D7.1 – Development and Experience of Clean and Efficient Urban Freight Support Measures in ARCHIMEDES

November 2012
## Project Information

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1. Introduction

1.1 Background CIVITAS

CIVITAS - cleaner and better transport in cities - stands for CIty-VITALity-Sustainability. With the CIVITAS Initiative, the EC aims to generate a decisive breakthrough by supporting and evaluating the implementation of ambitious integrated sustainable urban transport strategies that should make a real difference for the welfare of the European citizen.

**CIVITAS I** started in early 2002 (within the 5th Framework Research Programme);
**CIVITAS II** started in early 2005 (within the 6th Framework Research Programme) and **CIVITAS PLUS** started in late 2008 (within the 7th Framework Research Programme).

The objective of CIVITAS-Plus is to test and increase the understanding of the frameworks, processes and packaging required to successfully introduce bold, integrated and innovative strategies for clean and sustainable urban transport that address concerns related to energy-efficiency, transport policy and road safety, alternative fuels and the environment.

Within CIVITAS I (2002-2006) there were 19 cities clustered in 4 demonstration projects, within CIVITAS II (2005-2009) 17 cities in 4 demonstration projects, whilst within CIVITAS PLUS (2008-2012) 25 cities in 5 demonstration projects are taking part. These demonstration cities all over Europe are funded by the European Commission.

**Objectives:**
- to promote and implement sustainable, clean and (energy) efficient urban transport measures
- to implement integrated packages of technology and policy measures in the field of energy and transport in 8 categories of measures
- to build up critical mass and markets for innovation

**Horizontal projects support the CIVITAS demonstration projects & cities by:**
- Cross-site evaluation and Europe wide dissemination in co-operation with the demonstration projects
- The organisation of the annual meeting of CIVITAS Forum members
- Providing the Secretariat for the Political Advisory Committee (PAC)
- Development of policy recommendations for a long-term multiplier effect of CIVITAS

**Key elements of CIVITAS**
- CIVITAS is co-ordinated by cities: it is a programme "of cities for cities"
- Cities are in the heart of local public private partnerships
- Political commitment is a basic requirement
- Cities are living 'Laboratories' for learning and evaluating

1.2 Background ARCHIMEDES

ARCHIMEDES is an integrating project, bringing together 6 European cities to address problems and opportunities for creating environmentally sustainable, safe and energy efficient transport systems in medium sized urban areas.
Cleaner and better transport in cities

The objective of ARCHIMEDES is to introduce innovative, integrated and ambitious strategies for clean, energy-efficient, sustainable urban transport to achieve significant impacts in the policy fields of energy, transport, and environmental sustainability. An ambitious blend of policy tools and measures will increase energy-efficiency in transport, provide safer and more convenient travel for all, using a higher share of clean engine technology and fuels, resulting in an enhanced urban environment (including reduced noise and air pollution). Visible and measurable impacts will result from significantly sized measures in specific innovation areas. Demonstrations of innovative transport technologies, policy measures and partnership working, combined with targeted research, will verify the best frameworks, processes and packaging required to successfully transfer the strategies to other cities.

Urban freight logistics is one of eight categories in CIVITAS ARCHIMEDES. Heavy goods vehicles (HGVs) are essential to daily life in city centres, but they make up a significant share of traffic in European cities. They are major contributors to deteriorating air quality, rising carbon emissions and congestion. CIVITAS cities encourage the use of cleaner freight vehicles and have developed solutions to better coordinate freight logistics. More efficient freight deliveries can reduce congestion, lower emissions and free up space for sustainable modes. This work package will develop new and innovative forms of goods vehicle management, establishing new forums for communication, but also managing access for the health and benefit of citizens.

Urban goods transport policies aimed at introducing new concepts and solutions for freight are acquiring ever-growing relevance in inner city areas. Not only do the vehicles represent a real physical obstacle to free movement, they also cause noise and pollution (in many European cities, more than half of harmful emissions come from heavy goods transport). Another challenge is the advent of new distribution patterns linked to emerging information technologies.

Measures taken under the CIVITAS initiative include bundling of goods delivery, guided routes for goods delivery and promotion of the use of clean vehicles. Measures relating to bundling of goods have included the use of inner city logistics centres, permits for certain types of delivery vehicles and restrictions on other types, and the promotion of closer contacts between companies to foster cooperation and bundling agreements.

The overall aim is to increase the efficiency of goods transport in the ARCHIMEDES cities with solutions elaborated through partnership working, strategic planning and, where necessary, restrictions/directions on movement and access. The measures will be applied in the CIVITAS study areas, generally covering key parts of the city centre as well as corridors linking to commercial areas close to the peri-urban fringe.

Supporting objectives include:
- Pollution and noise reduction in the city;
- Improving efficiency of goods distribution through consistency and logical models for integrating this mode into planning of the CIVITAS study areas;
- Increase partnership and stakeholder involvement with city planning and strategy development.

2 Participant Cities

The ARCHIMEDES project focuses on activities in specific innovation areas of each city, known as the ARCHIMEDES corridor or zone (depending on shape and geography). These innovation areas extend to the peri-urban fringe and the administrative boundaries of regional authorities and neighbouring administrations.

