



SUMP IT UP: PRAGUE MOVING TOWARDS SUSTAINABLE URBAN MOBILITY

Katarína Svitková

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About the Author

Katarína Svitková, Ph.D. is an Associate Research Fellow at EUROPEUM, focusing on areas of cities, climate change, sustainability and innovation. She earned a PhD in International Relations at the Department of Security Studies, Faculty of Social Sciences of the Charles University, focusing on urban governance and resilience policy of cities. She led and participated in several international research projects. Her monograph titled [*Resilience and Urban Governance: Securing cities*](#) was published by Routledge / Taylor and Francis in 2021. Katarina has worked as program manager, research associate, university lecturer and consultant in the public sector.

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EXECUTIVE SUMMARY

Cities play a significant role in the **process of decarbonization**. In reducing their carbon footprint, one of the key areas to focus on is **urban transportation**. Sustainable urban mobility is related to urban planning, active mobility, intramodality, technological innovation and economic viability. In order to explore the complex ways in which European cities make their transport systems 'greener', this policy paper is divided into several parts.

The first one looks into the carbon footprint of urban transport in general, **contrasting the impacts of car traffic to the ones of public transport**. Individual motorized traffic produces significantly higher emissions compared to public transport. Consequently, it makes sense to develop multi-modal public transport systems connecting the city core with peri-urban areas. Modernized and accessible public transit frees up space for the essential car traffic, including but not limited to, supply, maintenance and city logistics.

The **covid-19 pandemic brought a number of changes to urban mobility patterns in Europe**. While it temporarily reduced urban transit as a whole, the mid-term effects include a slight increase in active (pedestrian and cycling) mobility, but also a reduction of public transportation passenger numbers. The latter has not come back to the pre-pandemic levels, limiting the revenue of city transportation companies. This poses a challenge when it comes to financing operations and modernization of urban transport systems.

The second part focuses on the concept of **Sustainable urban mobility plan** (SUMP for short), a framework adopted by a multitude of cities across Europe to date. The general objectives of SUMP include emission reduction, road safety, public transport modernization, quality of life improvement, city brand building and innovation.



The paper offers an overview of the **SUMP of the City of Prague**, originally adopted in 2019. It identifies its 15 priority areas, along with examples of specific action measures (there are over 200 of them overall). In addition to some implementation issues, recent developments in areas of public transport and city logistics are discussed in more detail.

The conclusion summarizes the key messages and weighs the benefits of sustainable urban mobility against its political and economic costs. The author argues that **sustainability does not stand against prosperity**. Modernized, accessible and liveable cities attract innovation and investment, in addition to providing a healthier environment for residents, passengers and visitors.

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CITIES AND THE GREEN TRANSFORMATION

More than three quarters of the European population currently lives in cities. In addition to being economic powerhouses, cities are centres of infrastructure, knowledge generation, innovation and technologies.¹ Dynamic and innovative as they are, urban centres are also major polluters when it comes to CO₂ emissions. Cities are currently responsible for more than 80 % of all the global greenhouse gas (GHG) emissions causing climate change.²

This is also why cities often play the role of change makers, spearheading initiatives in climate policy and its implementation. Climate action leadership on the level of mayors often surpasses that of national governments, for reasons ranging from ideological to practical.³ Cities and municipalities have formed multiple associations, platforms, and movements focused on climate sustainability, such as *C40 Cities Climate Leadership Group*,⁴ *Carbon Neutral Cities Alliance*⁵, *European Covenant of Mayors*⁶ or *Net Zero Cities*.⁷

The role of urban planning in its widest sense is central to reducing carbon emissions in cities. Aiming for long-term sustainability and resilience, there are many organizational and technical ways cities can do that. One of the key aspects is **decarbonization of urban transport** with the objective to achieve sustainable and efficient urban mobility. This concerns many related areas such as public transport, pedestrian and cycling infrastructure, fuel policies, parking pricing and tolls, city logistics, and others.

¹ Net Zero Cities. 2023. Towards climate neutral European Cities by 2030. Available at: <https://netzerocities.eu/>

² Lassen, C., Davidova, K. 2018. *Sustainable Urban Mobility*. Heinrich-Böll-Stiftung, Prague, 9/2018, p. 32.

³ Svitkova, K. 2021. *Resilience and Urban Governance: Securing Cities*. New York: Routledge, p. 6.

⁴ See C40. Undated. C40 Cities Network of Mayors. Available at: <https://www.c40.org/>

⁵ See CNCA. Undated. Carbon Neutral Cities Alliance. Available at: <https://carbonneutralcities.org/>

⁶ See European Commission. 2023. Covenant of Mayors – Europe. Available at: <https://eu-mayors.ec.europa.eu/en/home>

⁷ See NZC. 2023. Towards climate neutral European Cities by 2030. Available at: <https://netzerocities.eu/>



In order to explore the ways in which European cities make their transport systems 'greener', this study is divided into several parts. The first one looks into the carbon footprint of urban transport in general, contrasting the impacts of car traffic to the ones of public transport. Among other things, it considers the impact of the covid-19 pandemic on urban mobility in Europe. The second part focuses on the concept of *Sustainable urban mobility plan* (SUMP for short), a framework adopted by a multitude of cities across Europe to date. The third part serves as a case study of the City of Prague (CoP) and its SUMP, which was originally adopted in 2019. The final part then summarizes the key messages and weighs the benefits of sustainable urban mobility against its political and economic costs.

PRIVATE VS. PUBLIC TRANSPORT: WHY DOES IT MATTER?

Transportation-related traffic, infrastructure and operations are key aspects when it comes to decarbonisation of cities – for better and for worse. That said, **transport** accounts for approximately a quarter of all greenhouse gas (GHG) emissions in Europe and is the **single largest cause of air pollution in European cities**. The most problematic of all existing modes is road transport (i.e., motorized vehicles), accounting for about 70 % of all transport-related emissions.⁸

Negative impacts of transport of people and goods connected to high levels of carbon emissions also include noise pollution, public health impacts, fragmentation of public space, and environmental effects with regards to land use or conservation.

At the same time, **reliable and efficient transport is absolutely key to the everyday functioning and development of cities**. The solution is to transform

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⁸ Lassen, C., Davidova, K. 2018. *Sustainable Urban Mobility*. Heinrich-Böll-Stiftung, Conference publication, Prague, 9/2018, p. 27.



the existing transport systems to improve efficiency, optimize capacity, and modernise and decarbonise their infrastructure and operations.

To a large extent, sustainable urban mobility is related to accessible and reliable public transport. **Personal cars generate three times more GHG emissions than public transport systems do**, and even though personal cars account for only about one-third of trips made within cities worldwide, they are responsible for up to 73 % of air pollution. For instance, cities in the United States heavily reliant on personal motorized vehicles produce 50 % more carbon emissions compared to cities in Europe.⁹



Picture 1: Car traffic in Prague.

Prague Climate plan 2030, 2021, Department of Environment, Prague City Hall.

Reducing GHG emissions aligns with the wider European green objectives. As

much as 40 % of road transport is tied to cities, which means that emissions can be reduced by addressing daily mobility and commuting habits on the local level.¹⁰

This can be done in a focused, integrated way by planning for and building **multi-modal public transport systems connecting the city core with peri-urban**

⁹ Ibid., p. 33.

¹⁰ Degen, A. 2021. Building back European public transport after Covid-19. In *Urban Mobility after COVID-19. Long-term strategies for the sustainable mobility transition in European cities*. CIDOB publication nº 82, 07/2021. Available at: https://www.cidob.org/es/publicaciones/serie_de_publicacion/monografias/monografias/urban_mobility_after_covid_19_long_term_strategies_for_the_sustainable_mobility_transition_in_european_cities

areas. In addition to greatly helping to cut cities' carbon footprint, such systems are also important determinants of mobility and quality of life of residents and visitors.

