Internal Report Cluster 1 2015
IRCL1.4
Urban Freight
Innovations and solutions for sustainable deliveries

Final version

Date 12 April 2016

Project co-funded by the European Commission within the Seventh Framework Programme Start date of project: 1st January 2012 Duration: 48 months		
Dissemination Level		
PU	Public	
PP	Restricted to other programme participants (including the Commission Services)	X
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

Editors

Editors	Jacques Leonardi, Michael Browne (UoW)
Contributors	Gabriela Barrera (POLIS) Ronald Jorna (Mobycon) Christophe Rizet (IFSTTAR) Juergen Schrampf (Econsult) Thanks to many industry representatives and experts named in this report for their essential contribution

Disclaimer

Abstract

This document presents the long version of the material collection on the BESTFACT Urban Freight Best Practices 2015. It uses the selection and evaluation methodology developed by the BESTFACT team. It includes 5 case studies presented in form of standardised inventories and 5 in-depth surveys. Chapter 1 presents an overview and summary of all case studies 2012 to 2015. Chapter 2 is a short introduction. Chapter 3 is the Inventory material collected. Chapter 4 contains the in-depth survey for the 5 case studies of the year 2015. Chapter 5 presents a brief transversal analysis and concluding remarks.

Document versions

Version number	*Name (company)*	*Date*	*File name*
1	*Jacques Leonardi (UoW)*	*22 July 2015*	BESTFACT_IRCL14-ClusterReport2015-22July2015.doc
2	*Jacques Leonardi (UoW)*	*12 April 2016*	BESTFACT_IRCL14-ClusterReport2015-12Apr2016.doc

Table of contents

List of tables

List of Figures

1 Summary of the Urban Freight cases 2012 to 2015

1.1 Summary of BESTFACT Cluster 1 Best Practice cases 2015

1.1.1 Low emission zone, city of Rotterdam

The Low Emission Zone of the city of Rotterdam was established in 2007. Several replications have occurred in The Netherlands. The Zone has been extended to a greater area and the impacts are beneficial regarding air pollutants.

1.1.2 Brussels Strategic Plan for Urban Freight

Brussels developed a comprehensive freight plan including infrastructure, economic and consolidation measures. The plan entered into force in 2013 and delivers today beneficial impacts on logistics businesses in form of a new consolidation centre, new rules and new governance structures.

1.1.3 Environmentally friendly paper supply to municipality buildings: the case of Amsterdam

The city of Amsterdam decided to supply its administration with paper deliveries in a sustainable way. A tender was awarded to a logistics business with heavy full-electric trucks. A small additional funding covers the costs.

1.1.4 Paris LEZ

The Low Emission Zone in Paris was established in 2015 for freight vehicles, and will be progressively extended to other vehicles in 2016. This is the first Low Emission Zone in France and it is expected to trigger further replications across the country.

1.1.5 CityLog EMF

This best practice is an innovative electric vehicle with a hydrogen-based powertrain, which can be coupled with an electronic shaft to a small road train, very suitable for city centres. Successful tests were run in Klagenfurt, Austria.

1.2 Summary of Urban Freight Best Practice cases 2014

1.2.1 La Petite Reine: Supermarket Home Delivery Services by e-bikes

'La Petite Reine' delivers purchases from supermarket stores to consumer homes, using clean delivery vehicles, adapted to dense urban centres. Delivery vehicles are electrically-assisted cargo tricycles and electric vans. The cargo tricycles can go where small vans and other light commercial vehicle cannot (i.e. city centres reserved for the pedestrians, the tourist spaces, etc.). These vehicles are zero emissions, silent, ergonomic and agile.

1.2.2 Beaugrenelle UCC of Chronopost, by Sogaris

Beaugrenelle ULC is a logistic centre located in the centre of Paris, close to Chronopost's customers. It has as main impacts the reduction of delivery distances (vehicle km should be divided by two) and CO2 (predicted reduction of about 80%) and the improvement of the express service. The automation of the whole operation on the site decreases the difficulty of the work and improves safety.