The two Learning cities, to which experience and best-practice will be transferred, are Monza (Italy) and Ústí nad Labem (Czech Republic). The strategy for the project is to ensure that the tools and
measures developed have the widest application throughout Europe, tested via the Learning Cities’ activities and interaction with the Lead City partners.

2.1 Leading City Innovation Areas
The four Leading cities in the ARCHIMEDES project are:
- Aalborg (Denmark);
- Brighton & Hove (UK);
- Donostia-San Sebastián (Spain);
- Iasi (Romania).

Together the Lead Cities in ARCHIMEDES cover different geographic parts of Europe. They have the full support of the relevant political representatives for the project, and are well able to implement the innovative range of demonstration activities.

The Lead Cities are joined in their local projects by a small number of key partners that show a high level of commitment to the project objectives of energy-efficient urban transport. In all cases the public transport company features as a partner in the proposed project.

2.2 Aalborg
The City of Aalborg, with extensive experience of European cooperation and having previously participated in CIVITAS I (VIVALDI) as a ‘follower’ city, is coordinating the consortium and ensures high quality management of the project. The City has the regional public transport authority (NT) as a local partner, and framework agreements with various stakeholder organisations.

Aalborg operates in a corridor implementing eight different categories of measures ranging from changing fuels in vehicles to promoting and marketing. The city of Aalborg has successfully developed similar tools and measures through various initiatives, like the CIVITAS-VIVALDI and MIDAS projects. In ARCHIMEDES, Aalborg aims to build on this work, tackling innovative subjects and combining with what has been learned from other cities in Europe. The result is an increased understanding and experience, in order to then share with other Leading cities and Learning cities.

Aalborg has recently expanded its size by the inclusion of neighbouring municipalities outside the peri-urban fringe. The Municipality of Aalborg has a population of some 194,149, and the urban area a population of some 121,540. The ARCHIMEDES corridor runs from the city centre to the eastern urban areas of the municipality and forms an ideal trial area for demonstrating how to deal with traffic and mobility issues in inner urban areas and outskirts of the municipality. University faculties are situated at 3 sites in the corridor (including the main university site). The area covers about 53 square kilometres, which is approximately 5 % of the total area of the municipality of Aalborg. The innovation corridor includes different aspects of transport in the urban environment, including schools, public transport, commuting, goods distribution and traffic safety. The implementation of measures and tools fit into the framework of the urban transport Plan adopted by the Municipality.
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2.3 Brighton & Hove
Brighton & Hove is an historic city, in the south-east of England, known internationally for its abundant Regency and Victorian architecture. It is also a seaside tourist destination, with over 11km of seafront attracting eight million visitors a year.

In addition, it is a leading European Conference destination; home to two leading universities, a major regional shopping centre, and home to some of the area’s major employers. All of this, especially when set against the background of continuing economic growth, major developments across the city and a growing population, has led the city council to adopt a vision for the city as a place with a co-ordinated transport system that balances the needs of all users and minimises damage to the environment.

The sustainable transport strategy that will help deliver this vision has been developed within the framework of a Local Transport Plan, following national UK guidelines. The ARCHIMEDES measures also support the vision, which enables the city to propose innovative tools and approaches to increase the energy-efficiency and reduce the environmental impact of urban transport.

2.4 Donostia - San Sebastián
The city of Donostia -San Sebastian overlooks the sea and, with a bit more than 180,000 inhabitants, keeps a human scale. Some people consider the balanced combination of small mountains, manor buildings, and sea as the setting for one of the most beautiful cities in the world. We have a tradition in favouring pedestrians, cyclists and public transport.

For about twenty years, the city has been enforcing a strong integrated policy in favour of pedestrians, bicycles and public transport. Considering walking and cycling as modes of transport, has led to the building of a non-motorised transport network for promoting this type of mobility around the city.

Likewise, the city has extended its network of bus lanes. The city holds one of the higher bus-riding rates, with around 150 trips per person per year.

The CIVITAS project is being used as the perfect opportunity to expand Donostia -San Sebastian’s Sustainable Urban Transport Strategy. With the package of CIVITAS measures Donostia-San Sebastian will:
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- Increase the number of public transport users;
- Decrease the number of cars entering in the city centre;
- Increase the use of the bicycle as a normal mode of transport;
- Maintain the high modal share of walking;
- Reduce the number of fatal accidents and accidents with heavy injuries;
- Reduce the use of fossil fuels in public transport.

2.5 Iasi
The City of Iasi is located in north-eastern Romania and is the second largest Romanian city, after Bucharest, with a population of 366,000 inhabitants. It is also the centre of a metropolitan area, which occupies a surface of 787.87 square kilometres, encompassing a total population of 398,000 inhabitants.

The city has five universities with approximately 50,000 students, the second largest in Romania. The universities and their campuses are located in the central and semi-central area of the city. In the same area, there are also a large number of kindergartens, schools and high schools with approximately 10,000 pupils. This creates a large number of routes along the main corridor, served by the public transport service number “8” (Complex Tudor Vladimirescu - Copou) with an approximate length of 10 km. The City of Iasi will implement its integrated measures in this area to be known as the “CIVITAS+Corridor”.