This is why the European Commission continues to support transformation of cities with a strong focus on transport decarbonisation. Strengthening and modernising public transport in cities is an important part of this process. Especially large cities across Europe rely on complex systems of metro, urban trains, busses, trams, trolleybuses, boats and other means of public transport. The quality, reliability and sustainability of these systems varies. In any case, their desired transformation is supposed to follow three broad objectives: **decarbonization, digitalization and growth.**¹¹

URBAN MOBILITY AND THE COVID-19 IMPACT

As a result of the covid-19 pandemic starting in 2020, mobility in many European cities was affected in several waves. On one hand, cities experienced temporary reduction of urban transit as schools were shut and many people worked from home. This contributed to a temporary reduction of car traffic, which had some positive impact on air quality. At the same time, however, numbers of public transport passengers fell dramatically, due to a combination of distancing measures and a fear of infection.¹² This, in turn, boosted preference for **walking, cycling** and – for a proportion of commuters who saw no better alternative – **driving.**

¹¹ Ibid.

¹² Gragera, A. 2021. How can shared mobility contribute to the postpandemic urban mobility transition? In *Urban Mobility after COVID-19. Long-term strategies for the sustainable mobility transition in European cities.* CIDOB publication nº 82, 07/2021. Available at: https://www.cidob.org/es/publicaciones/serie_de_publicacion/monografias/monografias/urban_mobility_after_covid_19_long_term_strategies_for_the_sustainable_mobility_transition_in_european_cities



The effect on **public transport** was more than evident; **some cities in Europe experienced a 90 % drop of passenger numbers**. This caused considerable

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revenue losses throughout 2020 and 2021, combined with increased expenses related to the required distancing and sanitizing measures. All of this happened in the context where municipal budgets had already been strained.¹³ Closed spaces and relative proximity of strangers in public transport contributed to the fear of infection, despite the mandatory use of protective masks. Compared to public transport, more risk contacts often happened in schools, workplaces and places of leisure where the protective measures were difficult to enforce at times.

Picture 2: Prague tramway.

Prague Climate plan 2030, 2021, Department of Environment, Prague City Hall.

As noted above, the popularity of cycling increased as well with sales of bikes skyrocketing. Other services of micro-mobility such as scooters, e-bikes and such also grew in popularity –



however, their use is generally somehow limited by uncertainties and changing regulations that cities and municipal districts tend to adopt. In the meantime, the car traffic between

¹³ Degen, A. 2021. Building back European public transport after Covid-19. In *Urban Mobility after COVID-19. Long-term strategies for the sustainable mobility transition in European cities*. CIDOB publication n° 82, 07/2021.



cities and suburbs was somewhat boosted by a proportion of residents permanently moving to peri-urban areas; a move that is likely to create more pressure on the commuting infrastructure in the long run.¹⁴

That said, most cities have not managed to get the public transport passenger numbers back to the pre-pandemic levels. This poses a serious challenge to many cities across Europe when it comes to municipal revenue and car traffic.¹⁵ In the meantime, the benefits of public transport from the viewpoint of public health, public space, access and mobility are evident. This is why many European cities place a great emphasis on developing and modernising their current systems, often with the support of European frameworks and finance.

CITIES AND MOBILITY: EUROPE LEADS THE WAY

Within the broader framework of Europe's Green Deal, the current commitment of green transformation and cutting carbon emissions is, in the area of transport and development, closely tied to **urban mobility**. For more than a decade, a series of specific frameworks and initiatives focused on supporting sustainable public transport have been developed. In addition to its environmental and public health context, decarbonisation of transport in and between cities is closely related to innovation and economic development.¹⁶

On the level of concrete cities, site-specific plans and strategies are needed to achieve the broad objectives of transport decarbonisation and the necessary urban planning interventions. This is what led to the concept of **Sustainable urban mobility plans** (SUMP). Originally appearing in the European Commission's

¹⁴ Gragera, A. 2021. How can shared mobility contribute to the postpandemic urban mobility transition? In *Urban Mobility after COVID-19. Long-term strategies for the sustainable mobility transition in European cities*. CIDOB publication n° 82, 07/2021.

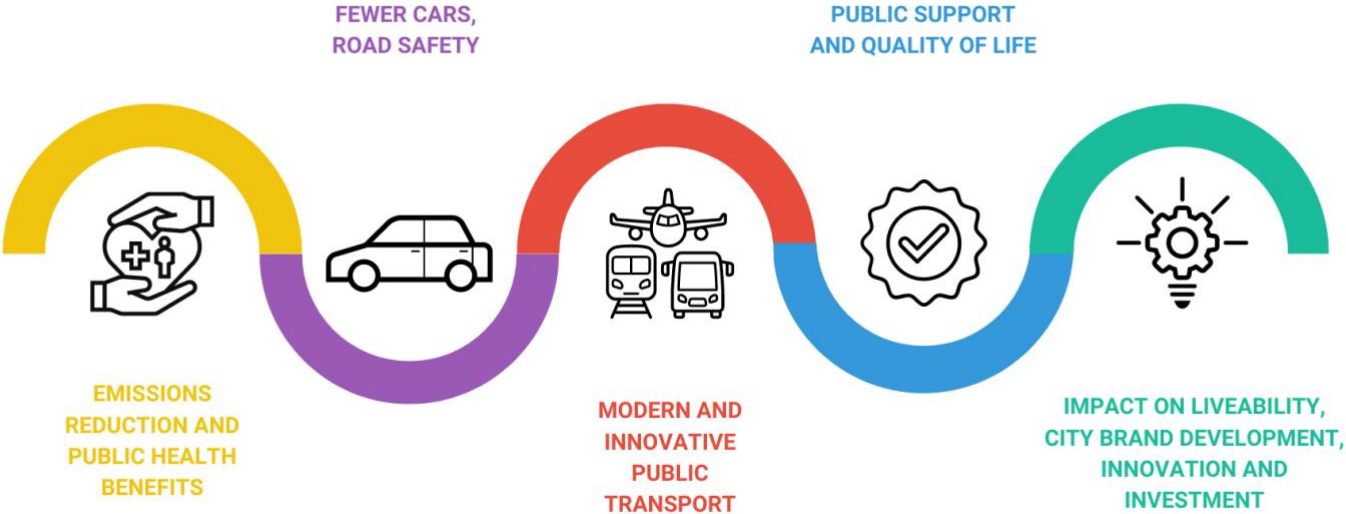
¹⁵ Tuck, A. 2023. Urban challenges for 2023. Monocle 24 Podcast: The Urbanist. 01/2023. Available at: <https://monocle.com/radio/shows/the-urbanist/587/>

¹⁶ For instance, the European Institute of Innovation and Technology has supported innovation and business creation in this area through its EIT Urban Mobility network. More information can be found here: <https://www.eiturbanmobility.eu/>

Urban Mobility Package in 2013, detailed guidelines have been developed overtime. Many cities have adopted and started to implement their SUMP, a community of experts has grown, and a series of SUMP conferences have been held.

SUMP: OBJECTIVES AND PRINCIPLES

The 2019 version of the SUMP Guidelines reflects the evolution of transportation and information technology, city planning and governance contexts, as well as user (i.e. passenger) dynamics as all of these change over time.¹⁷ As noted above, the covid-19 pandemic has impacted urban mobility across Europe. However, the objectives and key components of SUMP, in many cases adopted before the pandemic, remain the same (in fact, some now seem to be more relevant than before). These goals include:¹⁸



¹⁷ See Rupprecht Consult (ed.). 2019. *Guidelines for Developing and Implementing a Sustainable Urban Mobility Plan*, Second Edition, 2019. European Commission. Available at: https://www.eltis.org/sites/default/files/sump-guidelines-2019_mediumres.pdf

¹⁸ Ibid, p. 13.





