Vol. 2(2): 167-177 (2025)

Journal of Regenerative Economics

10.5937/jre2502167K

# SUSTAINABLE URBAN MOBILITY IN SERBIAN CITIES: STATUS, CHALLENGES, AND POLICY DIRECTIONS

**Ivana Kostadinović**
Faculty of Economics, University of Niš, Serbia
✉ ivana.kostadinovic@eknfak.ni.ac.rs
https://orcid.org/ 0000-0002-7676-3472

**Marina Stanojević**
Faculty of Economics, University of Niš, Serbia
✉ marina.stanojevic@eknfak.ni.ac.rs
https://orcid.org/ 0000-0002-5784-1607

**Dejan Ž. Đorđević**
Faculty of Economics, University of Niš, Serbia
✉ dejan.djordjevic@eknfak.ni.ac.rs
https://orcid.org/ 0000-0003-4568-7523

***Abstract:*** *This paper examines sustainable urban mobility in Serbian cities within the broader context of European transport decarbonization imperatives and the country's EU accession process. Serbian cities are navigating the transition from car-centric transport paradigms toward more sustainable, inclusive, and multimodal mobility systems. This paper provides a state-of-the-art review of urban mobility in Serbia, covering the existing public transport infrastructure, active mobility conditions, policy frameworks, electric vehicle adoption, and walkability enhancement. Drawing on academic literature, institutional reports, and recent policy documents, the review identifies persistent structural challenges while highlighting significant momentum toward sustainable urban mobility planning. Serbian cities can substantially advance sustainable mobility by drawing on the best practices of developed cities; however, the effective transfer of these approaches requires their careful adaptation to local conditions through gradual implementation, intensive public awareness and education efforts, and consistent long-term political support.*

***Keywords:*** *urban mobility, public transport, sustainable mobility, SUMP.*

Original scientific paper
Received: 29.06.2025
Accepted: 30.12.2025

## 1. Introduction

Cities are the engines of national economies, and the manner in which people move within them is a fundamental determinant of economic productivity, environmental quality, and social equity (Newman & Kenworthy, 1999). Across the European continent, sustainable urban mobility has become a policy priority of the first order, driven by climate commitments, public health imperatives, and the broader ambitions of the European Green Deal. Serbia, a candidate country for European Union membership, finds itself in a transitional moment, one where inherited post-socialist urban forms, rapidly growing car ownership, and insufficient public transport investment are simultaneously challenged and partially countered by a new wave of strategic planning frameworks and international financing.

With approximately 57% of its population residing in urban areas (World Bank, 2023), and with Belgrade anchoring a metropolitan region of nearly two million inhabitants, Serbia's urban mobility challenges are neither marginal nor abstract. They manifest daily in congested arterial roads, overcrowded and aging bus fleets, dormant rail infrastructure, and active transport networks that remain vastly inadequate by European standards. At the same time, the country is witnessing the gradual emergence of Sustainable Urban Mobility Plans (SUMPs), renewed investment interest in rail and metro infrastructure, and the initial rollout of electric vehicle charging networks representing all signals of a system in transition.

This paper surveys the state of the art of urban mobility in Serbia, organizing the analysis around five thematic pillars:

1) the structural context of Serbian urbanization and transport heritage;
2) public transport systems and their performance;
3) active mobility and micromobility;
4) policy and planning frameworks;
5) emerging trends and strategic investments.

Urban transport in Serbia stands at a crossroads. On one hand, the country is experiencing the same macro-level pressures that have driven sustainable mobility reform across Europe: growing urban populations, worsening air quality, rising transport-related greenhouse gas emissions, and the fiscal and public health costs of traffic congestion. On the other hand, Serbia's specific history as a post-socialist transition economy has shaped a distinctive urban mobility landscape, one marked by rapid motorization since the 1990s, inherited but underinvested public transport infrastructure, and limited institutional capacity for integrated transport planning. The urgency of reform has been compounded by Serbia's trajectory toward European Union membership.

Urban mobility in Serbian cities is undergoing a gradual but noticeable transformation, shaped by broader European sustainability agendas, technological advancements, and evolving societal preferences. While the transition remains uneven and context-dependent, several key trends can be identified.

## 2. Mobility Patterns in Serbian Urban Context

Understanding urban mobility in Serbia requires situating it within the country's distinct urban development trajectory. Unlike Western European cities, where compact, transit-oriented growth patterns were established over centuries, Serbian cities experienced a period of rapid, automobile-influenced spatial expansion during the late socialist era, followed by a disruptive post-1990 transition characterized by deindustrialization, informalization of land use, and weak planning governance (Nedović-Budić et al., 2011). The cumulative effect has been a built environment that is neither sufficiently compact to support efficient public transport nor adequately dispersed to accommodate car-based mobility without severe congestion.

