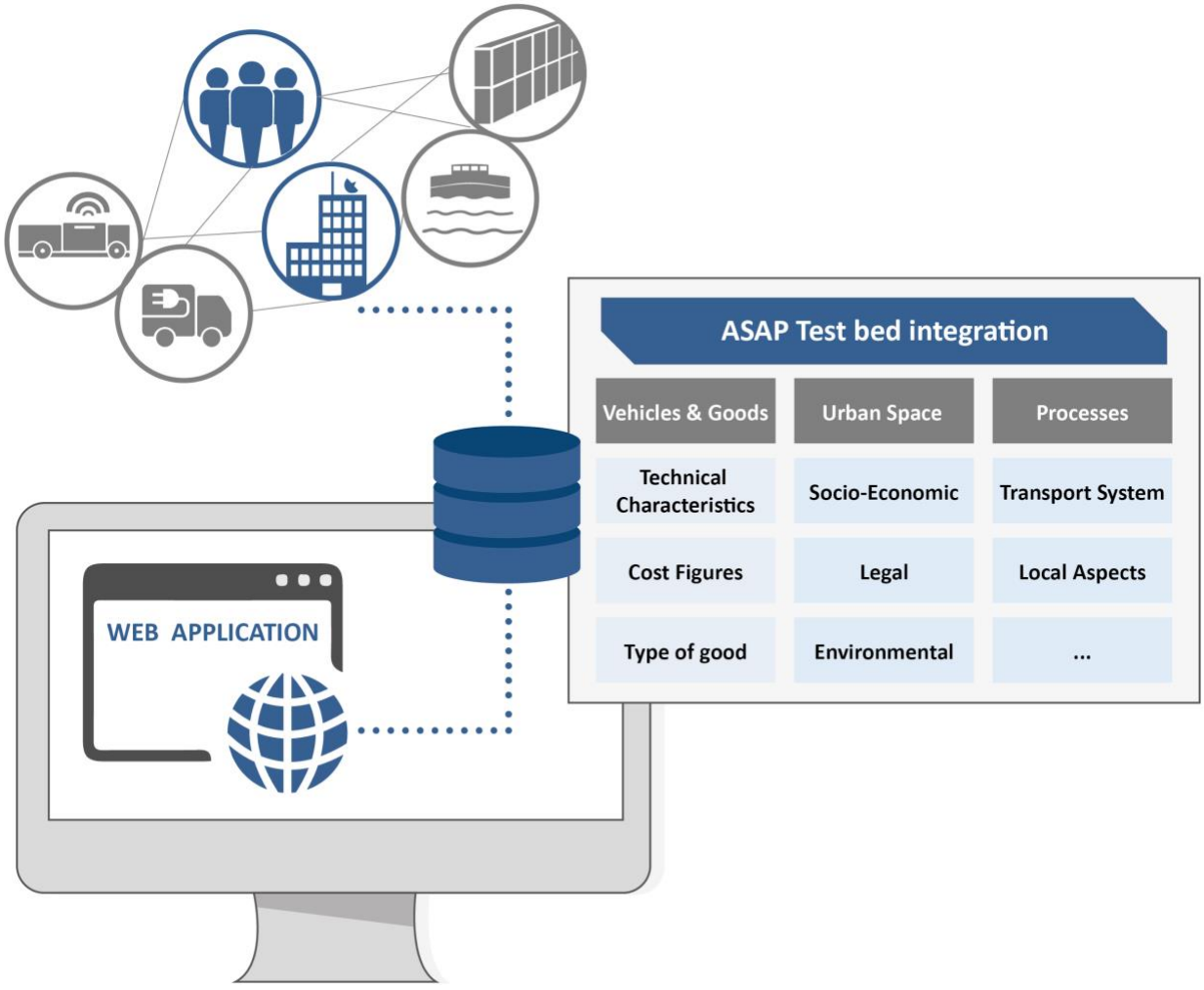
Project no. 875022

AWAKEN SLEEPING ASSETS PROJECT

D6.3 Line of Action Document



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Project partners

Organisation	Country
University of Natural Resources and Life Sciences, Vienna | BOKU	AUSTRIA
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List of Acronyms