The city's objectives in CIVITAS - ARCHIMEDES are based on the existing plans related to transport, Local Agenda 21, approved in 2002, and the Sustainable Social-Economic Development Strategy for City of Iasi. The CIVITAS Plus objectives will be integrated in the Strategy for metropolitan development which was finalized in October 2009.

2.6 Monza
Monza is a city on the river Lambro, a tributary of the Po, in the Lombardy region of Italy, some 15km north-northeast of Milan. It is the third-largest city of Lombardy and the most important economic, industrial and administrative centre of the Brianza area, supporting a textile industry and a publishing trade. It is best known for its Grand Prix.

The City of Monza, with approximately 121,000 inhabitants, is located 15 km north of Milan, which is the centre of the Lombardia area. This area is one of the engines of the Italian economy; the number of companies is 58,500, i.e. a company for every 13 inhabitants.

Monza is affected by a huge amount of traffic that crosses the city to reach Milan and the highways nodes located between Monza and Milan. It is also an important node in the Railways network, crossed by routes connecting Milan with Como and Switzerland, Lecco and Sondrio, Bergamo and Brianza. "Regione Lombardia", which in the new devolution framework started in 1998, has full responsibility for establishing the Local Public Transportation System (trains, coaches and buses) and has created a new approach for urban rail routes using an approach similar to the German S-Line or Paris RER.

Monza has recently become the head of the new "Monza and Brianza" province, with approximately 750,000 inhabitants, so will gain the full range of administration functions by 2009. Plan-making responsibilities and an influence over peri-urban areas will require the city to develop new competencies.
In this context, the objective of the City of Monza in participating in CIVITAS as a Learning City is to set up an Urban Mobility System where the impact of private traffic can be reduced, creating a new mobility offer, where alternative modes become increasingly significant, leading to improvements to the urban environment and a reduction in energy consumption (and concurrent pollution).

2.7 Ústí nad Labem
Ústí nad Labem is situated in the north of the Czech Republic, about 20 km from the German border. Thanks to its location in the beautiful valley of the largest Czech river Labe (Elbe) and the surrounding Central Bohemian Massive, it is sometimes called ‘the Gateway to Bohemia’. Ústí is an industrial, business and cultural centre of the Ústí region.

Ústí nad Labem is an important industrial centre of north-west Bohemia. The city’s population is 93,859, living in an area of 93.95km². The city is also home to the Jan Evangelista Purkyně University with eight faculties and large student population. The city used to be a base for a large range of heavy industry, causing damage to the natural environment. This is now a major focus for improvement and care.

The Transport Master Plan, to be adopted in its first form in 2007, will be the basic transport document for the development of a new urban plan (2011), which must be developed by the City subject to the provisions of the newly adopted Building Act. This will characterise the development of transport in the city for the next 15 years, and so the opportunity to integrate Sustainable Urban Transport Planning best practices into plan development during the project means an ideal match of timing between city policy frameworks and the ARCHIMEDES project.

The projects main objective is to propose transport organisation in the city, depending on the urban form, transport intensity, development of public transport, and the need for access. The process, running until 2011, will include improving the digital model of city transport that Ústí currently has at its disposal. The plan will have to deal with the fact (and mitigate against unwanted effects that could otherwise arise), that from 2010, the city will be fully connected to the D8 motorway, running from Prague to Dresden.

3. Background to the Deliverable
This deliverable summarises the research and demonstration activities conducted in relation to workpackage 7 of the CIVITAS ARCHIMEDES project – Energy-efficient freight logistics.

3.1 Introduction to the Measures
Research and demonstration activities in respect of energy-efficient freight logistics were conducted in five of the ARCHIMEDES cities, namely Aalborg, Brighton, Donostia - San Sebastián, Iasi and Ústí nad Labem, in the form of measures 63, 64, 65, 66 and 67. These measures are introduced in the following sections.

The results from the individual measures are reported in detail as follows:

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This deliverable draws together the experiences gained from the individual measures and presents the common issues and conclusions that can be drawn at the workpackage level. Further information and outcomes of the measures can be found in D10.3 Final Evaluation Report and D12.4 Final version of measure level result templates.

**Measure 63: Efficient Goods Distribution in Aalborg**

Aalborg implemented an environmental zone bounded south by the ring road around the city centre and north by the fjord. Only HGVs and buses (>3.5 tonnes) that comply with the motor standard EURO IV or newer or have a particulate filter installed are allowed to drive in the zone. The City of Aalborg organised information campaigns for freight companies and citizens.

The measure was evaluated with regard to pollution levels, which were modelled through air quality indicators such as CO, NO\textsubscript{x} and particulate levels. Pollution level data was compared to data from before the implementation. Vehicle emissions were further indicators for this measure. Emissions were modelled based on a licence plate registration carried out after the implementation of the environmental zone and compared with data from before the implementation. The license plate registration was used to get data about vehicle characteristics which were used to estimate emission levels.

**Measure 64: Efficient Goods Distribution in Brighton & Hove**

This measure involved the establishment of a Freight Quality Partnership in the area, which looked into freight solutions and options for more energy efficient freight logistics. A review of best practice on the development of Freight Quality Partnerships was conducted.