Serbia's urban system is highly primate: Belgrade, the capital, concentrates approximately 1.7 million residents and functions as the dominant political, economic, and cultural centre (BFPE, 2020). The next tier of cities, Novi Sad (approximately 280,000 inhabitants), Niš (approximately 260,000), Kragujevac (approximately 165,000), and Subotica (approximately 100,000) are substantially smaller. Beyond these, Serbia has a network of medium-sized cities (Šabac, Pirot, Kruševac, Zrenjanin, Smederevo, Sremska Mitrovica, and others) that together account for a significant share of the country's urban population but receive comparatively little research attention in the sustainable mobility literature.

This urban hierarchy has direct implications for transport planning. While Belgrade generates sufficient ridership density to support diverse public transport modes such as trams, trolleybuses, buses, and suburban rail, medium and smaller cities often rely almost exclusively on bus services, with lower frequencies and older fleets than those found in the capital. Peripheral urban areas and peri-urban zones face a particularly acute mobility gap, where low density and service infrequency make private car use structurally rational even for residents who might prefer sustainable alternatives.

Motorization has accelerated in tandem with rising incomes. Serbia currently has more than 2.5 million registered vehicles, the majority of which are passenger cars. Critically, the national vehicle fleet is aging, with an average vehicle age of approximately 15 years, a consequence of the prevalence of imported used cars, which are considerably more affordable than new ones. Older vehicles produce disproportionately higher emissions and are involved in more severe traffic incidents, compounding both environmental and safety challenges.

Air quality remains a high-salience driver for sustainable mobility in Serbian cities. Analyses summarizing the Serbian Environmental Protection Agency reporting indicate that in 2024 $PM_{10}$ remained the dominant pollutant nationally, and that large cities experienced excessive pollution episodes; media summaries highlight exceedances in major urban areas and identify additional pollutants (e.g., $NO_2$) in the capital region. A limitation for comparative urban mobility research is that while air-quality reporting is systematic, linking air-quality outcomes to specific transport interventions requires higher-resolution emissions inventories and evaluation designs, which are not consistently published for Serbian cities.

### 3. Emerging Trends in Urban Mobility in Serbian Cities

The modernization and partial electrification of public transport systems are gaining momentum. Investments in cleaner vehicle fleets, including electric and hybrid buses, reflect increasing alignment with environmental objectives and EU policy standards. However, challenges related to infrastructure, financing, and operational efficiency remain.

Active mobility, especially cycling and walking, is receiving increasing attention. Cities have begun expanding cycling infrastructure and pedestrian zones, although these efforts are still fragmented and often lack network continuity. Nevertheless, changing attitudes, particularly among younger populations, indicate growing demand for these modes. Walking and cycling occupy a paradoxical position in Serbian urban mobility. They account for a significant share of total trips: particularly short-distance urban journeys, yet receive minimal infrastructure investment and are treated as marginal in most transport planning frameworks. Cycling infrastructure, where it exists, is fragmented and often discontinuous; pedestrian environments in many urban neighborhoods remain uncomfortable, unsafe, or inaccessible to people with limited mobility.

Nonetheless, pockets of best practice exist. Novi Sad, Subotica, and Pirot are consistently cited as cities with comparatively advanced cycling cultures and more developed cycling infrastructure relative to their size (BFPE, 2020). Novi Sad, in particular, has committed to expanding cycling lanes and has recently introduced electric bus procurement as part of a broader sustainable urban development agenda, positioning itself as a model for other Serbian cities.

Shared mobility services remain embryonic. Prior to recent developments, the only ride-hailing service in Belgrade was Car:Go, while bike-sharing systems were available in a limited number of cities, with 15 stations in Belgrade, 10 in Novi Sad, and a handful in Niš and Subotica, largely concentrated around recreational areas rather than commuting corridors (GETS Report, 2020).

Another notable trend is the emergence of shared and smart mobility solutions. Services such as bike-sharing, e-scooter systems, and digital mobility platforms are becoming more visible, particularly in larger urban centers. These innovations contribute to the diversification of mobility options, although regulatory frameworks are still evolving. There is also a gradual shift toward data-driven and participatory approaches to urban mobility governance. The use of digital tools, mobility data, and stakeholder engagement processes is increasing, supporting more informed and inclusive decision-making.

