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# SUSTAINABLE URBAN MOBILITY: EU POLICY SOLUTIONS AND PRACTICES

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**Abstract**

The thesis aims to show that the European Union (EU) is undergoing a transition toward a more sustainable transport policy and to do so it has deployed an innovative soft-policy instrument - the Sustainable Urban Mobility Plan (SUMP) instrument. As my analysis will show, the SUMP instrument can be considered as a New Environmental Policy Instrument (NEPI), and its efficacy depends on an innovative method that favors the active participation of citizens, stakeholders, and both public and private economic actors in all stages of the SUMP, from the formulation to the implementation.

To understand whether the EU is moving toward a more sustainable transport policy, I will start by introducing the Environmental Policy Integration Principle (EPI), which has been considered the main tool for including environmental priorities into sectoral policies. This concept has been at the core of the NEPIs, which have been deployed by the EU Commission to start the transition toward a greener transport policy.

I will illustrate the different types of NEPIs and their features as well as the way they have been deployed by the EU Commission to enhance the transition toward sustainability.

Then, I will illustrate the development of the EU political approach towards sustainable mobility, showing its evolution over time. Until 1980 the Commission's political approach toward environmental issues was that of remedial actions instead of preventive actions, and NEPIs were seen as supplementary instruments. A new position of the Commission on environmental issues has been reflected in a series of White Papers aimed at developing and implementing public transport infrastructures and public transport policies between 1992 and 2011.

Two policy initiatives have paved the way for the SUMP: the EU Green Deal and the Clean Transport, Urban Transport (CTUT) policy. The EU Green Deal is relevant because it set the six common transport priorities for the 2019-2024 period and favored the development of a Smart and Sustainable Mobility Strategy that introduced the same targets that we can find in the SUMP instrument. The CTUT package has been important for understanding the focus of the SUMP instrument on the mobility issues at the urban level. Its main novelty was to identify the "urban area" for which develop and implement sustainable transport measures.

I will show that with the SUMP instrument and its innovative method based on a circular mechanism, the European Commission has been trying to implement a new integrated approach to policy design and implementation, which is based on the capacity to involve citizens, public and private economic actors, and stakeholders in the formulation and implementation of innovative solutions for sustainable mobility.
Finally, I will present three cities that have implemented the SUMP approach (Brussels, Prague, and Wroclaw). These cities have been classified as a "forerunner", an "engaged" and an "active" city, taking into consideration the status of their sustainable mobility policies. The analysis of the implementation of SUMP in these case studies will spell out the drivers and barriers to the implementation of this new instrument.

**Keywords:** Environmental Policy Integration (EPI), New Environmental Policy Instruments (NEPIs), SUMPs, sustainable mobility, EU transport policy, stakeholders, citizens

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## Introduction

During the second semester of this last year of my Master's Degree, I did an internship at Moverim consulting in Brussels, during which I could participate in several events about climate change. What I have learned during these webinars, was the reality of climate change today. The planet and people are vulnerable to global warming and what is needed now is to make choices today, which will create a better world for tomorrow. Halting emissions of greenhouse gasses is not sufficient to inhibit the climate impacts from already onset. The drastic cut in emissions during the 2008 financial crisis and the COVID-29 pandemic, had little impact on overall global warming. Events like desertification, loss of biodiversity, ecosystem degradation, and sea-level rise are worsening day after day. In the EU, economic losses due to climate change account for €12 billion per year, and an increase in temperature of 3°C above pre-industrial levels would cost the EU € 170 billion per year. The European Council has described climate change as "an existential threat" and is engaged in reaching climate neutrality by 2050 and reducing the emission by at least 55% by 2030, compared to 1990.

In this dissertation, I focus on the European Mobility and Transport policy, as in my opinion, it is one of the most important but at the same time challenging programs implemented by the EU to promote the transition towards sustainable and greener transport.

Since we are living in an era in which urban areas represent the core of the economic system, they attract a huge number of citizens for working opportunities. At the same time, this phenomenon means increasing pollution. Urban issues are a central political issue, and it is evident even if we think that the 11$^{th}$ goal of Sustainable Development Goals is the "Urban goal" which consists in making cities and human settlements more inclusive, safe, resilient, and sustainable. European cities are home to 70% of the EU population and they generate 80% of the Union's GDP even if they are connected with one of the world's best transport systems, however, urban mobility is still heavily dependent on the use of private cars.

The European Union (EU) is taking action to face the consequences of climate change of a growing urban population, indeed in the last decades, 50% of the European Regional Development Fund was spent on improving the urban environment. Then, in 2016 the EU adopted the Urban Agenda for the EU (European Commission, 2016) which identifies

issues and challenges for European cities to improve their sustainability. The European Union is pursuing its goals through the Green Deal (European Commission, 2019-2024) and its "Smart and Sustainable Mobility Strategy", and the "European transport, Clean Transport" policy, which have the scope to improve the quality of life of the citizens and to make the economy stronger while promoting sustainable urban mobility using clean and energy-efficient means of transport.

I will explore how the Commission pushes for the transition to sustainable mobility through the Sustainable Urban Mobility Plan (SUMP) that, I argue, fits the logic of the so-called new environmental policy instruments (NEPIs). I will therefore unpack the SUMP features against the NEPIs framework.

The thesis aims to investigate how the EU transport policy has been greened and how new soft policy instruments, namely, the SUMP have formulated in order to favor the transition towards sustainable mobility in urban areas. To do so, I will illustrate the measures promoted by SUMP to push member states to apply sustainable transport policies and its integrated approach which is based on the concept of interconnection between the various dimensions of urban life (environmental, economic, social, and cultural).

The SUMP does not use steering, but it provides recommendations and learning instruments for those cities that decide to undergo a transition towards more sustainable mobility. After a general overview of the SUMP instrument and its method based on an integration process between the urban area policy level and the urban area planning level, I will illustrate the measures, the goals, and the principles of SUMP, and the tools given to the cities to implement the transition towards sustainable mobility. I will also discuss the obstacles that cities face when implementing the SUMP approach.

Lastly, I will compare three cities' SUMP projects to understand if this program actually contributes to promoting awareness among cities about the need for more sustainable mobility. To better comprehend the common tendencies and the differences between cities will analyze three different cases; one city that is considered to be a "forerunner", one that is considered an "engaged" city, and one "active" city which is expected to be less proactive in applying European sustainable development policies (Plevnik et al., 2018).

According to scholarly definition, forerunner countries and regions (that represent 16% of EU countries) are those countries with have a solid urban transport planning framework that includes SUMPs and is sustained by national and regional political actors. They have a long-term transport plan based on the long period and they should develop a document that contains: a SUMP program, a legal definition, national guidance on SUMPs, an assessment scheme, monitoring, and evaluation.

Active countries and regions (that represent 44% of EU countries) have recently developed an urban transport plan framework that includes SUMPs but there is only a partial sustain from national or regional political actors. Among these countries, some have worked on their system for a long period but have not yet set up comprehensive support and are still building their system without all the necessary support.

Engaged countries and regions (that represent 25% of EU countries) are those regions that have only recently developed an urban transport planning framework that lacks complete support from the national and regional political actors. In these countries, there are cases of inefficient best practices or approaches.

Finally, I will show that the SUMP approach is not only innovative in terms of policy goals and measures, but it also entails innovative governance architecture as it is based on the active involvement of stakeholders, citizens, and both public and private economic actors since the very first stages of development and implementation of the local projects.

The sources I used are as follows: EU regulations and other official documents, interviews, as well as European institutions' websites (i.e. the SUMP website, the EIT urban mobility website), academic publications, press corners, recorded public interviews, videos, podcasts.

## 1 Research Design and Method

The thesis aims to show that the EU has undergone a transition towards a more sustainable transport policy and to do so it has deployed an innovative soft-policy instrument, the so-called Sustainable Urban Mobility Plan (SUMP) instrument. The SUMP instrument shows several features of NEPIs, which aim to promote policy change not only at the level of policy goals but also by introducing innovative governance architectures that favor the active participation of citizens, stakeholders, and both public and private economic actors in all stages of the SUMP from the formulation to the implementation.

To illustrate how the EU has made the transport policy more sustainable, I will start with an overview of the Environmental Policy Integration (EPI) principle that appears for the first time in the 1980s and introduced a comprehensive approach towards environmental issues, also in those policy fields that are not directly linked to the environment. This concept is fundamental for understanding how the EU has moved towards a greener transport policy because it represents the concrete attempt to make economic competitiveness compatible with environmental actions and the promotion of social development.

Thanks to EPI, environmental goals are now integrated into all steps of EU policymaking in non-environmental policy fields and policies, including those for sustainable transport. The analysis then continues by moving from the general concept to concrete policy instruments. Therefore, I will illustrate how the concept EPI has brought to the creation of the so-called New Environmental Policy Instruments (NEPIs) that have been deployed by the Commission and member states to favor the transition towards sustainable mobility.

NEPIs constitute a particular typology of instruments that introduce environmental goals and innovative governance processes into sectoral policies. They help allocate resources to sustainability priorities and create interaction and cooperation between policymakers during policy formulation and decision-making phases. They also provide the instruments to monitor and evaluate signs of progress through the establishment of a set of indicators for each measure. NEPIs can be divided into market-based instruments, eco-labels, environmental management systems, and voluntary agreements.

The thesis suggests that the SUMP programme can be considered a New Environmental Policy Instrument (NEPI), as it shows several policies and governance features that are

typical of NEPIs. It represents the increased effort of the Commission to make the EU transport policy more sustainable, moving from the aim of reducing GHGs emissions to making transport more sustainable and accessible to all.

In fact, the Commission has presented the European Green Deal (2019) package, which aims, among others, to make transportation cleaner, sustainable, accessible to all, and more efficient because the transport system is crucial to European businesses and provides around 5% of the EU GDP. The EU Commission has developed a Smart and Mobility Strategy that has the aim of reducing 90% of greenhouse gas emissions from transport by 2050. The Smart and Mobility Strategy is promising because it represents a strong step forwards in achieving sustainability in transport, largely building on the principles underlying the SUMP, and they are making mobility more sustainable, making the transport system more integrated, and offering the right incentives for a transition towards sustainability.

The SUMP program has been launched within the framework of EU transport policy and, more specifically, its "Clean Transport, Urban Transport" strand is focused on urban level. As the SUMP instrument, it has the aim of promoting cycling, the use of alternative fuels for sustainable mobility, the deployment of clean and energy-efficient vehicles, and more sustainable urban mobility by taking the urban areas as the space of action.

Thus, SUMP operates as an EU integrated instrument that puts into practice the goals of both the Smart and Mobility Strategy and the EU "Clean Transport, Urban Transport" package.

After having provided an overview of the SUMP instrument, I will illustrate its impact on the ground by analyzing its workings in three European cities. The three selected cities are Wroclaw, Prague, and Brussels. These cities belong to different groups of cities: forerunner, engaged, and active cities (PlevniBalant, Mladenovič, 2018), and therefore they can be reasonably expected to have different implementation dynamics.

This thesis aims at answering the following research questions:

- In what way has the Commission made the EU transport policy greener?
- How have NEPIs been deployed in the EU sustainable transport policies and in particular in the SUMP instrument?
- What are the specific SUMP features?

- Is SUMP successful in pushing decision-makers to adopt a sustainability plan at the urban level?

# 2 The Concept of Environmental Policy Integration and the New Environmental Policy Instruments (NEPIs)

## 2.1 The Concept of Environmental Policy Integration

To better understand how the EU has developed a more sustainable transport policy, I will begin by analyzing the basic concept of the so-called Environmental Policy Integration (EPI), which is also the same concept at the basis of EU policies for sustainability. Commencing from the general EPI concept then shifting to the instruments based on it that are the New Environmental Policy Instrument (NEPIs) and consequently the Sustainable Urban Mobility Plan (SUMP).

The term "Environmental Policy Integration" did not come up before the 1980s (Lafferty, Hovden, 2013). The first Environmental Action Plan (Council of the European Union, Representatives of the Governments of the Member States, 1973) was assumed in 1973 within the European Community and included innovative principles such as the "polluter-pays principle"[1] and the "precautionary principle"[2].

In the Environmental Action Plan (European Commission, 1973), it was stated that:

"The environment cannot be considered as an external surrounding […] but it must be considered as an essential factor in the organization and promotion of human progress. It is necessary to evaluate the effects on the quality of life and on the natural environment of any measure that is adopted or contemplated at national or Community level and which is liable to affect these factors".

This offered a more comprehensive approach to environmental issues, where non-environmental policy fields should also consider environmental impacts. In the Maastricht Treaty of 1993, it was defined that environmental analysis must be embodied into other policies, but in the Amsterdam Treaty of 1997, the EPI principle was included in Article 6, thus giving a constitutional foundation for EPI in the EU.

[1] One of the key principles in the EU environmental policies. The application of the principle means that polluters bear the costs of their pollution including the cost of measures taken to prevent, control and remedy pollution and the costs it imposes on society. [Special Report 2021, European Court of Auditors]

[2] The precautionary principle is detailed in Article 191 of the Treaty on the Functioning of the EU. It aims at ensuring a higher level of environmental protection through preventative decision-taking in the case of risk.

The EPI principle aims to systematically connect the incompatible goals of economic competition with social development and environmental protection. It is intended to be an important 'first order' principle to guide the transformation to sustainability.

Ute Collier's work (Collier, 1997) provides a definition of EPI based on three items: (a) reach sustainable development and avoid environmental harm, (b) withdraw discrepancies between policies and within policies, and (c) recognize mutual advantages and the aim of making reciprocally favorable policies.

*To reach sustainable development and avoid environmental harm:* the purpose of EPI is dual. The first is the overall aim of reaching the targets of environmental policy in the context of sustainable development and safeguarding of environmental loss. This says little about the definition of EPI. The aims of the "polluter-pays principle" or the "precautionary principle" are equally, in the end, the attainment of a set of general environmental goals (such as sustainable development). But this does not tell us what these principles imply in terms of policy consequences. The objective of EPI must be seen in more restricted terms, by specifically addressing the features of EPI and the characteristics that a policy should have for claiming that EPI is employed.

*To withdraw discrepancies between policies and within policies:* this point is an issue of policy coordination, which is useful but does not indicate a particular feature of EPI. EPI involves policy coordination in that it requires adjusting non-environmental policy for a better achievement of environmental goals, but it is a very specific type of policy coordination.

*Recognize mutual advantages and the aim of making reciprocally favorable policies:* this is a problematic point in Collier's definition for two reasons. The first is that any actors that try to obtain a policy objective would attempt to highlight the benefits not only for the "home" sector, but also for other sectors. For this reason, what is described concerns every policy-making strategy and does not differentiate EPI.

The second reason is that, even if there are many "win-win"[3] cases with mutual advantages for all actors, this is not the principal aspect of environmental policymaking. Indeed, the obstacles in operationalizing sustainable development derive from the

[3] The "win-win" strategy is a negotiation strategy where both parties gain roughly equal advantage. The parties agree to act in both their own interest and in the interest of the group.

incapacity of seeing and realizing mutual advantages, and from the fact that there are numerous conflicts of interest in environmental issues.

Therefore, Collier's definition offers interesting insights into the EPI principle, but it does not provide a precise definition of EPI.

The question remains: what is EPI and how do we recognize it?

The Underdal (1980) work introduces a definition of "policy integration" for the first time, and is useful in better understanding EPI. Underdal states that a policy is "integrated" when it fulfils three criteria: "comprehensiveness, aggregation, and consistency" (Underdal, 1980: 159). Comprehensiveness concerns time, space, actors, and problems; aggregation concerns the "overall" perspective not the sole perspective of a single actor; and consistency concerns the integration of the different elements of an integrated policy. Underdal's (1980) definition serves to define EPI as comprised of two dimensions:

- The integration of environmental goals into all steps of policymaking in non-environmental policy fields, with a particular acknowledgment of this aim as the guiding concept for the formulation and implementation of policy;
- The effort to combine assumed environmental effects into a comprehensive policy evaluation and a commitment to reduce conflicts between environmental and sector-specific policies by prioritizing environmental policies.

The first dimension of the concept concerns policy integration and represents a combination of Collier's (1997) and Underdal's (1980) definitions. It touches on the general classification of "environmental objectives" which includes sustainable development. It clarifies that the integration principle in terms of policymaking means making environmental issues essential at all stages of policy formulation.

The second dimension concerns a critical aspect in the EPI definition: the relevance of cross-sectoral and environmental goals. The purpose of EPI is to prevent situations where environmental loss becomes subordinate, and in the framework of sustainable development to assure that the long-term preservation of nature represents a core societal goal.

Environmental Policy Integration develops along two dimensions: horizontal and vertical. Vertical environmental policy integration (VEPI) (Lafferty and Hovden, 2010) specifies the extent to which a governmental field has embraced and wanted to implement

environmental principles as the central objective of its policies. VEPI concerns the level to which cross-sectoral governance has become "greened". The "greening" does not mean a predominance of environmental goals at the cabinet-level, since each branch is free to build its own interpretation of the concept. This refers to the degree of EPI with the steered scope of a department or ministry.

The horizontal environmental policy integration (HEPI) refers to the degree to which a central authority has elaborated a broad strategy for EPI. The "central authority" can be the government (cabinet), or a specific institution or commission which has been assigned the task of sustainable development; or an inter-ministerial institution assigned to tackle inclusive issues. In HEPI, the aim is to grant equal treatment for the environment and other opposing interests.

### 2.2 The New Environmental Policy Instruments

Here, we will examine what the New Environmental Policy Instruments (NEPIs) are and how they have developed over time. NEPIs are specifically being discussed because the Sustainable Urban Mobility Plan (SUMP) represents a strengthened NEPI that introduces an innovative approach of active citizen involvement, private economic actors and stakeholders in the sustainable urban mobility planning from formulation to implementation. How the EPI concept has been translated into the NEPIs instruments in the attempt of the Commission to make the EU transport policy more sustainable shall thus be analyzed.

Let us begin with the general definition of policy instruments by Howlett, since NEPIs are policy instruments. According to Howlett (2005), a policy instrument is an instrument that affects either the content or process of policy implementation, which alters the way goods and services are delivered to the public or the way such an implementation process takes place. Scholarly debate conceptualizes policy instruments as divided into two main categories.

*Substantive instruments* can affect many aspects of production, distribution, and consumption of goods and services, such as: which actors are involved in the production phase, what type of goods and services are produced, the quality of products, the number of goods and services provided and finally the methods, conditions, and organization of production.

Then, we have *procedural instruments* that affect the behavior of actors involved in policy implementation, by changing actor policy positions, promoting network self-regulation, changing evaluative criteria for assessing policy outcomes, and certifying or sanctioning certain types of policy-relevant behavior.

The SUMP can be seen as a new environmental policy instrument (NEPI) that belongs to the "procedural instruments' category because it consists of a set of measures that must be implemented following a circular order, from the formulation to the implementation stage, while constantly involving citizens in the process in order to make them an active element in changing their transportation habits.

Environmental and sustainable development policies have been among the most studied policy areas. The aim of the EU Sustainable Development Strategy is to identify and develop instruments to enable the EU to achieve a continuous long-term improvement of the quality of life of its citizens, through the creation of sustainable communities able to manage and use resources efficiently, able to tap into the ecological and social innovation potentials of the economy and, lastly, able to ensure prosperity, environmental protection, and social cohesion.

The next chapter shall explore the different types of NEPIs that have been applied by the Commission for the transition towards a more sustainable EU transport policy. NEPIs are essential in order to understand SUMP features.

## 2.3 NEPIs' Types

NEPIs have been interpreted in different ways. Scholars categorize them into "strong NEPI" and "weak NEPI" (Lenschcow and Jordan, 2010). "Strong" NEPI prioritizes the environment by ensuring that every attempt is made to measure the impact of policy on the life-sustainable capacities of the affected ecosystem. On the other hand, "weak" NEPI coordinates comprehensiveness, aggregation, and especially consistency (Peters, 1998), while searching for synergy effects and 'win–win' solutions in the making of sectoral policy choices (Collier, 1994), and implies the concept of reciprocity (Liberatore, 1997) between equally weighed parties or objectives.

From Political Systems Perspective, NEPIs must be decided by political majorities, organized and managed by establishing a clear organizational structure, and finally maintained either through enforcement or through persuasion.

There are three factors that matter in implementing NEPIs. The first is the structure of the prevailing political system which means institutions, constitutional principles, laws, and specialized bodies. The second factor is the political context since studies show that left-wing parties are more sensitive to environmental topics rather than right-wing parties that support economic development instead. Finally, the third factor is the social, legal, and administrative tradition of a polity which means the sensitivity to environmental issues.

NEPIs are significant from a political perspective because they assist in evaluating policymaking ex-ante through the so-called regulatory impact assessment, which assesses if any legislative proposals respect sustainability. They also help allocate resources in support of certain sectoral policy objectives, and to structure the interaction between policymakers during policy formulation and decision making by changing the administrative system. They also contribute to monitoring and evaluating and from data collection drawing indicators for each measure, which lets us know if we are reaching our targets.

All these aspects, the ex-ante evaluation, the allocation of resources, the interaction between policymakers and stakeholders in the policy formulation, and also monitoring and evaluation are present in the SUMP instrument.

If one wants to study sustainable development, one must keep in mind that the governing principles of this policy are the integration of different sectors and actors through cross-sectoral integration between the economic, social, environmental, transport, and energy sectors. The second aspect is the cross-jurisdictional integration that aims at integrating between sectors and the EU, national, regional, local levels. Finally, we have the inclusiveness/partnership principle which is enforced by the different political actors in the policy arena, that are public authorities, civil society, economic and social actors, and stakeholders.

It is relevant to mention policy instruments since their function is to link policy development and decision-making to policy implementation. Starting from policy development, the policy question is shifted into operational goals for which one must decide the most appropriate instruments to reach those goals. To see the policy process

as linear is an oversimplification since it is often based on a circularity where the description of the policy issue is actually based on the choice of instrument. Policy implementation is based on the particular context in which some instruments work and some do not, and their effectiveness depends on public and private organizations, knowledge, ideas. The behaviors in society, culture, and institutions largely influence policy development and choice of policy instrumentation.

For a more in-depth study of NEPIs instruments, the following analysis is based on a paper by Jordan, A., Wurzel, R.K.W. and Zito, A. (2005), which explains the different types of NEPIs.

According to scholar's definition, NEPIs are divided into four main types:

The ***market-based instruments (MBIs):*** which according to the Organisation of Economic Cooperation and Development (OECD) can in turn be divided into four main types: (1) eco-taxes; (2) tradable permit systems; (3) subsidies (i.e. fiscal incentives to reduce pollution from products/activities); (4) deposit-refund schemes. Market-based instruments comprise prices and economic tools as incentives for polluters to reduce or remove the negative externalities due to GHGs emissions. They try to handle externalities such as pollution by including the external costs of production or consumption actions through taxes and fees on processes of production and goods.

***Eco-labels:*** eco-labels rely on moral suasion by providing consumers with information about the environmental impacts of their conduct. OECD differentiates between three sub-types:

- externally: verified, multi-issues schemes
- unverified self-declaratory schemes
- single issues schemes

eco-labels do not guide society, but they encourage consumers to make more informed choices.

***Environmental management systems*****:** EU's environmental management and audit system (EMAS)[4], and the International Standard Organisation's (ISO) push industry to act more responsibly. These systems require member companies to assess their environmental impact and then to establish internal management systems to diminish the

[4] EU Commission Regulation EU 2018/2026

impact of their activities and in exchange, the business is conferred an official confirmation (or logo) by a qualified national authority (for EMAS) or the ISO.

***Voluntary agreements (VAs):*** European Commission has defined voluntary agreements as "agreements between industry and public authorities on the achievement of environmental objectives"[5].

These instruments have been applied with different intensities among the EU Member States. This is because the choice of the instruments for environmental policy implementation depends on the characteristics and sensibilities of political actors in each member state.

NEPIs are used to address specific tasks:

- Filling the fractures of the regulatory system (*co-existence*)
- Handling emerging issues like climatic change
- Handling issues that cannot be subject to a regulatory approach

[5] COM (96) 561 final, p.5

## 3 Institutional Patterns of NEPIs in EU Environmental Policy

Studying the development of the NEPIs instrument is relevant to the scope of the thesis since it underlines a clear change in the Commission's approach towards transport policies. The Commission's approach up until 1992 was focused on prevention with the deployment of soft policy legislations. After 1992, the Commission began to play an active role in pushing Member States to introduce NEPIs to develop concrete actions for sustainability. The analysis of NEPIs adoption shows the way in which the EU has embraced the environmental policies and how the Commission is moving towards a green mobility policy, especially in the transport field.

### 3.1 NEPIs before 1992

Until the 1980s, environmental policies corresponded to traditional regulations. The focus was on obvious pollution issues, and the approach was that of remedial action instead of preventive action. Few NEPIs already existed in a Member State, but they were seen as supplementary instruments (i.e. water pollution tax incentives for less polluting cars in Netherlands or Germany and the German eco-label).