A hard measure was implemented as part of the Walking Network Improvement programme. The purpose was to reduce the number of freight vehicles and improve the conditions for pedestrians.

Further, an Environmental zone (including restrictions on freight vehicles) was introduced in association and consultation with the newly established Freight Quality Partnership.

**Measure 65: Efficient Goods Distribution in Donostia - San Sebastián**

In Donostia - San Sebastián, a feasibility study into freight consolidation was undertaken. In preparation for the demonstration an inventory was made of the volumes of goods and number of freight trips in the central areas. Possible legal barriers to the implementation were also investigated.

The two main options investigated and discussed were:

1. The introduction of a Freight Consolidation Centre in the surroundings of the historic city centre. From this centre the 'last delivery mile' to the shops, would be carried out by small, silent and clean vehicles;
2. The use of telematics to improve communication between shopkeepers and transport companies, including communication with the municipal police and the possibility of reserving loading and delivery zones.

Following the recommendations of a feasibility study, an implementation plan was developed including these measures:

- Creation of a freight consolidation centre for the last mile distribution of goods;
- The use of clean vehicles for last mile distribution;
- Regulatory options to improve loading behaviour;
- Increased control in the use of loading bays;
- Design of a night distribution protocol;
The use of new technologies to make easier the communication between the distributors and the local shops, including communication with the municipal police and the possibility of reserving loading and un-loading zones.

**Measure 66: Efficient Goods Distribution in Iasi**

Iasi formed a Freight Quality Partnership with representation from key stakeholders. The activities were based on the Urban Goods Distribution Improvement Strategy for Iasi. They aimed to reduce HGV traffic and emissions in the city centre. To create the framework in which changes could be made, specific regulations to legalise proposed access control were introduced.

**Measure 67: Efficient Goods Distribution in Ústí nad Labem**

Ústí nad Labem elaborated a study to identify noise burdens in the city. Based on the results, the city identified tools suitable for reducing noise from traffic on local roads by means of traffic planning and management, construction and technical solutions. In accordance with traffic reduction proposals, a plan for efficient distribution of goods in the city was designed.

### 4. Analysis

#### 4.1 Comparison of Measures

The main themes in the measures are:

- Establishment of environmental zones;
- Establishment of freight quality partnerships;
- Other measures.

All five measures cover a broad range of initiatives for supporting end efficient urban freight system and most measures cover several of the mentioned themes. However, the objectives of the measures are slightly different.

In Aalborg, the overall objective was to reduce pollution in the city centre. An important strategy for pursuing this target was to continue good cooperation with freight companies and federations. At a more specific level, the objective was to reduce HGV emissions of CO, HC and NO\(_x\) by about 25% by restricting polluting vehicles of more than 3.5 tonnes from the city centre.

In Brighton & Hove, the overall objectives were to increase the efficiency of goods transport in the city and to reduce the number of commercial vehicles travelling within the central retail and business area of Brighton. This was achieved by establishing a Freight Quality Partnership and an Environmental zone. The key objective of the Freight Quality Partnership was to improve the sustainability of efficient movement of freight in the city. The outcome of the partnership was a strategy which outlines the partnership objectives over the next 4 years.

In Donostia - San Sebastián, the overall aim was to implement a goods distribution model with less negative impacts on the inhabitants and urban space. A main objective was to increase partnership and stakeholders' involvement with city planning and strategy development. Another objective was to reduce total fuel consumption and vehicle emissions by reducing the number of freight vehicle kilometres and by increasing loading rates of freight vehicles in the city centre.
Cleaner and better transport in cities

In Iasi, the measure focused on establishing the necessity of plan to introduce a new set of access times for freight vehicles and other technical solutions to reduce congestion, and pollutant emissions from deliveries and collections. The objectives were:

- To increase efficiency in goods distribution traffic;
- To optimise the flow of HGVs in narrow business streets by improving loading and delivery behaviour and facilities;
- To increase use of clean vehicles in goods distribution traffic;
- To build a strong partnership with stakeholders.

In Ústí nad Labem the objective was to identify areas in the city that were heavily affected by noise pollution caused by freight transport. Further, the aim was to propose solutions for reducing noise pollution, based on the results of measure 28, Noise reduction in Usti nad Labem.

### 4.2 Differences in Approach

In Aalborg the environmental zone is an administrative delimited zone for HGVs and is based on euro standards for motor engines. Signage and information was implemented but no physical changes were made. Iasi and Brighton & Hove established physical initiatives for preventing HGVs in certain areas. Ústí nad Labem analysed the opportunities for leading transit transport out of the city centre. In Donostia - San Sebastián the approach was to establish a freight consolidation centre and implement smaller bicycle based deliveries for the last mile delivery.

#### Environmental Zone

In December 2006 the Danish Parliament adopted a law concerning environmental zones in Denmark. In February 2009 Aalborg was the second Danish city to establish an Environmental Zone. The requirements for entering an environmental zone are exactly the same for all environmental zones in Denmark. Issues concerning geography and transit roads are individual.

