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Sprout

Sustainable Policy RespOnse to Urban mobility Transition

D2.2: Current state of urban mobility

Work package:	WP 2 - Understanding transition in urban mobility
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SPROUT Project Profile

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Glossary of terms and abbreviations used

Abbreviation / Term	Description
AFC	Automated Fare Collection
BKK	Budapesti Közlekedési Központ / Centre for Budapest Transport
BMT	Budapest Mobility Plan
CERTH	Centre for Research and Technology Hellas
EU	European Union
GA	Grant agreement
IoT	Internet of Things
HS2	High Speed 2
KPI	Key performance indicator
LRT	Light rail transport
MaaS	Mobility as a Service
MT	Million Tonnes
NTLP	National Territory Landscaping Plan
SPROUT	Sustainable Policy Response to Urban Mobility Transition
SULP	Sustainable Urban Logistics Plan
TAP	Transport Action Plan
TD	Transition Driver
UCC	Urban Consolidation Centre
UK	United Kingdom
USA	United States of America
VUB	Vrije Universiteit Brussel
WP	Work Package
ZLC	Zaragoza Logistics Center

1 Executive Summary

This deliverable presents an overview of the urban mobility situation in the 1st and 2nd -layer SPROUT cities. The data used for this deliverable was collected by representatives of the cities themselves, based on the template that was presented in Deliverable D2.1. The data has been compiled to establish a profile of each city, including information on the main IDFWRUVLQLFDWLQDFKDQHLVFXUUHQWOLQURJUHVVLQWKHFLW\XUEDQPRELOLW\HQLURQPHQW the main impacts which are currently unclear and therefore are not being addressed (or are inadequately addressed) by the current urban policy elements/instruments, as well as information on the pilots that will run the in the 1st ± layer cities.

For the 1st-layer cities, various main challenges in the current state of their urban mobility appeared. Kalisz and Valencia both struggle with urban freight logistics, with the latter additionally experiencing important congestion in the morning. Padua is unsure about the possibly disruptive medium- and long-term impact of new technologies like cargo-hitching, whereas Budapest encounters challenges with new modes of shared mobility. Lastly, Tel Aviv seeks to understand how to optimally allocate public space among all users, with a specific focus on vulnerable ones. :LWK WKH DLP WR SXW WKH FLWLHV¶ SURILOHV LQ FRPSDUDWLY perspective, this deliverable also contains a benchmark, which was established using the .3,GDWDWKDWWKHFLWLHV¶UHSUHVHQWDWLYHVJDWKHUHG

Even though data availability remains an issue, it can be concluded that the cities show very large differences in many aspects, including population, economics, land use, accessibility, traffic, infrastructure, urban passenger transport, active transport and urban logistics. It is therefore difficult to distinguish clear patterns among the cities. Nevertheless, certain city-specific peculiarities can be noted. Arad, for example, has very high mobility prices (price petrol, price of public transport tickets) when calculated as a percentage of income. Minneapolis has a remarkably high car use rate for trips within the city (over 80%). Tel Aviv stands out in the sense that all types of shared mobility are available, while in other cities (Arad, Almeida, Ioannina), no shared mobility systems exist.

2 Introduction

2.1 SPROUT project introduction and aims

SPROUT provides a new city-led innovative and data driven policy response to address the impacts of the emerging mobility patterns, digitally-enabled operating & business models, DQWUDQVSRUWXVHUV¶QHHGV3UHYLRXVOWHVWHGDQLPSOHPHQWHGSROLF\UHVSRQVHVHPSORLQ access restrictions, congestion charge or infrastructure provision seem unable to address adequately the changes underway in the urban mobility scene. Furthermore, any policy responses should take into account all stages of the policy lifecycle and should have an eye not only to the present but also to the future.

Therefore, starting from an understanding of the transition taking place in urban mobility, SPROUT will define the possible impacts at the sustainability and policy level, will harness these through a city-led innovDWLYH SROLF\ UHVSRQVH ZLOO EXLOG FLWLHV¶ capacity to identify, track and deploy innovative urban mobility solutions, and will navigate future policy by channelling project results at local, regional, national and EU level. To achieve its goals, SPROUT will implement 6 city pilots (including Ningbo in China) with real-life policy challenges as a result of urban mobility transition in both passenger & freight, covering urban and peri-urban areas, different emerging mobility solutions, and context requirements.

The project pays special attention to the needs of vulnerable groups and users with different cultural backgrounds, taking also into account gender issues. SPROUT ensures an active participation of numerous representatives from authorities of small and medium-sized cities. In SPROUT, a 3-ODHUVWUXFWXUHRIFLWLHV¶HQJDJHPHQW is applied (figure 2.1.1), with 1st ± layer cities running pilot project, of which the transferability is validated in 2nd ± layer cities and a 3rd layer of cities that actively participate in further validating and disseminating project outputs.

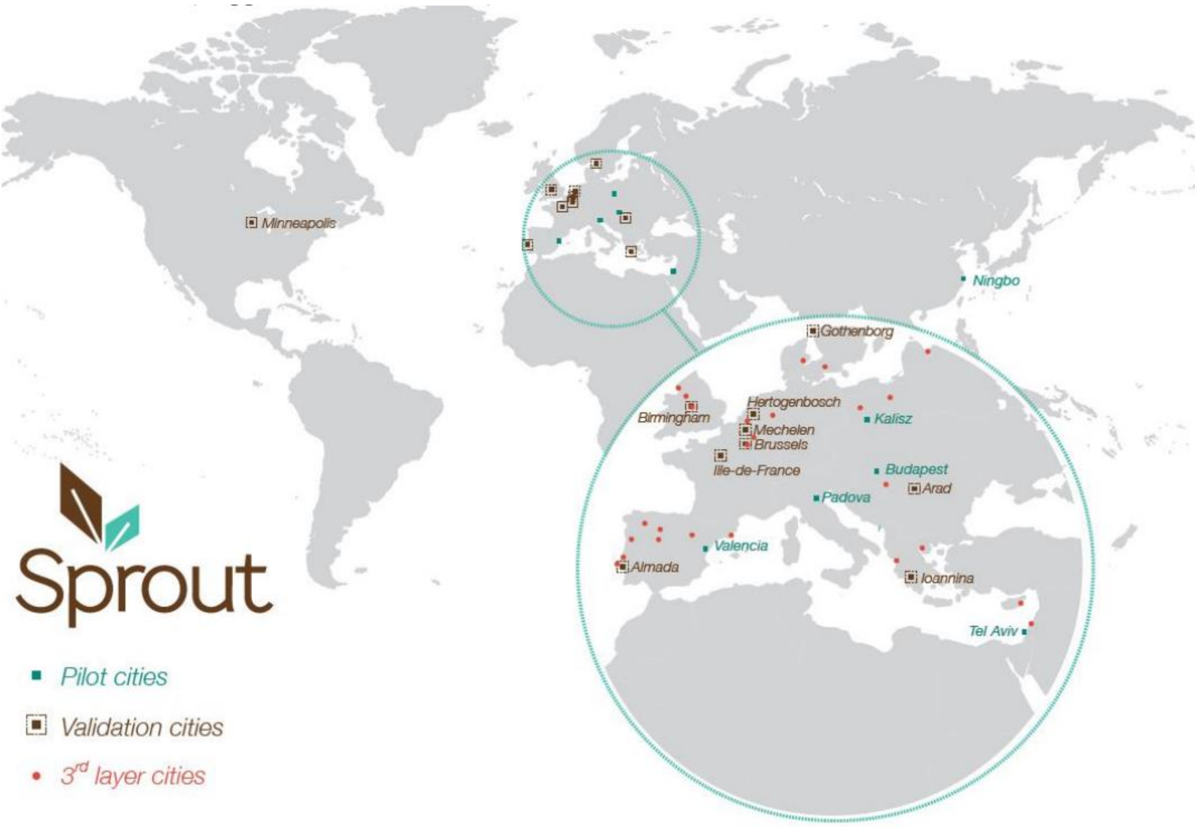

Figure 2.1.1. Cities actively involved in SPROUT

2.2 Aim of the deliverable

This deliverable is the second deliverable of WP2 of the SPROUT project, presenting the results of task µ&XUUHQWVWDWHRIXUEDQPRELOLW\¶7KH first phase of the SPROUT project is dedicated to constructing a general overview of the current status of urban mobility (passenger and freight) in the SPROUT cities. The goal of this deliverable is to present the data that was collected based on the urban mobility transition inventory, which was developed in Deliverable 2.1, i.e. a set of key performance indicators (KPIs) that can describe the current urban mobility system and its transition. Furthermore, the data is analysed and compared across the SPROUT cities to establish their profiles.

2.3 How this deliverable relates to other deliverables

This deliverable builds upon Deliverable D2.1, which presented the template according to which the data from the different SPROUT cities was collected. The results presented in this deliverable present a general knowledge base about SPROUT cities that will be used in the subsequent tasks and work packages, such as the construction of scenarios in WP3 and the monitoring of the pilots in WP4.

2.4 Structure of the deliverable

The remaining chapters of this deliverable will first discuss methodology, i.e. how the cities and local scientific partners were guided in the process of data collection (Section 3). Then, individual profiles of 1st-layer cities are presented (Section 4) and 2nd- layer cities (Section 5). This is followed by a benchmark chapter in which the cities are thematically compared to one another. The deliverable ends with a synthesising conclusion.

3 Methodological guidance for cities and local scientific partners

3.1 Data-driven approach

To achieve its objectives, SPROUT embeds a data-driven approach that aims at integrating data sources and data sense-making tools to support urban mobility policy making with adequate evidence, and ultimately enhance the knowledge and policy-making capacity of the cities (figure 3.1.1). The present report consists part of this approach and contributes by providing data and KPIs in five areas of urban mobility: population & economy; land use & accessibility; traffic; passenger & active transport; ftoham[(.)] TJETBT1 0349.7534.89 578.74 Tg[( )] TJET E

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also includes the transition drivers and barriers they could select and give further detail (see Deliverable D2.3 for the results).

For coordinating the work follow-up and support meetings were organized in two rounds (15 ± 17 October 2019), depending on the availability of the cities. For the first round, most cities had already read the document and asked some questions related to the KPIs. During the second round, all the questions compiled from the different 1st round meetings were mentioned and clarified.

Table 3.2.1. First round meeting questions.

Question	Response
When is the deadline? Is it possible to send further detail after the deadline?	The due date is 8th November. It is possible to send further detail after the date but try to fill as much as possible.
What happens if data is not available or is not as accurate?	If data is not available, indicate the reason (e.g. bike sharing is a service not available in the city). If it is not measured, but it is possible to estimate the value, do so and give further detail in the comments. It is possible to use some studies or news.
What happens if current mobility plan or data available is from several years ago?	Indicate the year. If there is some additional document with updates, indicate too.
Is it necessary to provide the documents or just indicate the source?	Just the source.
Commuting KPIs. Difficult to differentiate between both.	Adjust the definition if necessary or calculate just the value is available
Prize of parking: asked if street level or underground	Indicate both
GDP available at national level and other data at local level. Is a problem?	Indicate the geography level of all the sources and technical partners will check.
What happens if some KPIs is not disaggregated as fatalities and accidents?	Indicate
PM is available in Kg and not in micrograms. What to do?	Indicate is in kg.
Environmental KPIs cannot be disaggregated by source. What to do?	Indicate.
Data is not available for KPI25 and	Suggested asking some LSPs or LSP association for estimated values.

KPI26	

4 Current state of mobility in 1st-layer SPROUT cities

The 1st-layer cities are those cities where the project use cases (pilots) will run, the sustainability and policy impacts of innovative/emerging transport solutions will be assessed, and city-specific policy responses to harness these impacts will be tested and assessed. These cities include: Valencia (Spain), Padua (Italy), Kalisz (Poland), Budapest (Hungary), Tel Aviv (Israel), and Ningbo (China), though the latter is not discussed in this deliverable for reasons of data unavailability. This section presents profiles of each city, based on the information that was provided by the cities using the template that was developed in task 2.1. For 1st- layer cities, this includes sections on the main factors indicating a change is currently in progress in WKH FLW\¶V XUEDQ PRELOLW\ HQYLURQPHQW, the main impacts which are currently unclear and therefore are not being addressed (or are inadequately addressed) by the current urban policy elements/instruments, as well as detailed information on the pilots that will be run in the respective cities. The detailed datasheets for each city can be found in the Annexes.

4.1 Valencia (Spain)

4.1.1 Introduction

Valencia is the third-largest city in Spain after Madrid and Barcelona, with 791,413 inhabitants (2018) and an area of nearly 138 km^2, of which around 62.5 km^2 correspond to the city proper. Its metropolitan area extends beyond the municipality limits, adding up nearly 76 towns and a population of around 1.8 million people. Valencia is located on the east coast of the Iberian Peninsula, in front of the Gulf of Valencia on the Mediterranean Sea. It is the capital of the autonomous region of Valencia (see figure 4.1.1).

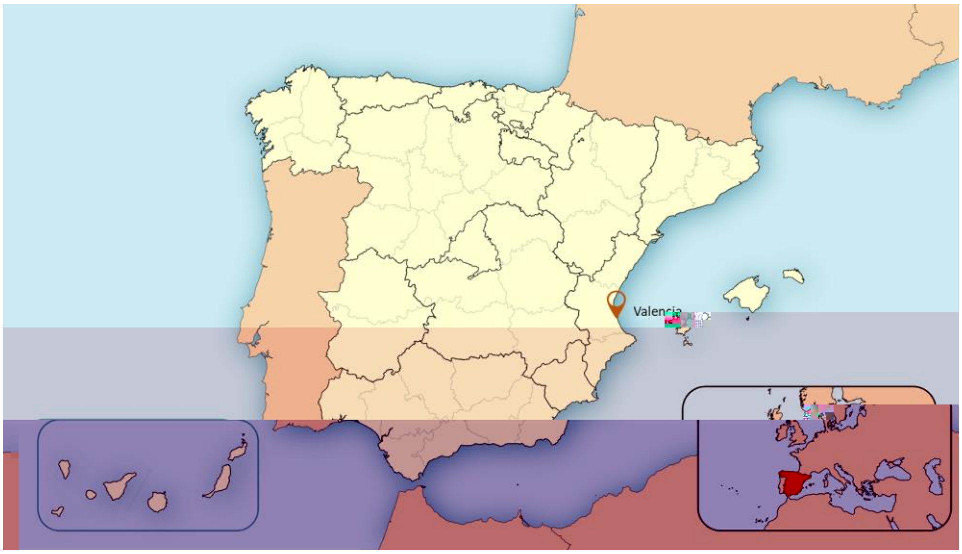

Figure 4.1.1. 1st-Layer city: Valencia (Location)

This city pilot is intended to test an intermodal urban passenger/freight node for collective public & private transport. Its corresponding validation (2nd-layer) city is µVHertogenbosch, the Netherlands.

4.1.2 Main factors indicating a change is currently in progress in the city's urban mobility environment

At the regional level, in 2011, the Valencia Regional Government established a legal framework for improving the mobility of citizens (region inhabitants) through the promotion of sustainable urban planning and management. The three main objectives of the law are as follows:

- Establishing the criteria for promoting mobility, but also taking into consideration road safety, sources of energy, urban landscape and environment.
- Regulation of public transport services.
- Regulation of transport infrastructures and logistics.

At the local level, in December 2013, the Sustainable Urban Mobility Plan was implemented. It aims to boost the use of efficient transport vehicles, to promote renewable sources of energy and to reduce energy consumption. One of the most important objectives is to reduce the traffic congestion in the city centre, especially during the first hours of the morning when the commercial premises open. This strategic objective will be achieved by the implementation of the following specific policies:

- Increase the number of areas for loading and unloading, especially in those places where a lack of service or a high degree of congestion are detected.
- Increase the vigilance of the loading/unloading areas trying to avoid unauthorized parking in these zones, even though for a short time parking.
- Use of the available new technologies to create a distribution and delivery system capable of reducing the number of journeys, the length of the routes as well as the time needed to complete the operations.

In addition, the specific policies regarding urban freight logistics, included in the urban mobility plan of the city of Valencia, also establish the following cross-cutting strategies:

- Increase the use of the new technologies for the management of the urban mobility.
- Integrate the urban design using new criteria for sustainable mobility.
- Communicate and promote sustainable mobility.
- Reduce carbon emissions from transport vehicles and operations.
- Coordinate the urban mobility infrastructures within the land-planning procedures.

The main point of this urban mobility plan is to encourage the most sustainable transport modes which are: walking, the use of bicycle, and public transport. The development of the strategic lines of these transport modes corresponds to the core of the urban mobility plan of the city. The measures needed for private vehicles and the cross-cutting measures have been defined according to the previously mentioned main strategic lines.

The structure of the actions that have to be adopted in the urban mobility plan of Valencia is divided into three different groups depending on its relevance: strategic lines, actions programs and specific measures. Figure 4.1.2 explains the implementation of the strategic lines and the action programs regarding the urban freight logistics and cross-cutting strategies of the urban mobility plan of Valencia.

Strategic Lines	Action Programmes
Structure the urban roads under criteria of sustainability	Reorganize and give hierarchy to the urban roads under criteria of sustainability Structure plan for the city centre
Calm the traffic in the city	Increase the extension of the "area 30"
Reorganize the parking area	Reorganize the parking area especially in conflict areas
Improve the loading and unloading operations in the city	Increase the areas for loading and unloading operations Implement UE recommendations and apply new technologies for the management of the urban freight mobility
Apply the new technologies to the urban mobility	Integration of the mobility information Extend Smart Cities Technologies
Integrate the urban design with sustainable mobility criteria	Design of the urban system under sustainable mobility criteria
Promote the sustainable mobility	Campaigns to promote and communicate the benefits of sustainable mobility
Descarbonize the transport system	Use low emissions, hybrid or electric vehicles
Coordinate the urban mobility infrastructures within the land-planning procedures	Coordinate the urban mobility infrastructures within the land-planning procedures

Figure 4.1.2. 1st layer cities: Valencia's strategic lines and action programmes

)RU IRVWHULQJ WKH FKDQJH RQ FLWL]HQ PRELOLW\ EHKDYLRXUV E\ IRFXVLQJ RQ PRELOLW\ SROLFLHV WRZDUGV PRUH HQYLURQPHQWDO WUDQVSRUW PRGHV 9DOHQFLD¶V F\FOH QHWZRUN KDV EHHQ H[WHQGHG by more than 75% in the previous years, to a total length of 145 km in 2018, while also improving the interconnection between the cycle lanes of different areas and developing a cycling ring in the city centre. Furthermore, new business models have been tested to improve the use of bikes; in particular, Valencia counts on a public bike sharing system created in 2010 with 275 stations and 2,750 bikes. Thanks to this experience, other neighbouring towns have also implemented public bike systems. These measures have led to an increase in bicycle use of over 15% in the last year and a 2.7% decrease in total traffic in the city.

In urban freight transport, new business models have been also tested to improve the last mile distribution using tricycles. Nowadays, there are several companies that have implemented this kind of last mile distribution that can save around 2 tonnes of CO_2 per year and tricycle according to the pilot experiences.

As a follow-up, the city of Valencia is strongly interested in continuing to introduce new transport services and/or blending them using new business models, in order to reduce CO_2 emissions, noise and congestion in the city for both passenger and freight transport.

4.1.3 Main impacts which are currently unclear and therefore are not being addressed (or are inadequately addressed) by the current urban policy elements/instruments

The implementation of the urban mobility plan of Valencia in 2013 improved the previous situation regarding the problem of urban freight logistics. However, there are still some aspects that must be improved in order to increase the quality of life of the citizens and reduce the strong impact in the urban environment. Some of the most critical aspects are:

- In some areas of the city, there are not enough dedicated loading/unloading bays for the urban freight distribution. This situation is also motivated because commercial premises do not apply, and demand reserved places.
- Some of the most important avenues of the primary network do not have parking places for any type of vehicles. This situation also disturbs the loading and unloading operations.
- In some cases, the access of the delivery vehicles to the pedestrian areas and the historic centre generate conflicts with pedestrians, especially when distribution operations are performed outside of the planned timetable.
- Traffic interruptions and congestion due to delivery operations.
- Traffic violations of private vehicles that do not respect the loading and unloading reserved places although they are clearly indicated.

4.1.4 Conclusion

9DOHQFLDV6XVWDLQDEOH8UEDQ0RELOLW\3ODQ was defined in 2013 to move the city towards a more environmental and liveable city. One of its main objectives is to reduce traffic congestion from private and freight transport. More kilometres of bike lanes, improved mobility services and service models are helping in changing the travel behaviour and passengers with the goal to reduce private car usage. However, freight transport can be considered one of the weakest points of the SUMP. As most cities, Valencia was not designed to accommodate the increased demand for goods deliveries and 21st century sustainability challenges. Valencia`s pilot aims to create an intermodal node with a twofold objective: first, fostering passenger inter-modality with secure bike parking; and secondly, to improve last mile distribution with the use of parcel lockers. This solution is expected to succeed in meeting Valencia's mobility goals. From the initial to the final stages, the pilot's feasibility and sustainability (environmental, social and economic) measurements will help in monitoring, adapting and designing the regulatory and policy recommendations. These results will help to replicate the innovative solution in other cities where collection is a critical aspect during the monitoring and assessment phases. However, the KPIs (see Annex A:) show that there is still room for improvement and the city needs to increase the effort to compile the required data that will help to evaluate the pilot and spread the solution.

4.2 Padua (Italy)

4.2.1 Introduction

The city of Padua (figure 4.2.1), has 210,000 inhabitants with a population density of 2,267 inhabitants/km². The entire Province of Padova has 939,000 inhabitants. Its corresponding validation (2nd-layer) cities are Ioannina, Greece and Gothenburg, Sweden.

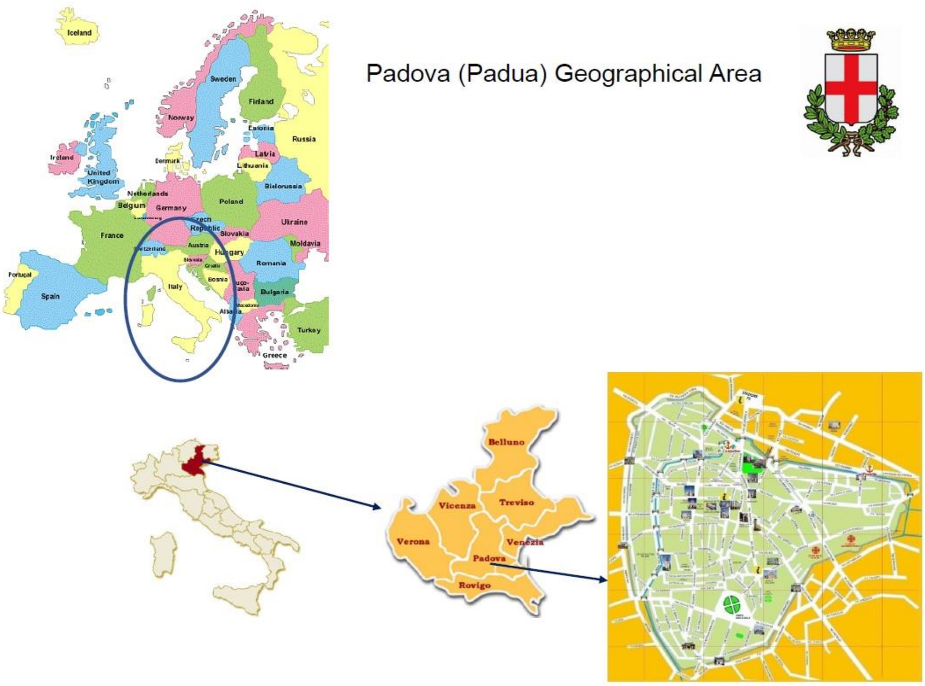

Figure 4.2.1. 1st-Layer city: Padua (Location).

4.2.2 Main factors indicating a change is currently in progress in the city's urban mobility environment

Padua is going through a rapid economic change, demonstrated in the last decade by the central role of private cars (representing currently some 51% of overall urban mobility and 74% for the metropolitan area) and changing user needs, particularly due to the skyrocketing development of home deliveries. Negative impacts (congestion, pollution, safety, etc.) are in place, which should be addressed by innovative and effective policies. Even though the constant increase of the modal share of sustainable modes is promising (49% for the city centre, 26% for the metropolitan area), the municipality of Padua is developing the new SUMP which already includes a rather exhaustive analysis framework leading to the definition of main bottom-line urban planning goals, including:

- Fostering the use of more environmentally friendly transport modes.
- Reducing the role of road transport.
- Decreasing the number of road accidents.
- Improving the quality of public space, namely accessibility.
- Improving the effectiveness and efficiency of urban logistics and freight transport.

The SUMP, which has already been completed, is currently awaiting adoption. Main factors driving the change of future urban mobility include innovative emerging technologies (e.g. advanced smart transportation system based on swarms of electric modular self-driving pods) and disruptive business models (like cargo-hitching, a mixed solution for both passenger and freight transport) as they are connected to policy-making (forthcoming SUMP).

Major investments are mainly services (a new tender for a new public transport operator has just been concluded) and, secondarily, infrastructure (which means a new fleet of vehicles). The implementation of an urban tram line net is in progress. Tram line 2 and tram line 3 are, respectively, in planning or in the implementation phase. More information about the mobility and logistics status of the city can be found at http://www.interportopd.it.

