU28 average of EUR 3,200.⁷⁰ Per capita revenues in the 10 analyzed cities were generally below the national average ranging from 270 to 410 EUR (Figure 33). Only Novi Sad had per capita revenues above the national average (EUR 700).

Figure 33. Total budget revenues per capita in 2021, RSD



Source: Bulletin Public Finance (mfin.gov.rs)

6.2 CAPITAL EXPENDITURES

The 10 analyzed cities allocated an average of 20 percent of their annual budgets to capital projects from 2019 to 2021. This is a high proportion by European standards, given that the EU28 average is only around 10 percent.⁷¹ Roughly half of capital expenditures were allocated to projects that contribute to green and resilient urban development, including investments in sustainable urban mobility, water supply and sewerage infrastructure, energy efficiency improvements and renewable energy. Novi Sad and Novi Pazar allocated the highest proportions of their budgets to capital expenditures in general and to green and resilient urban development projects specifically (Figure 34).

During the 2019-2021 period, nine⁶⁴ of the analyzed cities invested EUR 181 million in green and resilient urban development.⁷² Most of the investments were related to traffic infrastructure (EUR 93 million), water supply (EUR 52 million), sewerage construction (EUR 19 million) and energy efficiency improvements/renewable energy use (EUR 13 million). The smaller investments are related to waste management (EUR 3 million) and other environmental projects (EUR 2 million). But the overall scale of green investments is still small in relative terms (EUR 74 per capita in 2021) and in comparison to the scale of environmental challenges confronting the cities.

The engagement of the analyzed cities in disaster risk transfer is almost non-existent. In other words, the cities do not engage with the insurance sector to assess, mitigate and manage disaster risks and do not stimulate demand for insurance products. Only two cities (Užice and Novi Pazar) confirmed awareness of the existence of disaster risk insurance for residential, commercial and public property and infrastructure, but with insignificant practical application in this regard.

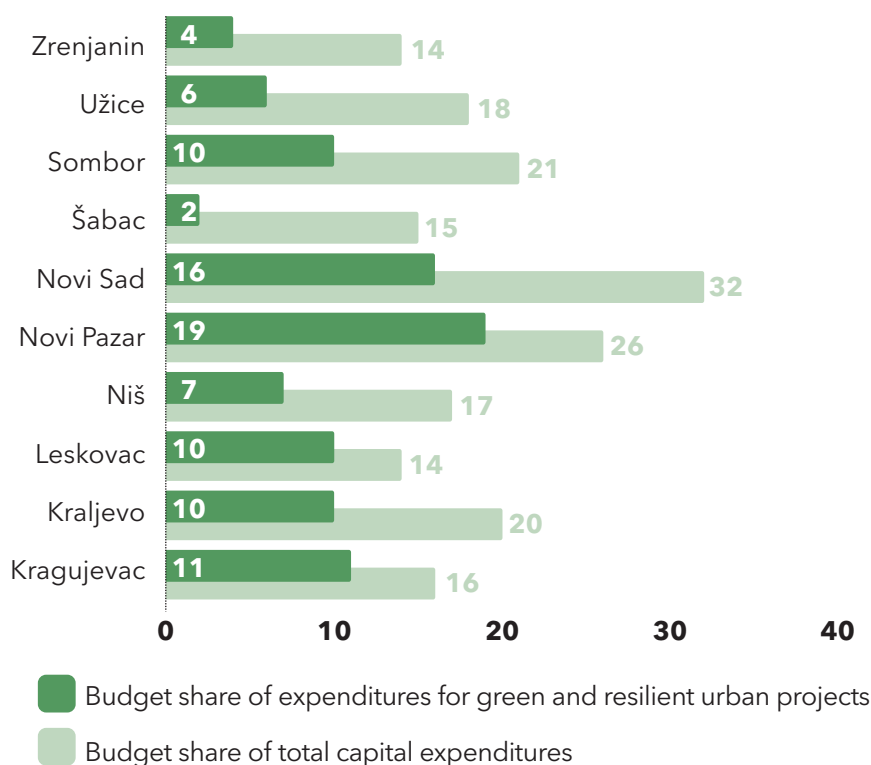
⁶⁹ ibid

⁷⁰ <https://www.oecd.org/regional/EU-Local-government-key-data.pdf>.

⁷¹ OECD: <https://www.oecd.org/regional/EU-Local-government-key-data.pdf>, page 14.

⁷² Data for Kragujevac was not available at the time of writing.