Acronym	Meaning
API	Application Programming Interface
ASAP	Awaken Sleeping Assets Project
C-ITS	Cooperative Intelligent Transport Systems
DT	Digital Twin
HLAG-ST	High Level Advisory Group on Sustainable Transport
IoT	Internet of Things
JPOI	Johannesburg Plan of Implementation
OECD	Organisation for Economic Co-operation and Development
SDGs	Sustainable Development Goals
SULP	Sustainable Urban Logistics Plan
UN	United Nations

Executive Summary

This comprehensive document endeavours to function as a robust guide, created to cater to the needs of individuals keen on i**mplementing cutting-edge logistics solutions** grounded in the principles of the **Awaking Sleeping Assets Project (ASAP)**. By providing detailed insights into the array of tools and documents prepared within the framework of the project, it aims to equip readers with the necessary orientation to **find the appropriate materials offered** by the project. Moreover, it delves into the concept of the ASAP project, elucidating its historical backdrop and overarching objectives, while also shedding light on the many **challenges afflicting urban logistics**. These challenges, which pose formidable obstacles to the formulation of inclusive logistics strategies, like **Sustainable Urban Logistics Plans (SULPs)** that accommodate the diverse array of stakeholders, are underscored throughout. Crucially, in order to overcome these hurdles and move ahead toward sustainable urban development, the document emphasises the need to embrace a holistic approach. This involves not only a commitment to the principles supported by the **Sustainable Development Goals (SDGs)** but also a concerted effort to further discourse and action that accounts for the multifaceted interplay between economic, social, and environmental considerations. Through such concerted endeavours, cities can prepare a course towards a more equitable, resilient, and prosperous future, ensuring that the benefits of innovative logistics solutions are shared by all.

The document presented here offers an overview of several tools and documents developed within the project for potential **interested replicators of the ASAP concept** and the implementation of **innovative sustainable logistics measures.** For a deeper understanding, it is advisable to explore the ASAP platform, the project website, or to delve into the detailed documents referenced below.

1. Introduction

1.1 Challenges of Urban Logistics

Incorporating urban logistics concerns into city policies presents several challenges. Firstly, the intricate nature of urban systems involving transportation, distribution, and delivery within densely populated areas complicates the creation of comprehensive policies that address all aspects efficiently. Secondly, the involvement of diverse stakeholders, including businesses, residents, administrative units and government agencies, makes it difficult to balance conflicting interests. Thirdly, limited space and infrastructure in urban areas lead to operational inefficiencies, necessitating careful planning for optimal land use and transportation routes. Additionally, urban logistics activities can have significant environmental and social impacts, requiring policymakers to develop sustainable solutions. Existing regulatory frameworks may not always support efficient urban logistics operations, requiring adjustments to accommodate technological advancements and ensure compliance. Furthermore, rapid technological innovations continuously reshape urban logistics. Policymakers would need to stay abreast of these developments to proactively address their implications through flexible and adaptive policies. Most of the time this is not feasible. Last but not least, implementing effective urban logistics policies often requires substantial investments and/or legal changes, which can be challenging due to financial and responsibility constraints. Addressing these challenges necessitates collaborative efforts to develop holistic and sustainable policies that promote economic vitality, environmental stewardship, and social equity.

1.2 The Awaken Sleeping Assets Project

Urban goods delivery and retail systems have changed significantly in recent years. Local retailing stagnates, while e-commerce keeps growing. This leads to massive growth in delivery trips, usually carried out by motorised fossil fuel vehicles – causing congestion, air pollution and other externalities. Especially at rush hours, these systems lead to a decrease of efficiency of logistics operators because they must share roads with other traffic participants. Furthermore, the degree of urbanisation is expected to keep on increasing in the next decade which will compound these problems. In a nutshell, the current urban goods supply, predominantly relying on fossil fuel vehicles, represents an unfriendly solution for residents due to local emission of noise and pollution. Beyond that, these practices are also problematic in the global context of climate change.

