

D1.1 Framework for the development and implementation of effective strategies for vertical upscaling

Version 0.6 – Final

Disclaimer

This report is part of a project that has received funding by the European Union's Horizon 2020 research and innovation programme under grant agreement number 955332.

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D1.1 – Framework for the development and implementation of effective strategies for vertical upscaling

WP No.	1	WP Title	SATRTEGIES FOR VERTICAL AND HORIZONTAL UPSCALING
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Due Date	08.11.2022		
Delivery Date	30.11.2022		

Version history

Version	Date	Summary of changes
01	28 SEPTEMBER 2022	Content table and draft deliverable to discuss with city of Turku
02	20 October 2022	Revised draft after discussion with Turku; to be validated and completed with some information by Turku
03	27.10.2022	Comments from the city of Turku
04	02.11.2022	Draft for peer review



05	28.11.2022	Final draft for coordination team
06	30.11.2022	Final version



List of Acronyms	
Acronym	Meaning
ATR	Antwerp Transport Region
CRTM	Consorcio Regional de Transportes de Madrid
DMOW	Department of Mobility and Public Works
EC	European Commission
EMT	Empresa Municipal de Transportes
EU	European Union
FUA	Functional Urban Area
KPI	Key performance indicator
MaaS	Mobility as a Service
OECD	Organisation for Economic Co-operation and Development
SULP	Sustainable Urban Logistics Plan
SUMP	Sustainable Urban Mobility Plan
TEN-T	Trans-European transport network
WP	Work Package
NMBS	Nationale Maatschappij der Belgische Spoorwegen



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1 Introduction

1.1 Context and aim of this deliverable

WP1 addresses the framework to develop, implement and validate strategies for vertical and horizontal upscaling in the SCALE-UP urban nodes, Antwerp, Madrid, Turku, and beyond. WP1's first deliverables, D1.1. and D1.2. (development of the framework for effective strategies on the vertical and horizontal approach), are closely related and jointly aim to respond to SCALE-UP's main goal: to develop user-centric and data-driven strategies, to enhance the take-up of smart, clean and inclusive mobility, through well-connected and multi-usage urban nodes, in a consistent and comprehensive manner.

Deliverable 1.1 focuses on strategies for vertical integration: defining the relevant criteria, elements, methods and processes required for aligning and coordinating policies, plans and implementation across different levels of government (city, Functional Urban Area (FUA) and Trans-European Transport Network (TEN-T)). This deliverable reports on the process and depicts the first insights and results of efforts to provide a framework for the development and implementation of effective strategies for vertical upscaling.

This envisaged framework provides a foundation to:

- Support diagnosis methodologies on the SCALE-UP urban nodes, in terms of describing the state of play, i.e. the vertical integration of the city, FUA and TEN-T within the context of the geographical scope of the daily urban (transport) system; of mobility and spatial planning practices; and of governance and cooperation between stakeholders.
- Support diagnosis of impacts of current strategies facilitating the definition of criteria and performance indicators for later upscaling of the vertical integration.

This deliverable also contains guidance for the thematic cooperation in WP 2 - WP 6, supporting discussion on the current diagnosis, challenges and recommendations.

The current deliverable serves as a building block towards the development of the overall framework for effective strategies for vertical upscaling. It provides a view of the current status on vertical upscaling, drivers and barriers on the integration challenges and recommendations on integration actions for Antwerp, Madrid and Turku.



1.2 Methods

Strategic planning is more than the implementation strategy. Planning is a process, often depicted as a cycle in the context of SUMP (i.e. the SUMP-cycle). It is generally considered that effective sustainable urban mobility planning requires the development of an integrated strategy, which is – amongst others: guided by a long term vision; is developed based on cooperation across institutional boundaries (horizontally and vertically), considers the geographical scope of the mobility patterns it is trying to influence; and considers all modes.

When authorities of an urban node want to improve the integration with the FUA and the TEN-T within their policies and strategies or specific parts (i.e. thematic areas of these), then it should become clear:

- *For which thematic areas within the strategy is this relevant? Do all policies and actions need to consider or target the FUA and/or TEN-T level, and why/why not?*
- *Which organisations or other stakeholders do we identify to operate, have mobility competencies, within this higher level? And which impact do organisations, or other stakeholders, have on the effectiveness of the mobility strategy of the city? Why do the cities need this cooperation?*
- *And why should these organisations and other stakeholders support or co-operate with the city authority: what is in it for them?*

Within the SCALE-UP project, 28 measures across 3 nodes have been defined. These measures have however been defined from the perspective of well-established boundaries, of sectors, organizations, task responsibilities, roles, ideas, ways of financing and working. In terms of vertical upscaling it is therefore important to make stakeholders aware of these boundaries. Hence, the focus should be on raising awareness of the usefulness of vertical integration of the city, FUA and TEN-T layer in mobility planning in the nodes, defining ways how this can be applied, as well as defining drivers and barriers.

PROCESS APPROACH

Therefore, the process approach which has been developed in NUVit [1] and Vital Nodes [2], has been applied. It serves as an awareness raising tool and support for diagnosis in and between the urban nodes. Awareness on the position of cities and urban nodes in wider Functional Urban Areas has also been raised via the Advisory Board (Professor Jos Arts) during the General Assembly of SCALE-UP in Antwerp.



In order to make the role of policy makers at different levels in the Functional Urban Area visible, the following issues in the decision-making process have been discussed with the three nodes:

1. **Why** should one act in the current situation in the Functional Urban Area? (What is the added value?)
2. **What** are the (potential) synergies between the spatial and network dimension and which strategies might be chosen to obtain value? (Which elements should I choose from my responsibility?)
3. **How** could the strategy be implemented effectively? (Which stakeholders do I need and what is my role?)

Combining these three key questions (why, what, how) with the dimensions of spatial, network, time, institutional, financial, and value dimensions (the core of the Vital Nodes approach), result in the process approach, which is visualized below. The guidance documents on the process approach has been attached as Annex 1 to this report

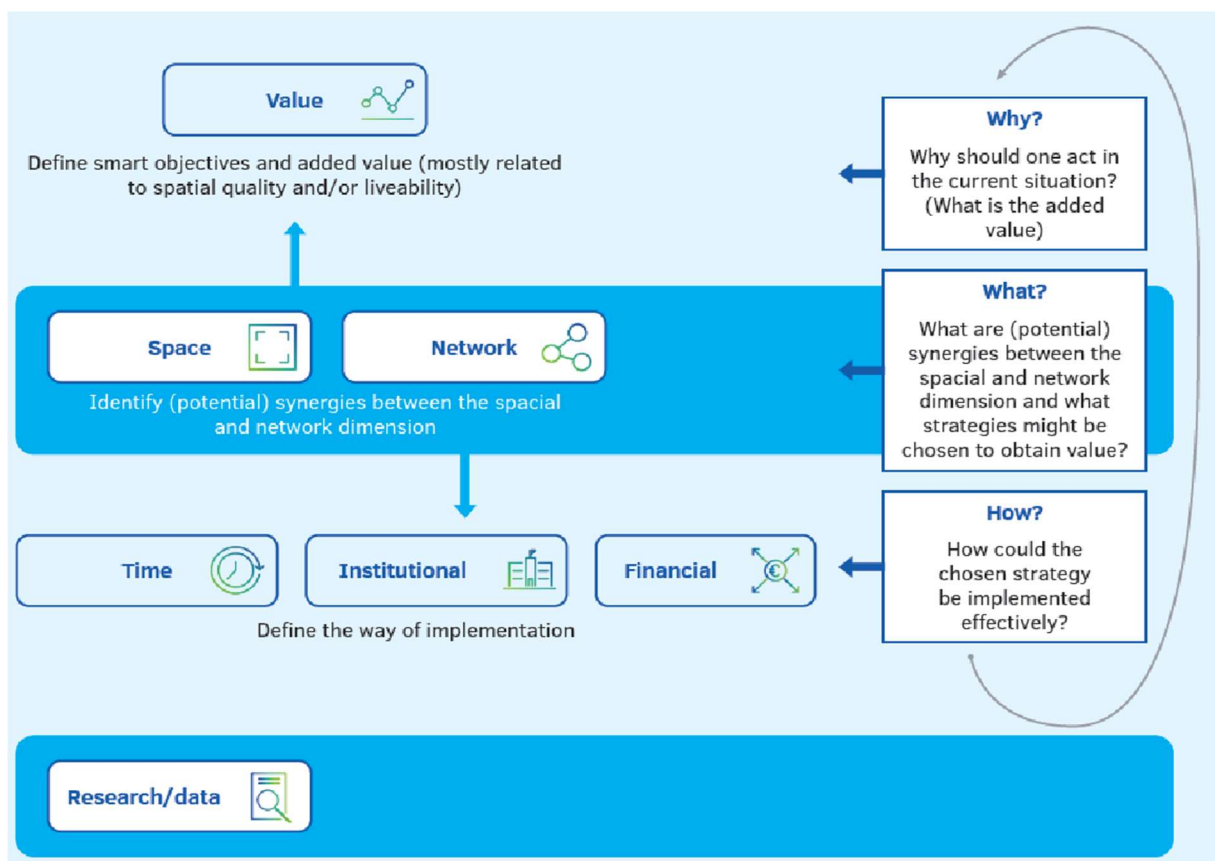


Figure 1: Integrated planning process approach (Source: Vital Nodes)

SUPPORTIVE TOOLS

In other projects tools have been developed to support the diagnosis of vertical integration and discussions with stakeholders. The Vital Node project for example has developed a Toolbox with a process guideline to integrate urban mobility and TEN-T policy. It describes a broad range of methods and approaches for developing a comprehensive policy strategy in a multi-actor context [2]. One of the tools from this box, the Fingerprint, has been applied in this deliverable. Urban nodes have very diverse geographical and infrastructural characteristics such as their size and location, their position on one or more TEN-T corridors, urban and regional and socio-economic developments, and the state of the art of their local and regional multimodal infrastructure networks. The Fingerprint provides facts and figures on the urban node on the level of the city, FUA and TEN-T.

The “Fingerprint” is thus a data collection tool, but also provides the means to visualize the current status of the SCALE-UP Urban nodes. Draft Fingerprints were shared with stakeholders from the three nodes to validate findings and with participants of Focus Group Discussions in Antwerp, Madrid and Turku to have a structured discussion. The Fingerprints have been attached to this report as Annexes 2 to 4.

Other tools which have been used are the reports, and lessons learned in the projects of MORO [3], CEDR SPINtrends [4] and SPINdesign [5], as well as the SUMP topic guides, especially on metropolitan areas and financing.

1.3 Inputs for this deliverable

To understand the current status of vertical integration in each node the following information was gathered:

- Strategic documents on the three urban nodes have been collected and analysed;
- Knowledge exchange webinars around the intervention field Governance were organized by Ecorys, as thematic cooperation task leader of WP2-Governance. Detailed notes of these meetings were taken;
- Notes of the bilateral meetings and knowledge sessions for the Work Packages 2 to 6, were studied. The task leaders of each work package were instructed on which questions to ask in terms of vertical upscaling. Ecorys has drafted guidance documents within Task 1.1 and has scheduled several meetings with Task 2.1 and Task 6.1 leaders to discuss and explain the guidance documents. This guidance has been used as an input by Tasks 2.1 and 6.1 for thematic co-operation meetings. See Annex 1 for the drafted and discussed guidance documents on vertical upscaling;
- Given the strong relationship with WP2, Improved multi-level governance models and multi-stakeholder cooperation, there was a direct exchange of inputs and outputs



between WP1 and WP2. D2.1 reports on challenges, drivers and barriers in governance and cooperation strategies for integration.

- UPM (together with Ecorys) has organized three Focus Group Discussions (one for each node) with a group of local experts from outside of the SCALE-UP project. The purpose of these meetings was to discuss challenges, barriers and drivers for horizontal and vertical integration, to both verify and complement those identified by the stakeholders within the project.
- The relation between D1.1 and WP 7 is also an input – output relation. Ecorys has facilitated the definition of criteria and performance indicators for upscaling the vertical integration by drafting and discussing these in several meetings with WP 7 (see Annex 5). Deliverable 7.3 provides the baseline situation of the 3 SCALE-UP urban nodes - on the level of the city and the FUA - to monitor to overall changes in these nodes. This baseline describes barriers and drivers identified by the Measure Leaders (ML) and Local Evaluation Managers, amongst others in terms of governance.
- Canvas discussion during the General Assembly in Antwerp

1.4 Structure of this deliverable

The next chapter will dive deeper into the role and definition of vertical integration. Chapter 3 will then focus on the lessons which can be learned from other projects and the process approach. In the chapters 4 to 6 the diagnosis of vertical integration and preliminary conclusions will be presented per urban node. Chapter 7 provides the overall conclusions and chapter 8 recommendations.

These recommendations are directed to the city participants in WP 1, who are the direct strategic link to the measures in WP 2 – WP 6. At the same time, these recommendations are also directed to the D2.1 – D6.1 leaders, who are in charge of bringing these recommendations on step further together with the WP leaders. Based on the findings, input will also be provided to the monitoring and evaluation task where indicators to assess the level of upscaling the vertical integration.

At the same time the results of this deliverable are input for D1.5: Guidelines and recommendations for other cities/urban areas on the SCALE-UP strategies for vertical and horizontal upscaling.



2 Role and definition of vertical integration

2.1 Trans-European transport network

As a starting point: what are the trans-European transport network (TEN-T) aspects for urban nodes that need to be integrated in the urban mobility planning approach of cities? Is there a challenge for urban nodes at the TEN-T level to integrate this perspective in their policies? How do these challenges relate to the way the (SCALE-UP) nodes perceive the relevance of TEN-T for their urban policy design?

According to Art. 4 of COM(2021) 812 final on the revised TEN-T Guidelines [6], the objectives of the trans-European transport network, include:

- Cohesion through: (iii) for both passenger and freight traffic, **efficient coordination and interconnection** between transport infrastructure for, on the one hand, **long-distance traffic and**, on the other, regional and local traffic and transport services in **urban nodes**;
- Efficiency through: (iv) optimal **integration and interconnection** of all transport modes, including in **urban nodes**.

But what are these urban nodes exactly? According to the definition listed in the TEN-T Guidelines, an '*urban node*' portrays an urban area where elements of the transport infrastructure of the trans-European transport network, such as ports including passenger terminals, airports, railway stations, bus terminals, logistic platforms and facilities and freight terminals, located in and around the urban area, are connected with other elements of that infrastructure and with the infrastructure for regional and local traffic. It comprises:

(a) transport **infrastructure in the urban node that is part of the trans-European transport network**, including bypasses, and that increases the performance of the trans-European transport network;

(b) **access points** to the trans-European transport network, notably multimodal railway stations, multimodal freight terminals, ports, or airports;

(c) **first and last mile connections** between and to these access points.

Urban nodes have a crucial **role in the TEN-T network** as starting point or final destination ("last mile") for passengers and freight moving on the trans-European transport network and as points of transfer within or between different transport modes. They are also important because important bottlenecks and missing links on the network are located in these urban nodes.

Up to now, **the integration of the TEN-T policy perspective into urban and regional mobility policy** and vice-versa has not been sufficiently ensured. There is a need to have a better



integration of urban nodes within their region, including the **integration of long-distance TEN-T traffic** with the local transport flows, more collaborative planning at different policy levels and more emphasis on inter-modality [7].

In order to achieve the integration of the TEN-T perspective, the revised TEN-T Guidelines [6] set the following priorities for the EU urban nodes:

- ensure availability of **alternative fuels recharging** and refuelling infrastructure, including in logistics platforms and for public transport;
- ensure for passenger transport:
 - sustainable, seamless and safe **interconnection** between rail, road, air, the active modes of transport and, as appropriate, inland waterway and maritime infrastructure;
 - ability for passengers to access information, book, pay their journeys and retrieve their tickets through **multimodal digital mobility services**;
 - ensure the development of **multimodal passenger hubs to facilitate first and last mile** connections which are equipped with at least one recharging station;
- ensure for freight transport: sustainable, seamless and safe **interconnection** between rail, road, and, as appropriate, inland waterway, air and maritime infrastructure as well as appropriate connections with logistics platforms and facilities;
- ensure the development of at least **one multimodal freight terminal** allowing for sufficient transshipment capacity within or in the vicinity of the urban node.

In addition, guidelines state that urban nodes should:

- adopt a sustainable urban mobility plan (**SUMP**) in line with Annex V that takes long-distance trans-European transport flows into consideration and improve the accessibility of the *functional urban area* (FUA);
- collect and submit to the Commission, **urban mobility data** per urban node covering at minimum greenhouse gas emissions, congestion, accidents and injuries, modal share and access to mobility service, as well as data on air and noise pollution.

2.2 Overlap between urban area and TEN-T: the FUA is covering multiple policy domains

Crucial in the more effective and sustainable integration of urban nodes into TEN-T corridors is the element of bringing together two important policy domains, i.e. urban mobility policy (such as SUMP) and TEN-T policy. The figure below visualizes the focal area for integration.



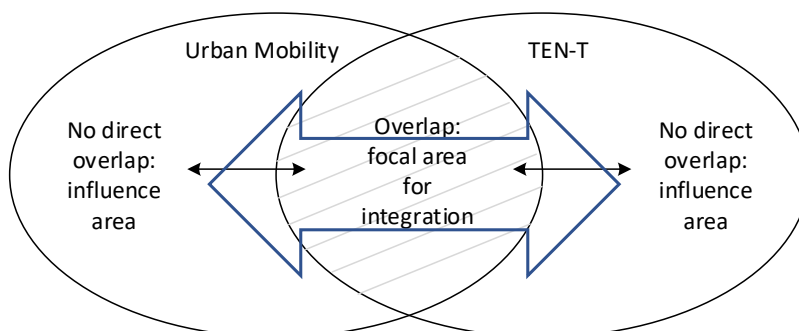


Figure 2: Overlap of urban mobility and TEN-T policy

This focal area is the overlap between the two policy domains: the urban area and its related Functional Urban Area. The integration of urban nodes in the TEN-T network requires integrated policy attention. **The main challenge is the outreach from the functional urban area to the TEN-T and – especially in SCALE-UP – from the overlap area to the urban mobility domain**, and the imbedding of these parts (see Figure 2.1).

Therefore, awareness-raising is of utmost importance for policy makers on all relevant levels (EC, national and local) at various levels and in various sectors to ensure widespread support throughout the functional urban area.

2.3 What is vertical integration in SCALE-UP?

Within the context of the SCALE-UP project, integration of policy and planning perspectives, which supersede the geographical and administrative boundary of a single city, municipality or other public entity at local level, is considered vertical integration.