Before 1987 Single European Area, there was no explicit legal base of a common environmental policy, and this required the EU to develop environmental legislation legitimized by economic harmonization. The Commission's Directorate-General for the Environment (DG Environment) was a weak partner who did not have a significant legislative accumulation, and it had to agree with other DGs, with different priorities and constituencies, to adopt NEPIs. Nevertheless, the EU adopted stringent measures to protect the Single European Market, but the Commission agenda focused on creating new legislation with less attention to cost-efficiency requirements.

The institutional limitations led the Commission to conduct a strategy of *negative integration*[6] to protect the Single European Market, in contrast with *positive integration*[7] which meant to draw new EU policies and/or adoption of novel policy instruments. The use of *soft* framework legislation was the rule before 1992.

[6] Negative integration implies the elimination of barriers that restrict the movement of goods, services and factors of production.

[7] Positive integration refers to the creation of a common sovereignty through the modification of existing institutions and the creation of new ones.

### 3.2 NEPIs After 1992

The EU has used mainly command and control instruments to bring about the Single European Market[8]. But three pressures from below pushed the Commission to suggest new initiatives and offer policy windows for supporters of NEPIs. The post-Maastricht agenda pressed the Commission into a more responsive mode in improving efficiency and implementation of new policies.

The second pressure occurred when the European economy suffered a recession in the 1990s. This event encouraged actors to search for instruments to improve economic competitiveness.

The third pressure arrived when the EU environmental policy developed and needed a more systematic approach and cost-effectiveness analysis.

The Commission acknowledged the necessity to involve industry more directly, and concentrated on soft-law instruments (for example legally non-binding resolutions and green papers) to push Member States towards general values and better habits.

During the 1990s, the eco-label scheme was agreed upon and the "Access to Information" Directive[9] (European Parliament, Council of the EU, 2003) was introduced. After three years, Commission officials published the White Paper on "Growth, Competitiveness, and Employment"[10] (European Commission, Secretariat-General, 1993) to promote the use of market-based instruments which would take into consideration environmental costs.

### 3.3 NEPIs Adoption at the EU Level

The Commission has pushed for the adoption of NEPIs at the Member State level with the aim of favoring the transition towards more sustainable transport. NEPIs have shown to be more or less effective according to the characteristics of each Member State. NEPIs

[8] Since its creation in 1993, the internal market of the European Union (EU) is a single market in which the free movement of goods, services, capital and persons is assured, and in which citizens are free to live, work, study and do business

[9] Directive 2003/4/EC of the European Parliament and of the Council of 28 January 2003 on public access to environmental information and repealing Council Directive 90/313/EEC. Available online on: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32003L0004

[10] European Commission, Secretariat-General, *Growth, Competitiveness, Employment : The Challenges and Ways Forward into the 21st Century: White Paper*, Publications Office, 1994, Available online at: https://op.europa.eu/en/publication-detail/-/publication/0d563bc1-f17e-48ab-bb2a-9dd9a31d5004

effectiveness results to be strongly shaped by the development of the EU Commission approach towards sustainability. Indeed, in the last years the EU Commission has shown a growing commitment introducing NEPIs within Member States. It follows the analysis of the adoption of the above-mentioned NEPIs by EU Member States, shaped by the approach of the Commission towards sustainability policy.

***Environmental Taxes***

The main instrument of this category is the failed attempt to adopt a common carbon-energy tax. The coalition between the Commission and the DG Environment used the 1992 Rio Earth Summit and the growing concern about climate change as an excuse to push for a carbon-energy tax, and make the EU a global leading actor in environmental policies implementation. The proposal received support from Member States which were worried about the competitive impact of unilateral eco-taxes.

For its approval, the DG Environmental was forced to reach an agreement with other Commission Directorates, but since the adoption of supranational taxes requires unanimity within the Council, the opposition of Member States such as the UK (which feared a loss of sovereignty) and Spain (for development fears) blocked the proposal of a carbon tax.

In 1997, the Commission suggested harmonizing Member State taxation on energy products, particularly fossil fuels [CEC 1997] but the proposal was blocked by the Spanish government.

After several negotiations, the EU Finance Ministers reached an agreement on the framework directive on March 20$^{th}$, 2003, which established the necessity to enhance market harmonization by ensuring a congruent taxation policy in all Member States. The Energy Products Directive (2003) pushed national measures toward a minimal convergence on price levels of minerals, coal, natural gas, and electricity, while raising minimum prices for oil products. Due to unanimity rule, the progress at the EU level proceeded slowly, but finally led to informal meetings between like-minded countries (as Denmark) that already passed national energy taxes or pushed for EU-wide versions (such as Germany).

Despite these meetings that took place in the 1990s, these countries made little progress in achieving an EU-wide agreement on the carbon dioxide tax.

***Voluntary Agreements***

The experiment of Voluntary Agreements (VAs) in the Netherlands and Germany gave effort to the Commission's proposal on sustainable development policies. The subsidiarity principle[11] allowed the Commission to create a policy window for the introduction of VAs. Voluntary agreements represent a less interventionist approach promoted by some Member States, that enabled DG Environment to include VAs in the EU agenda. Since those voluntary agreements were not legally binding in the Community Treaties, the community promulgated a legally non-binding communication that permitted avoiding veto points. But, by late 2001, only more than one dozen of EU voluntary agreements had been embraced.

In 1996, the Commission declared the will to promote effective environmental agreements as instruments to supplement the traditional regulation (CEC 1996), but the mixed coalition of Commission and industry fostering VAs has not yet created an authentic model. There have been tensions to identify the appropriate approach to apply VAs. For example, the Dutch tradition of VAs stresses the need for formal instruments, while the German tradition is about an informal approach.

***Eco-labels***

Eco-labels were established in 1992 as a label of environmental excellence for those products and services that respect the environmental standards in the entire product life cycle. Eco-labels can act as market instruments, if their adoption is high, for a specific product in a market where consumers' behavior has a high degree of environmental awareness.

Eco-labels are non-binding voluntary policy instruments. They are soft policy tools that rely on moral suasion and exert moderate constraints on market actors, if compared with traditional command and control legislation, and with market instruments like eco-taxes. Eco-labels can also be utilized to increase public environmental awareness, but this calls for significant public resources.

[11] The principle of subsidiarity is defined in Article 5 of the Treaty on European Union. It aims to ensure that decisions are taken as closely as possible to the citizen and that constant checks are made to verify that action at EU level is justified in light of the possibilities available at national, regional or local level.

Germany was a pioneer in adopting the first nationwide eco-label in 1978, and then twenty years later other nations followed the same path with dozen national and multinational eco-labels established worldwide.

The 1992 EU eco-label had little impact on consumers' and producers' behaviors; however, even if producers did not apply for the EU label, they started to use it as a benchmark. The Commission proposal in 1996 was considered unacceptable to the Environmental Council and the European Parliament. At that time, the Commission suggested: 1) the abandonment of national eco-labels; 2) the establishment of an independent eco-label organization; 3) the substitution of the pass/fail system with a graded label.

The graded eco-label system would have had the advantage of considering different environmental conditions in different Member States. The EU Member States, and members of the European Union Parliament would rather sustain the simple pass/fail system to avoid that a more complicated system would bewilder consumers. Initially, the European Parliamentarians supported the abandonment of national eco-label schemes, although demanding more stringent criteria for the EU scheme proposed by the Commission but, in the end, the European Parliament joined the Member States' proposal of coexistence of EU and national labels.

In July 2000, the Environmental Council and the European Parliament adopted a regulation (1980/2000/EC)[12] which established the following major variations: 1) creation of the EU eco-labeling board (EUEB), composed of the national competent authorities to ensure that Member States keep playing a decisive role; 2) higher transparency; 3) wider scope of the label (also services); 4) greater involvement of consumers and environmental groups; 5) a fee threshold which allows price reductions from small businesses which use the EU's environmental management assessment system (EMAS).

The **EU Emission Trading System (ETS)** instead, represents a mandatory and coercive eco-label instrument based on the principle of "cap-and-trade"[13]. It establishes an absolute

[12] Regulation (EC) No 1980/2000 of the European Parliament and of the Council of 17 July 2000 on a revised Community eco-label award scheme. Available online at: https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX%3A32000R1980

[13] Cap and trade refers to a government regulatory program designed to limit, or cap, the total level of emissions of certain chemicals, particularly carbon dioxide, as a result of industrial activity.

limit or “cap” on the emissions of greenhouse gases each year by the bodies included in the system. The EU ETS was introduced in 2005, and thanks to this system, emissions have been cut by 42.8% in the power and heat, energy-intensive industrial areas, and aviation, which are the main sectors covered by the ETS. Under the EU ETS, regulated bodies buy or get emission allocations to cover their beams, and by the end of the year, they must include all their emissions. If a regulated body reduces its emissions, it can use the “saved” reductions to include future emissions. The European Commission is planning to reduce the emissions from the European Trading System (ETS) field (including the maritime sector) by 61% by 2030, compared to the 2005 emissions’ level. Achieving the EU target of -55% emissions by 2030, compared to 1990 emissions, cannot be achieved without emission cuts in buildings and road transport. The Commission is drawing a new EU-wide emissions trading system that will set a price on emissions from buildings and transport. This system will control fuel suppliers who will be responsible for supervising and communicating the amount of fuel they introduce into the market, and for transferring emission permissions each year, depending on the carbon concentration of fuel. This will be an incentive for fuel suppliers to decarbonize fuel, for reducing the cost of harmonization with the ETS. This innovative system is expected to start in 2026 and will introduce a specific system to control carbon price growth. Carbon pricing alone is not sufficient to tackle the deployment of low and zero-emissions solutions in transport and buildings. These areas will be included under the Effort Sharing Regulation (European Commission, 2018) which sets national targets for emission reductions from road transport, heating systems in buildings, agriculture, small industrial installations, and waste management. The Commission’s proposal is to push the Member States to spend their revenues for zero-emission vehicles, energy efficiency ameliorations in buildings, and for emissions trade in the road transport and buildings sector.

The Innovation Fund with € 450 million allocations from the ETS in 2021-2030, will be increased by 50 million allocations and 150 million allocations from the new emissions system for road transport and buildings. The Innovation Funds which count for 2% of total allocations, will be augmented by 2.5% of allocations.

## 4 The European Union's Mobility and Transport Policy

In this chapter, the development of the EU mobility and transport policy will be analyzed. In particular, two of the main EU mobility policies are the Green Deal (2019-2024) and its Smart and Sustainable Mobility Strategy established in 2020, and the "Clean Transport, Urban Transport" policy. The analysis of the EU transport policies highlights the Commission's effort at making EU policy transportation greener. The SUMP instrument has been introduced by the EU Commission to give practical instruments and incentives to those cities that choose to undergo a green transition, and at the same time, favouring the achievement of the Green Deal and Clean Transport, Urban Transport goals.

The Commission's increasing effort at creating an EU sustainable transport mobility, derives from the fact that over the last decades, anthropic activities greatly contributed to climate change and the earth's temperature rising, due to fossil fuels, the destruction of rainforests, and livestock farming. The serious threat to the environment is the reason which caused the European Union to develop, among other policy packages, the "Sustainable and Smart Mobility Strategy"[14] (European Commission, 2020) with its Action Plan of 82 initiatives to reduce Green House Gasses (GHGs) emissions.

The Sustainable and Smart Mobility Strategy represents a branch of the European mobility policy called the Green Deal (2019-2020), which aims at reducing 90% of emissions by 2050, thanks to the development of a "smart, competitive, safe, accessible and affordable mobility system".

The Executive Vice-President for the European Green Deal, Frans Timmermans explains the goal of the Green Deal: "*To reach our climate targets, emissions from the transport sector must get on a clear downward trend. Today's strategy will shift the way people and goods move across Europe and make it easy to combine different modes of transport in a single journey. We've set ambitious targets for the entire transport system to ensure a sustainable, smart, and resilient return from the COVID-19 crisis.*"

[14] European Commission, 2020. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: Sustainable and Smart Mobility Strategy – putting European transport on track for the future. Available online at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020DC0789

In order to attain a smarter and more feasible future, all transports must become more sustainable, and the right incentives must be put in place to favor this transition. Therefore, the EU has established core steps to steer a transition accomplished by these different deadlines:
By 2030:

- at least 30 million zero-emission cars will be in operation on European roads.
- 100 European cities will be climate neutral.
- high-speed rail traffic will double across Europe.
- scheduled collective travel for journeys under 500 km should be carbon neutral.
- automated mobility will be deployed at a large scale.
- zero-emission marine vessels will be market-ready.

By 2035:

- zero-emission large aircraft will be market-ready.

By 2050:

- nearly all cars, vans, buses, and new heavy-duty vehicles will be zero-emission.
- rail freight traffic will double.
- a fully operational, multimodal Trans-European Transport Network (TEN-T) for sustainable and smart transport with high-speed connectivity.

All of these goals have been translated into effective actions by identifying two "flagships" to implement specific measures.
The first flagship is sustainability*:* it involves a number of actions to make transport more sustainable from an environmental point of view, by increasing the adoption of zero-emission vehicles, vessels, and airplanes, and the use of renewable and low-carbon fuels and their necessary structures (i.e. setting up 3 million public charging points by 2030) and build zero-emission airports and ports (by promoting sustainable aviation and maritime fuels). The third action implies turning interurban and urban mobility into something healthy and sustainable (i.e. duplicating high-speed rail traffic and building extra cycling infrastructure in 10 years) while the fourth aims at greening cargo transport

(i.e. by doubling rail cargo traffic by 2050). Finally, the last action consists in faring carbon and offering better incentives for users (i.e. implementing a set of measures to assure efficient and fair prices among all transports).

The second flagship is resiliency. Since the COVID-19 pandemic negatively impacted the transport sector, the Commission consequently decided to invest in reinforcing the single market through the strengthening of the investments for the Trans-European Transport Network (TEN-T) by 2030. The aim is to create a "fair and just for all" mobility, making mobility affordable and accessible in all regions of the EU and for all types of passengers.

To better understand how the EU arrived at establishing these goals, it is necessary to undergo an analysis of the development of EU transport policies. It will be demonstrated that the approach of the Commission towards sustainable transport policy has changed, moving from a soft-policy approach to the development of an innovative strategy for the creation of an EU green and sustainable transport policy, by setting targets and providing instruments for Member States that decide to participate.

### 4.1 The Main Directions and Developments of EU Transport Policy

The European Commission's approach toward sustainable transport mobility has changed significantly in the last ten years. It was initially based on a subsidiarity[15] method, which avoids being involved in policies that can be handled at the national, regional, or local level. Nonetheless, urban transport was accountable for 80% of congestion (EC, 2007) and 14% of carbon emissions. For this reason, urban transport was considered too important to be left only at the national level. As a consequence, the development of the Commission's Action Plan on Urban Mobility[16] (European Commission, 2009) and the

[15] The principles of subsidiarity and proportionality govern the exercise of the EU's competences. In areas in which the EU does not have exclusive competence, the principle of subsidiarity seeks to safeguard the ability of the Member States to take decisions and action and authorizes intervention by the Union when the objectives of an action cannot be sufficiently achieved by the Member States, but can be better achieved at Union level, 'by reason of the scale and effects of the proposed action'.

[16] European Commission (2009). *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: Action Plan on Urban Mobility.* Available online at: https://eurlex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2009:0490:FIN:EN:PDF

2011 White Paper entitled "Roadmap to a Single European Area – Towards a Competitive and Resource-Efficient Transport System"[17] (Commission, 2011) specified some necessities to be followed by European Union cities in the transition towards more sustainable mobility. It suggested a lowering of 20% of transport emissions between 2008 and 2030 (with the exclusion of international maritime transport), and a cut-off of at least 60% of emissions between 1990 and 2050. It also asked for a reduction of 40% of emissions from international maritime transport between 2005 and 2050. In addition, it called for the adoption of low-carbon fuels for 40% of planes in the aviation sector by 2050 and a reduction of 50% of vehicles that adopt conventionally fuels with the goal of abandonment by 2050.

How did the EU Commission arrive at the point of introducing mandatory benchmarks for the EU Member States?

On 2 December 1992, the Commission passed the White Paper on the future development of the common transport policy[18] (Commission, 1992). It promoted the opening of transport markets and the extension of the Trans-European Transport Network. It also sustains the transition towards an integrated approach based on "sustainable mobility".

The following White Paper of 22 July 1998 was entitled 'Fair Payment for Infrastructure Use: a Phased Approach to a Common Transport Infrastructure Charging Framework in the EU'[19] (Commission, 1998) and focuses its attention on the differences in costs for transport services.

[17] European Commission (2011). *Roadmap to a Single European Transport Area – Towards a competitive and resource-efficient transport system*. [White Paper]. Available online at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:52011DC0144

[18] European Commission, (1993) *The future development of the common transport policy : A global approach to the construction of a Community framework for sustainable mobility*. Publications Office. Available online at: https://op.europa.eu/en/publication-detail/-/publication/67d2cd43-9740-42b0-8ba8-e759d36f3109

[19] European Commission (1998). *Resolution on the Commission White Paper entitled 'Fair Payment for Infrastructure Use: A phased approach to a common transport infrastructure charging framework in the EU'*. Pubblications office. Available online at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A51999IP0111%2801%29

In September 2001, the Commission published the White Paper entitled 'European Transport Policy for 2010: Time to Decide'[20] (European Commission, 2001). In this paper, the Commission assessed the issues and disputes faced in European transport policy. It foresaw a huge rise in traffic which would cause congestion, health problems, and environmental issues. The aim of the study was to sever the connection between economic growth and increased traffic, and to handle the unequal growth in means of transport. A focus was placed on the need for revised guidelines for the Trans-European Network to adapt them to the needs of a larger European Union.

In 2006, the Commission transmitted a middle assessment of the 2001 White Paper (European Commission, 2001) named 'Keep Europe Moving – Sustainable Mobility for Our Continent'[21]. New instruments were introduced like the plans of action for logistics of good transport, the use of intelligent transport systems, and urban mobility along with two comprehensive action plans for transports in inland waterways named Naiades and Naiades II, that set strategic targets and suggestions for the EU maritime transport.

On 28 March 2011, the Commission published its White Paper on the future of transport named 'Roadmap to a Single European Transport Area – Towards a Competitive and Resource-Efficient Transport System'[22] (European Commission, 2011). Among the 10 goals established in the paper, the Commission included the establishment of a single European transport area.

In 2016, the White Paper 'A European Strategy for Low-Emission Mobility'[23] (European Commission, 2016) was published introducing measures for the decarbonization of

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[20] European Commission (2001). *European transport policy for 2010: time to decide. White Paper.* Available online at: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52001DC0370&from=EN

[21] European Commission (2001). *Communication from the Commission to the Council and the European Parliament - Keep Europe moving - Sustainable mobility for our continent.* White paper. Available online at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2006:0314:FIN

[22] European Commission (2011). *Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system.* White Paper. Available online at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:52011DC0144

[23] European Commission (2016). A European Strategy for Low-Emission Mobility. Communication. Available online at: https://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A52016DC0501

European transport. The strategy aspires to reach zero emissions, as set in the 2011 White Paper on the future of transport.
Finally, in December 2020, the Commission published its Sustainable and Smart Mobility Strategy with the objective of turning EU transport policy sustainable and smarter.

### 4.2 The EU Policies for Sustainable Mobility

The following paragraphs will illustrate the main policies adopted by the European Commission in the field of sustainable mobility, in order to analyze how the EU is trying to make the transport policy greener and more sustainable. Furthermore, an analysis of transport policies would be useful for proving that the SUMP instrument is an innovative NEPI in terms of its circular method and the promotion of active participation of stakeholders and citizens, although many of its core principles were already present in the European policies as the European Green Deal and its Smart and Mobility Strategy, and the Clean Transport, Urban Transport policy. This means that the Commission is using the SUMP instrument to operationalize the principles of its mobility policies to provide European cities with an effective strategy in the transition toward sustainable transport.

#### 4.2.1 The European Green Deal and the Smart Mobility Strategy

A European Green Deal is one of the six Commission priorities for the 2019-2024 period. The European Green Deal is a political strategy to face climatic change and environmental deterioration, which are a real danger to Europe and the world. The aim is to change the EU into a modern, resource-efficient, and innovative economy, by ensuring:

- No emissions of greenhouse gases by 2050.
- Economic growth dissociated from resource use.
- No persons or regions left behind.

One-third of the 1.8 trillion Europe from the Next Generation EU Recovery Plan and the EU's seven-year budget will finance the European Green Deal.
Green Deal has fixed seven main goals to reach. The first goal is transforming our economy and societies by making transport sustainable for all, and leading to a third industrial revolution. Our energy system will become cleaner and the promotion of the development of renovating buildings will represent a great incentive for greener lifestyles.

To protect our planet and health, a strategy will be developed that works with nature and boosts global climate action.

The Green Deal aim is to improve the wellness and health of citizens and future generations by offering fresh air, clean water, healthy soil, and biodiversity, renovated energy-efficient buildings, healthy and affordable food, more public transport, cleaner energy, and cutting-edge clean technological innovation, durable objects that can be restored, recycled, and re-used, future-proof jobs and skills training for the transition and globally competitive and resilient industry.

Providing efficient, safe, and environmentally friendly transport:

The transport system is crucial to European businesses and global supply chains, providing around 5% of EU GDP and hiring more than 10 million people in Europe. On the other hand, transport emissions stand for 25% of the EU's total greenhouse gas emissions, and they are growing in recent years. The Green Deal goal is to transform Europe into the first climate-neutral continent by 2050, but to obtain this calls for fundamental changes in transport. A clear strategy is essential to get a 90% reduction in greenhouse gas emissions from transport by 2050. The EU Commission has embraced a set of proposals to make the EU's climate, energy, transport, and taxation policies suit to reduce net greenhouse gas emissions by at least 55% by 2030, compared to 1990 levels.

Sustainable and Smart Mobility Strategy:

The European Green Deal aims at reducing 90% in greenhouse gas emissions from transport, to achieve the goal of making the EU a climate-neutral economy by 2050. One of the strategies of the European Green Deal is named "Sustainable and Smart Mobility Strategy". This strategy has the aim of (1) making all transport means more sustainable, (2) making sustainable substitutes extensively available in a multimodal transport system, and (3) offering the right incentives to favor the transition.

In this work, only the "making transport sustainable for all" goals will be analyzed, followed by the analysis of each of the above-mentioned goals, that will help to better comprehend what the aim of sustainable mobility instruments in the EU is, and in which terms, is it similar to the actions proposed in SUMP.

To make transport more sustainable, there are ten flagships to respect:

Flagship 1 - Increase the uptake of low and zero-emissions vehicles as well as renewable and low carbon fuels and related infrastructure:

Partnerships sustained by Horizon European, such as Batteries, 2Zero, and Clean Hydrogen can be effective instruments for the supply of innovative vehicle technologies. However, at the same time, an extensive policy is needed to encourage the demand for zero-emissions vehicles without barriers within the European market. The Commission will draw up actions to improve the development of zero-emission vehicles with fully sustainable batteries along their entire life cycle.

The development of zero-emissions engines for the vehicle does not however fix the problem of tires, which cause a major part of noise and microplastic emissions. Higher performant tires should be promoted which can reduce energy consumption and emission, but maintain their safety.

Fuel providers and operators should be aware that transport fuels must become carbon-neutral in favor of the deployment of sustainable, renewable, and low-carbon fuels on large scale. The Commission will introduce additional measures to sustain these fuels by applying a minimum share of quotas through the revision of the Renewable Energy Directive.

For road transport, the development of zero-emissions vehicles is recently increasing, and manufacturers are considering investing in battery-electric vehicles. Manufacturers are also spending on hydrogen fuel-cell vehicles for commercial use of fleets, busses, and heavy-duty transport. These alternatives are supported under the EU energy system integration. Energy efficiency shall be a criterion for the deployment of suitable technologies in the future. Transitional technological solutions should comply with the CO2 and pollutants standards. Electrification systems, or in alternative, the use of hydrogen for rail transport is also needed.

EU international emissions from navigation and aviation have increased by more than 50% since 1990. These means of transport must have priority entry to additional renewable and low-carbon liquid and fuels, given that there is a lack of alternative powertrains in the short term. The ReFuelEU Aviation and FuelEU Maritime initiatives will encourage the production and development of sustainable aviation and maritime fuels. The Commission will consider the opportunity to create a Renewable and Low-Carbon Fuels Value Chain Alliance with the cooperation between public authorities, industry, and civil society to favor the use of sustainable fuels. “Recharge and Refuel” is a European flagship under the Recovery and Resilience Facility: by 2025, the goal is to

build half of the 1000 hydrogen stations, and one million out of 3 million public recharging points expected by 2030.