Nevertheless, for most cities and their authorities, addressing this problem is simply too difficult and falls outside their direct obligations, and they often lack the resources to identify good practices in an easy way and adapt them to their local context. This is the main reason why Sustainable Urban Logistics Plans (SULPs) have not been very successful so far. Here we would like to define a SULP as follows: A Sustainable Urban Logistics Plan (SULP) is a strategic framework designed by cities and urban authorities to promote environmentally friendly and efficient logistics practices within urban areas. It aims to optimise freight and goods transportation while minimising negative impacts on the environment, such as noise and pollution. SULPs typically involve the identification and implementation of sustainable logistics solutions tailored to the specific needs and context of a city.
Beyond the internal challenges that each city encounters in implementing a SULP, there exists a notable deficiency in collaboration between cities despite the shared nature of their challenges. ASAP aims to overcome these problems by demonstrating practical solutions and providing a SULP-interaction platform as a comprehensive knowledge base.

1.3 The ASAP project Objectives

ASAP strikes new paths aiming for three overall goals:

(1) to activate and promote underused or inactive infrastructure or resources for sustainable urban logistics.

(2) to provide testing structures (testbeds) for innovative urban logistics systems.

(3) to combine activities to build a new Sustainable Urban Logistics Planning platform (SULP-Platform)

The SULP-Platform was intended as an instrument that can help cities to contribute and activate sleeping assets and promote specific innovative urban logistics solutions. It will also provide help and support for cities conceiving their own SULP. On the one hand, this will foster a shift away from fossil fuel vehicles to non- or low-fossil alternative vehicles as well as the use of other modes of transport. On the other hand, this platform allows interested local authorities to easily find suitable urban logistics solutions corresponding to their own situation. Furthermore, they get the possibility to learn from existing testbeds and participants' expertise. By activating new sustainable urban logistics systems, the ASAP project aims to foster inhabitant friendly solutions to make the urban areas a more liveable space.

ASAP aims to create a centrally retrievable and bundled presentation of information that has a strong focus on real testbeds, user interaction, and long-term usability.
It will be based on testbeds that are activating underused assets within cities for the use by city logistics operations. These testbeds are pilot structures for Sustainable Urban Logistics Solutions that will be used to provide data on success and failure factors, framework conditions, and transferability information. The partner cities have acted as **"lighthouse cities"** showing the way and contribute 13 existing testbeds activating "sleeping" assets. In addition, the initiation of up to 11 concepts for new testbeds will be fostered within the project.
In general, we classify "sleeping assets" for sustainable urban logistics solutions as:

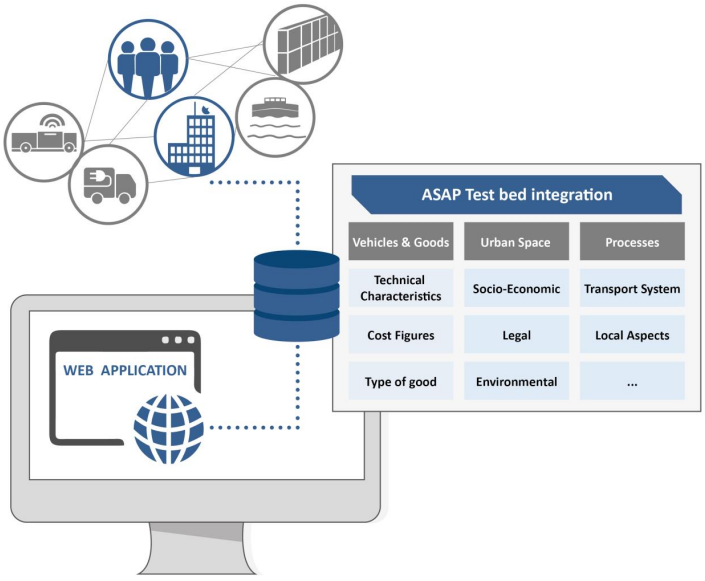


Figure 1: The ASAP Concept and Elements

- **Neglected Routes** – rivers, canals, tramlines, bus lanes with spare capacity that could be used for logistics activities, avoiding congested roads.
- **Under-Used Resources** – vehicles/infrastructures not used effectively either through inactivity or being active but under-loaded on some routes or at certain times.
- **Idle and new Infrastructure** – Vacant or underused buildings such as shops, transport hubs, car parks or new infrastructures such as micro-depots, tunnels, or smart loading zones.