4.2.3 Main impacts which are currently unclear and therefore are not being addressed (or are inadequately addressed) by the current urban policy elements/instruments

The current policy framework on mobility dates back to 2010. Since then, several initiatives emerged that were not foreseen in the SUMP. This is particularly evident for a set of innovative urban mobility scenarios, such as cargo-hitching and the self-driving pods. Therefore, the medium/long-term impacts of the identified emerging technologies and cargo-hitching business models are still to be properly assessed and are not currently addressed by existing urban policy tools. Other critical issues can be identified within the existing policy framework, which represent key goals of the forthcoming SUMP:

- Strong focus on innovation of urban transport, using ITS/big data and autonomous vehicles, both for passenger and freight.
- Developing e-mobility to reduce emissions, fossil fuel consumption and mitigating climate change.
- Improving the overall efficiency and effectiveness of urban mobility, both for passenger and freight.
- Improving energy and environmental sustainability.
- Improving safety.
- Improving socio-economic urban sustainability.

The new regulatory framework/SUMP in development± which is based on the principle of sustainability ± has the strategic goal of outlining the vision and future scenarios of the urban mobility for the coming decade by identifying and implementing a harmonized and coherent range of policies and measures of sustainable urban mobility.

4.2.4 Conclusion

Padua is experiencing rapid economic growth with a large development of skyrocketing home deliveries and with a promising sustainable mobility share. Among the goals of the new SUMP, improving the effectiveness and efficiency of urban logistics and freight transport is a priority. It contemplates the development of disruptive business models: cargo-hitching and self-driving pods.

While autonomous vehicles are still under development and with the not widely known concept of cargo-KLWFKLQJWKHVXFFHVVRI3DGXD¶VSLORWZLOOGHILQWHO\GHSHQGRQWKHFRUUHF and anticipated definition of a regulatory and policy framework. This pilot will require well-designed evaluation criteria and methodology that considers the level of acceptance and the dimensions of operational feasibility and sustainability. The assessment reliability and accuracy depends on the data compilation process. From the table in Annex B:, we observe most data are available so they should not face many difficulties for gathering the information.

4.3 Kalisz (Poland)

4.3.1 Introduction

Kalisz is a city in central Poland with 100,975 inhabitants (2018), the capital city of the Kalisz Region, situated on the Prosna river in the south-eastern part of the Greater Poland Voivodeship. Kalisz is one of the main cities in the Kalisz-Ostrów Wielkopolski agglomeration with nearly 360,000 inhabitants. Kalisz is an important regional industrial and commercial centre in the Wielkopolska region.

Figure 4.3.1. 1st-Layer city: Kalisz (Location).

The Kalisz pilot will examine the new operational business models and the incentives and reward schemes to spread the use and acceptance of sensors and mobile applications for truck drivers to manage loading/unloading spaces within the selected area. As a result, SPROUT will use this information to define a new regulatory and policy framework.

4.3.2 Main factors indicating a change is currently in progress in the city's urban mobility environment

.DOLV]¶V EDVLF GRFXPHQW FRQWDLQLQJ WKH UHVSRQVHV WR WKH XUEDQ PRELOLW\ FKDOOHQJHV LV WKH Low-Emission Plan for the City of Kalisz, developed in 2017, which was extended by the elements of the Sustainable Urban Mobility Plan ± SUMP[1]. Numerous other documents on the internet describe the current mobility status.[2]

Major urban transport investments (services, policies and infrastructure) currently in progress or planned in the next 3 years are the following:

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[1] https://bip.kalisz.pl//uchwaly/2017_34_450.pdf

[2] Plan Gospodarki Niskoemisyjnej dla Miasta Kalisza ± https://bip.kalisz.pl//uchwaly/2017_34_450.pdf

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Okresowy raport sprawozdawczy z realizacji Strategii Rozwoju Miasta Kalisza na lata 2014-2024, raport za rok 2017

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Road and Transport Authority in Kalisz ± http://mzdik.kalisz.pl/

Kaliskie linie autobusowe ± http://kla.com.pl/

Kaliski rower miejski (bike sharing system) ± https://kaliskirowermiejski.pl/en/

- Construction of the Integrated Traffic Management System in Kalisz. The main goal of the project is the improvement of accessibility to the regional and supra-regional road system.
- Development of the public transport system of the Kalisko-Ostrowska Agglomeration with the modernization of street lighting. The main goal is striving to improve air quality in the City of Kalisz by increasing a low-emission public transport system.
- Construction of the Kalisz bypass within the national road no. 25 (completion planned for 2022).
- Further development of the bike sharing system (new stations and new bicycles).
- Purchase of new eco-friendly city buses.
- SUMP document update.

4.3.3 Main impacts which are currently unclear and therefore are not being addressed (or are inadequately addressed) by the current urban policy elements/instruments

The dynamic development of cities and changes in the lifestyle of their inhabitants result in a constant increase in their transport needs. As travel behaviour changes, the number of vehicles on the streets increases, resulting in congestion, accidents, emissions and noise, and a consequent reduction in the quality of life. Furthermore, these issues concentrate in the city centre, where there are a lot of historical monuments and high density of urban structure.

The distribution of goods in urban areas is heavily increasing and therefore it strongly contributes to the increase of traffic in the city centre. *Goods deliveries require unloading spaces that are convenient enough to unload the cargo fast* and does *not* cause additional *disturbances* when unloading is on-going.

The city of Kalisz has not introduced any system for managing goods deliveries in the city. Neither has it defined a methodology for managing deliveries.

LQ\WKHFLW¶V *Sustainable Urban Mobility Plan does not address freight transpor*t. Therefore, the following impacts remain unclear:

- The impact of introducing urban freight operations, on urban mobility planning.
- The impact of introducing an IoT-enabled truck parking/unloading system into the FLW\¶VXUEDQWUDQVSRUWV\VWHP
- The impact of blending the IoT-enabled system with the existing conventional loading/unloading system.
- Embedding an IoT-enabled truck parking/unloading system into a data-driven urban mobility planning setting.

- The impact of introducing reward-based policies (e.g. enhanced access rights) for transport companies/drivers that deploy the system in an efficient way for the city's operation (e.g. arriving and departing at/from the parking place at the allocated time, notifying the city authority in case of deviations for reallocating the parking place in real-time, etc.).

4.3.4 Conclusion

Kalisz has not yet addressed freight transport in its SUMP, so far. However, it is experiencing the consequences of e-commerce with a high increase in the goods distribution within the city boundaries, and therefore, it is convinced it has to manage deliveries as part of the overall planning process, taking advantage of emerging technologies as key facilitators.

Kalisz plans to start to use sensors in specific loading/unloading locations. These sensors will help in distributing and managing space better, reducing bad parking practices, traffic congestion and having a less polluted and more liveable city. Furthermore, these devices will enhance the data compilation process with more accurate and reliable data that may be useful to find patterns and define better regulations and policies.

To succeed in adopting and spreading this innovation, SPROUT will examine the new business models, drivers and barriers, incentives and reward schemes to finally develop a new regulatory and policy framework based on informed decisions using real data from the pilot.

From the table above, we observe that the value of many KPIs is not available yet (see Annex C:). In some cases, it is because the particular services are not available in the city, such as car-sharing and e-scooter-sharing. In other cases, the city does not measure this information (GHG and pollutant emission, public net mobility finance). Finally, freight data will be measured by mid-2020, giving an initial picture of the last mile urban delivery patterns. As environmental and freight information is essential for SPROUT pilots, the city will have to increase its efforts to compile this data.

4.4 Budapest (Hungary)

4.4.1 Introduction

Budapest, as the sole metropolis of the country, is the centrally located capital city in Hungary. It is situated in the Central Hungary region. The country has a Budapest-centric road and train network (Figure 4.4.1). As of 2018, Budapest has a total population of 1,749,734 inhabitants, which is 17.8% of the population of Hungary. Budapest has a slightly decreasing population and a population density of 3,332 inhabitants/km².

Figure 4.4.1. 1st-layer city: Budapest (Source: Nations Online Network)

The geographical conditions and historical urban development fundamentally determine the main challenges of the current urban mobility of Budapest. The city has a complex geographical situation, as the Danube river divides the city into the hilly Buda and the flat Pest side, creating transport bottlenecks in the city.

)RU DOPRVW WKUHH GHFDGHV VWDUWLQJ IURP WKH ¶V XUEDQ SODQQLQJ DQG GHYHORSPHQW principles were determined by giving priority to motorised transport at the expense of other aspects, even liveable environment was a secondary issue. Budapest currently has a deteriorating modal split. New modes of micromobility have appeared in the city, which are currently unregulated. In addition, the number of accidents is increasing.

This city pilot is intended to test policy responses to shared mobility (new dock-less bike sharing and car-sharing systems). Its corresponding validation (2nd-layer) cities are µV Hertogenbosch in the Netherlands, Arad in Romania, Birmingham in the United Kingdom (UK) and Minneapolis in the United States of America (USA).

4.4.2 Main factors indicating a change is currently in progress in the city's urban mobility environment

The city of Budapest is experiencing a number of changes in its urban mobility environment. New transport services using new business models are being introduced, as for example new car-sharing services, dock-less bike sharing systems and cargo bike delivery services, which appeared in 2017-2018, while a living-lab test of a Mobility-as-a-Service is currently under preparation. Furthermore, emerging transport technologies are being implemented, such as the Automated Fare Collection (AFC) system, the new electric vehicle charging infrastructure system, the procurement of more electric vehicles for public transport, while electric powered personal and freight vehicles are becoming more popular. At the same time, user needs are evolving, with participatory planning initiatives showing that people need more space for walking and cycling and less space for cars in the city, while their requirements for better services, increased safety (development of an integrated transport safety database), and more connections, are becoming stronger. Finally, new institutional and financing structures (regulation of parking & taxi services, regulation of sightseeing vehicles and tourist buses, new financing structures for sharing-based mobility solutions and a new time-based fare system in public transport) have already been or are being implemented.

The first Sustainable Urban Mobility Plan of Budapest (Budapest Mobility Plan ± BMT) was developed by BKK Centre for Budapest Transport. In 2014, the previous strategic documentation was reviewed, and the draft version of the SUMP was shared for public consultation. The Objectives and Measures volume of the SUMP (formally Balázs Mór Plan) was approved by the General Assembly in 2015. In May 2019, the General Assembly of Budapest and the Innovation and Technology Ministry of Hungary approved the full SUMP named Budapest Mobility Plan, (BMT), after an extensive professional consultation period.

BMT contains the following volumes:

- Objectives and Measures.
- Transport development and investment program proposal.
- Project information sheets.
- Institutional assessment.
- Monitoring and assessment handbook.
- Strategic Environmental Assessment.

Budapest has not only set the goal of becoming a more liveable, attractive and healthy city in its SUMP based Budapest Mobility Plan but realised how crucial it is to plan for the people and understood that public involvement can have a key role in reaching these goals. Budapest shifted its development focus to plan the city of places and recently has started to implement participatory planning pilots on local, neighbourhood and city level.

Finally, the major urban transport investments in progress or planned in the next 3 years are the following:

- Renovation of metro line M3 in three phases (currently the second phase).
- Renovation of Széchenyi Chain Bridge.
- Development of airport high-speed road.
- Development of Metro line 1 (accessibility improvements, new exits, 2 new stations, vehicle procurement).
- Road developments with integrated approach.
- Vehicle procurement.

4.4.3 Main impacts which are currently unclear and therefore are not being addressed (or are inadequately addressed) by the current urban policy elements/instruments)

The following impacts remain unclear:

- the impact of changing user needs on the current urban mobility environment;
- (the impact of introducing car-sharing, bike-sharing and MaaS services, on the FLW\ XUEDQ PRELOLW\ WUDQVSRUW V\VWHP DQG LWV UHJXODWRU\ JRYHUQDQFH HQYLURQPHQW
- WKH LPSDFW RI GLIIHUHQW FLW\DXWKRULW\ UROHV UHJXODWRU YV IDFLOLWDWRU successful deployment of shared passenger mobility.

4.4.4 Conclusion

Budapest is experiencing changes in its urban mobility (new MaaS business models, users need more space for walking and cycling and less for cars, users require more and improved connections and new financial instruments related to shared mobility.

The pilot will base the outcomes of the project (policies, regulations and recommendations) on the results obtained from the data compiled and analysed for the operational feasibility and sustainability assessment processes. Although Budapest has most of the information available (Annex D), environmental KPIs are decisive indicators not available yet. It requires this city considers the indicators under this group as essential information they will have to calculate.

4.5 Tel Aviv (Israel)

4.5.1 Introduction

Tel Aviv Yafo is situated on the Mediterranean coastline on a land area comprising 51.8 km^2. It is the largest and most populous city in the metropolitan area, (1,519 km^2).

Figure 4.5.1. 1st -Layer city: Tel-Aviv (location).

In 2017, the population of Tel Aviv Yafo numbered 443,900, which is 5% of the total population of the State of Israel. This number does not include work migrants (legal and illegal) or refugees, of which there are an estimated 40-50,000 living in the city.

The population of Tel Aviv Metropolis numbered 3,918,800 with population density of 8569.49 inhabitants/km².

This city pilot is intended to test data-driven urban mobility planning and traffic management strategies to prioritise non-motorized transport modes and vulnerable road users. Its corresponding validation (2nd-layer) cities are Almada in Portugal and Birmingham in the United Kingdom.

4.5.2 Main factors indicating a change is currently in progress in the city's urban mobility environment

The Outline Plan for Tel Aviv Yafo, approved in 2016, is a statutory plan which retains the mission statement set-out in the Strategic Plan of 2005: development of a sustainable multi-modal efficient transport system, which provides accessibility and a high standard of service for residents, commuters and visitors. A system that takes into consideration protection of WKHHQYLURQPHQWDQGWKHXUEDQHFRORJ\DVZHOODVWKHFLW\¶VFXOWXUDOKHULWDJHIRUWKHEHQ of present and future generations. In short, emphasis is on achieving and maintaining a more sustainable modal split. The Sustainable Urban Mobility Plan for Tel Aviv Yafo was completed in September 2017.

Since August 2015 and for the foreseeable future, the biggest urban transport investment is the construction and implementation of the light rail system in the Tel-Aviv metropolitan area, including all the related infrastructure and changes in the road and street layout. Also, a think tank has been created to rethink the infrastructure possible to optimise and increase bicycle lanes.

Additional investments include the car-sharing scheme Tel Auto and privately-operated e-scooter sharing schemes. New parking policy and regulations were finalised in 2016 and are based on two guiding principles: 1) creation of a differential standard based on distance from a transport hub; 2) decrease in car park spaces standard in high employment areas to encourage use of public transport. Other investments are aimed at significantly increasing the number of dedicated bus lanes.

4.5.3 Main impacts which are currently unclear and therefore are not being addressed (or are inadequately addressed) by the current urban policy elements/instruments

Tel Aviv Yafo strives to maintain its role as the economic, commercial and cultural centre of the metropolitan area while providing its residents with high standards of living conditions and a clean environment.

Urban productivity is highly dependent on the efficiency of its transport system to move labour, consumers and freight between multiple points of origin and destination. Therefore, the city needs to deal, inter alia, with traffic (private and public); commuting; non-motorised transport and freight distribution. The main challenge for the city is to find an optimal way of allocating public space between the various users: pedestrians, cyclists, public transport, freight and private cars.

- **Traffic**. Some challenges, like congestion, have been there for years and it is one of the most prevalent transport challenges. It is particularly linked with the rise of motorisation, which has increased the demand for transport infrastructures. The supply of infrastructures has often been unable to keep up with the growth of mobility and smarter transportation solutions are needed to mitigate city congestion.
- **Commuting**. On par with congestion, people spend an increasing amount of time commuting between their residence and workplace.
- **Parking**. The demand for parking space has created space consumption problems particularly in the central areas of Tel Aviv Yafo. The scarcity of parking space has led to increase in the time spent looking for a parking space (what is termed FUXLVLQJZKLFKLQWXUQUHDWHVDGGLWLRQDOGHODVDQLPSDLUVORFDOFLUFXODWLRQ
- **Public Transport**. Public transport, in particular one with its own infrastructure (subway, light rail, buses on dedicated lanes, etc.), can significantly improve traffic

conditions. However, in Tel Aviv Yafo, the various public modes, trains & buses, are independent from each other and to achieve efficiency their services need to be LQWHJUDWHGZLWKLQWKHFLW\GHYHORSPHQWSODQ

- **Non-motorised transport**. A great majority of trips in Tel Aviv Yafo are over short distances, non-motorised modes, particularly walking and cycling, have an important role to play in supporting mobility. However, bicycle infrastructure takes capacity away from roadways as well as parking space and may impede congestion and its environmental consequences.
- **Freight distribution**. As freight traffic commonly shares infrastructures with the circulation of passengers, the mobility of freight in Tel Aviv Yafo especially in the centre has become increasingly problematic. The growth of e-commerce and home parcel deliveries has created additional pressures. There is a growing understanding that this issue has been neglected and that Tel Aviv Yafo has to establish logistics strategies to provide solutions to the variety of challenges of freight distribution within the city.
- **Environmental impacts.** Traffic flows influence the life and interactions of residents and their usage of street space. More traffic impedes social interactions and street activities. Pollution, including noise, generated by circulation has become an impediment to the quality of life and even the health of urban populations. A shift towards more efficient and sustainable forms of urban transportation is a necessity which Tel Aviv Yafo aims to achieve.

A great deal of uncertainty is associated with:

- the impact of the new public transport services on mobility patterns;
- the impact of the re-allocation of public space in specific arteries, while specifically addressing the needs of vulnerable road users;
- The impact of embedding integrated quantitative/qualitative methodologies/algorithms/tools into a data-driven urban mobility planning setting.

4.5.4 Conclusion

The city of Tel Aviv undergoes tremendous transport changes during the construction of the new public transport system, on top of the new car-sharing service that was launched in summer 2017. The city plans to revolutionize major arteries in order to integrate additional light rail transit (LRT) lines, besides other traffic and public transport changes throughout the city. As a result, new priorities in the allocation of the public space will be required, mainly regarding the prioritisation of non-motorized transport modes. The city has already begun to explore the opportunities of using new information sources that would serve as a basis for in-depth understanding of travel habits and mobility needs. Insights gained by advanced data analysis will be valuable in setting the grounds for designing major arteries as mobility managed roads.

The pilot is focused on compiling data from different sources and analysing these raw data with advanced techniques such as machine learning that will be used for identifying the new mobility patterns. It will analyse several scenarios of allocating the Public Sphere and the road-cross sector as a trade-off between the transport system capacity and the liveability while considering safety and vulnerability. This demonstrator will tackle the reallocation process in three levels (strategical, tactical and operational) and implement it using simulation techniques and processing algorithms.

All the new information sources, processing techniques and simulation and visualization tools will help in discovering patterns and support decision making processes. Final results and experiences will be used to define the policy recommendations and guidelines to make decisions driven by data. This pilot relies completely on data collection processes. Annex E with 25/27 KPIs available shows that it will be possible to face the pilot successfully.

4.6 Summary overview of 1st layer cities' challenges

The table below gives an overview of the different 1st ODHUFLWLHV¶FKDOOHQJHV when it comes to urban mobility transitions.

Table 4.6. Summary of 1st ODHUFLWLHV¶FKDOOHQJHV

City	Challenges experienced
Valencia, Spain	• Important congestion in the city centre (mornings) • Urban freight logistics ○ Not enough designated/used loading/unloading places Conflicts with pedestrians
Padua, Italy	• Medium/long-term impact of new technologies (cargo-hitching and self-driving pods)
Kalisz, Poland	• Urban freight logistics ○ Strong increase in deliveries No strategy for managing the increase
Budapest, Hungary	• Micromobility • New modes of shared mobility ○ New dock-less bike-sharing and car-sharing system
Tel Aviv, Israel	• Optimally allocating public space among all users (pedestrians, cyclists, public transport, freight and private cars)

5 Current State of Mobility in 2nd - layer SPROUT cities

The 2nd-layer includes additional cities that will validate the transferability of the policy results specific to the pilot cities and contribute to their transformation into what is called in 635287DµFLW\-OHGSROLFUHVSRQHIHDUHVSRQHWKDWLVZLGHODSSOLFDEOHLQWHUPVRILWV contents and structure) to European cities. For this to be achieved, each of the nine 2nd-layer cities has been linked to at least one pilot city in terms of its interest in the new mobility solutions to be tested and its potential policy impacts.

5.1 Ioannina (Greece)

5.1.1 Introduction

Ioannina is the capital and largest city of Epirus, a region in the North-West of Greece. The municipality of Ioannina is composed of 6 municipal units and is the most important and larger of the 8 municipalities of Prefecture of Ioannina, which belongs to Epirus Region. The following map (Figure 5.1.1) shows the area of municipality of Ioannina in Epirus Region area.

According to the last census of the population (2011), the Ioannina municipality has 112,486 residents living in 403.32 km^2, representing a population density of about 278.90 inhabitants/km^2. The municipality of Ioannina is one of the 10 largest municipalities in Greece in terms of inhabitants. However, the population is not homogeneously distributed in the municipality, with significant differences between the six municipal units with more urban and densely populated areas like Ioannina Municipal Unit with population density of 1588.67 inhabitants/km^2 and the Perama municipal unit with a population density of 46.26 inhabitants/km^2.

This city is interested in new mobility planning that integrates passenger/freight planning. This is a validation city of the pilot in Padua, Italy, which will test self-driving pods for cargo-hitching.

Figure 5.1.1.2nd-layer city: Ioannina (location)

5.1.2 Description of the urban mobility landscape

Strategically, the municipality of Ioannina forms a geopolitical crossroads of the development axis of north Greece, especially after the construction of the Egnatia Odos Motorway. Combined with the Ionian Odos Motorway and the E65 motorway, Ioannina is a strategic interchange node of combined transportation due to its proximity to the country's international gateway, the port of Igoumenitsa. Also, the city of Ioannina is a major tourist destination all times of the year.

The city of Ioannina is the trade centre of all the Epirus Region, so there is a continuous traffic flow to and from the Region of Epirus. Moreover, there is an important traffic flow to the city from employees of the suburbs, linked to the habit of the population to use their owned car for every transportation. The daily use of public transport is mostly from students and college students and not from employees.

Municipality of Ioannina has a goal of reducing CO_2 emissions by at least 20% by 2020 (short-term target) and by at least 40% by 2030 (long-term target), and a part of it refers to transportation emissions.

To achieve these goals, the municipality of Ioannina has recently completed (2019) the Sustainable Energy Action Plan of Municipality of Ioannina, which contains mobility actions that are included in the Strategic Plan for Sustainable Urban defined on January of 2017.

Also, in June of 2019, the Municipality of Ioannina completed its Sustainable Urban Mobility 3ODQ DMRU LQHVWPHQWV WR LPSOHPHQW WKHVH DFWLRQ DUH WKH H[SDQLRQRI WKH SLORW H SDUNLQ DSSOLFDWLRQVWHUH mobility, enhance walking and cycling habits for transporting, construction of special bicycle routes, bike and car sharing schemes that encourage people to reduce the use of the car. Moreover, the city of Ioannina aims to raise the percentage of hybrid/electric cars in its fleet up to 50% by the year 2030.

5.1.3 Conclusion

The major challenge of the Municipality of Ioannina is the permanent traffic flow to and from the region of Epirus and from the employees of the suburbs to the city with the population using their private cars. Public transport is mostly used by students.

The city aims to reduce the transport-generated GHG emissions introducing new ways of mobility and encouraging people to change the habits towards more active and sustainable modes of transport. For this, it will construct special bicycle routes and introduce bike and car-sharing schemes that do not existencourage people to reduce the use of the car. Besides, the percentage of hybrid/electric cars in its fleet is expected to rise by 50% by 2030.

This city is the validator of the pilot in Padua, which aims to integrate passengers and freight for enhancing mobility. Although the city of Ioannina has not mentioned urban freight transport as an objective, the interest in this pilot may be a good starting point for defining the strategy for coping with the city logistics. About the KPIs provided in Annex F:, most of the missing information refers to the use of new mobility services that are not available or freight transport, which it seems not considered by the city SUMP yet. The involvement in this project will help Ioannina in having a better idea and knowledge for transforming mobility through the learnings and findings of the new tested innovations.

5.2 Gothenburg (Sweden)

5.2.1 Introduction

Gothenburg is a port city situated on the west coast of Sweden with a strategic location between Oslo and Copenhagen (Figure 5.2.1). It has a population of around 555,000 and it LV6ZHGHQ¶VVHFRQGODUJHVWFLW\7KHRWKHQEXUJUHJLRQZKLFKLQFOXGHVPXQLFLSDOLWLHVLQ Greater Gothenburg, has a population of 1.1 million inhabitants.

This city is interested in new mobility planning that integrates passenger and freight planning. This is a validation city of the pilot in Padua, Italy, which is testing the innovative urban mobility solution of self-driving pods for cargo-hitching.

Figure 5.2.1. 2nd-Layer city: Gothenburg (location).

5.2.2 Description of the urban mobility landscape

The City of Gothenburg is growing rapidly through densification and this stresses serious challenges. Climate change, social equity, environmental and health issues and providing space efficient and reliable accessibility for people and freight without congestion.

By 2035, it is expected that Gothenburg will have 150,000 more residents and 80,000 more jobs and be the hub in a region of 1.7 million people. Gothenburg is on its way from being a big town to becoming a major city. This process involves many challenges, but also creates us the chance to create a cohesive city characterized by high environmental standards.

There are different sustainable urban mobility plans in order to face Gothenburg¶ urban mobility challenges:

- **Transport Strategy for a close-knit city (SUMP) Gothenburg 2035 (adopted 2014-02-06).** The three main objectives in the strategy ± an easily accessible regional centre, DWWUDFWLYH XUEDQ HQYLURQPHQWV DQG 6FDQGLQDYLD¶V ORJLVWLFV FHQWUH are a response to the 13 strategic questions in the Comprehensive Plan for *RWKHQEXUJ7KHWKUHHPDLQREMHFWLYHVDUHDOVRKLJKO\UHOHYDQWWR*RWKHQEXUJ¶VURO as a hub and as a driving force for the entire region. Under review 2019-2020
- **Strategic Climate Programme for Gothenburg, (adopted 2014-09-04):** The Climate Programme aims to achieve the environmental quality objective of reduced climate impact. The programme comprises nine strategy objectives, which are area orientations and extend through to 2030. The aim is to significantly reduce the

climate impact of Gothenburg but also to prepare for mitigation of effects caused by climate-change.

