



# Final Report

## Study on urban logistics

The integrated perspective

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# **Study on urban logistics**

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## Chapter 1 Non-binding guidance aiming at smarter urban logistics

Urban goods transport issues result from a wide pattern of developments in our society. In such a context, policymaking requires well-designed plans, often involving consultation and participation processes due to the complexity of issues involved (social, economic, legislative and technical) and diverse interests of various stakeholders. This is particularly the case for policy-making in urban goods transport, since it involves many different parties with diverging and often conflicting interests having to share limited urban space. The complex operations of urban goods transport and the variety of problems that they cause, further complicate policymaking in this area that holds a great number of stakeholders.

The European Commission's Directorate General for Mobility and Transport (DG MOVE) therefore saw the need for advice to the local policy makers and mandated a study<sup>1</sup> facilitating the preparation of EU Non-Binding Guidance Documents (NBGDs) on urban logistics. This was announced in the Communication "Together towards competitive and resource efficient urban mobility", COM(2013) 913 Final. The consortium responsible for this study was formed by Ecorys, University of Antwerp, University of Lisbon and Prof. Laetitia Dablanc of IFSTTAR.

The consortium prepared non-binding guidance documents on six topics. Based on a general literature review on urban logistics research and consultation of academic publications, reports on pilot projects, and an intense stakeholder consultation process,<sup>2</sup> six documents were drafted, each complemented with a technical report. The following three sections provide background information on how the six NBGD topics have been selected, the target audience as well as the aim.

### Six central topics for the NBGDs tackle the main challenges

The study commenced with an online stakeholder consultation, defining the six topics. A questionnaire, published in five languages, was launched in 2015 and remained available on-line for a total of six weeks. The invitation was sent to over 100 selected relevant contacts, many of which were stakeholder organisations expressing views in name of their members. A LinkedIn article was also published and shared in many interest groups on urban freight transport.

In total, 167 respondents completed our survey. The largest number originated from France (42%), followed by Belgium and Austria, accounting for 11% and 10% of respondents to the survey respectively. Almost 60% of the respondents filled in the survey on behalf of a government or a company, around 30% filled it in as an individual and 10% of the respondents spoke on behalf of a stakeholder representative association (e.g. vehicle producers, association of cities, freight transport representation, cyclist- and other organisations). Many individual companies (i.e. couriers, trucking, multimodal) also completed the survey.

The most important question in the online consultation concerned the challenges for the urban logistics sector. Respondents were asked to score the relevance of some challenges for the European urban logistics sector on a scale from 1 and 5, where 1 stands for no relevance and 5 equals very high relevance. The overall view of the scores can be found in Table 1 below. These are ordered in a way that the challenge that scores highest is on the top row of the table and the challenge that scores lowest on relevance is indicated in the bottom row.

<sup>1</sup> Study on Urban Mobility - Preparation of EU Guidance on Urban Logistics (MOVE/C1/2014-370).

<sup>2</sup> This process involved three stakeholder workshops (30 November 2015, 14 June 2016 and 17 January 2017) and an online questionnaire which was online for a total of six weeks.

**Table 1: Challenges for the European urban logistics sector**

Challenges	Absolute scores					Average scores
	1	2	3	4	5	
Road congestion	2	1	8	38	80	<b>4.50</b>
CO <sub>2</sub> emissions	4	0	9	41	74	<b>4.41</b>
PM and NO <sub>x</sub> emissions	3	2	10	43	68	<b>4.36</b>
Parking	1	5	10	49	62	<b>4.31</b>
Logistics sprawl	3	7	21	45	41	<b>3.97</b>
Regulatory/administrative procedures	4	5	27	45	43	<b>3.95</b>
Noise	2	6	30	51	39	<b>3.93</b>
Poor liveability of urban areas	4	4	29	45	37	<b>3.90</b>
Logistics costs for logistics suppliers	2	9	27	47	37	<b>3.89</b>
Poor enforcement	2	14	24	45	33	<b>3.79</b>
Energy costs	3	9	32	52	29	<b>3.76</b>
Wear and tear of infrastructure	4	9	35	51	27	<b>3.70</b>
Accidents, conflicts with pedestrians and cyclists	7	15	36	30	39	<b>3.62</b>
Lack of logistics warehousing	5	15	34	39	28	<b>3.58</b>
Lack of innovations	5	18	38	39	26	<b>3.50</b>
Logistics costs for receivers	8	16	36	37	26	<b>3.46</b>
Commercial attractiveness of urban areas	10	16	41	24	25	<b>3.33</b>
Taxation	7	20	39	37	18	<b>3.32</b>
Differing labour markets and labour legislation between Member States	21	17	27	23	15	<b>2.94</b>
Shortage of qualified logistics personnel	14	28	38	27	4	<b>2.81</b>
The level of training of logistics staff declines	15	27	39	26	1	<b>2.73</b>

Source: Results of 2015 survey as part of this study

The main observations are that emissions and road congestion have been ranked by stakeholders as the two most important challenges posed by freight transport and logistics in urban areas. Additional issues for urban logistics are (i) the lack of parking areas for loading and unloading, (ii) the lack of space for logistics facilities leading to relocation and concentration in suburban areas (logistics sprawl), (iii) regulatory procedures, (iv) noise, (v) poor liveability in urban areas, (vi) costs for logistics suppliers, (vii) poor enforcement of regulations, (viii) energy costs, and (ix) infrastructure wear and tear.

The second most important question in the online consultation concerned the type of topics that the non-binding urban freight transport guidance documents should focus on.

These topics, sorted from most to less relevant, are listed in Table 2 below.

**Table 2: Topics of focus**

Type of topics	Average score (1-5)
Access restrictions for urban freight transport vehicles on emissions	<b>4.54</b>
Low emission vehicles	<b>4.50</b>
E-commerce	<b>4.36</b>
Innovations in off-peak logistics	<b>4.28</b>
Return flows in logistics	<b>4.15</b>
Courier and express logistics	<b>4.15</b>
Parking, loading/unloading	<b>4.10</b>
Electric or hybrid propulsion	<b>4.07</b>
Waste logistics	3.97
Access restrictions for urban freight transport by time of the day	3.97
Noise of freight vehicles	3.94
Building logistics	3.79
Bicycle freight transport	3.76
Access restrictions for urban freight transport vehicles on vehicle types	3.72
Stock keeping in stores	3.66
Rail transport for urban freight flows	3.45
Barge transport for urban freight flows	3.41
Access restrictions for urban freight transport vehicles on weight	3.17
Tram transport for urban freight flows	3.07
Drones for urban freight transport	2.23

Source: Results of 2015 survey as part of this study

The main observations are:

- Access restrictions are high on the list of policy solutions
- Low Emission Vehicles score second
- E-commerce is ranked third

The final list of six topics were chosen based on the survey results (the challenges and topics identified by stakeholders), input from DG MOVE, CIVITAS Advisory Group on Urban Logistics and the expertise of the consultant.