Figure 34. Percent share of green projects and total capital expenditures in LSG budgets



Source: Authors' interpretation based on final budget accounts of analyzed cities

All 10 cities have a contingency fund for post-disaster recovery (up to 0.5 percent of the annual budget), but funds are established only as a legal obligation and, thus, are highly insufficient. Based on the calculations in disaster risk assessments (DRAs), financial resources needed to deal with the estimated impacts in the most severe disaster risk scenarios are in the range of 10 percent (Užice) to 408 percent of the annual budget (Kraljevo).⁷³

6.3 FISCAL PERFORMANCE

Between 2018 and 2021, the recurrent revenues of the 10 analyzed cities grew at an annual average rate of about 10 percent (in nominal terms). This was considerably higher than the average rate of growth of recurrent expenditures, which equaled 5.8 percent over the same period. Performance varied, however, with recurrent revenue growth exceeding recurrent expenditure growth in all cities except for Novi Sad (Figure 35). Zrenjanin, Leskovac and Kragujevac were particularly successful in holding down the rate of growth of recurrent expenditures. The cities used current budget surpluses to reduce debt and to finance capital investments, either on their own or in conjunction with external financing sources.

⁷³ Kraljevo has huge cost implications considering the city is highly prone to natural disasters such as floods and earthquakes.

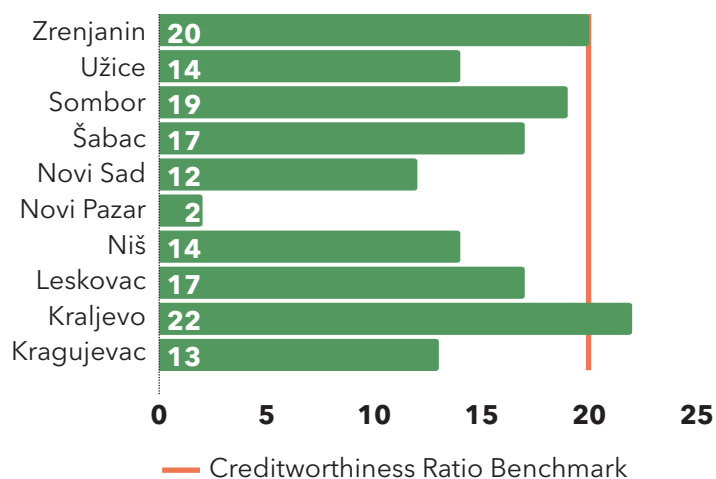
Figure 35. Percentage increase of current budget revenues and expenditures, 2018–2021



Source: Authors' interpretation based on final budget accounts of analyzed cities

6.4 ACCESS TO LONG-TERM CREDIT

Figure 36. Creditworthiness ratio: Net-operating budget surplus to recurrent revenues, 2021 (%)



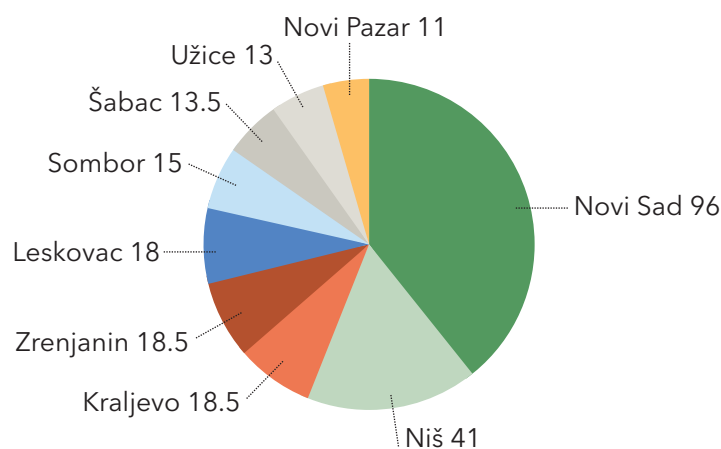
Source: Authors' interpretation based on final budget accounts of analyzed cities

The creditworthiness of the 10 analyzed cities notably improved from 2018 to 2021, as a result of the rationalization of current spending and reduction of outstanding debt. This increased the capacity of the cities to finance capital projects through net current surplus and new borrowing, and to attract private investment. As a result of improved fiscal performance, the creditworthiness of the 10 cities, expressed as the ratio of their respective net-current budget surpluses⁷⁴ to their recurrent revenues increased from 7 percent on average in 2018 to 15 percent in 2021. Kraljevo and Zrenjanin exceeded the benchmark

⁷⁴ Net current surplus is a surplus of recurrent revenues after all liabilities (operating expenditures and debt service) are paid.

ratio of 20 percent set by the World Bank Municipal Finance Self-Assessment Tool.⁷⁵ Sombor, Šabac and Leskovac achieved moderate creditworthiness, while Niš, Užice, Kragujevac and Novi Sad showed low creditworthiness. Only Novi Pazar showed very low creditworthiness, with a ratio of only 2 percent (Figure 36).