- **Development Strategy for Gothenburg 2035, February 2014:** The Development Strategy shows which places and areas in the intermediate city have particularly good conditions for making day-to-day life simpler for as many people as possible. It prRYLGHV VXSSRUW LQ SULRULWLVLQ WKH PXQLFLSDOLW\ SODQQ PHDVXUHV DQ LW DOV shows the outside world where we want the city to develop in particular and in what way. The strategy has been produced in a close cooperation between the City Planning Authority and Property Management Administration. The work has been carried out parallel with the Parks and Landscape Administration producing a Green Strategy for the city and for the traffic department producing a Transport Strategy. These three strategic aims and planning documents together with The Rivercity Vision form the basis for the planning of the future Gothenburg.

Major urban transport investments for the next 3 years are the following:

- West Sweden Package.
- 200 Electric busses by the end of 2020.
- New bus lines, tram lines, cycle paths, bridges funded by the Swedish state through national and regional transportation plans negotiated as a part of the National Negotiation on Housing and Infrastructure, NNHI.
- Building a new bridge to Hisingen, which will replace the existing bridge that will be demolished.
- Marieholm tunnel.

5.2.3 Conclusion

The expected population and number of jobs growth will increase the number of transport flows, from people commuting to work and other activities, and from freight deliveries. The city of Gothenburg is working on facing the negative impact of this evolution with different SUMPs and the firm engagement of mitigating the climate change impact and preparing for the effects. It aims to create a close-knit city with an easily accessible regional Centre, DWWUDFWLYH XUEDQ HQYLURQPHQWV DQ 6FDQLDYLDVWOR Centre. This city is also investing in new infrastructures (new bus lines, tram lines, cycle paths, bridges) and services (electric bus) that support more environmentally friendly mobility.

2Q RI WKH WSLFDO FLW\ FKDOOHQJHV LV IUHLJKW WUDQVSRUW)RU WKHQXUJ WKH 6FDQLQYLDY logistics Centre may increase traffic congestion, due to freight transport flows generating higher interest in the cargo-hitching solutions implemented by Padua. The freight data available foresee good feedback as a validator of this solution (see Annex G:).

5.3 Arad (Romania)

5.3.1 Introduction

The City of Arad is situated in the Western part of Romania and represents the most important road and rail transportation junction point in the Western region, being the first Romanian city at the entrance from Western Europe (Figure 5.3.1). In 2017, the number of inhabitants was 177,464 covering a Territorial Administrative Unit Area: 237.88 km² with a population density of 746.02 inhabitants/km².

This city is interested in the results of two 1st-layer cities: On the one hand, IoT in urban logistics demonstrator in Kalisz (Poland) testing real-time dynamic management of parking /unloading operations including planning and booking. On the other hand, the pilot in Budapest (Hungary) WKDW WHVWV VKDUHG SDVVHQJHUV¶ PRELOLW\ VXFK DV WKH QHZ GRFNOHVV ELN sharing and car-sharing systems.

Figure 5.3.1. 2nd-Layer city: Arad (location).

5.3.2 Description of the urban mobility landscape

The city of Arad is facing a large number of challenges for improving urban mobility. First, the improvements and development of road, rail and air transport infrastructure according to the connection needs in the European, national, regional and local level. Second, it aims to LPSURYH SDVVHQJHUV¶ PRELOLW\ ZLWK WKH GHYHORSPHQW RI DOWHUQDWLYH WUDQVSRUW LQ UHDVL area accessibility for pedestrians, improving public transport services and increasing the quality of urban public areas. Finally, it has started to asVHVV WKH QDYLJDELOLW\ RI WKH 0XUH river proposed by the NTLP (National Territory Landscaping Plan). All of this with the overall purpose of reducing air pollution.

To address these challenges Arad developed the SUMP in 2015-2016, which was updated in 2017 and with the 2023 as the implementation horizon for the proposed and approved measures. Arad is currently in the second year of SUMP.

Principal investments, for the next 3 years, focusing RQ HQKDQFLQJ SDVVHQJHUV¶ PRELOLW\

- Procurement of rolling stock (large and medium capacity trams).
- Procurement of electric buses, hybrid/ecological (large and small capacity).
- Modernization of rolling stock (trams).
- Modernization of the tram infrastructure (railway, tram stops).
- Construction of a bridge over the river MuUH LQFOXGLQJ HOHFWULF EXV URXWH RYHU WKH bridge).
- Investments in road infrastructure for achieving the city accessibility (road links with the north ring road, south-east ring road: Arad County Council).
- Procurement of an e-ticketing system and video monitoring.
- Reshaping of the central boulevard.
- Development of a parking policy.
- Development of new public transport lines, routes reorganization.
- Development of rental and parking system for bicycle (bike sharing).
- Green areas/curtains for protection.
- Construction of pedestrian areas.
- Development of infrastructure for electric vehicles (charging stations).

5.3.3 Conclusion

7KH FLW\ RI $UDG LV LQVWLQJ LQ HQKDQFLQJ SDVVHQJHUV¶ PRELOLW\ ZLWK WKH PRGHUQL]DWLRQ RI existing tram lines, developing new infrastructure and services that support new ways of mobility, with a video monitoring system, an e-ticket service, and the development of infrastructure for electric vehicles (charging stations).

The actions to implement these objectives are in the SUMP of 2015/2016, updated in 2017 and with the target of fulfilling objectives by 2023. Although Arad does not consider urban freight transport as one of the main investments for the next three years, this is a challenge all cities are facing. Therefore, Arad is not only interested in the solution of Budapest for WHVWLQJ VKDUHG SDVVHQJHUV¶ PRELOLW\ EXW DOVR LQ WKH .DOLV] GHPRQVWUDWRU IRU PDQDJL loading/ unloading parking spaces. This city is compiling most of the data requested. Most gaps belong to the freight transport that foresees this city has to improve the freight data collection (see Annex H:).

5.4 Mechelen (Belgium)

5.4.1 Introduction

Mechelen is a medium-sized city situated between Antwerp and Brussels in the North of Belgium (Figure 5.4.1). It has a population of 86,600 citizens and is expected to grow to 100,000 by 2030. 38,500 inhabitants live in the inner city within the ring road.

This city is interested in the results of Kalisz (Poland) demonstrator that is testing the IoT in urban logistics demonstrator with real-time dynamic management of parking/unloading operations including planning and booking.

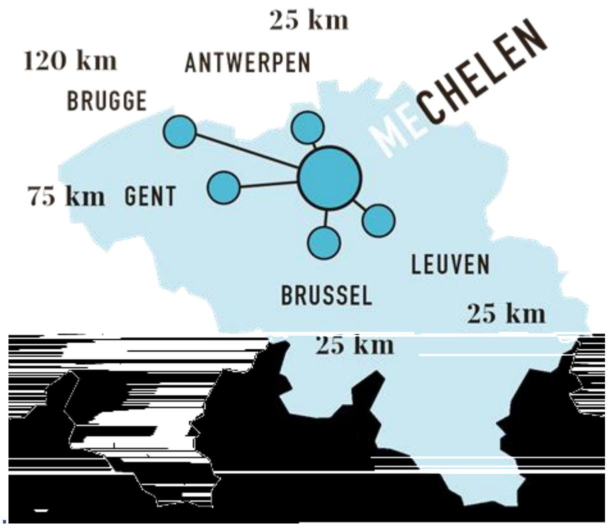


Figure 5.4.1. 2nd- Layer city: Mechelen (location).

5.4.2 Description of the urban mobility landscape

On personal mobility, there is still a big focus on the car, creating congestion around the city and safety issues in the inner city for cyclists and pedestrians. Mobility also has an environmental impact. The board of aldermen and the mayor have made mobility one of the three main themes of this legislature (2019-2024). It will focus on cycling and shared mobility. The city has the ambition of becoming the cycling city of Flanders and wants to invest in infrastructure (cycling paths and bicycle storage). With a push strategy, it wants to promote and invest in shared mobility. The ambition is that in dense areas, everybody should have access to a shared car within 150 meters.

On logistics mobility the challenge is to make urban freight more sustainable and more efficient. This means:

- Reduction in number of vehicle movements.
- Reduction in number of driven kilometres.

- Reduction in CO_2 emissions.

In logistics the EU-guideline of zero-emission logistics by 2030, is seen as the parameter. There is a close collaboration with the operating city hub (consolidation centre) and bike courier company in the city. There is a SUMP in place since 27th of January 2015 (approved by local council).

Major investments for services, policies and infrastructures are the following:

- Enlargement of the car free/low car zone with timeframes for delivery.
- Inner city = cycling zone (max 30km/h, all cycling streets = cyclists have priority).
- Installation of an area covering network of cycling.
- Investment in bike infrastructure and bicycle storage.
- Investment in shared mobility.

5.4.3 Conclusion

For the city of Mechelen, major mobility challenges are car congestion, pedestrian and cyclist safety, and the environmental impact of transport from both, either passenger and freight transport. These reasons are the main motivations why the board of aldermen and major are focusing on fostering cycling and shared mobility through the investments in bike lanes and with the ambition for everybody to have access to a shared car within 150m. About logistics, there is a growing collaboration between the city hub and the bike Courier Company and also investments for managing the free/low car zone with time frames for delivery that could benefit from the Kalisz demonstrators. It could facilitate the land use management providing couriers with a mechanism to book a place for operating.

About data collection, table in Annex I shows this city is in good shape with almost all the information compiled and only some remaining KPIs related to freight

5.5 Ile-de-France / Agglomeration Paris (France)

5.5.1 Introduction

Ile de France is located in the north-central part of the country (Figure 5.5.1). The population 12.1 million inhabitants is distributed as follows: 2.190 million inhabitants in Paris, 4.5 million inhabitants suburbs (around Paris) and 5.7 million inhabitants in the outer suburbs (peri-urban and rural areas)

More than 80% of the population is located on less than 20% of the territory with an average population density of 1.010 inhabitant/km², but with huge variations between the central area and rural areas: 21,607 inh/km² in Paris, 6,900 /km² in inner suburbs and 470 inh/km² in outer suburbs.

This city is interested in the results of Kalisz (Poland) which is testing real-time dynamic management of parking /unloading operations including planning and booking.

Figure 5.5.1. 2nd-Layer city: Ile-de-France (location)

5.5.2 Description of the urban mobility landscape

Nowadays, the region of Ile-de-France suffers from a high number of passenger movements with 43 million trips each day, of which 70% outside Paris. This figure is expected to increase by 7% by 2030 due to population growth with serious consequences such as road congestion and overcrowded public transport. Ile-de-France has explored inland water and rail as alternative modes of transport for freight, because 90% of the 227MT of yearly freight is transported by road. However, the railway network is saturated, so priority is given to passenger trains, and inland waterways need massive investment for the renovation of big infrastructure (dams and locks). Ile-de-France has identified the following specific challenges and priorities:

- 70% of trips are made outside dense urban areas, so less suitable for public transport.
- Desire to switch to green vehicles to reduce air pollution.
- %HWWHUXVHRIQHZWHFKQRORJLHVWRRSWLPL]HVXSSO\FKDLQDQGGHOLYHU\VFKHPHV
- Need to convert and requalify old logistic zones in dense urban areas to suit the PDUNHW¶VQHHGVDQGXSJUDGHWKHVHSDUWVRIWKHXUEDQWHUULWRU\
- Increase knowledge and collect data on freight flows inside the region.
- Raise awareness among the local authorities about freight issues and their role to improve the system.
- Educate consumers to adopt appropriate better behaviour and adapted requirements regarding delivery conditions.
- Set up innovative tools to change land management system and propose new kind of financial and economic arrangements for a better integration of logistics facilities in the metropolis.

To respond to these challenges, Ile-de-France adopted the current SUMP in June 2014, which was adapted with a new roadmap in 2017 to update the targets and take into account the new regional policies (renewal of the Regional Council in December 2015). The next 3-\HDUV PDMRU FLW\SROLFLHV LQIUDVWUXFWXUHV DQG VHUYLFHV LQYHVWPHQWV IRFXV RQ SDVVHQJHU mobility:

- Grand Paris Express: new metro lines.
- EOLE: regional express train line crossing the Region from East to West.
- New rolling stock for suburban trains (Transilien).
- Veligo: electric bikes proposed in location.
- Bike parking spaces: 20 000 spaces by 2021.
- 100% green buses by 2025 in urban areas (5 000 buses).
- Smart Navigo pass (MaaS, digital travel pass, transport planner).

5.5.3 Conclusion

Every day, Ile-de-France suffers from an overwhelming number of passenger movements with over 43Mtrips each day. The expected population growth will cause this figure to increase, and the city is unlikely to be able to tackle such a large number of vehicles and public transport users Besides, this city is conscious of the impact of urban freight transport increase in urban mobility. Ile-de-France is considering both passengers and freight transport challenges to create efficient urban mobility space where both can coexist in liveable and carbon-neutral spaces.

Ile-de-France has established priorities and actions to face the future scenario with the use of green technologies; the use of digitalization to create a smart city with new shared mobility services; the increase of citizens awareness with education programmes to become more responsible consumers; plans for managing logistics operations such as the setup of innovative tools to change land management system and propose new kind of financial and economic arrangements for a better integration of logistics facilities in the Metropolis. This last objective aligns with the involvement of Ile de France as validator city of Kalisz, whose pilot aims at testing real-time dynamic management of parking loading/unloading operations including planning and booking. About the data collection status of Ile de France (see Annex J:), there are several KPIs not compiled that might be useful for validating the pilot.

. It shows this city needs to start collecting the missing data but cannotcommit to the production of all the KPIs by the end of the project, because there is no visibility about when and how the data will be available.

5.6 Birmingham (United Kingdom)

5.6.1 Introduction

The West Midlands metropolitan area is located in the English Midlands (Figure 5.6.1). The largest city in the West Midlands is the city of Birmingham. The cities of Coventry and Wolverhampton are located in the West Midlands area also. There are 2,808,352 inhabitants within the Metropolitan Area.

This city is interested in the results of Budapest (Hungary) which is testing a new dockless bike-sharing and car-sharing systems and in the results of Tel Aviv (Israel) developing a data driven urban mobility planning and traffic management strategies to prioritise non-motorized transport modes and vulnerable roads users.

Figure 5.6.1. 2nd-Layer city: Birmingham (Location).

5.6.2 Description of the urban mobility landscape

Main challenges refer to the following: congestion, resilience of highway High Speed 2 network, impact of transport scheme development on existing highway infrastructure (i.e. HS2 rail construction), reliability of bus and rail networks, new mobility operators and impact on existing services (i.e. Uber).

The Movement for Growth 2026 Delivery Plan for Transport[3] was produced in 2017. It is currently being updated and will be widely consulted upon over the next 6 months.

Main transport investments are the expansion of West Midlands Metro network in Birmingham, the opening of new rail stations and Camp Hill Line for passenger services with 3 new stations, the delivery of Sprint service on first corridor and the works to enable construction of HS2 rail line between Birmingham and London.

5.6.3 Conclusion

Birmingham is investing in infrastructures to face congestion and increase the resilience of WKHKLJKZD\QHWZRUN,WDLPVDWHQDEOLQJSDVVHQJHUV¶PRELOLW\ZLWKWKHLPSURYHPHQWRIWKH bus and the rail networks. Furthermore, its objective is to analyze the impact of the new mobility operators on both passHQJHUV¶PRELOLW\SDWWHUQDQGH[LVWLQJWUDQVSRUWVHUYLFHV

Birmingham is interested in analyzing the impact of new mobility services may benefit from the outcomes of the dockless bike-sharing Budapest pilot, and then provide meaningful feedback to these results. The data-driven urban mobility planning and traffic management systems of the Tel-Aviv pilot may bring transferrable results to enhance the terms of inclusion and users experience of mobility operators. This validator will help in identifying the conditions that need adjustments to fit the cities idiosyncrasy.

0RVWSDVVHQJHUV¶GDWDLVDOUHDG\FROOHFWHGDV table in shows Annex K:. This information is in alignment with the objectives of the city. However, goods transport is one of the cities hurdles are starting to include in their urban mobility planning. Therefore, it is highly recommended Birmingham initiates urban logistics data collection.

5.7 Minneapolis (United States of America)

5.7.1 Introduction

Minneapolis is located in the State of Minnesota, which is on the northern boundary with Canada in the middle of the United States (Figure 5.7.1). The city has a population of 422,331 inhabitants; the metropolitan region 3.2 million inhabitants.

This city is interested in the pilot of Budapest (Hungary) which is testing new dock-less bike-sharing and car-sharing systems.

[3] https://www.tfwm.org.uk/media/2539/2026-delivery-plan-for-transport.pdf

https://www.tfwm.org.uk/media/2525/annex-1-corridors.pdf

https://www.tfwm.org.uk/media/2526/annex-2-dashboards.pdf

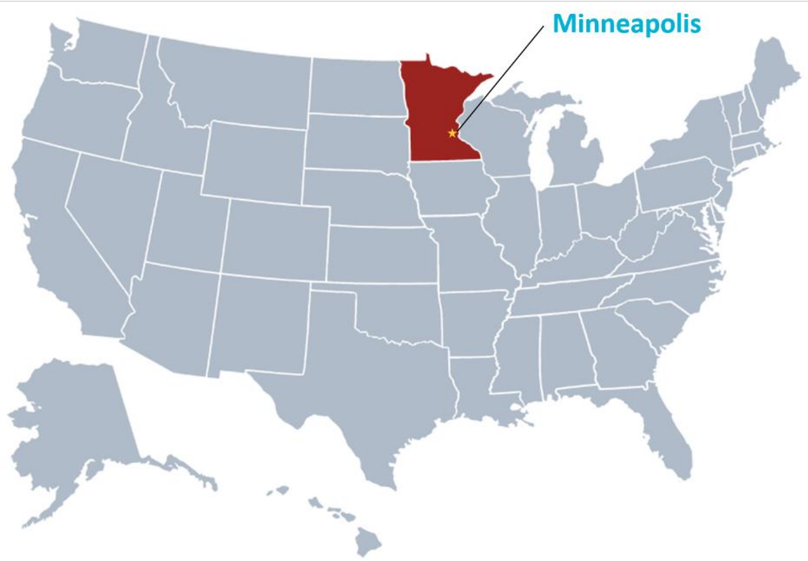


Figure 5.7.1. 2nd-Layer city: Minneapolis (location).

5.7.2 Description of the urban mobility landscape

The city suffers increased congestion and therefore strives to curb passenger and freight vehicle flows. The cultural argument of the car versus other modes remains significant in all USA cities. Severe winter weather also poses additional challenges as it impacts the private VHFWRU¶VGHVLUHWRWHVWQHZFRQFHSWV, but also poses challenges with regard to maintenance. There currently is limited understanding of the impacts of freight and some passenger delivery and there is a general lack of data concerning the impacts of travels. There also is a continuing need to educate and influence external stakeholders on changing infrastructure priorities. Finally, changing zoning regulation and land use patterns are also a factor in its changing mobility patterns.

The city is currently preparing a Transportation Action Plan (TAP), which will be released in 2020. The previous plan, Access Minneapolis is still in effect until the new TAP is released. There is also a Climate Action Plan in effect and a Comprehensive 2040 plan in effect. In terms of investments, Metro Transit is building a fourth train line and 10 Bus Rapid Transit lines in the next 10 years. The city is working on developing a Mobility as a Service platform with Metro Transit; it is also developing a network of Mobility Hubs. It is also updating its Complete Streets policy and investments. It recently released the draft of the Vision Zero plan, which outlines the investment priorities. The city is working with Xcel Energy and the City of St. Paul to build EV charging infrastructure. It is also working on new curbside management policies and tools.

5.7.3 Conclusion

The major challenge for Minneapolis is the increasing congestion by the growing demand of both passengers and freight transport. Cars remain the most popular mode of transport. Cultural factors and weather are the main barriers to the mental shift. This city is conscious of the efforts needed to educate and increase people environmental concerns that will generate the change. Also, they acknowledge the data collection as a key factor for raising the understanding of the impact of passengers and freight mobility actions and improving decision making. According to this perception, the city is making investments and efforts for developing mobility infrastructures, providing new services and defining new plans and policies. The table in Annex L: contains almost all data requested, the missing information falls under freight mobility. The city is interested in the results from Budapest, which will give insights about the use of dockless services that Minneapolis may find useful to motivate the passengers to use this service, adapting it to its idiosyncrasy.

5.8 Almada (Portugal)

5.8.1 Introduction

Almada is located on the south bank of the Tagus River across from Lisbon (which is the capital of Portugal). It includes two cities (Almada and Costa da Caparica), suburban neighbourhoods and rural areas, Almada is one of the 18 municipalities that compose the Lisbon Metropolitan Region (Figure 5.8.1).

According to the last census of the population (2011), Almada Municipality has 174,030 residents living in 72 km², representing a population density of about 2,500 inhabitants/km² which is more than twice as much the population density of the Lisbon Metropolitan Area. However, the population is not homogeneously distributed in the Municipality, with significant differences between the more urban and densely populated areas like Cova da Piedade, Almada, Laranjeiro or Feijó and the outskirts like Sobreda, Trafaria or Charneca da Caparica.

This city is interested in two pilots: 1) the city of Tel Aviv (Israel) which is testing data-driven urban mobility planning and traffic management strategies to prioritise nonmotorized transport modes and vulnerable road users; 2) the city of Ningbo (China) which is testing a hyper-local on-demand logistics.

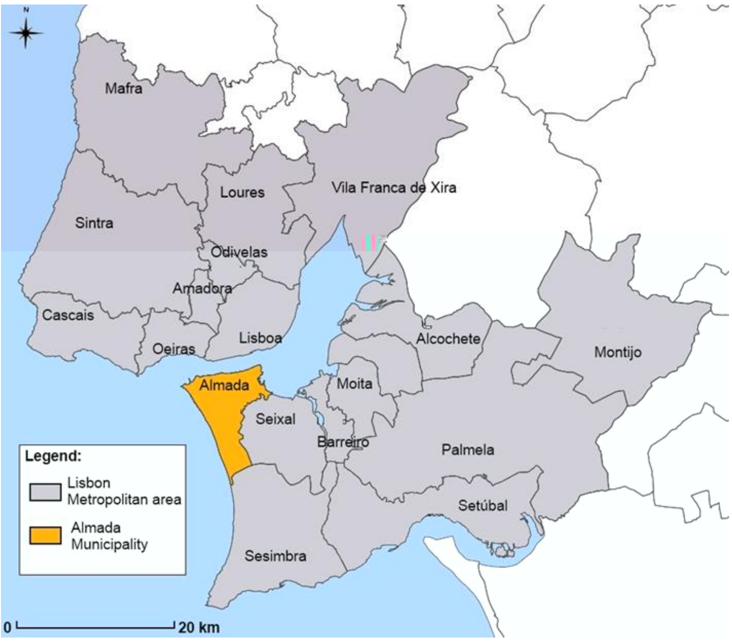


Figure 5.8.1. 2nd-Layer city: Almada (location)

5.8.2 Description of the urban mobility landscape

Although Almada has several points of interest, nearly 50% of the trips made in the municipality refer to crossing traffic, as Almada is the southern gateway to Lisbon: the bridge crossing the Tejo river, connecting Almada and Lisbon, serves nearly 160,000 vehicles a day. Mobility patterns of the population of the municipality of Almada are also influenced by the fact that from the total employed residents, about 46% work in a different municipality (mostly Lisbon and Seixal). Of the people that work inside the municipality of Almada, most work in the city of Almada (35%). The result is that from the 124,000 commuting movements of Almada municipality only 47% are internal; 32% refer to people from Almada commuting to other municipalities and 21% correspond to people doing the opposite flow (from other municipalities to Almada).

According to the 2015 Mobility Survey, the modal distribution of commuting trips of Almada residents (including departures from the municipality) shows that almost half of their trips were made by individual motorized transport (47%), while about 36% were by public transport. and 17% on foot. Bicycle use is negligible.

In relation to logistics, at present, with the exception of the loading/unloading time windows, no specific city logistics solutions aiming at rationalizing freight distribution and at reducing CO_2 emissions and energy consumption exist in Almada. The development of a Sustainable Urban Logistics Plan (SULP) envisaged the creation of an Urban Consolidation Centre for last-PLOHGHOLYHULHVZLWKWKHDLPRIUHGXFLQWKHIUHLJKWWUDIILFLQWKHFLWFHQWUHEXWL been implemented so far. Moreover, no significant agreements are known to exist among freight operators (mainly based in Lisbon) for consolidating and optimized deliveries and trips to Almada.

Almada started developing a Sustainable Urban Mobility Plan that is currently on hold, by decision of the present city council administration. In terms of infrastructure investments, Almada will expand the tram service and the EV charging infrastructure and reformulate and update the service level of the bus network. It has to be pointed out the city is implementing a living lab on logistics and circular economy.

5.8.3 Conclusion

Despite the efforts from the City Council to promote a multimodal mobility system in Almada in the last years, there is still a high car dependency in the daily trips of residents and visitors of Almada. From the 160,000 vehicles crossing the bridge every day to and from Lisbon together with other daily commuters coming to and from Almada, around 50% use private car, one third public transport and only 17% walking while the bicycle use is almost residual.

The city’s SUMP is now in stand by and the recent SULP contemplates the use of an urban consolidation centre for the last mile deliveries in the city centre (motivated and co-funded by the participation in the EU ENCLOSE project) which, among other measures, contemplates the creation of an urban consolidation centre for the last mile deliveries in the city centre. This UCC will be tested on a small-scale level within the framework of the Decarbonization Living Lab of Almada, which will run through 2020.