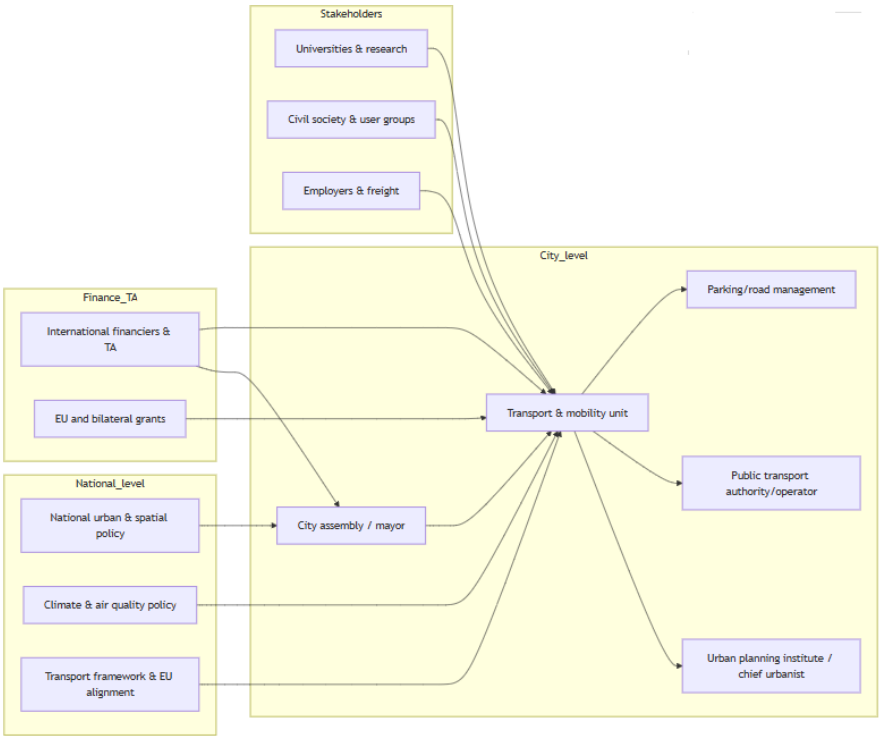
## 3. Policy Directions: Toward Sustainable Urban Mobility in Serbian Cities

Serbia has adopted major framework policies relevant to urban mobility. The Sustainable Urban Development Strategy of the Republic of Serbia until 2030 (adopted in 2019, Official Gazette) defines national priorities for sustainable urban

development, explicitly including urban mobility as a policy domain to be addressed alongside public spaces, inclusion, institutions, and finance.

The governance structure for sustainable urban mobility in Serbia typically spans national ministries, city governments, public transport operators, infrastructure and parking entities, academia, civil society, and international financiers. A city-level SUMP (City of Niš, 2025) often formalizes steering bodies and working units that include municipal departments, public companies, universities, and stakeholder organizations.

**Figure 1: Conceptual framework for sustainable urban mobility model**




*Source:* Authors

## 3. Implications and Recommendations for Enhancing Sustainable Urban Mobility

he findings indicate that advancing sustainable urban mobility in Serbia requires coordinated action across public institutions, the private sector, and citizens. Despite the existence of strategic frameworks, implementation remains limited, reflecting challenges commonly identified in transition economies, such as institutional fragmentation, insufficient funding, and car-dependent mobility patterns.

### 3.1. Recommendations for Public Policy Makers

Strengthening the regulatory and strategic framework is essential. Sustainable Urban Mobility Plans (SUMPs) should be legally recognized and integrated into formal spatial planning systems to ensure continuity and enforceability. International practice highlights that institutionalizing SUMPs significantly improves implementation outcomes (European Commission, 2023). In parallel, Serbia should adopt a dedicated national action plan to support local governments through co-financing mechanisms, technical assistance, and capacity building.

Improving regulatory coherence and enforcement is equally important. Clear standards for cycling infrastructure, pedestrian safety, and emerging mobility modes (e.g., e-scooters) should be established, accompanied by stronger monitoring mechanisms. Previous studies emphasize that regulatory gaps and weak enforcement often undermine sustainable mobility transitions in Southeast Europe.