The existing testbeds and innovative new testbeds to be initiated within the project are covering a broad range of solutions across all "Awaken Sleeping Assets"-classes.

2 ASAP Platform - Tools and materials for followers

2.1 Analysis of Underused Urban Infrastructures

The ASAP concept, centred around leveraging underused or inactive infrastructure and resources for sustainable urban logistics solutions, was previously underexplored in research. Thus, one of the initial steps in the project involved conducting a thorough analysis of these "Sleeping Assets." This analysis, conducted through rigorous scientific methods including desk research and expert interviews, identified three primary categories of sleeping assets: 1. Neglected routes; 2. Idle real estate; and 3. Underutilised resources.

The resulting research paper explores these "sleeping assets" and aims to identify opportunities for their utilisation in building sustainable urban logistics systems. Through the comprehensive literature review and expert interviews, the study examines challenges and opportunities in this context, proposing innovative solutions for more efficient and environmentally friendly urban freight logistics. The paper concludes with recommendations for practitioners and highlights the need for a multi-disciplinary approach to achieve truly sustainable urban freight logistics.[1]

The analysis identified political and legislative frameworks as significant barriers to utilising urban sleeping assets. This paper highlights opportunities for cities to leverage legislative adaptations to facilitate the implementation of sleeping assets, fostering innovation. It emphasises the importance of holistic strategies that align state and city requirements with long-term political objectives to guide innovative actions and investments in city logistics. The findings are pertinent for practitioners in city administrations and organisations, offering guidance on unlocking the potential of increased sleeping asset utilisation. Additionally, it underscores the importance of addressing critical barriers during project planning and implementation to develop sustainable city logistics systems effectively. Overall, this work represents a step forward in advancing sustainable urban logistics. For more detailed information we refer the interested reader to our project website (http://www.smarturbanlogistics.eu/).

2.2 Best Practice Examples of ASAP Testbeds

The various testbeds in the partner cities of Hamburg, Paris, Stockholm, and Vienna are described in detail on the ASAP platform. Visitors to the platform can first select which testbeds in which category of Sleeping Assets interest them. The platform offers three categories: Idle Infrastructure, Neglected Routes, and Underused Resources.

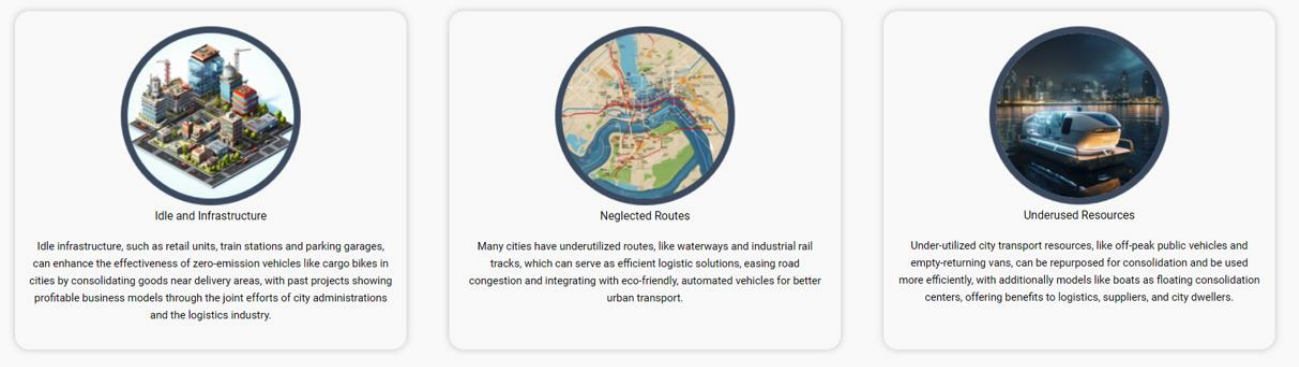


Figure 2: Different Sleeping Assets Categories

Once a certain testbed in one of the above areas is selected the presented information includes:

- a short **description** of the testbed

[1] An Analysis of Underused Urban Infrastructures: Usage Opportunities and Implementation Barriers for Sustainable Logistics. L. Schachenhofer, et. al. Applied Science 2023,13,7557. https://doi.org/10.3390/app13137557

- the **type of goods** that are transported: e.g. parcels, office supplies, food, etc.
- the **urban area(s)** that the testbed operates in
- the **processes** that are involved in the working of the testbed
- the **data** and the related **KPIs** (Key Performance Indicators) that are available for a specific testbed
- the **innovation and relevance** of the testbed with regards to urban logistics
- things that are **"good to know"** for potential followers
- **relations** to other urban logistics projects
- plans for **future development** or expansion
- related **SDGs** and impact
- **contact details** of the implementing organisation

2.3 How to Prepare and Initiate a Testbed

As cities grapple with multifaceted transformations across various dimensions like living standards, environmental preservation, and service quality, the need for efficient logistics emerges as a critical economic and locational factor. Balancing the imperative of smooth freight transport with minimising its adverse impacts on the environment and quality of life becomes imperative. With freight transport now designated a priority area in future transport policies owing to its dynamic growth and associated challenges such as logistics coordination and technological advancements, the impetus for testbed initiation can stem from diverse sources including political strategies, local resource management needs, or observations of successful testbeds elsewhere. Based on the comprehensive analysis of the ASAP Testbeds the project has developed documents (extended and short version) that serve as guides outlining vital steps for launching or transferring testbeds. The guides aim to provide decision-makers with a strategic tool and orientation framework, drawing upon processes refined in consultation with representatives from Hamburg, Stockholm, and Vienna, and based on the FLUDIS testbed implementation in Paris. Envisaged as a guide for both public and private entities interested in implementing testbeds for alternative logistics solutions, "Deliverable 5.2 Preparation and Initiation of Testbeds (PIT)" advocates for the exploration of existing infrastructural assets and emphasises knowledge exchange for sustainable urban development. Structured to mirror the implementation journey from ideation to evaluation and knowledge transfer, the content outlines six subprocesses essential for testbed implementation, offering insights primarily from the perspective of city administration stakeholders. This deliverable in its extensive and short version is part of the ASAP Tools that has been created for followers and is available on the project's website (http://www.smarturbanlogistics.eu/).

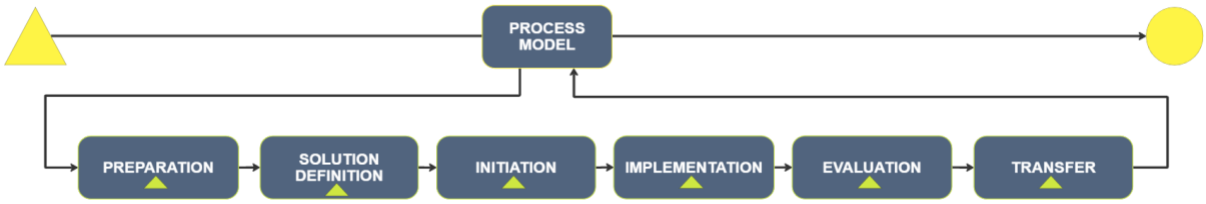


Figure 3: Testbed Preparation and Initiation Process Map

2.4 Benefits of simulations to plan or improve sustainable logistics solutions

To assess the potential of new intended testbeds or the improvement of existing testbeds the use of a multi-agent simulation environment can bring many benefits. Multi-agent simulation environments provide several benefits for logistics implementations because they accurately represent the complex nature of logistics systems, incorporating various interacting entities and dynamic environments by modelling individual agents with their behaviours, decision-making processes, and interactions.