Flagship 2 – Developing zero-emission airports and ports.

In the transition to zero-emission, the shift to more sustainable airports and ports must become the norm in order to develop environmental-friendly forms of connectivity. Ports and airports should turn into multimodal mobility and transport hubs. This will boost air quality, and at the same time the health of residents. The Commission will present measures to make airports and ports cleaner through the use of renewable and low-carbon fuels, filling stations with renewable power, and cleaner air transport.

Simultaneously, the establishment of "Emission Control Areas" in all EU areas to reach zero pollution to air and water should be a priority.

The second pillar consists in making sustainable alternatives widely available in order to allow better modal choices. The EU cannot rely solely on technological innovations, but needs to adapt its mobility system to deal with climate change and reduce pollution. People want to switch to more sustainable means of transport for their daily mobility, and the EU must support the development of sustainable alternatives and make them available to citizens.

In brief:

- At least 30 million zero-emission cars and 80 000 zero-emissions trucks will be available by 2030.
- Almost all cars, vans, and buses will be zero-emission by 2050.
- Vessels and aircraft with zero emissions will be available on the market by 2030 and 2035.

Flagship 3 – Making interurban and urban mobility more sustainable and healthier.

Europe should build a high-quality transport network with high-speed rail services on short routes and clean aviation services on long trips. The Commission will act for creating the conditions to offer travelers transport alternatives by 2030 that are carbon-neutral under 500 km distance.

According to the 2030 climate target plan, the share of collective multimodal and connected transport, intended as walking and cycling, and of automated transport will lower pollution and congestion in urban areas. The Commission will work with cities and

the Member States to assure that all large and medium-sized cities will put their plans for urban mobility in place by 2030. Active transport means cycling has grown in cities that have planned 2300 km of extra cycling infrastructure with the purpose to double it to 5000 km in the next decade.

Flagship 4 – Greening freight transport.

The European Green Deal goal is to transform a considerable part of the 75% of inland transport by road, to rail and inland waterways transport. Urgent action must be taken since rail transport which was 17.9% in 2018 is become only 18.3% in 2011. A revision of the regulatory framework such as the Combined Transport Directive and the introduction of economic incentives should be considered. Multimodal logistics must be part of the transformation both within and behind urban areas, while the Sustainable Urban Mobility Planning must focus on the transport aspect. Priority should be given to fixing the scarcity of trans-shipment infrastructure and inland multimodal terminals, for making collective travel under 500 km carbon-neutral by 2030 within the EU.

In recent years, innovative companies have shown how transport can be attractive for consumers, but the domestic rules and technical barriers are an obstacle to increased performance. The Commission will suggest transforming the Rail Transport Corridors and the TEN-T Corridors into “European Transport Corridors” focusing on train length, loading capacity, and better operational rules to reinforce the infrastructural aspect, while boosting intermodal transport. Rail transport traffic will increase by 50% by 2030 and double by 2050.

In brief:

- Travel under 500 km should become carbon neutral by 2030.
- There will be at least 100 climate neutral cities by 2030.
- Rail cargo traffic will grow by 50% by 2030 and double by 2050.
- Transport by inland waterways will grow by 25% by 2030 and by 50% by 2050.

Flagship 5 – Setting prices for carbon and offering better incentives for users

The EU ETS is the most important instrument of carbon price setting to internalize the costs of CO2 emissions. The Commission wants to extend the EU Emission Trading System (EU ETS) to the maritime transport sector. The proposal for aviation is to revise the EU ETS Directive to reduce the discounts for aviation.

Fossil fuel subsidies should end, and at the same time, the taxation of electricity and energy products should be aligned with EU policies on climate and energy. Smart road fees based on distance, with various rates for the type of vehicle, and the time spent, is effective to incentivize sustainable and economically efficient alternatives, and to manage traffic while reducing congestion.

Increased education on the environmental footprint of our trips, and feasible alternatives for consumers will reinforce a more sustainable transport choice. For this reason, the Commission wants to establish a European framework for measuring transport and logistics greenhouse gas emissions based on global standards, to give consumers an estimation of the carbon footprint of their choices.

In brief:

- By 2030, rail and marine transport will compete with road transport.
- By 2050 external costs of transport within the EU will be embraced by transport users.

Flagship 6 – Developing connected and electronic multimodal mobility.

Europe must consider the opportunities presented by Connected, Cooperative, and Automated Mobility (CCAM). This type of mobility can improve safety for all. The Commission will improve the investments in CCAM under Horizon Europe to make Europe a leader in the development and utilization of CCAM systems.

Another target is to allow the planning and purchasing of tickets for multimodal journeys. This will entail the insufficient availability and accessibility of data, the cooperation between suppliers and sellers, and payment system interoperation.

Future mobility should provide paperless alternatives for professional and individual drivers. The introduction of digital certificates for drivers and vehicle information, contactless payments for parking, and better information on areas in cities where the traffic is limited to handle congestion or improve air quality.

The deployment of the European Rail Traffic Management System (ERTMS) and the Single European Sky remains a key point for the Commission and Next Generation EU. Improvements in train automation and air traffic management systems are required through Joint Undertakings (JUs). The Commission is proposing updated Technical Specifications for Interoperability (TSIs) to include new technologies such as 5G and satellite data for making rail autonomation and traffic management a reality. Also, for the

aviation field, improving the efficiency of air traffic management (ATM) will help decrease fuel burn and CO2 emissions caused by airplanes inefficiencies.

Flagship 7 – Innovation, data, and Artificial Intelligence for smarter mobility.

The Commission sustains the use of drones and remote-control aircraft for sustainable mobility. To allow digital transformation to happen, the EU should boost industrial capacities for the design and production of components, software platforms, and the Internet of Things technology. The EU needs to assure the highest performance of digital frameworks, to develop the highest levels of automation across a variety of mobility solutions. The goal is to achieve uninterrupted internet coverage across the transport networks of Europe with a well-functioning digital market.

Artificial intelligence is essential for transport automation, but digital transformation requires efforts related to data availability. For this reason, the Commission wants to create a European Common Mobility Data Space to collect data to reach the EU transport goals from sustainability to multimodality.

In brief:

- Electronic ticketing will be introduced by 2030 to favor multimodal passenger transport.
- Automated mobility will be distributed on large scale by 2030.

Flagship 8 – Reinforcing the single market.

The Commission assessments show the need for public and private investments at the national level: the extra investments for 2021-2030, in vehicles and renewable and low carbon fuels, are assessed at 130 € billion per year in comparison with the previous year. Investments should follow several principles: the non-refundable support from the Recovery and Resilience Facility, European Regional and Development Fund (ERDF), Cohesion Fund, and Innovation Fund for projects with a high social, environmental, economic value. Moreover, market failure and sub-optimal investments should be dealt with through financing instruments, such as the Sustainable Infrastructure and Research. Innovation and Digitalization under the InvestEU transport policy should offer an extensive framework that attracts private and public investments for the development of sustainable and smart technologies.

Investments in transport infrastructures are the key point to assure connectivity, sustainability in the economy, and cohesion among Member States. The EU must prompt

transport investments based on EU infrastructure. Infrastructures must be adjusted to climate change and flexible to disasters.

Flagship 9 – Making mobility "fair and just for all".

The Commission wants to assure that possibilities under the fair transition mechanism are fully analyzed to make the new mobility available in all regions and for all passengers, including passengers with disabilities and reduced mobility. Support from the Cohesion Fund and ERDF fund will be furnished for less developed regions within the EU. To favor the transition to a multimodal system, it would be necessary to introduce sustainability criteria. As an example, short-distance flights cannot be required where a more sustainable alternative exists. Fair mobility also implies the protection of passengers. The high number of cancellations during the COVID pandemic has demonstrated that EU-wide rules and a uniform implementation are needed to let passengers be reimbursed for their tickets in case of cancellation.

Flagship 10 – Enhancing transport safety and security.

The Commission's commitment is to improve the safety and security of the most vulnerable road users through a better collection of information and analysis. The upgrade of high-risk infrastructure is a priority, together with the development of network linkages. The key actions are the creation of a multimodal Trans-European Transport Network for sustainable and smart transport with high-speed connectivity by 2030, and the decrease of deaths caused by transport near to zero by 2050.

The European Green Deal and the Sustainable and Smart Mobility Strategy adopted in 2019 and 2020, offer a new EU framework for the EU transport policy, and acknowledge the importance of urban mobility for green and digital transitions. The principles of making mobility fair and accessible for all, the transition toward more safe and secure mobility, the development of a multimodal system of transport, and the support for the transition towards more sustainable means, are all goals that will be found in the SUMP.

### 4.2.2 Clean Urban Transport

The "Clean Transport, Urban Transport" is the second EU transport policy on which the Sustainable Urban Mobility Plan is based, and it aims at promoting low-carbon urban transport and sustainable mobility policies. To better understand the SUMP, it will be useful to give an overview of what clean transport in urban areas actually means.

The European Commission is taking action to enhance the quality of citizens' lives, and strengthen the economy by promoting sustainable urban mobility and the use of clean and energy-efficient transport. The objective is to boost mobility and at the same time diminish congestion, accidents, and pollution in all European cities.

The Clean Transport, Urban Transport policy focuses on six main points: (1) cycling, (2) alternative fuels for sustainable mobility in Europe, (3) Sustainable Transport Forum (STF), (4) clean and energy-efficient vehicles, (5) urban mobility.

Each point will be examined in order to better understand just how the Clean Transport, and Urban Transport policy works in creating a better urban transport system.

*Cycling*

Cycling is an effective way of using a cost-intensive and scarce space in urban areas and it is healthy, clean, and cheap. It has a huge potential if we consider that almost half of car commutes in cities are less than five kilometers.

In October 2015, in Luxembourg, the informal meeting of EU Ministers of Transport adopted the Declaration on Cycling[24] as a climate-friendly means of transport. In the Declaration, cycling is recognized as the most cost-effective transport mode after walking, because it creates massive positive externalities for society at little cost with regards to infrastructure and vehicles. Considering production, maintenance, operation, and fuel, cycling is the most greenhouse gas efficient mean of transport of all. If we consider that more than half of all driving cargo trips in EU cities can be shifted to bicycles, there is a huge potential to increase the use of bicycles to improve the quality of life.

There is also a second positive aspect: health. Cycling benefits society. Children who cycle to school are more concentrated, and employees who cycle to work demand fewer paid sick days. The Health benefits of using bicycles instead of cars balance out the safety risks: cycling becomes safer if there are more cyclists on the road according to the Safety in Numbers principle. According to the World Health Organisation, if every adult in the EU walked or cycled for an additional 15 minutes a day, more than 100,000 premature deaths due to insufficient physical activity in a year could be avoided.

The action plan drawn for better development of cycling mobility is based on three main points:

[24] Informal meeting of EU ministers for Transport, Luxembourg, October 7th, 2015

1. Integration of cycling into intermodal transport policy, among others smart mobility, and the development of physical infrastructures and behavioral changes.
2. Draw an EU strategic document on cycling which should: 1) list all the aims within EU power that would benefit from an increase in cycling mobility, 2) find EU policy and funding instruments that should be mobilized to increase cycling, and 3) insert cycling in the EU policies and funding instruments.
3. Set up a European central office for cycling 1) to answer cycling-related questions, 2) to promote the exchange of best practices among the Member States with regards to cyclists' road safety, 3) to oversee the implementation and impact of the EU strategy for cycling.

Member States can contribute to enhancing the cycling mode share by identifying a national focal point for cycling, to collect and disseminate best practices within the Member State, and to collaborate with the European office by ensuring that national transport infrastructure projects are aimed at strengthening international, national, regional, and local cycling networks.

In practical terms, what are the challenges cities face, and how can cycling fix them?

Cycling infrastructures are often enforced to increase cycling levels through a modal shift from other means of transport. A modal shift is the direct and easiest way to check the impact of cycle measures, it is usually the indirect impacts or co-benefits which tackle cities' issues. The modal shift can fix seven main challenges faced by cities:

- Safety

According to DG MOVE, cyclists constitute over 8% of the total number of accidents on the EU's roads in 2016. Even if the number of cyclists killed on the road has been decreasing since 2007 (a decrease of 24%), the speed of decline has been lower compared to all other road fatalities during the same period (a decrease of 40%). Cycling can improve road safety by reducing the frequency and seriousness of the interaction of cyclists with motor vehicles. It can be reached through choosing the proper infrastructure that limits dangerous interactions between non-motorized and motorized traffic. A modal shift to cycling can boost safety for cyclists by enhancing the awareness of other road users to people cycling on the carriageway.

- Congestion

Congestion costs nearly € 130 billion annually or 1% of the EU's GDP (EC, EU Urban Mobility: Policy Context, 2017). Congestion occurs when the volume of traffic exceeds the capacity of the roadway. This issue is influenced by various demographic, social, and economic factors, including car property, availability of public transport, availability of parking, economic activity, urban cargo transport, and delivery of goods. These factors can also influence where people live and work, the position of businesses, and how people can reach these locations, and all these factors should be considered when handling congestion issues.

Cycling can be an optimal alternative to motorized transport, in particular for urban journeys shorter than 5 km, and the use of e-bikes can be highly efficient at prompting a modal shift to cycle for commuting to school or work. Moreover, cycling is a space-efficient mode of transport, and a modal shift to cycling can bring about a reduction in congestion on urban roads. A modal shift is highly effective when it reduces the congestion of motor vehicles at peak hours.

- Environment

Motorized vehicles are the major source of air pollution in EU cities; the 46% of NOx emissions, which contribute to the decrease of the ozone layer and the creation of acid rain; 15% of particulate matter (PM) emissions, which can cause reduced visibility and material destruction; and 15% of the EU's $CO_2$ emissions, which is the major greenhouse gas contributing to climate change. Noise pollution is another environmental impact of vehicles, which the European Union is handling with the Regulation (EU) No 540/2014 of the European Parliament and the Council of 16 April 2014.

A modal shift to cycling can reduce air and noise pollution from motorized traffic, and bicycles are more space-efficient than vehicles, and preferable in terms of urban space demand.

- Health

Motor vehicles are a major source of harmful air pollutants including NOx, CO2, and PM. A study of the World Health Organization (WHO) in 2018 on air pollution and child health, shows how nine out of ten people worldwide breathe everyday polluted air and this causes 7 million deaths every year, many of them are children.

Physical inactivity among adults and children is causing diseases, including obesity, and a higher risk of noninfectious diseases such as diabetes, heart diseases, cancer, dementia,

depression, and premature death. Environmental factors relating to increased urbanization have been identified that may dissuade participation in physical activity, including high-density traffic, low air quality, pollution, a lack of green areas and parks and sports facilities.

A modal shift to cycling can improve health by reducing the physical inactivity of people who decide to cycle.

- Economy

A modal shift to cycling can improve mobility by increasing speed and efficiency, while reducing congestion because of a reduction of vehicles on roads, and as a consequence a more fluid traffic flow. It would improve health, with lower national health services costs, and also create jobs like cycle tourism and retail. Cycling will invest money into the economy via cycle production and enhance the vitality of town centers and local commerce. Finally, it will amplify value to neighbors and communities through bike-sharing.

- Accessibility

Accessibility is the capacity of people to obtain goods, services, and activities which is the key goal of almost all transport. To improve social inclusivity in society, cities should be accessible for all. But individuals can have difficulty getting those jobs, goods, services, and activities since adequate means of transport or routes may not be available, and the cost of tickets can be inaccessible.

Cycling can improve a city's access to a greater number of people, instead of other means of transport which might be less affordable and accessible. The cost of cycling makes it a low-cost means of transport, thus offering an alternative to the more expensive ones. Lastly, it provides access to areas not covered by public transport. Cycling may be also a means to commute from home to public transports stations.

- Social/community

Cycling contributes to improving the liveability of cities and the quality of life for residents. Cycle-friendly cities are often also people-friendly cities, that boost social interaction and create convenient places to live in.

Finally, the achievement of co-benefits depends strictly on the implementation of an infrastructure network, and similar measures which take into account quality design

principles for cycle infrastructures, like safety directness, coherence, attractiveness, and comfort.

Alternative fuels for sustainable mobility in Europe

The second point of the EU strategy for clean transport in urban areas, concerns the implementation of alternative fuels. Alternative fuels are necessary to break the European transport co-dependency on oil supply. European transports depend on oil for 94%. The problem is that 84% of oil is imported with a cost of up to EUR 1 billion per day. In 2015, the unrefined oil import cost was estimated at around €187 billion and additional costs for the environment.

The clean power for transport package aims at creating a single market for alternative fuels for transportation in Europe. It includes:

- A statement about the broad European alternative fuels strategy for a long-term replacement of petrol as an energy source in all means of transport (COM(2013)17).
- A proposal for a directive on the deployment of alternative fuels recharging and refueling infrastructure (COM(2013)18).
- An accompanying impact assessment (SWD (2013)5).
- A staff working document on the market conditions, regulations, codes and standards for the broad market uptake of LNG in the shipping sector (SWD(2013)4).

Clean and energy-efficient vehicles

Clean and energy-efficient vehicles play an important role in reaching EU policy objectives of reducing energy consumption, CO2 emissions, and pollutant emissions.

The Directive on the Promotion of Clean and Energy Efficient Road Transport Vehicles targets a broad market introduction of ecologically friendly vehicles. Each Member State has a national target that defines the minimum percentage of clean vehicles. This means that Member States are flexible in distributing the efforts among contracting authorities and contracting entities.

What is the Urban Mobility Package?

The Clean Transport, Urban Transport policy includes a set of actions named the Urban Mobility Package. It is under this package of measures that we find the Sustainable Urban Mobility Plan (SUMP) instrument for the first time.

The EU Urban Mobility Package is based on the following actions:

Delivering sustainable urban mobility together.

It aims at transforming urban mobility through coordinated actions by decision-makers and competent authorities at different levels of government. To be effectively implemented, concepts and tools developed at the European level should be adapted to the specific scenarios of each Member State and then promoted at the national and regional levels.

Sustainable Urban Mobility Plan.

New instruments to urban mobility are arising, and they seek to push for a shift towards cleaner and more sustainable transport means, such as walking, cycling, public transport, and innovative ways of car ownership and use. Many cities in the EU are experimenting with innovative solutions for urban mobility, and they are sharing their initiatives with other European cities. The Commission is strongly promoting the SUMP instrument to find innovative solutions for mobility issues. The guidelines for the development and implementation of Sustainable Urban Mobility Plans were elaborated to provide local authorities with practical suggestions on how to implement strategies for urban mobility, which build on an analysis of the present situation, and a clearer vision for the sustainable development of urban areas.

The Sustainable Urban Mobility Plan instrument considers the functional urban areas and proposes actions on urban mobility as part of a wider urban and territorial strategy, which means that these plans are meant to be developed in cooperation, through different policy areas and sectors (transport, land use, environment, economic development), and different level of government and administration in cooperation with urban and rural authorities.

Sustainable Urban Mobility Plan is about promoting balanced development and better integration of different urban mobility modes, and this concept emphasizes that urban mobility is primarily about people, which means that citizen and stakeholder engagement is required to reach the goals. Sustainable Urban Mobility Plan is thought to help cities make efficient use of available transport infrastructure and services, and cost-effectively implement urban mobility measures.

To assure the best practices in sustainable urban mobility planning are adopted, the instrument should be adjusted to the specific requirements and actual planning exercised by each Member State, and then promoted at the national level. At the same time, suitable

measures should be taken in the Member States to assure appropriate framework conditions, which allow local authorities to implement local urban mobility strategies successfully.

For this reason, Member States should consider running an assessment of the present and future performance of urban mobility in their territory, and to formulate an approach to urban mobility which assures a coordinated and reinforced action at the national, regional, and local level. They would guarantee that Sustainable Urban Mobility Plans are elaborated and applied in their urban area, but also integrated into a wider urban and territorial development strategy. Member States must consider the technical, policy-based, legal, financial tools at the disposal of local planning authorities.

The Commission, on the other hand, will prepare a European Platform on Sustainable Urban Mobility Plans to harmonize EU cooperation, promote further development of tools, and support national, regional, and local authorities to improve and implement Sustainable Urban Mobility Plans and their funding instruments.

Coordinating private and public sector intervention.

Gaining systemic improvements in the transport sector requires the joint work of public actors at different levels of governance, and also of private actors in some areas indicated in the White Paper on Transport (European Commission, 2011).

More action on urban logistics.

Urban logistics are crucial for cities to perform successfully, and to fill a significant share of urban traffic as part of national, regional, and international supply chains network.

There is significant potential to improve urban logistics operations and services, such as mail delivery vehicles and garbage trucks, starting from the introduction of new types of vehicles and alternative fuels to reduce gas emissions.

Member States and urban authorities need to provide the frame to assure that private logistic stakeholders have the proper incentives to invest in new technologies and mobility solutions. Cooperation between actors should be favored, the capacity at the local level should be set up, interoperability of local logistics solutions based in Intelligent Transport Systems assured, and national priorities safeguarded. Member States should consider guaranteeing that urban logistics are given proper consideration in their national approach to urban mobility and Sustainable Urban Mobility Plan. Platforms should be

developed for cooperation, and exchange of data and information for all actors involved in urban logistics.

The Commission will increase the introduction and dissemination of the best practices for urban logistics, and will draw up guide documents providing practical tips on improving urban logistics performance, e.g., by drawing up delivery and service plans, city logistics schemes.

Smarter urban Access rules and auto vehicles charging zones.

Improving accessibility to urban centers requires a choice about the use of urban space.

At this point, there is a wide variety of systems across Europe that need to be coordinated for a better understanding of the costs and impacts.

A fully harmonized European approach would not be appropriate, since it is vital to design implementation schemes specific to the needs of each urban area. Non-binding guidelines would let Member States and cities join from the expertise elsewhere and boost a more common approach to the same issues, such as vehicle categories, road signs, information centers, pricing. This approach would allow cities the necessary flexibility to adapt their local circumstances.

A more transparent approach, together with the use of Intelligent Transport System solutions, would cut costs for users and cities and will boost compliance.

Coordinated Deployment of Urban Intelligent Transport Systems.

Smart technologies and Intelligent Transport Systems (ITS) are key drivers for urban mobility planning, because they support policymakers in reaching their policy objectives and coping with concrete traffic operations. ITS aid to optimize the use of existing infrastructure through a variety of instruments such as traffic signals, smart ticketing, or so-called cooperative systems (vehicle-to-vehicle and vehicle-to-infrastructure communication systems). They boost a coordinated management of road and public transport networks.

Member States should consider creating adequate connections between urban and surrounding interurban transport networks, and also establish datasets to gather information about urban mobility.

The Commission will work on reinforcing the existing legislation on access to traffic and travel data, and draw specific Real-Time Traffic Information and Multimodal Information Services.

Urban Road Safety.

Some 11,000 people die in road traffic in EU urban areas every year, and the majority of fatal pedestrian accidents happen in urban areas, with 50% of those killed being pedestrians or cyclists. In the last decade, the number of pedestrian fatalities went down by only 39% compared to the 49% of car driver accidents.

Member States should assure that Sustainable Urban Mobility Plans take into account road safety points as a horizontal issue, and tackle issues like safe urban infrastructure, traffic rules enforcement, and road safety education appropriately. The Commission in return, will collect good safety practice examples for road planning while evaluating measures for reducing the number of serious road traffic accidents.

Reinforcing EU support.

The Commission set up an Urban Mobility Observatory in 2009 within the Action Plan on Urban Mobility: the ELTIS website. It is aimed at sharing knowledge and experience on urban mobility transport-related issues. The Commission wants to improve the scope of the portal by establishing the present Mobility Plans portal into a knowledge center that will strengthen information on urban transport planning from across the EU. In addition, a European Platform on Sustainable Urban Mobility Plans will be established to better develop the concept and the tools necessary for its successful application by local planning authorities.

Smart Cities and Communities – A European Innovation Partnership.

Smart cities will facilitate strategic partnerships between industry, European cities, and other parties to build tomorrow's urban systems and infrastructure. The initiative is meant to strengthen cooperation between sectors like transport, energy, information, and communication technologies. Most actions of the partnerships will be implemented by local authorities with the EU financial support under Horizon 2020. In addition, the European Green Vehicles Initiative (EGVI) for Energy Efficiency of Vehicles & Alternative Powertrains will give a reinforced framework for the development of clean, safe, and efficient urban rail and road vehicles.

## 5 Sustainable Urban Mobility Plan (SUMP)

In this chapter, the SUMP instrument will be analysed. This represents the practical means by which the Commission is trying to favor the transition towards sustainability, by adopting a NEPI instrument consisting in an innovative approach toward involving those actors that are generally not engaged, or only partially, in policy formulation and implementation phases, such as citizens, stakeholders and private and public economic actors.