1.2.3 Smart Urban Logistics: an Austrian networking platform to boost and promote intelligent solutions in the field of urban logistics

The aim of the initiative "Smart Urban Logistics" is to build up an Austrian networking platform to boost and promote intelligent solutions in the field of urban logistics.

The intention was to make stakeholders aware of the topic, to create acceptance for innovative technologies, to initiate a communication process, to support further discussions and to be the incentive for the start of pilot projects that help to design future cities.

1.2.4 EMILIA electric mobility

The demonstration project focuses on innovative freight logistics for urban areas especially tailored towards a significant use of electric mobility ranging from e-cargo bikes to alternatively-fuelled road trains:

- *Open Innovation for actively involving external stakeholders*
- *Develop novel logistics concepts, algorithms and applications*
- *Optimize small cargo vehicles: increasing range and reducing cost and weight*
- *Demonstrate that using electric vehicles in urban logistics is technically feasible and economically viable*

1.2.5 LOGeco ? eco-friendly logistics: innovative approach to public-private decision making process

The LOGeco project deals with design and validation of a new model for urban logistics solutions that entails innovative and sustainable actions. LOGeco started for example a new management process for City Logistics policy in Rome Trident, set-up an Urban Consolidation Centre, increased the use of clean vehicles, contributed to change in regulation and access rules to certain area, and to increase in logistics operation efficiency. LOGeco involves all the relevant public and private stakeholders operating in the different distribution chains affecting the urban freight sector, and defines sustainable solutions for the 'last mile', including electromobility.

1.2.6 Electric Removal Truck, Aad de Wit Verhuizingen

Aad de Wit now uses two full electric trucks for removals. Hereby, the company fulfils current and coming environmental rules and regulations implemented in Amsterdam. The company now offers a zero-emission furniture removal service in the city, but in fact they can offer it country-wide. The electricity used by the trucks is 100% green energy (solar and wind energy). Besides, the trucks are more silent compared to conventional removal trucks. Removals by Aad de Wit can be done in a clean and quiet manner.

1.2.7 Mokum Mariteam: Cargo delivery by a 20 meter long full-electric ship on the canals of Amsterdam.

Mokum Mariteam uses the canals of Amsterdam to transport goods and deliver services. Hereby it reduces the number of small- and medium-sized trucks in the inner-city. The ships are driven by silent and clean electric engines. Goods are transported through the city and delivered at its destination without noise pollution. Using existing transport units like rolling containers, pallets and mesh containers, the system can be implemented by new clients and partners without any problems. This makes it possible to scale up the system gradually.

1.2.8 Combipakt: delivery services via taxi

A taxi company for special target groups and patient transport and a traffic school delivers medicines from the city of Nijmegen to rural villages and houses in the surroundings of the city. On their way back to Nijmegen they pick up agricultural products from small farms and bring these to the city. Both the taxi company and the traffic school do this together with their usual business. This reduces the number of cars/vans in the city of Nijmegen as well as it increases the level of services in rural areas. At the same time a 100% transition from conventional fuelled vehicles to electric vehicles takes place.

1.2.9 Citylogistik-kbh Copenhagen UCC

Citylogistik-kbh in Copenhagen involves using an urban consolidation centre (UCC) for the supply of goods to the historical city centre of Copenhagen. All goods are shipped to and consolidated at a distribution centre outside the city and then transported by the City logistics provider Citylogistik-kbh to the customer. Citylogistik-kbh is an ongoing scheme started in 2012 that uses an environmentally friendly electric vehicle to deliver the goods to the stores located in the city centre that are participating to the scheme.

1.2.10 KAUTRA: Parcels distribution services by bus

Purpose of the service is to deliver parcels and small cargo from any KAUTRA served city or town to another city or town that is also served by KAUTRA interurban busses in no more than 24 hours. Parcel and small cargo is delivered using interurban buses. The most of the parcels and cargo are delivered the same day or it takes as long as it takes for the bus to go between origin and destination. Par-cels and small cargo may be dropped off in designated terminals or directly to the driver of the bus if there is no terminal in the city.