Figure 37. Borrowing capacity (EUR millions)



Source: Authors' interpretation based on final budget accounts of analyzed cities

Despite their general creditworthiness and borrowing capacity, the analyzed cities make very little use of long-term credit to support financing needed green investments. In fact, their use of long-term credit has diminished in relative terms over the last 10 years, mirroring the national trend. In the period 2012–2022, the total local debt, as a percentage of GDP, declined from 2.3 percent to 0.8 percent.⁷⁶ This partly reflects the cities' preference for – and growing reliance on – capital grants from the central government to finance investments. Borrowing capacity is governed by the Law on Public Debt, which sets limits on local short-term borrowing for cash-flow management and long-term borrowing for capital investment. According to the law's debt ceiling provisions,⁷⁷ the 10 cities have ample borrowing capacity and are able to borrow a combined maximum of an additional RSD 28.7 billion (EUR 244 million) in new debt. As shown in Figure 37, Novi Sad alone has the capacity to borrow up to EUR 96 million more.

The supply of long-term financing does not appear to be a constraint. There are numerous international financial institutions and donor-supported programs⁷⁸ that have recently financed green investment projects and that provide technical assistance programs. The Government of Serbia also has its own Green Fund financed from various environmental fees. LSGs could also raise funds by issuing bonds or borrowing directly from international finance institutions and commercial banks.

Instead, the binding constraint appears to be the inability of cities to prepare bankable projects. According to a recent EU-sponsored study,⁷⁹ most Serbian LSGs do a poor job of project preparation. "With very few exceptions, (local) public servants currently do not possess adequate knowledge or skills to perform efficiently tasks related to local planning, infrastructural development and management." Many respondents interviewed for the report

⁷⁵ Better Cities, Better World – A Handbook for Local Governments, World Bank.

⁷⁶ Ministry of Finance, Public Debt Administration: <https://javnidug.gov.rs/en/>.

⁷⁷ The provisions governing long-term borrowing allow LSGs to borrow in domestic and foreign capital markets, in domestic or foreign currency, and in the form of loans or bonds. All such borrowing is subject to two ceilings: (1) the total long-term debt may not exceed 50 percent of the total current revenues realized in the previous year, and (2) debt service may not exceed 15 percent of the total current revenues realized in the previous year.

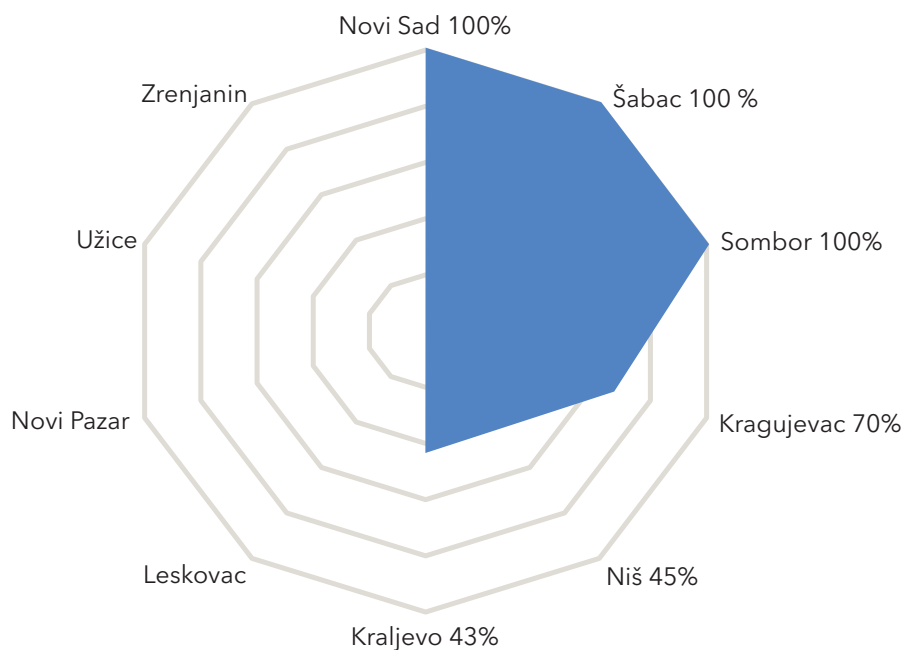
⁷⁸ International donors include, amongst others, the World Bank, EBRD, EC, UNDP, SDC, SECO, SIDA, GIZ, KfW.