SUMP represents a New Environmental Policy Instrument (NEPI) used by the EU Commission to involve cities in participating in the development and implementation of sustainable mobility plans. It is a procedural instrument because it tries to affect the behavior of actors involved in policy implementation, by changing actor policy positions, promoting network self-regulation, changing evaluative criteria for assessing policy outcomes, and certifying or sanctioning certain types of policy-relevant behavior. The definition of a Sustainable Urban Mobility Plan is widely accepted between European Member States, and it reads as follows:

*"A Sustainable Urban Mobility Plan is a strategic instrument designed to satisfy the mobility needs of people and businesses in cities and their surroundings for a better quality of life. It builds on existing planning practices and takes due consideration of integration, participation, and evaluation principles."*

Sustainable Urban Mobility Plans (SUMP) arose in 2013, because that year the problem of urban mobility, and the need for new approaches to urban mobility planning, become necessary in an ever-changing urban mobility climate.

A Sustainable Urban Mobility Plan (SUMP) instrument is based on a strategic and integrated approach, and aims at enhancing the accessibility of urban areas and providing high-quality and sustainable mobility and transport within cities. It focuses on the needs of the "functioning city" and its suburbs, instead of the municipal administrative region[25]. The 2013 Urban Mobility Package (European Commission, 2013) articulated the concept for Sustainable Urban Mobility Plans instrument (SUMPs), which emerged after

[25] Annex: a concept for sustainable urban mobility plans to the communication from the commission to the European parliament, the council, the European economic and social committee, and the committee of the regions. together towards competitive and resource-efficient urban mobility.

consultations between European stakeholders and policy experts. A SUMP aims at satisfying the mobility needs of people and businesses in cities and surroundings for a better quality of life. Its core goals are to enhance accessibility and the quality of life by shifting towards sustainable mobility. The decision-making process begins from the practical conditions of urban areas, and adopts a long-term vision. Implementing SUMP requires an assessment of the present situation and future trends, a common vision with the strategic goals, and a set of regulatory, financial, technical, and infrastructure actions that must be constantly monitored and evaluated.

Sustainable Urban Mobility Plan instrument has introduced several innovative aspects compared to the traditional transport plans. Below is a table comparing the differences between the traditional environmental policy instruments and the sustainable urban mobility plan (Rupprecht Consult, 2019).

**Table 5.1:** Differences between traditional transport plans and SUMP

| **Traditional transport plans** | | **Sustainable Urban Mobility Plans** |
|---|---|---|
| Short term point of view without a strategic vision | **Strategic level/vision** | Including a long term/strategic vision with a time horizon of 20-30 years |
| Concerned on a particular city<br>Limited data from drivers and other local partners.<br>Limited transport and infrastructure focus | **Geographical aim**<br>**Level of public involvement**<br>**Sustainability**<br>**Sector integration** | Functional city: cooperation with neighbouring authorities is essential<br>Balance social equity, environmental quality, and economic development (environment, land use, social inclusion…)<br>Integration between levels of government (district, municipality, agglomeration, region) |

| | | |
|---|---|---|
| | | Attention on the fulfilment of measurable results and goals |
| Not mandatory to cooperate between links of authority<br>Lacking or focusing on broad goals<br>Historic attention on road schemes, infrastructure development | **Institutional cooperation**<br>**Monitoring and evaluation**<br>**Thematic focus** | Crucial shift in favour of actions to prompt public transport, walking and cycling<br>Revision of transport costs and benefits also among policy areas |

Regarding the strategic level, SUMP is different from traditional transport plans because it has a higher emphasis on developing a long-term vision, while traditional plans focus on the short term.

SUMP aims at including citizens and stakeholders throughout the process, clarifying objectives, establishing targets for all aspects of sustainability, and formulating effective packages of measures. It makes efforts to integrate the different levels of government. Traditional plans are, on the other hand, focused on a particular city, with little data on drivers and a restricted focus on transport and infrastructures.

While in traditional plans it is not mandatory to cooperate between authorities, and the focus is on narrow goals like infrastructures and road congestion, SUMP wants to promote walking and cycling, and to revise transport expenditures and benefits.

### 5.1 The SUMP's Concept and Principles

The strength of the Sustainable Urban Mobility Plan depends on its innovative principles, that are:

1. Program for sustainable mobility in the whole operational urban area.

The "functional urban area" might be a city and its peri-urban area, a polycentric region, or a group of municipalities. The description of a functional urban area is based on a

definition agreed by OECD, the European Commission, and its Directorate-General for Regional and Urban Policy which focuses on "population density to identify urban cores, and on travel-to-work flow to identify the hinterlands whose labor market is highly integrated with the cores"[26]. A sustainable transport system is defined as reachable to all users, a system that answers to different demands for mobility and transport for residents, workers, and industry, and fulfills the needs of sustainability, economic interests, social equality, and environmental protection. It boosts efficiency and cost-effectiveness, and makes proper use of urban space and transport facilities. It can improve green urban spaces, quality of life, public safety and enhance road security. It would lower air and noise pollution, GHGs emissions, and energy use while at the same time enhancing the performance of the overall trans-European transport network

2. Cooperation across institutional boundaries.

The development and adoption of the SUMP instrument are based on cooperation, coordination, and dialogue between different layers of government and institutions of the specific urban area. A SUMP should:

- Assures the additional resources between SUMP and the local transport policies
- Coordinates between public and private providers of transport services

3. Involvement of citizens and stakeholders.

A SUMP should meet the mobility needs of citizens in urban areas. It follows a transparent approach, and involves citizens in the plan's development and implementation. Citizens' participation is essential because it makes them more favourable to accept decisions.

4. Assessment of current and future performance.

A Sustainable Urban Mobility Plan is based on the assessment of the current and future performance of a city's transport system. It offers a review of the current situation and

[26] OECD, Definition of Functional Urban Areas (FUA) for the OECD metropolitan database, 2013, p. 2. *www.oecd.org/cfe/regional-policy/Definition-of- Functional-Urban-Areas-for-the-OECD-metropolitan-database.pdf.*

sets a baseline on which to evaluate progress. It defines objectives and goals, and the correspondent performance indicators related to the established picture, and then performance indicators are set. Indicators are used to evaluate current and future status.

5. Delineate a long-term vision and an explicit implementation plan.

A Sustainable Urban Mobility Plan is based on a long-term approach for transport means and mobility development of the urban area. It covers all means of transport: public and private, motorized, non-motorized, stationary, and moving. It also includes infrastructures. A SUMP includes all implementation timetables and the necessary budget for the short-term period, and also includes the objectives and goals of the short-term strategy.

6. Development of all transport modes in an integrated manner.

A Sustainable Urban Mobility Plan pushes for balanced and integrated development of all the main means of transport while making sustainable mobility a priority. It establishes a set of measures to enhance the quality, safety, security, accessibility, and cost-effectiveness of the mobility system. It also includes the infrastructural, technical, and financial aspects. A Sustainable Urban Mobility Plan manages all aspects of public mobility (traditional public means of transport and shared mobility); active mobility (walking and cycling); intermodal and door to door mobility; road security; moving and stationary vehicles, mobility management, and Intelligent Transport Systems (ITS).

7. Arrangement for monitoring and evaluation.

The implementation of the Sustainable Urban Mobility plan requires strict monitoring. The signs of progress in reaching the goals and targets of the plan must be evaluated regularly based on performance indicators. Constant monitoring and evaluation of implementation actions are useful to revise targets and make corrections when necessary. Sharing a monitoring report with citizens and stakeholders is effective in informing them about signs of progress in SUMP implementation.

8. Measurement of quality.

Adopt mechanisms to assure SUMP quality and to check compliance with the requisites of the Sustainable Urban Mobility Plan concept is an important task. To assure data quality is essential in managing problems during implementation.

SUMPs are also characterized by some specific features. These features are:

Long-term vision and implementation plan.

A Sustainable Urban Mobility Plan adopts a long-term strategy for the development of cities and transport and mobility infrastructures. It also includes a plan for the short-term implementation strategy. The schedule and budget plan ideally cover a 3–10-year period and responsibilities and the resources are identified for each actor.

The assessment of current and future performance.

The establishment of sustainable urban mobility should be made on the assessment of the present and future fulfillment of the urban transport system.

A SUMP plan should give an all-embracing revision of the current condition and establish a baseline through an "urban mobility performance audit". To evaluate the performance of the SUMP it is necessary to develop performance indicators: such as the quality of the services, land-use and spatial development, safety and security, energy, environment, economic development, etc. The SUMP identifies "hotspots" where the performance of the transport system lacks one of these aspects. Moreover, a SUMP determines specific objectives according to the current situation and more ambitious objectives about a more general urban mobility plan and set measurable targets based on realistic measurement. These targets represent the specific objectives of the SUMP.

Balanced and integrated development of all modes.

A SUMP encourages an equal development of all transport means, while stimulating the shift to more sustainable transport. The plan offers an integrated scenery of technical, infrastructure, policy-based and soft measures to boost cost-effectiveness according to the goals and objectives.

The first topic addressed is public transport: SUMP offers a strategy to enhance the quality, accessibility, and safety of public transport. Then, we have the non-motorized

transport: SUMP generally includes a plan to promote the safety of walking and cycling. Infrastructure needs to be improved, when necessary, not only for vehicles but also for pedestrians and cyclists. It follows the so-called inter-modality, which means that the SUMP must favor the integration of transport means and explore multi-modal means of transport.

Another relevant area is urban road security: a SUMP should improve road safety starting from the evaluation of road safety problems, resolving traffic issues, and introducing measures that are aimed at enhancing road infrastructures and public means of transport. It follows that SUMP aims at improving urban logistics in terms of efficiency, while reducing externalities like GHGs emissions, along with creating better mobility management to boost a change toward more environmentally sustainable mobility. Finally, there is the creation of an Intelligent Transport System (ITS), which can apply to all transport means and mobility facilities.

Horizontal and vertical integration.

SUMP requires a high level of cooperation and coordination between government and public authorities, which means that suitable structures and procedures should be identified and proposed by the Local Planning Authority. It requires cooperation among interdepartmental authorities to assure the supplementarily of a Sustainable Urban Mobility Plan with local policies and strategies with the related transport policies. Cooperation means a tight exchange with the relevant public authorities between different levels of government and administration, and the development of complementarity with other already existing development and transport plans.

A participatory approach.

A Sustainable Urban Mobility Plan must follow a transparent and participatory method. It should involve relevant actors, such as citizens and economic actors, in performing the plan to assure a high level of agreement.

The monitoring, review, reporting.

The execution of a Sustainable Urban Mobility Plan should be closely supervised. A monitoring report is essential to review the plan’s implementation.

Quality assurance.

Local Planning Authorities should have the instruments to ensure the quality and conformity between the application of the plans and the goals of the Sustainable Urban Mobility Plan.

### 5.2 The Advantages of Implementing Sustainable Urban Mobility Planning

The benefits of implementing SUMP are several if we think that air pollution causes more than 400,000 premature deaths in the EU each year. To take Madrid, the Spanish capital for example, it has reduced 15 % of nitrogen dioxide pollution in only three months, since the establishment of low emissions zoned in its SUMP program began in November 2018. The city of Toulouse aims at reducing people exposed to NOx emissions to less than 300 in 2030.

SUMP implementation means improved public health, and road safety encourages active means of transport like cycling. A British study has shown that people who regularly cycle to work are 45% less likely to develop cancer. Thanks to SUMP, the second largest city of Estonia, Tartu, has increased cycling from 4% to 8% in five years. SUMP can also help to reduce 50% of road deaths and serious harm by 2030.

With better transport infrastructures, there is less competition between different means of transport for public space: SUMP helps to develop additional resources for people's individual mobility needs. In Milan, the application of SUMP in 2016 has reduced private car use by 50%.

Better infrastructures also create better liveability both for people and businesses: the shared mobility scheme in Milan, such as scooters, electric cars, and bicycles, has attracted millions of users, making locations accessible to everyone, while simultaneously raising the quality of life. Indeed, seven out of ten of the more liveable cities in the EU are applying Sustainable Urban Mobility Plans. In addition, better mobility helps improve the public image of a city, favors tourism and shopping in local stores, and real estate investments. In Copenhagen, pedestrianized areas brought a 30% increase in sales in a single year.

Finally, SUMP entails a better integration of mobility options: better integration of sustainable mobility options means better efficiency of the entire transport system. Since the adoption of the Sustainable Urban Mobility Plan in 2017, the city of Ghent has

increased its cycling by 25% inside the city center and 35% outside the city center. On the other hand, the city of Antwerp has seen a decrease of 25% in private car use towards the city on a weekday.

### 5.3 The SUMP Process and Governance

The SUMP process can be broken into four main stages:

1. Preparation and analysis.

When decision-makers decide to plan a SUMP, they must answer several questions, such as:

What are our resources? Decision-makers must assure that all institutions and policymakers are involved in supporting SUMP's development.

What is the planning context? Decision-makers must analyze the geographic scope, already existing plans, legal barriers, and the planning timeline. They must assure that the "functional urban area" becomes the planning area for SUMP.

What are the main issues and opportunities? Investigate the mobility scenario from the points of view of all transport means and sustainability sides by using an appropriate data set.

2. Strategy development.

The aim of this stage is to outline the strategic direction of the SUMP in coordination with citizens and stakeholders. The key questions are:

What are the alternatives for the future? Consider the possible changes in external variables for urban mobility and draw possible different scenarios.

What type of city do we want? Develop a shared common vision among citizens and stakeholders based on mobility analysis and scenario effects. Objectives have to cover the main problems and all the important means of transport in the urban area.

How will we define success? Establish an index and goals that can help monitor the progress of our objectives without collecting impractical amounts of data.

3. Studying mobility condition.

This phase is about moving from the theoretical level to the operational level. The key questions to answer are:

*What will we do in practical terms?* It is useful to create a list of actions and evaluate their efficacy.
*What will it take and who is going to do what?* It is useful to break the benchmarks into tangible actions and describe them in detail, including costs and risks. Then, identify internal and external financial instruments and funding opportunities. Finally, match clear responsibilities, priorities of implementation and the schedule for each measure. Decision-makers must gain public support for the SUMP actions and set the schedule in accordance with stakeholders and decision-makers.
*Are we ready to start?* It is essential to agree on a budget for each action of the program and long-term implementation strategy, and for the distribution of costs among all participants before SUMP is adopted.

4. Implementation and monitoring.

This phase is about monitoring the implementation of SUMP actions. The key questions here are:
Who is capable of guiding it well? The department and local authorities in charge should program the technical details of their actions, perform implementation, and purchase goods and services in case of need.
How are we doing? Monitoring systematically helps to understand when things are going according to the plan or when corrective action is needed.
What have we learned? The final step is to rethink successes and failures, and share the results with stakeholders and the public. Decision-makers should have an invested interest in understanding what has worked and what has not, and include these lessons in the next SUMP project.
These guidelines are thought for local authorities, urban transport, and mobility actors and stakeholders involved in the implementation of SUMP.

### 5.4 Which Characteristics of NEPIs Does the SUMP Represent?

The SUMP is an instrument, a method, and not a rigid scheme to follow, and the test is to implement a SUMP adapted to the city's local context. The SUMP cycle is the tool to outline in an easy way what urban mobility planning implies, and it is not necessary to

follow the steps in the order presented in the cycle, since some activities can run simultaneously.

Differently from NEPIs instruments, that are limited to creating compatibility between environmental and non-environmental policies, to assure that the impact of the policy is compatible with the ecosystem; the SUMP appears instead extremely innovative in favoring coordination between policies through a careful ex-ante evaluation of the needs and funding resources available in the city or region, and through the promotion of interaction between policymakers and stakeholders for mobility solutions at the urban level. It also provides a practical scheme to follow to ensure all the necessary steps are respected, in order to develop and implement a SUMP for those cities that decide to participate.

Another innovative aspect of SUMP is that it identifies a *functional urban area* on which to develop a mobility plan, by placing strong attention to the needs of the transport user-base. The social aspect is something new in the NEPIs landscape, and it represents a strong incentive for cities to elaborate a transport plan that starts from the specific needs of its direct users.

As a NEPI, the SUMP tries to integrate environmental, social, and economic interests by creating "win-win" solutions for each policy. A relevant aspect of SUMP, as in NEPIs, is the cooperation and coordination between different government levels and at the regional, national, and EU levels, for the creation of a cross-jurisdictional integration between relevant public and private actors.

A strong novelty in comparison to NEPIs is the importance given to the involvement of citizens and stakeholders, from the development to the implementation phase. Unlike NEPIs that are more focused on the government authorities at the national, regional, and local levels, and do not consider citizens and stakeholders' involvement, the SUMP applies what can be considered a flipped approach based on involving actors that can contribute in providing suggestions (as citizens), and funds (as stakeholders) for financing a sustainable transition. The goal is to create horizontal and vertical integration based on real coordination and cooperation between different government levels. This cooperation should be based on an effective urban mobility plan, for which public authorities at different government levels would act correspondingly.

Moreover, a sustainable transition in transport requires a change in travelers' habits. For this reason, direct involvement of citizens from the very start of SUMP formulation is an effective approach for making them aware of the mobility needs at the urban level, and the necessity to develop more sustainable means of transport to preserve the environment. Awareness is the key to an effective sustainable urban mobility transition.

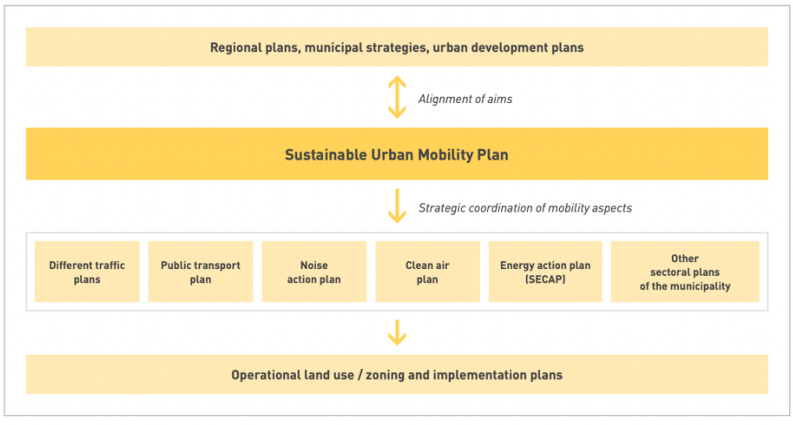
As in NEPIs and likewise in SUMP, the approach focuses on the long-term development of transport means and mobility. The novelty, compared to NEPIs, is that SUMP aims at improving all transport while making sustainability a priority in the mobility field.

If NEPIs are more focused on providing Member States with instruments to reduce GHGs emissions, SUMP focuses instead on the advancement of all public transport means and infrastructures, both for active and passive mobility, at the urban level, by offering a circular scheme of actions to follow to achieve the desired improvements.

An innovative aspect that is not present in NEPIs, is the creation of performance indicators for the monitoring of the implementation action. This is an important step forward for the Commission's adoption of an instrument for sustainable mobility, because it aims to assuring the quality of measures and grants the possibility to make corrections when necessary.

Local planners must clearly define planning requirements, and understand where responsibilities are placed in order to include the proper actors in the SUMP project.

**Figure 5.1:** Relationships between SUMP and other plans



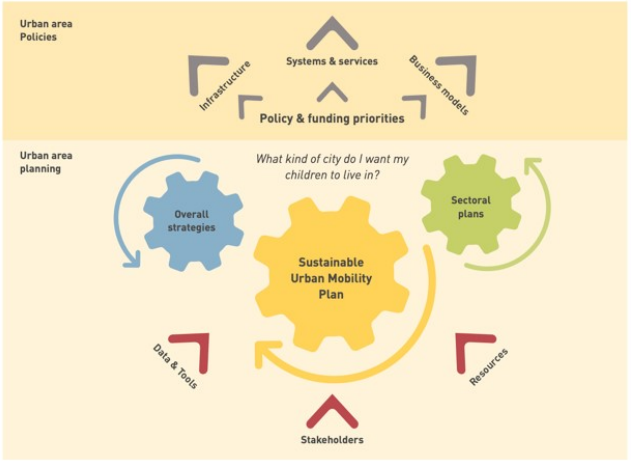

Source: Ruprecht Consult (2019) "Guidelines Developing and Implementing a Sustainable Urban Mobility Plan."

A SUMP project must set the general goals and turn them into compatible actions, developing a detailed sector-specific strategy. Policy coordination is required to assure coherence and coordination in time, space, and implementation. Coordination reduces confusion due to building infrastructures and fewer stakeholders' efforts.

The core question to answer to develop urban planning is:
*What kind of city do I want to live in?*
There are two steps to be aware of:

- At the Urban area policies level: policy and funding priorities, which are infrastructures, systems and services, and business models, must be identified
- At the Urban area planning level: to develop a sustainable urban mobility plan while, at the same time, identifying stakeholders and resources, collecting data, and choosing the right tools. To reach the goal, sectoral plans are drawn specific to the urban area features, and overall strategies are set.

**Figure 5.2**: SUMP as an integration process. Source: Ruprecht Consult (2019) "Guidelines Developing and Implementing a Sustainable Urban Mobility Plan".




The SUMP must be adapted to the local context while keeping the goals high. The need for adaptation may come from the specific function of urban areas, e.g. as a national port that has traffic problems. Or a city on an island with seasonal transport roots. In these cases, SUMP must define specific goals and targets focused on specific mobility topics. However, minimum requirements must be reached:

- The analysis of the problems and opportunities of the urban area, the goals agreed with stakeholders and the description of steps, and their evaluation must be drawn with a participatory approach;

- Implementation must be overseen and modified if needed while informing citizens and stakeholders of any variations.

Governance adjustments due to SUMP.

Urban mobility is a cross-setting policy connected with environment, road safety, energy, and spatial organization policies. Urban mobility planning is for the most part a local responsibility, but cities need support from regional and national levels of government to develop an effective Sustainable Urban Mobility Planning. There are several motives for national and regional actors to sustain SUMP development.

SUMP development brings about:

Better coherence between different sectors of policies and the governance levels.

Urban mobility policies are often formulated by political and institutional actors at the regional, national, and European levels. The risk is to draw an uncoordinated plan without being able to address the specific issues.

Elimination of barriers to SUMP elaboration and implementation.

Inefficient national frameworks create the absence of cooperation between urban, regional, and national levels, and narrow coordination at the national level between ministries brings to a disparity between national government departments' policies. It also causes inadequate funding at the national, regional, and urban levels and low monitoring and evaluation of the quality of the program, because of a lack of professional support from experts.

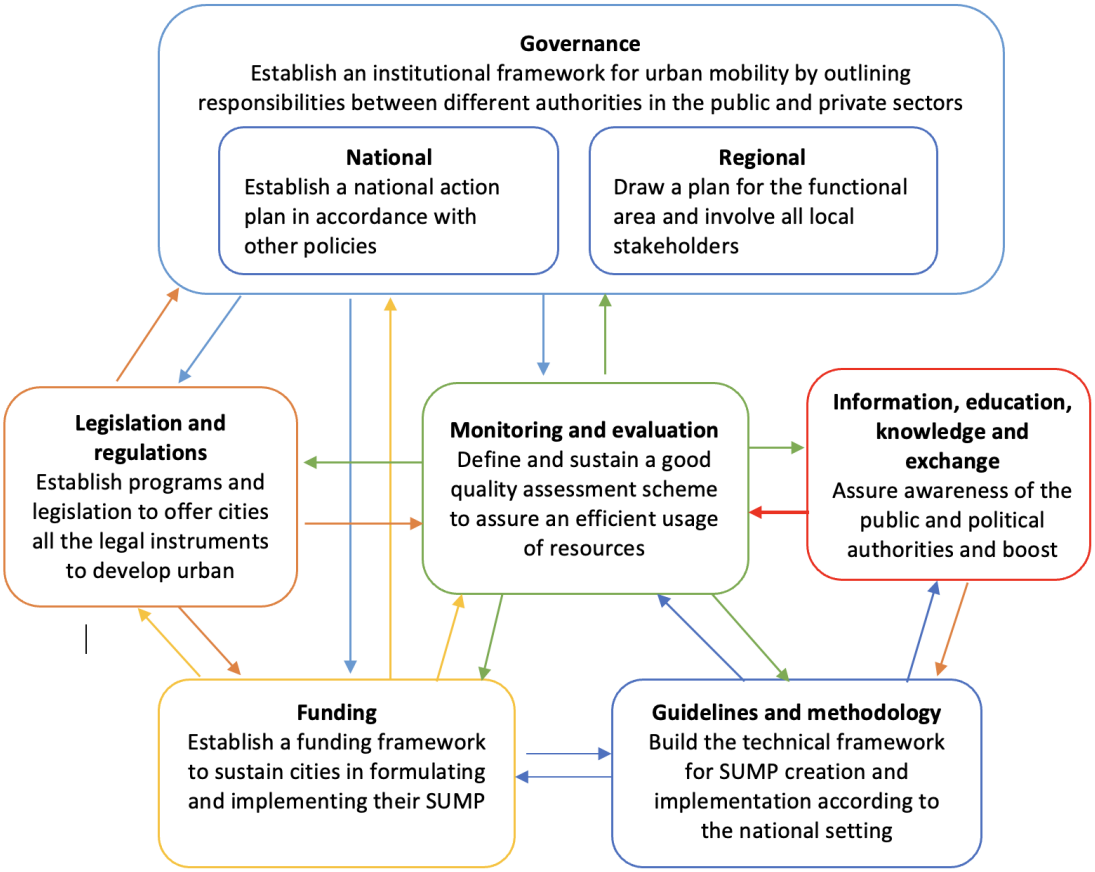
An optimized and coordinated European, national, and local funding.