### One umbrella document

This umbrella document serves (i) as an aid to better understand the broader challenges in urban freight policy making, (ii) as a guidance document on reading the six documents separately, and (iii) as a holistic approach to urban freight policy making.

It consists of a short overview of the series of six Non-Binding Guidance documents (NBGDs) prepared within the scope of the study. These six topics are:

- 1: Use of Information and communication technologies
- 2: Treatment of logistics activities in Urban Vehicle Access Regulation Schemes
- 3: Engagement of stakeholders when implementing urban freight transport policies



- 4: Logistics schemes for E-commerce
- 5: The use of Environmentally Friendly Freight Vehicles
- 6: Indicators and data collection methods for urban freight distribution

More in-depth examples, references and practical guidance can be found in the fully referenced Technical Reports (TR). The 12 deliverables are grouped by this document providing a general overview and linking the technical- and Non-Binding Guidance Documents together.

## Target audience and use

All documents aim to help stakeholders understand the challenges brought about by logistics activities in an urban context, and identify the most suitable measures and actions to overcome these challenges. The documents provide an easy accessible review of current literature on the topic, best practices, approaches and pitfalls. Each document provides recommendations.

The set of documents is **primarily aimed at public authorities, such as municipalities or local agencies, responsible for the management of traffic, transport and transport infrastructures within urban areas.**

Logistics and freight transport operators with operations in cities may also benefit from these documents. No background in logistics or freight transport is required to understand the documents.

Consideration of the topics in cities' Sustainable Urban Mobility Plans (SUMP) or in their Sustainable Urban Logistic Plan (SULP) is a general recommendation. A SUMP is a strategic plan designed to satisfy the mobility needs of people and businesses in cities and their surroundings for a better quality of life. A SULP proposes a set of measures and actions that, collectively, will contribute to reducing the energy consumption and environmental impacts of urban freight logistics enabling its economic sustainability.

The **Sustainable Urban Mobility Plan** (SUMP) concept considers the functional urban area and foresees that plans are developed in cooperation across different policy areas and sectors, across different levels of government and administration and in cooperation with citizens and other stakeholders. The European Commission (EC) has actively promoted this concept for several years. Guidelines were developed, which provide local authorities with a clear framework for the development and implementation of such a plan. The EC supports the development of such plans through funding instruments and is providing information via [www.eltis.org](http://www.eltis.org).

## Chapter 2 Short overview of the six topics

Chapter 2 provides a short overview of the six topics where each is framed with a background on the developments in the field, and concludes with a short introduction of the NBGD.

### NBGD 1: Use of Information and Communication Technologies

#### Background

The European Commission (EC) has been actively working on the development and deployment of ICT at EU level. The Commission has proposed 16 initiatives set out in the Digital Single Market strategy (adopted in May 2015<sup>3</sup>). It is built on three pillars: (i) better access for consumers and businesses to digital goods and services across Europe; (ii) creating the right conditions and a level playing field for digital networks and innovative services to flourish; (iii) maximising the growth potential of the digital economy. The flagship initiative related thereto is the well-known ITS Directive (Directive 2010/40/EU) on the framework for the deployment of Intelligent Transport Systems in the field of road transport and for interfaces with other modes of transport<sup>4</sup>. The Directive establishes a framework in support of the coordinated and coherent deployment and use of Intelligent Transport Systems (ITS) within the Union. The ITS Directive in particular calls for the interoperable access and exchange of travel and traffic data incl. the use of standards and data sharing mechanisms including National Access Points. In the context of urban logistics, the specifications of priority action 'B' (EU-wide real time traffic information) and the specifications of priority action 'A' (EU-wide multimodal travel information services) are close to adoption<sup>4</sup>.

In 2015, the EC established The Digital Transport and Logistics Forum (DTLF) (Decision C(2015)2259), a platform for the coordination and cooperation between stakeholders in a multimodal and cross-sectorial perspective. Key working areas include: electronic transport documents (e.g.: multimodal e-transport documents) and optimisation of cargo flows along transport corridors (e.g. better exchange of data across IT systems). These aspects are also visible in urban freight transport.

Another initiative is ETP-ALICE ([www.etp-logistics.eu](http://www.etp-logistics.eu)), a platform of experts, academics and logistics companies. It aims to develop a comprehensive strategy for research, innovation and market deployment of logistics and supply chain management innovation in Europe. Their deliverables can be regarded before developing freight transport policies. A final initiative worth mentioning is the C-ITS platform – Platform for the Deployment of Cooperative Intelligent Transport Systems in the EU. C-ITS are systems that allow effective data exchange through wireless technologies so that vehicles can connect with each other, with the road infrastructure and with other road users.

#### NBGD 1 at a glance

This first NBGD aims to assist policy makers by identifying current best practices for the use of ICT. It offers an overview of 13 ICT solutions, grouped in six clusters. Some examples of solutions are: communication from vehicle to vehicle and from vehicle to infrastructure, real time logistics monitoring, fleet management or collaborative platforms.

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<sup>3</sup> COM(2015) 192 final

<sup>4</sup> The ITS Directive established six priority actions. Priority A is "EU-wide Multi-Modal Travel Information" and Priority B is "EU-wide Real-Time Traffic Information". Further information available at: <http://bit.ly/1yjwMQM>

The document (i) describes the major challenges choosing and implementing ICT solutions for managing the logistics sector within the urban context, (ii) offers various options to address these challenges, (iii) describes the advantages, disadvantages and impacts of these options, (iv) helps choose the optimal policy approach, and (v) offers guidance on the main implementation issues as well as some solutions to mitigate undesirable impacts of the scheme.

## NBGD 2: Treatment of logistics activities in Urban Vehicle Access Regulation Schemes

### Background

Cities throughout Europe are implementing Urban Vehicle Access Regulation Schemes (UVARs) to guide mobility within urban areas. As defined in the European Commission Staff Working Document "A call for smarter urban vehicle access regulations" (SWD(2013) 526 final.), UVARs are measures to regulate vehicular access to urban infrastructure. UVARs aim at decreasing (urban) road congestion and emissions, two challenges that have been ranked as among the most important freight transport and logistics challenges for urban areas. UVARs are aimed at improving overall living conditions for both residents and visitors and typically encompass all mobility to, from and within urban areas. Specific solutions need to be identified for integrating freight transport and logistics, given the particular nature of the issues these activities may raise/encounter in an urban area.