Sustainable financing mechanisms must also be developed. Diversified funding sources, including national funds, public–private partnerships, and international financial instruments (e.g., EIB, EBRD), are critical for both infrastructure development and long-term maintenance. At the same time, strengthening institutional capacities and fostering intersectoral coordination can enhance policy effectiveness and support data-driven decision-making. Promoting intermodality and integrated transport systems through unified ticketing, multimodal hubs, and improved connections between transport modes can significantly increase the attractiveness of sustainable alternatives

### 3.2. Recommendations for Economic Actors

The private sector plays a crucial role in the development of sustainable mobility systems. Investments in green transport infrastructure and services should be encouraged, including electric vehicle charging networks, shared mobility systems, and digital platforms for smart transport management. Public–private partnerships represent a viable model, particularly in the public transport sector, where private operators can contribute to service provision under appropriate regulatory oversight.

Support for the transition toward electric mobility and domestic production capacities is also essential. Serbia has the potential to position itself within emerging value chains related to electric vehicles and associated technologies. Incentives for innovation and investment in this sector could yield significant environmental and economic benefits.

Companies should also adopt internal mobility policies aimed at reducing congestion and environmental impact. Measures such as promoting carpooling, supporting cycling infrastructure for employees, and subsidizing public transport use can contribute to broader systemic improvements. In addition, active participation of businesses in urban planning processes can foster innovative solutions, particularly in areas such as urban logistics and last-mile delivery.

### 3.3. Recommendations for Citizens and Local Communities

Citizens play a fundamental role in the transition toward sustainable mobility through their everyday travel behavior. A gradual shift away from private car use toward walking, cycling, and public transport can significantly reduce congestion and environmental impacts. Even partial behavioral changes, such as reducing car use several days per week, can generate substantial cumulative benefits. Active engagement in community initiatives is equally important. Local communities should participate in planning processes, advocate for safer and more inclusive transport infrastructure, and collaborate with public authorities in identifying and addressing local mobility challenges. Civic initiatives and grassroots movements have already demonstrated their capacity to influence policy outcomes.

Furthermore, citizens should support and participate in awareness campaigns aimed at improving traffic culture and safety. Educational activities, community events, and participation in initiatives such as European Mobility Week can contribute to broader societal shifts in mobility behavior. Acceptance of innovative mobility solutions is also critical. The adoption of shared mobility services, digital applications, and emerging transport technologies can enhance efficiency and accessibility. At the same time, users should provide feedback to ensure that such innovations are implemented in a safe and inclusive manner (OECD, 2024).

Responsible use and maintenance of existing infrastructure is essential for long-term sustainability. Citizens contribute to system resilience by respecting public space, reporting infrastructure issues, and supporting a culture of shared responsibility.

## 4. Conclusion

The transition toward sustainable urban mobility in Serbia represents a complex, multi-dimensional, yet ultimately attainable policy and development endeavor. Contemporary Serbian cities are increasingly confronted with pressures that many European metropolitan areas have faced over recent decades, such as persistent congestion, deteriorating air quality, high energy dependence, road safety risks, and unequal access to employment, education, and services. Against this backdrop, the strategic challenge is to shift from a long-standing car-dominant mobility paradigm to a more balanced and integrated transport system that prioritizes people, public space quality, and environmental performance, while maintaining economic efficiency and urban functionality. In practical terms, this implies strengthening multimodality and rebalancing the modal split in favor of walking, cycling, and high-quality public transport, complemented by measures that manage private car use more effectively.

The analysis indicates that Serbia has entered a formative stage in which planning frameworks and policy commitments are increasingly present, and initial implementation steps have been undertaken, most notably in Belgrade, Novi Sad, and Niš. These steps include the preparation of strategic documents, the introduction of selected public transport and active mobility interventions, as well

as growing incorporation of sustainability principles into local development agendas. However, the pace and scale of tangible change remain insufficient to produce systemic effects across the urban areas. In other words, while "planning readiness" is improving, the translation of plans into street-level transformation such as reallocation of road space, continuity of cycling networks, upgrades in public transport reliability and accessibility, and the consistent application of demand-management tools, has not yet reached the critical mass required for a decisive mobility transition.

Achieving measurable progress will depend on coordinated governance across levels of decision-making and on the alignment of institutional, financial, and regulatory instruments. At the national level, the state has a decisive role in establishing a coherent enabling framework through legislation, strategic guidance, funding mechanisms, and technical standards consistent with European best practices. This includes stable and predictable financing for public transport modernization and active mobility infrastructure, strengthened regulatory support for Sustainable Urban Mobility Plans (SUMPs), and improved capacity for monitoring and evaluation through standardized indicators. At the local level, municipal governments must assume a proactive implementation role, combining infrastructure delivery with policy experimentation and adaptive management. This approach can include pilot projects (e.g., temporary street redesigns), low-cost urbanism solutions, and iterative scaling based on evidence regarding safety, user satisfaction, and modal shift.