The introduction of a coordinated framework for regional, national, and local funding may help support sustainable urban mobility. Any funds would promote sustainable transport mobility means.

Promotion of innovative and new markets.

The creation of a national or regional approach for mobility can embrace the setting of clearly defined priorities for mobility strategies and innovative technological solutions. As an example, the Clean Vehicles Directive asks public bodies to collect clean vehicles, promoting zero-emissions transport.

**Figure 5.3:** Governance adjustments due to SUMP




Source: Ruprecht Consult (2019) "Guidelines Developing and Implementing a Sustainable Urban Mobility Plan".

Governments can encourage the uptake of the SUMP through four levels of action:

1. Information: the national government gives detailed information about the SUMP at the national level. The establishment of a national platform can facilitate the exchange of the SUMP ideas among cities.
2. Incentives: having a SUMP is imperative for cities to obtain national funds for mobility programs.
3. Enabling cities and regions: national governments give cities the legal power to introduce taxes and fees to experiment with new approaches to sustainable mobility.
4. Regulation: SUMP is compulsory for all cities based on certain given criteria.

## 5.5 Developing and Implementing SUMP

### The SUMP Cycle

The novelty of the SUMP instrument as a NEPI is immediately clear from its methodology. Indeed, the SUMP instrument introduces a formulation and implementation procedure for the sustainable mobility plan, based on a "circular approach" of four phases, with twelve steps which are broken down into 32 actions.

The milestones are tied to a decision, or a necessary result, for the next phase and represent the conclusion of the previous phase.

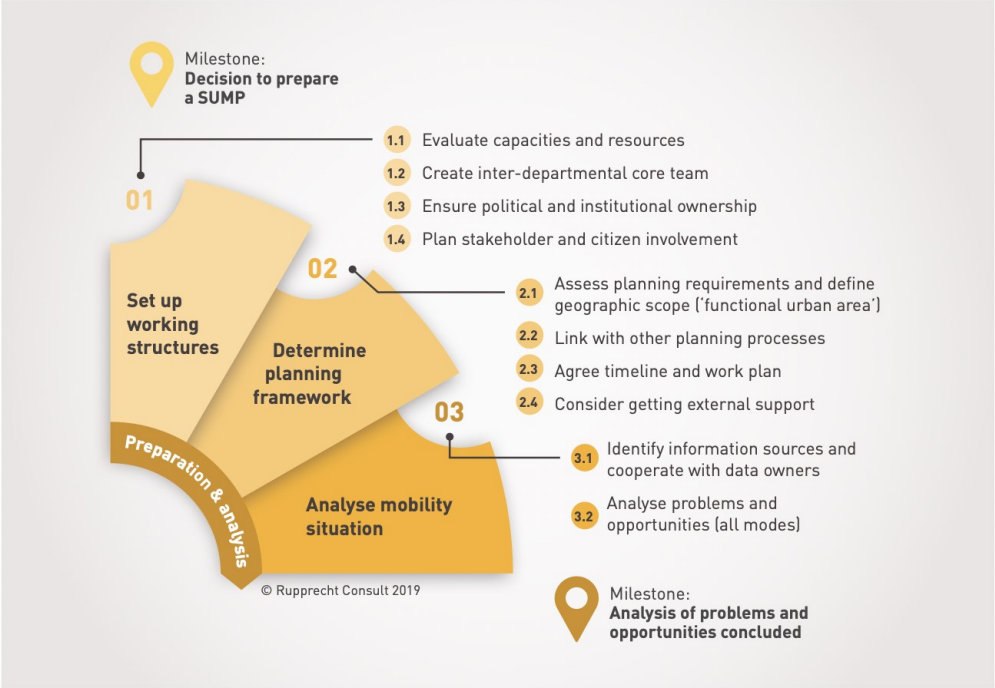
**Figure 5.4:** The 12 Steps of Sustainable Urban Mobility Planning


Source: Ruprecht Consult (2019) "Guidelines Developing and Implementing a Sustainable Urban Mobility Plan"

### Phase 1: Preparation and Analysis

The first milestone is the decision by public authorities to draw a Sustainable Urban Mobility Plan. In the first phase, it is easy to identify the similarity between SUMP and NEPI in constituting an instrument for the ex-ante policy evaluation of the capacities, knowledge, and resources at the urban level.

**Figure 5.5:** The decision to prepare a SUMP




Source: Ruprecht Consult (2019) "Guidelines Developing and Implementing a Sustainable Urban Mobility Plan".

The preparation and analysis phase are made up of three steps:

1. **Set up working structures:**

This step can be broken into four activities, and each activity is made up of specific tasks. The first activity is:

Evaluate capacities and resources.

The aim is to obtain a clear image of the strengths and weaknesses of ongoing planning practices about developing a SUMP in the local area. In this activity, it is necessary to ensure that local authorities and stakeholders have the required skills for running the Sustainable Urban Mobility Planning, and to evaluate the financial resources for implementing the plan.

In order to evaluate the capacities and resources, the first task is to study the transport planning actions using the online SUMP self-assessment tool to see how far the process is incorporating the principles of sustainable urban mobility plans.

It is essential to detect the driving actors and barriers to the development of SUMP in the urban area, that are the driving actors who can sustain the development and

implementation of SUMP. It is useful to identify the legal barriers, institutional constrictions, and regulatory and financial obstacles which can concern the whole program, and to evaluate the obstacles which may occur during the implementation of the plan. To do so, a self-assessment elaboration represents the starting point for boosting the planning process and policies.

The second relevant aspect is to identify the available resources by outlining the budget for the SUMP development, and clearly defining the budget necessary for the implementation.

To produce a self-assessment, the SUMP provides an online SUMP Self-Assessment tool[27] which shows how much the planned activities are coherent with SUMP principles, and will offer advice for improvement.

Create an inter-departmental core team.

The *creation of an inter-departmental core team* begins with assigning a project coordinator with the resources and authority to correctly implement the program. The aim is to assign a senior project coordinator that will ensure the support necessary for cooperation, and to establish a core team as project leader, which is regularly entailed in the progression of SUMP. It is necessary to make sure that team members have the management skills necessary to guide the planning process, and also the technical and political competencies to carry those decisions through the process. A knowledge of transport and urban planning, economic, social and environmental policies is essential. It is recommended to maintain the team at a feasible working size, since not all skills need to be present within the core team. The team will discuss the results of the self-assessment planning measures by emphasizing links between different means of transport.

Assure political and institutional ownership.

To *assure political and institutional ownership* consists in identifying all important stakeholders and their goals, power, capacity, and plan resources. It is necessary to build a strong coalition in support of the SUMP project, obtaining approval from the

[27] *www.sump-assessment.eu*

government and also the opposition, while avoiding conflicts with powerful actors, and to meet politicians in person to examine their points of view and involvement. The purpose is to endorse the idea of Sustainable Urban Mobility Planning to politicians in all main departments, and to apply an open and transparent approach in cooperation among actors, including organizations and municipal authorities.

It is important to identify relevant stakeholders with the skills and knowledge for Sustainable Urban Planning. SUMP is successful when participants have the following skills:

1. Ability to obtain political support.
2. Knowledge of transport networks and services.
3. Technical capacity in SUMP development.
4. Capability to reach public support or to comprehend public needs.

Plan stakeholder and citizens' involvement.

The *planning of stakeholders and citizens' involvement* means to set up involvement actions as part of planning practices, and supply participation instruments that are suitable for both. The first step is to establish a "steering group" made up of important politicians and main stakeholders, and to draw a communication and engagement approach and timeline. It is crucial to try to reach as much involvement as possible while giving proactive information to the public, and to be sure to involve all actors of society including minorities, young and older people, and citizens with disabilities. For a greater participation, it would be useful to plot news releases to share that a new SUMP will be drawn up, and all citizens and stakeholders may participate.

**Figure 5.6:** Citizens' involvement in the SUMP process


Source: Ruprecht Consult (2019) "Guidelines Developing and Implementing a Sustainable Urban Mobility Plan".

The figure represents the involvement of citizens in each phase of the SUMP program; indeed, they are consulted in the preparation and analysis phase to allow them to participate in the development of the plan, and for identifying the important issues they face using public transport. In the strategy development phase, they are involved in the discussion of possible future scenarios, and for the co-creation of a common vision for the city by asking for feedback about the strategic priorities. In the measure planning phase, they play a role in validating measure packages together with stakeholders, and in ensuring wide public support for actions. Finally, in the implementation and monitoring phase, citizens are informed and give their contribution in learning lessons for future improvement.

**Step 2: Determine planning framework**

The determine planning framework step can be broken into four actions as follows:

<u>Measure planning needs and the geographic scope.</u>

This action consists in assuring that the significant regional, national, and European legal requirements are determined. It is necessary to have a clear vision of how the regional, national and European framework will impact the planning process, and to specify the geographic goal of the plan concerning the functional urban area of mobility patterns. To do so, it is crucial to detect the main authority bodies in the planning process, and to reach

a political decision with them to agree about the geographic goal and the core organization. Also, the long-distance linkages transport corridors are taken into consideration

Link with other planning processes.

*The link with other planning processes* action consists of detecting local sectoral strategies for transport and mobility, and pinpointing relevant plans of local transport actors, service operations, and municipalities in the planning area. It must be ascertained that the aims of the plans are coherent with the sustainable urban mobility objectives, and to do so, it is useful to determine the coordination needs between different policy domains. For example, the relationship between land use planning and transport in order to improve the use of sustainable means of transport to new developments locations.

A great planning process is based on regular exchange of information between core authorities, including the help of a land-use planner on the team, and the integration of the Sustainable Urban Mobility Planning in the development of other policies and practices.

Agree on timeline and work plan.

*Agreeing on a timeline and work plan* means taking the necessary time to draw a plan for implementing SUMP, and developing the working structures. The timeline can be obtained by defining a schedule for SUMP development, including the phases of analysis, development of a strategy, and plan for the measure. It takes at least one year for cities to adopt the plan after it launches, and it is also useful to include the possibility of challenging periods (elections or problems for budget) because they influence the timing of the plan.

A plan should focus on the future two or three years, but at the same time be mindful of the long-term actions after 10 years of implementation, and it should set the timeframe through the construction of infrastructures.

Considering getting external support.

*Considering getting external support measures* means choosing which tasks require external support if internal capacity is insufficient to cover them. Getting external support

for tasks that cannot be carried out properly because of a lack of internal skills in the organization should be taken into consideration. Be sure to present activities in the appropriate way, as a group, (usually tasks highly related to each other e.g., citizen involvement and communication) or if specific competencies are required and need to be presented separately (e.g., data collection, an analysis of bike infrastructures). A SUMP is based on a clear and precise description of the tasks, including timeline and specific outputs by using the proper criteria for selecting offers that need to be specified in the terms of reference.

**Step 3: Analyse mobility situation**

The first action of the third step is:

Detect information sources and collaborate with data owners.

This action consists in getting a summary of all available data for the Sustainable Urban Mobility Plan and measure its quality. It is necessary to select the available data which shows the status of transport and mobility in a city based on the general goals of sustainable urban mobility, and the political preferences which brought to SUMP development. It is important to identify all transport means used in the city and the level of their multimodality, and also all sustainable mobility features important for the city (e.g., air pollution, road safety, traffic noise, accessibility to services). Stakeholders and citizens must be consulted about the issues which they think need to be handled by the SUMP. These actions will bring to the creation of a common set of information based on a data share between partners and external data owners (e.g., data sharing platform). The choice on how to collect data (with a qualitative or quantitative method) depends on the accessible resources, the size of the city, and the reliability of data.

The Gehl Institute[28] has elaborated a set of tools to measure how people use public spaces, and how they can be boosted for public life.

- Twelve Quality Criteria: measure whether the different features of a public area are “protective, comfortable and enjoyable” for people;

[28] *https://gehlinstitute.org/tools/*

- People Moving Count which measures how many people move in a specific space and which transports they use, to understand how busy a place is;
- The Stationary Activity Mapping show what people are doing in a specific space each time, and this helps to understand how to improve the public life.

Analyze problems and opportunities.

The *analyze problems and opportunities* action means studying data including spatial analysis of the accessibility to transport services, traffic, air and noise pollution, holes in cycle paths or footpaths. Together with stakeholders and citizens, an analysis must be elaborated to identify the main problems which need to be addressed by the SUMP. In the analysis of the issues, an important aspect is to include the social exclusion in the framework of transport policies, taking into consideration the needs of the whole community, including those more vulnerable such as children and the elderly, by guaranteeing equal access to means of transport.

**Phase 2: Strategy development**

The second phase is the strategy development phase, that is made up of three steps:

Build and assess scenarios.

The *build and assess scenarios* action consists in developing scenarios of possible futures. To assess possible future scenarios, it is necessary to examine possible future improvements of the external factors of urban circulation (i.e. economic condition, climate changes, technological innovation, political sustain for sustainable development) and analyse tendencies in innovative cities. The consequences of future external variables on the local transport system should be examined, such as the impacts of global or national transformations (e.g. new technologies, automated driving), and local drifts (e.g. the rise or decrease of the population). An important aspect is to draw different scenarios according to different political priorities that consider the interdependence between changes in different areas: transport, economy, environment, land use.

Discuss scenarios with citizens and stakeholders.

The second action is the *develop scenario with citizens and stakeholders.* In practical terms, this measure aims at illustrating scenarios and their outcomes to core stakeholders

to favour a discussion of policy options and their consequences. It is necessary to consider the interconnections between changes in transport and other sectors, to understand how to create synergies and avoid negative consequences.

It is relevant to examine the scenarios with groups of people from different parts of society, including underrepresented groups such as younger, older, ethnic minorities, people with disabilities. A method could be to put information and feedback boxes in different spots of the city, collect feedback online and via social media, work–with organisations, report in different languages. Finally, it is recommended to present a clear agenda to the public and stakeholders to let them know how they can participate.

Develop vision and strategy with stakeholders.

The first measure of this step is to establish common points of view with citizens and stakeholders. This measure wants to create a representative group of stakeholders that would become accountable for the development of the project. The aim is to favor and prepare stakeholders' meetings by providing information to ensure common knowledge, including the outcomes of mobility analysis while also trying to directly involve citizens in the development of the program through meetings and workshops. Citizens should be informed about the building process of the plan, and be able to give their opinion on the draft of the program.

This action would then develop a draft vision, that includes the urban area and the other important sustainability features such as road safety, air quality, noise pollution. Also to cover the different means of transport, public and private, motorised and non-motorised. Decision-makers must be included in all steps of the draft plan development and results must be published in a clear and understandable format.

Agree on goals addressing common problems.

This step considers the developments of the scenario and the regional, national and EU goals. It consists in identifying the desired developments together with stakeholders, and agreeing on common objectives for each theme which represents a priority for stakeholders and citizens. Clear goals must be identified that can help guide measure selection and design, and clarify what should be achieved and when. Objectives should

include strategic priorities and the sectors to focus on to improve the situation (e.g. reduce car use not only for improving the quality of air but to make the city a short distance city.

Set targets and indicators.

To set targets and indicators, common indicators for all objectives must be identified. This measure consists in specifying goals and choosing the aspects to monitor. To do so, it is necessary to create a small number of quantitative and qualitative indicators that should be easily measurable, and to use standard indicators which are well defined, easy to measure, and analyze. It is important to elaborate outcome indicators that focus on the accomplishment of sustainability goals, not only transport indicators but also economic and environmental ones. A relevant aspect is to draw indicators that are useful for communication with politicians and the public, and to agree on them with the main stakeholders and the core organisations of the area.

**Phase 3: Measure planning**

The *measure planning* phase consists in the selection of measure packages with stakeholders. This phase can be broken down into the following steps:

Develop and evaluate the long set of measures with stakeholders.

The *develop and evaluate the set of measures with stakeholders* consists in creating an overview of the actions already planned or implemented based on mobility plans (e.g. walking, cycling, public transport), and relevant policy topics (e.g., land use, environment, energy). A list of potential innovative actions should be drawn which can be linked to the objectives and vision of the plan. It is important to involve stakeholders in building a list of actions and to include a mix of investments, operational and organisational actions for all relevant means of transport. It would be useful to include measures that have already been implemented elsewhere, and that have been a success.

Define integrated measure packages.

The *define integrated measure packages* action means identify different types of measures (regulation, creation of infrastructures, information), evaluate their acceptability, clarify their objective or challenge, determine their geographic scope, establish their costs and assess the dependence on external finances. It is useful to collect measures into packages to create synergy and interactions between different measures.

A risk assessment of the measure packages should always be carried out by asking about the effectiveness of measures and what would happen if circumstances change.

Plan measure monitoring and evaluation.

The *plan measure monitoring and evaluation* action consists in pinpointing the information needed to make an evaluation of the measures by answering some questions regarding:

The outcome: What are the impacts assumed from a measure? Establish an outcome or transport indicator for each measure to assess its success.

The output: what policy, infrastructure or service is performed in a measure?

The input: what resources do you spend?

It also aims at creating monitoring and evaluation deals for all indicators (strategic and measure indicators).

Agree on actions and responsibilities.

This step starts with the description of all actions by following these questions:

- Where should the actions run?
- When should the actions run?
- Who will handle it?
- How much should it be used?

It is useful to detect links between different actions to establish the most efficient order of implementation, and to display actions in a table including detailed descriptions and legal requirements.

In this phase, it is necessary to find funding resources and evaluate financial capacities. It is essential to identify the financial instruments and funds for each action such as: local taxes (as a local transport tax), revenue funding (prices to access the city centre, parking tickets). For financing SUMP implementation, funds must be collected from municipalities, national and regional subsidies and private actors involved through public-private partnerships.

Agree on priorities, duties, and timeline.

This action is relevant since each measures and priority is evaluated by also taking into consideration which stakeholders will provide funds. The so-called "related actions" such as implementing a new bus line after the construction of the necessary infrastructure must be considered, along with the consequences of big projects which would influence the mobility system of the city, such as the construction of a new tram, the implementation of congestion.

Ensure wide political and public support.

To ensure wide political and public support it is essential to inform and get feedback from relevant political actors, stakeholders, and citizens on implemented actions. To do so, an effective approach is to make the core elements of the SUMP available on local media, and underline the positive effects of SUMP actions by using quantifiable proof of the benefits of implemented actions.

Prepare for adoption and financing.

This step concerns the elaboration of financial plans and the agreement about costs sharing. To do so, it is essential to create coordination with other municipalities, regional bodies, and the national level and coordinate with financial actors about the funding sources necessary to finance actions. Financial projections for each action must be elaborated to be sure to cover all costs. Finally, an agreement must be reached about the sharing of all costs and revenues among municipal, regional, and national authorities.

The SUMP program is financed by the European Structural and Investment Funds (ESIF funds) to achieve key policy objectives in transport areas. The ESIF can be implemented by the Member States and their regions for nationally co-finance programs. ESI funds are used to sustain economically feasible projects that promote EU policy goals, particularly those projects about the "sustainable transport networks and congestion and can build opportunities for capacity building, training and technical assistance, and the development of local mobility strategies and plans.

The ESIF contains five separate funds, including the European Regional Development Fund (ERDF) and the Cohesion Fund.

SUMP is also financed by other three funds that are:
*Project-related incomes* from:

- Prices, ticket selling;
- Rent for advertisement in public transport and at the station.

Project-related incomes are incomes that are commonly used in transport, but they cover only a share of expenses, and their income is generated only after the service has been provided. They hold a percentage of uncertainty.
The second fund consists in *parking management and congestion charging* that are instruments used to disincentivize private car use. The aim is to internalize costs of private car use, but they can cause a push and pull approach based on how they are employed. These instruments are often difficult to introduce because they face strong political resistance since roads are often considered public goods. Strong capacities are needed to enforce these measures, and they often lead to costs because of the introduction of technology to implement it. The goal is to reduce private car use knowing that there are no reliable and long-term incomes.
Parking management is an instrument that has the pros of being easy to implement, indeed most cities have the legal capabilities to introduce parking management plans, the majority of parking spaces are public, and the implementation costs are moderated. The cons are that parking management requires control and observance. The difficulty is also in choosing adequate fees that exceed public transport prices by being able to do not put pressure on narrowing areas.
Another approach is the so-called *push and pull method* which combines disincentives for car use and incentives to use public transport, bikes, and walking.

<u>Finalize and assure the quality of the Sustainable Urban Mobility Plan.</u>
This represents the last action of the measure planning phase. Indeed, at the end of this phase it is useful to prepare a full draft of the SUMP, which includes the background, local context, and an outline of the development process; the results of the mobility study; the measure packs with their actions (such as timeline, responsibilities, and financial resources) and the monitoring and evaluation of the scheme.

The draft is an instrument for evaluating the compatibility with the EC directive on strategic environmental assessment, ensure it respects the procedure requirements, and to make the last modifications together with key stakeholders.

**Phase 4: Implementation and monitoring**

The first step of this phase is the management of implementation. This step requires the coordination of actions implementation to assure continuity between process development and implementation. An agreement on management actions and responsibilities must be reached, and ascertain that each action has its own implementation manager of reference. To do so, regular contacts must be maintained with action managers by planning regular meetings.

The second step consists in assuring goods and services, starting from the identification of the real needs of the city, and put them as starting point of purchase. To do so, the management authorities have to establish the method and timeframe for each good and service, and define how it should be performed; and also clarify the specific technical aspects and the use of performance criteria that better describe the function of specific products.

Monitor, adapt and communicate.

The *monitor, adapt and communicate* step consists in measuring indicators with regularity, with data collected and measure-level indicators to supervise the progress of measure packages. Strategic indicators are used to assess the progress of the SUMP general targets (every 1-2 years). It must be flexible about adjusting measures in case of difficulties in implementing the activities, such as strong oppositions, or for measures which end up being less effective, such as bicycles lanes which are used less than expected.

Inform and engage citizens and stakeholders.

The involvement of citizens and stakeholders about planned measures before implementing is a basic feature of SUMP instrument. It is effective to find creative methods to involve stakeholders whenever possible. Citizens must be kept informed about the progress in implementing measures by publishing results for citizens and politicians.

Review and learn lessons.

This is the last step of the implementation and monitoring phase, in which the focus is on the analysis of successes and failures of SUMP by studying the strengths and weaknesses of each phase. It is important in this step to also involve stakeholders and citizens in finding improvements to the process from their perspective.

The implementation of SUMP is positively linked with higher use of public transport and a lower percentage of car traffic. Nonetheless, cities with SUMP do not show a higher bicycle percentage.

Larger cities tend to adopt SUMP more easily than smaller cities. If we compare cities with a population higher than 500,000 inhabitants to cities with less than 500,000 inhabitants, the percentage of people using cars and bicycles is lower than in smaller cities, while the use of public transport is higher.

Cities that participate in SUMPs show a positive reduction in the use of private cars in the mobility tendency of the city. This happens because SUMPs are more easily created in cities with efficient sustainable transport actions and/or the fact that when a SUMP is developed it is easier to implement sustainable transport activities. Therefore, cities with SUMP should sustain the SUMP cycle to discover successful paths to sustainable local mobility. Small and medium-sized cities in Europe that have not yet adopted SUMPs should be sustained to do so.

Analysis shows that developing goals and planning actions does not necessarily bring to an effective change. It appears that more cycling actions should be implemented in the European Union to give a greater contribution to the goals of sustainable development. The existence of a SUMP alone does not mean that the modal share of cycling would be altered. Nonetheless, even after the implementation of a SUMP, evidence shows that larger cities still delay behind smaller cities regarding the percentage of bike traffic. The European Commission and Member States should adjust their support for cities to execute measures sustaining non-motorized transport.

### 5.6. Obstacles to Implementing SUMP

Why do cities that adopt SUMPs then have difficulties in implementing measures about walking, cycling, and sustainable means of transport?

There are some factors that have been identified as obstacles.

Mark out funds.

The EC EVIDENCE project discovered that local policymakers that develop a SUMP found it difficult to present it at the national level, and to impact national decisions on providing funds and making it a priority. So, while measures adopted in a SUMP focus on creating a consensus from the bottom upwards regarding social and environmental goals, it may be seen by backers at the national level as less important than directly providing funds for major infrastructure proposals. Indeed, public transport can also be implemented in major infrastructure measures. A slight change is happening in the preference of national authorities for investing in traditional infrastructure interventions instead of small interventions promoted by SUMP to gain consent.