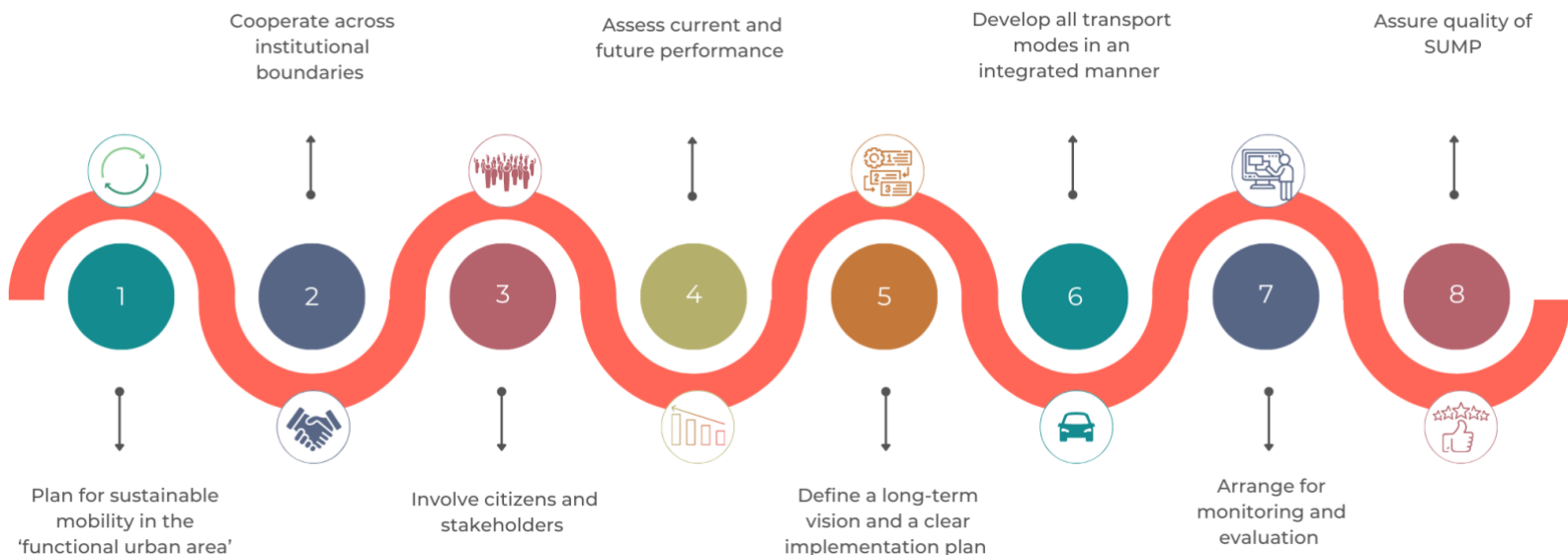
Picture 3: Planned Metro D in Prague.

Prague Climate plan 2030, 2021, Department of Environment, Prague City Hall.

It is evident that achieving these objectives involves a broad spectrum of municipal government agencies, operators, service providers and private sector. It includes financial and regulatory

considerations related to built environment, infrastructure, urban planning, energy, ICT operations and many more areas. Involving multiple city organizations can strengthen the ownership of measures to be undertaken; at the same time, it can bring some organizational and accountability challenges.

Planning for sustainable development of a city as an integrated whole, there are several principles considered to be key:¹⁹ *²⁰



¹⁹ Ibid, pp. 11-13.

²⁰ FUA is an extended territory including areas integrated with the urban core based on daily flows of passengers and goods, regardless of the municipal boundaries. OECD has identified all the FUAs in Europe.



In line with the above, many European cities have already adopted their SUMP, such as Stuttgart, Leipzig, Zurich, Amsterdam, Copenhagen, Stockholm, and Prague.²¹ The full list of cities and plans can be accessed in the ELTIS City Database;²² in any case, the number of currently published plans is over 1000.²³

WHAT MATTERS IN SUMP

While the plan is supposed to be a rigorous, stand-alone document, it is **not the point of SUMP to “reinvent the wheel”** so to speak. In many cities, questions of sustainable mobility, climate change adaptation had been on the agenda long before the adoption of SUMP. The objective of SUMP is to build on and develop the existing knowledge, plans and measures in decarbonizing and modernizing city transport systems. That said, SUMP brings a detailed and innovative methodology in order to assure quality of the plans under its label.

**not the point of SUMP to
“reinvent the wheel”**

One of the indicators closely followed is the cities’ **modal split**, or the proportion of journeys made by different modes of transport (i.e., cars, public transport, walking, cycling, etc.). Achieving a larger share of public transport (producing lower levels of emissions) at the expense of motorised personal vehicles is often an objective in itself. In any case, modal split typically serves as baseline for analysis and target setting of urban transport systems to begin with.²⁴

More information can be found here: <https://www.oecd.org/regional/regional-statistics/functional-urban-areas.htm>

²¹ Lassen, C., Davidova, K. 2018. *Sustainable Urban Mobility*. Heinrich-Böll-Stiftung, Conference publication, Prague, 9/2018, p. 28.

²² ELTIS. 2023. The Urban Mobility Observatory: City database. Available at: <https://www.eltis.org/mobility-plans/city-database>

²³ European Commission. 2021. Questions and Answers: European Urban Mobility Framework. Available at: https://ec.europa.eu/commission/presscorner/detail/en/qanda_21_6729

²⁴ Rupprecht Consult (ed.). 2019. *Guidelines for Developing and Implementing a Sustainable Urban Mobility Plan*, Second Edition, 2019. European Commission, p. 100.



When it comes to transport modalities, one of the goals is to integrate the system to make it easy and quick to find and execute “combined” journeys for people to get around. The **intramodality** approach often works in parallel with providing **mobility as a service** (MaaS).²⁵ It is generally defined as a way for customers (passengers) to “*fulfil and manage all their mobility needs on demand, based on their general preferences and journey-specific needs. The service is based on the seamless integration of all different public and commercial modes of transport and is delivered via a digital interface.*”²⁶

Much of it is built on – and requires – smart technological applications and real time data to function at its best. This is why SUMP counts with cities developing **Intelligent Transport Systems** (ITS).²⁷ Such systems use real time data collection and analysis to monitor and regulate flows of traffic, access, parking and vehicle charging capacities, and also allow for planning and execution of multimodal travel, including payments, booking and ticketing.²⁸ ITS and its components, therefore, enable the everyday functioning of MaaS.

An area which has historically not received the levels of attention corresponding to its relevance for the everyday functioning of urban areas is **city logistics**.²⁹ Under the banner of urban mobility, most people imagine a system of public transport, motorways, bikes and pedestrians. Less often they think of freight vehicles and delivery fleets that supply and service the needs of cities on a day-to-day basis. Sustainability, management and optimisation of the related traffic is a

²⁵ See ERTICO – ITS Europe (ed.). 2019. *Mobility as a Service (MaaS) and Sustainable Urban Mobility Planning*. European Commission. Available at: https://www.eltis.org/sites/default/files/mobility_as_a_service_maas_and_sustainable_urban_mobility_planning.pdf

²⁶ Ibid, p. 7.

²⁷ See ERTICO – ITS Europe (ed.). 2019. *Intelligent Transport Systems (ITS) and SUMP – making smarter integrated mobility plans and policies*. European Commission. Available at: https://www.eltis.org/sites/default/files/the_role_of_intelligent_transport_systems_its_in_sumps.pdf

²⁸ Rupprecht Consult (ed.). 2019. *Guidelines for Developing and Implementing a Sustainable Urban Mobility Plan*, Second Edition, 2019. European Commission, p. 111.

²⁹ See Aifandopoulou, G., Xenou, E. 2019. *Sustainable Urban Logistics Planning*. European Commission. Available at: https://www.eltis.org/sites/default/files/sustainable_urban_logistics_planning_0.pdf



no easy task for municipal governments, with a strong private sector collaboration being absolutely essential. To this end, the concept of *Sustainable urban logistics plans* (SULP), to be integrated with SUMP, has been created.³⁰

Picture 4: Canva.com

Issues related to governance and financing also matter a great deal in SUMP.

Mayoral support is one of the key factors, as strong mayors can act as a stable driving force for the plans to be



implemented. This has been the case of cities such as London, Brussels, Dresden, Groningen or Ljubljana.³¹ Another important factor is the extent of **citizen participation** in creating SUMPs. This can take different forms, but overall increases the sensitivity of measures to actual residents' needs, and helps to strengthen the ownership throughout the implementation process. Cities across Europe have used different ways to engage with the public; examples of good practice can be found in Budapest, Ghent, Dresden, Bremen, Vilnius, or the Czech city of Brno.³²

Finally, ambitious SUMP measures typically require a great deal of **funding and financing**.³³ City budgets (let alone the national ones) often do not suffice, due to

³⁰ See Ripa, F. 2021. European Commission releases new Urban Mobility Framework. ELTIS, 12/2021. Available at: <https://www.eltis.org/in-brief/news/european-commission-releases-new-urban-mobility-framework>

³¹ Rupprecht Consult (ed.). 2019. *Guidelines for Developing and Implementing a Sustainable Urban Mobility Plan*, Second Edition, 2019. European Commission, p. 43.