As part of the ARCHIMEDES project the first step was to arrange an information meeting with freight operators on September 16th 2008. The environmental zone was introduced in February 2009. One week before and one week after its introduction, inauguration posters were displayed at approximately 40 outdoor commercial screens in the city. At the inauguration of the environmental zone, an event was held on Monday February 2nd 2009 at 8 am. The event included revealing the first environmental zone sign, and handing out breakfast rolls and leaflets to interested drivers and other people.
Figure 2: The established environmental zone in Aalborg is delimited by the fjord in the north and the ring road in the south. The transit routes are marked with red lines.

By July 2010 new requirements for entering the zone were enforced by the Government as a common set of rules was introduced for the largest cities. HGV engines had to be EURO IV or newer or have a particulate filter. The zone message signs were updated accordingly. From November 2011 foreign vehicles were subject to the low emission zone requirements.

License plate registration was conducted on all access roads to the environmental zone. The registration showed minor changes to freight traffic in the period 2005-2008, but major decreases in the number of lorries entering and leaving the environmental zone from 2008-2010. However, the explanation for the decrease was most likely the financial crisis which negatively impacted on the amount of goods delivered. A similar decrease is experienced in other places in the road system.
Freight Quality Partnership

In Brighton & Hove research led to the following recommendations:

- Implementing a partnership approach to research and take forward actions to involve local businesses, delivery companies, and local communities. This could involve inviting local businesses and other stakeholders to attend a Freight Forum Workshop.
- Undertaking further work to obtain data on the present volume and nature of deliveries, the likely participation of local businesses, and the most appropriate combination of solutions.
- Developing a combination of best practice approaches, to improve efficiency for businesses and reduce the impact of deliveries into the city centre.

In response to these suggested actions, the task was split into two parts:

- Face-to-face surveys with traders and freight operators to identify current delivery practices and issues
- The establishment of a Freight Quality Partnership (FQP), to be known publically as ‘A Freight Forum for Brighton & Hove’, and holding its inaugural meeting

These activities were carried out with a view to determining possible future improvements to freight logistics in Brighton. Following submission of Deliverable T64.1 (the report of the FQP) in September 2010, Brighton & Hove City Council (BHCC) officers sought to establish plans for changes to access in the Lanes area of Brighton, focusing on East Street.

In summary, Brighton & Hove:

- Undertook research into freight efficiency measures;
- Undertook research with traders and freight operatives to identify current practices and issues;
- Held inaugural meeting of the FQP;
- Developed plans for revised access arrangements in the East Street area of Brighton;
- Consulted with local residents and businesses;
- Implemented East Street scheme.
Cleaner and better transport in cities

Figure 4: Large vehicles originally had problems delivering goods in the Brighton & Hove city centre.

A research study was also conducted in Donostia - San Sebastián and the design of this was related to urban goods distribution. The elements which are analysed were:

- Incidents that occurred during loading and delivery;
- Infrastructures and other means that shops and transport companies could utilise;
- Emissions and noise related to urban goods transit, consumption of energy and traffic density;
- Traffic control system.

In 2008, the Basque Logistics Institute (IVL) established a Freight Quality Partnership and subsequently managed this. It was a stakeholder group including representatives from:

- The Chamber of Commerce;
- Shopkeeper associations;
- Representatives from the transport sector (Federación Mecantil (Retail Association), Dendass (Business Council), and the haulage association Guitrans);
- The municipal police;
- The city mobility department (ADS).

The group monitored and contributed to the research study. It discussed possible solutions and barriers to implementation of the partnership. IVL organised meetings with these key stakeholders within the duration of ARCHIMEDES.

Figure 5: Sustainable vehicles used for deliveries in the historic urban centre of Donostia - San Sebastián.

Following the recommendations, an implementation plan was developed including these measures:
• Creation of a freight consolidation centre for the last mile distribution of goods;
• The use of clean vehicles for last mile distribution;
• Regulatory options to improve loading behaviour;
• Increased control in the use of loading bays;
• Design of a night distribution protocol;
• The use of new technologies to make easier the communication between the distributors and the local shops, including communication with the municipal police and the possibility of reserving loading and un-loading zones.

Figure 6: Common practice for delivery at Av. Boulevard in Donostia - San Sebastián (before).

Other measures
Other actions were implemented to support efficient urban freight systems.

• Iasi signed partnerships with several business owners who agreed to restrict goods deliveries to certain time windows in off peak hours. In exchange, business owners were awarded with facilities like fees and taxes exemptions/reductions, parking spaces placed near the companies’ headquarters, and support for special payments for night shifts.

• Ústí nad Labem focussed on noise reduction from HGVs. It identified tools suitable for reducing noise from traffic on local roads by means of traffic planning and management, construction and other technical solutions.

In Iasi, the purpose of the research study was to inform the development of the strategic goods distribution plan. This intended to promote a participative culture among local companies within a public partnership framework. It would be advantageous both for companies and reduction of pollution from vehicles involved in goods distribution. The study focused on:

• determining the development trend of the companies located in the CIVITAS corridor;
• clarifying the actual goods supply and distribution schedule within Iasi County;
• identifying the problems that companies faced with supply/distribution activities;
• identifying ways of improving the supply/distribution schedule to reduce pollution.