⁷⁹ European Union and Council of Europe. 2017. Report on Training Needs Analysis in The Republic of Serbia.

noted a “surplus of low-capacity employees and lack of capable staff.” The report notes that some of the larger LSGs have developed internal capacity to prepare projects, while others managed to overcome the internal lack of capacity through partnership with CSOs, local businesses, regional development agencies, etc. However, the overall perception is that “due to the lack of capacity in project preparation, donor funds are not used to their full potential.”⁸⁰

One important step towards addressing this issue would be to improve the process of local investment planning and budgeting. Serbian legislation provides a framework for local investment planning, but it is not consistently adhered to in practice. The Law on the Planning System requires LSGs to prepare local development plans, but only a small number of LSGs have done so -- and mostly with technical assistance from international donors. The Budget System Law, for its part, requires LSG annual budgets to include three-year plans for funding capital expenditures. Six of the 10 analyzed cities adopted three-year capital expenditure plans in their 2022 budgets, but only Novi Sad, Šabac and Sombor managed to link the capital expenditure plan with the organizational and program budget in the LSG’s Budget Decision for the first year of implementation (Figure 38). And only Novi Sad’s plan contains all the prescribed data for each project, including the budget classification, implementation period, total value, degree of completion, annual amount and sources of financing, and expenditures after the planning period.

Figure 38. Level of integration of the capital expenditures plan into the budget



Source: Authors’ interpretation based on 2022 budget decisions of analyzed

Capital investment planning depends on each city’s capacity to set its own rules and procedures for proposing, evaluating, and selecting capital investment projects for implementation and financing; this has led to ineffective public spending. Serbian legislation contains a well-developed set of rules and procedures for capital investment planning for projects with a value above EUR 5 million. However, since nearly all local projects cost less than EUR 5 million, LSG capital investment projects are not subject to this law. The planning of local projects is subject to the law regulating the annual budgeting process, but there are no relevant rules and procedures for the development of medium-term capital expenditure plans. Thus, the cities lack guidance and incentives to improve their local investment planning and budgeting process. Acting on their own, some of the cities do better than others (see Box 7).

⁸⁰ European Union and Council of Europe. 2017. Report on Training Needs Analysis in the Republic of Serbia, <https://rm.coe.int/1680709656>.

Box 7. Good Capital Investment Practices

Novi Sad follows an advanced and integrated three-year capital investment planning process that is linked to budget planning.

The current Capital Investments Plan (CIP) of Novi Sad for 2022-2024 adopted by the City Council was drafted by the Capital Investments Committee with the support of the Finance Department in all professional, technical and administrative matters, fully in accordance with the Regulation on Capital Investments Management. The CIP includes 196 capital investment projects and contains all prescribed data for each project, including budget classification (organizational, functional, program), implementation period, total value, degree of completion, annual amount and sources of financing, and expenditures after the planning period. It was used for drafting the 2022 Budget Decision for the city. The Sector for Financial Monitoring and Analysis of Capital Projects within the Finance Department is responsible for monitoring project implementation.

By adopting the Local Development Plan (LDP) for 2021-2031, Kragujevac has established a planning framework for capital investment management.

Kragujevac is gradually developing its own rules and procedures in accordance with national regulation, i.e., it has formed a Committee for Capital Investments and a Project Management Unit. The LSG created a database of project ideas during preparation of the LDP using the network portal of the offices for local economic development. Although the medium-term plan has not been officially adopted for the first three-year period, the LDP lists 149 priority projects worth EUR 12.1 million, which were planned to start in 2021-2023. However, the city's creditworthiness outlook for 2022-2024 is weak due to the LSG's high debt burden. Therefore, investments will depend on the generation of earmarked current and capital revenues and the use of budget surplus from previous years.

Novi Sad also provides an example of good practice in debt management and accessing capital markets.

The city has an advanced debt management system. In 2011, Novi Sad became the first LSG in Serbia to issue municipal bonds in the local capital market, and it was one of the first three LSGs in Serbia rated by Moody's Investors Service in 2010. Novi Sad's latest credit rating is Ba2, according to Moody in 2021, which rated the city as having a stable outlook.