Lack of confidence.

The EVIDENCE projects show that many city authorities think that small interventions are not as effective as traditional infrastructure interventions in terms of economic advantages. Consequently, fewer initiatives are sustained, and SUMP results in being less efficient.

Limited availability of resources and skills.

Another reason for the gap between planning and actions is the lack of financial and skill resources for implementing SUMP actions. In accordance with the EU co-founded CH4LLENGE project, authorities should possess the following skills: process leadership, project management, strategic thinking, and knowledge of available measures. But it often happens that only half of the skills are possessed by authorities.

Need for proper monitoring and evaluation.

Monitoring and evaluation are core elements in SUMP planning and implementation phases. SUMP actions should be evaluated from ex-ante and ex-post perspectives to assess their necessity, economic value, and effectiveness in enhancing the sustainability of urban transport. If there are not adequate monitoring schemes, cities would not be able to find gaps between plans and their implementation. This can bring to a lack of timely interventions, and will create delays in SUMP implementation.

The role of car traffic.

In small cities, traffic and air pollution are seen as a small public issue, and as consequence policymakers are less interested in implementing measures to substitute cars with more sustainable means of transport. A high number of citizens and work places create the probability of crowded streets, and that increases congestion and air pollution.

## 6. Case studies: Comparing SUMP Development and Implementation in Wroclaw, Prague, and Brussels

In this paragraph, three European Union cities that decided to implement Sustainable Urban Mobility Plans shall be compared.

The criteria was: one city from an eastern EU Member State, as Wroclaw in Poland; one from a central-eastern EU Member State, as Prague in the Czech Republic; and one from a western EU Member State, as Brussels in Belgium.

The aim is to see if a "leading country" such as Belgium and its capital, Brussels which represents the EU "capital" and a forerunner city, is more involved in implementing a plan for the transition towards sustainable urban mobility than a city of an eastern European Member State like Wroclaw, which belongs to the group of "less developed regions" or active city; and a city of a central-eastern European Member State like Prague, which is considered to belong to the "transition regions" or engaged city. Wroclaw and Prague indeed, for their characteristics, are expected to be less involved in political themes like sustainable urban mobility implementation.

### 6.1. The Wroclaw Mobility Policy

To find information about the city of Wroclaw, I surfed the European website of SUMP and then I went to the section "city database". In this section, it is possible to choose the European cities participating in the SUMP project and read their proposal of a Sustainable Urban Mobility Plan and how they are implementing it.

For the city of Wroclaw, there is a website which is called "Baltic Sea Region Competence Center on Sustainable Urban Mobility Planning". Here, there is a page that presents the Wroclaw Mobility Policy program that was elaborated between 2012 and 2013 for the development of a mobility strategy for the city.

It starts emphasizing that Wroclaw is a city in Poland with 634,000 inhabitants with a huge traffic and traffic congestion problem. For this reason, the Wroclaw Mobility Policy aims at solving the problem of transportation.

The targets of the plan consist in creating better transport accessibility to the city, developing a reinforced role of public transport as the starting point for the sustainable development of the city, promoting a higher transport quality, developing a raised

mobility safety, and producing a less negative impact on the environment and daily life quality.

Strategic objectives.

The strategic objectives of policy implementation are about 15 main areas.

The first one is the land-use planning with a forward glance to the development and possibilities of the transport network. The second one is the sustainable mobility generation, which means the will to influence citizens' habits. Then we have the car individual transport, that tries to fix the necessity to favor a better use of private car transport. The transport of goods area follows, that tries to fix the problem of accessing the city center. Another important issue is the air transport, the Wroclaw-Strachowice Airport needs to be well integrated with public and private transport.

Another relevant aspect to fix is the traffic safety issue, and the need to prompt road safety, but also the parking policy area with the aim of removing parking from the city centre by promoting the use of car parks.

A further point is cycling: the goal of the Wroclaw SUMP is to create better cohesion and development of the cycling structures, and also give priority to pedestrians and persons with disabilities traffic across the city.

Another area concerns the organization and management filed with the aim of favoring a better coordination and management of all modes of transport. For what concerns the economic and financial aspect, the aim is to create a long-term plan of investments by allocating a significant number of sustainable public means of transport, and to increase pedestrian and bicycle trips to reduce pollution for better environmental protection.

The social dialogue, which means the interaction with citizens to collect their opinions for SUMP improvement, is seen as having an essential role for SUMP implementation.

The SUMP for Wroclaw also comprises monitoring tools. The monitoring will be done periodically, once a year and once every 5 years, in each area of intervention. The parameters of evaluation are:

- The percentage (e.g., travel by private car)
- List (of actions or expenditures)
- Medium (e.g., the speed of trams in the city)
- Number (e.g., parking for bicycles)

- Length (e.g., routes for bicycles)

Unfortunately, on this website, there is no information about Wroclaw practical examples of SUMP implementation. The only information available on the Wroclaw website is in Polish and there is no possibility to access translated documents.
However, on the Eltis Urban Mobility website, there is an article about Wroclaw as one of the finalists of the 8th Award for Sustainable Urban Mobility Planning (SUMP Award), for having built 650 km of cycling lane.
In 2010, the city started to invest in a cycling policy, by creating new pedestrian spaces and cycling paths.
Since the introduction of SUMP in 2018, Wroclaw developed a bicycle rental system that reached 2,000 bicycles in 2019. In 2018, 1.1 million bike rentals have been registered.
Cyclists can already enjoy 420 km of cycling lanes, which will be expanded to 600 km in the following 5 years assuring service to the 72% of Wroclaw's citizens that live within a range of 30-minute cycling distance from the city center.

**Evaluation of Wroclaw SUMP Plan**

The city of Wroclaw's SUMP is still at an early-stage phase. To analyze it, I will break down the plan according to the steps of the SUMP cycle described in the previous chapter, to see the weak spots and suggest how to improve them.

Phase 1: Preparation and analysis phase

The Wroclaw mobility policy identifies the city of Wroclaw as the functional urban area of action, with problems of traffic congestion. Then there is the identification of the targets of the plan which regards fixing congestion problems and reducing traffic while enhancing active transport means, such as cycling and walking, together with a better organization of land use. The description of the issues of the city is poor, because it is too general and not punctual in describing the mobility problems. It lacks an analysis of the available financial resources to sustain the actions of the SUMP, and there is not a clear assessment of the actors that may lead the implementation. The outline of the budget for SUMP development is not clear nor is the definition of the budget necessary for implementation.

It does not offer a description of who will be the project coordinator and, as a consequence, a list of the selected team members with the necessary technical and political skills to make decisions for proper implementation of the SUMP is not provided. Identifying the relevant stakeholders with the proper skills and knowledge is essential for SUMP, because for successful development and implementation of sustainable plans, it is necessary to involve actors with the correct knowledge and technical capacities, to gain political support, and to have the ability to reach the public and involve it in the process.
Also, the involvement of citizens and stakeholders is poorly described. It only mentions interaction with citizens to collect their opinion, but it does not provide a description of how this involvement should be done. There is not a set-up of practical actions and instruments to exchange opinions with citizens, nor a description of the approach and timeline that would be adopted.
The geographic scope of the plan is defined as the city of Wroclaw, but there is not a provision of the main authorities that will participate in the plan, which is an important aspect to consider because it enables reaching a political decision about the geographic goal. Moreover, the focus is only on short-distance transport while long-distance means of transport are not considered at all.
The sectoral local strategies for transport and mobility are not mentioned, and it is not clear which local actors will be involved. How different policy domains will be coordinated is not mentioned in the plan, and it results difficult to understand how it would improve the land-use planning and the development of the transport network.
Another aspect that is lacking is the timeline and work plan to implement SUMP and develop the working structures. It is important to define a schedule for SUMP development which should include the phases of analysis, development, and implementation of the strategy. The focus is on the short term and there is no provision for a long-term implementation of the plan in the next ten years.
Another important aspect of SUMP is getting external support to be sure of doing activities in the proper way, and to compensate for a lack of expertise in the organization by asking for external aid. To do so, Wroclaw should draw a plan about activities that would be presented as a group (for example those that require citizens' involvement), and those that require specific skills to delineate clearly and precisely the tasks with their timeline and specific outputs. To obtain external support it is useful to describe tasks

precisely, including timeline and results expected, and this aspect is lacking in Wroclaw SUMP.

The description of the mobility situation in Wroclaw SUMP is poor, it is said that the city suffers for traffic congestion, but it is not clearly explained in the targets of the plan what are specifically these types of issues. It should be provided a summary of all the available data concerning the status of transport and mobility, including the general goals of SUMP. The plan needs to be improved with a clear description of all means of transport used in the city, all the sustainable mobility features relevant for the city to create a common set of information based on data shared between partners and external actors. To offer a proper description of the mobility status of a city is important, because it helps in identifying: the status of national programs in the EU Member States, the efficient national programs and their contents, the main issues blocking SUMP plans in cities, regions, and countries, and the necessities of national and regional level authorities for the development and advancement of national programs

In the Wroclaw SUMP there is a brief description of the issues the city is facing about traffic congestion, but what is needed to develop a good program is to provide a relevant document about the status of urban transport, the issues, and strategies. There is no provision of a spatial analysis about the accessibility to transport services, traffic, air, and noise pollution, which instead appears only in the target measures, but without concrete examples of what are the urban mobility issues in Wroclaw.

Phase 2: Strategy development

In the Wroclaw SUMP, the strategy development is expressed partially in the targets of the policy, but they are not well grouped and explained. Strategy development is based on the analysis of possible futures, which in this case is not present if not in terms of making a list of the policy targets of the plan. Policy-makers do not provide a detailed analysis of the different possible future alternatives based on the local transport systems, such as automated driving or car sharing. The analysis is sterile, and fails to identify the interdependence between changes in different areas such as transport, economy, environment, and land use.

One of the targets of the plan is “social dialogue” but it is not clear how the discussion of scenarios and measures with citizens and stakeholders should happen, and which are the

relevant groups to involve in the discussion. Are underrepresented groups involved? This information is completely lacking in the plan. The participation of citizens and stakeholders is a point that should be better developed in the SUMP of Wroclaw.
Who are the stakeholders involved, and how are the meetings organized? This aspect is relevant for all those actions of exchanging information and points of view on the draft program.
The identification of goals provided in the plan is just a list of the expected targets to reach, which briefly explains the issues due to traffic congestion. This approach is not sufficient; indeed, it should analyze the development of the urban mobility scenario, keeping in mind the regional, national, and EU goals. Then, it would be useful to analyze the desired developments together with stakeholders, and to agree on common objectives for each priority. This phase is clearly still underdeveloped in the Wroclaw mobility plan. To be clearer, the plan should express the specific goals and the aspects to monitor in a very precise manner, and use standard indicators for monitoring that which must be well defined and easy to measure and analyze. Economic and environmental indicators, not only transport ones, should be introduced to measure the accomplishment of sustainability goals.

Phase 3: Measure planning and monitoring

The Wroclaw SUMP program does not comprehend the creation of a list of measures planned and implemented according to the different topics, such as land use, environment, or energy. Stakeholders seem to not be involved in the process, and there are no references about the investment, operational and organizational actions for each target measure. What measures should be implemented to reach the targets? What is their objective, geography, and cost for each measure? It is not possible to find an answer in the program at this stage.
The parameters of evaluation of the program presented in Wroclaw SUMP are the percentage, the length, the number, the medium, and the list. But nothing is said about the outcome expected by a measure, or the output which means the policy, infrastructure, or service performed by a measure, and what are the inputs or resources used. The lack of tools and monitoring (as the development of indicators) represents an obstacle in SUMP

withdrawal, and precludes stakeholders from having a clear view about SUMP which is essential to develop a proper SUMP support policy.

The Wroclaw SUMP needs to describe all actions in a detailed way by putting them in a table, and defining the proper financial instruments and funds for each measure, which can come from local taxes or revenue funding. It is necessary to develop a financial plan and agree on cost-sharing by coordinating with Wroclaw municipal authorities, regional bodies, and national level actors.

So, to improve Wroclaw SUMP, policy-makers should prepare a draft of the plan which includes: the analysis of the local context, an outline of the expected development process, the results of the mobility study, the measures packages, and a precise description of their actions, and finally a better-developed monitoring and evaluation scheme.

Phase 4: Implementation and monitoring

The monitoring scheme is completely absent and there are no measure-level indicators to measure the signs of progress of actions. The evaluation is established every 5 years, which is a too long a period, because studies have shown that it is better to make evaluations every 1 or 2 years, to be able to fix measures in case of difficulties or in case they are less effective than expected.

In conclusion, we can say that the city of Wroclaw is only at the first step of the SUMP program, which needs to be better organized and developed. Wroclaw is still far from achieving a well-established coherence between policies and coordinating EU, national and local findings in favour of a sustainable urban mobility plan.

**Governance shifts due to SUMP**

Evidence shows that in Poland, as happens in most other eastern European countries, there is less support for sustainable mobility which derives from a substantial lack of national strategies, and an insufficient public awareness about the necessity of sustainable urban mobility projects. The market is still characterized by a strong dominance of car ownership, which also derives from an insufficient and poorly linked public transport network. It is required to introduce the regulation of car ownership, fees on used cars, and standards for emissions of harmful pollutants.

SUMP has favored a better awareness of environmental issues thanks to the involvement of stakeholders and citizens in developing the SUMP plan for Wroclaw. The simple fact

that the city of Wroclaw decides to participate in SUMP formulation and development means that city decision-makers are aware of the environmental problems and have the will to fix them with practical action steps. The problem here is that the plan is still underdeveloped due to limited coordination between national, local, and regional political actors. The strategies to involve citizens, stakeholders and economic actors are not clear, and it seems that there is not enough political support for this plan. A greater coherence between policies is needed to obtain a well-developed and systematic plan. The main inadequacy concerning governance is linked with the lack of cross-administrative cooperation. In the absence of a specific organization that facilitates the debate and decision-making processes, stakeholders do not cooperate and it leads to counter-productive situations.

More support is necessary from local governments for implementing and advancing the EU's agenda on urban mobility. This requires better coordination among multiple stakeholders, public and private partnerships, technological development and better investments, and stronger involvement of the citizens. Low support from the national level authorities is an obstacle for SUMPs' take-off. In countries where the SUMP acceptance is low, it is necessary to have strong support for national political actors and technicians in ministries to succeed in the execution.

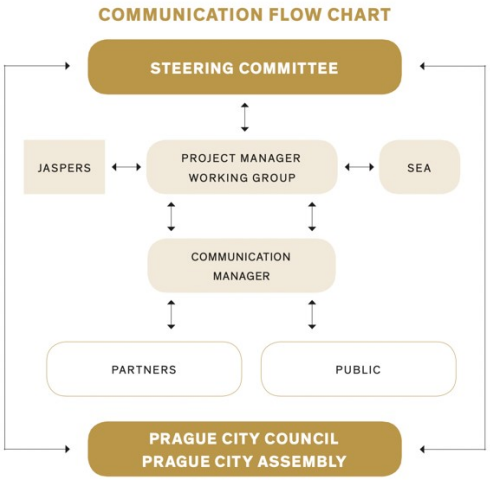
In terms of governance, the SUMP for Wroclaw has failed in defining clear rules about the responsibilities between national, local authorities, and private actors. This low cooperation has traded off an efficient implementation of SUMP. The Sustainable Mobility Plan concept is developed at a basic level, and the processes and contents are not well-known by stakeholders and citizens that show low support.

On the other hand, the SUMP for Wroclaw has surely succeeded in raising awareness about land use planning, which can create new possibilities for the transport network. It offers inputs for the improvement of the sustainability of public transport, and the need to reduce private car use in daily transport. SUMP has mobilized political actors and stakeholders for the removal of parking in the city center, a better cohesion and development of cycling structures. Thanks to SUMP, long-term funds will be allocated for the creation of sustainable means of transport.

### 6.2. The Prague Mobility Policy

The city of Prague has developed a sustainable mobility plan which is called "Prague Mobility Policy". The plan was started after a decision of the municipal council of Prague on 21 July 2015, and it was approved by the Prague City Assembly on 24 May 2019, replacing the previous Transport Policy Principles document.

**Figure 6.1:** Stakeholders' rganization for Prague Mobility Plan




Source: Ruprecht Consult (2019) "Guidelines Developing and Implementing a Sustainable Urban Mobility Plan"

Prague Working Group is made up of:

- Prague City Hall, Transport Department
- Prague Institute of Planning and Development
- Regional Organiser of Prague Integrated Transport
- Integrated Transport of the Central Bohemian Region
- Prague Technical Road Administration
- Prague Public Transport Company
- ICT Operator
- Central Bohemian Region

The SUMP was elaborated with the active cooperation of citizens and stakeholders and each step was discussed with experts that represent the interests of the municipal districts of Prague, the municipalities of the Central Bohemian Region, and the civil society.

The SUMP was approved in September 2017, and established the direction of the mobility plan until 2030, by outlining seven objectives and indicators based on general concepts of sustainable mobility.

The strategic objectives are: (1) the enhancement of the spatial efficiency of transport, (2) lowering the carbon footprint, (3) the improvement of the performance and reliability, (4) a higher safety and security, (5) the strengthening of financial sustainability, (6) better public health and (7) transport accessibility.

There are 15 priorities that have been identified. The first one is the public transport priority and advancement of rail transport, the second is the consistency of public transport with other means of transport, then we have the ease capacity problems in the transport network. The fourth priority is the creation of new connections for various means of transport and incentives for walking and cycling. City logistics must be valorised and the transport accessibility and public space for residents must be improved. Another priority is the advancement of public space quality together with a reduction of air and noise pollution and carbon footprint. High attention is put also on the reduction of the spatial demands for transport means together with a reduction in transport fatalities. The transport system must become made economically sustainable, and support should be created for sustainable mobility and efficient city administration. The aim is to develop a sustainable Prague metropolitan space that would favor the economic development of the city.

Measures for implementation

Measures for implementing the plan have been divided into two groups: standard measures and development measures.

*Standard measures* ensure the reconstruction of existing transport means together with specific modifications such as increasing safety or removing mobility obstacles. The aim is to create better mobility conditions.

1. Reconstruction of rail infrastructure.

This measure aims at the optimization of the Praha-hlavní nádraží (Prague Main Railway Station) – Prague-Hostivař line, the reconstruction of Praha and the Masarykovo nádraží (Prague Masaryk Station), while increasing the capacity of the Prague–Kolín line. These infrastructures both in train and tram networks are the prerequisites for maintaining the

operability of rail systems. They represent the busiest intersections of electric lines, and the aim here is to increase safety while reducing their impact on the environment. The reconstruction of Masaryk Station, the second most crowded station in Prague, will lead to an increase in travel quality to 30,000 travellers each day. The aim is to solve the connections problems for the S line.

2. Reconstruction of road infrastructures.

The reconstruction of road infrastructures means repair of the Libeňský, Hlávkův, Barrandovský, Palacký, Jiráskův and Legií Bridges, the pilot project on the overhaul of Strahovský tunnel, and the optimization and development of the Barrandovský bridge node. The measures aim at properly maintaining the existent transport infrastructure. The conservation of transport infrastructure will sustain the existing level of safety, and will limit the growth of negative externalities for the environment and citizens.

3. Parking zones.

This measure tries to develop paid parking zones. It aims at dealing with problems of scarcity of parking, and will favor the use of public transport instead of private cars. Paid parking areas will also create more liveable public spaces.

4. Traffic control.

This measure strives to develop the ownership and management of traffic lights, and a technological transport management information system for a better traffic control scenario. The goal is to improve the efficiency of traffic control systems and introduce a single approach to manage communication between light intersections. This can improve the deployment of tools of area traffic control.

5. Public transport priority.

The public transport priority measure consists in a program for increasing the flow of trolley operations, in particular for what concerns the physical separation of trolley tracks. Trams Trolleys should have priority when restoring and building traffic control signals. The aim is to assure an established lane for public transport both in Prague and the Central

Bohemian Region. It will push citizens to opt for public transport by growing the popularity of modern rail transport and the technological development in the mobility sector.

6. Improvement of the public transport environment.

The improvement of the public transport environment is a program for the reconstruction of transfer points for furnishing public transport transferring points in Prague. A system will be developed for maintaining a database of accessible public transport stops. The goal is to maintain a good quality of stops and transfer points for public transport, and create free access to stops and transfer points, by introducing a database of barrier-free access points, including apps on mobiles and websites.

7. The revitalization of urban space.

The revitalization of urban space includes actions specifically thoughtout for the city of Prague, that are: the reconstruction of Malostranské náměstí (Lesser Lower? Town Square), the reconstruction of Václavské náměstí (Wenceslas Square) and of the streets Veletržní and Dukelských hrdinů. This measure targets roads and boulevards which are important for the city and are the core of public transport, automotive traffic, pedestrians, and cyclists. The reconstruction of boulevards and avenues will favour the use of those streets by citizens.

8. Accessible infrastructure.

To make infrastructures more accessible, the SUMP for Prague has set plans for creating better accessibility of metro stations Jiřího z Poděbrad, Flora, Želivského, the reconstruction of selected trolley stops to make them more accessible and finally the removal of excessive railing. The aim is to make trolley and metro stops reachable to all users. Barriers do not only apply to persons with disabilities, but also to improve the poor conditions of certain underpasses which limits its use for some people due to subjective barriers.

9. Traffic safety.

The traffic safety measure aims at settling safety modifications to accident blackspots. In particular, the procedure will create safety modifications to railway crossings in the Central Bohemian Region, and the removal of billboards from local roads with a speed limit of 70 km/h or higher.

10. Integrated transport system.

The creation of an integrated transport system for the city of Prague means favoring a full integration of public transport in the Central Bohemian Region. This integration will be reached thanks to the introduction of PID Lítačka (Prague Integrated Transport Pass) app, and the establishment of Position of Prague Public Transport connections in the ROPID system. Given that every day an average of 200,000 people commute between Prague and the Central Bohemian Region, the aim is to enhance the attraction for public transport in order to improve the city environment with fewer moving and parked cars. The idea is to create a single integrated transport system that would give the possibility to buy and handle tickets online for all passengers. The opportunity to handle tickets online will make transport easier for people to use. The project "Position of Prague Public Transport Connections in the ROPID System" will let users monitor the status of their stop via a mobile app.

Then, we have development measures. The first development measure concerns:

1. The development of the railway network.

The development of the railway network for the city of Prague means the construction of a new connection 2 (metro S), the building of a train connection between Prague, Prague Airport, and Kladno, and a train connection between Prague, Mladá Boleslav, and Liberec.

The aim here is to enhance the capacity of train networks, and establish the full transit model. These actions are a precondition for the introduction of high-speed connections out of the center of Prague, such as connections to the airport.

2. Development of the trolley and metro network.

For the city of Prague, the development of the trolley and metro network includes the creation of a metro D to connect Pankrác to the Depo Písnice section, the establishment

of an eastern trolley tangent, and the building of a trolley line between Nádraží Podbaba and Suchdol. Metro D will respond to the lack of fast and timely transport in the western part of Prague's southern sector. Trolleys are widely used as means of transport in Prague, indeed a third of all journeys is by trolley. Assuring the quality and stability of the service is a key factor in this case. These measures want to solve the connection problems of the southern part of Prague which is the less serviced to decrease traffic on road.

3. Public transport priority.

The Prague SUMP will develop legislation that gives priority to public transport and will establish legal norms and technical standards for public transport stops. It is necessary to create the idea that public transport is a priority. This measure will answer the problem of services in the outer zone, the existence of overloaded bus routes, and the low reliability of public transport. This measure will answer the problem of services in the outer zone, the existence of overloaded bus routes and the low reliability of public transport.

4. Completion of the outer ring road.

For the completion of the outer ring road, another relevant aspect for better sustainable mobility in Prague, an outer Ring Road (D0) will be created, 511 (Běchovice – D1), the outer Ring Road (D0), 518 and 519 (Ruzyně–Březiněves) and the motorway D3 – Central Bohemian section. The creation of outer ring roads will solve the problem of congestion in the main streets of the city, by creating the use of alternative roads, and so less traffic congestion.

5. Completion of the inner ring road.

The completion of the inner ring road aims at increasing the capacity of Jižní spojka (South Connecting Road) between the Vídeňská and Května section. An inner Ring Road which connects Pelc–Tyrolka and Štěrboholská radial road (project preparation) will also be created. A study to reduce noise and air pollution in the northern part of the city will also be conducted. The inner ring road aims at diverting traffic out of the city center while reducing susceptibility to huge traffic. The negative impact of automotive traffic on public health will also be solved by running new routes through tunnels.