³² Ibid, pp. 49-50.

³³ See Werland, S., Rudolph, F. 2019. *Funding and financing of Sustainable Urban Mobility Measures*. European Commission. Available at: https://www.eltis.org/sites/default/files/funding_and_finance_of_sustainable_urban_mobility_measures.pdf

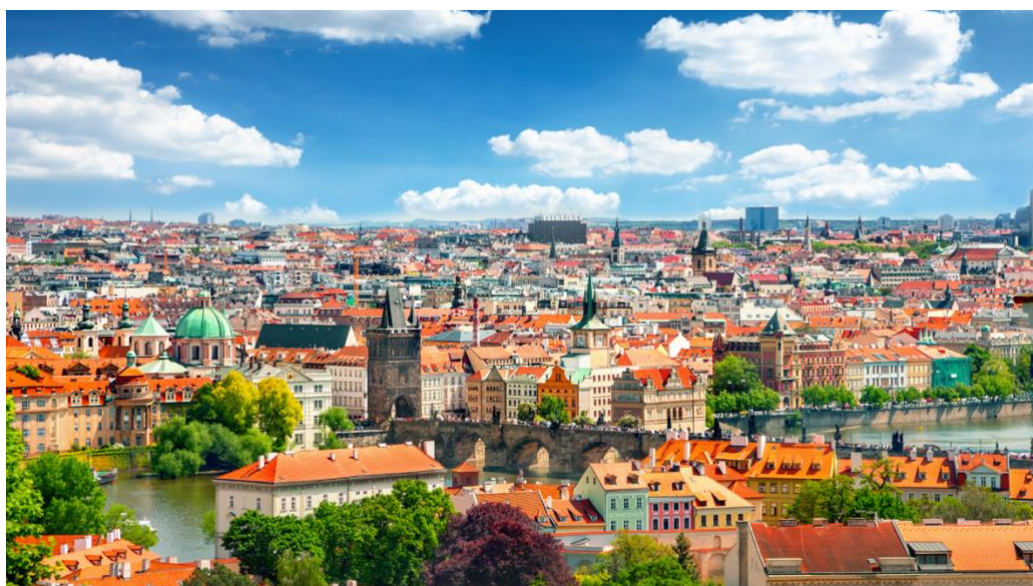


limited tax income, parking charges or tolls revenue. Under the European Commission, multiple initiatives and programs are available, mostly tied to the investment component of SUMP. These include, for instance, *European Structural and Investment Funds*, *European Fund for Strategic Investments*, *Knowledge and Innovation Communities (KICs) on Climate and on Urban Mobility*,³⁴ or *Horizon Europe* (for example its 'Mission' to create 100 climate-neutral and smart cities by 2030).³⁵ Additional opportunities to fund sustainable and public transport are connected to the *Recovery and Resilience Facility*.³⁶ In the meantime, the new *European Urban Mobility Framework* sets the most ambitious requirements yet for sustainable transport planning, concerning particularly the largest 424 cities in Europe.^{37,38}

CASE OF PRAGUE – SUMP REVISITED

Picture 5: Canva.com

Judging by the number of relevant adopted strategies in the area of transport, there has been an evident move towards clean mobility on the national level in Czechia in recent years. The key concepts and



³⁴ Rupprecht Consult (ed.). 2019. *Guidelines for Developing and Implementing a Sustainable Urban Mobility Plan*, Second Edition, 2019. European Commission, p. 131.

³⁵ European Commission. 2021. Questions and Answers: European Urban Mobility Framework.

³⁶ Degen, A. 2021. Building back European public transport after Covid-19. In *Urban Mobility after COVID-19. Long-term strategies for the sustainable mobility transition in European cities*. CIDOB publication n° 82, 07/2021.

³⁷ European Commission. 2021. Questions and Answers: European Urban Mobility Framework.

³⁸ This complements the proposal for revised guidelines for the Trans-European Transport Network, according to which the largest 424 EU cities on the TEN-T network should adopt a sustainable urban mobility plan (SUMP) by 2025 and collect relevant data. More information can be found here: <https://www.eltis.org/in-brief/news/european-commission-releases-new-urban-mobility-framework>



policies include the *Transport Policy of the Czech Republic for the period of 2021 - 2027 with an outlook until 2050*. More recently, the *Concept of Urban and Active Mobility for the period of 2021 - 2030* can be seen as a focused strategy concerning urban development that enables short distance cities, encourages citizens to use alternatives to cars in their transport needs, and pushes for the use of clean energies for transport.³⁹

The City of Prague itself has adopted a number of strategies with similar

The most comprehensive framework tied to Prague's actual transport policy is the *Plan of sustainable mobility for Prague and surrounding areas (Prague SUMP)* adopted in 2019.

objectives. The *Climate plan of the capital city of Prague 2030* with a subtitle of *Pathway to Carbon Neutrality* (2021)⁴⁰, offers a comprehensive and ambitious strategy which includes a separate chapter on sustainable mobility in CoP (see below). Additionally, the

Study of City Logistics (2019)⁴¹ is focused on city-wide delivery and supply, exploring the ways in which goods are transported throughout Prague. Also, the *Strategy of supporting alternative fuels in Prague up to 2030* was adopted in 2020.⁴² More recently, the *Strategy of Active Mobility in Prague* (2022)⁴³ primarily concerns the ways to support cycling and pedestrian modes of urban transport as opposed to motorised vehicles. Prague is also part of several international city associations

³⁹ ELTIS. 2022. The Urban Mobility Observatory: Czechia. Available at: <https://www.eltis.org/mobility-plans/member-state/czechia>

⁴⁰ Prague City Hall. 2021. *Climate plan of the capital city of Prague 2030: Pathway to Carbon Neutrality*. Prague City Hall, Department of Environment. 10/2021. Available at: https://portalzp.praha.eu/file/3553799/Klimaplan_CZ_2301_09_ONLINE.PDF

⁴¹ Institute of Planning and Development. 2019. *Study of city logistics on the territory of the capital city of Prague*. Area of Infrastructure, IPR, Prague, 04/2019. Available at: https://iprpraha.cz/uploads/assets/dokumenty/2019-05-09_studie_citylogistiky.pdf

⁴² Prague City Hall. 2020. *Strategy of supporting alternative fuels in Prague up to 2030*. Prague City Hall, 10/2020. Available at: <https://iprpraha.cz/assets/files/files/60a730e716475eb999977c394767eb19.pdf>

⁴³ Prague City Hall. 2022. *Strategy of Active Mobility in Prague*. Prague City Hall, Transportation Department, 8/2022. Available at: <https://iprpraha.cz/assets/files/files/87b4ebf26cb977aef979b38a55f7502b.pdf>

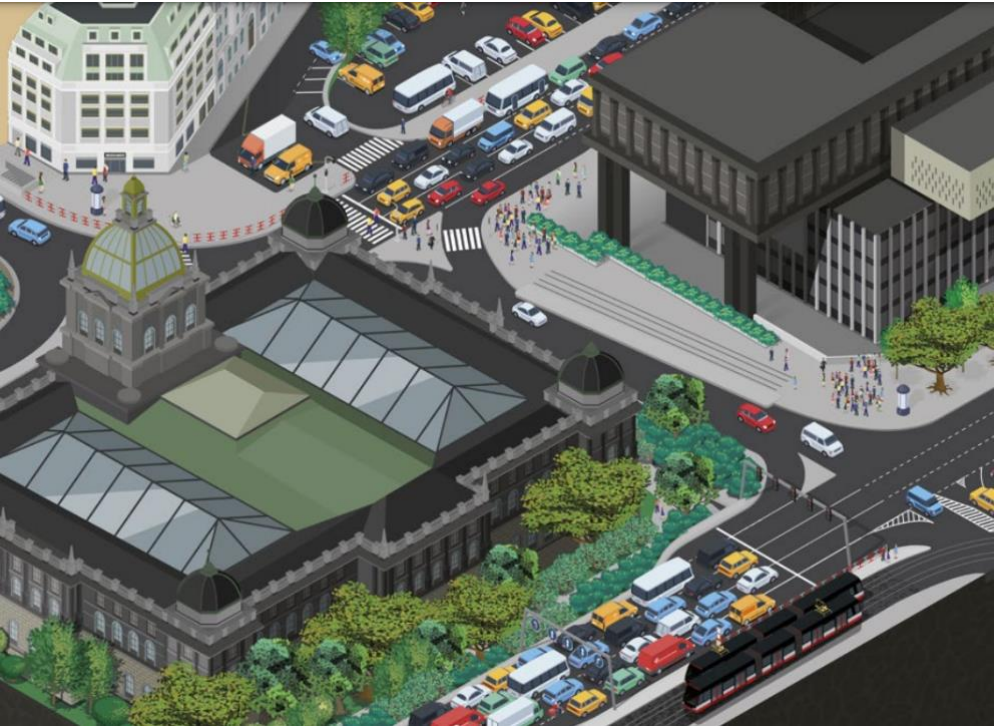


and initiatives focused on reducing their carbon footprint; among others, the *Covenant of Mayors*⁴⁴ or a more recent *Net zero cities initiative*.⁴⁵