At the same time these environments offer high adaptability, allowing users to model different scenarios, test various strategies, and explore what-if scenarios without real-world risks. This flexibility enables logistics practitioners and cities to assess different approaches effectively. Such simulation environments also offer a risk-free space for experimentation and facilitate performance evaluation under various

conditions, allowing users to assess the efficiency, reliability, and robustness of their logistics implementations. This in turn provides all involved stakeholders with decision support.

In the ASAP project such **multi-agent simulations** were used as a new tool to study several potential urban logistics measures. These included:

1. Clean floating recycling waste collection in Stockholm [2];
2. Connected Freight Parking Zones in Paris;
3. Micro-hubs for multimodality in London; and
4. Dynamic service times in Stockholm (the last measure was not simulated but analysed and evaluated).

A detailed description of these simulations can be found in Deliverable 5.3 “Simulation of 4 new testbeds’ performance and potential”. Interested readers or organisations hoping to replicate some of the ASAP measures can find the document and several scientific publication on the topic here (http://www.smarturbanlogistics.eu/source-material.html).

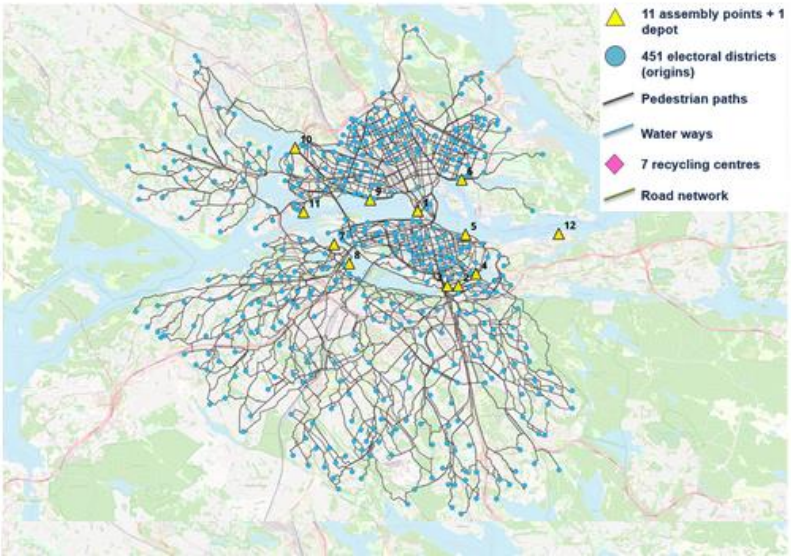


Figure 4: GIS data preparation for simulation

The ASAP Project also considered **Cooperative Intelligent Transport Systems (C-ITS)** and new technological smart city developments. One simulation focussed on a conceptual scenario of smart cities logistics to explore the potential of such solutions for sustainable logistics applications. The simulation relied on a **Digital Twin (DT)** platform for **Internet of Things (IoT) called Thing’in** developed by Orange Labs Research, also a partner in the project. Scenario-based simulations are conducted to demonstrate how the DT technologies and the platform can enhance last-mile delivery in smart cities, being more dynamic and efficient to better use city-wide assets (infrastructures, transportation means, etc.). New paradigms such as Physical Internet are also investigated in the scenario design and simulation. For more information and publications on this matter, please refer to the website.

2.5 Integration of Map Material

The ASAP platform also provides various maps of urban areas. The aim of these maps is to provide an overview of (static) data related to logistics available in the partner cities. These maps might include maps

[2] Operational analysis and optimization of a water-based municipal solid waste management system with hybrid simulation modelling. Y. Kummer et.al., Susatainable Cities and Society 99, 2023. https://doi.org/10.3390/app13137557

on elevation, street network, population density, and land use plans which are often already digitised and available either through internal city systems or external **Application Programming Interfaces (APIs)**. In Vienna, for example, Loading Zones are also available, which are of interest to logisticians unfortunately they are not available in a digitised or other version in all cities. Therefore, the aim is to provide an overview of (static) data related to logistics available in cities, allowing less advanced cities to gain inspiration in this regard.