Although the SUMP is waiting for the final political steering and decision, the city is progressing with measures to improve urban mobility. One is the aforementioned UCC; others are the investments in EV charging infrastructures and in the public transport system.

This city is interested in two demonstrators. Tel±Aviv will bring insights for improving data collection and decision making; Ningbo, with the hyperlocal pilot, will help in integrating and improving local businesses.

Data collection for this deliverable shows the city can produce almost all the KPIs requested (see Annex M:).

5.9 ‘s-Hertogenbosch (Netherlands)

5.9.1 Introduction

‘s-Hertogenbosch is located in the South of the Netherlands. Its population is around 150,000 inhabitants and with 2000 households/km^2:. This city is interested in two pilots: 1) the city of Valencia (Spain) which is testing an intermodal urban passenger/ freight node for collective public & private transport; 2) the city of Budapest (Hungary) which is testing new dock-less bike-sharing and car-sharing systems.

5.9.2 Description of the urban mobility landscape

µV-Hertogenbosch organised a survey among citizens to estimate travel behaviour, modal choices and the future adaptation of new mobility services and new modes of transport. It is expected that the growth of e-bikes will be of high significance in the city. Also, the amount of electric cars is expected to rise significantly over the next 5 years. The city makes an effort to provide the citizen with a smooth transition to sustainable urban mobility, especially bike, e-bike and electric car and zero-emission public transport and zero-emission inner-city logistics. From the survey, it was concluded that there are main differences between mobility choices of inhabitants of urban neighbourhoods and suburban areas. The city therefore aims at improving external accessibility by both car and train.

This city has a SUMP in effect which was updated 2 years ago and which it still further elaborates, such as with a sustainable mobility action plan which is in preparation and will be in effect beginning of 2020. The SUMP has four main working lines explained below:

- Infrastructure (hardware): the city is programming multiple inner-city road redesigns whereby less public space is devoted to cars and more emphasis is put on quality of the urban fabric.
- Technology (software): it focuses on the implementation of software and data-based smart mobility solutions in order to reduce traffic congestion (by the use of apps) and modal shift towards sustainable modes of transport by the implementation of Mobility as a Service.
- Behaviour (mindware): it starts a multimodal campaign focussed towards behavioural change (modal shift) towards sustainable modes of transportation: bike, e-bike, carsharing, public transport and electric car.
- Cooperation (orgware): it is working on a multiyear program focussing on sustainable transportation of employees in its municipality, working together with businesses and entrepreneurs.

5.9.3 Conclusion

From a survey conducted by Hertogenbosch, they realized citizens will increase the use of e-bike dramatically in the city. Also, electric cars will rise significantly over the next 5 years. These results motivated the city to focus the effort on providing citizens with a smooth transition towards the use of new mobility services, especially e-bike, electric car, zero-emission public transport and zero-emission inner-city logistics. The actions are defined in the SUMP under four main strategies that affect to: the infrastructures, the use of new WHFKQRORJLHV WKH FLWL]HQV¶EHKDYLRU LQFUHDVLQJDZDUHQHVV DQG DJHQWV¶EHKDYLRU IRVWHULQ cooperation.

The two pilots that this city is interested in are aligned with the goals of the city which aims at providing the population with new mobility services and improve logistics management. Especially the pilot in Budapest will help in providing insights for the correct adoption of e-bike services. The pilot in Valencia will give Hertogenbosch the opportunity to validate the use of an intermodal node based on improving the use of bikes and e-bikes for both, either passengers or freight mobility.

With regard to the state of data compilation, this city lacks a lot of KPIs and therefore, it will require increasing the efforts during the next stages of the project (see Annex N:).

6 Comparison and benchmarking

6.1 Introduction

As can be understood from the preceding sections, the SPROUT cities vary greatly in size and profile. In this chapter the data on the KPIs (see annex) is used to compare the cities¶ mobility characteristics and put their profiles in perspective.

The KPI data was collected by each of the SPROUT-cities individually. For guidance in the process, not only a template was developed (deliverable 2.1), but also several conference calls were organised in which the city representatives could ask additional questions (see section 3.2). After the filled-in templates were returned to the project team, the data was verified and discussed in several iterations. However, the availability of data with regard to the requested indicators remained an issue (reflecting the wider data unavailability in many European cities), as can be seen in table 6.1.

Notable differences in local data collection methods were observed, such as for the data on accidents, so these KPIs were left out of the comparison in order to avoid a distorted picture. For other KPIs, such as those that concern urban logistics, in most cases data was simply not available. Hence, a selection is made of indicators for which both the data was available for sufficient number of cities and where the data was measured in a format compatible with that of other cities. For the indicators that were selected, data availability for the region of West-Midlands (Birmingham) was insufficient, so this city is left out of the benchmark.

The benchmark is structured around 7 themes: traffic volume and spatial impact, environmental impact, vehicle ownership, shared mobility, commuting, modal split, price level of mobility and urban logistics. To facilitate comparison various additional calculations were made: data on the traffic volume was calculated as a proportion of the city population (section 6.1), data on the price level of mobility (section 6.7) was converted from local currencies to euros and was calculated as a percentage of the local average monthly income.

Table 6.1.1. Availability of KPI data (in the requested format)

	Valencia	Padova	Kalisz	Budapest	Tel A.	Paris	Mech.	Ioannina	s-Hert.	Gothenb.	Arad	Almada	Minn.	Birm.
Population														
City	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	no
Metro	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
KPI01 - Residents' net average monthly income														
Per year	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	no
Per month	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	no
KPI02 - Price level of transport														
Price for one hour of parking in the city centre	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	no
Price for a single trip by public transport	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	no
Price for a monthly public transport pass	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	no
Average local price of one litre 95-octane petrol	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	no
KPI03 – Vehicle ownership														
Car ownership	yes	yes	yes	yes	yes	yes	yes	yes	no	yes	yes	yes	no	no
Bicycle ownership	no	no	no	no	yes	yes	yes	no	no	yes	yes	yes	no	no
Motorcycle ownership	yes	no	yes	yes	yes	yes	yes	yes	no	yes	yes	yes	no	yes
E-scooter ownership	no	no	no	no	yes	no	no	no	no	no	yes	no	no	no
KPI04 - Mobility Net Public Finance														
Mobility Net Public Finance	no	yes	no	yes	yes	no	no	no	no	no	yes	no	no	no
KPI05 - Mobility space usag														
Mobility space usage (m2/capita)	no	yes	yes	yes	no	yes	yes	no	no	no	yes	no	no	no
KPI06 - Distribution of land use types (%)														
Residential land use	yes	yes	no	yes	yes	yes	yes	no	no	no	yes	yes	yes	no

Industrial & business land use	yes	yes	no	yes	yes	yes	yes	no	no	no	yes	yes	yes	no
Commercial land use	no	yes	no	yes	yes	no	no	no	no	no	yes	no	yes	no
Recreational land use	no	yes	no	yes	yes	no	yes	no	no	no	yes	no	yes	no
KPI07 - Commuting to work														
Average commuting distance (km)	no	yes	yes	no	yes	yes	no	yes	yes	yes	yes	yes	no	no
Average commuting time (min)	no	yes	yes	no	yes	yes	yes	yes	no	yes	yes	yes	yes	no
KPI08 - Proportion of road types														
High-speed roads rate	no	yes	yes	yes	yes	no	yes	no	no	no	yes	no	no	yes
Slow roads rate	no	yes	yes	yes	yes	yes	yes	yes	no	no	yes	no	no	yes
Bicycles lanes rate	no	yes	no	yes	yes	yes	no	yes	no	no	yes	no	no	yes
Bus lanes rate	no	yes	no	yes	yes	yes	no	no	no	no	yes	no	no	yes
KPI09 – Fatalities														
Fatalities	Data too variable for analysis													
KPI10 - Urban mobility accidents														
Car accidents per 100,000 inhabitants	Data too variable for analysis													
Public transport accidents														
Bikes accidents														
E-scooter accidents														
KPI11 - Traffic volume of cars														
Average number of private cars entering the city on a daily basis	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	no	no	no
KPI12 - Traffic volume of freight vehicles														
Average number of trucks entering the city on a daily basis	no	yes	yes	yes	no	no	yes	no	no	yes	yes	yes	no	no
KPI13 - Environmental impact of urban mobility														
GHG (Kg CO2/inhabitant)	no	yes	no	no	yes	yes	yes	yes	yes	yes	yes	yes	yes	no
PM10 (µg/m3)	yes	yes	no	no	yes	yes	yes	no	no	yes	no	yes	no	no

NO2 (µg/m3)	yes	yes	yes	no	yes	yes	yes	no	no	yes	no	yes	no	no
KPI14 - Rate of parking spaces														
Rate of parking spaces	no	yes	yes	no	yes	yes	yes							

KPI19 - Availability of car sharing														
Number of station-based shared cars deployed per capita	no	yes	yes	yes	yes	yes	yes	yes	yes	no	yes	yes	yes	no
Number of free-floating shared cars deployed per capita	no	yes	yes	yes	yes	yes	yes	yes	yes	no	yes	yes	yes	no
Number of station-based car sharing operators in operation	no	yes	yes	yes	yes	yes	yes	yes	yes	no	yes	yes	yes	no
Number of free-floating car sharing operators in operation	no	yes	yes	yes	yes	yes	yes	yes	yes	no	yes	yes	no	no
KPI20 - Availability of real-time travel information														
Availability of real-time travel information	no	yes	yes	yes	yes	no	no	yes	yes	no	no	yes	yes	no
KPI21 - Availability of smart payment and booking methods on local public transport														
Availability of smart payment and booking methods on local public transport	no	yes	yes	no	yes	yes	no	yes	yes	yes	yes	yes	no	no
KPI22 – Commercial establishments														
Number of shops	no	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	no	no
Number of supermarkets	no	yes	no	yes	yes	yes	yes	yes	yes	yes	yes	no	no	no
Number of restaurants	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	no	no	no
Number of other type of establishments	no	yes	no	no	no	no	yes	yes	no	yes	yes	no	no	no
KPI23 - Delivery vehicle parking														
Delivery vehicle parking	no	yes												

Average number of boxes (50x50x50 cm) per delivery per shop	no	no	no	no	no	no	no	no	no	yes	no	no	no	no
Average number of boxes (50x50x50 cm) per delivery per supermarket	no	no	no	no	no	no	no	no	no	yes	no	no	no	no
Average number of boxes (50x50x50 cm) per delivery per restaurant	no	no	no	no	no	no	no	no	no	yes	no	no	no	no
Average number of boxes (50x50x50 cm) per delivery	no	no	no	no	no	no	no	no	no	yes	no	no	no	no
KPI27 - Urban logistics innovation														
number of freight capacity sharing (cargo consolidation) apps for urban delivery	no	no	no	no	no	no	yes	no	no	yes	no	yes	yes	no
number of transportation companies providing combined urban passenger & cargo delivery services by using spare (public or private) passenger transport capacity	no	no	no	no	no	no	yes	no	no	yes	no	yes	yes	no
number of transportation companies providing green urban delivery services (e.g. with cargo-bikes, bikes, electric vans)	no	no	no	no	yes	no	yes	no	no	yes	no	yes	yes	no
number of companies providing on-demand next-hour to same-day delivery services (e.g. for delivering at home an order placed online to a store)	no	no	no	no	yes	no	yes	no	no	yes	no	yes	yes	no
number of companies providing or testing delivery services using autonomous/automated vehicles	no	no	no	no	yes	no	yes	no	no	yes	no	yes	yes	no

6.2 Traffic volume and spatial impact

Figures 6.2.1 - 6.2.3 show several indicators with regard to the volume of traffic and its spatial impact: the number of private cars entering the city (KPI11), the number of parking places per household (KPI14) and the usage of space for mobility (KPI05). For easing the comparison between the cities that strongly differ in size, the number of private cars is also divided by the number of inhabitants. It must be kept in mind that comparison remains difficult due to the fact that the precise location of administrative borders of cities and the resulting inclusion or exclusion of zones of traffic attraction and generation may greatly influence the results.

With regard to the number of cars entering the city, we notice strong differences between the FLWLHV ZLWK 's-Hertogenbosch attracting the highest number of cars and Ioannina the lowest number relative to the number of inhabitants. The number of parking spaces per household also shows a strong variability, though less marked as the former KPI. In terms of spatial impact, we observe the highest number of mobility space usage in Mechelen, though a complete analysis data is lacking for too many cities for an overall analysis.

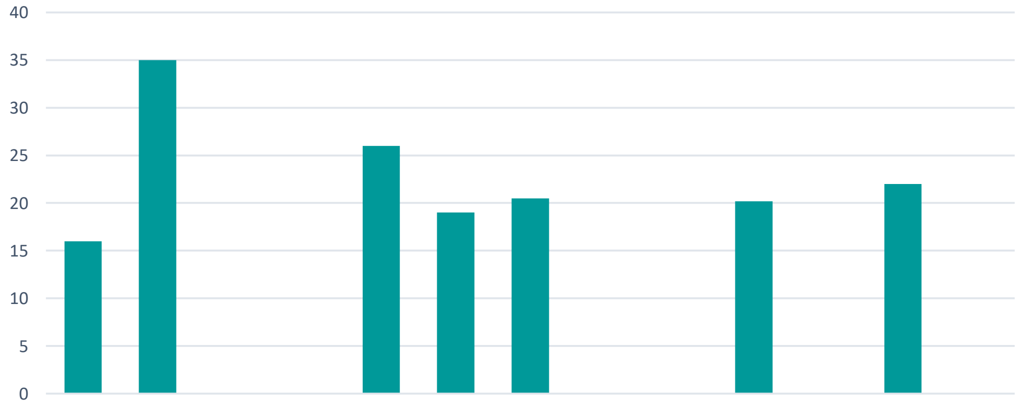
6.3 Environmental impact

Figures 6.3.1 ± 6.3.3 show several key indicators for air pollution: CO_2 emissions, the average level of PM_{10}, and the average level of NOx produced by transport (KPI13). Among the observed cities, we notice that Minneapolis has by far the highest level of CO_2 emissions produced by transport. For the other two indicators, data from Minneapolis is not available, but the significant differences exist especially with regard to NOx, for which the emissions of Tel Aviv are about six times higher than those of Paris.

5 Ibid

6 Data was not available or for cities for which no values are shown. For references, refer to the individual city profiles in chapters 4 and 5 and the KPI tables in the annex.

m² Mobility space usage per capita Figure 6.2.3. Mobility space usage per capita6



7 Data was not available or for cities for which no values are shown. For references, refer to the individual city profiles in chapters 4 and 5 and the KPI tables in the annex.

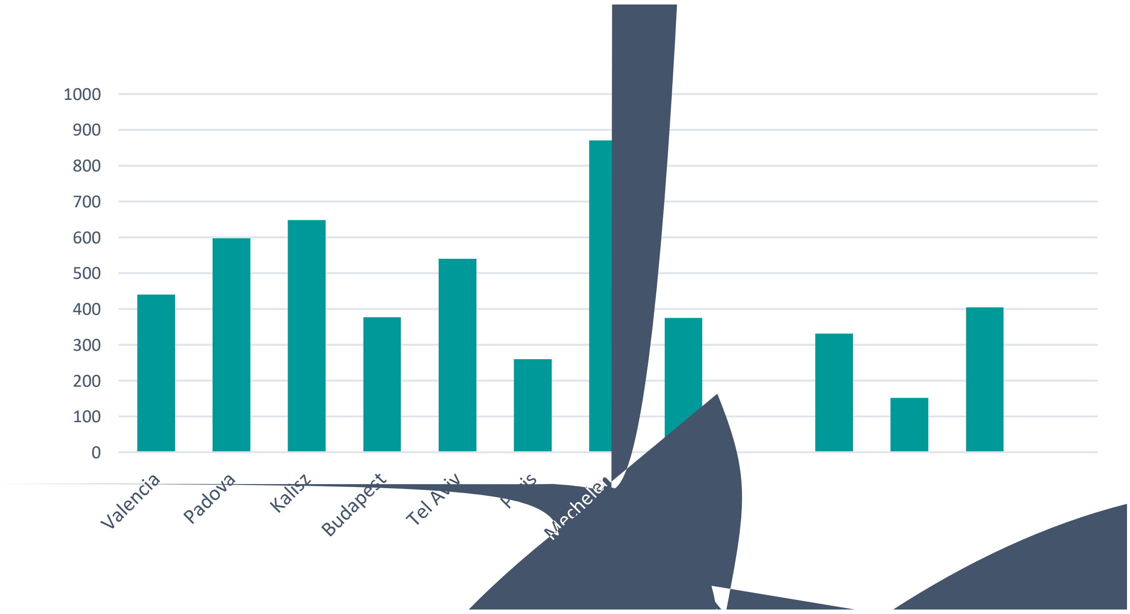
8 Ibid

6.4 Vehicle ownership

Figures 6.4.1 ± 6.4.3 show the numbers of registered vehicles (cars, motorcycles and bicycles) per 1000 inhabitants (KPI03). For cars, the strongest difference can be noted between Mechelen on the one hand with almost 900 vehicles and Arad on the other hand with about 150 vehicles per 1000 inhabitants. Mechelen also has the highest ownership rate of bicycles, followed by Gothenburg, but it must be kept in mind that bicycle registration data is available in only a few cities. Motorcycle ownership rates show a different picture, with Valencia topping the list.

9 Data was not available or for cities for which no values are shown. For references, refer to the individual city profiles in chapters 4 and 5 and the KPI tables in the annex.

Average level of NOx produced by transport



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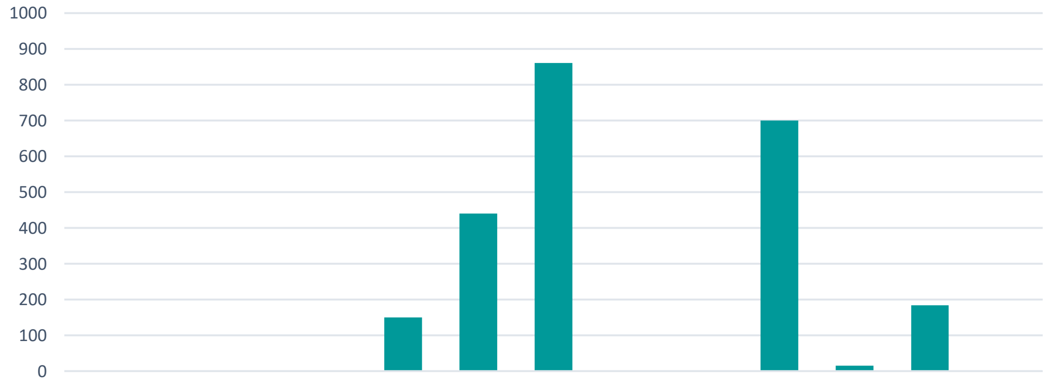
10 Data was not available or for cities for which no values are shown. For references, refer to the individual city profiles in chapters 4 and 5 and the KPI tables in the annex.

11 Ibid



6.5 Shared mobility

Figures 6.5.1 ± 6.5.3 provide an indication of the accessibility of shared mobility by showing the number of shared cars, bicycles and e-scooters per 1000 inhabitants (KPI019, KPI017, KPI018). We see that Ioannina has the highest rate of shared cars (station-based), whereas in several cities the number of shared cars is much smaller or non-existing (table 6.5.1).

Gothenburg has the highest number of (station-based) shared bicycles, which are non-existent in Ioannina, Arad and Almada. While most cities have more station-based than free-floating bicycles, in Padua only free-floating bicycles are available.

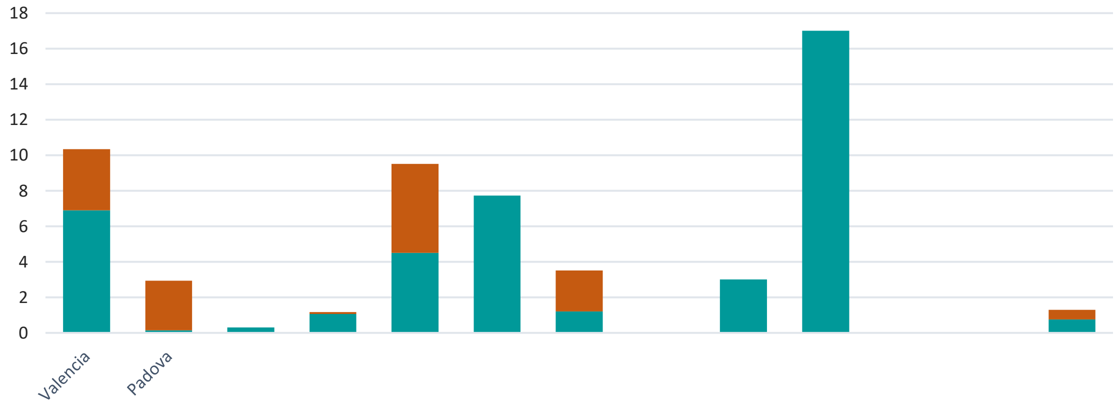
12 Data was not available or for cities for which no values are shown. For references, refer to the individual city profiles in chapters 4 and 5 and the KPI tables in the annex.

Table 6.5.1. Availability of sharing systems in SPROUT cities

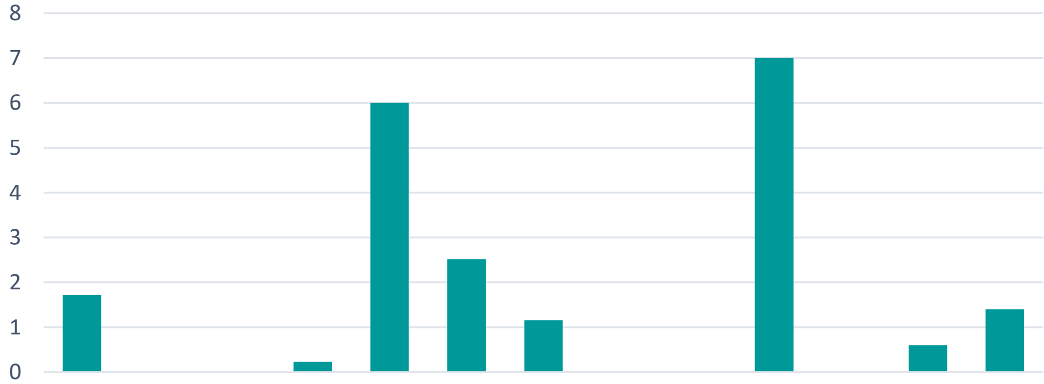
Availability of sharing systems					
	Station-based car sharing	Free floating car sharing	Station-based bike sharing	Free-floating bike sharing	E-scooter sharing
Valencia	**No data**	**No data**	**Yes**	**Yes**	**Yes**
Padua	**Yes**	**No**	**Yes**	**Yes**	**No**
Kalisz	**No**	**No**	**Yes**	**No**	**No**
Budapest	**No**	**Yes**	**Yes**	**Yes**	**Yes**
Tel Aviv	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Paris	**Yes**	**No data**	**Yes**	**No data**	**Yes**
Mechelen	**Yes**	**No**	**Yes**	**Yes**	**Yes**
Ioannina	**No**	**No**	**No**	**No**	**No**
‘s-Hertogenbosch	**Yes**	**No**	**Yes**	**No**	**No**
Gothenburg	**Yes**	**No**	**Yes**	**No**	**Yes**
Arad	**No**	**No**	**No**	**No**	**No**
Almada	**No**	**No**	**No**	**No**	**Yes**
Minneapolis	**Yes**	**No**	**Yes**	**Yes**	**Yes**

13 Data was not available or for cities for which no values are shown. For references and definitions, refer to the individual city profiles in chapters 4 and 5 and the KPI tables in the annex.

Number Shared cars per 1000 inhabitants Station-basedFree-floatingFigure



14 Ibid

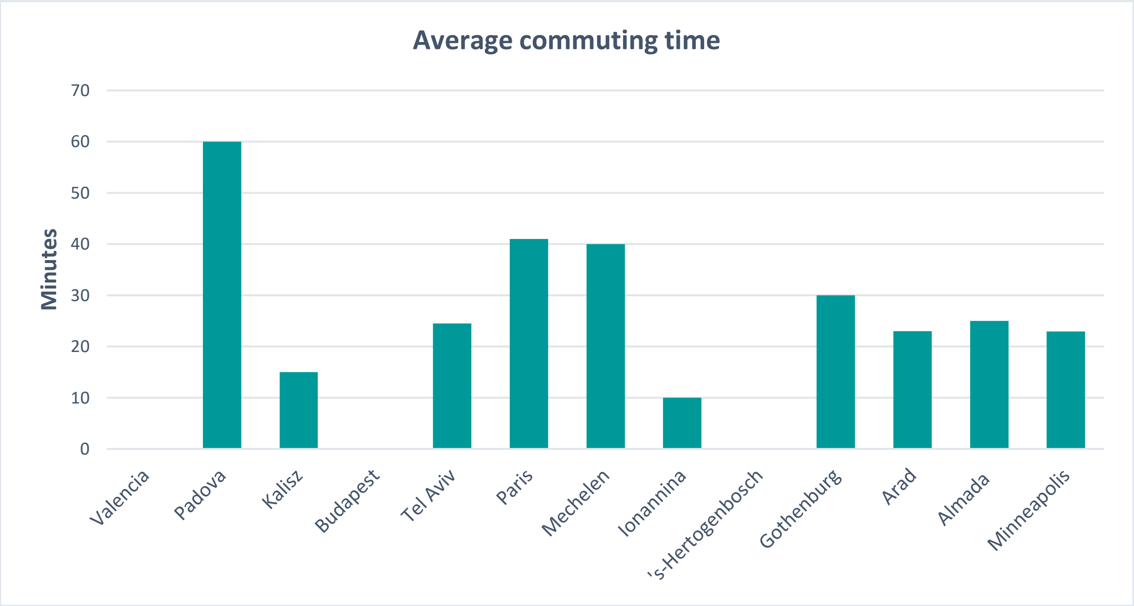


6.6 Commuting

In figures 6.6.1 and 6.6.2 the cities are compared concerning the average time and distance for the commute of their inhabitants, which is defined as the time it takes to travel to work (KPI07). It can be noted that Padua has the longest commute time-wise. Thought FRPPXWHUVLQ3DGRYDWUDYHOUHODWLYHOIDUFRPPXWHUVLQ Heerlen which travel furthest.