Both the elements space and scale of challenges involved in planning for sustainable mobility, often supersede the technical, spatial and administrative limits of local authorities. Passenger mobility is largely confined to daily urban systems of FUA covering a cluster of municipalities. In freight transport, many of the flows occur between FUAs at the level of the TEN-T, while first-last mile transport occurs within the FUA.

Vertical integration looks at how local policy fits into wider regional and national frameworks and how it conforms with relevant legislation at other hierarchical levels of government (from the region all the way to the EU). In order to achieve “top-down” transport, mobility, urban and sustainability policy objectives “higher level” authorities need cities to plan and implement actions in support these goals.

At the same time, authorities at the local level, strongly depend on the support and alignment of policies from “higher level” authorities. For example, in Antwerp (as well as in



all other municipalities in Flanders) efforts to support and encourage the use of cycling and public transport are undermined by a federal government policy which provides fiscal benefits for commuters who travel by car. At the same time, the Flemish government has assumed a leading role in the roll-out of public charging infrastructure on the public domain (unless a city/municipality has decided to do this itself). The roll-out of public charging points is done by means of a concession contract. The Flemish Government has appointed charging station operators who will take care of this roll-out in the participating Flemish cities and municipalities over the next two years. Municipalities, citizens, companies and organizations can apply for a public charging station via an e-counter. Public charging points will also be added when existing charging points are used frequently. In addition, since March 2021, charging points must be provided at certain buildings and car parks for which an environmental permit is requested. Furthermore, the government provides subsidies for (semi-)public charging infrastructure on private property, such as supermarket car parks, sports grounds, shopping malls and industrial estates.

The financial resources and technical know-how at the lower level authorities, such as municipalities, especially smaller ones, may not be sufficient to deal with all the challenges involved in securing sustainable urban mobility solutions. Still, responsibility for dealing with many challenges has been delegated from higher to lower levels of authority. This brings opportunities to use local knowledge and may help to create support for policies and interventions. With delegation of authority to a lower governance level, comes a need for a supervisory/coordinating role at a higher level. Uncoordinated actions and competition in spatial and mobility planning poses threats to sustainable and effective implementation of policies in these areas. Urban sprawl, patchworks of local access regulations in environmental zones and varying requirements related to quality, market access or data sharing to MaaS and shared mobility service providers are such examples.

Coordination across levels of government (i.e. regional, national or EU-level) is important in order to ensure coherence in policies for sustainable mobility, the implementation of the policies, and ultimately, the achievements of its objectives. Vertical integration as part of an effective multilevel governance framework should be seen more broadly than just an approach to human and financial resource scarcity [8]. Vertical integration has been defined as “the act of aligning and coordinating policies, plans and implementation across different levels of government, leveraging the potential of each respective level through collective efforts and promoting top-down and bottom-up information exchange” [9]. This alignment and coordination can be steered by systems in which different levels of government interact (i.e. governance frameworks), as well as a variety of instruments. Instruments include amongst others funding mechanisms, monitoring and reporting, specific platforms for cooperation and exchange, action plans, training and capacity (building), citizen/community participation, etc.



Hence, cooperation between municipalities is also considered when discussing vertical integration. This is a wider interpretation than what is commonly adopted in urban planning literature, in which such territorial cooperation is often considered a form of horizontal cooperation. However, such cooperation can be both part of the framework and an instrument for vertical integration, as it can be used to manage, align, coordinate policies and implementation “upwards” and “downwards” in the vertical hierarchy.

We used Fingerprints as one of the tools to analyse if the elements listed above are included in the SUMP in the urban nodes. We use the city SUMP as a base and relate this to the FUA.



3 Lessons from other projects and SUMP planning cycle

3.1 Lessons from other projects

The projects of Vital Nodes, MORO [3], SPINtrends [4] and SPINdesign [5] all focus on the integrated approach of spatial planning and mobility in urban development. The paragraphs below describe the highlights of each project.

MORO

The MORO project included the German research on Implementing the Territorial Agenda 2020: impacts of European sector policies in selected model regions - enhancing regional potentials in the context of further developing the TEN-T. Linking transport refers to improved linkages between various transport modes (long-distance and regional transport, intermodal transport), and to the coordination of transport and spatial development. So there was a clear relation between regional and TEN-T level, policies and strategies.

Better linkages between transport modes have been differentiated both according to content-related aspects and different stakeholder groups. As regards contents, there were three main thematic fields differentiated:

- passenger transport,
- goods transport and logistics,
- participation, cooperation, governance.

In MORO the following four fields of action were differentiated:

- physical infrastructure (political level responsible for investments),
- transport management (supply side),
- mobility management (demand side),
- development of suitable framework conditions (political level).

These fields of action overlap with each other and are primarily influenced by different stakeholder groups (transport planners, operators, users, local and regional authorities, politicians and the general public).

Further conclusions of the MORO project were:



- Regions differed as regards the degree to which they are affected by TEN-T developments, their territorial types and regional characteristics, and expressions of interests by regional stakeholders
- New tasks occur regarding the coordination of spatial and transport planning. A better coordination between local public transport and settlement planning, for example, is necessary for rural areas to benefit from better accessibility.
- A clear distribution of tasks, allocation of responsibilities and good communication between the stakeholders are pivotal for connecting transport and spatial development.
- The awareness in cities of being part of the TEN-T network was low.

VITAL NODES, SPINTRENDS AND SPINDESIGN

Vital Nodes, SPINtrends and SPINdesign are all three projects that are based upon the NUVit approach, integrating spatial development and mobility. The project SPINtrends explored effective approaches for future-proof road networks based on trends in mobility and spatial development. The objective of the SPINdesign project was to provide National Road Authorities and other planning authorities a toolbox that helps them optimize the multi-modal performance of the transport system in the urban region. The SPINdesign toolbox supports infrastructure- and spatial planners in initiating an integrated (multimodal, spatial, broad scope) and collaborative (multi actor) approach.

Where SPINtrends and SPINdesign were more focused on road infrastructure and last-mile transport, Vital Nodes was a Horizon funded project focussing on the interaction between city – FUA and TEN-T level. The objective of Vital Nodes is to improve European interconnection while developing sustainable mobility within the urban nodes of the Trans-European Transport Network (TEN-T). Vital Nodes delivered evidence-based recommendations for effective and sustainable integration of the nodes into the TEN-T network corridors. It addresses specifically the multi- and intermodal connection between long-distance and last-mile freight logistics, considering the interaction with passenger transport. It also supports the deployment of innovative measures in the urban nodes, while establishing a long-lasting European expert network. Vital Nodes has shown that using a mix of the methods is necessary to take further steps in exploring the integration of urban nodes in TEN-T. The added value and synergies need to be appraised among stakeholders in urban nodes. The project provided a Toolbox and lessons which have been integrated in SCALE-UP.



3.2 SUMP planning cycle

Preparing a Sustainable Urban Mobility Plan (SUMP) is a complex undertaking. Guidelines developed with the Commission's support, offer concrete suggestions on how to apply the SUMP concept and prepare an urban mobility strategy that builds on a clear vision for the sustainable development of an urban area. This process of developing and implementing a SUMP can be broken down into 12 main steps. The SUMP planning cycle has been visualized below.



Figure 3: The SUMP Cycle. Source: <https://www.eltis.org/mobility-plans/sump-process>

At the same time, while the SUMP guidance may be known and understood by many cities, they also struggle with a planning scope beyond the city boundaries.

Despite the fact that the Organisation for Economic Co-operation and Development (OECD) and the European Commission have jointly developed a methodology to define



Functional Urban Areas in a consistent way across countries¹, cities and countries have differing understanding of planning scopes and of definitions for region, metropolitan area, and functional urban area. Therefore, various reports [10] have suggested that the **functional urban area as a concept** needs adaptation and flexibility for different contexts as well **as for a better integration with the TEN-T network**. The focus should be on functional regional cooperation rather than on a clear definition of the geographic scope. For improving and consolidating regional cooperation, cities need support and guidance for feasible cooperation models beyond the city boundaries. This should also entail the relation with urban nodes and a focus on the broader transport perspective such as long-distance transport.

3.3 The process approach in SCALE-UP

Hereafter, the Vital Nodes elements are described in relation to the phases in the SUMP / SULP planning process.

(1) PREPARATION AND ANALYSIS

Based on the findings of the Vital Nodes project **policy makers should be made aware of their role in the Functional Urban Area and should be made aware of other (political) authorities and decision makers operating** in the FUA. In order to adequately address the planning challenges, policy makers should take a common decision at this stage of the defined geographical scope in which they operate and co-operate, including an **analysis of the values and common objectives of the integration of infrastructure, mobility/freight-logistics and spatial development**. The planning area goes beyond local borders. And the planning area of logistics and freight differs from the daily urban system of commuters. Furthermore, the planning area is not always related to governance / formal entities, such as a metropolitan region, but also relates to voluntary co-operation for effective planning.

Based on the findings of Vital Nodes, the management and working structure should reflect the FUA. Important elements are stakeholder mapping and setting up the process co-ordinator, SUMP / SULP core group, steering and technical committee. A major learning point from Vital Nodes is that **capacity building requires specific attention for freight and logistics capacity in the authorities**. Another learning point for most of the current SUMP is that additional stakeholders are needed, such as national authorities, which are responsible

¹ Using population density and travel-to-work flows as key information, a FUA consists of a densely inhabited city and of a surrounding area (commuting zone) whose labour market is highly integrated with the city.



for the planning of superordinate transport infrastructure (highways, railway, or waterways), and the relevant infrastructure managers and providers. For spatial development and freight/logistics such actors as logistics operators, railway companies, housing and business estate developers are required.

Once working structures and capacity are in place, an analysis can be conducted of the mobility situation including spatial functions, infrastructure networks and freight/logistics. During this phase, a start should be made to define the value; this is done by each stakeholder. If a stakeholder fails to define a value, the definition of the FUA may be incomplete and co-operation within a FUA may not be fluent. A learning point from Vital Nodes is that **a FUA should not (only) be defined based on data; co-operation mechanisms** reflecting the functioning of an area **are also a basis for defining a FUA** and starting the planning process.

(2) STRATEGY DEVELOPMENT

The stakeholders within a defined geographic scope will co-operate in the planning of the FUA. Therefore, it is important to evaluate ex-ante draft objectives and ambitions towards the defined value of each stakeholder. This serves as input for a joint urban mobility vision and strategy for the FUA together with the various stakeholders. An important element is the assessment of policy scenarios including the impact on the different scales (multi-scalar) and the different sectors (multi-sectoral; policy objectives regarding economy, accessibility, social inclusion, energy transition, spatial quality, liveability, and overall vitality of a region).

The integration of TEN-T and freight/logistics related aspects into scenario development reflects current trends, possible changes of circumstances, and expected future trends of long-distance goods transport, relevant land-use, infrastructure development and implications for spatial quality. This helps planners and decision-makers to evaluate the multi-scale risks and opportunities for possible measures on the different sectors and dimensions. Since these scenarios are discussed with a wide range of stakeholders, including policymakers and experts, a common understanding and agreement can be reached reconciling local/regional and long-distance vision and objectives for freight and logistics at the local, FUA and TEN-T level. Here, synergies should be identified between infrastructure and spatial development. **Definition of strategic indicators and targets enables ex-ante and ex-post evaluation**, the monitoring of progress and the achievement of the objectives within a functional urban area.

(3) MEASURES PLANNING

In the Vital Nodes approach, time, institutional and financial elements are required to define the method of implementation. Lessons learnt from Vital Nodes regarding financial



elements demonstrate that many urban nodes follow the current financial instruments of the EC, which is reflected in the capacity of EU financial experts within authorities. Examples of new financial models and their features can be in the SUMP topic guide on finance [11]. From the Vital Nodes perspective, it is **important that stakeholders in a functional urban area define the added value of scenarios and measures for the integration in FUA / urban nodes and TEN-T corridors**. In this way, the funding and financial models reflect the functional value.

The measure planning phase is concluded with the preparation of the implementation phase and submission of the SUMP / SULP to the decision-makers of the competent political bodies, who then adopt the plan. Main outputs are a financial plan including the reflection of value, an evaluation and monitoring scheme, an implementation plan (including risk management) and a finalized SUMP / SULP.

(4) IMPLEMENTATION AND MONITORING

This phase focuses on implementing the measures and related actions defined within a SUMP / SULP, accompanied by systematic monitoring, ex-post evaluation and communication.



4 Urban Node Antwerp

4.1 The strategy of Antwerp: objectives

As a result of the Future Alliance Antwerp ('Toekomstverbond'), the aim of a sustainable 50/50 modal split for passenger transport has been included in the Antwerp Mobility- and Antwerp Climate Plan. In practice, this means that by 2030 at least 50% of all trips in the Antwerp Transport Region (ATR) will be made by bicycle, train, tram, bus, foot, taxi, waterbus and shared systems, and a maximum of 50% by car. The Mobility policy is not only aimed at a CO₂ reduction, but also at a liveable and attractive city. For freight traffic, the City of Antwerp also wants to transport a maximum of half by road by 2030. This however is related, but parallel, to the Port's (Port of Antwerp-Bruges) ambitions on multimodality, often driven and stimulated by regional transport and infrastructure policies. But also by TEN-T policies, as the port of Antwerp and the hinterland infrastructures are of core importance for EU goods transport.

The city of Antwerp has its own policy approaches, for mobility, infrastructure and climate change. This is a core competence of the city authority, while many of the infrastructure investments relate to regional (road and public transport administration) and national budgets and competencies (railways) too. Related to the goods transport objectives, is the Flemish regional policies for ports and hinterland traffic, and the implementation thereof in cooperation with the port Authority and the infrastructure managers (e.g. *Infrabel* for railway infrastructure, *De Vlaamse Waterweg* for inland shipping). The port is a separate entity. The mobility aspect of the urban node's policy is also integrated in a strengthened cooperation on a regional scale, the ATR. This rather new body is a cooperation of cities and communities, which have no focus on TEN-T, but more scope their policies on local challenges and objectives.



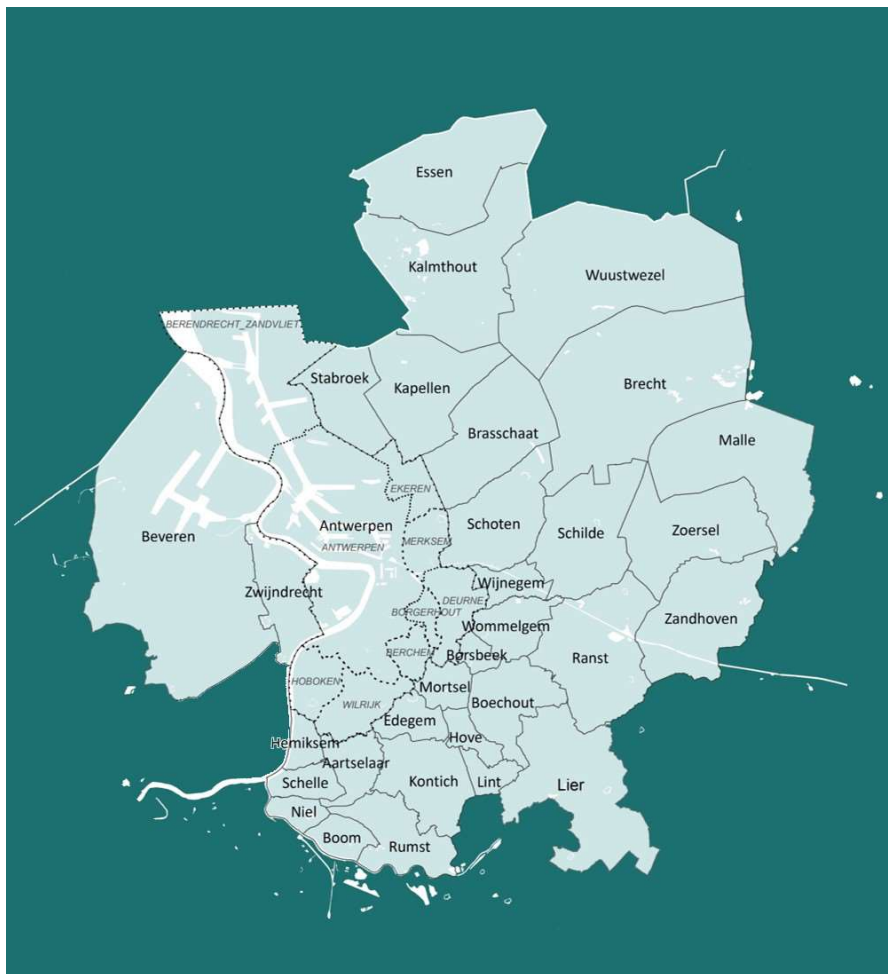


Figure 4: The Antwerp Transport Region with City of Antwerp centrally located

Antwerp's city mobility policy has its origins in the Mobility Plan Antwerp 2020 – 2025 – 2030 [12], adopted in 2015, and subsequently supplemented by the 2019-2024 administrative agreement and the 2030 Roadmap of the Antwerp transport region [13]. The efforts in the Mobility Plan have been expanded in practice by the Alderman for Mobility and the city council. For years, for example, Antwerp has been working with 'Smart ways to Antwerp' to create a city that is easily accessible by encouraging residents and visitors to try out and combine different modes of transport. This is an action plan that is strongly linked to the interventions that are taking place in the context of the Oosterweel Works (a large infrastructure investment plan, rounding the Antwerp Ring road and jointly developing liveability projects as ring parks, increasing the quality of life for the city residents (named The Big Link, 'De Grote Verbinding').

Antwerp's mobility policy is strongly linked to investments made by the regional authorities (in rounding the ring road, the liveability projects around the ring road and in the new vision on the public (bus and tram) operator De Lijn). For port investments, a hybrid model exists



as the regional Authority, DMOW and the Port invest, in cooperation with private stakeholders and other government bodies like Infrabel. Infrastructural works are grouped in *Lantis*.

The mobility vision for the wider Antwerp region, mildly aligned with the FUA, is to stimulate a modal split of 50/50 by developing a regional approach on transport policy; The Routemap 2030 of the Transport Region.

This Routemap 2030 encompasses a state of play, a vision on urban developments and visions for many aspects of the transport policies within the region (tram, bus, shared mobility, urban planning etc.). The city of Antwerp is highly generating incoming and outgoing traffic to and from the ATR. The city clusters a significant number of residents and is the core of the ATR. As such the city's policy cannot be seen separately from regional ambitions, and the regional vision on public transport.

THE ROLE OF THE CITY OF ANTWERP

The role of the city is to organise the mobility in, to and from the node to the ATR and beyond in an efficient, and innovative way. The city has a well-developed transport team and is therefore skilled to plan, monitor and develop policies, wherein shared mobility is a key facet. The city is trying to build a regional transport approach for the wider ATR, in consultation with other municipalities. Being the largest partner, challenges arise in this consultation process. As many local governments lack the expertise or have a different scope or approach in mind, Antwerp is leading, but should find a balanced approach in developing policies and building infrastructure, across the region. Having the size, Antwerp can also be the middleman linking the ATR to the Regional and Federal government, funding on regional and EU level.