### NBGD 2 at a glance

The schemes can be shaped on the basis of different access regulation criteria. The majority of European examples take account of emissions and vehicle weight; these are often called Low Emission Zones (LEZ). Some also consider pricing as a separate or additional access regulation policy, for example Congestion Charging Schemes (CC). Policies or schemes that combine LEZ and CC are also possible. Many also have different access criteria depending on the time of the day. Access regulations for freight transport can be differentiated by: access time, vehicle characteristics (tonnage, dimensions, age, Euro emission category), load factors or via access charges.

Some examples are outlined in NBGD 2, more details of over 500 schemes in Europe can be found on [urbanaccessregulations.eu](http://urbanaccessregulations.eu)

When properly implemented, an UVAR can create benefits (lower emissions, reduced congestion, or even increase in commercial attractiveness of the area or a reduction in delivery costs). However, to achieve the objectives in an efficient way, a set of implementation steps are advised.

NBGD 2 offers UVAR best practices, and suggests proven solutions to alleviate side-effects. Therefore, it (i) describes the challenges to frame the logistics sector within UVAR, (ii) offers options to address them, (iii) describes their advantages, disadvantages and impacts, (iv) helps choose the optimal policy approach, and (v) offers guidance on implementation issues as well as mitigating solutions. Four specific economic challenges need to be addressed:

- Ensure the accessibility of retail stores, offices etc.: Define how the region/municipality/city will ensure freight vehicle access to retail locations.
- Optimise the efficiency of the UVAR: Plan an efficient enforcement and strive to minimise unnecessary economic costs for the logistics sector or other urban groups.
- Avoid "shifting the problem": Ensure that any changes in traffic flows caused by the scheme do not create problems just outside the UVAR zone.
- Aim for a fair balance of the negative impacts: Negative impacts of policies can often be spread across stakeholders via pricing to avoid a situation in which just one of the supply chain actors bears all the costs. Assist companies which are willing to acquire cleaner vehicles (e.g. via subsidies or regulatory benefits).

In addition, technical challenges need to be considered before and during implementation. These are identified in the NBGD, "Vehicle types, exemptions and (cross-border) enforcement of successful UVAR schemes across Europe".

Simply banning all freight vehicles will impede economic activities and therefore this second NBGD also suggests three mitigating solutions: Off-peak deliveries, Urban Consolidation Centres or cargo bikes.

## NBGD 3: Engagement of stakeholders when implementing urban freight logistics policies

### Background

The influence of urban freight logistics on people's quality of life (congestion, emissions) is progressively attracting attention. People want to be informed and involved in policy-making and implementation processes, particularly when they are likely to be directly affected. Residents are not the only interested parties. Urban freight logistics activities are mostly private to their nature, involving many different stakeholders, and the active participation of all interested parties is increasingly recognised as fundamental to the success of a decision-making process. A proper stakeholder engagement plan enhances the transparency and acceptability of the decision-making process and could lead to a sense of ownership of decisions and measures, increasing their efficiency and acceptability.

### NBGD 3 at a glance

In recent years, the term *stakeholder engagement* has become more common in public decision-making. Stakeholder engagement is a broad term used to designate the involvement of various stakeholders in a decision-making process. This topic is treated in NBGD 3. Stakeholder engagement is increasingly valued and regarded as an integral part of a policy implementation process.

In order to maximise the conditions for an efficient, anticipatory and adaptive stakeholder engagement, we have suggested the following six good practices:

- Map all stakeholders, as well as their responsibilities, core motivations and interactions.
- Define the ultimate line of decision-making, the objectives of stakeholder engagement, and the expected use of inputs.
- Allocate proper financial and human resources, and share all information necessary to achieve result-oriented stakeholder engagement.
- Regularly assess the process and outcomes of stakeholder engagement to learn, adjust and improve accordingly.
- Embed engagement processes in clear legal and policy frameworks, organisational structures/principles and through responsible authorities.
- Customise the type and level of engagement and keep the process flexible to changing circumstances.

A checklist for public action to follow the implementation of the above mentioned principles is suggested. This requires listing questions and indicators to help monitor the effectiveness of engagement processes and identify areas of improvement.

The NBGD includes examples of Freight Quality Partnership (FQPs) and stakeholder engagement processes in cities in Spain, France and Bulgaria among others.

Despite their potential, these processes have some limitations and difficulties. Consensus building is a lengthy process and initiatives may take a long time to be deployed, as urban freight logistics is a complex business, with many stakeholders and activities.

## NBGD 4: Logistics schemes for E-commerce

### Background

Delivery services offered by e-retailers are one of the fundamental factors influencing a consumer's purchase decision. E-commerce is one of the main drivers of a more prosperous and competitive Europe, with significant potential for contributing to economic growth and employment. The EC's Communication on e-commerce (COM(2011) 942 final), together with other initiatives has identified the physical delivery of goods ordered online as being one of the key elements of e-commerce growth. E-commerce is also a spear action point in the EC's Digital Single Market initiative. The directive's first pillar (I: Better access for consumers and businesses to digital goods and services across Europe) is tackling geoblocking (unequal restrictions or prices based on the consumer's location), aims to make cross-border e-commerce easier and will contribute to more efficient and affordable parcel deliveries. The Commission also launched an antitrust competition inquiry into the e-commerce sector in the European Union, which resulted in an E-commerce Sector<sup>5</sup>.

Half of e-commerce sales directly translate into freight volume and deliveries. The other half is services, which generally do not generate deliveries. Delivery operators have to find appropriate responses to their customers' changing delivery expectations, while taking into account challenges such as the high cost of the first and last miles, or the decreasing willingness of customers to pay for home delivery. Making customers aware of the true price of transport is increasingly difficult.

### NBGD 4 at a glance

Freight transport resulting from e-commerce is, from a local authority point of view, often seen as a "business issue" which more or less resolves itself since there is an economic interest in doing so. However, the local authority needs to implement regulations and policies which affect the logistics parameter and decision makers, and therefore needs to understand both the cause and effect of such measures and how the outcomes could be optimised.

Urban authorities, confronted by complaints made by residents and various road users, have for some time responded reactively rather than proactively to the negative environmental impacts of urban freight. Accordingly, policy and regulatory measures implemented by urban planners have aimed at limiting rather than extending freight operations.

NBGD 4 provides a comprehensive overview the e-commerce markets, actors in the sector, trends and the available logistics policy options for mitigating negative mobility impacts of e-commerce. Logistics policy schemes are divided in two groups: Home Delivery and Delivery Collection. Home Delivery is composed of Parcel Delivery, Smart Boxes, e-groceries (at home or picked up by the consumer) and On Demand Delivery. Delivery Collection is composed of Pickup Points, Automated Parcel Lockers and Delivery Collection at the Retailer's premises (e.g. click and collect for e-groceries).