The existing legal framework for urban goods' distribution was inappropriate, resulting in disorganised distribution. Taking into account these factors and the study results, members of ARCHIMEDES team within Iasi Municipality Technical Department prepared an Urban Goods Distribution Improvement Strategy. This was called 'Efficient Goods Distribution in Iasi'. It aimed to reduce congestion and
pollutant emissions, especially in the city centre. To create the proper conditions for these changes, special legal regulations were proposed to restrict the access of freight vehicles.

The strategy was structured in six modules:

1. Users’ Requirements;
2. Leadership and Coordination;
3. Goods Distribution Policies;
4. Infrastructure;
5. Information and Educational Campaigns;
6. Freight Quality Partnership.

As part of the strategy’s implementation, Iasi Municipality signed a Partnership document for Quality Goods Distribution with the main businesses of the area. Partnership activities were defined according to the measures proposed in the strategy.

In Ústí nad Labem the results from the study of noise pollution were processed to develop noise reducing scenarios in relation to city freight traffic. These were based on a noise map and a traffic model ‘PTV Vision’ simulating traffic load. The scenarios included:

- Regulation of access for freight vehicles;
- Regulation of sources and destinations for freight transport;
- Reduction of transit traffic;
- Proposal for centralised distribution source;
- Regulation of access to the city by emission levels.

The ‘before’ data on noise perception, noise levels and number of freight vehicles were calculated. Cost benefit analyses and assessments of the effectiveness of proposed scenarios were conducted.

### 4.3 Problems Encountered & Solutions Attempted

#### 4.3.1 Technical Issues

The technical issues were related to traffic management. In terms of traffic problems, the most common issues identified were as follows:

- A lack of places to park/unload;
- The misuse of loading bays;
- Pedestrian conflict with traffic;
- Difficulties for goods vehicles to negotiate junctions.

#### 4.3.2 Process Issues

The most important problems encountered related to process issues. The main issues were:

- Attracting interest from local businesses;
- Obtaining acceptance from business, both delivering and receiving goods;
- Maintaining momentum in partnership forums;
- Higher administrative costs such as increased wages for night deliveries, and loading costs;
- Raising funds for actions.

Although most problems encountered varied between the cities, a common problem was identified. This was establishing a well-functioning partnership with the right people. This led to difficulties with measure acceptance and negotiations, and delays in implementing the initiatives.
In Iasi, for example, no special measures contributing to the efficiency of distribution services and interaction with general traffic were taken prior to ARCHIMEDES. Implementing new and innovative measures for solving freight issues led to difficult negotiations with the businesses and, consequently, to delays in implementing the initiatives. Also, the unfavourable economic context limited the extent of vehicle access restrictions to certain periods due to the potential of negative impact on the businesses.

In Donostia - San Sebastián, the main problem was the reticence of a supermarket chain to carry out night time unloading pilot tests. This company worked without respecting the regulations set out in the pilot, supplying its centres from public roads at any time of the day, even stopping traffic.

In Brighton & Hove the intention was to seek approval to consult on the plans and then implement the environmental zone by September 2011. However, in March 2011 it became clear that delivery of the environmental zone within the agreed timescales was highly unlikely. Once funding was secured for the scheme during summer 2011, work began on implementation and it was completed in April 2012.

Another issue in Brighton & Hove was to attract interest from local businesses to establish a freight quality partnership. This was done through written invites, follow up phone calls and contact with traders’ associations. However, these endeavours did not prove to be fruitful. Nevertheless, it is noted that the dependence on the willingness of third parties was always identified as a risk with this task. Indeed, the issues experienced supported the findings of the best practice research, which stated that key barriers to the implementation, and longevity of freight quality partnerships were:

- Attracting interest from local businesses;
- Maintaining long term funding;
- Maintaining a FQP manager;
- Maintaining momentum.

The first of these points was played out in reality with efforts to establish a freight quality partnership in Brighton & Hove. Initial indications would suggest that the latter barriers are also likely, though a more informed assessment will be possible later in the life of the fledgling freight quality partnership.

Three specific categories of problems relate to the freight quality partnerships.

**Stakeholder interest and funding**

There were difficulties in stimulating the interest of key stakeholders and in obtaining funding. This meant additional time was needed to develop alternative approaches, delaying some of the measures. It became clear that some targets would not be achievable within the agreed timescales. The main reasons for this were:

- The removal of match-funding for wider public realm and transport improvements;
- Low levels of stakeholder engagement in the freight quality partnership process and sensitivities surrounding proposed changes to good distribution.

Additionally, it was suggested:

- there should be unloading permits for traders who use private cars for deliveries;
- the timing of waste collections could be considered to avoid conflict with other activities.

**Local residents**

In general, the majority of local residents were in favour of the scheme as they felt it would create a more pedestrian-friendly environment in the historical city centres where retail premises are generally located. However, some of the residents who lived in the immediate vicinity of the scheme initially objected to the proposal. In Brighton & Hove, for example, local residents' main concerns were that...
they could no longer park outside their front door and that creating pedestrian zones would encourage noise and anti-social behaviour from customers of nearby bars. To overcome the objections short stay loading was introduced and a promise was made to the residents that BHCC would look into pedestrianising the wider area, thus reducing the effect of concentrating noise and anti-social behaviour in a small area.