4.2 Vertical integration in Antwerp

Below a summary has been given of the work packages and measures being implemented in Antwerp and their relationship with vertical integration. A distinction has been made between vertical upscaling, replicating or showcasing a measure. From a SCALE-UP perspective replicating or showcasing is not vertical integration. Replicating is doing the same at a different level, while vertical integration involves the adaption of the project and involved stakeholders to the higher scale. A more detailed description of the measures is given in the next paragraphs.



Table 1: Summary of measures in Antwerp and their relationship with vertical upscaling

Description	Vertical integration	Replicating	Showcasing
WP3 (Multimodality) and WP5 (Clean, safe & inclusive mobility)			
A3 Multimodal mobility hubs and network optimisation	This measure defines a typology and hierarchy for hubs at the level of ATR, but (competing) definitions are developed at the level of the city and Flemish government.		The multimodal hubs and network will be exemplary for the whole Flemish Region and beyond.
A6* The Ring Road as a highway for green energy	The measure itself mainly involves Antwerp, but since it is connected to the Big Link project, it has an impact on regional and TEN-T level.		
A7* Electric bike sharing scheme for the Antwerp Transport Region		Measure at ATR level. The objective is to cover the entire transport region. Lantis is in the lead and is partnering with more than 30 local authorities. Additional stakeholders (e.g. universities) will be involved.	
A8* Safe routing for freight transport including collection of freight data	The objective is to foster safe transport in the Antwerp Transport Region and safeguard a good connection and integration (in)to the TEN-T network and hubs (i.e. Port of Antwerp-Bruges).	The core of the API that is being developed can be applied anywhere, so it can easily be replicated.	



WP4 (Data driven strategies and Tools)				
A4	NxT Mobility data strategy: management tool for multi modal mobility	The two entities (city and port) work in parallel and in independent ways. the Port is focusing on long distance freight flows, while the city is focusing on short-distance passenger flows. Both perspectives are however needed to realize a modal shift towards more sustainable and shared mobility and the take-up of Mobility as a Service (MaaS).		
A5	Towards a better intraport flow freight management by using smart data			
WP6 (Behavioural change with a focus on active and healthy modes)				
A9	Nudging and incentivising sustainable travel	Potential for scaling up – Antwerp Transport Region (later in time)	Potential to open up the platform to other governmental organisation to build up on it	
A10	Active travel campaigns and events as a catalyst for sustainable travel	No practical/real vertical integration aspect identified. It has an apparent vertical component in the sense that events gather crowds from a larger region; but it is managed by the City of Antwerp as communication actions can target people from outside the city.		



The involvement of stakeholders in the region on the theme's multimodal hubs, data, greening and behavioural aspects within SCALE-UP is sketched below.

Table 2: Involvement of stakeholders on different themes within SCALE-UP

(+=strong relation, ?=some relation, 0= no relation)

	Multimodal hubs	Data	Green	Behaviour
TEN-T	0	0	0	0
Federal Agency on Mobility and Transport	?	?	?	0
DMOW	+	?	+	?
Province	?	0	?	?
ATR	+	0	?	?
Antwerp city authority	+	+	+	+

4.3 Strategy on integration of space and network (WP3 and WP5)

A3: MULTI MODAL MOBILITY HUBS AND NETWORK OPTIMISATIONS IN ANTWERP TRANSPORT REGION

Hubs are an important theme within SCALE-UP. WP3 focuses on the design of multimodal hubs in urban areas. The main goal of measure A3 in Antwerp is to boost and enhance sustainable mobility through strong multimodal mobility hubs (reinforcing hubs operation, accessibility, and service level) and bike networks. This overall objective is pursued through three main lines of action:

1. Design and implementation of hubs
2. Digital presence of the hubs (to nudge and incentivize multimodal travel)
3. Connecting the bicycle highway network to the multimodal hubs



The approach of the city is focused on realising the 50/50 ambition on car and non-car (sustainable) trips by 2030. Therefore, the city invests and facilitates MaaS developments and sharing mobility solutions such as e-scooters and bikes. Recent additions are electric bikes from Donkey Republic, placed not only in the city centre but in the whole transport region.

The approach stretches beyond the own city boundaries, via the ATR. Many flows originate in the region, and lead towards or via Antwerp (ring road). Therefore, the ATR approach, with two core elements the Oosterweel works (governance by Lantis and guided by ATR), and the public transport plan for bus and tram, are key for succeeding in the 50/50 ambition for the region. The regional government invests heavily in rounding the ring road, and in creating liveability solutions in the same move. This entails building viaducts, tunnels, bike paths, ring parks (on the new ring road) and multimodal hubs (such as P&R, but also tram/bus hubs and facilitating last mile transport with shared mobility from railway stations and other nodes).

The second, reorganising the tram/bus net, is not a finalised process. Given the need to form a consensus in the ATR council, and being tied to a fixed budget, the negotiation with many stakeholders with diverting views and sensitivities is a challenge. Moreover, the ATR council has no competence in the concession contracts of De Lijn (bus and tram), or NMBS (railways). The first is managed and contracted by the regional Ministry for Mobility, the latter by the Federal government. Also, **the ATR does not have own budget for funding for operations or capital expenses**. These elements make the struggle even larger.

Hub development, especially creating one shared vision by different stakeholders has been proven a challenging task. This can be explained by the new governance structure, where municipal representatives still have to accustom to the new setting and way of working. Another challenge consists of the unfamiliarity of many stakeholders of the financial consequences of operational choices in combination with a lack of infrastructure funding for building qualitative hubs.

It is right to state that the decoupled levels of transport plan development (municipalities in the ATR council) and the concessionaire for public transport (De Lijn and NMBS), and the concession giver (Regional and Federal Ministries), and the lack of own budgetary means of the ATR, hamper the process to come to a long-term vision on mobility in the region. **Therefore, a lack of involvement in coordinating objectives within the FUA is seen.** Also, political view, diverting in the ATR and between the ATR and other stakeholders is an additional difficulty for cooperation.

FREIGHT AND LOGISTICS LACK OF COORDINATION AT FUA LEVEL

Freight and logistics are regarded as a competence of the private sector, the port authority and regional or Federal authorities and Ministries. Minor steps are developed only for city



distribution policies. Though, the city is currently developing their first SULP. In the ATR, freight and logistics, do get a place, but are not a priority it seems. The city facilitates a depot in the city outskirts, as a way to bundle freight flows towards the city, and as a pilot case to test innovations as electric vans and cargo bikes.

PASSENGER HUBS COULD WORK BETTER WITH AN INTEGRATED APPROACH

Antwerp is developing hubs in the city core, were tram and bus link with shared mobility solutions. The P&R's, recently opened, offer this connection between modes, and with cars exiting the ring road towards the P&R. This is a first development, but main breakthroughs will only happen when the new tram and bus transport plan is adopted.

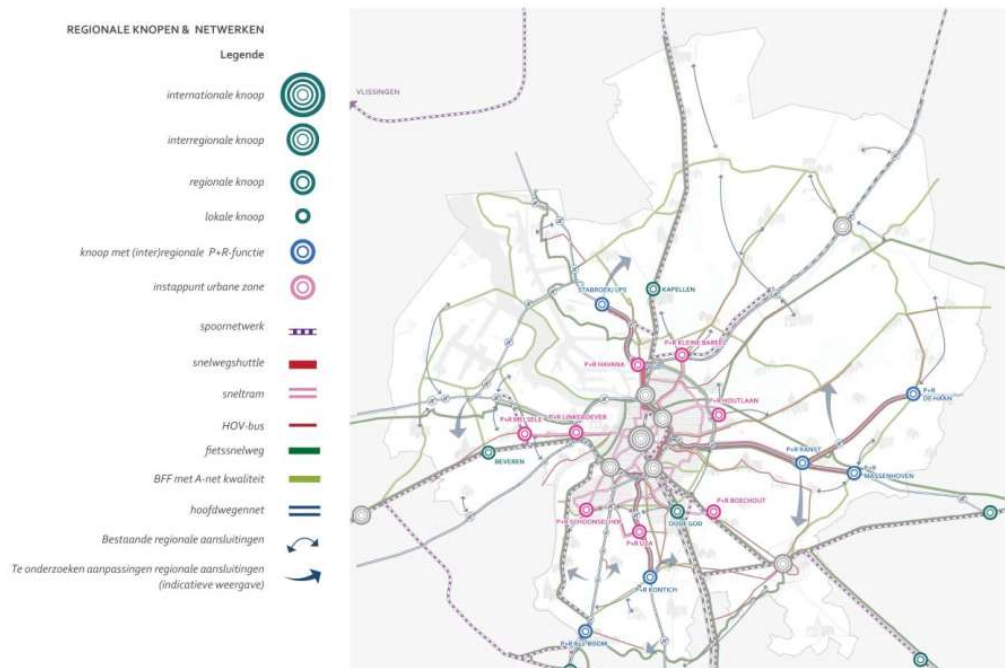


Figure 5: A typology of nodes in Antwerp

4.4 Strategy on data (WP4)

Work Package 4 includes the following measures:

- A4: NxT Mobility data strategy: management tool for multi modal mobility
- A5: Towards a better intraport flow freight management by using smart data

There is a clear strategy on the vertical integration aspect of data in the measure MaaS Ecosystem and collaborative Governance Framework (WP2). This governance aspect is directly related to involvement of multiple stakeholders in the overlap area of urban and TEN-T. The governance challenges are a prerequisite for the (SCALE-UP) challenges in the implementation measures of WP 4: the implementation of data driven strategies and tools in Antwerp and the measure towards a better intraport flow freight management by using smart data.

The vertical integration perspective of the elaboration of the MaaS Ecosystem and collaborative Governance Framework will be guided via WP 2: a knowledge exchange and session with experts outside the consortium will be arranged.

4.5 Strategy on behaviour (WP6)

Work Package 6 includes the following measures:

- A9: Nudging and incentivising sustainable travel
- A10: Active travel campaigns and events as a catalyst for sustainable travel

The behavioural aspects in the policy of the urban node Antwerp are not copied in other municipalities and cities. Nevertheless, stakeholders in the region, for example Voka and the Port Authority, learn from the approach, cooperate with the city administration, and copy the approaches in their daily business and stakeholder management. To upscale the Smart Ways to Antwerp measures, ATR will work in collaboration with the city of Antwerp and employers' organization Voka and the Provincial Mobility Point, who have already conducted Mobiscans (an analysis of the present mobility situation in an organization) for several companies or company parks to point out the alternatives for car users to commute.

4.6 External perspective

The above-described findings are based on the discussions with SCALE-UP project partners and the applied tools on vertical integration analyses. Within **focus group discussions** we have analyzed vertical integration from the **perspective of stakeholders from outside the SCALE-UP project**.

The Antwerp FGD was held in Antwerp on May 20th, 2022 and was organized and moderated jointly by ECORYS and UPM. There were 1 moderator and 1 facilitator, 2 researchers taking notes (from UPM and ECORYS), and observants from ECORYS, City of



Antwerp and TML. This event was held in the Lindner Hotel (Antwerp, Belgium), right after 2022 SCALE-UP's General Assembly.

A clear conclusion from this focus group was that the **regional limitation of the Antwerp Transport Region is not reflecting the area which is considered as an effective strategy for the FUA**. The FUA is larger and reaches the regional and international themes as well, for example railways to Brussels and Amsterdam. And the ATR also links with many other transport regions. A broader co-operation is required for the SCALE-UP ambitions; this is including the Province(s) and the Flemish and Federal Ministries. Also, the aspect of Regional Planning is considered as a requirement. The Antwerp FUA is characterised by the complexity of a poly-centric nature of the dense urban environment of the area including Brussels, Antwerp, Ghent and stretching further towards the Dutch Randstad.

CONCLUSIONS OF THE FOCUS GROUP WERE:

- The Transport Regions have been chosen but are not reflecting the FUA. The challenge is that these different Transport Regions have to co-operate, but they are operating at different speed. The Antwerp Transport Region is already a few steps ahead of the other transport regions because it was the first. So, they all already have plans and they are coming to the point of taking decisions. And the other regions still are working on their plans. So, there is **a need for more interactions between all the transport regions in Flanders**. However, there is already interaction with the Transport Region of the Kempen and also with e.g. Waasland and Ghent.
- When we look at the Functional Urban Area; actually, you have the additional complexity that you are even outside the border of Flanders and the disadvantage of this. So, these transport regions are actually quite local and this misses integration; **Integration between the different transport regions, but especially integration with the matter that is still federal**, which is the rail policy; and ideally they really look at transport in an integrated way.
- What misses is a global vision for the FUA, which requires involvement of all stakeholders.
- **Transport regions are too small defined to address issues at the FUA level and they are not dealing with all modalities**, giving this task to a Transport Region, makes a connection between rail transport and public transport very hard for the Transport regions.
- But what makes the challenge even bigger is that upon the different layers of government, you have different political parties in charge. So basically, you have a full rainbow of colours that have to agree.
- Even if Transport Regions are not fully collaborating, it's better than the situation before. For small villages and also for the city the region makes you consider the city with the surrounding.
- **Smaller villages do not automatically perceive Transport Regions as an added value**. The way some smaller villages see it, that it is better for the core city, but worse for the peripheral. So, the core cities have a benefit and are not looking really at an efficient



design for the entire region. This involves a stronger involvement of the smaller municipalities. **However, mostly smaller villages lack capacity.**

- The Transport Region has a fixed amount of money that they get from the Flemish government and then within the Transport Region they have to decide what they would do with that money. And every city of course wants to have as much money or transport to their own places. So, it's like if you get more money as a central city then the surroundings get less money. Actually, this is asking for a regional objective with a clear assessment of measures with regional impact. An assessment framework at the regional level is lacking.
- **The responsibilities are on too small scale.** They should lift it up to a higher level. You can't give the transport region the responsibility to solve these mobility problems, because these mobility problems come from the Flemish region or European region.
- The transport regions are not the concessionaire.
- And crucial for the mobility system is actually also urban planning. Ideally, we have one functional officer responsible for at the same time planning and mobility. Because the long-term effects are urban planning effects and they are at each level of governance, they are completely separated.
- Establishment of the transport region provides a platform to discuss and reflect on the public transport network in the region between the municipalities involved, although it is the public transport operator De Lijn which is responsible for their operation and management (although the role of De Lijn has been subject of political discussion at the Flemish level). While the ATR provides a platform for this discussion, which is an improvement compared to the situation prior to its establishment, it does not mean coordination has become more efficient. The municipalities have different interests and balancing public transport accessibility needs of the core city with those of the surrounding municipalities, remains a key challenge. Network rationalisation may be possible at regional level, but no one wants to see its services at local level reduced/changed.
- The role of the Province is lacking; they are not in the transport Region.
- For permissions on developing business districts, for logistics or industry, the competence is not with the ATR or city or municipality, but with the Flemish Department *Omgeving*, responsible for planning and related policies. Though these developments steer the freight mobility on very long time.
- The transport region decides on the location of mobility hubs, but the provinces on the bicycle infrastructure. This should be related.



4.7 General conclusions

Are the organisations in the FUA aware that they are part of a FUA and TEN-T corridor?

The Antwerp city authority is aware of the leading (dominant) role in the ATR, and of the own competences and conflicts/complementarities with competences of other cities and communities or regional authorities, and for example governance challenges like concessions for public transport. It is an active member of the ATR and is leading discussions, sometimes revealing different sensitivities, scope, capacities, and skills in the same transport region.

In the *Roadmap 2030*, the layered approach is however depicted. But **developing an operational plan to organise transport services and offer on these levels is challenged by local sensitivities**, lack of knowledge and innovation, and financial and governance issues.

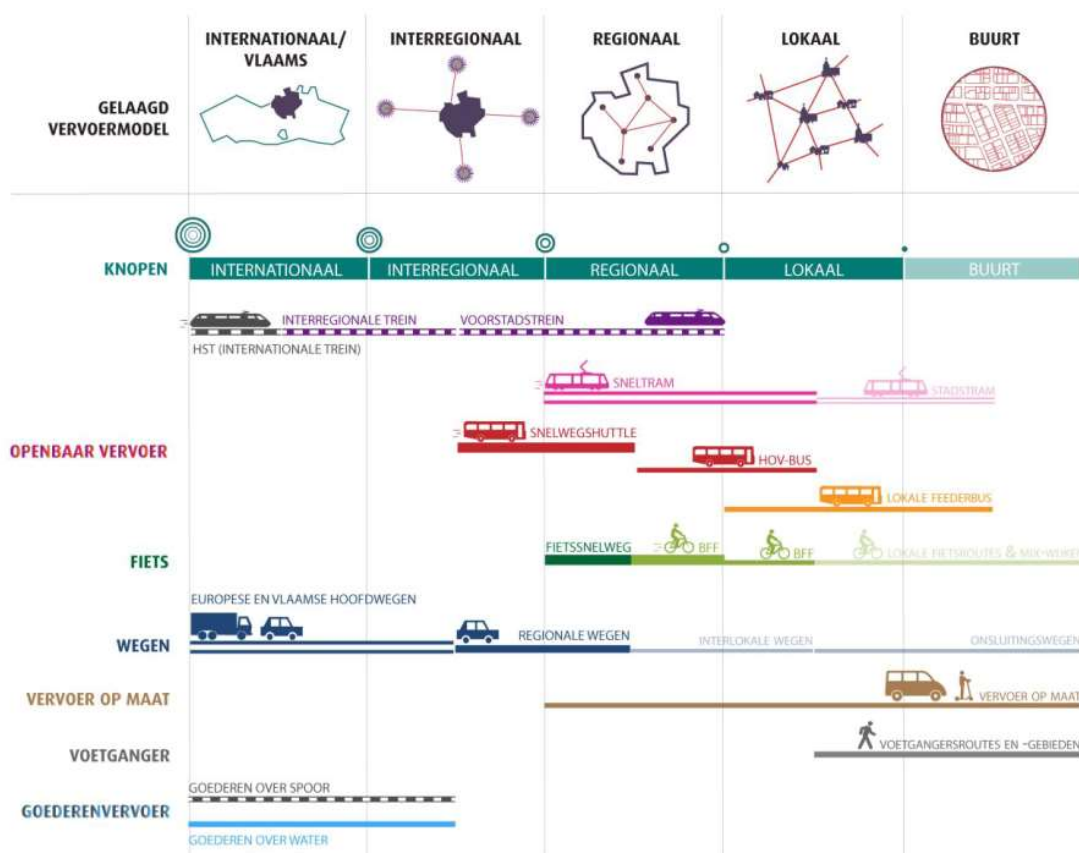


Figure 6: The Antwerp Transport Region has developed a layered approach on mobility policies



The coordination with TEN-T is only ad-hoc. The main focus of the city authority is the local and regional movements, mainly or almost solely of passengers and not of freight traffic. **The TEN-T is observed more as a national or intra-EU scale, on which the ATR nor Antwerp develop policies.** This is certainly true for stakeholders in the region, cooperating in the ATR, who often regard TEN-T as being the responsibility of authorities at a “higher level” (e.g. authorities and transport operators at the Flemish and national level). Moreover, TEN-T is observed mainly in relationship to the Port, and not in relationship to the movement of passengers. For example, cross-border passenger trains or local-regional-national movements are not linked with TEN-T policies, also because this theme is seen as a competence for the regional/federal authorities and related bodies.