6. New road connections.

To favor a better mobility, new road connections will be established between Průmyslová and Kutnohorská (Hostivař junction), a bypass between Dolní Měcholupy and Písnice and the construction of a radial road (project preparation). These roads are important for long-distance connections and do not pass through highly populated zones. The development of the Radlice radial road will deviate the traffic from the western area of Prague towards the center with a new road placed in a tunnel.

7. Toll system.

The Prague toll system consists of a pilot project and implementation. Introducing a fee system will limit non-essential automobile traffic. This system can be also used to manage traffic during peak hours.

8. City logistics.

The SUMP for Prague also comprises a sustainable logistics strategy. This strategy includes the creation of the position of Freight Transport Specialist and the development of a low carbon solution to waste logistics in Prague. Logistics will be enforced thanks to the construction of a Freight Transport Specialist that covers the Central Bohemian Region.

9. P+R and B+R facilities.

Another relevant point of the SUMP for Prague is the creation of P+R and B+R facilities. The program includes the development of P+R facilities at metro stations and the development of P+R facilities in priority areas 1, 2, and 3 of the Central Bohemian Region, and the advancement of B+R facilities. P+R facilities for cars and B+R facilities for bikes are a suitable expansion together with the public transport system. The focus is on the ability of a parking system to reduce the travel distances, and encourage public transport. The persuasive parking system will reduce private transport and will help congested zones during city social events.

10. Integrated mobility services.

The integration of mobility services means the creation of a multimodal route planner. To do so, the proposal in the SUMP for Prague is to create a common information system with Public Integrated System (PID) and an automatic vehicle occupancy detection. The Prague transport system requires innovative solutions like the "mobility as a service" approach. It is necessary to create a common information system for users of public means, tourists, and pedestrians. It is also needed to use real-time occupancy data to plan transport. Understanding how people use transportation will make it easier for travelers, drivers, and public authorities to understand how means of transport are used.

11. Shared mobility.

For sustainable mobility, a relevant aspect is the development of shared mobility. The proposal for the city of Prague is to establish a station bike-share scheme, and a car-share and carpooling plan. Shared mobility that includes all means of transport is coherent with the trends of metropolises and the development of public transport. These measures contribute to improving people's mobility and respond to negative effects of private transport such as greenhouse gas emissions, insufficient physical activity, air quality, public health.

12. Support for cycling.

In support of cycling as means of transport, a connection between Prague and the Central Bohemian Region by bike will be created, and a left-bank cycle route A1 with connections in the region. The strategy goes under a non-motor transport development strategy. The main objective is to boost the connection between Prague and the Central Bohemian Region and offer adequate rail transport continuity. The development of "door-to-door" cycling levels and improved connections make non-motorized transport a real alternative for all. The aim is to answer directly to the absence of pedestrian and cycling linkages.

13. New pedestrian links

A better pedestrian mobility will be achieved thanks to the creation of Holešovice–Karlín footbridges and Kačerov–Roztyly footbridges. A connection between Motol Hospital and

Vypich will also be created, and between the Zličín commercial zone with the metro. The aim is to walk to locations that are poorly accessible or inaccessible.

14. Traffic calming

To reduce traffic, SUMP for Prague will establish a program for the creation of pedestrian zones in the city center, which goes under the Prague traffic safety strategy for the creation of 30-km/h zones.
The aim of these measures is to reduce accidents and the consequences of traffic caused by accidents, while collecting data about pedestrian travel to collect data about this mode of transport.
These projects want to fix the problem of traffic accidents, the impact of traffic pollution on health, and the delays and low speed of public transport on surface.

15. Electric buses and private electric vehicles

For the deployment of electric buses and private electric vehicle, the bus lines in Prague will be electrically powered. New charging stations for electric vehicles will be built, and electric vehicles will be used as business cars for municipal companies.
Private electric vehicles are the tool to improve air quality and the quality of life of residents. Since private electric vehicles are becoming necessary as sustainable means of transport to reduce GHGs emissions, it is also necessary to increase the network of electric vehicles. These measures are a long-term solution for the reduction of GHGs combustion engines, which are also produced by buses.

16. Strengthening Public Transport

Public transport will be strengthened through the construction of the 8th platform at Prague Main Railway Station, and an improvement of urban rail lines and the strengthening of bus connections to trains.

The project is to increase the appeal of trains and buses for short trips. Increasing the number of train rails will create new connections on electric tracks. Urban rail links will address the missing connections in the city.

17. Campaigns promoting sustainable mobility

The SUMP for Prague also includes campaigns for the promotion of sustainable mobility. These campaigns will support the creation of a Zero-Emission Prague. Campaigns in favor of sustainable mobility will enhance citizens' awareness. The maintenance of the Zero-Emission Prague campaign will increase their awareness about sustainable mobility, and will promote the use of sustainable means of transport. The campaign will use the popularity of public transport and stimulate new technologies and innovation.

18. Innovation in city transport administration.

The innovation in city transport administration measure concerns a Mobility Plan for major enterprises and schools, which will create an advancement of the major transport network after 2030. The aim is to encourage changes and innovations in transport infrastructure. The measures aim at fixing the fragmentation of local government, the lack of coherence between priorities of conceptual documents, and the city budget.

19. Traffic control.

Traffic control will be achieved through the creation of a road line traffic control of the Outer Ring Road. A–traffic-dependent control area will be established, along with an accident detection and a navigation system to vacant parking spots.
These measures place emphasis on the development and application of cooperative systems which can raise awareness, strengthen road safety for users, and make car trips safer.

Strategic objectives

Finally, for what concerns the SUMP for Prague strategic objectives in transport policy they have been identified in:

1. Increasing spatial effectiveness of transport.

The increase of spatial effectiveness of transport involves a rise of public, pedestrian and cycling transport from 70% to 73%. The proportion of rail transport to the number of passengers will grow from 67.2% to 72% and the number of cars passing within the city center will decrease from 530,000 to 464,000 ~~a~~ per day. Concerning cycling lanes, the length will increase from 173 to 260 km, and also the expected number of car-sharings will grow.

2. Reducing the carbon footprint.

For reducing the carbon footprint, the emissions from car traffic will diminish, and also the specific emissions of GHG gases from transport will be reduced. The number of electric vehicles will grow from 1,060 to 56,000 and the number of electric public transport buses will increase from 2 to 250.

3. Boosting performance and reliability.

To boost the performance and reliability of transport, the speed of Public Integrated Transport (PID) buses will grow from 25.2 km/h to 26 km/h and the delay of PID buses traveling from the Central Bohemia Region to Prague will decrease. Also, the punctuality of PID will increase from 94% to 96% and the number of people transported by integrated transport in Prague will grow from 1.26 million to 1.35 million.

4. Increasing safety.

The increasing safety objective aims at reducing the number of pedestrians and cyclists killed from 732 to 650 a year. The number of citizens that are victims of minor injuries will decrease from 1,951 to 1,750 a year, and the serious traffic accidents will diminish from 173 to 110 a year.

5. Increasing financial sustainability.

For increasing financial sustainability, the proportion of transport income in the total city budget will grow from 4.6% to 6.6%. The proportion of losses from public transport will

diminish from 80% to 75% and the number of people with permanent residence in Prague will grow from 1.280 million to 1.357 million.

6. Improving public health.

For improving public health, there will be 0% of areas exceeding the annual emissions limits for PM10 and PM2.5, and there will be no areas that will exceed the limit for benzo(a)pyrene. Any citizen will live in an area that exceeds emissions limits.

7. Improving access to transport.

Access to transport will be increased by raising the share of underground bus connections to regular bus connections from 52% to 80%, in the city of Prague. The share of underground bus connections to regular bus connections will grow from 52% to 80% and the number of accessibility metro stations will grow from 72% to 85%.

**Evaluation of Prague SUMP Plan**

Preparation and analysis.

The Prague Mobility Policy appears as a well-established SUMP program in which the involvement of the municipal council and the Prague city assembly comes together with the participation of a well-established group of stakeholders: Prague City Hall, Transport Department, Prague Institute of Planning and Development, Regional Organiser of Prague Integrated Transport, Integrated Transport of the Central Bohemian Region, Prague Technical Road Administration, Prague Public Transport Company, ICT Operator.

The involvement of citizens is well planned, and the steering group is made up of relevant policymakers and stakeholders.

Cities in Central Eastern Europe (CEE) do not generally have a long tradition of integrated transport planning and face a lot of barriers from the institutions, and in addition, they rarely apply multi-actor approaches and public involvement strategies which are underestimated in the policy practice (Jordová and Foltýnová, 2021). That is why the analysis of the Prague SUMP seems particularly interesting in understanding how the mobility plan was developed by the Prague authorities.

Strategy development.

For what concerns the *strategy development* phase, a clear evaluation of the strengths and weaknesses in terms of transport sustainability of the Prague urban area is lacking. The program goes directly to the presentation of the strategic objectives, that in the case of the city of Prague, are the advancement of the spatial efficiency of transport, lowering the carbon footprint, the improvement of performance and reliability, the increase of safety and security, the strengthening of financial sustainability, the rise of public health and better transport accessibility. Another aspect that is not clear is who will be the project coordinator with the right resources and authority to implement the program. An explicit description about the technical and political competencies of each stakeholder's actor that is part of the steering group is not provided. Moreover, it is unclear how the minorities in society will be included in the development process.

The Prague SUMP program focuses on actors and targets at the national and regional levels and provides specific goals concerning the functional urban area of Prague. The coordination between different policy domains instead is an aspect that is not well explained.

It is not clear what the defined schedule for SUMP development is for the phase of implementing measures. Measures are well described and divided into two categories, which are development measures and standard measures, but the schedule of implementation is not clarified. Measures seem to be focused on the short-term period, instead there is not a clear proposal for the long-term actions. Moreover, there is no consideration about obtaining external support to compensate for the lack of internal skills for certain actions.

Measure planning.

The plan continues with a clear description of standard and development measures. The standard measures are aimed at fixing the inefficiencies of mobility services such as road and rail infrastructures, parking zones, traffic control, public transport, urban space, accessibility to transport, and integrated means of transport. On the other hand, development measures aim at enhancing the development of mobility services and for each action, there is an explanation of the expected results that the city wants to reach.

So, for what concerns the explanation of actions within the SUMP of Prague, this section is well presented and not only explained by offering concrete examples for each action, but also offered a description of the reason why a certain measure is needed and what benefits it is expected to bring. A well-structured body of stakeholders has certainly helped in developing a clear description of targets and goals, as represented in this program.

On the other hand, the plan does not offer a list of indicators that will be used to assess each target and to monitor all aspects. A set of quantitative and qualitative indicators should be developed to help to focus on the accomplishment of sustainability goals such as transport, environmental and economic indicators.

The innovation actions fell below the section about strategic objectives, that comprehend both objectives about fixing transport issues and also for improving people's health and their accessibility to transport. The selection of measure packages is well formulated because the actions planned are well explained, their implementation is clear, and also it is clear which relevant policy topics they want to address (such as land use, environment, health, and the accessibility to public transport).

What can be done is make a better classification of measures according to their types, acceptability, objective or challenge, geography, and costs, and also the reliance on external costs. This would help define integrated measure packages and to create synergy and interactions between different actions.

Implementation and monitoring.

A negative aspect of this plan is that the measures for monitoring and evaluation are lacking. It is not explained how the measures would be evaluated in terms of their outcome or impacts, output or policy, and infrastructure performed. A set of monitoring and evaluation indicators through which to assess the impact of measures in reaching their targets is not provided. The monitoring and evaluation is a core aspect in SUMP because it helps in modifying measures that are not efficient, and also in evaluating if the fixed targets can be reached, or the plan is not working in creating a better environmental mobility policy.

In conclusion, a section about the actions and responsibilities in terms of time, geography, actors, and linkages between actions for the establishment of the most efficient order of implementation should also be developed.

**Governance shifts due to SUMP**

The strengths of the Prague SUMP derive from a well-established organization of stakeholders involved at the national and local levels. The involvement of stakeholders and citizens represents a core aspect for SUMP, and the structure of the relationships between these actors is well represented. The Plan tries to involve both the public actors at the municipal level, like the Prague city hall, the central bohemian region at the national level, and the main stakeholders about transport policies and infrastructures. The coherence between different sectors of policies and the governance levels is developed in an efficient way, even if it lacks a reference to the European level institutional actors that seem to not be involved in the process. SUMP for Prague seems to be an overall well-known concept, but more attention should be put on specific components like developing a multi-modal mobility system, which often is not really comprehended or put into practice. The city of Prague has also developed a quality assessment of SUMP which results in being very effective.

SUMP will provide the city of Prague with a new railway and trolley network that will enhance both the capacity of trains and the connections out of the city center. It will make the transport network better connected, and this will give travelers the possibility to access intermodal means of transport. A better network of transport will also have the benefit of reducing road traffic and private car use.

Thanks to the program, funds will be allocated for completing the outer and inner ring roads, which will reduce the congestion and the relative public health problems of citizens. City logistics will be enforced thanks to the construction of Freight Transport Specialist in the Bohemian region, and SUMP will also push the city to develop efficient P+R and B+R rental services of cars and bikes to favor sustainable mobility inside the city center. SUMP will also raise awareness and will provide funds for the development of shared mobility and cycling infrastructures, that will offer citizens the chance to answer their mobility needs. Citizens' knowledge will also be raised through sustainable mobility campaigns funded by SUMP, that will stimulate the popularity of public transport use.

The SUMP succeeds in eliminating the barriers to elaboration and implementation of sustainable mobility solutions, indeed the plan favors cooperation between the urban, regional, and national level. At the national level, the cooperation between the ministries involved in mobility policies is clearly defined, and this shows the effort to create cooperation among political and non-political actors for developing an integrated approach between the urban policy level and the urban planning level.

A negative aspect of this SUMP for Prague is the scarce provision of instruments for monitoring and evaluation of the quality of the program. The coordination between European, national and local funding must be improved because they are essential for the support of sustainable urban mobility development.

Finally, the promotion of innovative and new markets is another aspect of modified governance thanks to SUMP. Indeed, the SUMP for Prague includes the will to introduce technical innovations for electricity powered buses and private vehicles, which means introducing electric vehicles, and to reinforce their infrastructures by increasing the number of charging point stations around the city.

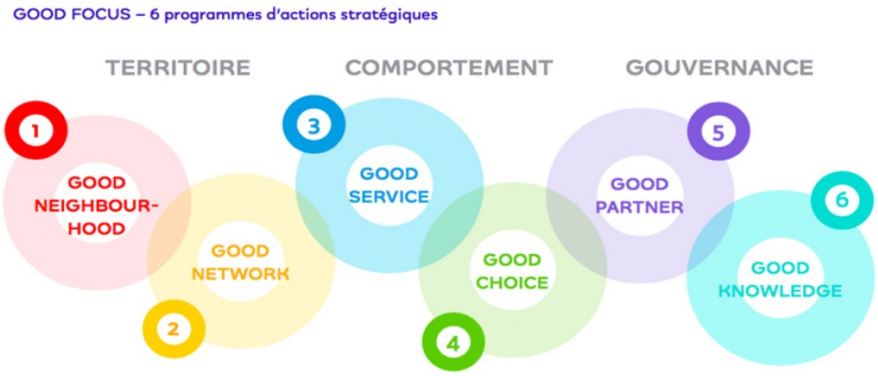
### 6.3. The Good Move Plan in Brussels

Brussels was chosen because it represents the “capital” of the European Union and a so-called forerunner city. The website is well structured and clear, and offers brochures of the plan in three languages, which are the main languages of Europe: English, French, and Dutch.

The plan for the region of Brussels Capital is called Good Move. It was approved in 2020 by the Brussels Government and aims at improving the living environment of the people of Brussels while promoting economic and social development.

The plan is based on a transversal approach to mobility, and aims at improving the standard of living of the people in the regions, while encouraging inhabitants to change their habits.

**Figure 6.2:** Good Move Plan actions in Brussels




Source: mobilite-mobiliteit.brussels. (n.d.). *Bruxelles Mobilité*. [online] Available at: https://mobilite-mobiliteit.brussels/fr [Accessed 28 Jan. 2022].

The plan is divided into six objectives, which are:

1. **Good Neighbourhood**

This objective aims at improving mobility in the neighbourhoods and strengthening the quality of life of citizens.

To reach this objective, a speed limit of 30km/h will be introduced to enhance safety on roads and the public transport which is free from traffic transit. The other proposal is to restore main public spaces by favouring citizen safety. Also, deliveries will be optimized by the promotion of dedicated spaces and bicycles deliveries.

2. **Good network**

The aim here is to handle the transport network and assure an efficient service through the road specialization.

To create a good network, some roads will be redesigned into multimodal urban boulevards and pedestrian paths will be built to link the regional centers. A network of cycling lanes will also be developed, and the regular frequency of trolleys and buses will be assured. An important aspect is to keep developing the public transport network by organizing vehicle ways to access the main logistic area of the city. Hold road infrastructures, footpaths and cycle lanes will be renewed and places of work will be organized to favor accessibility and reduce travel. Easy traffic flow will be boosted through a better control of traffic lights crossing.

3. **Good service**

This objective aims at offering inhabitants a wide variety of services. How?

The good service will be reached by bringing transport alternatives together both physically and digitally, with regards to information, booking, and payments. The quality, the availability of public transport linkages and services will be boosted, and the interconnection of different means of transport will be reinforced through the creation of hubs. The development of MaaS, which means "Mobility as a Service", will be sustained, which would be a single platform to enter all means of transport.

4. **Good choice**

This objective aims at making individual and collective decisions without undermining individual freedom. In which steps?

The good choice objective will be reached by linking urban innovations with the mobility deal, and by strengthening the access to parking tools. Automobile fees will be reformed in favor of more sustainable vehicles, and road transport tariffs will be developed. Charging infrastructures for electronic auto vehicles will be extended to favor the use of electric vehicles, and to encourage businesses to improve their orders and deliveries. Waterways will be promoted as a preferential way of transport in logistics.

5. **Good Partner**

This objective aims at ensuring partners to govern the mobility plan, by encouraging decompartmentalized collaboration between municipalities, the neighboring regions, the government, Europe, and stakeholders and by favoring citizens' participation.

6. **Good Knowledge**

This objective aims at collecting data regularly for evaluating the plan. How?

The good knowledge measure aims at evaluating the regional mobility policy by monitoring and adjusting the plan regularly, and by analyzing and sharing mobility data through administration of surveys about user satisfaction. The creation of a knowledge center about developments and innovation in mobility will be favoured, to draw a strategic vision for the automation of vehicles.

A great focus is put on cooperation between stakeholders at the federal, metropolitan, and municipal levels. The approach is one of a transversal level with synergy between regional and municipal stakeholders through multilayer programs. The mobility plan will be incorporated into the budgets and goals of operators, and the region will adapt the plan to the city of Brussels.

The document also offers concrete examples of execution of the plan, such as the development of:

- Newlines between Simonis and the Heysel Plateau with the renovation of public spaces on the route.
- Separate cycle paths and wide sidewalks on the small rings.
- Cyclist-pedestrian along the waterway and footbridges at the bridges.

**Evaluation of Brussels SUMP Plan**

Phase 1: Preparation and analysis.

The Good Move Plan for Brussels has the strength of providing the document translated into different languages, and this surely enhances the accessibility of the documental resources. The aim of the plan is to improve the living environment of the city of Brussels while promoting economic and social development. It adopts a transversal mobility approach that tries to involve the different actors at the national, regional, and local levels, but it does not provide a clear description of who are the actors, both stakeholders and political actors, involved in the process. A strength of the Good Move Plan is that the Belgium government allocates funds in favor of those cities that decide to develop SUMPs.

Phase 2: Strategy development.

The political and institutional ownership does not appear in the plan: it does not provide the description of a strong coalition of stakeholders, but only states that the cooperation between stakeholders and the federal, metropolitan, and municipal authorities is favored. The adopted approach is transversal, trying to create synergy between regional and municipal stakeholders through multilayer programs.

Phase 3: Measure planning.

Actions are divided into three categories: geographic, behaviour, and governance actions. The actions under the geographic category aim at improving the neighbourhood and the quality of life of citizens, and on the other hand to assure efficient transport network connections. The actions under the behaviour category aim at modifying citizens' habits by pushing them to choose alternative transport means. Finally, the governance category actions try to ensure the participation of political actors from the national and local level, but also of stakeholders and citizens in the development and implementation of the plan.

The actions are well divided into subgroups, but the schedule for each action is not clear, should they be taken together? It is not explained.
The scenarios described regard short-term measures, while the development of possible future scenarios based on the improvements thanks to the measures adopted is not provided.
A focus is put on the geographical and behaviour measure package, but this appears to be only partially developed. The explanation about why the city has adopted this type of division, and what is the consequence of developing sustainable mobility is unclear.
The measures about monitoring and evaluation should be improved by explicating the outcome, output, and input for each type of measure.
Finally, the financial funding and cost-sharing should be better described. An explanation is not provided about what will be the financial instruments for adopting SUMP measures, and what is the amount of funding necessary for each action.
Phase 4: Implementation and monitoring
SUMP monitoring and evaluation are not compulsory for the city of Brussels, the use of indicators for monitoring and evaluation is just encouraged. The evaluating bodies for the region of Brussels are identified in national, regional, and territorial political authorities.
Moreover, there is not a description about what the short-term and long-term actions are and how much time should be devoted to each action.

**Governance shifts due to SUMP**

SUMP for Brussels is surely a well-defined program in terms of the focus on mobility objectives. It tries to tackle all transport means according to the specific sub-types measures on the basis of governance, habits, and geographical scope. Instead, it is less clear about the collaboration between national and local authorities. Even if the aim is to create cooperation between stakeholders, citizens, federal, municipal, and local actors is clearly expressed, on the other hand, it lacks a genuine explanation of who these actors involved are.
The involvement of citizens in the process and the aim of enhancing awareness about environmental issues, is the main governance shift prompted by the program.

The SUMP has contributed to the establishment of a set of actions to improve public transport accessibility, the changes in citizens' behaviours and habits about public transport use, and the development of cooperation across political institutions.

In the specific case of the city of Brussels, the SUMP has helped the development of a plan for sustainable mobility by identifying Brussels as the functional urban area, and creating the conditions for stakeholders and citizens to participate in the development and implementation process.

It contributed to introducing better infrastructures for cycling and walking activities and to set speed limits in the city center. The introduction of mobility as a service system, helps users to use a single platform to enter all means of transport, with the aim of facilitating the use of public transport means.

Thanks to SUMP, the political authorities of the city of Brussels have decided to invest in improving mobility in the neighborhoods by introducing speed limits, boosting the public transport services, restoring public spaces, and strengthening the spaces and bicycles deliveries by making them a high-quality service.

SUMP will make it possible to introduce a good transport network that would give priority to the construction of cycling lanes and pedestrian paths, and will make workplaces more accessible through public transport. The interconnection of mobility services will be enhanced, and a better provision of charging infrastructure will favor the use of electric vehicles by travelers.

The city of Brussels with its Good Move Plans demonstrates to have a strong legislative framework that supports its SUMP program, and available funds for SUMP adoption, implementation, monitoring, and evaluation phases.

In each of the three cities, SUMP has an important impact on introducing innovative instruments at the local level and has contributed to modifying the habits of the citizens.

The strength of this program is in the potential to introduce innovative transport services that make public transport more accessible and sustainable. It helps create intermodally means of transportation and better access to public mobility for all social groups, including the most disadvantaged.

SUMP is efficient in developing innovative solutions that make urban mobility more sustainable while pushing citizens to change their habits.

The changes in governance due to SUMP implementation concern these main areas (European Commission, 2013):

Public transport services.

The provision of public transportation services is an important aspect of sustainable mobility planning because they offer a sustainable mode of transport and assure fairer access to transportation means, independently of citizens' economic capacities. Investments in transportation services play a significant role in the efficiency of the transport sector which has important effects on the economic system. Investments in vehicle fleets and their preservation is a clear driving factor in public transport appeal, because they ensure competition, security, and protection for people with disabilities. An inefficient plan in investment and preservation can have negative consequences and cause social costs. Sustainability plans also try to avoid negative problems such as gaps, congestion, accidents, air quality, and noise pollution.

Public transport coverage and public transport frequencies.

SUMP has the potentiality to increase the use of public transport by rising the uptake area of the public transport network and rising access to opportunities. One of the most important ways to make public transport more attractive than private means is to turn it as attractive as personal vehicles. This can be done if the changes that are accessible to passengers using a car are comparable to the opportunities offered by public transport in terms of job opportunities, leisure, shops, hospitals.

Interoperable ticketing, payment systems, and public transport pricing.

Pricing in transport services depends on the appeal of public transport services. A big effort has been made in Europe to make tickets interoperable and to develop European Electronic Toll Services. Making tickets and payment systems interoperable is an important aspect of continuous travel which has been identified as the priority to make public transport more attractive and car flow more fluid. These actions can be more or less efficient in boosting sustainable behaviors, depending on the management system in place, which are the welfare-maximizing travel structures and the profit-maximizing travel structures.