The most comprehensive framework tied to Prague’s actual transport policy is the *Plan of sustainable mobility for Prague and surrounding areas* (Prague SUMP) adopted in 2019.⁴⁶ With two broad objectives of reducing the city’s carbon footprint and improving public health, Prague SUMP follows the broad contours set out by the European SUMP concept.⁴⁷ In defining the concrete objectives and implementation pathways, it reflects the Czech capital’s governance model, infrastructures, resources, and priorities.

Picture 6: Cover page of Polad’ Prahu P+

P+ Polad’ Prahu, 2019, Transportation Department, Prague City Hall.



The plan itself was created over the years 2015-2018, with many stakeholders involved including the Prague City Hall, Institute of Planning and Development of the CoP, Transport Company of the CoP, ICT Operator, Central Bohemian Region, and other

⁴⁴ City of Prague. Undated. Climate Partnerships. Available at: <https://klima.praha.eu/en/climate-partnerships.html>

⁴⁵ See Net Zero Cities. 2023. Towards climate neutral European Cities by 2030. Available at: <https://netzerocities.eu/>

⁴⁶ Prague City Hall. 2019. *Plan of Sustainable Mobility for Prague and the surrounding areas (Polad’ Prahu)*. Prague City Hall, Transportation Department, 05/2019. Available at: https://poladprahu.cz/wp-content/uploads/2019/10/PNavrh_2019-05-24-1.pdf

⁴⁷ The continuous work on the Prague SUMP also reflects the updated 2019 SUMP guidelines. The methodology was prepared by the Technology Agency of the Czech Republic, certified by the Ministry of Transport in 2022.



organizations responsible for technical and operational aspects. Following the European SUMP model, the preparation included workshops and consultations with experts across relevant areas, and also counted with public participation in form of surveys.

Approved by the CoP assembly in May 2019, the SUMP itself was complemented by the *Action plan for 2019-2023*, which identifies responsible authorities, collaborators, tasks, timelines and budgets for the measures to be implemented. In years following the publication of SUMP and the Action plan, the covid-19 pandemic and related organizational and budgetary challenges impacted the implementation to a point that required a revision, resulting in a detailed *Amendment to SUMP* adopted in June 2022. The following sections summarize the ultimate goals of the Prague SUMP, which have remained constant, although some of the implementation pathways and timelines have had to be adjusted.

EXISTING TRANSPORT ISSUES AND PROBLEMS

Echoing the logic of 'functional urban areas', the Prague SUMP concerns the Prague Metropolitan Area, which exceeds the administrative territory of the City of Prague. On either level, Prague as the capital of the Czech Republic is considered to be an important centre of economy, infrastructure, transport, and culture on the EU level. The largest urban area of the Czech Republic has a population of over 1.3 million according to the most recent census.⁴⁸ Prague has a solid economic base with the city developing fast on many levels, which requires (among other things) a robust and well-functioning system of transport within and beyond the city boundaries. Development, maintenance and operation of transport annually takes up around 35 % of the budget of the City of Prague.⁴⁹ Beyond its motorway infrastructure, which definitely has its challenges, the city prides itself in its public

⁴⁸ Czech statistical office. 2021. Census of 2021. Available at: <https://www.czso.cz/csu/scitani2021/vysledky-prvni>

⁴⁹ Prague City Hall. 2019. *Plan of Sustainable Mobility for Prague and the surrounding areas (Polad' Prahu)*. Prague City Hall, Transportation Department, 05/2019.



transport network, consisting mainly of trams, metro and busses. The vehicles, related operations and technology have become part of the city's diplomacy on an international level.⁵⁰ In fact, the high levels of satisfaction and quality of life perceived by Prague residents are related to the reliability and quality of public transport in the city.⁵¹



Picture 7: Public transport traffic over the Vltava river.

Prague Climate plan 2030, 2021, Department of Environment, Prague City Hall.

Adapting the existing complex transport system of Prague in order to achieve today's sustainability goals requires a deep understanding of its functioning logic, resources and capacities. The Prague Integrated Transport (PID) network has been growing, although the existing connections to the Central Bohemian Region are not satisfying the demand of hundreds of thousands of passengers daily commuting to and from Prague. Development of the existing infrastructure, including suburban railway system, is one of the key pathways to the ultimate goal

⁵⁰ Ministry of Foreign Affairs of the Czech Republic. 2022. Not just the metro and trams: Incoming in the area of PT and smart cities from Colombia. MFA, 10/2022. Available at:

https://www.mzv.cz/bogota/cz/obchod_a_ekonomika/nejen_metro_a_tramvaje_incoming_v.html

⁵¹ Gabal, I., Lapacek, T., Brabec, T. et al. 2019. *Study of the quality of life of Prague residents*. IPR Praha, 11/2019, pp 18-29. Available at:

https://iprpraha.cz/uploads/assets/dokumenty/ssp/analyzy/Obyvatelstvo/studie_kvality_zivota_prazanu.pdf

of reducing motorised vehicle traffic in and across the city; in other words, getting people to leave their cars at home.

Reducing car traffic is a necessary condition for decreasing current levels of GHG emissions throughout the city, a goal that surpasses SUMP and aligns with wider decarbonisation policies on the national and EU levels. Phasing out cars, however, is a difficult task in a city traditionally reliant on motorway transport, with infrastructure primarily focused to serve the latter. The push for cleaner transport modes thus brings up a number of issues in urban planning, operations, technology and investments.

In the meantime, problems of insufficient capacity appear throughout the busy urban motorway network, but also within the public transport system, especially on several busy bottleneck sites connecting different modes of public and private transport, such as Charles Square or metro C line. Capacity and utilization of Park and Ride infrastructure, most notably large capacity parking facilities across the city, is also on the table. Additionally, goods transport and last-mile logistics have also become a challenge, especially with the rise of e-commerce during and past the covid-19 years.

GOALS AND MEASURES

These are just some of the issues faced by the City of Prague that the current SUMP aims to tackle. The Plan has a number of strategic goals and indicators, with concrete tasks to be implemented within each of them. The goals are:





picture 8: Cyclists on Náplavka, Prague.

Prague Climate plan 2030, 2021, Department of Environment, Prague City Hall.

Within the above strategic goals, Prague SUMP has 15 concrete priority areas focused on the following⁵²:

⁵² Prague City Hall. 2019. *Plan of Sustainable Mobility for Prague and the surrounding areas (Polad' Prahu)*. Prague City Hall, Transportation Department, 05/2019, pp. 29-32.