15 Data was not available or for cities for which no values are shown. For references, refer to the individual city profiles in chapters 4 and 5 and the KPI tables in the annex..

Number Shared e-scooters per 1000 inhabitants Figure 6.5.3. Shared e-scooters per 100



16 Data was not available or for cities for which no values are shown. For references, refer to the individual city profiles in chapters 4 and 5 and the KPI tables in the annex.

17 Ibid

6.7 Modal split

Figures 6.7.1 and 6.7.2 compare the cities in terms of modal split, both for trips within the city (KPI015) as for commuter trips to the city (KPI016). For trips within the city, it can be observed that the rate of car usage is by far the highest in Minneapolis (over 80% of trips), while for commuter trips Budapest has the highest rate and Ioannina has the lowest rate of car usage.

Logically, the usage rate of active modes is more important for trips within the city than for commuting. Especially Paris is remarkable for its extraordinarily high rate of walking. For commuter trips this region also stands out for its high rate of public transport usage.

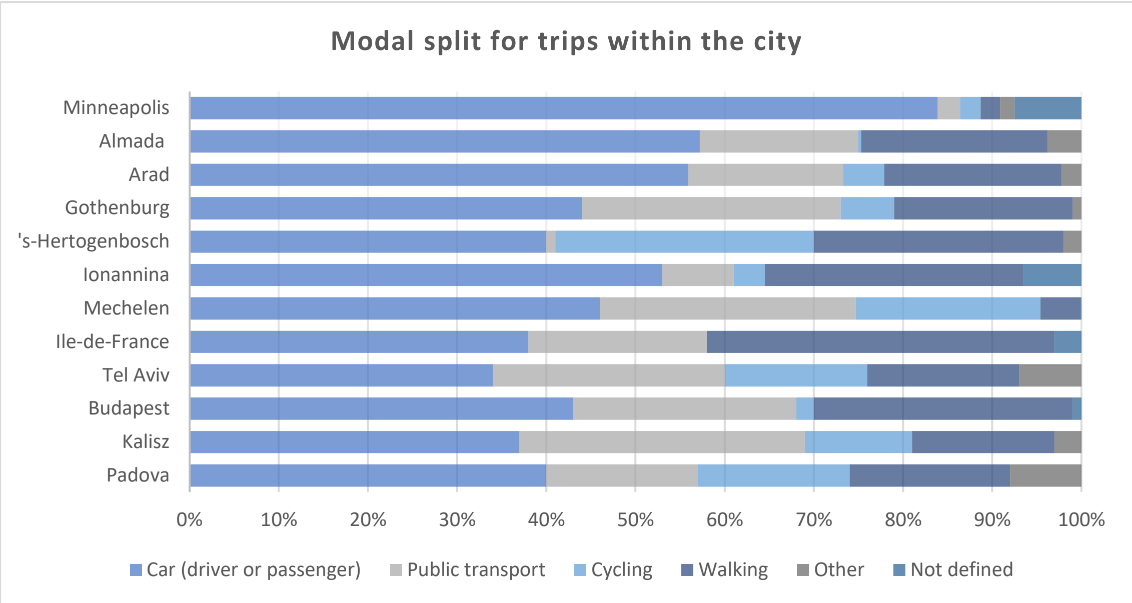


Figure 6.7.1. Modal split for trips within the city (% of trips)[18]

18 FRUVRPHFLWLHVGDWDLVQWDYDLODEOHIRUVRPHWUDQVSRUWPRGHVZKLFKDUHWKHUHIRUHFDWHJ For references, refer to the¶ individual city profiles in chapters 4 and 5 and the KPI tables in the annex.

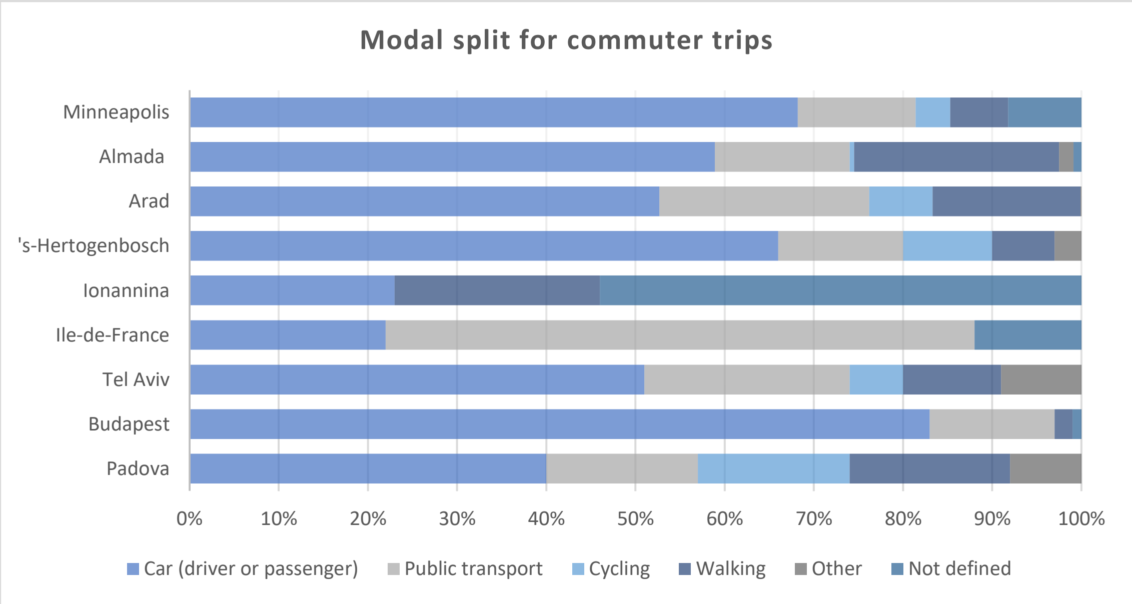


Figure 6.7.2. Modal split for commuting trips from outside the city (% of trips)[19]

6.8 Price level of mobility

Figures 6.8.1 ± 6.8.8 show the price levels of several components of mobility in the SPROUT cities (KPI02), both in absolute terms as in percentages of the average monthly income per capita. The indicators include the price of parking (one hour in the city centre), the price of a single trip by public transport, the price of a monthly public transport pass and the price of one litre of petrol.

In terms of parking, Paris and Valencia are the most expensive cities (regions). Parking in these cities is also expensive when measured relative to income, though here Ioannina tops the list.

When looking at the prices for public transport, but also for petrol, it is remarkable that the prices in Arad are modest in an absolute sense, but high in relative terms. For the monthly SXEOLF WUDQVSRUW SDVV 's-Hertogenbosch and Minneapolis stand out both in absolute as in relative terms.

It must be kept in mind that direct comparisons of price levels entail various difficulties. Parking prices, for example, typically vary throughout the city by zone, and the ratio of the prices in the most expensive zone to the average parking prices in cities might differ from city to city.

19 FRUVRPHFLWLHVGDWDLVQRWDYDLODEOHIRUVRPHWUDQVSRUWPRGHVZKLFKDUHWKHUHIRUHFDWHJRULVHGDV ¶QRWGHILQHG¶ For references, refer to the individual city profiles in chapters 4 and 5 and the KPI tables in the annex.

OVR WKHUH DUH YDULRV DV WR GHILH WKH SULFH D VLJOH WULS E SEOLF WUDVSRUW ,V -
Hertogenbosch, for example, a flat-rate single ride ticket is relatively expensive, but the price of a fare is typically calculated in accordance with the distance travelled. Similar difficulties

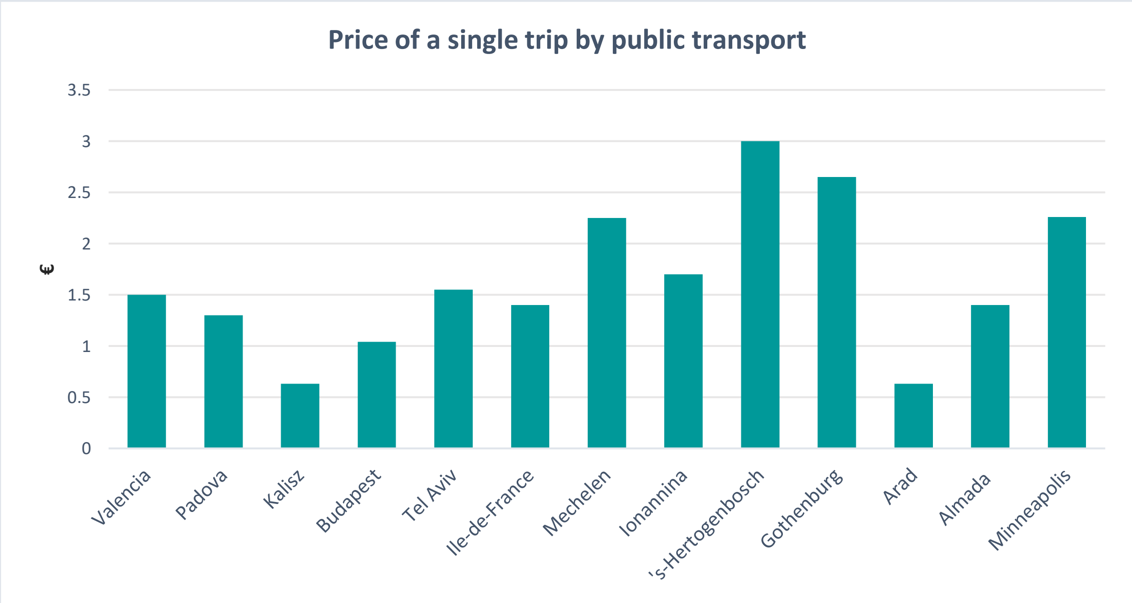
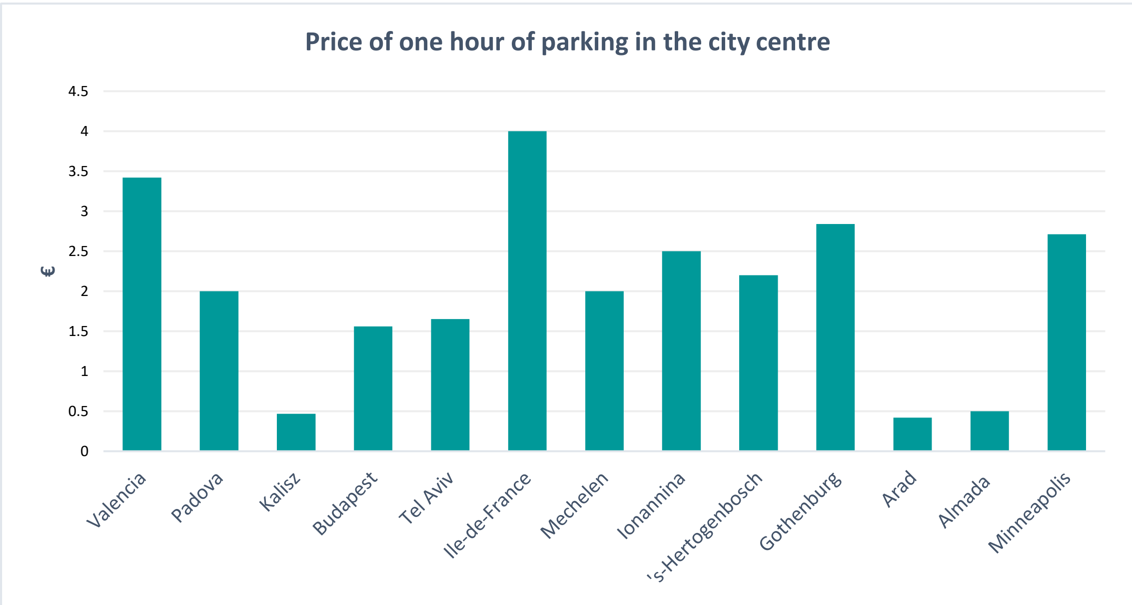


Figure 6.8.1. Price of a single trip by public transport[20]

pertain for the comparison of month passes, which in certain cities might be valid for all possible transport modes in the entire city, but in other cities only for a specific transport mode, trajectory or zone.

20 All prices converted from local currencies to euros (December 2019). Data was not available or for cities for which no values are shown. For references and definitions, refer to the individual city profiles in chapters 4 and 5 and the KPI tables in the annex.



21 All prices converted from local currencies to euros (December 2019). Data was not available or for cities for which no values are shown. For references and definitions, refer to the individual city profiles in chapters 4 and 5 and the KPI tables in the annex.

22 Ibidem

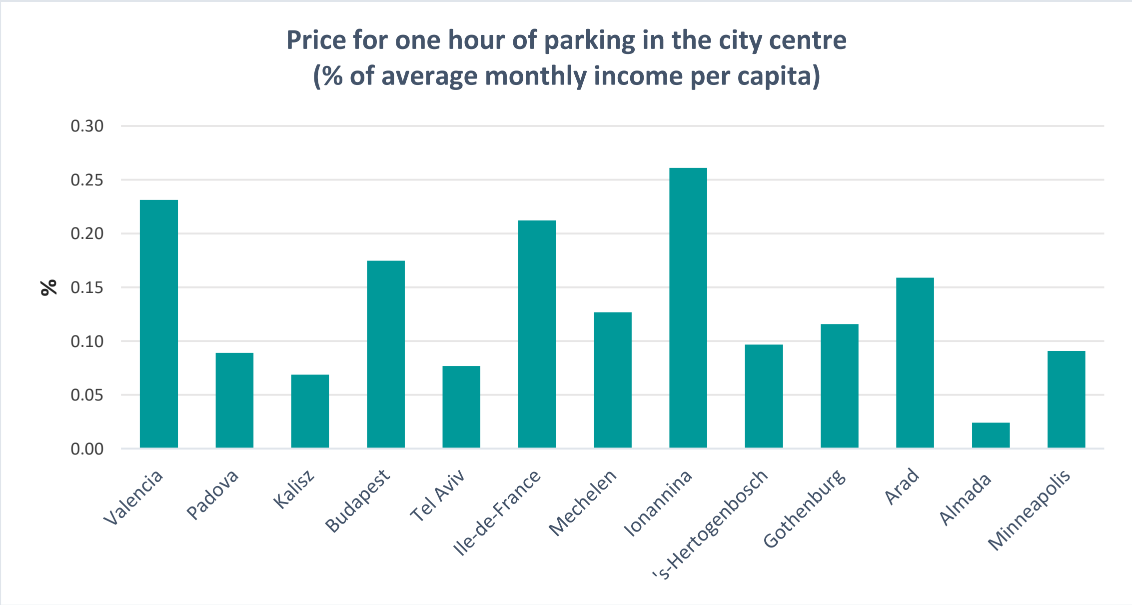
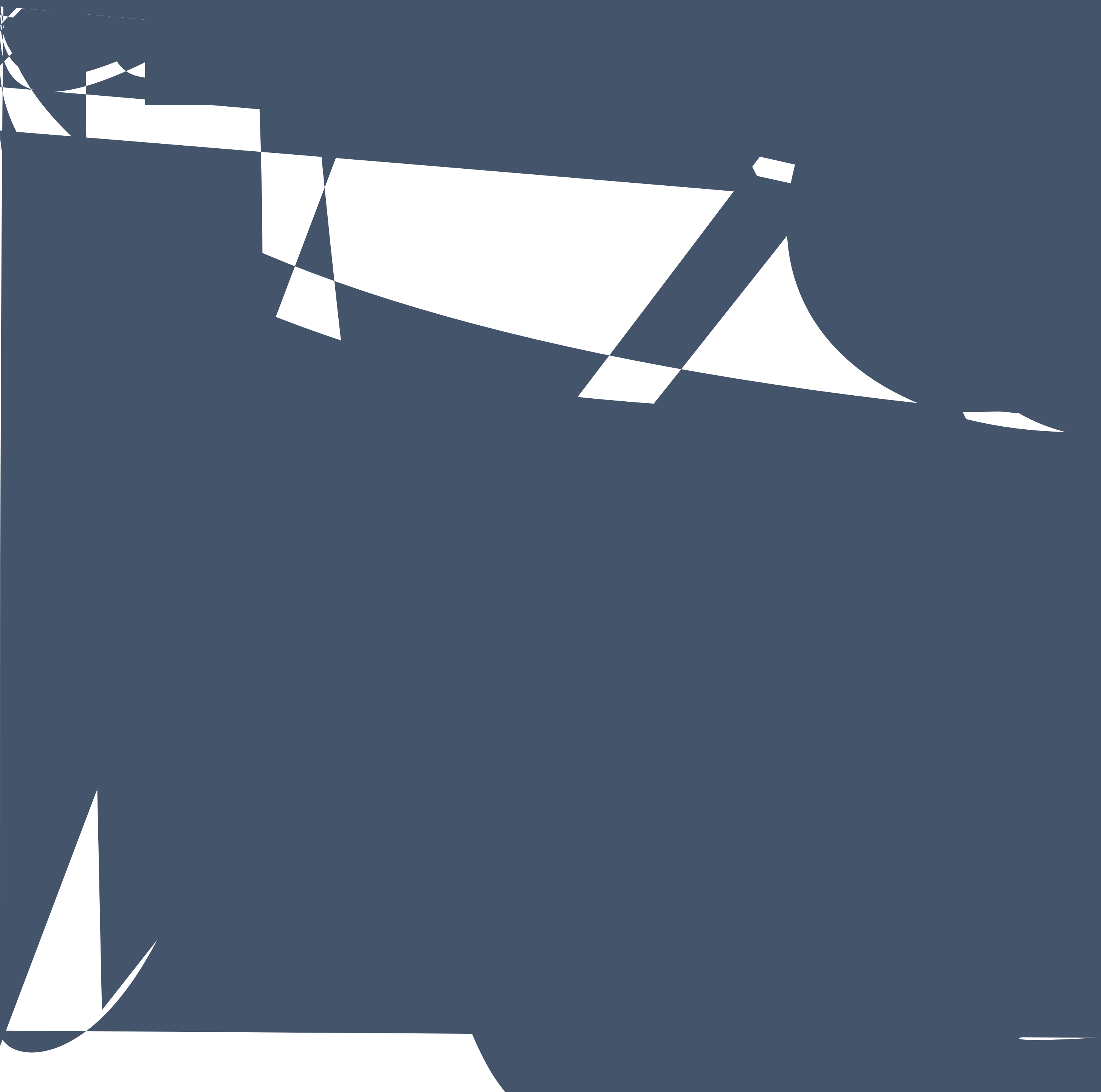


Figure 6.8.4. Price of one hour of parking in the city centre relative to income[23]

23 All prices converted from local currencies to euros (December 2019). Data was not available or for cities for which no values are shown. For references and definitions, refer to the individual city profiles in chapters 4 and 5 and the KPI tables in the annex.

24 Ibidem



Price of a monthly public transport pass relative to income

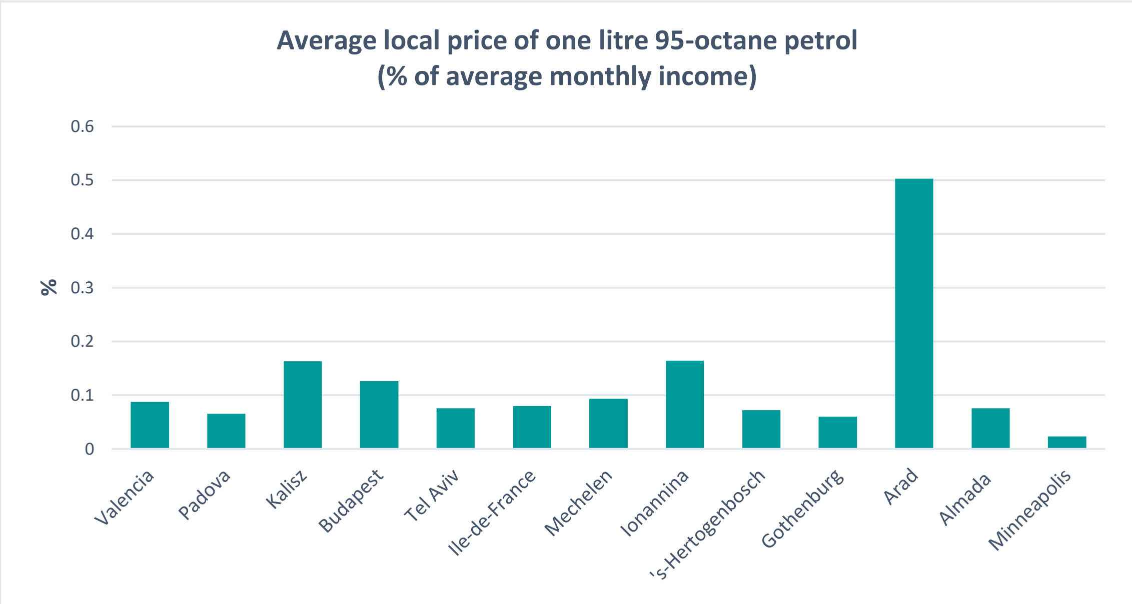


Figure 6.8.8. Average local price of a litre of petrol, relative to income[27]

6.9 Urban logistics

As table 6.1.1 shows, data concerning urban logistics is very sparse. Most cities do not have data available, or the data is too variable for analysis. Figures 6.9.1 and 6.9.2 nevertheless show the characteristics of the SPROUT cities with regard to two urban logistics indicators: the number of delivery vehicle parking places and the number of daily freight trips. From the cities that have data available, Paris stands out from the rest in terms of delivery vehicle parking places. For the number of daily freight trips, there is a clear division between on the one hand Arad, Almada and Mechelen with more than 16 daily freight trips, and on the other hand Padova and Gothenburg with fewer than 3 daily freight trips per 1000 inhabitants.

27 All prices converted from local currencies to euros (December 2019). Data was not available or for cities for which no values are shown. For references and definitions, refer to the individual city profiles in chapters 4 and 5 and the KPI tables in the annex.

n m

al city profiles in

7 Conclusion

This deliverable presents a first overview of the urban mobility situation in the 1st and 2nd -layer SPROUT cities. The data used for this deliverable was collected by representatives of the cities themselves, based on the KPIs that were presented in deliverable 2.1. For many cities, the collection of data in the proposed format appeared to be challenging, especially for certain themes such as urban logistics. Hence, for the benchmark it was decided to compare the cities in a few key themes with regard to the urban mobility transition (volume of traffic and spatial impact, environmental impact, vehicle ownership, shared mobility, commuting, modal split, price level of mobility and urban logistics). From the analysis we can conclude that the cities show very large differences in all themes. With the available data it is therefore difficult to establish rankings with regard to sustainable mobility, to distinguish patterns or to typify thematic clusters of cities.

Certain cities, however, stand out from the rest on or several topics. Arad, for example, has very high mobility prices (price petrol, price of public transport tickets) when calculated as a percentage of income. Minneapolis has by far the highest car use rate (over 80%). Tel Aviv stands out in the sense that all types of shared mobility are available, while in other cities (Arad, Almeida, Ioannina), no shared mobility systems exist.