The most encouraging results come from welfare-maximizing travel structures by moving to more sustainable habits and enhancing actual practices.

Travel information provision systems.

Information in transportation facilities is an instrument to open to new users and planners. It is an instrument to improve transportation choices by taking sustainability into consideration. If people are informed about sustainable transport, they have the opportunity to choose means of transport with intelligence. The future transportation will be based on the availability of applications about real-time travel and traffic, and the chance to easily plan multi-modal journeys.

Taxi services (individual and collective).

Taxi services are viewed as a luxury or special transport services, but studies show how important they are in sustainability planning.

The high overturn of vehicles in the taxi services give the possibility to introduce new vehicle technologies, and to impact the sustainability of transport with positive impacts on congestion of cities. Firms are starting to provide alternative taxi services, such as bicycles for example, which would reduce traffic congestion and noise pollution.

Dedicated walking and cycling infrastructure and bike-sharing.

Infrastructure development in cycling not only means making cycling lanes safer but also sustaining bike-sharing. Nowadays, 80 cities in Europe have set different systems. However, 80% of bicycle sharing in Europe is concentrated in 4 countries: Spain, France, Germany, and Italy.

Experts show how measures for walking and cycling have important middle and long-term economic and social impacts.

Car sharing and carpooling schemes.

Car sharing schemes have been introduced as an instrument to reduce the necessity to buy a personal car, and provide a flexible alternative to conventional car rental services. These services do not mean a reduction in car use, but they tend to restrict vehicles ownership. They let drivers pay as they go.

Carpooling instead requires drivers to have their own vehicles. These schemes are important for corporate and school mobility plans, and they are growing as the internet allows the easy organization of pools.

Multimodal connection platforms.

The EC White Paper on a single European transport (2011) states that "no major change in transport will be possible without the support of an adequate network and more intelligence in using it". The paper asks for an efficient multimodal network in cities. Multimodal connection platforms represent a key element in this network. They not only contribute to better integration of urban transport services, but also represent a gate for national and international holistic transport. The European Road map for an integrated transport states that "a transformation of the European transport system will only be possible through a combination of multiple initiatives at all levels".

Park and ride areas.

Park and ride areas are a form of combined transport that is meant to optimize trips by allowing travelers to use their cars for the section of the trip that is not sufficiently served by public transport means. Moreover, they let travelers choose public transport to escape traffic congestion within city centers in peak hours. These measures enable better use of resources while decreasing congestion levels. The development of park and ride areas in different European cities has had high impacts on sustainability goals and has increased the efficiency of travel. They also provide the possibility to shift towards more sustainable transport means.

Road transport.

Road network investment and maintenance is a dual measure for sustainable mobility. On one hand, investment in road networks assures the proper functioning of the infrastructure, and the renewing and enforcement of security measures necessary for safe road transport. On the other hand, the maintenance of road infrastructures is essential for economic activities, and to assure the right accessibility levels for cities and their services. The European Union Road Federation (ERF) states that road maintenance is the core of transport policy and the key to improving social welfare in Europe.

Reallocation of road space to other means of transport, as dedicated bus lanes.

Reallocation of road space to other means of transport has the aim of encouraging public transport use via land use planning. In accordance with KONSULT database, the measures include: "*improving conditions for the efficient operation of public transport; locating land uses close to public transport services which serve them, and increasing the demand for public transport, particularly by encouraging mode change from the private car".* Studies show how employing road space for more sustainable means of transport has obvious effects on pushing passengers to choose public transport as they increase the quality of their service and the speed.

Parking management and pricing.

Parking management aims at influencing behaviors by regulating the ability of drivers to park their cars easily or cheaply after travels. For that reason, some European cities have used these measures to make parking costly and time-consuming. This helped control the number of cars in certain urban areas, and pushed people to choose public transport instead of private cars. Furthermore, parking management programs want to control parking supply and reduce the land use for parking infrastructures. Parking management is a powerful instrument to influence people's choice about means of transport because it restricts car use in certain areas, it eliminates parking issues and congestion issues due to parking shortage, and it increases incomes that can be spent on other mobility services.

Dynamic traffic management measures.

Dynamic traffic management measures want to increase safety on networks while regulating flows in real-time to avoid traffic issues. These tools require a high integration and coordination between traffic signals and real-time information about transport structures utilization. These instruments are used to get better traffic performance from a road network by lowering delays to vehicles and the frequency of stops and to weight capacity in a network, to engage or discourage traffic from particular ways or areas, to give precedence to specific categories of vehicles such as public transport.

Reducing travel time and enhancing good network performance can increase road capacity.

Low-speed zones.

Low-speed zones are part of traffic measures that employ physical and regulatory measures to lower cars' speed. These measures have impacts on drivers' habits while at the same time improving non-motorized travel.

Results suggest that traffic calming is successful in bettering the "livability" of streets, giving additional preservation to the local environment, and lowering the rate of accidents. It is less efficient in improving effectiveness and promoting the economy, but there is an overall positive outcome from the implementation of traffic measures.

Promotion of eco-driving.

Promotion of eco-driving aims at teaching drivers about how to use their cars in an efficient manner to curtail fuel consumption and fatalities. This measure works both for private and professional drivers. Cargo companies have established these actions to raise savings as a result of less fuel consumption, and lower accidents rate. Eco-driver campaigns have been performed in different cities in Europe and, according to the European Platform on Mobility Management (EPOMM) database, eco-driving lowers fuel consumption by 15 to 25%.

Access restriction schemes.

More and more European cities have become concerned in planning and implementing transport requirement management strategies based on regulating access to certain urban areas. Different access restriction strategies have been applied with different objectives. Some cities have focused their restrictions on environmental problems, others on traffic congestion and a few cities on increasing funding for environmental protection actions.

Urban pricing.

Space is a limited resource, and its assignment is a key element of urban transport and a big goal for assuring urban sustainability. Moreover, urban pricing is an instrument that aims at distributing road space to transport vehicles or private cars with high holding for the purpose of rising the transport capacity in a certain territory while lowering pollutants. Urban pricing is also used to limit access to certain zones of the urban area.

In this way, urban pricing reduces traffic volumes, lowers emissions from private vehicles, and aids in switching passengers to a more sustainable form of transport. This drives the economy to find a more efficient manner to envision mobility by escaping unsustainable customs and improving sustainable habits.

Low emission zones.

Low Emission Zones have the scope to encourage the implementation of cleaner vehicles and the use of newer most optimal motor technologies to lower pollutant emissions in certain areas of the city. Low emission zones are easy to enforce and, according to the mode of implementation, cheaper than other actions. The use of ICTs to supervise access to certain areas could quickly push up investments and conservation costs. Moreover, these areas have a high influence on pushing for a replacement and/or change of vehicle used in the area. It can also be used to favor stricter emission benchmarks. Experts see these actions as cheap and with high consequences on land use and health.

Investment in infrastructure for alternative fuels.

Following TransPord's (2009) analysis of various motor technologies and alternative fuels, there are two main branches where investments in infrastructures are needed. One sector is electric vehicle charging points and Compressed Natural Gas (CNG) and Liquid Natural Gas (LNG) charging stations. These two technologies are in the medium range of viability in the next 10 years. Hydrogen is achievable only in the long term.

Stakeholders and citizens' involvement.

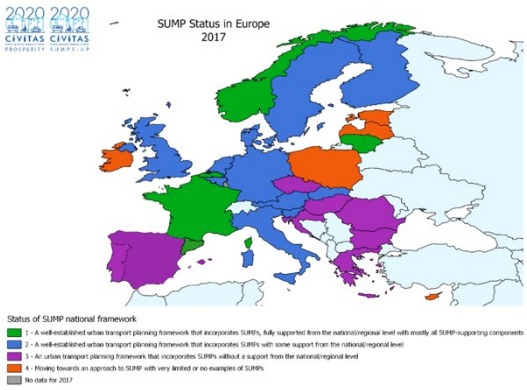
Public participation has five key goals: information exchange, education, support building, supplemental decision-making, and representational input. Making people participate in the process has several benefits: it makes the decision-making process more transparent, it increases mutual understanding between citizens and administration, it takes into consideration ideas, concerns, and practical points of view from the citizens, it strengthens knowledge, and it has positive effects on planning processes with a higher level of acceptability. There are several barriers to stakeholders’ and citizens' involvement, which consist of the absence of political will and support for implementing the participation process and a low preference for participation within the administration,

limited funds and personnel skills within local authorities to establish and handle an involvement process and to set its internal administrational process. There is also a lack of skills in planning and carrying out the participation process due to a lack of knowledge about the involvement tools, and this results in a fragmented set of actions for involvement. A "consultation fatigue" due to a low interest in transport planning measures among citizens and stakeholders, difficulties in changing behaviors, and the lack of participation practice in Eastern European countries, where institutional culture is still based on low participation of citizens and stakeholders in the development of transport planning policies.

Even though high-quality SUMP aid for local authorities has been developed, only a small number of European cities have implemented SUMP.

Below is a map of EU Member States and their status of implementation of SUMP in 2017 (Thomas Durlin, 2018). It is important to increase the SUMP adoption rate to achieve mobility goals such as better air quality, higher accessibility and mobility, safer roads, less traffic noise, higher energy efficiency, and better connectivity of the transport system. Cities need to receive better advice, support, and easier access to financial instruments to be able to start SUMP with the support of national governments.

**Figure 6.3:** Status of SUMP in the EU Member States in 2017




Source: Thomas Durlin (2018) "European Programme for Accelerating the Take-up of Sustainable Urban Mobility Plans", *SUMPs-Up,* pp. 1-408

Why there is a different degree of implementation of SUMP between the Member States, and what are the obstacles to the development of SUMP?

There are several obstacles to the development of SUMP both in the elaboration and implementation phases. The first one is that it is difficult to create cross-administrative cooperation between political actors at the local, regional, and national levels because

there is often inadequate national support and regulatory framework due to a lack of political interest. Another issue is the lack of ability to establish the priorities in coherently implementing measures with the SUMP concept, and the accessible resources and an absence of data for evaluation of measures.

There are some aspects that create difficulties in encouraging SUMP from a national perspective. These aspects include a lack of cooperation between core national bodies and a lack of awareness at the national level, and generally low interest about SUMP concepts among political actors at all levels. The professionals with the right skills to formulate a SUMP are normally lacking, and the funding from national, regional, and local actors both for implementation and development of SUMP actions tend to be scarce.

Moreover, there is a persistent strong approach in favor of traditional transport plans, based on investments in infrastructures and motorized traffic which are preferred rather than actions promoted by SUMP. Finally, to successfully implement SUMP it is necessary to access EU funds.

### 6.4 Requirements for Successfully Implementing SUMP

For an efficient implementation of SUMP some aspects should be clear, these aspects are:

Ministry in charge of urban mobility planning.

It is relevant to identify which ministry and agency are responsible for the urban mobility plans and how their duties are divided. Usually, the ministry in charge is the Ministry of Transport, in other cases, it could be the Ministry of Environment or the one of infrastructure. Usually, there are two of three ministries that cooperate on mobility plans. However, the risk is that if there are too many ministries involved in a plan, it could create a risk of having mixed or inadequate levels of consciousness among stakeholders.

Having a single ministry in charge of urban mobility planning means a higher level of awareness, while having two or three ministries creates a mixed situation with a ministry more responsible about sustainability (usually the Ministry of Transport) and other two that are less familiar with sustainability issues (such as the planning, environment and funding ministries).

As far as the three cities taken into consideration are concerned, the country of Belgium is expected to belong to the group of forerunner countries because it is one of the most developed EU Member States, and its capital Brussels can also be considered as the heart

of the EU. The Good Move plan for Brussels appears indeed clear in explaining what type of actions will be implemented to enhance the quality of public transport, accessibility to the means of transport, and to favor the change in citizens' habits. But it is in the Prague SUMP that we find a punctual and clear description of the development of integrated public services, new connections in the metro network, the percentage of the expected reduction of GHGs emissions, and the measures for a better organization of the urban space.

On the other hand, Brussels shows a high level of awareness about SUMP concept. Belgium belongs to the 12% of European Union Member States in which stakeholders are “mostly familiar” or “very familiar” with the SUMP concept, while in the 25 % of other European Union Member States awareness about SUMP goes from “limited” to “clearly insufficient” as the case of Eastern European countries, such as Poland. Another 25% of countries have a mixed situation in which the ministries involved in mobility plans have different awareness about mobility situation, as the case of the Czech Republic.

Prague belongs to the group of engaged cities and shows a strong commitment to SUMP development to increase the sustainability of the city, favor cooperation across institutions and citizens' involvement, provide a short and long-term vision about measures for sustainable transport, and move towards the development of all means of transport.

A relevant aspect to consider for understanding SUMP commitment in a region is how many cities are involved in implementing a SUMP because it represents an indicator of the level of interest of the region in sustainable mobility. The major givers are countries where the adoption of SUMP is made compulsory or supported by consistent funds, as happens in Belgium. The cities in which a higher number of SUMPs has been registered are those cities with a long tradition of urban mobility planning Brussels.

On the other hand, the Czech Republic and Poland show a great increase of cities that are involved in implementing their first SUMPs. According to the publication by Thomas Durlin (2018), in the region of Brussels in Belgium, the number of adopted SUMP in 2017 was 1 and the number of first SUMP elaboration was 0. In the Czech Republic, the number of adopted SUMP in 2017 was 3 and the number of first SUMP elaboration was 7. Finally, in Poland, the number of adopted SUMPs in 2017 was 10 and the number of SUMPs elaboration was surprisingly 30. Since the city of Wroclaw still has a rudimentary

SUMP, cities in Poland are showing a strong commitment to adopt sustainable mobility plans that do not yet receive the proper support.

Finally, Wroclaw belongs to the group of active cities and regions being still at the early stage of development of SUMP, showing a lack of support from national and regional bodies. Its SUMP is at a phase for which it does not provide long-term visions for implementation of actions, and the cooperation between stakeholders and political authorities and citizens involvement is poor. It does not provide a clear plan for the improvement of sustainability of the urban area, and the measures and actions are presented in a confused and partial manner.

## 7. Conclusion

The European Union's approach towards transport policies has changed significantly in the last ten years, becoming progressively greener. The transition toward sustainability starts gradually with the introduction, in the first Environmental Action Plan (1973), of the idea that the environment is something to take into account and protect in the policy adoption. This idea is embodied in the Environmental Policy Integration (EPI) principle, which was included in article 6 of the Amsterdam Treaty, to establish the practice of connecting the EU economic goals with social development and environmental protection. In doing so, the Commission intended to introduce a "first-order" principle to guide the transition toward sustainability by developing the idea that environmental goals must be included in all steps of policymaking, also in non-environmental policy fields, to reduce the conflicts between environmental and sector-specific policies.

The transition toward a sustainable transport policy also meant a change in the Commission's approach to pollution issues. Indeed, before the 1980s, the approach focuses on remedial action instead of preventive action. In 1987, the legal base for an environmental policy was non-existent, the only available environmental legislation was in function of an economic balance. The Commission adopted a limited approach towards sustainability until 1992, restricted to development of general regulatory principles to build a gradual commitment toward sustainable mobility policies. After 1992, the Commission's approach toward environmental policies became stronger, thanks to the introduction of soft-policy instruments based on the NEPIs logics.

Only in 1993, through the White Paper on "Growth, Competitiveness, and Employment", the Commission promoted the use of market-based instruments which would also consider environmental costs. In the beginning, the environmental instruments were of three types: environmental taxes, which allowed the introduction of an Energy Products Directive (2003) that pushed national measures toward a minimal convergence on price levels on minerals, coal, natural gas, and electricity while raising minimum prices for oil products.

The second type was voluntary agreements which represented a less interventionist approach to sustainable development. They do not set mandatory minimum standards, but allow Member States to decide how to reach objectives and timetables.

Finally, the eco-labels schemes, represent non-binding voluntary policy instruments. They were soft-policy tools that relied on moral suasion and introduced moderate constraints on market actors if compared to traditional legislation or eco-taxes.

However, the concept of "sustainable mobility" was introduced in the "White Paper on the Future Development of the Common Transport Policy", on 2 December 1992.

In 2006, the Commission introduced plans for better logistics and the use of intelligent transport systems and urban mobility, but it is with the introduction of the Action Plan on Urban Mobility, and the 2011 White Paper entitled "Roadmap to a Single European Area – Towards a Competitive and Resource-Efficient Transport System", that for the first time a set of binding requirements to be respected by European Member States in favor of a transition towards more sustainable transport was introduced.

Only in December 2020, the Commission approved the Sustainable and Smart Mobility Strategy to make transport more sustainable and smarter.

The transition toward a European greener transport policy culminated in the development of the two main EU environmental policies: the Green Deal (2019-2024) and its Smart and Mobility Strategy, and the Clean Transport, Urban Transport policy (CTUT).

With the European Green Deal, the EU Commission established for the first time a strategy to face climate change and environmental deterioration, which has become a central Commission priority for the period 2019-2024. The European Green Deal is the core environmental program that set the same targets present in the SUMP, and that aims to increase the health of citizens by providing accessible clean public transport services. Thanks to this program, the Sustainable and Smart Mobility Strategy was developed by the EU Commission to make transport more sustainable, develop a multimodal transport system, and offer the right instruments for improving the accessibility to public transport means for travelers.

The Sustainable and Smart Mobility Strategy was indeed introduced in the European Green Deal (2019-2024), and the measures promoted by the strategy are very similar to the principles and actions boosted by the SUMP for what concerns the transition toward more sustainable mobility, and the provision of the right incentives for this transition.

In particular, the Sustainable and Smart Mobility Strategy favors the increase of low and zero-emissions vehicles, and the deployment of renewable and low carbon fuels infrastructures.

The EU Commission is using the SUMP instrument, an innovative NEPI instrument, to provide cities with the right tools and incentives to concretely apply the principles already promoted in the Sustainable and Smart Mobility Strategy.

The second EU sustainable transport policy is the Clean Transport, and Urban Transport policy (CTUT). Under this policy, we find the definition of SUMP that has appeared for the first time in the European Urban Mobility Package of 2013 under the CTUT policy.

This policy is relevant for the introduction of an innovative concept, the "urban area", as the target of action for the adoption of sustainable mobility measures. The SUMP instrument applies the same logic of considering the *urban area* as the space on which to formulate a specific strategy of transition towards sustainability, based on an analysis of the peculiar characteristics of the city.

The SUMP instrument represents a novelty within the traditional NEPIs in several aspects.

Differently from NEPIs that were limited to creating compatibility between transport and non-transport policies, the SUMP is focused on favoring coordination between policies through an ex-ante evaluation of the necessities and funds available in the city or region, thanks to the promotion of interaction between policymakers and stakeholders for finding sustainable transport solutions. SUMP goes beyond NEPIs in introducing the concept of the *sustainable urban area* as the space of action for the implementation of a transport plan.

However, the major innovation introduced by SUMP is the importance given to the social aspect, that consists in the adoption of a flipped approach for the collection of opinions, beginning from citizens, and funds, from upwards toward stakeholders.

In this way, SUMP gives the possibility to decision-makers to develop a plan which is meant to satisfy the specific needs of the urban area by starting from the practical transport issues of the city expressed by its commuters.

It is in the concept itself of Sustainable Urban Mobility Planning, the promotion of the public involvement from the very beginning of the transport planning process, and not in a second phase when the plan is already formulated.

Lastly, a SUMP does not focus only on a single typology of means of transport, but deals with all aspects of public mobility, from the public transport to the shared mobility, by

simultaneously monitoring and evaluating the introduced measures packages through the use of measure-level indicators.

SUMP is a well-designed document that considers the social, economic, and technological needs of a city and results, for this reason, in an innovative instrument in several aspects. It has established a paradigm for which the emphasis is on the accessibility of transport, the development of all transport modes, the creation of incentives for cyclists and pedestrians instead of private car use, and the development of travel time reliability.

Whereas traditional transport plans focus on offering the necessary space for new cars and transport places for citizens with the necessity to move to the city center, SUMP sustains public transport and active transport (such as walking and cycling) and, at the same time, restricts private car use. Transportation affects urbanism and for this reason SUMP also focuses on the improvement of transport plans which should build more livable areas for citizens to live and work, through the elimination of invasive transport infrastructures. A mix of measures should handle emissions, urban traffic, and better public transport and in this way support the Green Deals objectives for climate change mitigation. SUMPs are applied by member states according to the principle of subsidiarity.

First of all, SUMP is especially focused on improving urban logistics to make urban transport better connected and efficient through the introduction of platforms for cooperation, exchange of data and information, and the development of logistics solutions based on Intelligent Transport Systems. It aims at introducing measures to increase the accessibility to urban areas. Travel becomes smarter due to the use of online ticketing and “vehicle to vehicle” or “vehicle to infrastructure” communication systems.

Another peculiar aspect of SUMP is its “circular method” that consists of four main phases, with each phase made up of three actions. The four phases spell out the main steps for project development: the preparation and analysis phase, the strategy development phase, the measure planning phase, and the implementation and monitoring phase. It first begins with an analysis of the current situation, then it follows the development of a strategy of implementation and the setting of targets, to finally reach the identification of the most appropriate actions to take and the identification of the funds to finance them.

This approach has the benefit of providing project coordinators with a clear plan of action for the transition toward sustainability.

The EU Commission is using the SUMP instrument to translate the actions of its main sustainable policies, that is the EU Green Deal and the Clean Transport, Urban Transport (CTUT) policy into practical measures for favoring cities to develop sustainable mobility solutions.

SUMP concerns the progress of transport for creating balanced transport and improving interconnections. This would not mean that improved transport will be faster but that it will increase safety, costs and reduce the need for private car use.

The difficulty of applying the SUMP instrument relies on the challenge of agreeing on clear policy strategies for sustainability which concerns concrete issues that need to be fixed through a "sophisticated policy mix" (Jordová, R. and Foltýnová, 2021) such as the regulation of prices, a redesign of public spaces and new infrastructures.

An important aspect of a successful implementation of sustainable transport in cities is the active support from citizens, which can be reached through proper communication between transport specialists and society. The effectiveness of SUMP relies on the capacity to create public and private partnerships of citizens and stakeholders to favor a real sustainability transition that will create a greener EU transport policy. It is important to investigate how transport systems are seen by relevant actors and how politicians and the use of transportation by citizens, play a vital role in achieving sustainable transport systems. The creation of sustainable transport should be transposed into plans and policies which focus on travelers and create the circumstances for a sustainable mode of life.

Although some transport-related issues persist – such as parking and the consequent space consumption, traffic congestion and emissions, and also safety and health problems – new themes have appeared that need to be understood and accepted by policymakers and citizens.

The analysis of mobility plans in Wroclaw, Prague, and Brussels demonstrates that SUMP is an effective instrument in increasing awareness about environmental issues, both among political actors and citizens. SUMP provides inputs for the improvement of public transport, and it represents a strong incentive for the mobilization of political actors and stakeholders in implementing measures for sustainability. It offers a scheme of actions to follow for those decision-makers that decide to develop a plan for sustainable mobility

which can include measures for the reconstruction and improvement of means of transport, but also transport modifications that will boost travelers' safety or make transportation accessible for all.

In the city of Prague, the formulation of a SUMP has made decision-makers aware of the need to reconstruct the rail and road infrastructures, develop parking zones, and to make public transport a priority for pushing citizens to opt for public means of transport instead of their private cars. The adoption of SUMP has also shown the opportunities for creating an integrated transport system for the city of Prague by creating a full integration of public transport in the Central Bohemian Region, thanks to the deployment of an application that will give travelers the possibility to buy and handle tickets online.

Thanks to SUMP, the advantages of developing a system of public transport and shared mobility that can give travelers the possibility to stop using their private cars for reaching places are made clear, and this incentivizes decision-makers to transform their cities by developing a better system of transport which has, as side effects, the reduction of GHGs emission and consequently improved public health.

As far as the SUMP for the city of Brussels is concerned, the focus is on travelers' habits. Thanks to the SUMP method, the city has had the inspiration to rethink the mobility in the neighborhoods through the specialization of roads, and to assuring an efficient transport network that will enhance the quality of life for citizens. The mobility innovations are thought to digitalize transportation information, payments, and booking with the scope of giving incentives to travelers for opting for public transport. To favor the use of sustainable vehicles, the city of Brussels will, thanks to the SUMP instrument, formulate a plan for providing recharging infrastructures for electronic vehicles and introducing fees for road transport.

SUMP represents the future for the formulation of urban mobility plans being based on an approach that tries to reach sustainability gradually, by introducing travel solutions that can be first accepted by citizens and then transformed into their habits. Being the transition to sustainability in transport is very difficult to reach, I think that the SUMP approach can become a strong tool in the hands of decision-makers that decide to act for sustainability.

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