1.2.11 Meyer&Meyer: Use of heavy electric trucks for urban distribution

To increase their corporate image, test the usage of electro mobility and develop concepts to increase the profitability of electro trucks, the logistics business Meyer&Meyer, specialised in clothing, started a pilot in which the C&A store (Kurfürstendamm) is being delivered by an electric vehicle. For this purpose they developed a vehicle concept for 12t MAN trucks in cooperation with the manufacturer All Green Vehicles (AGV, The Netherlands) where existing standard diesel-powered vehicles are modified with an electric engine.

1.3 Summary of the Urban Freight cases 2013

1.3.1 Binnenstadservice Nederland

Binnenstadservice Nederland is an innovative concept that has been applied for five years in 11 cities in the Netherlands. Binnenstadservice manages an Urban Consolidation Centre (logistics depot and distribution service) on behalf of retailers and other organizations located in the city centre. Goods destined for these retailers are delivered to this consolidation centre, by freight operators. At this centre, goods are bundled and delivered to shops in the city centre. Simultaneously empties/packaging/paper are returned to the consolidation centre.

1.3.2 CITYPORTO – Last mile deliveries in Padua

Cityporto is an Urban Consolidation Centre (UCC) service operational in Padua, Northern Italy, focusing on deliveries to the central area 'Low Traffic Zone' of 830,000 m^2. The manager is Interporto Padova S.p.A., which also manages the local freight village, a PPP whose major stakeholders are the local public bodies (Municipality, Province, Chamber of Commerce). Cityporto has been operating since 2004 and performs more than 100,000 deliveries per year (2012), for 65 customers (most of the couriers and forwarders operating in the city).

1.3.3 The Green Link: last mile with cargo cycles and vans in Paris

The Green Link (TGL) is a company making parcels deliveries in central Paris with an entire fleet of battery electric vehicles. The business is proving to be profitable. TGL started operations in 2009 and is now using 3 urban depots (green hubs) in Paris and trying to develop in other French cities and other countries. At the end of 2013, the volume of parcels distributed was 2,500 per day, and the business is expected to grow to a volume of about 5,000 parcels per day in 2014. The scale of growth is limited by the size of the current depots.

1.3.4 Gothenburg City Logistics Initiatives

The City of Gothenburg has developed and applied a bundle of city logistics policies and solutions, including the regulation of city centre and shopping area, developing new infra-

structure, establishing a consolidation centre, promoting the use of clean vehicles, developing trials of innovative solutions, monitoring and data collection on new vehicles and new technologies. The solutions have been developed coherently and are supervised by a well-established network of experts active in different businesses and public sector institutions.

1.3.5 Urban freight distribution with electric vehicles in San Sebastián

In San Sebastián (referred to as Donostia in Basque) an urban freight system has been implemented that replaces the use of diesel vans making direct deliveries from a suburban depot. Instead the goods are delivered to a small consolidation centre, before being dispatched to the final customer with a fleet of electric cargocycles. This in intended to reduce the negative impacts imposed on the inhabitants and urban space. The company Txita and the Municipality cooperated with several partners to set-up and manage this solution.

1.3.6 Use of electric vehicles for parcel distribution at UPS Karlsruhe

UPS is testing and analysing the use of a fleet of electric vehicles in urban traffic systems to reduce CO_2 emissions, noise and particulate emissions. The vehicles being used are conventional diesel vehicles that have been modified into electric vehicles. These electric vehicles are being used mainly in inner city areas and on trips shorter than 80km. The vehicles return to the depot with about 20% residual charge and are then recharged at a specific loading facility by the responsible person. All vehicles are charged through the night.