Annex A: Urban mobility KPIs for Valencia

Urban population and economics					
KPI01 - Residents' net average monthly income					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI02 - Price level of transport					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI03 - Vehicle ownership rate					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

KPI04 - Mobility Net Public Finance					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
Urban land use and accessibility					
KPI05 - Mobility space usage					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI06 - Distribution of land use types					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
					Yearly

KPI07 - Commuting to work					
No data					
Urban traffic and infrastructure					
KPI08 - Proportion of road types					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI09 - Fatalities					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

[30] *First value for bicycle lanes, second value for bicycle boulevards*

KPI10 - Urban mobility accidents					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI11 - Traffic volume of cars					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI12 - Traffic volume of freight vehicles					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
Traffic volume of freight vehicles	***No data***				
KPI13 - Environmental impact of urban mobility					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

Urban passenger & active transport characteristics					
KPI14 - Rate of parking spaces					
No data					
KPI15 - Modal split for passenger trips within the city					
No data					
KPI16 - Modal split for trips for commuting to the city					
No data					
KPI17 - Availability of bike-sharing					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
		31			

31 http://www.valencia.es/ayuntamiento/catalogo.nsf/IndiceAnuario?readForm&lang=1&capitulo=3&tema=10&bdOrigen=ayuntamiento/estadistica.nsf&idApoyo=58FB3C7A3D56E414C1257DD40057EB6C

KPI18 - Availability of e-scooter sharing					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI19 - Availability of car sharing					
No data					
KPI20 - Availability of real-time travel information					
No data					
KPI21 - Availability of smart payment and booking methods on local public transport					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
Availability of smart payment and booking methods on local public transport					
Urban Logistics					
KPI22 – Commercial establishments					

Sub-indicator name	Value	Data source	Geographic Aggregation Level	Responsible	Date & Frequency
KPI23 - Delivery vehicle parking					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI24 - Freight trips					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
Freight trips					

32 http://www.valencia.es/ayuntamiento/catalogo.nsf/IndiceAnuario?readForm&lang=1&capitulo=3&tema=11&bdOrigen=ayuntamiento/estadistica.nsf&idApoyo=58FB3C7A3D56E414C1257DD40057EB6C

KPI25 - Goods delivery frequency					
No data					
KPI26 - Goods delivery volumes					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI27 - Urban logistics innovation					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

Annex B: Urban mobility KPIs for Padua

Urban population and economics					
KPI01 - Residents' net average monthly income					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI02 - Price level of transport					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI03 - Vehicle ownership rate					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

KPI04 - Mobility Net Public Finance					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
Urban land use and accessibility					
KPI05 - Mobility space usage					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI06 - Distribution of land use types					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

KPI07 - Commuting to work					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
					-
					-
Urban traffic and infrastructure					
KPI08 - Proportion of road types					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
	1%				
KPI09 - Fatalities					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

[33] *First value for bicycle lanes, second value for bicycle boulevards*

KPI10 - Urban mobility accidents					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI11 - Traffic volume of cars					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI12 - Traffic volume of freight vehicles					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
Traffic volume of freight vehicles					
KPI13 - Environmental impact of urban mobility					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

		- - -			
Urban passenger & active transport characteristics					
KPI14 - Rate of parking spaces					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI15 - Modal split for passenger trips within the city					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
	40%				

KPI16 - Modal split for trips for commuting to the city					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI17 - Availability of bike-sharing					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

KPI18 - Availability of e-scooter sharing					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI19 - Availability of car sharing					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI20 - Availability of real-time travel information					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI21 - Availability of smart payment and booking methods on local public transport					

Sub-indicator name	Value	Data source	Geographic Aggregation Level	Responsible	Date & Frequency
Urban Logistics					
KPI22 – Commercial establishments					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI23 - Delivery vehicle parking					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI24 - Freight trips					

Sub-indicator name	Value	Data source	Geographic Aggregation Level	Responsible	Date & Frequency
KPI25 - Goods delivery frequency					
No data					
KPI26 - Goods delivery volumes					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
[redacted]					

[redacted]

98 Tm0 g1P <</MCID 142>> BDC 630.91 247.49 66984 P <<r 296.47 96.96 0.47 80.04ef 247 0.4/MCID 145>> BDC 690.92 2g56.84 334.87 102.14 28 0.47MCID 142>> BDCs

KPI27 - Urban logistics innovation					
No data					

Annex C: Urban mobility KPIs for Kalisz

Urban population and economics					
KPI01 - Residents' net average monthly income					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI02 - Price level of transport					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI03 - Vehicle ownership rate					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

KPI04 - Mobility Net Public Finance					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
Urban land use and accessibility					
KPI05 - Mobility space usage					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI06 - Distribution of land use types					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

KPI07 - Commuting to work					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
					2019
Urban traffic and infrastructure					
KPI08 - Proportion of road types					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI09 - Fatalities					

Sub-indicator name	Value	Data source	Geographic Aggregation Level	Responsible	Date & Frequency
KPI10 - Urban mobility accidents					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI11 - Traffic volume of cars					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI12 - Traffic volume of freight vehicles					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
Traffic volume of freight vehicles					
KPI13 - Environmental impact of urban mobility					

[35] Statistical Office gives only the total number of road accidents, without any breakdown by type of transport or vehicle (bicycles or scooters, public transport).

Sub-indicator name	Value	Data source	Geographic Aggregation Level	Responsible	Date & Frequency
Urban passenger & active transport characteristics					
KPI14 - Rate of parking spaces					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI15 - Modal split for passenger trips within the city[36]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

[36] Modal split calculated based on the number of trips per mode

KPI16 - Modal split for trips for commuting to the city					
KPI17 - Availability of bike-sharing					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI18 - Availability of e-scooter sharing[37]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

[37] E-scooter sharing: service not available

KPI19 - Availability of car sharing[38]					
No data					
KPI20 - Availability of real-time travel information					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI21 - Availability of smart payment and booking methods on local public transport					
SubMCID 107DC q6684					

KPI23 - Delivery vehicle parking					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI24 - Freight trips[41]					
KPI25 - Goods delivery frequency[42]					
KPI26 - Goods delivery volumes[43]					

[39] Accomodation and food service activities

[40] Legal and financial services, public services, craft, other services

[41] Available by mid-2020 using surveys in the city centre

[42] Available by mid-2020 using surveys in the city centre

[43] Available by mid-2020 using surveys in the city centre

KPI27 - Urban logistics innovation[44]

[44] Available by mid-2020 using surveys in the city centre

Annex D: Urban mobility KPIs for Budapest

Urban population and economics					
KPI01 - Residents' net average monthly income					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI02 - Price level of transport					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

KPI03 - Vehicle ownership rate					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI04 - Mobility Net Public Finance					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
Urban land use and accessibility					
KPI05 - Mobility space usage					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

KPI06 - Distribution of land use types[46]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
					2011
KPI07 - Commuting to work					
Urban traffic and infrastructure					

[45] Roads:31,61 km2
Underground, Rail & tramways: 7,06 km2
Waterways: 7,66 km2

[46] City area: 525,2 km2
Residential land use: 154,8 km2
Industrial &business land use: 30,72 km2
Commercial land use: 46,82 km2
Recrational land use: 8,81 km2

KPI08 - Proportion of road types[47]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI09 - Fatalities					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI10 - Urban mobility accidents					
No data					
KPI11 - Traffic volume of cars					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

47

KPI12 - Traffic volume of freight vehicles					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
Traffic volume of freight vehicles					
KPI13 - Environmental impact of urban mobility					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
Urban passenger & active transport characteristics					
KPI14 - Rate of parking spaces					

[48] 47 500 / day (freight vehicles <3.5 t)

20,800 / day (freight vehicles >3.5 t)

KPI15 - Modal split for passenger trips within the city[49]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

KPI16 - Modal split for trips for commuting to the city[50]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

[49] This data can be derived from previous household surveys:

A) Asking for the length of trips per mode between the origin and the destination

B) Asking for the number of trips per mode

[50] This data can be derived from previous household surveys:

A) Asking for the length of trips per mode between the origin and the destination

B) Asking for the number of trips per mode

KPI17 - Availability of bike-sharing					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI18 - Availability of e-scooter sharing[51]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

[51] Estimated number of e-scooter is 400 pieces. (~350 Lime and ~50 Breezy)

KPI19 - Availability of car sharing					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI20 - Availability of real-time travel information					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI21 - Availability of smart payment and booking methods on local public transport					
Urban Logistics					

KPI22 – Commercial establishments					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

9.34 96.62404 11.52 r<<271.87 2 g*0 g(9.3429.34 96.62404 11.52 r<</ 0 0 1 16EMC 65 96.5.65 25.92 reW* nBT/F8 9.96 Tf0 0 1 187.3.92 re s540 g(9.34 96.624Stre)-4(et)-3(M)

KPI25 - Goods delivery frequency					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI26 - Goods delivery volumes					
KPI27 - Urban logistics innovation					

Annex E: Urban mobility KPIs for Tel Aviv

Urban population and economics					
KPI01 - Residents' net average monthly income					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI02 - Price level of transport					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

[54] On-street parking is free for Tel-Aviv Yafo residents in designated spaces; Non-residents: (Sun-Thurs 9:00-19:00 and Fridays 9:00-13:00) 6.30 NIS per hour; Off-street car park municipally owned carparks (Ahuzot Hof) 16 NIS for the first hour (or part thereof) and 4 NIS for every additional 15 minutes (or part thereof)* **Privately owned/run carparks charge anywhere from 20-40 NIS per hour

KPI03 - Vehicle ownership rate					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI04 - Mobility Net Public Finance					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
Urban land use and accessibility					
KPI05 - Mobility space usage					

55 This is based on the number of cars registered in Tel Aviv Yafo but this includes company cars, whereby the company maybe Tel Aviv based but the actual car driver not a Tel Aviv Yafo resident

56

Sub-indicator name	Value	Data source	Geographic Aggregation Level	Responsible	Date & Frequency
KPI06 - Distribution of land use types[58]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
					2017
KPI07 - Commuting to work					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
					Data collected between 2014-2016

[58] City area: 525,2 km2

Residential land use: 154,8 km2

Industrial &business land use: 30,72 km2

Commercial land use: 46,82 km2

Recrational land use: 8,81 km2

Urban traffic and infrastructure					
KPI08 - Proportion of road types					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI09 - Fatalities					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI10 - Urban mobility accidents					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

[59] Roads with a speed limit over 51kmh 9.4%; Roads with a speed limit over 30kmh 81%

KPI11 - Traffic volume of cars					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
					
KPI12 - Traffic volume of freight vehicles					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
Traffic volume of freight vehicles[61]					

[60] There is no city specific data available at a countrywide level there were in 2017 111 road accidents involving e-scooters

[61] Based on the traffic counts carried out in Tel Aviv Yafo, between 2009-2016, the volume of freight trucks is around 6% of the total volume. For example, taking the average hourly traffic volume in two of the main arteries (Givat HaTachmoshet and La Guardia) into the city centre we get an average of 135 an hour.

KPI13 - Environmental impact of urban mobility					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
Urban passenger & active transport characteristics					
KPI14 - Rate of parking spaces					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI15 - Modal split for passenger trips within the city[63]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

[62] On-street parking – 34,709; Handicapped on-street parking 2693 (of which 1342 are designated for a specific licence holder) Off-street parking an estimated 120,000 car park spaces (of which 84,000 are in car parks operated by the municipally owned Ahuzot Hof) A further estimated 40,000 are parking spaces attached to residential buildings. Number of households in Tel Aviv Yafo - 199700

[63] The modal-split is calculated with regards to A trips per mode. There is no differentiation between a car driver and a car passenger with regards to getting to work.
63% of residents work in the city; 12% travel up to 10km to get to work; 12% travel 10-20km; 4% travel 20-40km; 2% travel over 40km; And 7% varying (Taub Centre for Social Policy Studies in Israel 2018 data correct for 2016) . With regards to trip length – 26.8% spend up to 14 minutes getting to work; 34.1% between 15-29 minutes; and 35.1 30 minutes or more (Central Bureau of Statistics 2016 Social Survey).

KPI16 - Modal split for trips for commuting to the city[64]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

[64] Commuting for work. Commuting trips into the city centre by private (drivers/passengers) 33% and the rest by public transport and non-motorised modes (Municipality Strategy for Mobility and Transport December 2018). The split above is the overall modal-split, the data to determine modal-split by either A or B is unavailable.64% of those employed in Tel Aviv Yafo commute into the city.

KPI17 - Availability of bike-sharing					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI18 - Availability of e-scooter sharing[65]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

[65] Each operator licensed for up to 2500 e-scooters

KPI19 - Availability of car sharing[66]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

KPI20 - Availability of real-time travel information	
Sub-indicator name	**Value**

Sub-indicator name	Value	Data source	Geographic Aggregation Level	Responsible	Date & Frequency
Urban Logistics					
KPI22 – Commercial establishments					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

KPI25 - Goods delivery frequency[68]					
No data					
KPI26 - Goods delivery volumes[69]					
No data					
KPI27 - Urban logistics innovation					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

67 This is an estimate based on the percentage of freight vehicles entering the city (2016). In general counts are carried from 7am to 7pm. The data regarding freight trips within the city is not available

68 While the importance of this issue is recognised in Tel Aviv Yafor's SUMP also recognised in this document is the severe lack of data on all matters pertaining to the issue

69 As part of the Civitas 2Move2 project two attempts were made to engage both shop holders and logistics providers in a Logistics Forum aimed at gaining insight into all matters pertaining to logistics to improve the movement of goods in the city. The first attempt which was at a specific neighbourhood level failed completely; The second at a city level attracted some of the major distributors shop holders and smaller distributors remained uninterested in cooperating in this matter. This means that there is a lack of data in this area.

Annex F: Urban mobility KPIs for Ioannina

Urban population and economics					
KPI01 - Residents' net average monthly income[70]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI02 - Price level of transport					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI03 - Vehicle ownership rate					

70 Assuming GDP per capita in 2014 (source: ine.pt - Gross Domestic Product per inhabitant at current prices (Base 2011 - €)

Sub-indicator name	Value	Data source	Geographic Aggregation Level	Responsible	Date & Frequency
	375				
	61				
KPI04 - Mobility Net Public Finance					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
Urban land use and accessibility					
KPI05 - Mobility space usage					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI06 - Distribution of land use types					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

71

KPI07 - Commuting to work[72]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

[redacted]

KPI09 - Fatalities					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI10 - Urban mobility accidents					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI11 - Traffic volume of cars					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI12 - Traffic volume of freight vehicles					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
Traffic volume of freight vehicles					
KPI13 - Environmental impact of urban mobility					

Sub-indicator name	Value	Data source	Geographic Aggregation Level	Responsible	Date & Frequency
Urban passenger & active transport characteristics					
KPI14 - Rate of parking spaces					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI15 - Modal split for passenger trips within the city[74]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

[73] The Municipality offers free parking to citizen and visitors as well

[74] 53% of trips are carried out by private cars (drivers and passengers).

KPI16 - Modal split for trips for commuting to the city[75]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI17 - Availability of bike-sharing[76]					
		Data source	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

7

KPI18 - Availability of e-scooter sharing[77]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI19 - Availability of car sharing[78]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

[77] Service not available

[78] There are no free car-sharing services in operation in Ioannina.

KPI20 - Availability of real-time travel information					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI21 - Availability of smart payment and booking methods on local public transport					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
Urban Logistics					
KPI22 – Commercial establishments[79]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

[79] Data collected within the framework of the ENCLOSE Project

KPI23 - Delivery vehicle parking					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI24 - Freight trips					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI25 - Goods delivery frequency					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

Annex G: Urban mobility KPIs for Gothenburg

Urban population and economics					
KPI01 - Residents' net average monthly income					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI02 - Price level of transport					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI03 - Vehicle ownership rate					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

KPI04 - Mobility Net Public Finance					
Urban land use and accessibility					
KPI05 - Mobility space usage					
KPI06 - Distribution of land use types					
KPI07 - Commuting to work					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
Urban traffic and infrastructure					

80

KPI08 - Proportion of road types					
KPI09 - Fatalities					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI10 - Urban mobility accidents					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI11 - Traffic volume of cars					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

KPI12 - Traffic volume of freight vehicles					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
Traffic volume of freight vehicles[82]					
KPI13 - Environmental impact of urban mobility					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
Urban passenger & active transport characteristics					

[81] This indicates the number of passages through the congestion tax stations and NOT the number of vehicles. 138 million registered passages in Gothenburg in 2018. Approx. 620 000 per day of which cars account for 75% Not able to differentiate how many of these cars are privately owned or company cars (all vehicles pay the congestion tax).

[82] This indicates the number of passages through the congestion tax stations and NOT the number of vehicles. 138 million registered passages in Gothenburg in 2018. Approx. 620 000 per day. Light trucks accounted for 15 % of this and heavy trucks for 5 %.

KPI14 - Rate of parking spaces					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

KPI15 - Modal split for passenger trips within the city[84]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

KPI16 - Modal split for trips for commuting to the city[85]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

83 The total number of parking spaces available are probably substantially higher. This is the number for parking spaces owned by the city and includes on street parking and off street parking

84 Car as a driver or passenger is the same because this is the number of trips made with the car, it is not known if they are the driver or the passenger.

85 Car as a driver or passenger is the same because this is the number of trips made with the car, it is not known if they are the driver or the passenger.

KPI17 - Availability of bike-sharing					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI18 - Availability of e-scooter sharing					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

KPI19 - Availability of car sharing[86]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI20 - Availability of real-time travel information					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

[86] Have e-mailed around to the three largest car pool companies and received a response from Moveabout. They have about 30 vehicles on the roads in Gothenburg. Sunfleet rents 181 parking spaces from us and buys 21 parking permits. They have about 550 vehicles. Then there are private players from which they rent places. We also have some smaller car pool companies that rent individual car spaces from us. " Unfortunately, it does not give a very good overview, more of a "minimum value.

KPI21 - Availability of smart payment and booking methods on local public transport[87]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
Urban Logistics					
KPI22 – Commercial establishments					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI23 - Delivery vehicle parking[88]					

[87] No Contactless, it is 100% mobile ticketing.KPI Formula is calculated by ticket sales in mobile ticketing divided by total ticket sales

[88] The inner city does not have delivery vehicle parking places. These were removed in 2014 as a measure to increase the attractiveness and accessibility for pedestrians in the inner city. As a result, delivery vehicles can stop where they need to to unload their deliveries – during the imposed time frame (between 5-11 am)

Sub-indicator name	Value	Data source	Geographic Aggregation Level	Responsible	Date & Frequency
KPI24 - Freight trips					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI25 - Goods delivery frequency					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI26 - Goods delivery volumes					

Sub-indicator name	Value	Data source	Geographic Aggregation Level	Responsible	Date & Frequency
KPI27 - Urban logistics innovation					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

Annex H: Urban mobility KPIs for Arad

Urban population and economics					
KPI01 - Residents' net average monthly income					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI02 - Price level of transport					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

KPI03 - Vehicle ownership rate					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI04 - Mobility Net Public Finance[89]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
Urban land use and accessibility					

[89] http://www.arad.insse.ro/# - GDP Arad County 2016

http://www.insse.ro/cms/sites/default/files/field/publicatii/populatia_romaniei_pe_localitati_la_1ianuarie2016_0.pdf - Arad County population

Detailed Revenues and Expenditure Local budget for the year 2019 – City of Arad

KPI05 - Mobility space usage					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI06 - Distribution of land use types[90]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
					2015 / at 10 years
KPI07 - Commuting to work					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

[90] Housing areas have also complementary functions – trade (small and medium shops).There are approx. 20 medium and big shops, with a surface of approx. 0,1 km²/ unit

[91] 7,7 km for public transport (average speed of 15,4 km/hour) - 6,6 km for vehicles N-S axis (average speed of 22,1 km/hour) - 7,7 km for vehicles E-V axis (average speed of 22,1 km/hour)

Urban traffic and infrastructure					
KPI08 - Proportion of road types[93]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI09 - Fatalities					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI10 - Urban mobility accidents					

92 30 minutes for public transport - 18 minutes for vehicles N-S axis - 21 minutes for vehicles E-V axis

93 The streets network includes streets classified as I-IV categories (from 2 lanes to 6 lanes)

Sub-indicator name	Value	Data source	Geographic Aggregation Level	Responsible	Date & Frequency
KPI11 - Traffic volume of cars					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
[94]					
KPI12 - Traffic volume of freight vehicles					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
Traffic volume of freight vehicles[95]					

[94] The traffic data are for the most important 6 road entrances in the city (road direction towards the city).

[95] The traffic data are for the most important 6 road entrances in the city (road direction towards the city).

KPI13 - Environmental impact of urban mobility[96]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
Urban passenger & active transport characteristics					
KPI14 - Rate of parking spaces					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI15 - Modal split for passenger trips within the city[97]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

96 Values for PM10 and NO2 are in the form and measurements units presented in SUMP Arad

97 Car as a driver or passenger is the same because this is the number of trips made with the car, it is not known if they are the driver or the passenger.

KPI16 - Modal split for trips for commuting to the city[98]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

[98] Car as a driver or passenger is the same because this is the number of trips made with the car, it is not known if they are the driver or the passenger.

KPI17 - Availability of bike-sharing[99]					
No data					
KPI18 - Availability of e-scooter sharing					
No data					
KPI19 - Availability of car sharing					
No data					
KPI20 - Availability of real-time travel information					
No data					
KPI21 - Availability of smart payment and booking methods on local public transport[100]					
Sub-indicator name	Value	Data source	Geographic Aggregation Level	Responsible	Date & Frequency
Urban Logistics					

[99] The local administration is currently developing a bike-sharing system, that will be operational in the following years

[100] Arad local administration has developed the documentation and will start tender procedures for an e-ticketing system in 2019

KPI22 – Commercial establishments					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI23 - Delivery vehicle parking[101]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI24 - Freight trips[102]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

[101] There are no special parking places for supply/delivery on the public domain. There is a Local Council Decision that regulates the way (including hours) in which the supply/delivery can be done to the economic operators (overnight) New supermarkets, through the construction documents, have provided separate access and parking places for supply/delivery

102 It has been assumed that a vehicle comes once, delivers and then goes empty. Only the number of freight vehicles resulting from the traffic census is available, divided to 2.

KPI25 - Goods delivery frequency
No data
KPI26 - Goods delivery volumes
No data
KPI27 - Urban logistics innovation
No data

Annex I: Urban mobility KPIs for Mechelen

Urban population and economics					
KPI01 - Residents' net average monthly income					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI02 - Price level of transport					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
		http://www.delijn.be			

KPI03 - Vehicle ownership rate					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI04 - Mobility Net Public Finance					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

Urban land use and accessibility					
KPI05 - Mobility space usage					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI06 - Distribution of land use types					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
					2018, yearly
KPI07 - Commuting to work					
Sub-indicator	**Value**	**Data source**	**Geographic**	**Responsible**	**Date &**

name			Aggregation Level		Frequency
Urban traffic and infrastructure					
KPI08 - Proportion of road types					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
		• •			
KPI09 - Fatalities					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

[103] 7,7 km for public transport (average speed of 15,4 km/hour) - 6,6 km for vehicles N-S axis (average speed of 22,1 km/hour) - 7,7 km for vehicles E-V axis (average speed of 22,1 km/hour)

104 30 minutes for public transport - 18 minutes for vehicles N-S axis - 21 minutes for vehicles E-V axis

KPI10 - Urban mobility accidents					
No data					
KPI11 - Traffic volume of cars					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI12 - Traffic volume of freight vehicles					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
Traffic volume of freight vehicles	26.920/day	Data coming from 122 ANPR cameras (automatic number plate recognition; used by police for enforcement)	City (Mechelen region)		
KPI13 - Environmental impact of urban mobility					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

[redacted]

[redacted]	Geographic Aggregation Level	Responsible	Date & Frequency

[redacted]

[redacted]	Geographic Aggregation Level	Responsible	Date & Frequency

KPI16 - Modal split for trips for commuting to the city					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
		Information published in a database called swing. It is an open source database: https://mechelen.incijfers.be/dashboard			

KPI18 - Availability of e-scooter sharing[105]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI19 - Availability of car sharing					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

105 The e-scooters have been removed because start of winter and low use.

KPI20 - Availability of real-time travel information					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI21 - Availability of smart payment and booking methods on local public transport					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
Urban Logistics					
KPI22 – Commercial establishments					

Sub-indicator name	Value	Data source	Geographic Aggregation Level	Responsible	Date & Frequency
KPI23 - Delivery vehicle parking					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI24 - Freight trips					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

KPI25 - Goods delivery frequency[106]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI26 - Goods delivery volumes					
KPI27 - Urban logistics innovation					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation**	**Responsible**	**Date & Frequency**

[106] There is only the weekly amount of vehicle movements for the whole of the city center, which is 4.598; there is no split per type of shop

			n Level		

Annex J: Urban mobility KPIs for Ile-de-France

Urban population and economics					
KPI01 - Residents' net average monthly income					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI02 - Price level of transport					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

[107] National statistics institute only publish the median and quartile values for individuals, therefore, the value is the median.

Sub-indicator name	Value	Data source	Geographic Aggregation Level	Responsible	Date & Frequency
KPI06 - Distribution of land use types[109]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI07 - Commuting to work					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

[109] Data available for 11 types of land use: activity, quarries, water, equipment, agriculture, artificialized open space, forest, collective housing, individual housing, semi-natural areas, transport.

Urban traffic and infrastructure					
KPI08 - Proportion of road types[110]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI09 - Fatalities					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

110 For the total length of roads, we consider communal roads (local roads, under the authority of municipalities), departemental roads (regional roads, under the authority of departments) and national roads (major roads, under the authority of the National government) – but not the highways (605 km in IDF)

KPI10 - Urban mobility accidents[111]					
Sub-indicator name	Value	Data source	Geographic Aggregation Level	Responsible	Date & Frequency

KPI11 - Traffic volume of cars					
Sub-indicator name	Value	Data source	Geographic Aggregation Level	Responsible	Date & Frequency
112					

KPI12 - Traffic volume of freight vehicles[113]					
Sub-indicator name	Value	Data source	Geographic Aggregation	Responsible	Date & Frequency

111 Data available only for killed and injured, accident that only cause damage are not considered. Data on individuals (injured or killed) and not by accident. Breakdown of data not by the cause of the accident, but by the mode used by the victim (ie. a pedestrian hit by a car will be considered in the “pedestrian” class and not “car accident” class).

112 Car journeys between the City of Paris and the rest of Ile-de-France region

113 Only data available on road freight flows: ETMV-IDF (urban freight transport survey – Ile-de-France) 4,3M goods delivery and removal in Île-de-France each week (B2B only). On average, 0,75 operations per job each week.http://tmv.laet.science/documents/rapports/plaquetteIDF.pdf

			Level		
Traffic volume of freight vehicles					
KPI13 - Environmental impact of urban mobility[114]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
Urban passenger & active transport characteristics					
KPI14 - Rate of parking spaces					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

114 Values for PM10 and NO2 are in the form and measurements units presented in SUMP Arad

KPI15 - Modal split for passenger trips within the city[115]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI16 - Modal split for trips for commuting to the city[116]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

[115] Rates by number of trips, and not by passenger-kilometres.

[116] Rates by number of trips, and not by passenger-kilometres.