The features of policy options are directed towards the main challenges (e.g. failed deliveries, carbon footprint, freight traffic in residential areas, on demand delivery). Every measure is introduced from a societal perspective and predominantly scoped within the city level of authority.

Successful examples are specified and barriers and enablers are also identified. Policymakers can remove local barriers and stimulate urban freight transport related to e-commerce.

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<sup>5</sup> SWD(2017) 154 final.

## NBGD 5: The use of Environmentally Friendly Freight Vehicles

### Background

Primarily vans or trucks with Internal Combustion Engine Vehicles (ICEVs) are used in distribution and logistics. Urban freight traffic is estimated to account for approximately 25% of urban transport related Green-House Gas emissions and 30-50% of other transport related pollutants (PM, NO<sub>x</sub>). Environmentally Friendly Road Freight Vehicles (EFFVs) have a growing potential to curb such trends. An EFFV is a vehicle that produces less harmful impacts to the environment than Internal Combustion Engine vehicles (ICEVs) running on gasoline or diesel, or ones that use alternative fuel. Hence, a transition towards EFFVs could contribute to alleviate the production of greenhouse gas emissions and other pollutants.

The EC has been promoting a shift towards sustainable urban freight logistics, not only through policy documents but also through related funding and research. In 'A European Strategy for Low-Emission Mobility' (COM(2016) 501 final), the EC defines an action plan aimed at (i) achieving a higher efficiency of the transport system, (ii) fostering low-emission alternative energy for transport and (ii) promoting low- and zero emission vehicles.

In the 2011 White Paper on Transport (COM(2011) 144 final), the EC set goals: (i) achieving essentially CO<sub>2</sub>-free city logistics in major urban centres by 2030, (ii) by mid-century, greenhouse gas emissions from transport should be at least 60% lower than in 1990, (iii) encouraging the exchange of best practices and the development of integrated strategies and (iv) improving public procurement procedures. Other relevant publications include the 'Green Public Procurement'<sup>6</sup>, the Clean Vehicle Directive' (2004/17/EC), or the '2013 Urban Mobility Package' (SWD(2013) 524 final).

### NBGD 5 at a glance

Depending on the availability of infrastructure, EFFVs are increasingly seen by stakeholders, as suitable alternative to ICE vehicles. The NBGD provides the user with an overview on technical and operational properties of EFFVs, and on policy measures to promote their utilisation for urban logistics. The document provides the Key Financial, Economic and Environmental factors of different options (e.g. Battery-Electric Vehicles, Hydrogen and Bio Fuels).

Choosing an EFFV is a complex decision as it involves decision parameters that are normally not considered in the case of an ICEV. Ultimately, the stakeholder will look at the viability of its business model and the ability to maintain quality of service while generating profits. The NBGD presents a list of typical decision factors considered when choosing an EFFV. The process and decision factors are described further.

Public authorities can accelerate market take-up of EFFVs by implementing appropriate measures that could enable stakeholders to overcome barriers and fully exploiting benefits. The choice of policy options should be built on technical analysis (social, environmental, economic and operational dimensions), ideally accompanied by stakeholder engagement initiatives. Considering EFFVs in the city's SUMP or in Sulp is a recommendation. Local governments can contribute to the uptake of these vehicles via promoting awareness of their benefits and advantages to possible users, fostering public procurement and also by leading by example.

The suggested policy measures are clustered into four groups:

- Stakeholder Engagement through communication and awareness raising measures aimed at informing and educating stakeholders.
- Legal and regulatory measures that influence the behaviour of stakeholder by enabling or prohibiting certain selected activities in specific conditions.

<sup>6</sup> <http://ec.europa.eu/environment/gpp/>



- Fiscal measures, via taxes and fees.
- Planning measures refer to infrastructure and urban planning changes (e.g., infrastructure, built environment, location of logistics, retail and business).

## NBGD 6: Indicators and data collection methods on urban freight distribution

### Background

The availability of data on urban freight distribution in Europe has been poor, although it has slightly improved due to technological innovations and some survey efforts. First, freight transport in general is neglected in many surveys and urban transport models. More specifically, it is observed that key parameters (type of goods, packaging, frequency, type of vehicle) needed to reflect the urban freight reality, are not available in common statistics.

Secondly, the lack of data at the urban level is huge. National surveys are carried out in many countries, but many times they do not contribute to an extended knowledge of urban freight distribution. Often, samples in an urban area are small, and thus statistically not representative.

Thirdly, it is observed that data collection methodologies are not homogenized; data in one city cannot be compared to data in other cities. It is also difficult to compare data from one historic period to another, as the frequency of freight surveys is low. Fourthly, where data is available, data processing is not extensive enough, as it can be expensive and complex, or require freight experts that are often missing within city administrations.

An advised policy making process and the role of data collection are discussed in the Sustainable Urban Mobility Plans (SUMP). 11 steps are identified in the SUMP guideline<sup>7</sup>, which can be consulted on the eltis website ([www.eltis.org](http://www.eltis.org)), of which four address data collection:

- Step 3: analyse the mobility situation and develop scenarios (preparation)
- Step 5: set priorities and measurable targets (goal setting)
- Step 8: build monitoring and assessment into the plan (elaboration)
- Step 11: learn the lessons (implementation)

### NBGD 6 at a glance

In order to be able to initiate policy measures on urban freight transport, as well as to measure the impact thereof, data collection is vital. When only a limited amount of data is available, authorities have limited insight into urban freight operations to be able to develop strategies and take policy measures.

This document covers the issue “Which data is needed for urban logistics policy-making and how data can be collected”. The document provides specific information on the various data that can be collected, the purposes of doing so, and the best ways to proceed. The NBGD provides an overview of indicators that characterise urban freight distribution, as well as common methodologies to collect these indicators. Here (local) authorities play an important role in turning the indicators and collection methods into a generic framework that is used by the main stakeholders.

The objectives of the NBGD are twofold. The first is to determine the common indicators needed in an urban freight context. The overview of indicators allows for the identification of different logistics profiles (elaborated on in NBGD 1), so that data can be collected in a more focused way. The second is to discuss the common data collection methods used to obtain these indicators.

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<sup>7</sup> Guidelines on developing and implementing a sustainable urban mobility plan, Directorate-General for Mobility and Transport, Unit C.1 - Clean transport & sustainable urban mobility, January 2014

The document provides case studies, refers to European projects on urban freight distribution. The process of collecting data can be different though for each city or project. The scope, availability of funding and aim will result in tailor-made data collection projects, although we recommend the use of some standard methods in order to enhance comparability. The NBGD provides a long list of possible indicators one can consider mapping, and the methods to collect data thereon. The methods are described with the aim of giving an accessible overview. Sources and references are provided for further reading.