COORDINATION AT THE FUA-LEVEL

In general, the node Antwerp cooperates well within the ATR with neighbouring cities and municipalities. We see coordination within the ATR, however not leading to breakthroughs (yet). Also the ATR does not cover the full area of the FUA with municipalities which could clearly be considered to be part of the FUA not being represented in the ATR (but being part of a neighbouring Transport Region). The level of coordination on a FUA scale is at the moment limited, as on the one hand the FUA is larger than the ATR governance, and on the other hand objectives, policies and implementation processes of the city, the ATR and the regional level are differing.

The ATR is only a (formal) cooperation of governments with a joint long-term plan. **The 2030 mobility plan however reads as a vision or wish list, not as a concrete policy plan.** It is a document expressing joint views and ambitions, but not a plan to which the council or stakeholders can be accounted for. The council of ATR is also a body still looking how to define its scope, approach and relevance. **The ATR is struggling to find a policy approach which works for both the urban area and rural areas, a process in developing long term changes, a role in relationship to more actors in the ATR and FUA (e.g. railways).** Also, the cooperation with other transport regions is new. And to conclude, the **investment capacity or impact on concessions given to public transport authorities is lacking.** As such the council is more an advisory body than a decisive body.

Our conclusion is that the regional and Federal Ministries are partly involved in the development of mobility policies of the FUA, but not involved in the coordination of the implementation of the mobility strategy for the FUA. If the Ministry is not involved in setting the objectives and coordination of their responsibilities the SUMP of Antwerp and stakeholders in the ATR cannot be effective. For example, a lot of discussions are guided towards the ATR council, where two competences are missing, the concession contract for public transport (Bus, Tram and Rail), and investment budgets.

There is also no integrated overview / visualization of the financial models, the funding scale and structure (local, ATR, Provincial, Regional, Federal and EU funds). Every city authority has



his own budgets, just as the stakeholders, Flanders and the Federal level and all government bodies like Infrabel, De Lijn, and Lantis. There is no strict division between budgets for infra and budget for exploitation of public transport in general, for De Lijn the Flemish government (MOW) has annual GIP (Integrated investment programme) overviews.

VERTICAL INTEGRATION IN ANTWERP

We can conclude that there are **clear institutional and organizational barriers for scaling up local mobility policies to a wider area, or to the Functional Urban Area**. Institutional competition and strong asymmetry (institutional, organizational) at the regional level severely hampers the possibilities for intermunicipal joint planning and actions. The coordination with TEN-T is only ad-hoc. For the city of Antwerp it is important to be aware of what its FUA is and the role of the ATR within this wider region. This also relates to the role of TEN-T in developing ATR and city mobility policies. Is TEN-T something only for the Port and national/Flemish government, or also for local actors? **Based on our analysis there seems a need to upscale the scope and competences of the ATR.**

For an effective strategy, including the FUA, the following actions are required:

Table 3: Possible actions for vertical upscaling

General	Outcomes
The relations with transport operators (De Lijn and NMBS) and authorities (regions, provinces and municipalities)	<ul style="list-style-type: none"> Improving relation between regional and local authorities to prevent multilevel tensions and ensure effective coordination between them (the city administration, Vervoerregio, Lantis, etc. Establish a constructive conversation between the transport region and De Lijn/NMBS. Involving relevant actors in the negotiations in order to formalize informal power dynamics.
Relation between policy sectors	<ul style="list-style-type: none"> Integrating roads, cycling lanes and public transport at the metropolitan level. Integrating land use and public transport at the metropolitan level.
The redistribution of financial resources	<ul style="list-style-type: none"> Metropolitan taxation for enhancing delivery capacity of transport regions. Finding additional (public or private) sources for financing metropolitan-wide transport projects. Establishing a mechanism for redistributing resources between municipalities.



However, currently a development in an opposite direction is being observed. The Flemish government is in a process of developing new regions for intermunicipal cooperation [14]. The envisioned new Antwerp region is a bit smaller in size than the current ATR. That's why some municipalities of the ATR will probably join other transport regions.



5 Urban Node Madrid

5.1 The strategy of Madrid: objectives

The city of Madrid has recently (July 2022) approved a new SUMP, titled the 'Madrid 360 Sustainable Mobility Plan' [15]. This plan sets out the strategic mobility lines until 2030 of the environmental sustainability strategy Madrid 360. Madrid 360 was launched in 2019 and replaced the former Madrid Central strategy. Madrid 360 was designed by the Madrid city council to drastically reduce emissions and thereby comply with the air quality standards as set in the EU Directive 2008/50/EC. In Madrid's new SUMP the goal has been set to increase the share of sustainable transport (public transport, walking and cycling) in the modal split by up to 65%. The SUMP includes measures like 250 kilometres of new bus lanes, the implementation of green corridors for busses, promoting the extension of the metro network, 35 kilometres of new bike lanes and 300 micro mobility hubs.

At the regional level the Madrid Regional Transport Authority of Consorcio Regional de Transportes de Madrid (CRTM) created a SUMP in 2013 with a horizon to 2025. The new SUMP (2023-2035) will be finished within the next 2 years. The work carried out by the CRTM is to support the development of the technical specifications for an external contract for the drafting of the plan. The recent change in the regional government has changed the initial approach, giving responsibility for the project back to the CRTM. So now the task is to initiate a revision process and adapt it to the administrative requirements of the CRTM in order to proceed with the corresponding contract.

5.2 Vertical integration in Madrid

Below a summary has been given of the work packages and measures being implemented in Madrid and their relationship with vertical upscaling. A distinction has been made between vertical upscaling, replicating or showcasing a measure. From a SCALE-UP perspective replicating or showcasing is not vertical integration. Replicating is doing the same at a different level, while upscaling involves the adaption of the project and involved stakeholders to the higher scale. A more detailed description of the measures is given in the next paragraphs.



Table 4: Summary of measures in Madrid and their relationship with vertical upscaling

Description		Vertical integration	Replicating	Showcasing
WP3 (Multimodality) and WP5 (Clean, safe & inclusive mobility solutions)				
M2	Improving multimodal hubs with Park & Ride + public transport at regional level	The objective is to scale up “Aparca-T” initiative to the whole region including all the P&R facilities, managed by different organisations, of the whole region; including the ones that will be constructed by Madrid City Council.		
M3	Fostering sustainable first and last mile logistics by mobility hubs		This measure has a high replicability potential in other locations and districts, by setting public-private partnerships and agreements.	
M5*	Scaling up shared (and active) e-mobility services in Madrid Metropolitan area	BiciMAD will not leave the municipal area of Madrid. However, if the BiciMAD network can be extended to the entire municipal area, this will have an impact on multimodality at regional level		
M6*	Promoting clean mobility (zero emissions) with supply/storage solutions		The implementation of this measure is at local level, but it has a large potential to be replicated in other municipalities of the region, thus having an impact	



			in the entire region.	
M7*	Promoting active mobility by deploying car-free areas		The implementation of this measure is at local level, but it has a large potential to be replicated in other municipalities of the region, thus having an impact in the entire region.	
WP4 (Data driven strategies and Tools)				
M4	Data driven mobility management and MaaS in the Madrid metropolitan area	CRTM will study and test some of the solutions and recommendations obtained within the multilevel governance and cooperation measure (M1) related with Mobility as a Service "MaaS CRTM".		
WP6 (Behavioural change with a focus on active and healthy modes)				
M8	Nudging multimodality at regional level	Not clear at this stage, further awareness needs to be built on vertical integration aspects.		



5.3 Strategy on integration of space and network (WP3 and WP5)

Hubs are an important theme within SCALE-UP. WP3 focuses on the design of multi modal hubs in urban areas. Under WP3 two measures are foreseen in Madrid: multimodal transport systems for passengers and freight.

M2: IMPROVING MULTIMODAL HUBS WITH PARK & RIDE + PUBLIC TRANSPORT AT REGIONAL LEVEL

This measure aims to address the challenge of commuting flows, increasing multimodality and enhancing connectivity with public transport by enlarging the network of multimodal hubs linked P&R facilities. At the local and regional level there are P&R's / hubs under development. 9 out of 12 P&R facilities have been already built (adapt the space and integrate services) and are in service. 7 of those are managed by the Empresa Municipal de Transportes (EMT) – the Municipal Bus Transport Company - and 2 are operated by CRTM despite CRTM does not manage them. The management is done by the local councils of the municipalities where the car parks are located, or in some cases by ADIF or Renfe. CRTM is responsible for signing agreements to cover the costs incurred by the incentives offered, such as use of public transport at reduced costs, etc. The P&R facilities themselves are financed with municipal funds (either from Madrid or other municipalities).

CRTM is developing a new P&R tool in Madrid Region called “Aparca-T” to improve the intermodality and modal shift within multimodal hubs where parking facilities are linked with public transport. The objective is to scale up “Aparca-T” initiative (real-time information + incentives program) to the whole region, including all the P&R facilities managed by other organisations; including the ones that will be constructed by Madrid City Council.

Some P&R's are close to the main radial access routes (TEN-T corridors), so they are connected to high-capacity transit system, mainly urban rail (Cercanías), and metro, but also the intercity buses, addressing local and regional flows. Below the 5 P&R's close to the TEN-T corridors have been summarized in Table 5.

Other P&R locations are near to Madrid's city centre. This is due to the planning requirements which stated to plan within the city borders. This resulted in a low added value due to the reason that the location was not attractive for the users and thus low occupancy rates.



Table 5: P&R's close to the TEN-T corridors

Park&Ride Name	Nearest motorway	Type of TEN-T corridor	TEN-T corridor
Fuente La Mora (EMT)	M11	Railway	Atlantic
Pitis (EMT)	M40	Railway	Atlantic
Wanda (EMT)	M40	Motorway	Mediterranean
El Recuerdo (EMT)	M30	Motorway	Atlantic
Aviación Española (EMT)	N-V	Motorway	Atlantic

Vertical upscaling in measure M2:

International practices show that planning of P&R's should involve stakeholders at both the local and regional / FUA level: first of all, P&R's or hubs are important nodes connecting different networks, which demands the involvement of a wide range of stakeholders. Secondly, the success of a hub / P&R is directly related to the policies being implemented by neighbouring municipalities. Therefore, a hub strategy on FUA level should be developed. Meaning that the city / CRTM should involve the required stakeholders in goal setting and sharing of tasks and responsibilities.

At the local level Madrid evaluates the feasibility and promotes the deployment of the P&R facilities through the "Park & Ride Program". The selection of the P&R locations responds to citizen's demand. Most probably these are the citizens of Madrid, while hubs effectiveness is related to the behaviour of citizens and policies of other municipalities. Currently each organisation defines its own incentive programmes. For example, the city of Madrid provides free parking to users of the P&R who stay for a minimum of 5 hours and make use of public transport. CRTM currently has no regulatory framework, except for the Aparca-T Agreement regime, which is a pilot test that will later evolve into a more stable regime.

The challenge in scaling up vertically is to have **a coordinated evaluation framework** in which the objectives of the hubs and P&R's are clearly indicated (indicators we can use to monitor the progress we make in the integration) and signed by all involved stakeholders.



M3: FOSTERING SUSTAINABLE FIRST AND LAST MILE LOGISTICS BY MOBILITY HUBS

Madrid is working on a hub for last mile distribution of goods in the city centre. This logistics hub should help to improve air quality in Madrid. The mobility hub is located in Canalejas parking in the city centre of Madrid, which is owned by the city and managed by EMT. The operation of the hub has been tendered to a logistics operator for a period of 5 years. These logistics hubs could be replicated in other municipalities of the Madrid region.

Vertical upscaling in measure M3:

This measure is not about vertical upscaling but is more reflecting replication. From the perspective of the city of Madrid the focus in terms of freight transport is mainly on inner city urban logistics. There is little awareness of the developments on the level of TEN-T corridors, given this is out of the scope of the cities' authority.

CRTM is the one that should propose the replicability of the logistics hub model of Madrid to other regional municipalities. Freight is however seen by CRTM as being out of their scope (passenger transport) and a planning challenge for middle- and long-distance transport (TEN-T). So, there is no strategy (within SCALE-UP) on coordination at the regional or FUA level for freight.

The regional and national government are the bodies charged with the development of freight transport on the level of the TEN-T corridor. Most of the high capacity roads in Spain are under the authority of the General Roads Directorate of the Ministry of Public Works and most of the railway infrastructure is managed by the state-owned company ADIF. Some of the motorways are however owned and managed by the autonomous communities. In the last decade the Madrid regional government (specifically the Consejería de Transportes e Infraestructuras) has invested a lot in new high-capacity roads that both complement the state-owned network and provide new connections.

A major learning point from Vital Nodes is that when investing in capacity building, cities need to have specific attention for freight and logistics capacity building too. Awareness for freight is still low, in general. There is a clear relation between lack of a wider strategy at FUA level, and a lack of city / regional planning of hubs for freight. When a strategy at FUA level is lacking, the planning of hubs (within WP3) might be scaled down to the question of an implementation strategy. For scaling up this is not reflecting the correct base line.



Under the **WP5** 'Clean, safe, and inclusive mobility solutions', three measures are foreseen in Madrid

M5: SCALING UP SHARED (AND ACTIVE) E-MOBILITY SERVICES IN MADRID METROPOLITAN AREA

The bike sharing programme of Madrid BiciMAD coverage was quite limited with about 10 percent of the total Madrid city area. This measure therefore aims to upscale BiciMAD to all the city's districts. BiciMAD is managed and operated by EMT.

M6: PROMOTING CLEAN MOBILITY (ZERO EMISSIONS) WITH SUPPLY/STORAGE SOLUTIONS

This measure has three elements:

- To offer better service (charging stations, bike parking,...) to the users of electric mobility, new micro mobility solutions and e-bikes.
- Improved access to charging infrastructure and charging information by providing integrated features (upgrade Electro-EMT App).
- Testing innovative energy supply and storage at parking facilities (V2G).

M7: PROMOTING ACTIVE MOBILITY BY DEPLOYING CAR-FREE AREAS

Pedestrianization is part of the Sustainability Strategy "Madrid360". The overall objective is to remove 14.6 million vehicles per year in these zones (once all pedestrian zones are implemented). 15 (out of 21) pedestrian zones have been already implemented throughout the city of Madrid. The measure is planned and executed by Madrid City Council. EMT cooperates in reorganizing its public mobility services

Vertical upscaling in measures M5-7:

All three measures under WP 5 are implemented on a local level within the city of Madrid. There is potential to replicate these measures to other municipalities within the Madrid region. This however requires the involvement of other actors, like CRTM. Currently there is no element of vertical upscaling beyond the city limits of Madrid withing work package 5.

Planning of projects such as bicycle sharing, pedestrianization, smart traffic management and parking policy is done at a "municipal" level and not on a FUA-level by CRTM.

In our opinion CRTM has a coordinating role at more strategic and tactical level for public transport and not at the level of micro mobility. Decision makers at city level (especially EMT, closely working with the City Council) have a strong capacity to develop new mobility services. This capacity is limited for CRTM, due to the large number of public transport operators and the lack of last mile mobility options outside the city. EMT itself lacks the competences to upscale successful initiatives to the FUA-level.



Although EMT, CRTM and Madrid City Council work together regularly in relation to different activities/projects regarding sustainable mobility strategies, there is no formal structure to promote cooperation among the different actors involved in Madrid's mobility ecosystem at FUA and regional level.

The reaction of the focus group confirms that it is a question how the different initiatives inside and outside the municipality of Madrid are coordinated, upscaled and integrated in the public transport system.

Coordination of these initiatives at the FUA is therefore a point of attention.

5.4 Strategy on data (WP4)

Work Package 4 includes the measure: M4 - Data driven mobility management and MaaS in the Madrid metropolitan area

The major issue in Madrid are the three administration layers operating different aspects of the city/FUA/regional/long-distance transport, and the difficulties in cooperating both in intention and in action. Each of these layers might have a relatively good control on the things under its scope, but with a lack of common vision for the transport at city level, or regional level, obstacles arise as soon as any measure requires coordination or exchanges with other public entities.

Data collection, integration and exchanges are a challenge. There is a planned National Access Point for mobility and transport data, but it does not integrate modes and information efficiently. Even when coordinated by EMT, this specific M4 measure implementation, or any derivative of it, needs the final approval of the CRTM. This is due to a city-level entity vs. a regional-level entity.

5.5 Strategy on behaviour (WP6)

Work Package 6 includes the following measure: M8 - Nudging multimodality at regional level

This measure aims to encourage multimodality and active mobility at a regional level through communication actions / improved travel information / specific incentives in relation to large events. Actions include creation of leaflets, maps, creation/promotion of secure routes for arriving at events' sites, incentives like free public transport with the event ticket. CRTM also works on the development of an app where users will be able to find info about the Green Routes within the region and their connection with public transport

This measure is led by CRTM and implemented on a regional level. It requires the involvement of different actors, like event organizers and mobility service providers, and



insight in the needs of the different municipalities. Nevertheless, further awareness needs to be built on vertical integration aspects.

5.6 External perspective

The above-described findings are based on the discussions with SCALE-UP project partners and the applied tools on vertical integration analyses. Within focus group discussions we have analyzed vertical integration from the perspective of stakeholders from outside the SCALE-UP project.

The Madrid focus group discussion was organized by UPM-TRANSyT team. The FGD was held on April 21st 2022, in the ETSI Caminos, Canales y Puertos of the UPM (Madrid, Spain). There were 6 external participants, 1 moderator, 2 facilitators and 2 researchers taking notes (internal from SCALE-UP, and all from UPM).