The private sector is likewise a critical stakeholder in the transition, both as a provider of technological and service innovations (e.g., digital ticketing, mobility-as-a-service solutions, micromobility systems) and as an investor and partner in the modernization of logistics and fleet management. Equally important, employers can contribute through workplace mobility plans that encourage sustainable commuting patterns. Finally, citizens are not merely end-users of mobility systems but co-producers of their long-term legitimacy and effectiveness: acceptance of change in the use of public space, shifts in travel behavior, and active participation in planning processes are essential to sustaining reforms over time. The transition is therefore not only a technical issue of infrastructure provision but also a social process shaped by trust, social norms, public communication, and perceptions of fairness, particularly regarding the distribution of mobility benefits and burdens.

Over the medium term, approximately within the next decade, Serbian cities could credibly approach the vision of *cities designed for pedestrians and cyclists*, characterized by cleaner air, reduced traffic-related stress, improved road safety, and more equitable access to mobility across socio-economic groups. Reaching this outcome requires a sustained commitment to implementation, the consistent prioritization of evidence-based measures, and the institutional capacity to coordinate across sectors (transport, environment, public health, urban planning, and economic development). The goal is not to eliminate car use altogether, but to ensure that private automobiles no longer define urban form and public space allocation at the expense of healthier, more inclusive, and environmentally responsible mobility options. With a coherent policy mix, adequate investment, and

strong stakeholder engagement, the transition to sustainable urban mobility is not only desirable but realistically achievable in Serbia.

## References

Alyavina, E., et al. (2025). Assessing the impact of Mobility-as-a-Service (MaaS) on sustainable urban travel behaviors: A systematic literature review. Frontiers in Sustainable Cities. https://doi.org/10.3389/frsc.2025.1645488

Amara, S., et al. (2025). Promoting Sustainable Transport: A Systematic Review of Walking and Cycling Adoption Using the COM-B Model. Future Transportation, 5(3), 79. https://doi.org/10.3390/futuretransp5030079

Belgrade Fund for Political Excellence (BFPE). (2020). On sustainable urban mobility in the National Assembly: 'Plan the city for people.' Retrieved from https://en.bfpe.org

Brand, C., et al. (2023). The effect of sustainable mobility transition policies on cumulative urban transport emissions and energy demand. Nature Communications, 14, 2357. https://doi.org/10.1038/s41467-023-37728-x

Božović, M. M., & Gladović, P. (2022). Estimation of the minimum required bus capacity between the hinterland and the centre of a functional urban region – a comparative study of the five largest Serbian cities. Journal of Maps, 18(1). https://doi.org/10.1080/17445647.2022.2147457

Buics, L., Prayogo, A., & Balassa, B. E. (2024). The Role of Demand-Responsive Transport Systems in Sustainable Urban Mobility: A Systematic Literature Review and Stakeholder Analysis. Engineering Proceedings, 79(1), 40. https://doi.org/10.3390/engproc2024079040

Chen, Z., et al. (2025). The landscape, trends, challenges, and opportunities of sustainable mobility and transport. npj Sustainable Mobility and Transport, 2(1), 26. https://doi.org/10.1038/s44333-025-00026-8

City of Niš. (2025). Plan održive urbane mobilnosti grada Niša za period 2023–2037 (POUM) – finalna verzija

Czeranowsky, F. (2025). Sustainable Urban Mobility Transitions — From Policy Uncertainty to the CalmMobility Paradigm. Smart Cities, 8(5), 164. https://doi.org/10.3390/smartcities8050164

Đorđević, T., et al. (2023). Walkability and bikeability for sustainable spatial planning (includes Novi Sad mode-share findings). Sustainability, 15(4), 3785

European Environment Agency (EEA). (2024). Greenhouse gas emissions from transport in Europe. EEA. https://www.eea.europa.eu/en/analysis/indicators/greenhouse-gas-emissions-from-transport

European Commission. (2023). Commission Recommendation (EU) 2023/550 on National Support Programmes for Sustainable Urban Mobility Planning. Official Journal of the European Union.

European Commission. (2024). Revised Trans-European Transport Network (TEN-T) Regulation. European Commission Directorate-General for Mobility and Transport.