## Chapter 3 Consolidated NBGD recommendations

This third chapter consolidates the key recommendations found in the separate NBGDs introduced briefly in the second chapter. This consolidated overview facilitates understating the interlinkages between the different topics and policy approaches.

### General recommendations

- The concept of Logistics Profile (LP) is a structured way of characterising the city's challenges and will provide guidance on the relevant characteristics of stakeholders, goods transport and products. The LP will also enable comparability with other cases and provides a valuable method of understanding the city's challenges and urban freight characteristics. It helps to identify, for some well-defined areas inside a city, reasonable homogenous groups of logistics needs. The utilisation of the LPs concept therefore provides a valuable method to become acquainted with the particularities and specificities of an urban freight logistics issue and therefore enables better informed decisions.
- The implementation of Urban freight logistics policies should ideally be framed within the context of a Sustainable Urban Mobility Plan (SUMP) and/or Sustainable Urban Logistics Plan (SULP) and set targets.
- Forums like e.g. the Digital Transport and Logistics Forum (DTLF) present valuable recommendations and opportunities for exchange of experiences.
- Implementing Urban Vehicle Access Regulation (UVAR) measures in residential areas in order to regulate freight traffic is essential for better liveability and predictability.

**Table 3: Consolidated NBGD recommendations**

Topic of the NBGD	Recommendations
1. Use of information and communication technologies	<ul style="list-style-type: none"> <li>• Before the implementation of specific ICT solutions, the <b>challenges for the city, and the contribution of urban freight logistics thereto should be investigated thoroughly</b>. Each solution has characteristics such as optimisation of the way goods are delivered or is specific for the type of products transported.</li> <li>• Listen to and engage stakeholders in order to resolve the issues. Stakeholders are in a privileged position to help identify and characterise the issue. They can also give inputs on the most suitable measures. And, naturally, they will have to implement them. Additionally, analysis of other cities and cases is beneficial to understand the difficulties, advantages and disadvantages. (See also third point of recommendations NBGD 3).</li> <li>• <b>Promoting and ensuring the interoperability of ICT solutions</b> is fundamental, e.g. by following the guidelines and recommendations laid down in the ITS Directive. Many urban freight logistics stakeholders use proprietary information systems with limited or no communication capabilities. This strongly limits the creation of synergies.</li> <li>• Be aware and mitigate the hidden challenges of ICT such as technology obsolescence and cyber security. This will influence the financial analysis, technical specifications and contracts.</li> <li>• <b>Evaluate and adjust</b> (if necessary). ICT tools can be used to monitor, collect, transfer and store data. These data can in turn be analysed to organise evaluation of the schemes to measure impacts on emissions and congestion levels.</li> </ul>

Topic of the NBGD	Recommendations
2. Treatment of logistics activities in Urban Vehicle Access Regulation Schemes	<ul style="list-style-type: none"> <li>• Investigate the issue thoroughly before implementation. Formulating this issue definition, defining the UVAR characteristics and understanding its implications are the first steps towards success. Listen to and engage stakeholders in order to solve issues (see above).</li> <li>• Carefully <b>analyse costs and benefits of UVAR enforcement and investment</b> needs which depend on the enforcement model.</li> <li>• Consider <b>well-designed pilot tests or introduction of UVAR in phases</b>, taking into account their pros and cons.</li> <li>• <b>Consider promoting mitigating solutions for the logistics sector.</b> "Can we mitigate some of the undesirable impacts of the scheme <b>within</b> the UVAR area?" "Can we control the impacts of the proposed scheme <b>outside</b> the area itself?" Three solutions are: (i) Urban Consolidation Centres (UCCs), (ii) Cargo bikes (CBs) and (iii) Off-hour deliveries (OHDs).</li> <li>• <b>Help to create more Urban Vehicle Access Regulation (UVAR) commonality in Europe</b> thereby preventing fragmentation of schemes and corresponding inefficiencies. Develop a coherent existing access <b>typology for freight vehicles</b>, ideally aligned with the criteria of neighbouring cities or municipalities. Consistent <b>regional, national and EU communication</b> on the access regulation schemes is important.</li> <li>• <b>Evaluate and adjust</b> (see above).</li> </ul>
3. Engagement of stakeholders when implementing urban freight logistics policies	<ul style="list-style-type: none"> <li>• Take some time to understand the Urban freight logistics challenge.</li> <li>• <b>Develop a proper stakeholder engagement strategy</b> before implementation using the four-step method proposed in the study.</li> <li>• <b>Involve stakeholders as soon as possible.</b></li> <li>• <b>Make the best use of the engagement decision-making techniques.</b></li> <li>• <b>Balance and rationalise the involvement.</b> The involvement of each stakeholder should be appropriate for the level of interest and expected feedback.</li> <li>• <b>Look elsewhere to other urban areas for good and bad practices.</b> The study presents a set of examples.</li> <li>• <b>Evaluate and follow up.</b> The very process of engagement should be subject to follow up in order to be improved throughout the decision-making process.</li> </ul>
4. Logistics schemes for E-commerce	<ul style="list-style-type: none"> <li>• E-commerce is becoming more and more important. Local authorities need to implement regulations and policies which affect the logistics parameter and decision makers without affecting residential areas and city sustainability</li> <li>• <b>Local authority knowledge and awareness</b> of how logistics and freight transport will work, as a result of the increase in e-commerce, should be improved. This would facilitate identification of challenges and opportunities and understanding both the cause-and-effect of measures and how the outcomes could be optimised.</li> <li>• The <b>urban perspective</b> (transport, land use and wider urban planning) should be better linked to the <b>transport-system perspective</b>. Interesting in this respect is that the TEN-T framework gives a particular role to urban nodes as part of wider logistics networks.</li> </ul>