KPI17 - Availability of bike-sharing					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI18 - Availability of e-scooter sharing					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

KPI19 - Availability of car sharing[117]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

[117] Fast changing environment – no credible data given by private operators Public station-based shared cars service in Paris (Autolib) from 2011 to 2018 (end of service)

KPI20 - Availability of real-time travel information[118]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI21 - Availability of smart payment and booking methods on local public transport					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
Urban Logistics					
KPI22 – Commercial establishments					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

118 Most vehicles and stations equipped, though Ile-de-France Mobilité (transport authority) does not give precise information about the number of vehicles equipped

119 Contactless smartcard (Navigo, Imagine R for students, Navigo solidarité and Navigo Gratuité for persons in need, Améthyste for seniors) - weekly, monthly and annual subscribers

KPI23 - Delivery vehicle parking					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI24 - Freight trips[120]					
KPI25 - Goods delivery frequency					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

120 Only data available on road freight flows: ETMV-IDF (urban freight transport survey – Ile-de-France) 4,3M goods delivery and removal in Île-de-France each week (B2B only). On average, 0,75 operations per job each week.http://tmv.laet.science/documents/rapports/plaquetteIDF.pdf

KPI26 - Goods delivery volumes					
No data					
KPI27 - Urban logistics innovation[121]					
No data					

[121] No credible data – fast changing environment

Annex K: Urban mobility KPIs for Birmingham

Urban population and economics					
KPI01 - Residents' net average monthly income					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI02 - Price level of transport					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

[122] Please note this value is Gross, before deduction of taxes, national insurance and does not include family allowances, and other

KPI03 - Vehicle ownership rate					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI04 - Mobility Net Public Finance					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
Urban land use and accessibility					
KPI05 - Mobility space usage					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

KPI06 - Distribution of land use types					
Sub-indicator name	Value	Data source	Geographic Aggregation Level	Responsible	Date & Frequency

KPI07 - Commuting to work					
Sub-indicator name	Value	Data source	Geographic Aggregation Level	Responsible	Date & Frequency

Urban traffic and infrastructure					
KPI08 - Proportion of road types					
Sub-indicator name	Value	Data source	Geographic Aggregation Level	Responsible	Date & Frequency

KPI09 - Fatalities					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI10 - Urban mobility accidents					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI11 - Traffic volume of cars					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation**	**Responsible**	**Date & Frequency**

			Level		
KPI12 - Traffic volume of freight vehicles					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
Traffic volume of freight vehicles					
KPI13 - Environmental impact of urban mobility					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
Urban passenger & active transport characteristics					
KPI14 - Rate of parking spaces					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI15 - Modal split for passenger trips within the city					

Sub-indicator name	Value	Data source	Geographic Aggregation Level

KPI17 - Availability of bike-sharing[123]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

KPI18 - Availability of e-scooter sharing					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

[123] New contract to be awarded in 2020 for bike share scheme

KPI19 - Availability of car sharing					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

[124] Co-Wheels - 9 cars, Enterprise 56 cars/vans

KPI20 - Availability of real-time travel information[125]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI21 - Availability of smart payment and booking methods on local public transport[126]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
Urban Logistics					
KPI22 – Commercial establishments[127]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation**	**Responsible**	**Date & Frequency**

[125] 12/2019 ± 2,173 buses

126 Trips using Swift smartcard

127 216µ8.EXVLQHVVDFWLYLWVL]HDQORFDWLRQ

			Level		
KPI23 - Delivery vehicle parking					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI24 - Freight trips					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI25 - Goods delivery frequency					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

KPI26 - Goods delivery volumes					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

KPI27 - Urban logistics innovation					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

Annex L: Urban mobility KPIs for Minneapolis

Urban population and economics					
KPI01 - Residents' net average monthly income					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI02 - Price level of transport					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
			City		

KPI03 - Vehicle ownership rate					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI04 - Mobility Net Public Finance					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
Urban land use and accessibility					

[128] This is the only number related to car ownership available to us

KPI05 - Mobility space usage					
Sub-indicator name	Value	Data source	Geographic Aggregation Level	Responsible	Date & Frequency

KPI06 - Distribution of land use types					
Sub-indicator name	Value	Data source	Geographic Aggregation Level	Responsible	Date & Frequency

KPI07 - Commuting to work					
Sub-indicator name	Value	Data source	Geographic Aggregation Level	Responsible	Date & Frequency

Urban traffic and infrastructure					
KPI08 - Proportion of road types					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI09 - Fatalities					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI10 - Urban mobility accidents					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

KPI11 - Traffic volume of cars					
No data					
KPI12 - Traffic volume of freight vehicles					
No data					
KPI13 - Environmental impact of urban mobility					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
Urban passenger & active transport characteristics					
KPI14 - Rate of parking spaces[129]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

[129] This is the total number of on-street metered parking and off street parking spaces owned or managed by the City. We do not have numbers for privately owned parking spaces, or on-street parking in the City right of way that is not designated as metered parking

KPI15 - Modal split for passenger trips within the city					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI16 - Modal split for trips for commuting to the city					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

KPI17 - Availability of bike-sharing					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI18 - Availability of e-scooter sharing[130]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

[130] October was used as peak deployment, scooter operators have scaled back since then

KPI19 - Availability of car sharing					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI20 - Availability of real-time travel information					

Sub-indicator name	Value	Data source	Geographic Aggregation Level	Responsible	Date & Frequency
KPI21 - Availability of smart payment and booking methods on local public transport					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
Urban Logistics					
KPI22 – Commercial establishments					
No data					
KPI23 - Delivery vehicle parking					
No data					
KPI24 - Freight trips					
No data					
KPI26 - Goods delivery volumes					
No data					

KPI27 - Urban logistics innovation					
Sub-indicator name	Value	Data source	Geographic Aggregation Level	Responsible	Date & Frequency
	0				
	0				
	0				

	9				
	0				

Annex M: Urban mobility KPIs for Almada

Urban population and economics					
KPI01 - Residents' net average monthly income[131]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI02 - Price level of transport					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

131 Assuming GDP per capita in 2017 (source: ine.pt - Gross Domestic Product per inhabitant at current prices (Base 2011 - €)

KPI03 - Vehicle ownership rate					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI04 - Mobility Net Public Finance[132]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
Urban land use and accessibility					

[132] The City Council does not receive any revenues from the Transport service. The revenues are totally received by the Transport Operators.

KPI05 - Mobility space usage					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

KPI06 - Distribution of land use types[133]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

KPI07 - Commuting to work					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

[133] Industrial, Commercial and general equipment land use, including hospitals and university – single data

Urban traffic and infrastructure					
KPI08 - Proportion of road types					
KPI09 - Fatalities					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI10 - Urban mobility accidents[134]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI11 - Traffic volume of cars					

[134] The available data refers to the all universe of accidents and does not specify the transport mode

Sub-indicator name	Value	Data source	Geographic Aggregation Level	Responsible	Date & Frequency
KPI12 - Traffic volume of freight vehicles[135]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
Traffic volume of freight vehicles					
KPI13 - Environmental impact of urban mobility					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
	μ				
	μ				

[135] Data collected within the framework of the ENCLOSE Project

Urban passenger & active transport characteristics					
KPI14 - Rate of parking spaces					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI15 - Modal split for passenger trips within the city[136]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
		2017 INE Mobility Inquiry (B)			

[136] Data is for the whole universe of trips form residents, because the data is not categorised between

KPI16 - Modal split for trips for commuting to the city[137]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

KPI17 - Availability of bike-sharing[138]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

[137] Data is for the whole universe of trips from the Lisbon Metropolitan Area, because the data is not categorised between "trips to city". We assume that the commuters who come to Almada have the same modal distribution of the average AML resident.

[138]

Sub-indicator name	Value	Data source	Geographic Aggregation Level	Responsible	Date & Frequency
KPI18 - Availability of e-scooter sharing					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI19 - Availability of car sharing[139]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

[139] There are no car-sharing services in operation in Almada

	0				
	0				
	0				
	0				
KPI20 - Availability of real-time travel information					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI21 - Availability of smart payment and booking methods on local public transport[140]					
Sub-indicator	**Value**	**Data source**	**Geographic**	**Responsible**	**Date &**

[140] All PT services in the Lisbon Metropolitan Area, of which Almada is part, already use contactless public transport tickets and monthly passes.

name			Aggregation Level		Frequency
Urban Logistics					
KPI22 – Commercial establishments[141]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI23 - Delivery vehicle parking					
No data					

141 Data collected within the framework of the ENCLOSE Project

KPI24 - Freight trips[142]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI25 - Goods delivery frequency					
No data					
KPI26 - Goods delivery volumes					
No data					
KPI27 - Urban logistics innovation					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
	0				
	0				

[142] Data collected within the framework of the ENCLOSE Project

	1				
	0				
	0				

Annex N: Urban mobility KPIs for ‘s-Hertogenbosch

Urban population and economics					
KPI01 - Residents’ net average monthly income					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI02 - Price level of transport					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

KPI03 - Vehicle ownership rate[143]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI04 - Mobility Net Public Finance[144]					
No data					
Urban land use and accessibility					
KPI05 - Mobility space usage					
No data					
KPI06 - Distribution of land use types					
No data					
KPI07 - Commuting to work					

[143] E-steps are forbidden in Netherlands

[144] The municipality is not responsible for public transportation; this is arranged on a regional level

Sub-indicator name	Value	Data source	Geographic Aggregation Level	Responsible	Date & Frequency
Urban traffic and infrastructure					
KPI08 - Proportion of road types[145]					
KPI09 - Fatalities					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI10 - Urban mobility accidents					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

145 length total roads: 843 km (https://opendata.cbs.nl/#/CBS/nl/dataset/70806ned/table?ts=1518987061270)

KPI11 - Traffic volume of cars					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI12 - Traffic volume of freight vehicles					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
Traffic volume of freight vehicles					
KPI13 - Environmental impact of urban mobility[146]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

146 These values are result of calculations with models

Urban passenger & active transport characteristics					
KPI14 - Rate of parking spaces					
No data					
KPI15 - Modal split for passenger trips within the city[147]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI16 - Modal split for trips for commuting to the city					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

[147] Rates by number of trips, and not by passenger-kilometres.

KPI17 - Availability of bike-sharing[148]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

148

KPI18 - Availability of e-scooter sharing[149]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI19 - Availability of car sharing					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

149 e-scooters are forbidden in Netherlands

KPI20 - Availability of real-time travel information					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI21 - Availability of smart payment and booking methods on local public transport[150]					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
Urban Logistics					

150 In 2011 smart card payment is introduced.

KPI22 – Commercial establishments					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**
KPI23 - Delivery vehicle parking					
KPI24 - Freight trips					
KPI25 - Goods delivery frequency					
Sub-indicator name	**Value**	**Data source**	**Geographic Aggregation Level**	**Responsible**	**Date & Frequency**

151 Food shops

152 horeca establishments

KPI26 - Goods delivery volumes
No data
KPI27 - Urban logistics innovation
No data

Annex O: Template sent to cities (KPIs)

1.

Basic data on transport system and operation (please specify for passenger & freight) (deadline 8th November)

Table to be filled-in		Passenger	Freight
	Which transport modes are available and used most for passenger transport?	•	
	What are the main issues in the distribution of freight in the city?		•
	Which are the new transport modes, services and city logistics solutions that emerged in the previous couple of years?	•	•
	How many operators are	•	

	there for public transport?		
	Is there an integration of public transport services and fares in the city or the metropolitan area?	•	

Is there a sustainable urban mobility plan in effect or preparation? ***Please, specify if it is in preparation or in effect (when was it released or updated?). Please provide a link to the plan if available.***

What are major urban transport investments (services, policies, and infrastructure) currently in progress or planned in the next 3 years?

Other considerations regarding urban mobility in the city? ***Please add any additional***

urban mobility and logistics environment.

Where can we find more information about the mobility and logistics status of the city? ***Please indicate website(s) and/or documents in English or in local language.***

Step 2: Data collection and calculation of key performance indicators for the city (deadline 8th November)

We have defined a number of KPIs that can help to describe the urban mobility environment and transition in your city. Some of the KPIs are straightforward values (e.g. number of car sharing operators), while others need to be calculated based on a number of input parameters (e.g. *rate of car ownership* needs two parameters: *number of cars registered in the city* and *total population*).

We are aware that you may not have the data in the exact format that is requested here, so:

- Please ***provide data as accurate and recent as possible***.
- If the data ***format or type is different*** from what is requested, please ***indicate*** this in the remarks section.
- In case you are ***unable to provide the data***, please ***indicate*** this in the remarks section and follow one of the options below:
    - Propose any ***alternative indicator***
    - Provide an ***estimation***
    - Provide ***short qualitative description*** HJ³ *We do not have accurate data about the number of e-scooters in the city, but it is estimated that 500-600 have been deployed´*

To compile the KPIs we have defined a table for each of them following the structure described in Table 6.9.1 below, with two types of cells:

1. White cells: this is information we provide to describe the KPI and explain what information has to be provided.
2. Yellow cells: this is the information the city has to fill in.
    a. If some field is ***not available or the service*** or infrastructure does not exist, please indicate it with one of the options below
        i. Data not available
        ii. Not existing service
    b. If there is some field you ***do not understand or know how to calculate***. Please, send an email to broyo@zlc.edu.es. We will compile the questions and answer them during the follow-up calls with cities.

Table 6.9.1. General KPI template description.

KPI name	
KPI name	Name used for the KPI.

KPI description	Description of the KPI. Some KPIs are defined with more than one sub-indicator
Formula to calculate KPI:	Explanation of the method to calculate the KPI.
Unit	Measurement unit used for the KPI
Current Value	*Introduce the value after calculation.*
Data Source	*Specify the data sources for all the parameters the KPI requires*
Geographic aggregation level:	*Indicate the spatial unit for the indicator and sub-indicators: e.g. part of the city, city, region, state, country.*
Responsible	*Specify which organisation is in charge of providing the data.*
Date & Frequency	*Indicate the year when the latest data is available and the frequency of data collection (monthly, yearly, every 2 years etc.).*
Notes & comments	*Any additional comment.*

Please, fill in the yellow cells in the KPI tables that follow.

1. Urban population and economics

Table 6.9.25HVLGHQWVQHWDYHUDJHPRQWKOLQFRPH

KPI01 - 5HVLGHQWVQHWDYHUDJHPRQWKOLQFRPH
KPI name

Unit	Value [local currency] per person and per month
Current Value	
Data Source	Local or national employment statistics
Geographic aggregation level:	*Indicate spatial unit for the indicator: part of the city, city, region, state, country. Specify if different levels were used for each indicator.*
Responsible	*Specify which organisation is in charge of providing the data.*
Date & Frequency	*Indicate the year when the latest data is available and the values were calculated and the frequency of data collection (monthly, yearly, every 2 years etc.).*
Notes & comments	*Any additional comment.*

Table 6.9.3. Price level of transport

KPI02 - Price level of transport	
KPI name	Cost of the use of transport
KPI description	This KPI indicates the cost of using public and private transport
Formula to calculate KPI:	The KPI consists of the following sub-indicators: 1. Price for one hour of parking in the city centre (most expensive zone) 2. Price for a single trip by public transport. In case distance-based fares or zones are used, please use the average travel distance in the city for a person (if this is not available assume trips of 10 km). In case time-based fares are used, use a fare that is valid for maximum 1 hour. ,IGLIIHUHQWRSHUDWRUVFKDUJHGLIIHUHQWIDUHVHJEXVDQGPHWURXVHWKHDYHUDJHRIWKHRSH 3. Price for a monthly public transport pass without any concessions valid for all local public transport (if available). If such an integrated pass is not available indicate the price for specific operators e.g. bus or

	metro only). 4. Average local price of one litre 95-RFWDHSHWURO(UR -VSHU)RUUHIHUHFHYDOHVSHUFRWUR can visit https://ec.europa.eu/energy/en/data-analysis/weekly-oil-bulletin#content-heading-1)	
Unit	All prices in local currency 1: price/hour 2: price/ticket 3: price/month 4: price/litre	
Current Value		
	Price for one hour of parking in the city centre	*Most up-to-date value*
	Price for a single trip by public transport	*Most up-to-date value*
	Price for a monthly public transport pass	*Most up-to-date value*
	Average local price of one litre 95-octane petrol	*Most up-to-date value*
Data Source	*Local public transport companies* *Local petrol providers* *European petrol prices:* https://ec.europa.eu/energy/en/data-analysis/weekly-oil-bulletin#content-heading-1	
Geographic aggregation level:	*Indicate spatial unit for the indicator: part of the city, city, region, state, country. Specify if different levels were used for each indicator.*	
Responsible	*Specify which organisation is in charge of providing the data.*	
Date & Frequency	*Indicate the year when the latest data is available and the values were calculated and the frequency of data collection (monthly, yearly, every 2 years etc.).*	

Notes & comments	*Any additional comment.*

Table 6.9.4. Urban population and economics: Vehicle ownership rate.

KPI03 - Vehicle ownership rate	
KPI name	Vehicle ownership rate
KPI description	Vehicle ownership indicates the number of vehicle owners per 1000 inhabitants. Vehicles refer to cars, bicycles (including electric bikes) and motorized two-wheelers (e.g. motorbikes). This KPI contains 4 separate sub-indicators: 1. *Car ownership*: cars refer to motor vehicles other than two-wheelers, intended for the carriage of passengers and designed to seat no more than nine people (including the driver) 2. *Bicycle ownership*: bicycles refer to electric and non-electric two-wheelers. 3. *Motorized two-wheeler ownership*: this vehicle refers to motorcycles, mopeds, or other motor-powered two- wheelers with a seat. 4. *E-scooter* is a motorised stand-up scooter using an electric motor as a form of micromobility.
Formula to calculate KPI:	1. *Car ownership* is the number of cars registered in the city divided by the number of inhabitants in the city and multiplied by 1000; 2. *Bicycle ownership* is the number of bicycles registered in the city (included electric bike) divided by the number of inhabitants and multiplied by 1000; 3. *Motorcycle ownership* is the number of motorcycles that are registered in city divided by the number of inhabitants and multiplied by 1000. 4. *E-scooter ownership* is the number of e-scooters owned by local residents in the city divided by the number of inhabitants and multiplied by 1000. (public shared e-scooters are not included)
Unit	Number of vehicles per 1000 inhabitants

Current Value	*Car ownership*	*Most up-to-date value*
	Bicycle ownership	*Most up-to-date value*
	Motorcycle ownership	*Most up-to-date value*
	E-scooter ownership	*Most up-to-date value*
Data Sources	*Indicate the data source for each sub-indicator (e.g. survey, statistics office, transport operator, etc.).*	
Geographic aggregation level:	*Indicate spatial unit for the indicator: part of the city, city, region, state, country. Specify if different levels were used for each indicator.*	
Responsible	*Specify which organisation is in charge of providing the data.*	
Date & Frequency	*Indicate the year when the latest data is available and the values were calculated and the frequency of data collection (monthly, yearly, every 2 years etc.).*	
Notes & comments	*Any additional comment.*	

Table 6.9.5. Urban population and economics: Mobility net public finance.

KPI04 - Mobility Net Public Finance	
KPI name	Mobility Net Public Finance.
KPI description	Net balance of government and other public authority revenues and expenditures related to city transport. This KPI reflects the affordability for governments to sustain the expenditures in the transport system. This indicator should cover all modes of transport (road, rail, inland waterways, persons and freight) for which the city government is responsible. Maintenance costs should be included as well.
Formula to calculate KPI:	*City government annual revenues from transport related charges* **minus** *city government annual operation costs related to city transport* [all in local currency] **divided by** the GDP of the city or region [in local currency]

Unit	%
Current Value	
Data Source	*City government annual revenues and city government annual operation costs related to city transport:* ***Indicate the data source*** *GDP:* ***Indicate the data source***
Geographic aggregation level:	*Indicate spatial unit for the indicator: part of the city, city, region, state, country. Specify if different levels were used for each indicator.*
Responsible	*Specify which organisation is in charge of providing the data.*
Date & Frequency	*Indicate the year when the latest data is available and the values were calculated and the frequency of data collection (monthly, yearly, every 2 years etc.).*
Notes & comments	*Any additional comment.*

2. Urban land use and accessibility

Table 6.9.6. Urban land use and accessibility: Mobility space usage.

KPI05 - Mobility space usage	
KPI name	Mobility space usage
KPI description	This KPI reflects the proportion of land use (square meters), taken by all the city transport modes (direct and indirect uses). 1. Direct uses: Fast transit roads, other roads, railways, inland ports and waterways. 2. Indirect uses: Open parking, private parking, service area and petrol station, storage and logistics centres, stations. It measures the efficiency of mobility space usage as the ratio of the area covered by all city transport

	modes (direct, indirect) to the total population of the city.
Formula to calculate KPI:	Total of direct land use for mobility applications **plus** the total of indirect land use for mobility applications **divided by** the number of inhabitants.
Unit	Km^2/ capita
Current Value	*Most up-to-date value*
Data Source	*Space occupied by the specific mobility application (e.g. GIS, statistics office).* ***Specify if different data sources were used for each indicator.*** *Number of inhabitants:* ***Indicate the data source.***
Geographic aggregation level:	*Indicate spatial unit for the indicator: part of the city, city, region, state, country. Specify if different levels were used for each indicator.*
Responsible	*Specify which organisation is in charge of providing the data.*
Date & Frequency	*Indicate the year when the latest data is available and the values were calculated and the frequency of data collection (monthly, yearly, every 2 years etc.).*
Notes & comments	*Any additional comment.*

Table 6.9.7. Urban land use and accessibility: Distribution of land use types.

KPI06 - Distribution of land use types	
KPI name	Distribution of land use types
KPI description	This KPI reflects the distribution of land among residential, commercial, industrial/business and recreational use. There is one sub-indicator for representing the percentage of space occupied for each

	type of activity. 1. *Residential land use*: Percentage of city land used for residential areas (houses and apartments). 2. *Industrial & business land use*: Percentage of city land used by industry and businesses (offices). 3. *Commercial land use*: Percentage of city land used by commerce (shops, supermarkets, services). 4. *Recreational land use*: Percentage of city land used for entertainment activities (sports fields, parks, swimming pools).	
Formula to calculate KPI:	Space occupied by the specific activity [km^2] ***divided by*** the city area [km^2]	
Unit	%	
Current Value	*Residential land use*	*Most up-to-date value*
	Industrial & business land use	*Most up-to-date value*
	Commercial land use	*Most up-to-date value*
	Recreational land use	*Most up-to-date value*
Data Source	Space occupied by the specific activity [km^2]: ***Indicate the data source*** *(e.g. GIS, statistics office). Specify if different data sources were used for each indicator.* City area [km^2]: ***Indicate the data source*** *(e.g. GIS, statistics office).*	
Geographic aggregation level:	*Indicate spatial unit for the indicator: part of the city, city, region, state, country. Specify if different levels were used for each indicator.*	
Responsible	*Specify which organisation is in charge of providing the data.*	
Date & Frequency	*Indicate the year when the latest data is available and the values were calculated and the frequency of data collection (monthly, yearly, every 2 years etc.).*	
Notes & comments	*Any additional comment.*	

Table 6.9.8. Urban land use and accessibility: Commuting to work.

KPI07 - Commuting to work		
KPI name	Commuting to work	
KPI description	This KPI is determined by the average travel distance for commuting and the average travel time for commuting to jobs. 1. *Average commute distance*: **¶UDJH GLVWDQFH IRU WUDYHOOLQJ EHWZHHQ RQH¶V KRPH SODFH DQG SODFH** work on a regular basis. This is an average value for all residents living in the city irrespective of where they work (in or outside the city). 2. *Average commute time*: **¶UDJH WLPH IRU WUDYHOOLQJ EHWZHHQ RQH¶V KRPH SODFH DQG SODFH RI ZRUN RQ** regular basis. This is an average value for all residents living in the city irrespective of where they work (in or outside the city).	
Formula to calculate KPI:	1. Total distance of commuting trips by city residents **divided by** the number of commuters living in the city 2. Total travel time of commuting trips by city residents **divided by** the number of commuters living in the city	
Unit	1. [km], 2. [minutes]	
Current Value	*Average commuting distance*	*Most up-to-date value*
	Average commuting time	*Most up-to-date value*
Data Source	*Indicate the data source (e.g. survey, statistics office, census). Specify if different data sources were used for each indicator.*	
Geographic aggregation level:	*Indicate spatial unit for the indicator: part of the city, city, region, state, country. Specify if different levels were used for each indicator.*	

Responsible	*Specify which organisation is in charge of providing the data.*
Date & Frequency	*Indicate the year when the latest data is available and the values were calculated and the frequency of data collection (monthly, yearly, every 2 years etc.).*
Notes & comments	*Any additional comment.*

3. Urban traffic and infrastructure

Table 6.9.9. Urban land use and accessibility: proportion of road types

KPI08 - Proportion of road types		
KPI name	Proportion of road types	
KPI description	This KPI reflects the percentage of road dedicated to the specific modes of transport below. 1. *Extent of high-speed roads (speed limit is over 51km/h or over)*: percentage of urban road length dedicated to high-speed roads. 2. *Extent of slow roads (speed limit is 30km/h or below)*: percentage of urban road length dedicated to high-speed roads. 3. *Extent of bicycle lanes and paths*: percentage of the urban road length dedicated for bicycles. 4. *Extent of bus lanes*: percentage of urban road length dedicated to buses only (24hrs or during certain periods). Please also include bus lanes where taxis and/or bicycles are also allowed.	
Formula to calculate KPI:	Length of the type of road/lane [in km] **divided by** the total length of urban roads	
Unit	%	
Current Value	*High-speed roads rate*	*Most up-to-date value*
	Slow roads rate	*Most up-to-date value*

	Bicycles lanes rate	*Most up-to-date value*
	Bus lanes rate	*Most up-to-date value*
Data Source	*Length of the type of road/lane (e.g. GIS, statistics office).* ***Specify if different data sources were used for each indicator.***	
Geographic aggregation level:	*Indicate spatial unit for the indicator: part of the city, city, region, state, country. Specify if different levels were used for each indicator.*	
Responsible	*Specify which organisation is in charge of providing the data.*	
Date & Frequency	*Indicate the year when the latest data is available and the values were calculated and the frequency of data collection (monthly, yearly, every 2 years etc.).*	
Notes & comments	*Any additional comment.*	

Table 6.9.10. Urban traffic and infrastructure: fatalities.