European Commission. (2024). Sustainable urban mobility planning and monitoring. Directorate-General for Mobility and Transport. https://transport.ec.europa.eu

Filipović, S., Tica, S., Živanović, P., & Milovanović, B. (2009). Comparative analysis of the basic features of the expected and perceived quality of mass passenger public transport service in Belgrade. Transport, 24(4), 265–273.

Gender Equality in Transport Study in Serbia (GETS). (2020). Final report – key findings. Ministry for Human and Minority Rights and Social Dialogue, Republic of Serbia. Retrieved from https://www.rodnaravnopravnost.gov.rs

Jovanović, M. (2014). Urban transport energy consumption: Belgrade case study. TeMA – Journal of Land Use, Mobility and Environment.

Moreno, C., et al. (2021). Introducing the "15-Minute City": Sustainability, Resilience and Place Identity in Future Post-Pandemic Cities. Smart Cities, 4(1), 93–111.

Mouratidis, K., et al. (2025). Sustainable Mobility and Shared Autonomous Vehicles: A Systematic Literature Review of Travel Behavior Impacts. Sustainability, 17(7), 3092. https://doi.org/10.3390/su17073092

Nedović-Budić, Z., Djordjevic, D., & Dabovic, T. (2011). The mornings after – Serbian spatial planning legislation in transition. European Planning Studies, 19(3), 429–455.

Newman, P., & Kenworthy, J. (1999). Sustainability and cities: Overcoming automobile dependence. Island Press.

Organisation for Economic Co-operation and Development. (2024). Sustainable Accessibility for All. OECD Publishing.

Republic of Serbia Government. (2019). Strategija održivog urbanog razvoja Republike Srbije do 2030. godine (Official Gazette, No. 47/2019)

Standing Conference of Towns and Municipalities (SKGO/SCTM). (2019–2020). Sustainable urban mobility in Serbian cities and municipalities.

Transport Community. (2024). Sustainable and smart mobility strategy monitoring report 2024. https://www.transport-community.org

United Nations Development Programme (UNDP). (2025). What is sustainable transport and what role does it play in tackling climate change? UNDP Climate Promise. https://climatepromise.undp.org/news-and-stories/what-sustainable-transport

United Nations Environment Programme (UNEP). (2024). Urban Mobility. UNEP. https://www.unep.org/topics/cities/integrated-planning/urban-mobility

World Bank. (2019). Taking the long way home: Women and transport in Serbia. https://blogs.worldbank.org

World Bank. (2023). Sustainable transport infrastructure program kicks off for Serbian local governments [Press release]. https://www.worldbank.org

World Bank. (2025). Green and clean transport in the Western Balkans. https://www.worldbank.org.

## Acknowledgement

Funded by the European Union, under the GA101136834 - CROSS-REIS. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or European Research Executive Agency (REA). Neither the European Union nor the granting authority can be held responsible for them

# ODRŽIVA URBANA MOBILNOST U GRADOVIMA SRBIJE: STANJE, IZAZOVI I PRAVCI JAVNIH POLITIKA

**Apstrakt:** U ovom radu se analizira održivu urbanu mobilnost u gradovima Srbije u širem kontekstu imperativa dekarbonizacije transporta u Evropi i procesa pristupanja Srbije Evropskoj uniji. Gradovi u Srbiji suočavaju se sa kompleksnom tranzicijom od saobraćajnih sistema zasnovanih na dominaciji automobila ka održivijim, inkluzivnijim i multimodalnim modelima mobilnosti. Rad pruža pregled savremenih saznanja o urbanoj mobilnosti u Srbiji, sa posebnim fokusom na infrastrukturu javnog prevoza, uslove za aktivne vidove kretanja, institucionalne i planske okvire, usvajanje električnih vozila i inicijative usmerene ka unapređenju pešačenja. Polazeći od relevantne akademske literature, institucionalnih izveštaja i najnovijih strateških dokumenata, identifikuju se trajni strukturni i upravljački izazovi, ali i ukazuje na rastući zamah u planiranju održive urbane mobilnosti. Rezultati sugerišu da gradovi u Srbiji mogu ostvariti značajan napredak oslanjajući se na iskustva razvijenijih urbanih sistema mobilnosti; međutim, uspešan prenos ovih praksi zahteva njihovu pažljivu adaptaciju lokalnim socio-ekonomskim, institucionalnim i prostornim uslovima. Ovaj proces podrazumeva postepenu implementaciju, intenzivnu edukaciju i podizanje svesti javnosti, kao i kontinuiranu dugoročnu političku podršku.

**Ključne reči:** urbana mobilnost, javni prevoz, održiva mobilnost, SUMP, Srbija