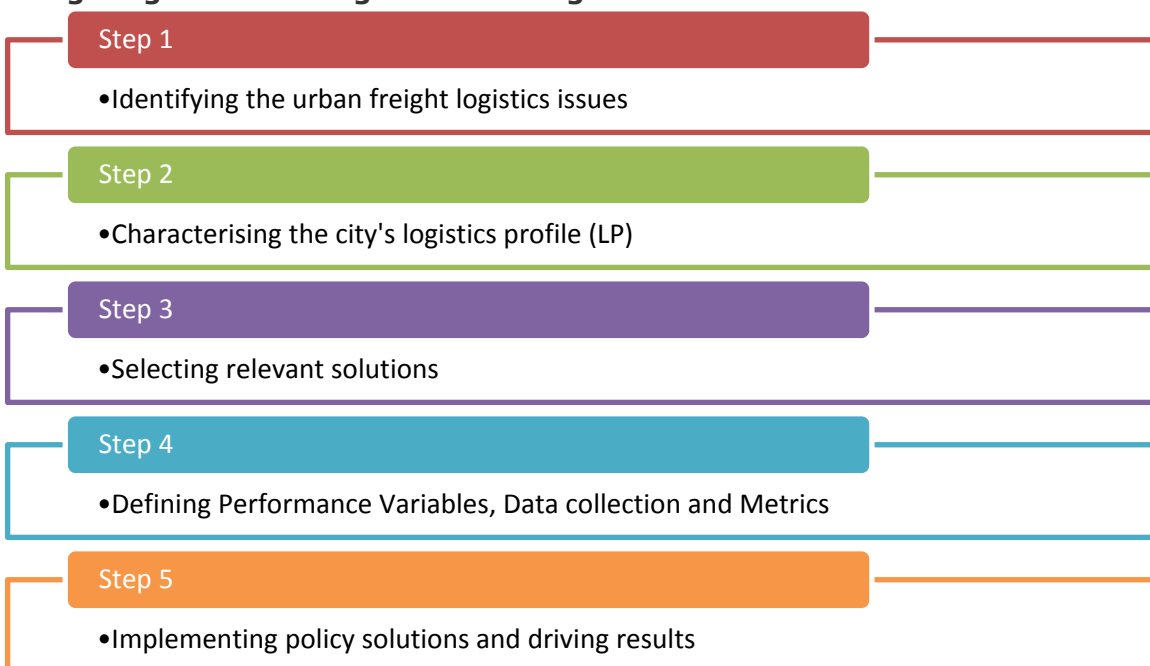
Topic of the NBGD	Recommendations
	<ul style="list-style-type: none"> <li>• A thorough ex-ante evaluation is needed supported by data collection methods in order to make the outcome of the implementation more valuable, as well as to show the actual impacts.</li> <li>• <b>Implement urban measures that make urban freight activities more efficient</b>, e.g. through allowing automated parcel lockers in public spaces, providing loading/unloading bays in residential areas or increasing the size of postal boxes.</li> <li>• <b>Encourage the use of sustainable methods of last-mile delivery</b> by e.g.; increasing the use of fulfilment centres/urban consolidation centres inside cities and by controlling the movement of freight vehicles and the use of Environmentally Friendly Freight Vehicles (EFFV).</li> </ul>
5. The use of Environmentally Friendly Freight Vehicles	<ul style="list-style-type: none"> <li>• <b>Frame EFFVs within the context of a Sustainable Urban Logistics Plan (SULP)/Sustainable Urban Mobility Plan (SUMP).</b></li> <li>• <b>Raise awareness of EFFVs' Benefits and Advantages by true information campaigns.</b></li> <li>• <b>Take the initiative and lead by example</b>, e.g. by acquiring or using EFFVs, notably bikes, e-bikes and e-scooters.</li> <li>• <b>Adapt legal and fiscal municipal regulations to Promote EFFVs.</b></li> <li>• <b>Establish a Local Recharging Infrastructure Network in accordance with the EU Alternative Fuels Action Plan.</b></li> <li>• <b>Foster Public Procurement of EFFVs.</b> Public procurement of EFFVs should be the norm and not the exception. The Clean Vehicle Directive established clear rules on how to proceed.</li> </ul>
6. Indicators and data collection methods on urban freight distribution	<ul style="list-style-type: none"> <li>• <b>Address the lack of urban freight data by raising awareness among local authorities for the need for data and by using harmonised data collection methods.</b></li> <li>• <b>Choose key indicators. The report provides some useful examples.</b></li> <li>• <b>Use sound data collection methodologies.</b> The four categories worth considering are establishment-based, vehicle-based, trip-intercept-based and tour-based methods.</li> </ul>

## Chapter 4 Linking the six topics - Choosing the best fitted policy approach

The selection of the most appropriate solution for an efficient urban freight policy depends on the identification of the drivers and nature of the issues and challenges, expected objectives, physical properties of the city and even the nature of the logistics and transport chains.

Urban regions often present distinguishing and unique features, and policy measures must be chosen accordingly. The transfer of measures between cities should as such be subject to ex-ante impact studies. Just because one measure was successful in city A does not guarantee that it will be successful in city B. The suggested general approach consists of five steps, as portrayed in Figure 2.

**Figure 1 Proposed five-step approach to select the best-fitted policy approach for mitigating the urban logistics challenges**



### Step 1 – Identifying the Urban Freight Logistics Issues

The first step begins with the identification of the challenges to be addressed. A challenge is a well-defined (in time and space) freight logistics activity that disturbs the normal development of the other urban users' activities.

As shown in Chapter 1, emissions and road congestion have been ranked by stakeholders in the 2015 online survey as part of this study, as the two most important challenges posed by freight transport and logistics in urban areas.

To be able to develop relevant and applicable policy measures, there is a need for an *ex-ante* research on the issues, drivers and magnitude of problems. Generally, the availability of data on urban freight distribution in Europe has been poor though, or has recently been slightly improved. Freight transport in general is neglected in many surveys and urban transport models. More specifically, it is observed that parameters such as type of goods, packaging, delivery frequency, type of vehicle, which are needed to reflect the urban freight reality, are not

available in common statistics. However, data on urban freight transport is differing locally: e.g. different cities have different urban planning, economic activities and related issues.

Identification of urban freight issues can come from data collection as well as discussions with stakeholders. It is for that reason that NBGD 3 deals with engagement of stakeholders when implementing policies and that NBGD 6 addresses data collection.

**NBGD 3** covers the issue of stakeholder engagement. The first step identifies the challenges and magnitude thereof. The data collection approach can be validated or complemented with a survey, round table discussion or interviews with stakeholders. A proper stakeholder engagement plan also enhances the transparency and acceptability of the decision-making process and could lead to a sense of ownership of decisions and measures, increasing their acceptability.

**NBGD 6** specifically covers the issue of data on urban logistics and how it can be collected for policy-making. The document provides specific information on the various parameters that data can be collected on, the purposes of collecting data and the most effective ways to do so. The NBGD provides an overview of indicators that characterise urban freight transport, as well as common methodologies to collect input. The overview of indicators allows for the identification of different profiles, so that data can be collected in a more focused way. Authorities play an important role in turning the indicators and collection methods into a generic framework to be used by the main stakeholders. Targeted data collection is of value added to *ex-ante* policy analysis. The results should also be used to monitor the policy impact (in step four).

Hence, to be able to initiate policy measures on urban freight transport, and to be able to measure the impact thereof, data collection is vital. When only a limited amount of data is available, there is limited insight into urban freight operations to develop strategies and implement measures. Data as such is not of added value if it is not used in developing a proper problem identification and policy implementation plan.