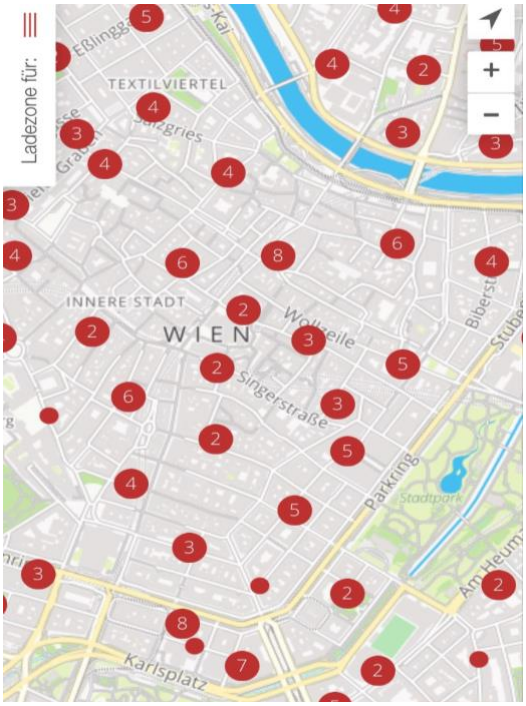
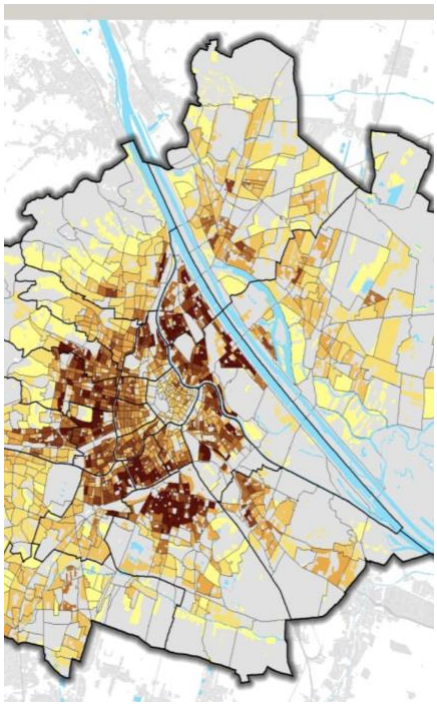
Loading Zones Map Vienna	Population Density Map Vienna
	

Figure 5: Loading Zone Map and Population density Map, both Vienna (Source: data.gv.at and wien.gv.at)

2.6 ASAP SULP & SDG Recommendations

Sustainable Urban Logistics Plans (SULPs) aim to address urban freight transport challenges but often face several issues. They struggle with urban **logistics' complexity**, involving various stakeholders, **transportation modes**, and **regulations**. Engaging stakeholders is difficult due to conflicting interests and limited resources. Data collection is hampered by insufficient methods and privacy concerns. Resource constraints limit ambitious SULP implementations, especially in smaller cities. Regulatory adaptations face resistance and legal hurdles. Technological advancements bring uncertainty, requiring infrastructure and regulatory adaptation. Evaluating SULP effectiveness is challenging due to inadequate monitoring frameworks. Effective SULPs need careful planning, collaboration, and ongoing evaluation. Additionally, SULPs often overlook the importance of **Sustainable Development Goals (SDGs)** in logistics, as highlighted in the "Deliverable D2.2 SULP Report" on the ASAP website.

Cities must recognize the importance of the United Nations' SDGs to tackle urgent environmental, political, and economic challenges. Embracing sustainability in logistics is crucial for addressing urban issues, improving quality of life, fostering innovation, enhancing global collaboration, and promoting long-term urban planning.

1. SDGs provide a framework for sustainable development, covering economic growth, environmental protection, and social equity. **Integrating SDGs into logistics strategies aligns city efforts with global sustainability goals.**
2. **Logistics significantly affects urban environments**, contributing to problems like traffic congestion and air pollution.