1.3.7 City Logistics in Copenhagen using an Urban Consolidation Centre

The concept of Citylogistik in Copenhagen involves using an urban consolidation centre (UCC) for the supply of goods to the historical city centre of Copenhagen. All goods are shipped to and consolidated at a distribution centre outside the city and then transported by the City logistics provider Citylogistik-kbh to the customer. Citylogistik-kbh is an ongoing scheme started in 2012 that uses an environmentally friendly electric vehicle to deliver the goods to the stores located in the city centre.

1.3.8 Electrically assisted tricycle for parcel deliveries in France

'La Petite Reine' delivers purchases from big stores to consumer homes, using clean delivery vehicles, adapted to dense urban centres. Delivery vehicles are electrically-assisted cargo tricycles and electric vans. The cargo tricycles can go where small vans and other light commercial vehicle cannot (i.e. city centres reserved for the pedestrians, the tourist spaces, etc.). These vehicles are zero emissions, silent, ergonomic and agile.

1.3.9 Marleenkookt meal deliveries in Amsterdam

MarleenKookt cooks meals for those who are short of time or have other reasons not to cook for themselves. People have to order their meals on a website. The meals are then delivered to the consumers by e-cargobikes. The operating area is limited to the centre of Amsterdam. Most customers are private individuals; only about 10% of deliveries are made to companies.

1.3.10 Urban freight delivery B2C solution with clean vehicles: Emakers

Emakers offers clean deliveries with a fleet of electric and cycle freight vehicles, and a B2C solution for delivery management and information exchange. It has been an evolving operation offered in Spain and the UK since 2012. The products and services developed by Emakers in 7 cities consist of an efficient B2C solution based on technology, unique operations and sustainable vehicles.

1.3.11 Clean vehicle and city logistics scheme in Brescia

"Eco-Logis" is a distribution service operational in the urban area of Brescia (Lombardy-Northern Italy), focusing on the historical city centre and its Low Traffic Zone (LTZ). The manager is Brescia Mobilità, an in-house company of the City of Brescia, in partnership with OMB Inter-national (Logistics Manager), Cooperativa Facchini Bresciani (Personnel Manager), and Consorzio Brescia Mercati S.p.A. (Depot owner). The service has been operational

since 2012 and was motivated by an objective to reduce the traffic congestion and pollution in Brescia city centre. The deliveries are performed by 11 LNG-powered vans. The depot is a 1000 m^2 wide urban consolidation platform located within the freight village.

1.3.12 Citylog EMF (efficient, modular, flexibel) – Electro-Multifunction-Transportation vehicle

Citylog EMF is a new type of electric freight vehicle developed in Austria by a consortium led by HET. The electric motor propulsion is fuel-cell based, and the vehicle concept consists of a series of 'self-driven' vehicles and 'trailers' that can be coupled to a train, and un-coupled for loading and unloading operations. The trials in Klagenfurt follow the prototype phase in which the technical feasibility has been demonstrated.

1.3.13 EMEL New loading/unloading regulation in Lisbon

The Lisbon Transport Authority (known as EMEL) has developed a new solution that helps mitigate specific traffic problems. The solution consists in the development and implementation of two technology based schemes:

- *Adapted Parking Meters that issue special tickets for 30 minutes of unloading/loading operations*
- *Detection sensors that detect the presence of a vehicle in the loading bay and send a message to the control centre of the Transport Authority (EMEL).*

1.3.14 GOFER cooperative system for freight management and regulation

GOFER'S main objective was to contribute to a reduction in emissions, queues, accidents and operator costs related to heavy road freight, by introducing new technical solutions and ways of cooperation. Three separate demonstrations took place in the project: A live demonstration on the 500 km route Oslo to Trondheim; a heavy vehicle driving simulator to study heavy vehicles prioritising measures in urban areas; and a simulation model for access to the Alnabru terminal area in Oslo. This best practice case describes the two first demonstrations.