Sombor offers an example of good practice in capital project implementation through public-private partnerships (PPP).

The city has entered PPPs for gas distribution and public lighting, which have supported climate change mitigation through the implementation of energy efficiency measures. Two additional PPP projects relating to the treatment and disposal of waste at Rančevo landfill and to the maintenance of local road infrastructure have been approved by the PPP Commission.

6.5 RECOMMENDATIONS

While the current financial health of the 10 analyzed cities is fairly sound, local government finance reforms are necessary to support financing needed green urban investments. Best international practice shows that the introduction of performance-based financing for local governments can serve as an incentive for local governments to direct more of their public expenditures to productive purposes and to investments in sustainable and green urban development.⁸¹ A national program of performance-based transfers for large and medium-sized cities can motivate LSGs to increase their fiscal base, improve urban management and institutional performance, and increase investments in resilient urban infrastructure. The priority recommendations to support the cities in raising financial resources for green and resilient urban development are the following:

- At the national level, introduce a performance-based fiscal transfer system for LSGs to incentivize improved urban management and institutional performance;
- Consider increasing the level of funding for general (unconditional) transfers to LSGs and the allocation of capital grants for investments that have country-wide benefits (such as sewage treatment and renewable energy sources for district heating);
- Review property tax rates and PUC tariffs and consider raising them; and
- Improve LSG capacity to plan bankable projects, including compliance with capital investment planning requirements and procedures, to increase access to available external resources for green investments and utilize borrowing capacity.

⁸¹ S. Randjelovic and S. Vukanovic. 2021. Fiscal decentralization and local public investment policy in the Republic of Serbia.

7. CONCLUSIONS AND KEY RECOMMENDATIONS

The analysis of 10 Serbian secondary and mid-sized cities, as presented in the previous chapters, identifies key trends and challenges facing the cities specifically and the constraints that are holding them back from reaching their potential to enable the country's green growth transition. The analysis points to several key findings:

1. Serbian cities need to plan and prepare explicitly for a declining and ageing population. At the same time, national policy needs to support development of medium-sized cities into regional growth centers or poles, based on their comparative economic advantages.
2. LSGs face capacity constraints to meet urban planning obligations and to ensure socially just and climate and disaster-risk informed planning.
3. Urban sprawl and deteriorating air quality are hampering green urban development.
4. Current communal infrastructure systems have negative environmental impacts and are in need to be upgraded to be climate-smart.
5. LSGs lack sufficient resources to finance needed green investments.

To support Serbia's Sustainable Urban Development Strategy (SUDS) and the country's green growth trajectory, the Government of Serbia must address the compounding challenges its cities face in a more targeted manner, through actions at the local level.

The Sustainable Cities Serbia report found that cities are the key agents to fulfilling the country's sustainability and climate goals and that the time is now to unlock their potential. To this end, a city-level assessment was conducted to support both the central government and the LSGs of the 10 analyzed cities to identify where each of the cities stands in terms of needs, gaps and achievements, and to offer recommendations targeted to address each city's specific challenges. The analysis and key findings presented in this report on the 10 selected cities provide the base for identifying and prioritizing actions to be implemented at the local level.

The main challenges to green urban development of the 10 analyzed cities and recommended actions to address the challenges are summarized in Table 4. The set of recommendations is aimed to support decision makers in the development of green, livable and resilient cities in Serbia, to enable the country's green growth transition. To implement the recommended actions effectively will require prioritization and collaboration between national and local government agencies, and between LSGs at the regional level. In other words, cross-jurisdictional and cross-sectoral cooperation will be key to transform the cities and unlock their green development potential.