Development of public transport and the railway network

Integrating public transport with other modes of transport

Supporting resilience and capacity of the existing transport network

Creating new connections of different modes of transport

Supporting walking and cycling

Optimalization of city logistics

Improving access to transport, infrastructure and public space for all residents

Improving quality of public spaces

Reducing air pollution, noise and carbon footprint

Reducing fragmentation of public spaces due to transport

Reducing the number of transport accidents

Financial sustainability of the transport system

Support of sustainable mobility and efficient city governance

Sustainable development of the Prague Metropolitan Area

Economic development of the city as a whole

There are over 200 specific measures stemming from the priority areas. The measures, for instance, contribute to the modernisation of railway networks connecting Prague to surrounding areas, the construction of the fourth line of the city metro system (line D), completion of the inner city ring road (Městský okruh) to keep transiting cars out of the city centre, implementing a toll system for motorised vehicles, planning for quality public space, supporting mobility as a service (smart and integrated solutions for public transport), or optimising the growing system of city logistics.⁵³

In order to publicly present and communicate the objectives of SUMP, the City of Prague set up a portal called *Tune Prague* (Polad' Prahu) where facts, charts, infographics, concrete projects or problem maps can be accessed.⁵⁴ The latter focus on car traffic, public transport and cycling traffic. All of the measures to be implemented under SUMP are presented in the Registry of measures (Zásobník opatření) accessible from the same portal with basic information, implementation status, costs and timeline for each of them.⁵⁵



Picture 9: Official logo of Polad' Prahu P+

P+ Polad' Prahu, 2019, Transportation Department, Prague City Hall.

⁵³ Ibid, pp. 55 onwards.

⁵⁴ See the Polad' Prahu portal. Available at: <https://poladprahu.cz/>

⁵⁵ See the Registry of measures (Zásobník opatření). Available at: https://zasobnik.poladprahu.cz/index.php?option=com_zasobnik&view=records

In line with Prague SUMP, sustainable urban mobility is also one of the priorities of *Prague Climate plan* adopted in 2021.⁵⁶ According to this Plan, the City of Prague is supposed to reduce carbon emissions by 45 % by 2030 (compared to emission levels of 2010) and ultimately reach climate neutrality by 2050. Building on the goals set out in SUMP, the Climate plan specifically highlights priorities in the area of transport such as:⁵⁷

Improving public transport



- Increasing its capacity, comfort and speed
- Automation of operations on metro lines C and D (newly constructed)
- Electrification of busses, building trolleybus connections
- Modernization of suburban railways (lines S)

Alternative modes of transport



- Walking – planning and creating safe pedestrian spaces and pathways
- Cycling – build-up of necessary infrastructure, new cycling paths and lanes
- Improved urban planning, positive public health impacts

Bringing down intensity of car traffic in the city



- Optimizing zones and pricing of street parking
- Introducing vehicle emission-based toll system in the city centre
- Increasing the number of pickup stations for parcels and cyclo-delivery depots

Supporting low and zero-emissions vehicles



- Purchasing hundreds of new 'clean' busses for the Prague Transport Company (DPP), Prague Integrated Transport (PID) and Prague Services (PSAS)
- Development of charging infrastructure for electric vehicles (private and public) and hydrogen fuelling stations
- Necessary adjustments and capacitation of power distribution network in the city
- Supporting smart platforms for shared transport with a goal to integrate with the existing public transport (mobility as a service)

⁵⁶ See Prague City Hall. 2021. *Climate plan of the capital city of Prague 2030: Pathway to Carbon Neutrality*. Prague City Hall, Department of Environment. 10/2021.

⁵⁷ Ibid, p. 58



Picture 10: Cover page of the Prague Climate plan 2021

Prague Climate plan 2030, 2021, Department of Environment, Prague City Hall.



ISSUES OF IMPLEMENTATION

In the years following the adoption of Prague SUMP, its implementation has been affected by the impacts of the covid-19 pandemic, budgetary pressures, and some organizational issues. The SWOT analysis pertaining to the original 2019 analysis predicted some of the problems, citing institutional fragmentation or a lack of integration and adoption of existing relevant strategies, policies and measures.⁵⁸ Additionally, the

pandemic brought a number of unforeseen hurdles complicating the envisioned transition. The overall mobility and the city economy was affected, and there continues to be a significant number of pending measures, with the multitude of concrete tasks which are difficult to monitor in a systematic manner.

ORGANISATIONAL

Although the 2019 Plan had been consulted across expert areas and political parties, some political decisions have not aligned with the agreed principles (especially regarding the pricing policies for street parking or city centre toll system).⁵⁹ SUMP as such is not politically binding, and thus its implementation can prove problematic, especially in a city like Prague with its 57 municipal districts.

⁵⁸ Prague City Hall. 2019. *Plan of Sustainable Mobility for Prague and the surrounding areas (Polad' Prahu)*. Prague City Hall, Transportation Department, 05/2019, p. 20.

⁵⁹ Prague City Hall. 2022. *Amendment to Analysis: Plan of Sustainable Mobility for Prague and the surrounding areas*. Prague City Hall, Transportation Department, 06/2022, p. 9. Available at: https://poladprahu.cz/wp-content/uploads/2022/06/Dodatek_k_Analyze_P_06-06-2022-1.pdf



The latter often prefer their own approach to urban mobility issues, which makes it very difficult to implement the necessary city-wide sustainability measures.

Also, more than 200 active measures and over 700 tasks are currently on the table within the framework of SUMP, which makes it problematic to coordinate and track the implementation effectively. Part of the reason is the multitude of collaborating organisations and a lack of clarity and accountability when it comes to concrete tasks.⁶⁰ The 2019 Plan set out 240 measures to be implemented in the

timeframe up until 2030; the status of individual measures changes overtime. As of 2022, these were further complemented by additional measures pertaining to the *Strategy of active mobility in Prague*, primarily focused on cycling and walking.

Part of the reason is the multitude of collaborating organisations and a lack of clarity and accountability when it comes to concrete tasks.



Infographic 1: Measures stemming from Prague SUMP (numbers corresponding to Fall 2022).

Source of data: Office of transport and infrastructure, IPR Praha.

Among the most significant measures currently being implemented is the construction of metro D line. Its importance lies in offering fast, reliable and sustainable connection for vast residential areas to the city centre and directly

⁶⁰ The 2022 Amendment to Prague SUMP suggests some personnel adjustments stemming from this. A possibility of creating a coordinator / manager position to act as a connector between these organizations and the CoP has been suggested.



connecting some key transport nodes of the city centre. New tramway lines currently under construction in Prague 5 and 6, respectively, will greatly improve access to public transport to areas with limited previous service.

Other measures are more difficult and time-consuming to implement, such as the city toll system which would, among other things, require some legislative action on the national level.⁶¹ Additionally, the initiative to plan and construct the missing parts of the Prague inner city ring road has also proven difficult and extremely costly.

FUNDING AND FINANCING

As noted above, the transport chapter takes up approximately 35 % of the CoP budget annually.⁶² The 2019 Prague SUMP counted with several sources of revenue and grant financing on the EU level, along with projecting the 2021-2023

The projected operational income stemming from planned parking charges and the envisioned city-wide toll system has not and likely will not be reached as planned.

Action plan to define concrete measures, finance and evaluation plan.⁶³ According to the 2019 Plan, about one third of the necessary investment expenditures was supposed to be covered from the CoP budget, followed by slightly smaller percentage of investments made

by railway and motorway authorities, and EU financing instruments (approximately 30 %).⁶⁴ The investments of the CoP were supposed to gradually decrease past the year 2025.

In contrast to the Plan, there are several difficult points when it comes to financing the implementation of SUMP. First and foremost, the projected operational income stemming from planned parking charges and the envisioned city-wide toll

⁶¹ The progress in this measure has been limited to conducting a comprehensive study of the city toll context and its projected impacts.

⁶² Prague City Hall. 2019. *Plan of Sustainable Mobility for Prague and the surrounding areas (Polad' Prahu)*. Prague City Hall, Transportation Department, 05/2019, p. 36.

⁶³ Ibid, p. 49.