Local businesses
The objective of several measures was to improve air quality by engaging with freight operators and businesses. This was achieved by schemes to remove traffic from the streets. However, removing vehicles inevitably caused some problems for businesses with loading requirements. In Donostia - San Sebastián this was partially overcome by providing additional loading provision in the wider vicinity. Some businesses were still unhappy about the new arrangements because of the changes that were required in relation to transport services (e.g. longer distance from vehicle to receiver and less flexibility in time windows for deliveries).

4.4 Main Outcomes & Results

4.4.1 Impacts

Environmental Zones
The assessment of environmental zones showed in general that they have a small effect on air quality compared to doing nothing. The environmental zones helped to push forward the replacement of older vehicles. However the progressive effect of the zone both in terms of vehicle improvements and air quality decreases over time unless the vehicular requirements are updated. In Aalborg, for example, the registration database showed that the share of lorries with Euro IV or newer increased from 28 % in 2008 to 54 % in 2010.

In Brighton & Hove changes to physical infrastructure involved re-structuring the entrance to the retail centre to improve conditions for with regard to pedestrians. This led to significant traffic reductions in the environmental zone, with traffic moved to other parts of the road system. Within the zone light goods vehicle numbers were reduced by 10-15 %, HGVs by 5-10 % and traffic in general by 40-45 %. Weekday pedestrian numbers increased by 65-70 % and at weekends, pedestrian numbers increased by 20-25 %. In general, the acceptance levels amongst local business increased by 5-10 %.

For the moment a 5 % reduction in emission levels was reached. However, in the future the effect will be less and even zero beyond the effect reached from raising the standards of euro norms for engines if not the demands in the environmental zone are increased.

Freight Quality Partnerships
The evaluations from the freight quality partnerships showed in general that:
- it is possible to reduce the average journey length of freight vehicles;
- last mile delivery by smaller vehicles can save a large amount of energy and persuade operators to deliver goods in off-peak periods.

In Donostia - San Sebastián, for example, the new goods delivery regulation in the CIVITAS area contributed to a reduction in the average journey length of delivery vehicles by approximately 0.5 km. The new last mile delivery service with electric cargo-bikes saved up to approximately 27,000 km per year. As a consequence, a yearly reduction of 22 % in energy consumption was achieved, in addition to a significant reduction of carbon and pollutant emission levels. The transport companies reduced their operational costs by over € 7,200 per year.
Regarding society indicators, surveys conducted reveal that nearly half of the involved population (neighbours, shopkeepers and transport operators) were aware of the initiatives put in place. The main outcome is that establishment of limitations for distributors are unpopular. Guidance and information regarding optimisation and improvements are more accepted. This evidences the complexity of goods delivery, where many stakeholders are involved and not all measures are well received by everyone.

Another example is from Iasi. This plan obtained the approval of Municipal Traffic Commission that supported a Local Council Decision, through which the circulation of vehicles that ensure the supply for businesses within 7.00 - 9.00 and 15.00 - 17.00 is restricted through new local laws. The process of implementing the support measures within the plan has started and will continue throughout the remaining period of the CIVITAS ARCHIMEDES project. After the businesses' participation on negotiation meetings they have agreed to follow the provisions of freight quality partnership agreements, which were implemented.

Other measures
The results from the initiatives in Iasi were measured with regard to emission levels and number of freight movements in peak hours. The results are:

- CO level decreased by approximately 15 %;
- NO₂ level decreased by 6-10 %;
- The number of freight vehicles at peak hours decreased, from 109 vehicles in 2009, to 41 in 2011 and 33 in 2012. In off-peak hours, the number of goods distribution vehicles increased from 17 in 2009, to 82 in 2011 and 78 in 2012;
- The awareness level was 80-85 % in all three years;
- The acceptance level increased during the evaluation period, from 77 % in 2009 to 90 % in 2012.
In general, reduction of noise emissions in the urban environment through reduction of traffic intensity appeared to have little effect, due to the fact that even small decreases in noise emissions require a significant reduction of transport intensity. Re-scheduling goods delivery to night deliveries create other challenges in terms of traffic noise - especially if residential areas are concerned. The conclusion is that the traffic affected is only marginal. Hence, there are no measurable indications on noise reductions.

4.4.2 Changes to Processes

In general, no changes to processes were encountered within this workpackage. However, in Brighton & Hove it was originally planned to deliver a city wide freight quality partnership but lack of stakeholder interest made this impossible. It was decided to link the project to a physical measure with a localised impact on freight to generate much more stakeholder interest.

4.5 Future Plans

The future activities regarding freight logistics and air quality improvements are largely based on expanding the current schemes to encompass additional city districts.

For example, BHCC is continuing the Walking Network Improvement programme. Following the completion of the East Street scheme, the next area likely to benefit from similar improvements will be the wider Old Town area. In Brighton & Hove, further traffic reduction measures will be applied to the area surrounding East Street. At the request of local businesses East Street will be fully
pedestrianised between 11am and 7pm each day. The streets surrounding the area will be restricted to business and resident use only. A more detailed freight strategy will be produced and alternative methods of engaging with freight operators will be considered.