The main findings from the focus group are:

- **Governance works top-down, not bottom-up.** New forms of mobility and legislation appear that catch the municipalities by surprise (e.g. micro mobility regulations). A barrier is that policies at the national or regional level are not always aligned with the objectives of the municipalities. Municipalities have the autonomy in their own jurisdictional area.
- There has been a **radical change of approach**, with some very brave legislative initiatives. This entire MITMA (Ministry of Transport, Mobility and Urban Agenda) package is a structured, solid and has an understandable discourse.
- The draft Mobility Law² and the Urban Agenda³ are meant to create **a top-down governance model that aligns objectives of the different government levels**. The Mobility Law and the Urban Agenda are supposed to try to get government bodies to all go in the same direction. But the objectives (at the State-Region-City level) are not always

² The Council of Ministers approved on the 1st of March the Preliminary Draft of the Sustainable Mobility Law, which will be the regulatory framework that will enable the public transportation and mobility policies of the various government agencies to better meet the needs of citizens and respond to the challenges of the 21st century: sustainability, digitalisation and social and territorial cohesion.

³ The Spanish Urban Agenda (SUA) was approved in 2019 and aims to achieve sustainable urbanization under the criteria of the 2030 Agenda for Sustainable Development, the principles of the New Urban Agenda and the Urban Agenda for the European Union. The SUA promotes the development of urban-focused policies, strategies and action plans at all levels of government and territories.



aligned in the same direction. The Urban Agenda has played the role of ordering these regulatory instruments so that cities/towns can propose measures. But the Urban Agenda is not normative, it is not binding; it is totally voluntary. Nevertheless, it is reaching the cities, the local entities, because they have seen the opportunity to plan.

- Madrid is a particular case in Spain. Spain is divided in 17 autonomous communities. The community of Madrid largely covers the entire metropolitan area of Madrid and thus acts as a metropolitan government body. However, **not the entire FUA of Madrid is covered by the community of Madrid**. Take into account not only the urban nucleus, city, metropolitan area, but also the surrounding areas of influence that interacts every day. In addition, **the different political colours between the municipalities and government levels hamper decision making**.
- Urban strategic planning exists at the city level, but it is connected with higher administrations and coordinated and linked (in terms of hierarchy). It is stated that Madrid should have a metropolitan public body, as has been installed in Barcelona, on the level of the FUA to coordinate matters.

5.7 General conclusions

The community of Madrid largely covers the entire metropolitan area of Madrid and thus acts as a de facto metropolitan government body. However, **not the entire FUA of Madrid is covered by the community of Madrid**. The authority, and districts, have an autonomy and a national perspective. Many mobility partners exist, where some are focussed on long distance transport (ADIF, RENFE) and many on local transport solely.

The awareness of the vast size of the city, and the need to expand policies throughout the urban area, be it the FUA or a part of it, is there. However, **the objectives (at the State-Region-City level) are not always aligned** in the same direction. **Governance works top-down, not bottom-up**. Although EMT, CRTM and Madrid City Council work together regularly in relation to different activities/projects regarding sustainable mobility strategies, there is **no formal structure to promote cooperation** among the different actors involved in Madrid's mobility ecosystem at FUA and regional level.

From the perspective of the city of Madrid the focus in terms of freight transport is mainly on inner city urban logistics. There is **little awareness of the developments on the level of TEN-T corridors**, given this is out of the scope of the cities' authority. The regional and national government are the bodies charged with the development of freight transport on the level of the TEN-T corridor. Cities need to have specific attention for freight and logistics capacity building too. **More vertical integration is necessary to improve the effectiveness of local measures and to go beyond the current practice of replicating instead of upscaling**.



6 Urban Node Turku

6.1 The strategy of Turku: objectives

The transport system planning work is guided by the Transport System plan 2020, a comprehensive plan covering the main outlines, themes and actions related to transport system development in the FUA. The most significant transport system development measures presented in the plan are part of the national MAL agreement 2020-2031 between the 13 municipalities of the region and the Finnish state on land use, housing and transport. Regular monitoring of the achievement of the objectives of the MAL agreement is under the responsibility of the Regional Council of South-West Finland.

The Transport System plan 2020 of the Turku city region has been devised in cooperation with the 13 FUA municipalities: Aura, Kaarina, Lieto, Masku, Mynämäki, Naantali, Nousiainen, Paimio, Parainen, Raisio, Rusko, Sauvo and Turku. The plan is, effectively, the region's SUMP, and has been devised according to SUMP principles. The Regional Assembly approves the regional plan, and each of the FUA municipalities approve the objectives set for them in their local councils.

Currently, the city of Turku does not have a separate SUMP. In 2021, Turku city underwent some administrative restructuring on the transport and mobility services. A new service area, Mobility Services, was established. It includes two units, one of Regional public transport services (ie Föli), and the other one named Urban mobility solutions, which is responsible for producing and developing mobility services in Turku. The mobility projects related to this topic (including SCALE-UP) were moved under the "Urban mobility solutions" sub-unit of the service area. It will remain to be seen, however, whether the desired impact will be reached. A critical issue is inadequate resourcing and lack of permanent staff.

6.2 Vertical integration in Turku

Below a summary is given of the work packages and measures being implemented in Turku and their relationship with vertical upscaling. A distinction has been made between vertical upscaling, replicating or showcasing a measure. From a SCALE-UP perspective replicating or showcasing is not vertical integration. Replicating is doing the same at a different level, while upscaling involves the adaptation of the project and involved stakeholders to the higher scale. A more detailed description of the measures is given in the next paragraphs.



Table 6: Summary of measures in Turku and their relationship with vertical upscaling

Description	Vertical integration	Replicating	Showcasing
WP3 (Multimodality) and WP5 (Clean, safe & inclusive mobility)			
T2 Implementing mobility hubs in the Turku region			Idea is to showcase the measure to other municipalities in SWF so that they can take the lessons learnt from it. Development of Loimaa and Uusikaupunki station areas is outside of the FUA area.
T3 Introducing MaaS ticket combos and adaptive parking in Turku region	No other municipalities currently involved. Upscaling is foreseen after the project ends. The outcomes of the measure will be part of the Regional Public Transport authorities, so they are actively involved in the project.		
T6* Speeding up inclusive cycling in Turku	For the cycling services, there is a possibility of vertical upscaling, but it is subject to the success of the services and the service operators.	For now the focus is on the city of Turku for the activation model. Replicating it in other municipalities is a challenge due to limitations in resources	
T7* Fostering carbon free city logistics and construction sites			The approved SULP will be showcased as a model for other cities.
Work Package 4: Data driven strategies and Tools			



T4	Creating a mobility portal	The portal is not limited to Turku only.		
T5	Implementing a real time regional mobility data platform	The mobility map will incorporate the open data from the regional level and FUA municipalities. It will still be managed by the city of Turku.		
WP6 (Behavioural change with a focus on active and healthy modes)				
T8	Implementing behavioural-change oriented mechanisms	Some of the behavioural change schemes will be integrated into the work of the regional public transportation authority. Scaling up of successful approaches (from 2024 on) – there is a vertical integration element, but more awareness needs to be created.		
T9	Mobility guidance during events and exceptional circumstances		Lessons learnt to be replicated in different locations in Turku.	The results will benefit other local authorities nationally and internationally.
T10	Winter as a mobility season	Scaling up is provisioned – unclear at this moment if beyond the city level or whether there are any relevant vertical integration aspects		



6.3 Strategy on integration of space and network (WP3 and WP5)

Hubs are an important theme within SCALE-UP. WP3 focuses on the design of multi modal hubs for passengers and freight in urban areas. Under the WP3 multimodal transport systems for passengers and freight two measures are foreseen in Turku.

T2: IMPLEMENTING MOBILITY HUBS IN THE TURKU REGION

The main objective of T2 is creating (and testing) new mobility services together with the region and with companies and developing the preconditions for successful deployment in the multimodality mobility hub (shared mobility, last mile logistic delivery, repair services, parking services and information services...). For T2 Turku city and SWF lead at local and regional level respectively. The global idea is to upscale T2 to the different municipalities of the region based on the lessons learnt. This will not happen during the project time.

An important element (which is outside of the scope of SCALE-UP) is the development of a Travel Centre that would serve as the main mobility hub in the city of Turku and in the Region of South-West Finland (part of the current Finnish state agreements concerning land use, housing and transport (MAL). This Travel Centre should be constructed between 2024-2029 and will combine the services of the current train and bus station, and enable a wide array of different mobility and logistics services. The Travel Centre will be an important node in the national rail network and thus there is a clear relationship with the TEN-T corridor between Turku and Helsinki, the national government, the national rail operator VR and the Finnish Transport Agency.

At regional level new mobility services are being developed for the station areas of Loimaa and Uusikaupunki. There is significant commuter traffic between the Turku region and Loimaa and Uusikaupunki. Services developed in these station areas will have an impact on the TEN-T. However, Loimaa and Uusikaupunki are not officially part of the Turku FUA and TEN-T.

From a vertical integration perspective, the upscaling challenge starts with the question: what is the value, why should a stakeholder act, what is in it for them to make the SUMP effective? When we make the relation with Madrid, the same challenge might appear for Turku: when a strategy at FUA level is lacking, the planning of hubs (within WP 3) might be scaled down to the question of an implementation strategy. For scaling up this is not reflecting the correct base line.

The practice in Turku is as follows:



If Turku plans a hub with regional value (FUA), it is a local decision, so the KPIs are evaluated at local level. However, there are guidelines at national level where the state contributes [16]. The Ministry of the Environment is responsible for the related preparations. The national land use guidelines do however not offer detailed indicators for evaluation, nor are these indicators enforced upon regions and municipalities.

Clear guidance and a hierarchy of hubs from a national level are lacking in Turku. International practices of a hierarchy of hubs might be a basis for a national guided hierarchy. This is a recommendation for Turku.

T3: INTRODUCING MAAS TICKET COMBOS AND ADAPTIVE PARKING IN TURKU REGION.

The measure T3 itself consists of three elements:

- Creation and testing of an open interface (generic sales platform) for event tickets combinations to the public transport ticket system, including the combinations of P&R tickets with public transport tickets.
- The creation of a systematic MaaS ecosystem with stakeholder engagement.
- The development of a parking hub platform and testing of 3 adaptive parking solutions in different locations, including P&R tests in connection with events.

Mobility as a Service has been identified as one of the key areas to develop in the field of mobility and transport of the city of Turku (Climate Plan 2029, in the Finnish state agreement concerning land use, housing and transport (MAL), and also in the spearhead projects). The outcomes of the measure will be part of the Regional Public Transport authorities' (Turku (host)+ 5 municipalities) work, so they are actively involved in the project. While the MaaS ecosystem and ticketing is looking to enlarge the number of stakeholders involved, there isn't really an upscaling strategy (within the Scale-Up project).

The parking hub measure is led by Turku city. Currently no other municipalities are actively involved in the project. It is an open-source platform that has been scaled up to the regional level and which gathers data from different sources. Other municipalities are free to use it. There is however little capacity and knowledge among other municipalities to effectively use this data. In addition, there aren't too many municipalities with paid parking and there is only one municipality with a physical parking hub. Private parking operators haven't shown a big interest in giving data.

Under the work package 5 Clean, safe and inclusive mobility solutions, two measures are foreseen in Turku

T6: SPEEDING UP INCLUSIVE CYCLING IN TURKU

The measure T6 consists of two elements:



- The design of an inclusive sustainable mobility activation model for day-care and schools (nudging through events and campaigns, improving kids cycling skills and finding a suitable way to evaluate the safety of surroundings and infrastructure, conditions and winter maintenance around day-care and schools);
- Testing of new bicycle services (e-cargo bikes, children's bikes and repair stations).

Since 2016, the city of Turku has a bicycle development plan for 2029 that highlights the need for cycling coordination and targeted actions. Currently 4 schools and two day-cares are involved in the pilot phase of the activation model. The basic elements of the activation model have been defined, but it takes a lot of capacity to integrate these in the daily activities of the schools and day-cares.

Involving other service areas (recreational services, health care services, employment services) of the city of Turku will be crucial in developing and implementation of the activation model, because changing commuting habits relies on adding to skills of children, improving the feeling of and actual safety and motivating people to choose sustainable ways of commuting. With the stakeholders involved from these other service areas it is possible to offer these services to other day-cares and schools as well in the city of Turku.

The plan is to get more schools in the city of Turku to implement the activation model, but the limited resources available at the city of Turku could hamper the scalability of the measure. The model can be easily scaled up to other local authorities (nationally and internationally) and also scaled to other target groups such as adult immigrants by explaining and describing crucial elements on how and why to involve different stakeholders in the city. By offering data for researchers about the level of cycling skills, the development of the skill and subjects affecting it, this skill could, depending on the results, eventually be added to national and/or local directive documents/curriculums of physical education at kindergartens and schools.

Vertical integration seems to be approached in the T6 measure from the point of replicating the measures to other municipalities instead of approaching them on a FUA or TEN-T level. Therefore, this measure does currently not have a vertical element in it.

T7: CARBON FREE CITY LOGISTICS AND CONSTRUCTION SITES

The measure T7 involves the development of a Sustainable Urban Logistic Plan (SULP), focusing on enhancing freight distribution processes towards carbon neutrality and define a road map for the fossil free construction sites. Currently there is little effort on improving logistics. Neither is there a SULP on any of the different government levels and little coordination between government levels. To really improve logistics the involvement of the national government and the biggest companies of Finland is crucial.



Turku is in the lead for this measure and is mainly concerned with the inner-city (last-mile) logistics. The city is however limited in its resources, which forms a barrier in the development of the SULP. Logistic companies will be involved, but not at this stage. The SULP will be part of the SUMP (according to the guidelines of the Commission) both at city (in the future) and regional level. The approved SULP will be showcased as a model for other cities. In conclusion, this measure isn't really about upscaling and there seems little attention to the impact on the TEN-T network and regional freight flows.

6.4 Strategy on data (WP4)

WP4 includes the following measures:

- T4: Creating a mobility portal combining personal transportation and logistics
- T5: Implementing a real time regional mobility data platform

The service map in T5 is focusing on user needs, which means it is designed to include not only transportation or mobility information, but city services in general, which might have a relation with mobility.

From a data governance perspective, the main challenges were:

- The privacy and data protection of users
- Maps accessibility data did not comply with national regulations
- Lack of adequate resources
- No common standards for data sharing.
- Reluctancy of private companies to share data

The service map contains data from other municipalities besides Turku City, and the aim is to integrate the data as much as possible to get a regional overview. The problem is however that other municipalities don't have a lot of data nor the resources to collect and exchange this data. To improve the collection and exchange of data among municipalities the national and regional government should provide the right incentive (resources). There is no vertical integration element in this action.

In T4 a planned shift from city resources to regional resources of the new established regional healthcare organisation is impacting especially the person and logistic transportation. As most health-related services will be managed by the new regional organisation, the quantity of available data for the measure is at risk. This is considered the main challenge in any initiative for integrating data at city level: the uncertain situation related to regional reform will last approximately 1 year from now.



6.5 Strategy on behaviour (WP6)

WP6 includes the following measures:

- T8: Incentivisation of mobility services in Turku: develop and test incentive schemes and nudges
- T9: Mobility guidance in connection with events and exceptional circumstances
- T10: Winter as a mobility season

The measures T8, T9 and T10 are led by the city of Turku. The incentive schemes developed in T8 will be integrated into the work of the regional public transportation authority for the suitable nudges developed, and will therefore be used actively also after the project. Scaling up of successful approaches is planned from 2024 onwards – there is a vertical integration element - but more awareness needs to be created. No vertical integration aspect was identified for T9 – integration of physical and digital wayfinding at the city level. SWF participates in the measure T10. Scaling up is provisioned – unclear at this moment if beyond the city level or whether there are any relevant vertical integration aspects.

6.6 External perspective

The above-described findings are based on the discussions with SCALE-UP project partners and the applied tools on vertical integration analyses. Within focus group discussions we have analyzed vertical integration from the perspective of stakeholders from outside the SCALE-UP project.

The Turku FGD was held on June 2nd, 2022, in Turku, organized by UPM in collaboration with the City of Turku and Turku's University of Applied Science (TUAS). There were 1 moderator, 1 facilitator, 2 researchers taking notes and the City of Turku and The Regional Council of Southwest Finland, as observants. The event took place at Turku's University of Applied Science (TUAS).

The main conclusions of the FGD on vertical upscaling are:

- The TEN-T level is a challenge for the Turku region. It takes targets further away than they were before.
- However, it is well recognized (awareness) in the local level that we have this European Union targets made for us and that we will we have to build some links between policies in order to achieve the goals in time.



- We talk to each other, of course, but it's kind of loose infrastructure. We talk about who's paying and that kind of things, so it's a matter of money or a lot of times that everybody has their own projects. And of course, we try to coordinate them. I think Travel Centre is one good project that we are bringing into the in the city, that is bringing the bus station and the railway station into one place, because now they are in two different places. That makes a larger network of regional trains, trains to Helsinki, etc. But that Regional public transportation is also a good example of working in cooperation because it's only 8 years old. Before that it was each (municipality) on it's own.
- One good thing is that we will have a regional forum, as part of the Region of South-West Finland, next year where the biggest cities in the region will start to discuss between the main politicians and civil servants. It's a new way of having cooperation between the region; this will be an opportunity for mobility as well.

6.7 General conclusions

Are the organisations in the FUA aware that they are part of a FUA and TEN-T corridor?

Turku was part of the Vital Nodes project⁴ and one of urban nodes in the first core of Vital Nodes. The relation with TEN-T and the corridor level is relatively high in Turku.

On the FUA level there is **great awareness from a freight & logistics and mobility perspective**. This is reflected in the SUMP on the level of the FUA. From a public passenger transport perspective however the awareness of stakeholders acting in the FUA level is low; **public transport is mainly dealt with at the level of Föli**. Specifically: the impact of the measure "regional organisation" on objectives including connectivity and efficiency does not raise awareness of the required stakeholders at the FUA level in Finland, including the Ministry.

COORDINATION AT THE FUA-LEVEL

In Turku there is no assessment framework at regional level for the ex-ante evaluation of measures with regional impact. This is due to the fact, that there is **no mandate at regional level for decision-making**. Local elected decision makers are part of the regional council, but without mandate for regional decisions, leading in fact to a non-policy making coordination role at regional level. The regional council is therefore in fact a **coordinator** and has **no budget** for measures, including infrastructure. **Final decisions are always made**

⁴ The Vital Nodes project had the main focus on freight and logistics. Within the Vital Nodes project the FUA for Turku from this perspective has been made.



in the municipalities' city councils. Municipalities' interests do not always meet the region's interest. That lead to conflicts and have a negative (content and/or time) impact on the regional sustainable urban mobility objectives.

In the FUA, the goals stated in the strategies may **not always coincide with the municipalities' own decisions.** When looking at mood and motivation to promote sustainable mobility from a more general point of view, one must not overlook the fact that the interests of the FUA and the interests of the city of Turku alone may differ significantly when it comes to transport and mobility development. In the FUA, public transport coverage is not that high beyond the Föli area, which can be observed in the rather low modal share for active travel modes.