After the data collection and consultation of stakeholders, the input collected can be used for defining a Logistics Profile of the city. This second implementation step is discussed in the next section.

## Step 2 – Characterising the city’s Logistics Profile (LP)

The second step entails the identification and isolation of homogeneous groups of logistics needs within the area of intervention. We call such homogeneous group a Logistics Profile (LP). In the areas of the city in which LPs can be defined, it is possible to adjust urban freight logistics services that will optimise the consumption of the involved public and private resources such as space and vehicles, according to the needs of the different market segments.

The LPs of a given urban area are defined by the interaction of three key aspects (see also Figure 2): (i) the urban characteristics of the area, (ii) the requirements of the logistics agents (i.e. the requirements concerning the type of delivery), and (iii) the characteristics of the products being transacted.



**Figure 2 Logistics Profile**

Source: adapted from Macário, 2011

In addition, it is necessary to set a scale, in order to quantify (or qualify) each of the features identified. Based on this classification, conditions are met to identify and characterise the LPs.

Previous research has identified six Logistics Profiles, which are likely to exist in a given city:

- Profile A: cluster of shops specialised in one specific type of service/product (e.g. a neighbourhood known for furniture stores, craft or art pieces, technological pole);
- Profile B: hotels, restaurants, small grocery stores, small neighbourhood markets;
- Profile C: business centre (courier, small deliveries, B2C);
- Profile D: large commercial stores (retail, shopping centres, distribution warehouses);
- Profile E: residential areas with local trade;
- Profile F: e-commerce in residential areas.

**NBGD 1**, and its Technical Report 1, focus on defining a city's Logistics Profile (LP).

The concept of Logistics profile (LP) is based on the hypothesis that it is possible to identify, for some well-defined areas inside a city, reasonably homogenous groups of logistics needs.

The existence of these profiles locally should of course be confirmed via case studies. These profiles can then be combined with product characteristics (ease of handling, specific conditions) and with agents and deliveries' properties (urgency, frequency, amounts, planned/unplanned). The combined positioning of the city in these three domains then offers guidance as to which the policy solution will be most effective.

After the first step, which is data collection on the local challenges for urban logistics, it is advised to develop a preliminary stakeholder engagement strategy (step 1). This engagement strategy is closely linked to the Logistics Profile (LP), defined in step 2. A LP serves as an overview of stakeholders, their behaviour and relates back to the long list of challenges on which data is collected. In the third step, relevant solutions and policy measures are chosen. These should logically tackle the challenges, and relate to the stakeholder engagement strategy.

### Step 3 – Selecting relevant solutions

The selection of the best solution depends on the city's logistics profile, the nature and magnitude of the challenges and other contextual properties. Investments in policy must be compared against the expected benefits and, obviously, the available budget a city has for developing urban freight transport policies. Several tools can be deployed for analysing impact of measures, for defining an optimal and cost-effective approach, including cost-benefit analysis, multi-criteria analysis or cost effectiveness analysis.

An ex-ante analysis of a policy measure often leads to better defined, more cost-efficient, measures.

A cost benefit analysis (**CBA**) is used to appraise the efficiency of a project in terms of its contribution to the (local) economic welfare. It differs from a financial analysis which only takes into account the financial costs and benefits that accrue to the owner of the project, as a result of project implementation. Instead, a CBA is conducted from the point of view of the society as a whole and includes the total costs and benefits from the perspective of all stakeholders that experience effects from the project.

Multiple-criteria analysis (**MCA**) is a research that explicitly evaluates multiple conflicting criteria in decision making. Some of the values of indicators are monetised; others could be regarded qualitatively via for example stakeholder consultations.

If only one specific problem is to be solved, policy impacts can also be assessed via measuring their impact on the reduction of the specific problem. An ex-ante and ex-post data collection can quantify the policy impact. This impact can then be related to the costs of the policy implementation, to assess the so-called cost-effectiveness

It is important to understand how measures impact on the different decision levels and on the – individual- stakeholders (agents). The final choices should have sufficient support from the urban logistics actors. The six NBGD topics answer identified key issues as in Table 4.

**Table 4: Linking key challenges in urban logistics to the six non-binding guidance documents and their proposed solutions**

Non-Binding Guidance Document number	1	2	3	4	5	6
Challenges in urban logistics						
Road congestion		v	V			v
Emissions		v			v	v
Lack of parking areas for loading and unloading	v		v	v	v	v
Lack of space for logistics, logistics sprawl			v	v		v
Regulatory procedures and poor enforcement	v	v	v			v
Noise		v	v		v	v
Poor liveability in urban areas		v	v	v	v	v
Costs for logistics suppliers (e.g. energy and efficiency)	v	v	v		v	v

The main challenges, and the relations to the proposed solutions discussed in the NBGDs (defined via the survey as part of this study) are briefly outlined below. Please refer to the NBGDs for more details, and to their respective Technical Report for further best practices and literature.

**Road congestion**

- This challenge can be tackled by treating logistics in UVARs (NBGD 2). UVARs can consist out of Low Emission Zones (LEZs) or Congestion Charging Schemes (CC), both having potential impact on congestion. Access restrictions can differ depending on the regulatory details. NBGD 2 proposes mitigation solutions for UVARs such as promoting off-peak deliveries. Data collection as described in NBGD 6 could assist in better defining the severity of the city's road congestion, and the contribution of freight vehicles thereto. That data can also be used at a later moment to monitor progress and impact.

**Emissions**

- This challenge can be tackled by treating logistics in UVARs (NBGD 2) or stimulating the use of Environmentally Friendly Freight Vehicles (EFFVs) (NBGD 5). UVARs can consist of LEZs or CC, both having potential impact on local vehicle emissions. A LEZ likely has the most impact on local freight emissions, though measuring impact is a challenge. The data collection, described in NBGD 6, could assist in defining the severity of urban freight transport emissions, which should in step 4 be used to monitor progress in emissions (e.g. via measuring PM or NOx at street level before and after the policy change).

**Lack of parking areas for loading and unloading**

- Loading and unloading requires space, which is scarce in urban areas. This problem can be tackled by via various angles: via implementing ICT innovations (NBGD 1) (sharing information), Engaging Stakeholders (NBGD 3) (behavioural changes), changing e-commerce's impact at street level (NBGD 4) (installing automated lockers or relay depots as alternatives to home deliveries) or stimulating the use of EFFVs (NBGD 5) (stimulate the use of Cargo Bicycles as alternatives to light commercial vehicles). Data collection, described in NBGD 6, could assist in defining the impact of policies.