In general the environmental zone requirements are regulated by and will develop according to Danish law. In Aalborg, no future specific activities are planned for the environmental zone, although the municipality is keeping a watch on the development of a national plan for Clean Air Zones which are being elaborated by the Ministry of Environment.

The Municipality of Donostia-San Sebastián is considering the possibility of implementing a second urban consolidation centre in another area of the city. Possible locations and management structure will be assessed in the near future.

Iasi will continue to maintain the partnerships signed with different businesses in the CIVITAS corridor. It will ensure that the time schedules approved for supplying activity are respected. In addition, Iasi will try to sign partnerships with companies placed on other corridors within the city.

In Usti the ambition was to include a plan for new roads in the SUTP that would allow moving transit freight traffic away from the city. However, for political reasons it was necessary to take this out of the SUTP. This does not change the need to divert traffic (Dresden-Prague route) away from the city to solve noise and environmental problems caused by HGVs.

5. Conclusions and Recommendations

Workpackage 7 focuses on energy-efficient freight logistics. This section summarises conclusions and recommendations regarding the various technologies within this workpackage. More detailed information regarding the different measures can be found in D10.3 Final Evaluation Report and D12.4 Final version of measure level result templates.

5.1 Conclusions

One conclusion regarding environmental zones is that they are realistic only when backed by national policy makers and other stakeholders like companies and freight associations. The results regarding environmental zones showed that their establishment induced renewing of the freight vehicle fleet. However, the increase in vehicle numbers reduced the potential for reduction in emissions of greenhouse gases. To reach a real, withstanding and positive impact it is necessary to implement regulations for HGVs - both administrative measures (signs, information etc.) and hard measures (physical delimitations like raising bollards, one-way streets etc.).

Regarding the hard measures in Brighton & Hove, for example, a conclusion drawn is that the part-pedestrianisation scheme was successful in reducing freight movements. However, its acceptance by local businesses only occurred due to prolonged dialogue with them, and many amendments to the scheme to ensure that it worked for all.

It can also be concluded that the dialogue with stakeholders is essential. The schemes turned out successfully in terms of reducing freight movements. However their acceptance by local businesses only occurred due to prolonged dialogue with them, and many amendments to the scheme to ensure that it worked for all. A conclusion regarding the freight quality partnerships is that an approach relying upon traders and freight operators’ goodwill to seek improvements to goods distribution would not
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appear to be sufficient. Measures of city logistics can result in positive impacts in terms of reductions of emissions of greenhouse gases although the initiatives are received negatively by the businesses.

It should be acknowledged that traders may have other more pressing priorities for their business than putting their time into something which they may perceive will have no outcome.

5.2 Recommendations

General recommendations on creating efficient systems for freight delivery are:

- Implement both hard and soft measures. Soft measures like freight quality partnerships are more efficient when combined with hard measures in terms of physical changes in the infrastructure.
- Balance the strategy. Increased efficiency in goods delivery may rely largely on improved operations that most probably will impact on carriers’ usual behaviour, thus seen by this sector as a threat to their actual working conditions. To gain their support, a balanced action plan including also measures that give clear benefits to transport operators, e.g. time savings.
- Urban goods delivery involves multiple private companies and information is not always easily available (both regarding volumes, characteristics - boxes, trolleys, cargo pallets, cooling etc. - and specific associated delivery needs). An intensive initial data collection phase is required to clearly understand the rationale behind urban goods delivery activity and produce a comprehensive action plan based on it.
- Approach the rationalisation of urban goods delivery in urban areas from a geographical basis, considering the possibility of establishing a freight consolidation centre serving a particular area of the city.
- Gain support from affected stakeholders. Urban goods delivery is a very complex activity where many stakeholders are involved and not all measures are well perceived by everyone. A wide consensus regarding the need for action and the way to articulate it guarantees the acceptance of measures and paves the way for further developments. A freight quality partnership is a tool for this, although they can be challenging to operate (see specific recommendations)
- Create citizen’s awareness. It is very important that citizens are committed to support behavioural change towards sustainable mobility that includes urban goods delivery. Continuous awareness raising activities are required to prevent falling back into ‘old habits’.
- Creating partnerships with different stakeholders in other cities may also contribute to successful measure implementation.

The recommendations regarding establishment of environmental zones are:

- The identification of and engagement with key freight operators/federations is crucial in the preparation phase of an environmental zone. This allows for the creation of a working group with the right people that should continue throughout the implementation period;
- Host frequent meetings with freight operators and focus on ensuring a good dialogue to utilise the experience held by shop-keepers, drivers etc. and provide the necessary information on reasons for implementing the zone and requirements to secure engagement and fulfilment of requirements.

The recommendations regarding freight quality partnerships are that:

- To successfully initiate a freight quality partnership it is necessary to have incentives (e.g. time savings giving by less queuing, removal of on street obstacles etc.) for the freight operators;
- Information should also be provided for residents to inform them of the impacts and prevent unfortunate behaviour that could negatively impact the results.
- Involve ‘champions’. This means cooperating with innovative companies, able to guide others through the implementation of innovative solutions.