Due to multi-stakeholders (state, municipalities) and a lack of mandate at regional level / lack of policy coordination, the required **multi-modal mobility network is not in place.** Local train connections should be one of the backbones for regional sustainable development, but are missing due to a lack of financial means and mandate. A regional public transport organization seems the first step forward. The how question is the main governance question within SCALE-UP. A possible model – as recommendation to WP 2 – is visualized below.

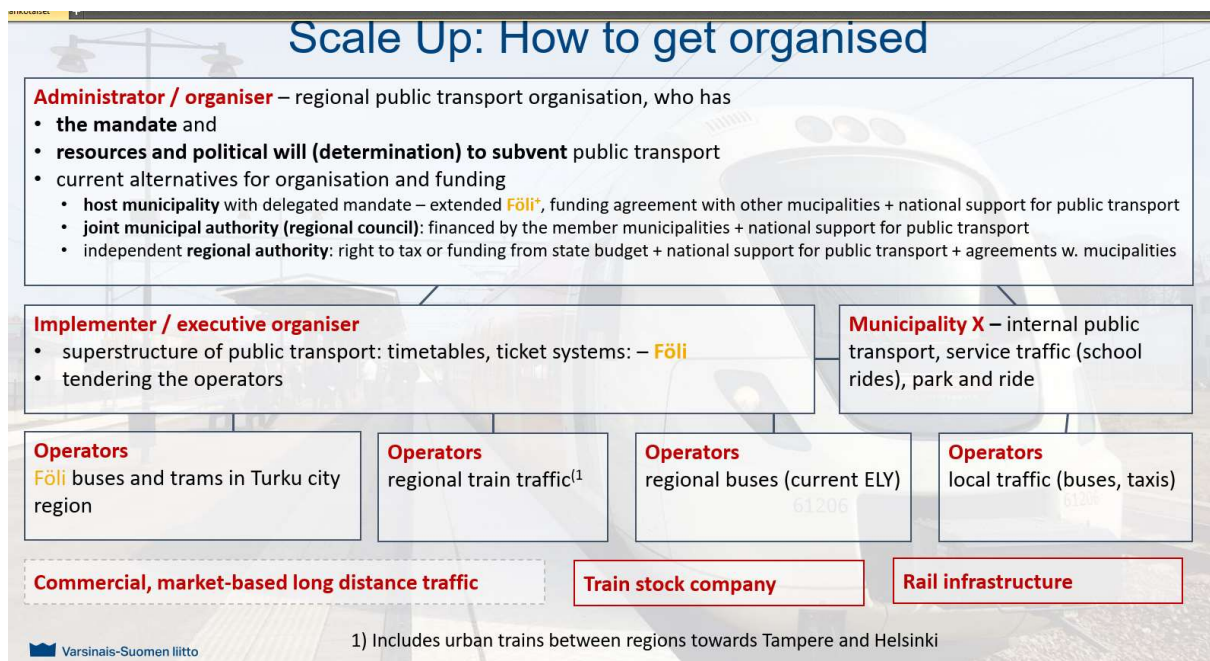


Figure 7: Possible model for regional transport authority



VERTICAL INTEGRATION IN TURKU

Applying the process approach of the strategic framework to Turku, we might conclude that actions on the street are visible and therefore politically attractive. However, especially in the FUA with multiple stakeholders, the strategy above the actions and the expected impact of actions should be discussed. In the city of Turku and to some extent also in the FUA, there are large-scale processes to improve transport and mobility ongoing at the same time. In addition, there are several mobility-related initiatives and pilots ongoing, and the general mood is in favour of these sort of actions. The so-called big picture, nevertheless, is still somewhat unclear. There is rather little crossing over of plans and strategies between sectors and divisions and the need of “gluing together of interests” has been recognized by those working with these issues.

SUMP at city level of Turku

There has not been a SUMP established at the level of the city. One of the questions of Turku is how to deal with establishing a SUMP for a city, given the fact that a SUMP at FUA level is in place. A showcase in this perspective is the SUMP process in Northern Limburg in the Netherlands. On a voluntary base, 8 municipalities in that region co-operated in establishing a SUMP at regional level, with regional objectives. At the same time, each of the municipalities set local objectives, which provided the basis for developing local SUMP's at municipal level.



7 Preliminary conclusions on upscaling vertical integration

This chapter provides the general conclusions on vertical integration in Antwerp, Madrid and Turku.

Are the organisations in the FUA aware that they are part of a FUA and TEN-T corridor?

The **Antwerp** city authority is **aware of the leading (dominant) role in the ATR**, and of the own competences and conflicts/complementarities with competences of other cities and communities or regional authorities, and for example governance challenges like concessions for public transport. It is an active member of the ATR and is leading discussions, sometimes revealing different sensitivities, scope, capacities and skills in the same ATR.

Turku was part of the Vital Nodes project and one of urban nodes in the first core of Vital Nodes. **The relation with TEN-T and the corridor level is relatively high in Turku**. On the FUA level there is great awareness from a freight & logistics and mobility perspective. This is reflected in the SUMP on the level of the FUA. From a public passenger transport perspective however the awareness of stakeholders acting in the FUA level is low; public transport is mainly dealt with at the level of Föli. Specifically: the impact of the measure “regional organisation” on objectives including connectivity and efficiency does not know awareness of the required stakeholders at the FUA level in Finland, including the Ministry.

Both **Antwerp** and **Turku** have an active approach to streamline mobility policies and can learn from the challenges they both encounter (aligning interests, prioritizing in a region with urban and rural aspects, limited budgets and no direct relationships between all cities and communities and concessions for transport services or MaaS suppliers etc.). They both **do however not regard TEN-T in their policies actively**.

The city of **Madrid** has recently (July 2022) approved a new SUMP, titled the ‘Madrid 360 Sustainable Mobility Plan’. This plan sets out the strategic mobility lines until 2030 of the environmental sustainability strategy Madrid 360. Madrid 360 was launched in 2019 and replaced the former Madrid Central strategy. Madrid 360 was designed by the Madrid city council to drastically reduce emissions and thereby comply with the air quality standards as set in the EU Directive 2008/50/EC. In Madrid's new SUMP the goal has been set to increase the share of sustainable transport (public transport, walking and cycling) in the modal split. At the regional level, CRTM created a SUMP in 2013 with a horizon to 2025. The new SUMP



(2023-2035) will be finished within the next 2 years. The recent change in the regional government has changed the initial approach, giving responsibility for the project back to the CRTM. So now the task is to initiate a revision process and adapt it to the administrative requirements of the CRTM to proceed with the corresponding contract. **TEN-T is not a focal point in the plan.**

Coordination at the FUA-level

In general the node **Antwerp** cooperates well within the ATR with neighbouring cities and municipalities. We see coordination within the ATR, however **not leading to breakthroughs (yet) and not including the FUA-level**. The level of coordination on a FUA scale is at the moment limited, as on the one hand the **FUA is larger than the ATR governance**, and on the other hand objectives, policies and implementation processes of the city, the ATR and the regional level are differing. The ATR is only a (formal) cooperation of governments with a joint long-term plan. Our conclusion is that the regional and Federal Ministries are partly involved in the development of mobility policies of the FUA, but not involved in the coordination of the implementation of the mobility strategy for the FUA. If the Ministries are not involved in setting the objectives and coordination of their responsibilities the SUMP of Antwerp, and stakeholders in the ATR cannot be effective.

There is also no integrated overview / visualization of the financial models, the funding scale and structure (local, ATR, Provincial, Regional, Federal and EU funds). **Every city authority has his own budgets**, just as the stakeholders, Flanders and the Federal level and all government bodies like Infrabel and De Lijn, and Lantis. There is no strict division between budgets for infrastructure and budget for exploitation of public transport in general, for De Lijn the Flemish government (MOW) has annual Integrated investment programme (GIP) overviews.

In **Turku** there is **no assessment framework at regional level for the ex-ante evaluation of measures with regional impact**. In the FUA, the **goals stated in the strategies may not always coincide with the municipalities' own decisions**. When looking at mood and motivation to promote sustainable mobility from a more general point of view, one must not overlook the fact that the interests of the FUA and the interests of the city of Turku alone may differ significantly when it comes to transport and mobility development. In the FUA, public transport coverage is not that high beyond the Föli area, which can be observed in the rather low modal share for active travel modes. Due to multi-stakeholders (state, municipalities), a **lack of mandate at regional level** / lack of policy coordination the required multi-modal mobility network is not in place. Local train connections should be one of the backbones for regional sustainable development but are missing due to a lack of financial means and mandate. A regional public transport organization seems the first step



forward. The how question is the main governance question within SCALE-UP. A possible model – as recommendation to WP 2 – is visualized below.

The community of **Madrid** largely covers the entire metropolitan area of Madrid and thus acts as a metropolitan government body. However, **not the entire FUA of Madrid is covered by the community of Madrid**. The authority, and districts, have an autonomy and a national perspective. Many mobility partners exist, where some are focussed on long distance transport too (ADIF, RENFE) and many on local transport solely. The awareness of the vast size of the city, and the need to expand policies throughout the urban area, be it the FUA or a part of it, is therefore many stakeholders. But, **the objectives (at the State-Region-City level) are not always aligned** in the same direction. **Governance works top-down**, not bottom-up. Although EMT, CRTM and Madrid City Council work together regularly in relation to different activities/projects regarding sustainable mobility strategies, there is no formal structure to promote cooperation among the different actors involved in Madrid's mobility ecosystem at FUA and regional level. Madrid can learn from the challenges Antwerp and Turku's region experience in setting up a collaborative approach in developing mobility policies at city, town, district, and regional scale. And all can learn from the coordination efforts, struggles and successes.

Main conclusions

We can conclude that there are **clear institutional and organizational barriers for scaling up local mobility policies to a wider area**, or to the Functional Urban Area. Institutional competition and strong asymmetry (institutional, organizational) at the regional level severely hampers the possibilities for intermunicipal joint planning and actions. For **Antwerp** it is important to **be aware of what its FUA is and the role of the ATR within this wider region**. The poly-centric nature of the FUA of Antwerp (closely linked to Brussels and embedded in a dense urban area) is an additional challenge. In general, a FUA is mono-centric with one urban core and a periphery. In **Turku** there is **no assessment framework at regional level for the ex-ante evaluation of measures with regional impact**. This is due to the fact, that there is no mandate at regional level for decision-making. Local elected decision makers are part of the regional council, but without mandate for regional decisions. Final decisions are always made in the municipalities' city councils. **Municipalities' interests do not always meet the region's interest**. That lead to conflicts and have a negative (content and/or time) impact on the regional sustainable urban mobility objectives. In the FUA, the goals stated in the strategies may not always coincide with the municipalities' own decisions.

In **Madrid**, **governance works top-down, not bottom-up**. New forms of mobility and legislation appear that catch the municipalities by surprise (e.g. micro mobility regulations).



A barrier is that policies at the national or regional level are not always aligned with the objectives of the municipalities. Municipalities have the autonomy in their own jurisdictional area. There has been a radical change of approach, with some very brave legislative initiatives. This entire MITMA (Ministry of Transport, Mobility and Urban Agenda) package is a structured, solid and has an understandable discourse. **The Urban Agenda has played the role of ordering these regulatory instruments so that cities/towns can propose measures.** But the Urban Agenda is not **normative, it is not binding**; it is totally voluntary. Nevertheless, it is reaching the cities, the local entities, with outcomes to be determined later.

The **TEN-T level is not explicitly addressed** by any of the authorities at urban or regional level, in the sense that no specific objectives have been set which specifically refer to TEN-T or long-distance transport flows. Cities do see themselves neither as the first responsible nor the best equipped to deal with interventions targeting TEN-T. The competence is with the national authorities and operators of the national rail and highway networks and ports. This does not mean the cities are not planning interventions that affect and benefit mobility on the TEN-T level. Antwerp, Madrid and Turku are all planning actions **targeting the access points to the trans-European transport network, most notably multimodal railway stations and first/last mile transport to these points.** However, the objectives are set towards the needs of the cities and not towards those of nationwide or even international mobility. Coordination/cooperation with “higher level” authorities on projects/interventions in the urban area varies per project/intervention.



8 Recommendations on integration actions

Based on the preliminary conclusions of chapter 7 this chapter describes the first recommendations on actions to strengthen/optimize the integration between the different levels (State-Region-City) in Antwerp, Madrid and Turku.

The three cities experience challenges in defining the regional and local scope of their mobility policies, each having a different maturity level and approach towards cooperation.

Turku has on the FUA level great awareness for freight & logistics and mobility perspective. This is reflected in the SUMP on FUA scale. Local train connections should be one of the backbones for regional sustainable development, but are missing due to a lack of financial means and mandate of SWF. **A regional public transport organization seems a first important step forward.** In spring 2022, a consultancy assignment was put out to tender to carry out a study on options for the organization models of regional train traffic in Southwest Finland.

The challenges of **Antwerp**, contrasting with on the one hand and mirroring with those of Turku, where the is that the ATR is not fully aligned with the FUA. This is mainly related to the position of the ATR region in a very dense and polycentric region, with a lot of commuting between the cities. **It would, from a governance and political perspective, not work to expand the ATR further.** As this then creates a too large and too diverse area to be covered by a single authority. It is however important that the ATR is aware of its restricted geographical scope and recommended **that it aligns its objectives and measures with the other transport regions.**

The community of Madrid largely covers the entire metropolitan area of Madrid and thus acts as a metropolitan government body. However, **not the entire FUA of Madrid is covered** by the community of Madrid. The current well established governance structures seem to be a barrier to upscale measures beyond the boundaries of the community of Madrid. It is recommended that Madrid takes in to account not only the current metropolitan area, but also the **surrounding areas of influence.**

We can conclude that there are **clear institutional and organizational barriers for scaling up local mobility policies to a wider area, or to the FUA.** Institutional competition and strong asymmetry (institutional, organizational) at the regional level severely hampers the possibilities for intermunicipal joint planning and actions.

It is therefore advised to define cooperation on the right geographical level, based on a balanced assessment and approach that takes account of the regional scale of transport flows (the FUA), without forgetting about the clear advantage of heterogeneity between the transport regions participating communities.



The transport region is best helped with a good cooperation between the partners developing joint supported policies in the region and locally; without forgetting that the transport region can also make ad-hoc relations with partners operation at the FUA or beyond (National Railways e.g.). **The transport region could take a joint position and use their strength in steering regional and national stakeholders.**

One can follow this step-wise approach:

- **Define the FUA**, as a background to develop aligned local and transport region policies.
- **Align the transport region and local policies to the flows of goods and passengers in the FUA**, with a serious consideration of balancing the scale of the FUA and the optimal size when implementation and governance is regarded. The transport region should not be too large, risking implementation inertia, or too small with the risk of not-aligning local with regional policies.
- The scale for implementation should be focussed on **creating heterogeneity** in the transport region, knowledge sharing, and position forming towards the regional and national levels.
- All transport regions, **should regard the TEN-T** and as a chance to develop the local-regional-national-EU approach towards mobility, and a chance to develop approaches locally that align with EU objectives and policy approaches, including funding.



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Annex 1 – guidance document D1.1

Steps in urban policy planning and relation with perspective from the functional urban area approach

Analyses and objectives

Analysis is of utmost importance. Data (quantitative analyses) as well as stakeholder consultations. The analyses leads to the setting of objectives. In planning for the functional urban area one should realize:

- The spatial dimension and the mobility system are inter-related.
- Policy making, strategies and measures at urban level, within the FUA, at national (and European (TEN-T level)) are inter-acting and effecting objectives. Several policies and measures – set by different policy makers - have an impact on local as well as FUA level.

Questions to get insight in the current situation are:

- At what level and how do cities carry out the analysis of their mobility system?
- To what extent do cities involve other policy makers in the analyses (local policy makers in the functional urban area, infrastructure providers, national road authorities, national policy makers)
 - o For example in planning a hub in the functional urban area, it is important to realize that origin – destination data are not only relevant from own citizens, but also from commuters from villages outside the city towards the city. And that local policy makers outside the city can impact the travel behaviour of those citizens.

As a further step:

- For which spatial level do the city determine objectives?
- Do city policy makers are aware of impact of other policy makers on the objectives
- Are objectives with relevance for the FUA set in co-ordination?

Strategy / measures

Experience learns that the spatial dimension and mobility are inter-related. In many cases the spatial strategy is part of another department or policy is made at another level (national). The TEN-T network strategy (longer term strategy) is affecting mobility at FUA level. At the same hand space is in many cases no indicator in TEN-T network policy.



Therefore the strategy to obtain impact and reach objectives in the FUA asks for a co-ordinated strategy; taking each others objectives into account and aiming to define common regional objectives respecting each others responsibilities.

Therefore questions on strategic level are:

- Who determines the long-term strategy?
- Which departments are involved (horizontal)?
- Which stakeholders are involved (horizontal)?
- Which levels are involved (local city, local policy makers in the FUA, national, TEN-T)
- How relates this strategy / measures to defined objectives?
- Who monitors and evaluates this progress?
- Who determines measures? At which level?
- How are these prioritised? And by whom?
- To what extend are measures described in detail (detailed location, timing, etc)

Implementation

In the Vital Nodes approach implementation has been defined in dimensions of governance / institutional, financial and time. Timewise it might be seen that local measures are planned for a short time horizon, while TEN-T infrastructure has a long time horizon. How is this co-ordinated / taken into account? Who is responsible for implementation of the strategy? Who finances the plan? Which financial co-operation mechanism? Is it solely public financed or is it a public private partnership? Who sets tariffs? What is the relation between local parking policy and the use of hubs (business model)?

Summary of possible guidance questions

- At what spatial level do you perform an analysis of the existing and future situation [or subtheme]?
- Do you look at origin & destination relationships at a higher geographical level?
- For passenger traffic: If so, what level? If not, why not?
- For freight traffic: If so, what level? If not, why not?
- When an analysis takes place at the level of a FUA, which authority is responsible for the analysis?
- Are other authorities involved in its preparation and/or validation? If so, how? If not, why not?
- For what distance do you consider walking as a relevant modality?