Table 4. Summary of challenges and recommendations for the 10 analyzed cities

Challenges	Recommendations
<p>Planning:</p> <p>Capacity constraints to meet urban planning obligations and to support climate and disaster-risk informed planning</p>	<ul style="list-style-type: none"> • At the national level, streamline the planning system by simplifying administrative requirements for mandatory and optional planning documents, adjusting to realities on the ground (at the LSG level); • Support horizontal and vertical cooperation to ensure alignment between national and local plans (including spatial, urban development and sectoral plans); • Improve capacity of LSGs to integrate land use and sectoral plans to promote sustainable development through coordinated investments; • Develop and implement climate resilient and risk-informed urban plans (for all identified significant hazards, e.g., landslides, earthquakes, floods for category II rivers); • Develop and maintain updated disaster risk assessments, disaster risk reduction plans and contingency plans to ensure the continuity of critical infrastructure in the event of disasters; and • Improve the quality of data, to support evidence-based planning and investment decision-making and to monitor performance indicators. This includes developing and enhancing GIS systems and developing a digital platform for inter-agency coordination to improve service planning and delivery.
<p>Urban development:</p> <p>Uncontrolled urban sprawl and poor air quality</p>	<ul style="list-style-type: none"> • Support zoning that aligns spatial growth scenarios with population projections, revising planned expansion of build-up areas where necessary; • Promote evidence-based planning and infrastructure investment taking into account demographic decline; • Strictly control informal construction and devise strategies for dealing with existing informal settlements; • Strengthen local level capacity for implementation of strategies dealing with existing informal settlements; • Support development of local air quality plans and citywide urban greening plans; • Prioritize urban regeneration and brownfield redevelopment over greenfield development; and • Promote cross-jurisdictional cooperation as a governance tool to aggregate capacity across lower capacity LSGs.
<p>Communal services and infrastructure:</p> <p>Underdeveloped waste management systems</p>	<ul style="list-style-type: none"> • At the national level, support the development of regional waste management plans and institutional systems for each city; • Support investments in containers and vehicles in the cities where waste collection service coverage is insufficient; • Adopt environmentally sound methods of waste treatment in the seven cities that rely on non-compliant municipal landfills and provide support to the cities to establish regional landfill arrangements; • Increase inspection controls and introduce penalties for the use of illegal dumpsites; • Increase the rate of recycling of household waste by providing convenient receptacles and offering incentives; • Promote cross-jurisdictional cooperation as a governance tool to aggregate capacity across lower capacity LSGs, and • Promote eco behavior through public campaigns.

Challenges	Recommendations
<p>Communal services and infrastructure:</p> <p>Deficiencies in <i>water supply, sewerage</i> and climate-resilient <i>drainage</i> systems</p>	<ul style="list-style-type: none"> • Prioritize infrastructure investments to expand water supply service coverage in urban areas where infrastructure is lacking; • Urgently draw and start implementing non-revenue water (NRW) reduction plans; • Implement sanitary protection of water sources as per national regulations; • Rehabilitate and expand sewerage systems and build new wastewater treatment plants in compliance with EU requirements; • Design and implement adequate urban stormwater drainage systems to cope with urban flooding; and • Develop and/or maintain an information management system to coordinate capital investment planning, service delivery, and lifecycle operation and maintenance of water systems.
<p>Communal services and infrastructure:</p> <p><i>Energy</i> systems that rely heavily on fossil fuels and are highly inefficient</p>	<ul style="list-style-type: none"> • Continue to replace fossil fuels with renewable energy sources for the generation of heat; • Rehabilitate DH transmission systems to reduce heat losses; • Expand the use of consumption-based tariffs to encourage conservation and energy-focused building rehabilitation; • Replace conventional lightbulbs with LED bulbs for public lighting; • Complete energy efficiency plans (for the cities that have not done so already) and regularly report progress to the central authorities; and • Promote cross-jurisdictional cooperation as a governance tool to aggregate capacity across lower capacity LSGs.
<p>Communal services and infrastructure:</p> <p><i>Urban mobility</i> systems that contribute significantly to carbon emissions and pose road safety concerns</p>	<ul style="list-style-type: none"> • Improve mobility data collection to support effective policy making; • Support development of integrated, multi-modal urban mobility plans and systems; • Increase investments in non-motorized transport infrastructure (e.g., sidewalks, crosswalks, bike lanes); • Convert aging public bus fleet to clean energy; • Consider local transport pricing policy reform to incentivize use of public transport; and • Establish fully functional local Road Safety Councils and invest in road infrastructure system improvements, maintenance and management to improve road safety
<p>Local finance:</p> <p>LSGs lack sufficient resources to finance needed green investments</p>	<ul style="list-style-type: none"> • At the national level, introduce a performance-based fiscal transfer system for LSGs to incentivize improved urban management and institutional performance; • Consider increasing the level of funding for general (unconditional) transfers to LSGs and the allocation of capital grants for investments that have country-wide benefits (such as sewage treatment and renewable energy sources for district heating); • Review property tax rates and PUC tariffs and consider raising them; and • Improve LSG capacity to plan bankable projects, including compliance with capital investment planning requirements and procedures, to increase access to available external resources for green investments and utilize borrowing capacity.

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