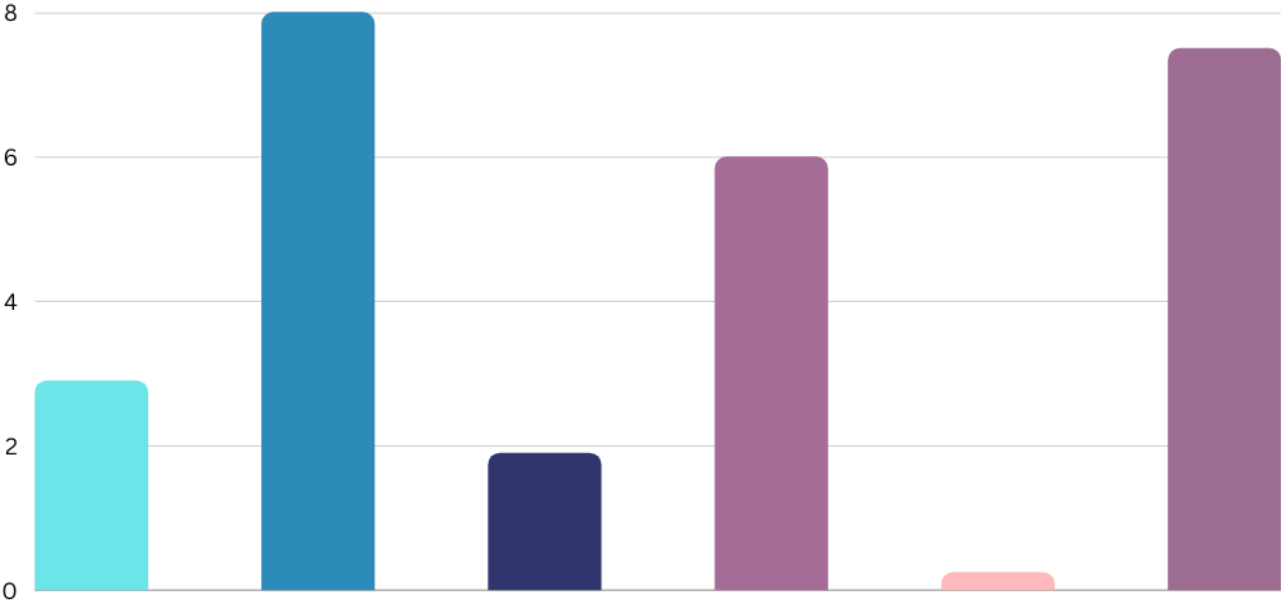
⁶⁴ Ibid, p. 107.



system has not and likely will not be reached as planned. It is important to note that these two are supposed to be the dominant sources of revenue for the City Hall in the area of transport. Also, Prague’s public transport system has had to be significantly financed by the CoP as its operation generates annual losses (the City Hall has had to cover approximately 85 % of the deficit annually). The ticket revenue loss caused by the drop in passenger numbers due to the pandemic has not helped to reverse this situation.

As funding the SUMP measures from the CoP budget is not possible to the extent planned in 2019, additional external funds must be explored.⁶⁵ This inevitably leads to a greater reliance on the available EU funding. The infographic below summarizes selected sources of external (EU) financing in the field of sustainable mobility that the CoP is eligible to compete for. In any case, the financial coverage of all necessary measures under SUMP remains quite uncertain.

- National plan of resilience and recovery 2021-2023 (clean vehicles, charging infrastructure): 2.9 bn CZK
- Operational program transport 2021-2027 (constructing new tram, trolleybus and metro lines): 8 bn CZK
- Operational program transport 2021-2027 (telematics for motorway transport): 1.9 bn CZK
- Operational program transport 2021-2027 (public charging infrastructure): 6 bn CZK
- Integrated Regional Operational Program 2021-2027 (electric busses and trolleybuses): 0.25 bn CZK
- Modernization fund 2021-2030 (clean vehicles and charging infrastructure for PT): 7.5 bn CZK



Infographic 2: selected sources of funding that CoP is eligible to compete for.

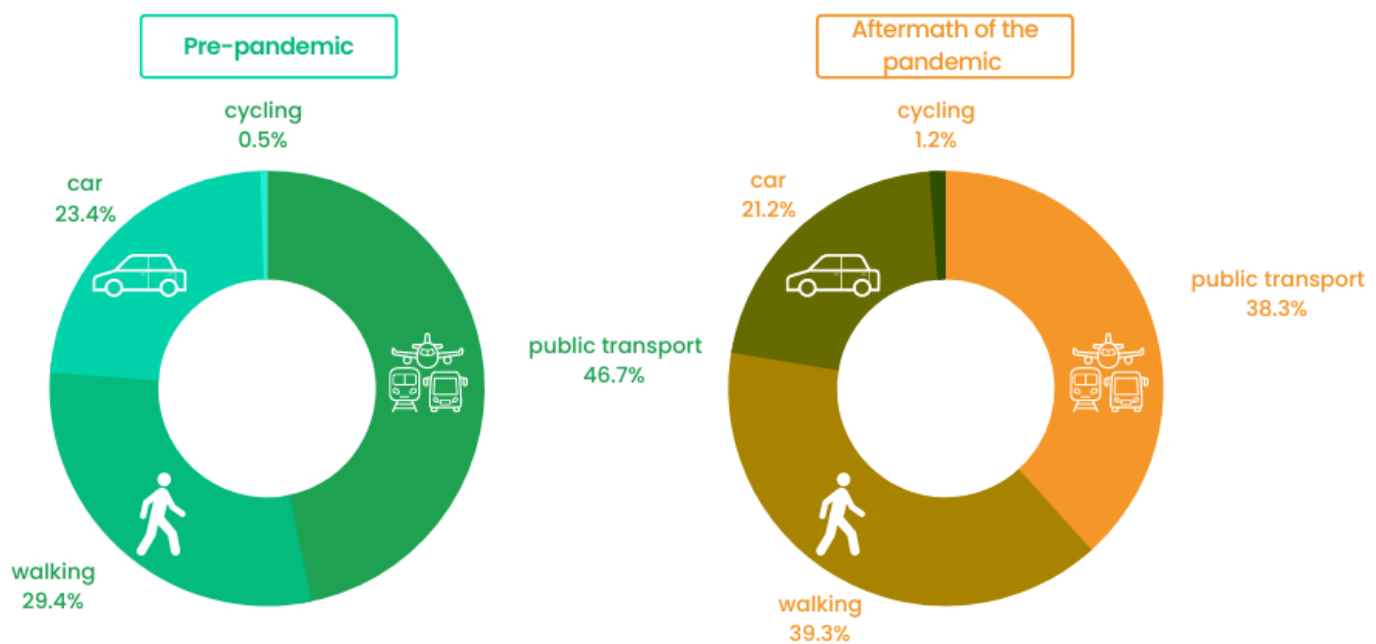
Source of data: Amendment to SUMP, 2022, p. 30.

⁶⁵ Including, but not limited to, the significant investments necessary to construct the new metro D line.



PUBLIC TRANSPORT AND COVID-19 IN PRAGUE

Despite its general accessibility and popularity, the use of public transport in Prague took a dive as a result of the covid-19 pandemic in 2020 and 2021. This poses a problem also from the perspective of sustainable mobility, as public transport greatly helps to reduce car traffic in the city. Data collected in Prague before the pandemic (years following 2016) indicated the following modal split of journeys made: 46 % by public transport, 29 % by walking, 23 % percent by car and 0,5 % by cycling.⁶⁶ The pandemic-affected year of 2021 brought different results. The total number of trips decreased as many people studied and worked from home while distancing measures were still in place. The modal split changed, bringing the share of public transport journeys down to 38 %, increasing the proportion of walking to 39 %, while car trips amounted to 21 % and cycling rose to 1.2 %.⁶⁷



Infographic 3: Prague modal split before (data from 2016) and in the aftermath of the pandemic (data from 2021). Source of data: Prague SUMP, 2019 and Amendment to SUMP, 2022.

⁶⁶ Prague City Hall. 2019. *Plan of Sustainable Mobility for Prague and the surrounding areas (Polad' Prahu)*. Prague City Hall, Transportation Department, 05/2019, p. 7.

⁶⁷ Prague City Hall. 2022. *Amendment to Analysis: Plan of Sustainable Mobility for Prague and the surrounding areas*. Prague City Hall, Transportation Department, 06/2022, p. 24.



A quick look at these numbers might suggest not-so-bad news, as car traffic mode slightly decreased while walking increased. However, the fall in passenger numbers in public transport led to lower ticket revenues. This happened in a context where the expenditures actually increased due to the need for sanitizing and distancing measures (while the City Hall continues to cover significant annual losses, as noted above). Also, similarly to the experience of other European cities, recovering the pre-pandemic passenger numbers takes time, while hesitation or newly acquired habits can lead many people to stick with driving their cars for the moment.