- For what distance do you consider cycling as a relevant modality?
- For what distance do you consider micromobility to be a relevant modality?
- Have you set objectives [per sub-theme] for specific geographic areas? If so, what goals and for what scope (e.g. city areas, city wide, FUA areas [e.g. a corridor], entire FUA, outside FUA/TEN-T)?
- Are authorities at a lower and/or higher level of government aware of the specific objectives?
- To what extent are the objectives supported by those authorities? Resistance – ambivalence – actively supported? Why?
- To what extent have authorities at a lower and/or higher level of government been involved in the formulation of the specific objectives? Not – consultation – co-creation?
- Are authorities or stakeholders at a different level involved in identifying measures? If so, how? If not, why not?
- Have you identified measures that affect mobility in geographic areas governed by another authority? If so, which measures? And what is that impact elsewhere?
- Have you identified measures that need to be carried out within the purview of another authority? If so, which measures? What is the importance of these measures for achieving your own objectives? Have agreements been made about the implementation of these measures? Which? If not, why not? Should this be different? What could be done to change this?
- To what extent have other authorities (at a lower and/or higher level of government) been involved in the prioritization of measures? Not – consultation – co-creation? Should this be different? What could be done to change this?
- What criteria were used when prioritizing measures? To what extent has this taken into account the importance that other authorities attach to the measure? Which measures? Do these have to be realized in the area under your control or elsewhere?
- To what extent has this taken into account the dependence on other authorities in the implementation?
- Do you make agreements with other authorities about the moment when measures that fall outside your area will be implemented? If yes which one? If not, why not? Should this be different? What could be done to change this?
- Do you make agreements about the financing of these measures? If yes which one?
- Do you monitor the implementation of these measures? How?



- Do you make agreements with other authorities about when measures that fall within your area will be implemented? If yes which one? If not, why not? Do you make agreements about the financing of these measures? If yes which one?
- Do you inform other authorities about the progress in implementing these measures? If so, how? If not, why not?

Specific relation vertical integration approach between WP 1 and WP 2.1 – WP 3.1 – WP 4.1 – WP 5.1 – WP 6.1

Process

The process of WP 1 is stepwise:

- Have objectives and targets **been clearly** identified?
 - Role for WP 2.1 – 3.1 – 4.1 – 5.1 – 6.1
 - Guidance from WP 1 with questions
- Challenges and barriers
 - Role for WP 2.1 – 3.1 – 4.1 – 5.1 – 6.1
 - Guidance from WP 1 with questions
 - **Diagnosis; Current status / awareness / involvement**
 - Own recognized barriers and knowledge questions by cities
 - Role for WP 2.1 – 3.1 – 4.1 – 5.1 – 6.1; in WP (theme) meetings as well as in knowledge exchange meetings (between nodes on theme level)
 - Guidance from WP 1 with questions
 - Barriers recognized by experts / advisory board / stakeholders outside the project partner circle
 - Role for WP 1 in co-operation with WP 8 à WP 1 meeting in the proposed meeting scheme
- How to overcome barriers on vertical integration per Work Package (strategy steps)
 - Role for WP 2.1 – 3.1 – 4.1 – 5.1 – 6.1; in WP (theme) meetings as well as in knowledge exchange meetings (between nodes on theme level)
 - Guidance from WP 1 on recommendations in strategy / good practices
 - Role for WP 1 in co-operation with WP 8 à WP 1 meeting in the proposed meeting scheme
- Strategy on vertical and horizontal integration and validation



- *In our opinion horizontal and vertical are inter-relating and should not be treated separate in the project. Two parallel strategies will not work*
- *Cities should be aware of the scope: are cities aiming to implement strategic recommendations, when, which time period, how is this reflected in the planning?*

From our vertical integration role in WP 1 we see a need of a structured and regular meeting from WP 1 with T2.1 – 6.1 to discuss progress, questions, et cetera. How is this reflected in the meeting structure?

Guidance questions (from last chapter) more detailed per WP

An important question is to clarify at which level the measure within your WP takes place and what position the measure leader has. Is it a project manager for implementing a measure? Is it an evaluator, evaluating the impact of the measures on the objective? Is the measure leader a technical measure leader or a process manager? How does the measure leader involve other stakeholders in the step to upscale the strategy? Is there an upscale strategy? How is the relation between recommendations from WP 1 and the uptake / implementation in WP 2- WP 6?

Questions included at a more detailed level in all implementation cases:

- *Is the measure part of a wider strategy? To which strategy?*
- *What is the implementation strategy?*
- *By whom is the measure financed?*
- *What is the objective of the measure? Is this a local or a regional objective?*
- *Which stakeholders have been involved in the strategy?*
- *Which stakeholders are involved in the implementation?*
- *How is the relation between the impact of the measure and the TEN-strategy related?*
- *What is the time line?*
- *Which data analyses are behind the measure? Why and by whom is the measure chosen?*
- *Does the measure have impact in the FUA? Are other policy makers effecting the impact on the city set objective?*



Further questions might include:

- What is the FUA? Most of the times this is for the nodes already defined. In all nodes this is defined from a commuter perspective.
- Are stakeholders in the measure aware of being part of a FUA?
- Are stakeholders in the measure aware of set objectives, local, or FUA?
- Which stakeholders / policy makers are involved in the measures?
- With which stakes and responsibilities? At which level?
- Is spatial planning at national level covered?
- Is each stakeholder aware of actions or plans with impact on each other? Which value to add?
- Have objectives on FUA level been set, by whom, who is assessing?
- Which are barriers to reach the objectives (impact)
- Which are barriers in overcoming the experienced governance / co-operation problem (including financial)?
- Which are possible models with pro's and con's to overcome barriers?

Possible barriers / chances / awareness on vertical integration

- Conflicting interests and non awareness of interests from stakeholder at FUA / TEN-T level have a negative impact on dimensions space (location), network (multimodality and hubs), time (duration of discussions) and financial (possible sub-optimisation)
 - Might be valid questions for hubs and data WP's
- No involvement of stakeholders at national level and/or stakeholders on spatial planning as driver for mobility
 - Question: should a stakeholder at national level be involved in certain measures and why? For example WP 6 behaviour. Is a national stakeholder required for upscaling? When and with which role to involve? Possible good practices: Beter Benutten (NL) or Smart to Antwerp
- No mandate at FUA level for decision making at FUA level (including freight; not included in public governance)
 - A lot of local policy plans together with all own stakes and decisions, leading to a long-time decision structure
 - Voluntary co-operation models, good practice from Vital Nodes is North-Limburg and/or the Freight Corridor Approach (North-Rhein Westphalia – Netherlands)



- *No regional objectives and/or no assessment framework at FUA level*
- *No budget at FUA level for measures / no financial co-operation model between municipalities at FUA level*
- *Lack of policy coordination at FUA level (leading to multi modal network / hubs as backbone to sustainably develop not in place)*
- *Unawareness of connection with TEN-T required including impact of measure "FUA coordination"*



Annex 2 - Fingerprint of Antwerp

Scale UP - Facts and Figures

A) General facts and figures (sources: Eurostat, statistics Flanders, stad Antwerpen in cijfers)

CITY = Municipality of Antwerp	Baseyear 2021	Trend	REGION = Antwerp Transport Region (Vervoerregio Antwerpen)	Baseyear 2021	Trend
City area (km2)	205	↔	Region area (km2)	1,200	↔
Population (city)	530,000	↑	Population (region)	1.100.000	↑
Population density city (km2)	2,595	↑	Population density city (km2)	917.0	↑
GDP	92,088 bln	↑	GDP	n.a.	↑
GDP per capita	49,300	↑	GDP per capita	n.a.	↑

Antwerp city and transport region

Antwerp City

Antwerp has 529,417 (01/01/2021) residents. The city area is 205 km² and is centrally located in the Flanders region. The Port of Antwerp is nearby the city and stretches over more than 40 km from the city centre, in the Northern direction, following the river Scheldt.

The governance of Antwerp is consisting of a central city Administration / Council with the Mayor of Antwerp, and 9 districts responsible for a selection of (local) competences.


The central district is located between the ringroad and the Scheldt river; the Antwerp right bank. This district is the historic and economic core of the whole city. Though, satellite cores are developed for each district.

The department of mobility consist of 5 subdepartments working on the mobility system

Challenges:

- Public transport in the city (and wider region) is often slow due to the large amount of stops and busses are outdated;
- Plans to reduce stops and therefore reduce travel time, are often met with fierce resistance;
- De Uij is often seen as pure an operator of public transport and has limited influence on operational development plans;
- There is a mismatch between the investments made in public transport infrastructure and the operating budget;
- In Antwerp shared mobility is seen as a good alternative to public transport and therefore experimented with on a large scale basis. Shared mobility however canalizes on public transport;
- There is no holistic vision on mobility hubs. There are multiple typologies of hubs and different government layers involved (city of Antwerp, transport region, Flanders). The development of these hubs is also often done in isolation from the development of public transport and shared mobility;
- Parking pricing is still a very sensitive topic

City map



Antwerp Transport Region

The Antwerp Transport Region is one of the 15 transport regions in Flanders. Antwerp transport region is a diverse and extensive region with 32 municipalities from Essen to Boom, from Beveren to Malle, and has more than one million inhabitants.

Governance:

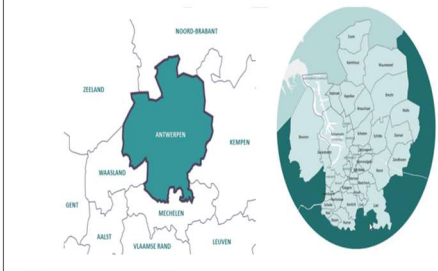
The transport regions were implemented in 2019 to tackle regional mobility challenges. The transport regions are also tasked with the local implementation of the concept of Basisbereikbaarheid; a more demand driven approach to public transport. Every Transport Region has a council with representatives from the municipalities, the provinces Antwerp and East-Flanders, the Flanders Department of Mobility and Public Works (DMOW), the Road and Traffic Agency (AWW) and the public transport operators De Uij and NMBS. The a'darmen represent the different municipalities in the transport region council. The Team Transport Region is a policy preparing and advisory body to support the Antwerp Transport Region in its functioning and operations

The growing demand for mobility is a major challenge in the region. The transport region Antwerp has developed a vision for 2030 (Routeplan 2030) aiming to create a accessible and livable region with a crucial role for multi-modal travel behaviour. For the short term the transport region has developed a plan for all bus and tram services.

Challenges:

- The transport region has no legal status, decision power and financial means of its own. The Transport Reg on is only a collaboration platform for the preparation of policy. The competences of the other actors with regards to implementation and financing did not change with the creation of the transport regions.
- Measures at regional level are financed by various actors: sometimes directly by the Flemish Government, by Flemish agencies (e.g. Agentschap Wegen en Verkeer), by De Uij (an independent agency under the MoW) or by municipalities.
- There is a big difference between municipalities in terms of in-house knowledge and expertise on mobility and this can hamper the exchange of knowledge between municipalities;
- Decision making is made on the basis of an unanimous vote, which can result in slow decision making and compromises;
- The Team Transport Region is not an entity on its own, but consists of different stakeholders detached partly or full-time by mobility-related entities operating within the Antwerp Region

Map Antwerp city as central location in the region



De Vervoerregio Antwerpen en z'n 32 gemeenten



Other government bodies

The city of Antwerp is the second largest city in Belgium. Belgium itself has been divided in three regions: Flanders, Wallonia and Brussels. Flanders has its own government and departments. Flanders itself has been divided into five provinces. One of which is the Antwerp Province, with the city of Antwerp being its capital. The Antwerp province contains 69 municipalities within 3 arrondissement: Antwerp, Mechelen and Turnhout. As can be seen on the figure on the right, the province of Antwerp is larger than the transport region of Antwerp and covers parts of the transport regions of Leuven and Mechelen. At the same time, a part of the Antwerp Transport Region lies in the province of Oost-Vlaanderen. The provinces of Antwerp and Oost-Vlaanderen have their own councils and departments working on spatial planning and mobility.

In the Antwerp region the organisation Lantis has been tasked to realize complex mobility projects that are of major importance to the Flemish government. Originally Lantis (then called BAM) was founded to implement the Masterplan Antwerpen, which was designed to improve the mobility in and around Antwerp. Crucial in the masterplan was the realization of a closed ringroad with the construction of the new Oosterweel tunnel. As the Oosterweel project transformed from a pure infrastructure project to a more holistic approach to the mobility challenges in Antwerp, so did the role of Lantis change. It is now also involved in the realization of park and ride facilities and the implementation of an e-bike sharing system.

Map Antwerp city as central location in the region

Antwerp TEN-T

The port of Antwerp is the second largest in Europe. The management of the (local) government-owned Port of Antwerp is consisting of a separate entity, and a board of directors in which the local government and independent members jointly steer the port. The daily management is led by an appointed CEO.

Antwerp is located on multiple corridors; North Sea Baltic, Rhine-Alpine, North Sea-Mediterranean. Antwerp is connected via TEN-T-core networks with the city and port of Rotterdam, city of Brussels and Ghent. In these corridors Antwerp is connected by IWW, Sea Ports, Rail and Road.

There are currently no big capacity issues regarding rail, but projects are being set up to increase to capacity of rail in order to achieve a modal shift from road to rail, especially in the context of the harbour. There are however certainly road capacity issues (see also below). The Port of Antwerp has a current modal split of 8% rail, 40% barge and 52% road. The ambition is a modal split of 20% rail, 40% barge and 40% road.

Challenges:

The city and the port of Antwerp are working as separate entities. There is no direct interaction between the development of the port and its hinterland with the plans for the mobility in the city itself. The city of Antwerp feels that they have to mitigate on the basis of what happens in the port. So in practice, they do influence each other and traffic flows and interests are in conflict.

Antwerp Ten-T

TOP 3 MARKTANDEEL HAMBURG-LE HAVRE RANGE

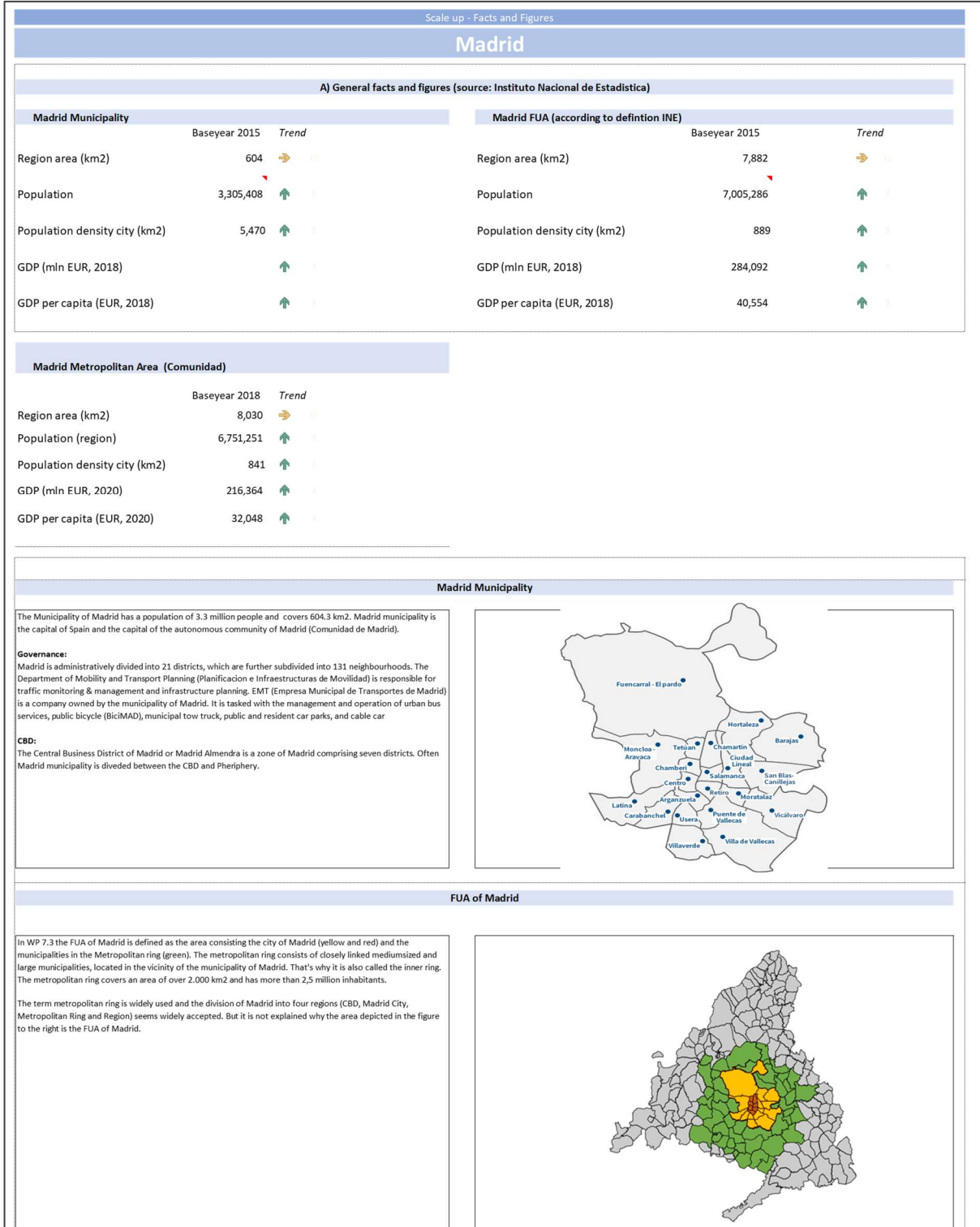
OVREDE MAATSCHAP	Antwerpen A.P.R.	Mechelen A.P.R.	Brussel A.P.R.	Leuven A.P.R.	Turnhout A.P.R.	Zuid-Afrika A.P.R.	Witwatersrand A.P.R.
ROTTERDAM	36,6%						
ANTWERPEN	15,4%						
HAMBURG	10,4%						

Regional (NUTS3) and functional area ; Antwerp Transport Region?

From a commuter perspective data (for example mobi-data) should be the basis to define the effectiveness of strategies (behaviour, impact) and the required involvement of stakeholders



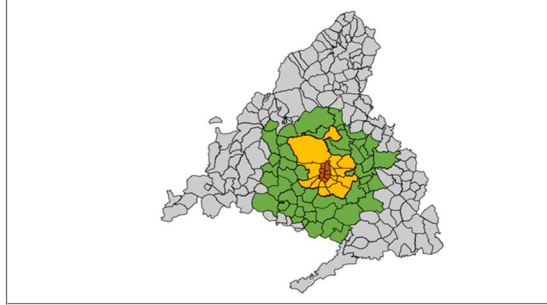
Annex 3 - Fingerprint of Madrid



FUA of Madrid

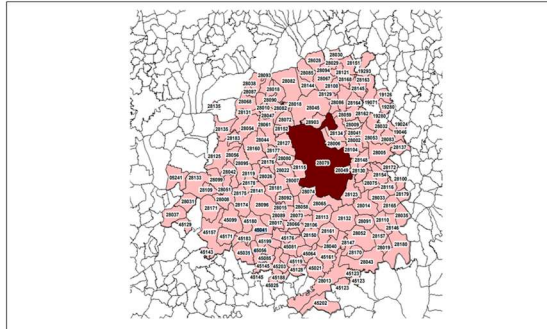
In WP 7.3 the FUA of Madrid is defined as the area consisting the city of Madrid (yellow and red) and the municipalities in the Metropolitan ring (green). The metropolitan ring consists of closely linked medium-sized and large municipalities, located in the vicinity of the municipality of Madrid. That's why it is also called the inner ring. The metropolitan ring covers an area of over 2.000 km² and has more than 2,5 million inhabitants.