Based on the researched and established weaknesses of most existing SULPs and the input from city administrations in Hamburg, Paris, Stockholm and Vienna, the ASAP project developed a set of SULP Recommendations. These are described in more detail in "D6.2 SDG Impact and SULP Recommendation Report." Please refer to the project website to dive deeper into this document. Below is a shortened version of the different steps that a city should ask if a SULP is to be elaborated:

- **WHY is a SULP needed? > Understand and define**:
  - Create common understanding + general agreed definition of SULP
  - Define city objectives and goals, legal framework assessment and strategic anchoring and data availability
  - SULP CHECKLIST: components, scope (topics, geographic, financial etc.), schedule, liability: requirements at meta level (see D5.2)
- **WHAT is the basis of our SULP? > Assess and Analyse**
  - Assign responsibilities and team (creation of an internal responsibilities)
  - Consider city policy, documents and characteristics: other city policies and documents (SUMP, STEP etc), structure, data analysis, logistics flows, actors etc.
  - SDG relation - define potential SDGs and impact of planned measures
- **HOW do we develop our SULP?** > **Involve and define:**
  - Stakeholder involvement and actors (multi stakeholder platform and partnership agreements)
  - Topics and measures contributing to SULP targets and project plan (time, responsibilities, formats, steps etc.)
  - Receive and analyse data regarding freight transport (volumes, impacts, routes)
- **WHAT should be measured by WHOM and WHY is the information important?** > **Measure and monitor:**
  - Criteria definition for documentation, evaluation and establishment of other testbeds
  - Regular audits with stakeholder groups from politics, administration, trade, logistics and the population
  - SDG relation check
- **WHERE should we implement WHAT kind of testbed and HOW should it be done? > Implement and reference:**
  - Selection of accorded fact-based testbeds
  - Operation of testbeds and continuous improvement of processes
  - Documentation and transfer of learnings for improvement
- **WHO does WHAT and HOW and WHY should we have an eye on it?** > **Reflect and exchange:**
  - Establish regular quadruple helix city exchange
  - Establish regular experience exchange with other cities
  - See | listen | learn and transfer learnings and testbeds
  - Review SDG integration and contribution

The developed list of questions ensures a holistic view to ensure an overarching coordination that keeps the overall objective in mind. Building on a fundamental understanding, the key departments must be involved, an evidence base created and the potential contribution to the objective assessed. The questions and points listed above provide orientation for a structured approach.

3 Conclusions

The aim of the ASAP project was to test and publicise concepts for sustainable urban logistics solutions to help cities tackle the problems currently caused by freight transport. The specific concept of ASAP is to activate and promote underused or inactive infrastructure and or resources - so-called ‘sleeping assets’ for logistics purposes. For this purpose, it was necessary to operate test structures, so-called testbeds, which followed this principle and to gain insights and data from them. In addition, the concept of ‘sleeping assets’ was scientifically analysed in the project and assessed in more detail with the help of relevant expert interviews in the four participating cities. Only through this scientific approach is it possible to bring this topic closer to a wider audience in a serious manner.

Another important aim of the project was to provide information and data obtained from the testbeds and multi-agent simulations in a bundled form. A particular focus was also placed on the question of how innovative digital technologies can contribute to the promotion of sustainable logistics solutions of the future. The project was thus able to gain well-founded scientific findings for interested experts and cities, which not only highlight the advantages of such solutions, but also point out technically sound obstacles and potential countermeasures.

More and more cities are deciding to develop and implement Sustainable Urban Logistics Plans. However, their implementation is hampered by various problems and hurdles. These hurdles include spatial and infrastructural constraints, the coordination of various stakeholders involved, economic and financial barriers, regulatory, policy and data management issues as well as technological and behavioural challenges. To address and overcome these challenges a multi-faceted approach is necessary, and it is also important to align logistical issues with the Sustainable development goals. The ASAP Project has paid particular attention to this and has highlighted this connection in different documents available for interested followers.
Summarising it can be stated that the tools and documents produced by this project that are available for interested parties wanting to implement similar measures will be valuable in providing inspiration and facilitating the decision-making process.