KPI09 - Fatalities	
KPI name	Fatalities
KPI description	Total number of fatalities per 100,000 capita. 7KLV .3, KDV DGRSWHG WKH 9LHQQ &RQYHQWLRQ GHILQLWLRQ VWDWHG LQ DV ³*A human casualty who dies within the 30 days after the collision due to injuries received in the crash".*
Formula to calculate KPI	Total number of fatalities **divided by** the number of inhabitants and **multiplied by** 100,000
Unit	Number of fatalities per 100.000 capita *per year*
Current Value	*Most up-to-date value*

Data Source	*Indicate the data source (e.g. survey, statistics office).*
Geographic aggregation level:	*Indicate spatial unit for the indicator: part of the city, city, region, state, country. Specify if different levels were used for each indicator.*
Responsible	*Specify which organisation is in charge of providing the data.*
Date & Frequency	*Indicate the year when the latest data is available and the values were calculated and the frequency of data collection (monthly, yearly, every 2 years etc.).*
Notes & comments	*Any additional comment.*

Table 6.9.11. Urban traffic and infrastructure: urban mobility accidents.

KPI10 - Urban mobility accidents	
KPI name	Urban mobility accidents
KPI description	The total number of accidents per 100,000 capita. We refer to an accident as an unfortunate incident that happens unexpectedly and unintentionally, typically resulting in damage or injury. This KPI splits into four sub-indicators (one per mode of transport): *1. Car accidents,* the number of incidents with a private car involved per number of inhabitants. *2. Public transport accidents,* the number of events with a public transport vehicle involved per number of inhabitants. *3. Bicycle (including electric) accidents,* the number of incidents with a bicycle involved per number of inhabitants. *4. E-scooter accidents, the* number of events with an e-scooter involved per number of inhabitants. One accident can appear more than once as every sub-indicator accounts for a specific mode of transport.
Formula to calculate KPI	Number of accidents of each mode of transport **divided by** the number of inhabitants and

	multiplied by 100,000	
Unit	Number of accidents with the specific mode transport involved per 100.000 population *per year*	
Current Value	*Car accidents*	*Most up-to-date value*
	Public transport accidents	*Most up-to-date value*
	Bikes accidents	*Most up-to-date value*
	E-scooter accidents	*Most up-to-date value*
Data Source	*Indicate the data source (e.g. survey, statistics office). Specify if different data sources were used for each indicator.*	
Geographic aggregation level:	*Indicate spatial unit for the indicator: part of the city, city, region, state, country. Specify if different levels were used for each indicator.*	
Responsible	*Specify which organisation is in charge of providing the data.*	
Date & Frequency	*Indicate the year when the latest data is available and the values were calculated and the frequency of data collection (monthly, yearly, every 2 years etc.).*	
Notes & comments	*Any additional comment.*	

Table 6.9.12. Urban traffic and infrastructure: traffic volume of cars.

KPI11 - Traffic volume of cars	
KPI name	Traffic volume of cars
KPI description	This KPI refers to the average number of private cars entering the city on an average weekday. The value should reflect the number of passenger cars that cross the city border towards the city during an average 24-hour period.
Formula to calculate KPI	Average number of vehicles entering the city on a daily basis

Unit	#/day
Current Value	*Most up-to-date value*
Data Source	*Indicate the data source (e.g. survey, statistics office). Specify if different data sources were used for each indicator.*
Geographic aggregation level:	*Indicate spatial unit for the indicator: part of the city, city, region, state, country. Specify if different levels were used for each indicator.*
Responsible	*Specify which organisation is in charge of providing the data.*
Date & Frequency	*Indicate the year when the latest data is available and the values were calculated and the frequency of data collection (monthly, yearly, every 2 years etc.).*
Notes & comments	*Any additional comment.*

Table 6.9.13. Urban traffic and infrastructure: traffic volume of cars.

KPI12 - Traffic volume of freight vehicles	
KPI name	Traffic volume of cars
KPI description	This KPI refers to the average number of freight vehicles (trucks/vans) entering the city on an average weekday. The value should reflect the number of freight vehicles that cross the city border towards the city during an average 24-hour period. If possible, please classify freight vehicles by category: <3.5t and >3.5t
Formula to calculate KPI	Average number of vehicles entering the city on a daily basis
Unit	#/day (by category)
Current Value	*Most up-to-date value*
Data Source	*Indicate the data source (e.g. survey, statistics office). Specify if different data sources were used for each indicator.*

Geographic aggregation level:	*Indicate spatial unit for the indicator: part of the city, city, region, state, country. Specify if different levels were used for each indicator.*
Responsible	*Specify which organisation is in charge of providing the data.*
Date & Frequency	*Indicate the year when the latest data is available and the values were calculated and the frequency of data collection (monthly, yearly, every 2 years etc.).*
Notes & comments	*Any additional comment.*

Table 6.9.14. Urban traffic and infrastructure: environmental impact of urban mobility.

KPI13 - Environmental impact of urban mobility		
KPI name	Environmental impact of urban mobility	
KPI description	This KPI is defined with three sub-indicators: Greenhouse gas (GHG) emissions per inhabitant, PM_{10} and NO_2 emissions. 1. *GHG per inhabitant* represents the kilograms of GHG emissions produced by transport per inhabitant. 2. *PM_{10}* represents the particulate matters below 10 micrometres of diameter produced by transport. 3. *NO_2* emissions produced by transport.	
Formula to calculate KPI:	For the GHG emissions: GHG emissions **divided by** the number of inhabitants.	
Unit	*GHG per inhabitant:* $kgCO_2e$/inhabitant, *PM_{10} and NO_2* : µg/m3 yearly average per measurement station and average of all urban roadside measurement stations	
Current Value	*GHG per inhabitant*	*Most up-to-date value*
	PM_{10}	*Most up-to-date value*

	NO_2	*Most up-to-date value*
Data Source	*Indicate the data source (e.g. survey, statistics office). Specify if different data sources were used for each indicator.* ***For PM10 and NO2, consider the roadside)***	
Geographic aggregation level:	*Indicate spatial unit for the indicator: part of the city, city, region, state, country. Specify if different levels were used for each indicator.*	
Responsible	*Specify which organisation is in charge of providing the data.*	
Date & Frequency	*Indicate the year when the latest data is available and the values were calculated and the frequency of data collection (monthly, yearly, every 2 years etc.).*	
Notes & comments	*Any additional comment.*	

4. Urban passenger & active transport characteristics

Table 6.9.15. Urban passenger and active transport characteristics: Number of parking spaces rate.

KPI14 - Rate of parking spaces	
KPI name	Number of parking spaces
KPI description	This KPI reflects the number of parking spaces that are 24 hours open to the public for private cars compared to the number of households. This includes parking garages, off-street open-air designated public parking areas and on-street parking where it is allowed.
Formula to calculate KPI:	Number of 24h parking spaces for private cars **divided by** the number of households in the city.
Unit	Number parking places per household
Current Value	*Most up-to-date value*
Data Source	*Indicate the data source (e.g. GIS, statistics office). Specify if different data sources were used for each*

	indicator.
Geographic aggregation level:	*Indicate spatial unit for the indicator: part of the city, city, region, state, country. Specify if different levels were used for each indicator.*
Responsible	*Specify which organisation is in charge of providing the data.*
Date & Frequency	*Indicate the year when the latest data is available and the values were calculated and the frequency of data collection (monthly, yearly, every 2 years etc.).*
Notes & comments	*Any additional comment.*

Table 6.9.16. Urban passenger and active transport characteristics: Modal split for passenger within the city.

KPI15 - Modal split for passenger trips within the city	
KPI name	Modal split for passenger trips within the city
KPI description	It is the percentage share of each mode of transport in the *total distance travelled by all passengers (passenger-kilometres)* within the city boundaries for any purpose on an average weekday (commuting trips with a destination or origin *outside the city boundaries are not included*). In case your modal split indicators are based on the *proportion of trips by each mode*, please indicate it in the notes below. There are 6 sub- indicators for each mode: 1. *Car as a driver*, percentage of passenger-kilometres by car as a driver. 2. *Car as a passenger*, percentage of passenger-kilometres by car as a passenger 3. *Public transport*, percentage of passenger-kilometres by local public transport i.e. tram, bus, metro, local train, ferry, etc. 4. *Cycling*, percentage of passenger-kilometres by bike (own or shared). *5.* *Walking,* percentage of passenger-kilometres as a pedestrian 6. *Other*, percentage of percentage of passenger-kilometres by any other mode (taxi, motorbike, etc.)

Formula to calculate KPI:	This data can be derived from previous household surveys: A) Asking for the length of trips per mode between the origin and the destination B) Asking for the number of trips per mode Specify which data is available (A or B)	
Unit	%	
Current Value	*Car as a driver*	*Most up-to-date value*
	Car as a passenger	*Most up-to-date value*
	Public transport	*Most up-to-date value*
	Cycling	*Most up-to-date value*
	Walking	*Most up-to-date value*
	Other	*Most up-to-date value*
Data Source	*Indicate the type of data available (A or B) explained by the formula.*	
Geographic aggregation level:	*Indicate spatial unit for the indicator: part of the city, city, region, state, country. Specify if different levels were used for each indicator.*	
Responsible	*Specify which organisation is in charge of providing the data.*	
Date & Frequency	*Indicate the year when the latest data is available and the values were calculated and the frequency of data collection (monthly, yearly, every 2 years etc.).*	
Notes & comments	*Any additional comment.*	

Table 6.9.17. Urban passenger and active transport characteristics: Modal split for trips for commuting to the city.

KPI16 - Modal split for trips for commuting to the city

KPI name	Modal split for trips for commuting to the city	
KPI description	It is the percentage share of each mode of transport in the *total distance travelled by all passengers (passenger-kilometres)* across the city boundaries into the city for any purpose on an average weekday (trips with an origin and destination *within* the city boundaries are *not* included). In case your modal split indicators are based on the *proportion of trips by each mode*, please indicate it in the notes below. There are 6 sub- indicators for each mode: 1. *Car as a driver*, percentage of passenger-kilometres by car as a driver. 2. *Car as a passenger*, percentage of passenger-kilometres by car as a passenger 3. *Public transport*, percentage of passenger-kilometres by local public transport i.e. tram, bus, metro, local train, ferry, etc. 4. *Cycling*, percentage of passenger-kilometres by bike (own or shared). *5. Walking,* percentage of passenger-kilometres as a pedestrian *Other*, percentage of percentage of passenger-kilometres by any other mode (taxi, motorbike, etc.)	
Formula to calculate KPI:	This data can be derived from household surveys: A) Asking for the length of trips by every specific mode of transport between the origin and the destination B) Asking for the number of trips Specify which data is available (A or B)	
Unit	%	
Current Value	*Car as a driver*	*Most up-to-date value*
	Car as a passenger	*Most up-to-date value*
	Public transport	*Most up-to-date value*
	Cycling	*Most up-to-date value*
	Walking	*Most up-to-date value*

	Other	*Most up-to-date value*
Data Source	*Indicate the type of data available (A or B) explained by the formula.*	
Geographic aggregation level:	*Indicate spatial unit for the indicator: part of the city, city, region, state, country. Specify if different levels were used for each indicator.*	
Responsible	*Specify which organisation is in charge of providing the data.*	
Date & Frequency	*Indicate the year when the latest data is available and the values were calculated and the frequency of data collection (monthly, yearly, every 2 years etc.).*	
Notes & comments	*Any additional comment.*	

Table 6.9.18. Urban passenger and active transport characteristics: Bike sharing.

KPI17 - Availability of bike-sharing	
KPI name	Bike-sharing (*Bike sharing bikes per capita; number of bike sharing operators*)
KPI description	This KPI indicates the availability of shared bicycle schemes in the city. This KPI includes 4 sub-indicators: 1. Number of station-based shared bicycles per capita 2. Number of free-floating shared bicycles per capita 3. Number of station-based bike sharing operators in operation in the city 4. Number of free-floating bike sharing operators in operation in the city Bike sharing covers any public or private schemes that are operated in the city, station-based and free-floating; manual and electric bicycles
Formula to calculate KPI:	1-2. number of shared bikes in operation **divided by** city population 3-4. provide total number of bikes sharing operators
Unit	1-2. % (Number of bicycles per capita) 3-4. # (Number of operators)

Current Value	*Number of station-based shared bicycles per capita*	*Most up-to-date value*
	Number of free-floating shared bicycles per capita	*Most up-to-date value*
	Number of station-based bike sharing operators in operation	*Most up-to-date value*
	Number of free-floating bike sharing operators in operation	*Most up-to-date value*
Data Source	*e.g. transport operator, field surveys, statistics office, etc. Specify if different data sources are used.*	
Geographic aggregation level:	*Indicate spatial unit for the indicator: part of the city, city, region, state, country. Specify if different levels were used for each indicator.*	
Responsible	*Specify which organisation is in charge of providing the data.*	
Date & Frequency	*Indicate the year when the latest data is available and the values were calculated and the frequency of data collection (monthly, yearly, every 2 years etc.).*	
Notes & comments	*Any additional comment.*	

Table 6.9.19. Urban passenger and active transport characteristics: E-scooter sharing.

KPI18 - Availability of e-scooter sharing	
KPI name	E-scooter sharing (*Shared electric scooters per capita; shared e-scooter operators)*
KPI description	This KPI indicates the availability of shared electric scooter schemes (e.g. Lime, Dott etc.) in the city. This KPI includes 2 sub-indicators: 1. Number of e-scooters deployed in the city per capita

	2. Number of e-scooter operators in operation in the city A shared e-scooter is a motorised stand-up scooter using an electric motor as a form of micromobility that can be rented through a mobile application. The shared e-scooter schemes cover any public or private schemes that are operated in the city	
Formula to calculate KPI:	1. number of shared e-scooters in operation ***divided by*** city population 2. total number of shared e-scooter operators	
Unit	1. % (Number of e-scooter per capita) 2. # (Number of operators)	
Current Value	*Number of e-scooters deployed in the city per capita*	*Most up-to-date value*
	Number of e-scooter operators in operation	*Most up-to-date value*
Data Source	*e.g. transport operator, field surveys, statistics office, etc. Specify if different data sources are used.*	
Geographic aggregation level:	*Indicate spatial unit for the indicator: part of the city, city, region, state, country. Specify if different levels were used for each indicator.*	
Responsible	*Specify which organisation is in charge of providing the data.*	
Date & Frequency	*Indicate the year when the latest data is available and the values were calculated and the frequency of data collection (monthly, yearly, every 2 years etc.).*	
Notes & comments	*Any additional comment.*	

Table 6.9.20. Urban passenger and active transport characteristics: Car sharing.

KPI19 - Availability of car sharing

KPI name	Car sharing *(Shared cars per capita; car sharing operators)*
KPI description	This KPI indicates the availability of shared cars (e.g. ShareNow, Zipcar etc.) schemes in the city. This KPI includes 4 indicators: 1. Number of station-based shared cars deployed in the city per capita 2. Number of free-floating shared cars deployed in the city per capita 3. Number of station-based car sharing operators in operation in the city 4. Number of free-floating car sharing operators in operation in the city Station-based car sharing covers any public or private schemes that are operated in the city providing cars that can be rented for shorter or longer periods with online booking but they need to be returned to the same station where they are picked up. Free-floating car sharing covers any public or private schemes that are operated in the city providing cars that can be rented for shorter or longer periods with online booking and they can be returned to any free parking space within the business area of the operator
Formula to calculate KPI:	1. number of station-based shared cars in operation divided by city population 2. number of free-floating shared cars in operation divided by city population 3. total number of station-based car sharing operators 4. total number of free-floating car sharing operators
Unit	1. %. 2. % 3. # 4. #
Current Value	*Number of station-based shared cars deployed per* *Most up-to-date value*

	capita	
	Number of free-floating shared cars deployed per capita	*Most up-to-date value*
	Number of station-based car sharing operators in operation	*Most up-to-date value*
	Number of free-floating car sharing operators in operation	*Most up-to-date value*
Data Source	*e.g. transport operator, field surveys, statistics office, etc. Specify if different data sources are used.*	
Geographic aggregation level:	*Indicate spatial unit for the indicator: part of the city, city, region, state, country. Specify if different levels were used for each indicator.*	
Responsible	*Specify which organisation is in charge of providing the data.*	
Date & Frequency	*Indicate the year when the latest data is available and the values were calculated and the frequency of data collection (monthly, yearly, every 2 years etc.).*	
Notes & comments	*Any additional comment.*	

Table 6.9.21. Urban passenger and active transport characteristics: Availability of real time travel information.

KPI20 - Availability of real-time travel information	
KPI name	Availability of real-time travel information
KPI description	This KPI indicates the availability of real-time travel information about public transport (such as estimated arrival and departures times, delays, information about incidents). Local public transport covers buses, trams, metros, ferries, ships and local trains that primarily serve the

	city area (long-distance, regional and suburban services *are not included*).	
Formula to calculate KPI:	Number of local public transport vehicles that are equipped to provide real-time data that is released to passengers through real-time displays at stops or through online applications ***divided by*** the total number of public transport vehicles operated in the city.	
Unit	%	
Current Value	*Availability of real-time travel information*	*Most up-to-date value*
Data Source	*e.g. transport operator, field surveys, statistics office, etc.*	
Geographic aggregation level:	*Indicate spatial unit for the indicator: part of the city, city, region, state, country. Specify if different levels were used for each indicator.*	
Responsible	*Specify which organisation is in charge of providing the data.*	
Date & Frequency	*Indicate the year when the latest data is available and the values were calculated and the frequency of data collection (monthly, yearly, every 2 years etc.).*	
Notes & comments	*Any additional comment.*	

Table 6.9.22. Urban passenger and active transport characteristics: Availability of smart payment and booking methods on local public transport.

KPI21 - Availability of smart payment and booking methods on local public transport	
KPI name	Availability of smart payment and booking methods on local public transport
KPI description	The KPI indicates the percentage of passengers that use a smart method to pay for or validate local public transport tickets and season tickets. Smart methods are:

	- Contactless smartcards - Contactless credit or bank cards - Mobile ticketing Local public transport covers buses, trams, metros, ferries, ships and local trains that primarily serve the city area (long-distance, regional and suburban services are not included). In case you do not have this data, please *indicate the availability of smart payment methods* (year of introduction, type of payment/validation).
Formula to calculate KPI:	Number of trips making use of a contactless smartcard/credit card/mobile ticketing per year **divided by** the total number of trips by public transport in the city. If this data is not available:

Table 6.9.23. Urban logistics: Commercial establishments

KPI22 ± Commercial establishments		
KPI name	Commercial establishments	
KPI description	Commercial establishments per category (shops, supermarkets, restaurants, other)	
Formula to calculate KPI:	7KH .3, LV FDOFXODWHG XVLQJ H[LVWLQJ VWDWLVWLFV DW WKH FLW\ OHYHO PRVW SUREDEO\ IURP WKH HV\ database, or any relevant GIS land use database	
Unit	Number of commercial establishments per category	
Current Value	*Number of shops*	*Most up-to-date value*
	Number of supermarkets	*Most up-to-date value*
	Number of restaurants	*Most up-to-date value*
	Number of other type of establishments (specify type)	*Most up-to-date value*
Data Source	*e.g. field surveys, statistics office, transport operator, local transport model, etc.*	
Geographic aggregation level:	*Indicate spatial unit for the indicator: part of the city, city, region, state, country. Specify if different levels were used for each indicator.*	

Responsible	*Who collects and provides this data?*
Date & Frequency	*When and how often is the data collected?*
Notes & comments	

Table 6.9.24. Urban logistics: Delivery vehicle parking

KPI23 - Delivery vehicle parking	
KPI name	Delivery vehicle parking
KPI description	Designated delivery vehicle parking places in the city
Formula to calculate KPI:	The KPI is calculated using existing statistics at the city level. We consider that 1 parking place serves only 1 delivery vehicle. Therefore, if in the same location can be served at the same time 3 delivery vehicles, we count them as 3 parking places.
Unit	Number of delivery vehicle parking places
Current Value	*What is the most recent value? (indicate date)*
Data Source	*e.g. field surveys, statistics office, transport operator, local transport model, etc.*
Geographic aggregation level:	*Indicate spatial unit for the indicator: part of the city, city, region, state, country. Specify if different levels were used for each indicator.*
Responsible	*Who collects and provides this data?*
Date & Frequency	*When and how often is the data collected?*
Notes & comments	

Table 6.9.25. Urban logistics: Freight trips

KPI24 - Freight trips	
KPI name	Freight trips
KPI description	Number of daily freight trips in the urban area
Formula to calculate KPI:	The KPI is calculated using either surveys of transport companies or by employing a local transport model. The outcome value can be in terms of: total QXPEHURIWULSVIRUJRRGV¶GHOLYHUWRWKHFLW\LQW\SL In cases where the vehicle returns during the same day to its origin depot/warehouse and reloads for another delivery round, this is calculated as an additional trip.
Unit	Number of freight trips per day
Current Value	*What is the most recent value? (indicate date)*
Data Source	*e.g. field surveys, statistics office, transport operator, local transport model, etc.*
Geographic aggregation level:	*Indicate spatial unit for the indicator: part of the city, city, region, state, country. Specify if different levels were used for each indicator.*
Responsible	*Who collects and provides this data?*
Date & Frequency	*When and how often is the data collected?*
Notes & comments	

Table 6.9.26. Urban logistics: Goods delivery frequency

KPI25 - Goods delivery frequency	
KPI name	Goods delivery frequency

KPI description	Average number of weekly deliveries to commercial/service establishments (e.g. shops, government buildings, large service building, etc.)	
Formula to calculate KPI:	The KPI is calculated using surveys of goods recipients (establishment survey). The outcome value can be in terms of: average number of weekly deliveries to a typical city centre establishment.	
Unit	Average number of weekly deliveries per commercial establishment	
Current Value	*Average number of weekly deliveries per shop*	*Most up-to-date value*
	Average number of weekly deliveries per supermarket	*Most up-to-date value*
	Average number of weekly deliveries per restaurant	*Most up-to-date value*
	Average number of weekly deliveries per other type of establishment	*Most up-to-date value*
Data Source	*e.g. field surveys, statistics office, transport operator, local transport model, etc.*	
Geographic aggregation level:	*Indicate spatial unit for the indicator: part of the city, city, region, state, country. Specify if different levels were used for each indicator.*	
Responsible	*Who collects and provides this data?*	
Date & Frequency	*When and how often is the data collected?*	
Notes & comments		

Table 6.9.27. Goods delivery volumes

KPI26 - Goods delivery volumes		
KPI name	Goods delivery volumes	
KPI description	Average volume per delivery to commercial establishments (e.g. shops, supermarkets, restaurants, other)	
Formula to calculate KPI:	The KPI is calculated using surveys of goods recipients (establishment survey). The outcome value can be in terms of: average number of boxes (50x50x50 cm) per delivery, per establishment type	
Unit	Number of boxes (50x50x50 cm) per type of commercial establishment	
Current Value	*Average number of boxes (50x50x50 cm) per delivery per shop*	*Most up-to-date value*
	Average number of boxes (50x50x50 cm) per delivery per supermarket	*Most up-to-date value*
	Average number of boxes (50x50x50 cm) per delivery per restaurant	*Most up-to-date value*
	Average number of boxes (50x50x50 cm) per delivery per other type of establishment	*Most up-to-date value*
Data Source	e.g. field surveys, statistics office, transport operator, local transport model, etc.	
Geographic aggregation level:	*Indicate spatial unit for the indicator: part of the city, city, region, state, country. Specify if different levels were used for each indicator.*	
Responsible	*Who collects and provides this data?*	
Date & Frequency	*When and how often is the data collected?*	

Notes & comments	

Table 6.9.28. Urban logistics innovation

KPI27 - Urban logistics innovation	
KPI name	Urban logistics innovation
KPI description	Existence of companies providing innovative urban logistics services. This KPI includes 5 indicators: 1. Number of available freight capacity sharing (cargo consolidation) apps for urban delivery in your city 2. Number of transportation companies providing combined urban passenger & cargo delivery services by using spare (public or private) passenger transport capacity in your city 3. Number of transportation companies providing green urban delivery services in your city (e.g. with cargo-bikes, bikes, electric vans, etc?) 4. Number of companies providing on-demand next-hour to same-day delivery services in your city (e.g. for delivering at home an order placed online to a store) 5. Number of companies providing or testing delivery services using autonomous/automated vehicles in your city
Formula to calculate KPI:	1. number of freight capacity sharing (cargo consolidation) apps for urban delivery 2. number of transportation companies providing combined urban passenger & cargo delivery services by using spare (public or private) passenger transport capacity 3. number of transportation companies providing green urban delivery services (e.g. with cargo-bikes, bikes, electric vans)

	4. number of companies providing on-demand next-hour to same-day delivery services (e.g. for delivering at home an order placed online to a store) 5. number of companies providing or testing delivery services using autonomous/automated vehicles in your city	
Unit	1. # 2. # 3. # 4. # 5. #	
Current Value	*number of freight capacity sharing (cargo consolidation) apps for urban delivery*	*Most up-to-date value*
	number of transportation companies providing combined urban passenger & cargo delivery services by using spare (public or private) passenger transport capacity	*Most up-to-date value*
	number of transportation companies providing green urban delivery services (e.g. with cargo-bikes, bikes, electric vans)	*Most up-to-date value*
	number of companies providing on-demand next-hour to same-day delivery services (e.g. for delivering at home an order placed online to a store)	*Most up-to-date value*

	number of companies providing or testing delivery services using autonomous/automated vehicles	*Most up-to-date value*
Data Source	*E.g. field surveys, statistics office, transport operator, local transport model, media, etc.*	
Geographic aggregation level:		
Responsible	*Who collects and provides this data?*	
Date & Frequency	*When and how often is the data collected?*	
Notes & comments		