The term metropolitan ring is widely used and the division of Madrid into four regions (CBD, Madrid City, Metropolitan Ring and Region) seems widely accepted. But it is not explained why the area depicted in the figure to the right is the FUA of Madrid.



INE, the Spanish Statistical Office, has defined Functional Urban Areas in Spain. Each FUA consists of a city and the municipalities that make up its functional environment, specifically of labour influence. 70 functional urban areas have been defined for the whole of Spain. A municipality belongs to the FUA of a city if 15% or more of its employed population commutes to this city for work reasons. That is the main criteria but there are others as contiguity. In Spain, the 15% threshold of commuting rate, is applied for all municipalities with more than 2.000 inhabitants.

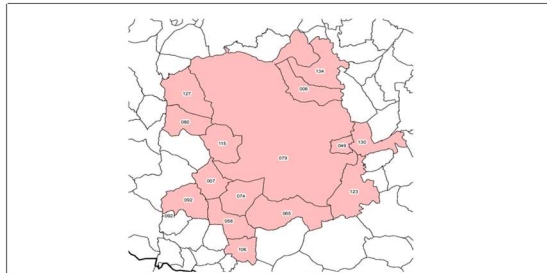
The FUA as defined by INE is much larger than the FUA as defined in WP 7.3. It is roughly comparable to the Comunidad de Madrid in size, but there are some differences in the administrative boundaries applied. That's why the FUA as defined by INE is 200km² smaller in size than the Comunidad, but has around 250.000 more inhabitants (more than 7 million in total).



Madrid The Greater City

INE has also defined an area in between the FUA and the municipality of Madrid: The greater city. The Greater city is an approximation of the urban centre when this stretches far beyond the administrative city boundaries. It is an approach to resolve underbounding and it consists to add another geographical level which is bigger than the city, a city is underbound if more than 25% of the population of its urban centre is located outside an Urban Audit city.

The greater City is smaller than the Metropolitan Ring.



Madrid Metropolitan Area (Comunidad Autónoma de Madrid)

The Community of Madrid is one of the seventeen autonomous communities of Spain and consists of 179 municipalities. The Community of Madrid is the third most populous in Spain with 6,7 million inhabitants and covering an area of over 8.000 km².

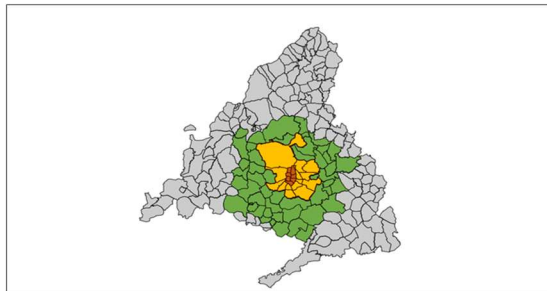
Governance:

Under Madrid's Regional Government, La Consejería de Transportes e Infraestructuras, is the body in charge, at regional level, of development, coordination and control of the execution of the Spanish Government's public policies in matters of transport, mobility, highways, railways, aeronautical facilities and other transport infrastructures. Under its scope it has 3 General Directorates:

1. Transport and Mobility
2. Highways
3. Collective Transport Infrastructures

The Consorcio Regional de Transportes de Madrid (CRTM) is an autonomous body created by Spanish law 5/1985 which is tasked with coordinating the public transport operations across multiple providers in the Community of Madrid. It harmonises fares for commuter rail, rapid transit, light rail and bus transport services provided by entities such as Renfe Cercanías, Metro de Madrid S.A. or the Empresa Municipal de Transportes de Madrid (EMT).

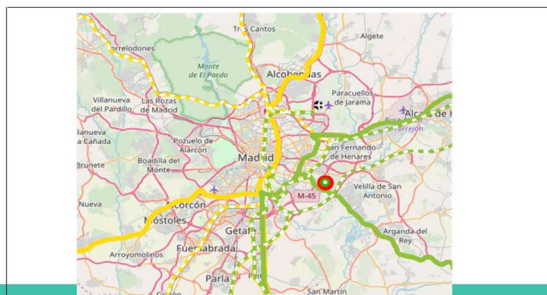
Its executive board is presided by the regional minister for Transportation. The vicepresident is a member of the Municipal Council of Madrid. The rest of board members are 6 more representatives of the regional government, 2 more representatives of the Madrid municipal council, 3 representatives of other municipal councils, 2 representatives of the State administration, 2 syndical representatives, 2 representatives of corporate associations and 1 representative of economic associations.



Scandinavian-Mediterranean TEN-T

Madrid is a node on the Atlantic and Mediterranean Trans-European Transport Networks. The Mediterranean Corridor is the main east-west axis in the TEN-T Network south of the Alps. It runs between the south-western Mediterranean region of Spain and the Ukrainian border with Hungary. The corridor primarily consists of road and rail. The Atlantic Corridor stretches from the ports of the Iberian Peninsula to the port of Le Havre in Northern France, and cities of Strasbourg and Mannheim on the French/German border. The corridor has strong multimodal dimensions, utilising rail, road, inland waterway and maritime routes. The corridor's main missing link is the cross-border connection between Lisbon and Madrid.

The figure to the right depicts the roads and rail networks belonging to both TEN-T corridors



Annex 4 - Fingerprint of Turku

Scale up - Facts and Figures

Turku

A) General facts and figures (source: OECD & Statistics Finland)

CITY OF TURKU	Baseyear 2015	Trend	FUA of Turku (FI003)	Baseyear 2015	Trend
City* area (km2)	245.7	→ ↘	Region area (km2)	4,386	→ ↘
Population (city*)	195,350	↑ ↘	Population (region)	364,437	↑ ↘
Population density city* (km2)	795	↑ ↘	Population density city (km2)	83	↑ ↘
			GDP (mln EUR, 2018)	13,763	↑ ↘
			GDP per capita (EUR, 2018)	37,765	↑ ↘

Southwest Finland (FI1C1)

	Baseyear 2020	Trend
Region area (km2)	10,910	→ ↘
Population (region)	481,403	↑ ↘
Population density city (km2)	44	↑ ↘
GDP (mln EUR, 2018)	18,438	↑ ↘
GDP per capita (EUR, 2018)	38,301	↑ ↘


City of Turku

Turku is a city on the southwest coast of Finland at the mouth of the Aura River in the region of Southwest Finland. In addition to the distinctive river landscape, the city is characterized by seven hills located in and out of the city centre. The city has spread out to a long and narrow land area: the distance between the northernmost and southernmost tips is 45 kilometres while the city is only 15 kilometres wide at its widest.

Governance:
The city is divided into 78 districts and 9 wards that do not function as local government units. In the city of Turku, transport and mobility planning is administrationally placed within the Urban Environment Division. The division has four service areas, two of which are connected to transport and mobility planning.

Cooperation is not nearly as well established within the city sectors as it is regionally. The Transport Planning unit and the Mobility Services service area for example are separate entities with separate responsibilities. The issue, in a nutshell, is that the information does flow to the direction of the Regional Council of South-West Finland but not necessarily within the city organization itself, towards the relevant service areas or units. Despite some recent restructuring of the Mobility Services service area, there is still no higher organization structure in the city that would cover all mobility related issues connected to different operating areas.

Cooperation with companies is also lacking ambition and resources. Attempts at promoting cooperation via a business incubator have been made, but no support structure exists for this type of activity.

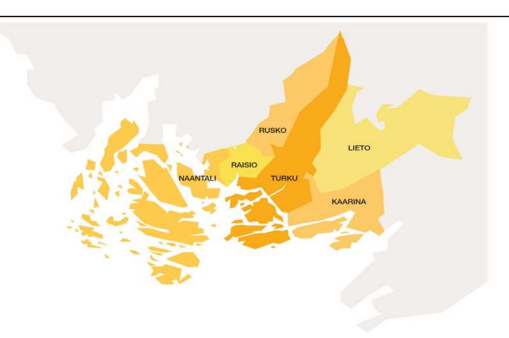


The fastest departure and arrival routes
— Routes for tractors
— Routes for cars

Föli

Turku region public transport Föli provides public transport services in six municipalities. The Föli area includes Turku, Kaarina, Raisio, Naantali, Lieto and Rusko. Föli organises and promotes public transport services in the area, plans timetables, sets ticket prices and handles the marketing and passenger communications for public transport. Föli procures the transport services from a company selected through competitive bidding. As such, it is a well-established and rather well-resourced actor with a strong capacity to organize transport services. In the FUA, public transport coverage is not that high beyond the Föli area.

Governance:
In 2021, Turku city underwent some administrative restructuring on the transport and mobility services. A new service area, Mobility Services, was established that will provide all the public transport services in the Föli municipalities. In addition, the service area is responsible for producing and developing mobility services in Turku and the city region. The mobility projects related to this topic (including SCALE-UP) were moved under the "Urban mobility solutions" sub-unit of the service area. This administrative rearrangement is a good start for achieving greater mass to design, organize and operate new mobility services in the city. A critical issue is inadequate resourcing and lack of permanent staff.





FUA of Turku

The Functional Urban Area of Turku is made up of the brown area as depicted on the map and the municipality of Aura and main islands of Parainen. The Functional Urban Area includes altogether 13 municipalities: The city of Turku and the municipalities of Naantali, Raisio, Kaarina, Lieto, Paimio, Sauvo, Rusko, Nousiainen, Mynämäki, Masku, Parainen and Aura.

Governance:

Transport and mobility planning on the FUA level at the Turku urban node is implemented via an established working arrangement, the transport system planning work, chaired by the Regional Council of South-West Finland. This work brings together all the FUA municipalities, regional administration and relevant national actors, such as the Finnish Transport Infrastructure Agency, Finnish Transport and Communications Agency and the Ministry of Transport and Communications. The transport system planning work is closely connected to regional land use planning work, with regular, thematic joint meetings (2-4 times / year).

The transport system planning work is divided into four thematic subgroups: those of traffic safety, traffic management, smart mobility and public transport. A variety of stakeholders is involved in each of the subgroups' work, depending on the theme. The traffic safety subgroup, for example, includes representatives from the police and fire and rescue services, in addition to the municipalities.

The transport system planning work is guided by the Transport System plan 2020, a comprehensive plan covering the main outlines, themes and actions related to transport system development in the FUA. The most significant transport system development measures presented in the plan are part of the national MAL agreement 2020-2031 between the 13 municipalities of the region and the Finnish state on land use, housing and transport. There is a monitoring system in place to follow up on the progress made.

In the FUA, the goals stated in the strategies may not always coincide with the municipalities' own decisions.



Southwest Finland

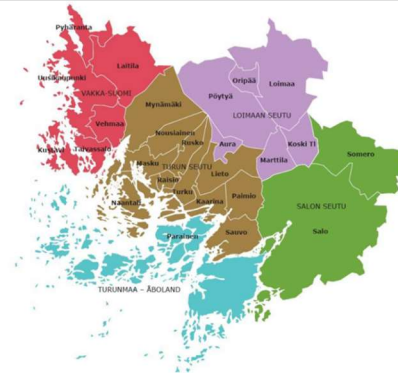
Southwest Finland (Varsinais-Suomi) is a NUTS-3 level region in the south-west of Finland. It borders the regions of Satakunta and Tavastia Proper. The region's capital and most populous city is Turku.

Governance:

The Regional Council of Southwest Finland is one of Finland's 19 regional councils. Regional councils are joint municipal authorities. Their role is to operate both as regional development authorities and as planning and lobbying organizations. There are 27 municipalities in the region of Southwest Finland. The municipalities finance the Council's operations with contributions that are proportionate to the size of their populations (Regional Council of Southwest Finland).

Important characteristics:

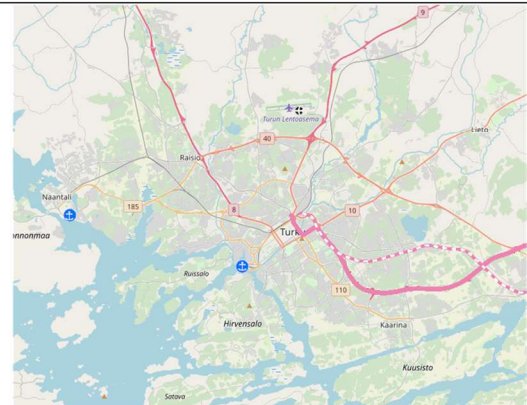
Southwest Finland (Varsinais-Suomi) is Finland's leading agricultural area and a significant food producer. Other important industries: shipyards, automobile manufacturing, metal and electric industries, bio cluster, medicine development. The region is moving from traditional to service-oriented.



Scandinavian-Mediterranean TEN-T

Turku is a node on the Scandinavian-Mediterranean Trans-European Transport Network (Scan-Med TEN-T). The Scan-Med Corridor is the longest of all core network corridors - accounting for 9,277 km of rail and 6,279 km of road on the core network. It includes 25 core ports, 19 core airports, 45 core intermodal terminals and 19 core urban nodes. The Corridor is key for the transport flows from Northern Europe, at the border with Russia in Finland, to the Southern Europe in Italy and Malta - crossing major urban nodes in Austria, Germany and Scandinavia.

The E18 national road and railroad connect Turku with Helsinki and the North Sea-Baltic corridor. The airport of Turku and the Port of Turku (and the Port of Naantali (to the west of Turku) are part of the Core Network.



Annex 5 - Relation with WP 7; draft indicators and data

(Ecorys - WP 1 vertical integration)

Objective and background:

Time line of WP 7 for framework and WP 1 is different. However, a first draft on vertical integration indicators is required:

- to raise awareness under cities;
- to activate technical leaders and evaluators in further awareness;
- to have a basis for further discussion / exploration between WP 1- WP 7 – technical leaders WP 2 – WP 6.

In this sense we consider this as a first discussion note between WP 1, WP 7, and technical leaders (meaning thematic co-operation leaders) WP 2- WP 6; meeting to be arranged in November.

City level – urban policy makers (measuring with urban / local policy makers of the city = interview)

- Awareness of role in FUA at urban (city) level; indicator *yes / no, high - low*
 - Awareness of urban (city) policy maker mobility person transport
 - Awareness of urban (city) policy maker mobility freight transport
 - Awareness of urban (city) policy maker spatial planning
 - Awareness of urban (city) policy maker environment
 - Awareness of urban (city) policy maker economy
- Awareness of the policy maker of the inter-relation between the broader spatial development of an urban node and transport and infrastructure (mobility and freight) solutions; ; indicator *yes / no, high - low*
- Awareness of existing planning approaches at different levels; ; indicator *yes / no, high - low*
- Co-operation / communication mechanisms in place between planning organisations at different levels; indicator *yes / no*



- Number of meetings per year between urban policy maker and other relevant FUA planning organisations
- Responsibility of urban (city) policy maker on ex-ante assessment of policies with impact on FUA (yes / no)
 - Measures / solutions / policy on data (origin destination data)
 - Measures / solutions / policy on hubs
 - Measures / solutions / policy on behaviour
- Clear responsibilities on ex-ante assessment of solutions / measures with impact on FUA (yes / no)
- Role in stakeholder engagement from urban (city) policy maker
 - Are urban (city) policy makers responsible in their profile to engage stakeholders at FUA level? How and which?
 - Do urban (city) policy makers engage stakeholders at FUA level?
 - How do urban (city) policy makers engage stakeholders at FUA level?
 - Which stakeholders do they engage, based on which guidance?
- Awareness of CEF projects
- Awareness of being part of the urban node
- Co-operation / communication structure between those responsible for CEF projects
- Value, space and network dimension taken into account within objectives

FUA – level – policy makers / coordinators

Measuring this with stakeholders, including local policy makers within the FUA (not the city), infrastructure providers, private parties, using a framework from WP 1 vertical integration

- Awareness of inter-relation between urban / city measures / policies and impact at FUA level
- Availability of FUA assessment framework
- Co-operation / communication mechanisms between planning organisations at different levels
- Involvement of FUA policy makers in policy effecting FUA level; are FUA policy makers involved in policy effecting the FUA level (yes / no)
 - Person transport
 - Freight transport



- Spatial planning
- Environment
- Clear responsibilities on ex-ante assessment of solutions / measures with impact on FUA (yes / no)
- Awareness of CEF projects
- Awareness of being part of the urban node
- Co-operation / communication with CEF project responsables
- Responsibility of regional / several local policy makers on ex-ante assessment of policies with impact on FUA (yes / no)
 - Data (origin destination data)
 - Hubs
 - Behaviour
- Value, space and network dimension taken into account within objectives.

Strategic indicators in final strategy / implemented SUMP (question if strategy will be implemented at city level / regional level) = KPI's

- Level of consideration of TEN-T network aspects in the planning scope of SUMP related to person mobility (consistent with SUMP self assessment tool = 5 scale level; indicator including steps in ex-ante assessment, stakeholder engagement, ex-post assessment, et cetera).
- Level of consideration of the functional urban area (FUA) in the planning scope of SUMP related to person mobility (consistent with SUMP self assessment tool = 5 scale level = indicator including steps in ex-ante assessment, stakeholder engagement, ex-post assessment, et cetera).
- Level of consideration of TEN-T network aspects in the planning scope of SUMP related to freight mobility (consistent with SUMP self-assessment tool = 5 scale level; indicator including steps in ex-ante assessment, stakeholder engagement, ex-post assessment, et cetera).
- Level of consideration of the functional urban area (FUA) in the planning scope of SUMP related to freight mobility (consistent with SUMP self assessment tool = 5 scale level = indicator including steps in ex-ante assessment, stakeholder engagement, ex-post assessment, et cetera).
- Process dialogue / amount of process dialogues between responsible entities for urban and TEN-T policy/planning.



- Number of agreements / actions / measures between TEN-T and urban.

Impact indicators on non process (at different levels):

Impact criteria	Description of indicators
Accessibility	Concerns the available capacity on the transport networks (multi-modal) in the urban node.
Safety	Concerns the number of injuries sustained due to transport activities and the measures taken to improve the safety of network users.
Economy	Concerns the level of socio-economic development of the urban node.
Vitality	Concerns the quality of living in terms of sustainability (energy transition), environmental conditions and health in the urban node.
Connectivity	Concerns the degree to which the urban node is connected to the wider region (functional urban area) and the TEN-T Corridor(s).

Example: planning of a mobility / freight hub (relation with WP 3); based on origin destination data of city and FUA villages, data governance / tool at FUA level (relation WP 4), sustainability strategy on corridor level (relation with WP 5). Impact measurement congestion, trips, occupancy rate of hubs, et cetera?

- Awareness (vertical) integration challenges - required via technical leaders WP 3 – WP 6 and via evaluators WP 7
- Knowledge exchange via WP 8