**Lack of space for logistics, logistics sprawl**

- This challenge can be tackled by Engaging Stakeholders (NBGD 3) via stimulating behavioural changes and changing urban planning, or by changing e-commerce's impact at street level (NBGD 4). In this respect installing grocery pick-up points, e-commerce pack stations or developing city hubs are mitigating solutions. The data collection, described in NBGD 6, could assist in assessing the impact and cost effectiveness of policies.

**Noise**

- This challenge can be tackled by treating logistics in UVARs (NBGD 2) or stimulating the use of EFFVs (NBGD 5). LEZs and CC have impact on local vehicle noise emissions, indirectly promoting low emission vehicles. The increased deployment of EFFV likely has the most impact in the long run. The data collection, described in NBGD 6, can assist in defining the severity of urban freight transport emissions, which should at step 4 be used to monitor progress in emissions (e.g. via measuring PM or NOx at street level before and after the policy change). Engaging Stakeholders (NBGD 3) is needed to successfully implement policy changes.

**Poor liveability in urban areas**

- This challenge overlaps with noise, emissions and congestion. The liveability is a challenge for policy makers as it entails quantifiable problems, but is also a perceived problem by residents. Perception of liveability is personal and for a vast amount subjective. This general challenge can be tackled by treating logistics in UVARs (NBGD 2), Engaging Stakeholders (NBGD 3), changing e-commerce's impact at street level (NBGD 4) or stimulating the use of

EFFVs (NBGD 5). Data collection, addressed in NBGD 6, could assist in defining the views of stakeholders (NBGD 3), given the subjective element.

#### **Costs for logistics suppliers**

- This challenge can be tackled by ICT innovations (NBGD 1) (better ICT improves performance of and monitoring by the sector). It is helped by Engaging Stakeholders (NBGD 3), when aiming at behavioural changes where suppliers can be stimulated to move deliveries to off-peak hours (e.g. via UVARS discussed in NBGD 2). When stimulating the use of EFFVs (NBGD 5), it can become clear to specific companies that electric, hybrid or other EFFVs can be beneficial to society and for economic development. The data collection, described in NBGD 6, can assist in defining the impact of policies.

In the next, fourth step, the policy approach is defined and there is again a need to define policy performance indicators. These can be used to monitor and evaluate the policy.

#### **Step 4 – Definition of Performance Variables, Data collection and Metrics**

Key performance indicators, or KPIs, can monitor the most important aspects of the urban mobility system. They must be chosen on a case-by-case basis, related to the policy measure, and according to the SMART approach.

SMART indicators stand for: *Specific* – target a specific area for improvement; *Measurable* – quantify or at least suggest an indicator of progress; *Assignable* – specify who will do it; *Realistic* – state what results can realistically be achieved, given available resources; and *Time-related* – specify when the result(s) can be achieved.

Data collection after implementation allows for an evaluation of the policy, and can allow for the policy to be adjusted at a later stage.

**NBGD 6** tackles data collection on urban logistics and how data can be collected on specific parameters. This data can then be used for policy-making: quantifying the challenges, simulating policy options and assessing impacts and cost effectiveness. The document provides specific information on the various data that can be collected, the purposes of doing so, and the best ways to do so.

*Ex-ante* data analysis can help identify the problems, benchmark urban logistics with KPI's that should apply, and better shape the measures to be taken. In *ex-post* analysis, the measures can then be confronted with updated measurements to define the effectiveness of the measures.

#### **Step 5 – Implementing policy solutions and achieving results**

The fifth step of the policy change is the final implementation, which builds further on the earlier preparations: identifying the challenges/issues by collecting data and engaging stakeholders, followed by analysis of possible policy options or a combination thereof, and defining performance variables. Some key takeaways for the implementation are listed below.

##### **Analyse cost and benefits. Implement gradually after pilot tests**

It is important to carefully analyse the costs and benefits of the policy options, as well as the planned enforcement strategies, future running costs and investment needs. Although general *ex-ante* ramification of the expected impacts of a scheme will be obtained in steps 1-4, the

specific outcomes of a measure for a specific city will remain uncertain until it is actually implemented. It can help if the design of the implementation process allows for minor changes to be made either before the measure goes into force, or just thereafter.

The main benefits of such flexible implementation are that, e.g. for an UVAR:

- It provides opportunity to deal with issues that need to be ironed out before full-scale implementation.
- It allows for the handling of unexpected insights into aspects of the scheme that may have been overlooked earlier.
- It is an excellent means of increasing support from both public sector decision makers, the private sector and city residents.

Pilots can be costly and risky, as they must be as close to the full scheme as possible, so the pros and cons should be well considered. For some measures (e.g. established parking policies or enforcement), there might be no need for pilot tests.

### **Think beyond the scheme itself. Mitigate**

The following two questions should be answered satisfactorily before deciding on a specific policy implementation:

- Can we mitigate some of the undesirable impacts? In NBGD 2, we described three commonly used mitigating solutions for UVARs: *Off Hour Deliveries*, *Urban Consolidation Centres* and *Cargo Bikes*. These instruments can ensure the continuity of the necessary logistics flows. It might be necessary for the municipality or city to develop a supporting or engaging policy, as part of the stakeholder engagement process.
- Can we control the impacts of the proposed measure outside the area itself? The whole scheme should of course include appropriate measures to ensure that the benefits eventually are not nullified by similar societal costs outside the area. This second question is more relevant for city regions, or the national policy level.

### **Listen to and engage stakeholders in order to resolve the issues**

A distinguishing feature of urban freight logistics is the ecosystem of relevant stakeholders: producers, wholesalers, logistics & freight transport operators, receivers, citizens or public authorities. Each one has unique features, perspectives, objectives and/or strategies. The success of any measure largely depends on their engagement. Stakeholders are in a privileged position to help identify and characterise the issue.

For all measures, it is vital to engage and listen to the key stakeholders. Effective engagement of stakeholders (e.g. residents, local retailers and regional logistics operators) brings multiple benefits, such as: it will lead to common confirmation (or adjustment), provide the public and private sector with a full understanding of the constraints and expectations and it will enable policy makers to chart implementation paths that have a better chance of succeeding.

More information can be found in **NBGD 3** which has guidance on proper stakeholder engagement and the identification of their issues. Also information on engagement processes and good practices is provided.

Despite their potential, these processes have some limitations and difficulties. Consensus building is a lengthy process and initiatives may take a long time to be deployed, particularly as urban freight logistics is a complex business, with many stakeholders and activities.

**Evaluate and adjust** (if necessary)

As the measures, directly or indirectly, will have measurable impacts on key challenges such as emissions and congestion, but also on the attractiveness of the urban area for businesses and residents, it is important to organise evaluations. The evaluations compare the expectations with outcomes. This is a continuous process.

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