The Prague Integrated Transport system has therefore been impacted negatively,⁶⁸ which corresponds with similar experiences of other cities across Europe witnessing a 'public transport crisis of its own'.⁶⁹ That said, the registered rise in walking and cycling modes is indeed positive. Concerning the latter, however, the percentage of cycling trips in Prague still remains rather minuscule. The long-term goal is to bring the figure up to 7 % of all journeys made.

LAST MILE AND CITY LOGISTICS

Physical delivery of parcels, grocery or food deliveries, in addition to services which typically require short term car parking on busy streets of Prague, have been an issue for some time. The pandemic brought momentum to this segment of transport, with municipal districts and the city as a whole facing a new level of necessity to deal with the city logistics. With e-commerce going largely mainstream throughout the last couple of years, the existing delivery infrastructure and street space is getting under pressure. Requiring actual physical delivery of goods from A to B leads to a multiplicity of short trips made predominantly by combustion engine vehicles. This in turn contributes to more GHG emissions and parking difficulties in residential areas. Technical solutions have been pushed by the

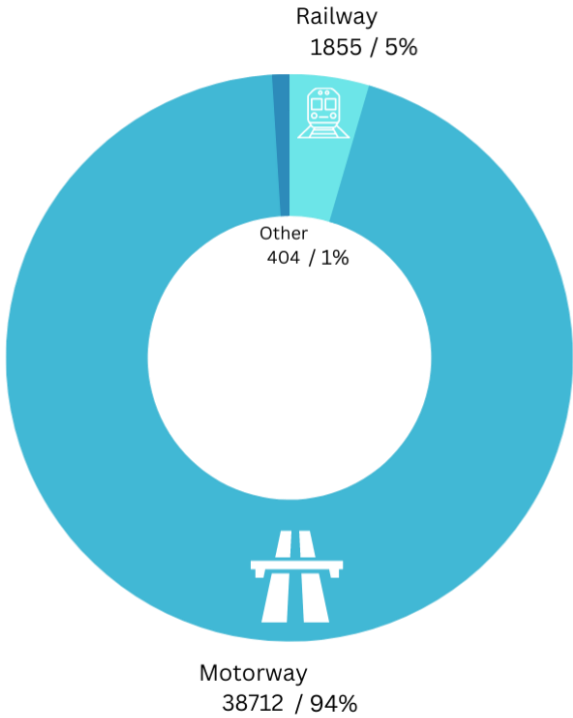
⁶⁸ Ibid, p. 29.

⁶⁹ Tuck, A. 2023. Urban challenges for 2023. Monocle 24 Podcast: The Urbanist. 01/2023. Available at: <https://monocle.com/radio/shows/the-urbanist/587/>



private sector, which has recently taken a more active role.⁷⁰ In any case, creating the conditions and regulations to enable smooth deliveries and transit also depends on the city authorities.⁷¹

Some successful steps have been made in this area by the CoP, which has now focused on the last mile logistics more systematically. Cycling depots for parcel deliveries are an example of active policy by the City Hall. Two major depots have been opened in the city centre since 2020, with a number of private delivery companies partnering with this initiative.⁷² Parcel pickup stations installed by private companies have proven successful, partly addressing the problem of last-mile delivery demand. That said, the transport of goods in the CoP is still largely



dominated by motorway transport, contributing to the issues described above.

Infographic 4: Volume of goods transported in Prague, in tons and percentage of overall (data from 2019). Source of data: Amendment to SUMP, 2022, p. 50.

⁷⁰ This includes (but is not limited to) significant investments in electric vehicles fleets used by major delivery companies or banks, or developing software solutions for MaaS or city logistics (example of Liftago).

⁷¹ Prague City Hall. 2022. *Amendment to Analysis: Plan of Sustainable Mobility for Prague and the surrounding areas*. Prague City Hall, Transportation Department, 06/2022, p. 49.

⁷² Prague City Hall. 2022. *Amendment to Analysis: Plan of Sustainable Mobility for Prague and the surrounding areas*. Prague City Hall, Transportation Department, 06/2022, p. 51.



The above data obviously concern goods transport throughout the City of Prague, corresponding to much larger distances than the mentioned 'last mile'. The numbers suggest that there is a systemic issue of predominantly motorised, high GHG emission transport by trucks and vans to, from and within the city of Prague, due to most of the logistical and storage facilities being located outside of the city centre. One of the possible solutions to consider is transporting goods by railway where possible, currently accounting for a relatively low proportion of 5 %. This would obviously require active policies, investments and collaboration with private sector, but the level of potential emission reduction could certainly make it worthwhile.

CLEAN CITIES OF TOMORROW: HOW TO GET THERE?

There is a long way ahead from the motorway-dominated urban transport currently causing significant levels of GHG emissions on one hand, to a net zero clean, modernised mobility system running on the smartest technologies on the other. Some experts argue that fully automated and integrated transport networks including drone deliveries of parcels are not things of a very distant future. Indeed, some examples of cities designed to meet the "smartest" standards can be found in countries such as the United Arab Emirates,⁷³ although the true "sustainability" of this model can be questioned.

In the European context, the task ahead is to transform the existing mobility networks which are, for the moment, still highly reliant on motorway transportation producing high levels of GHG emissions. Many cities in Europe are on the path to decarbonising and modernising their existing infrastructures, using significant conceptual and financial support from the EU. Ambitious objectives of

⁷³ Masdar City in UAE can be considered an example of such effort. See Pelikh, K. Undated. The best smart cities in the Middle-East. O-City. Available at: <https://www.o-city.com/blog/the-best-smart-cities-in-the-middle-east>



the *Urban Mobility Framework* released in December 2021⁷⁴ suggest that the European commitment has nothing but strengthened in the post-pandemic context.

That said, the last couple of years have brought unforeseen challenges for European cities and their budgets. The pandemic has had a significant impact on how people and goods are moved in cities. The principles of sustainable urban mobility, and the pathways to achieve them detailed in the existing SUMP, deserve more attention than ever.

As the example of Prague has shown, plans are important, but so is resilience and adaptability of cities facing unforeseen changes and shocks. The ability to revise, prioritise and continue to implement the key measures, as well as to learn from past experiences and difficulties, is essential for cities to grow and thrive. The newly formed leadership of Prague City Hall coming from the 2022 municipal elections has declared that modernisation and development of public transport will continue to be a priority in the upcoming years.⁷⁵ In any case, the extent of success will depend on a series of political decisions, economic circumstances, and the actual commitment to push the measures agreed on previously.

Many cities in Europe are on the path to decarbonising and modernising their existing infrastructures, using significant conceptual and financial support from the EU.

Building the infrastructure for alternative fuels, expanding and modernising public transport or pushing for smart city logistics are ways to literally free up urban space of non-essential traffic and improve air quality.

⁷⁴ See Ripa. F. 2021. European Commission releases new Urban Mobility Framework. ELTIS, 12/2021. Available at: <https://www.eltis.org/in-brief/news/european-commission-releases-new-urban-mobility-framework>

⁷⁵ Prague City Hall. 2023. *Coalition agreement on collaboration in the Council of the City of Prague for the election period from 2022 to 2026*, 02/2023, p. 19. Available at: https://www.praha.eu/public/26/1f/84/3558237_1271433_Koalicni_smlouva_2023.pdf



At the end of the day, in order to survive politically, municipal governments must consider and answer to the actual preferences of their constituents. Easy and seamless transport of people and goods from A to B, functioning supply and delivery infrastructure and sufficient capacities of residential parking are among these preferences. Inevitably, this creates pressure on the existing motorway and street infrastructure – a sensitive spot for many city residents – which is what brings these topics up time and again ahead of the municipal elections.

Providing alternatives is costly, as it requires considerable planning and investments, and also a reasonable agreement across the elected political spectrum. Building the infrastructure for alternative fuels, expanding and modernising public transport or pushing for smart city logistics are ways to literally free up urban space of non-essential traffic and improve air quality. Combined with the comfort and convenience these alternatives can bring to residents and passengers, the growing interest of private sector does not come as a surprise. That said, the role of the municipal governments is to enable and support this transformation, and drive public investment also in the parts of cities where key mobility infrastructure does not have a business case.