1.3.15 Fleet Operator Recognition Scheme (FORS) in London

The London Fleet Operator Recognition Scheme (FORS) is a publicly-funded, voluntary certification scheme aimed at ensuring that fleet operators work lawfully and to best practice by meeting specified standard. It encourages behavioural change and is targeted at commercial operators, local authorities and procurement specialists. FORS generates actions by fleet operators as it requires them to meet standards and requires they demonstrate their safety, environmental and business efficiency performance improvement. In return fleet operators are awarded FORS awards.

1.3.16 Lean and Green Municipalities (Connekt) in the Netherlands

Lean and Green is a project lead by Connekt. Lean and Green supports and rewards organizations for reducing CO_2 emissions and costs. The main subject is the distribution of goods in inner cities, which is an issue of increasing importance due to urban infill and traffic congestion. Lean and Green is attempting to improve the collaboration between municipalities and local companies to reach shared goals. In addition, Lean and Green is sharing its knowledge with municipalities to solve practical issues.

1.3.17 Urban distribution of small parcels using self-service terminals in Lithuanian towns and cities (LP EXPRESS 24)

LP EXPRESS, a branch of the state-owned enterprise AB "Lietuvos paštas", adopted an innovative urban distribution system of self-service terminals. This self-service system, referred to as "LP EXPRESS", is the latest addition to the company's service offer, providing terminals that are available 24/7, located in 41 cities and town in Lithuania. The functionality of these terminals has been expanded to include that: users may drops off their parcels, send

their parcels abroad, and choose other delivery options (e.g. couriers). Additionally, the unique operating system was developed to support these services.

1.3.18 Post Receiving Box by Austrian Post AG

The "receiving box" allows the deposit of registered mail at the customer's residence. If a shipment cannot be delivered, the postman deposits it in the receiving box and notifies the recipient with an RFID-Card in the letter box. The recipient removes the notification card from the letter box and uses it to open the receiving box.

1.4 Summary of the Urban Freight cases 2012

1.4.1 Use of battery-electric tricycles and vans for retail distribution in London: Gnewt Cargo

Electrically-assisted cargo tricycles and electric vans are used to deliver parcels from a small urban consolidation centre to customers in the centre of London. The operation of the vehicles does not result in any fossil fuel consumption or greenhouse gas emissions as the electricity used is produced from renewable sources. The urban consolidation centre and the deliveries made from it are operated by the new company Gnewt Cargo, specialising in green urban freight deliveries.

1.4.2 Electric vehicles use in parcels deliveries in Stuttgart-Ludwigsburg

As part of the IKONE project, about 50 Mercedes-Benz Vito E-CELL transporters powered by electricity are used by selected partners and the large German parcel logistics service provider DPD in the Stuttgart region. Their field of application involves various commercial activities and delivery tasks. The Stuttgart region has a very difficult topography (situated in a basin) and the filed test focused on the analysis of the vehicle use in these specific conditions.

1.4.3 Distripolis: Urban Consolidation Centres and battery-electric vehicles for last-mile deliveries

In order to replace the use of standard diesel trucks, GEODIS, a large road transport operator, is testing Urban Consolidation Centres (UCCs) and electric vehicles in a large scale trial in France. In the project (called Distripolis) new, small UCCs (blue points in the picture to the left), are located in the city centre of Paris, and receive goods from a central depot (located in Bercy) by Euro 5, Hybrid or CNG trucks. From these UCCs, the final deliveries are performed with low emission vehicles (battery powered - electric vans and tricycles) on short distance trips.

1.4.4 Cityporto: Last mile deliveries in Padua

Cityporto is an Urban Consolidation Centre (UCC) service operational in Padua, Northern Italy, focusing on deliveries to the central area 'Low Traffic Zone' of 830,000 m2. The manager is Interporto Padova S.p.A., which also manages the local freight village, a PPP whose major stakeholders are the local public bodies (Municipality, Province, Chamber of Commerce). Cityporto has been operating since 2004 and performs more than 100,000 deliveries per year (2012), for 65 customers (most of the couriers and forwarders operating in the city). The deliveries are performed by 11 LNG-powered vans. The depot is a 1000 m2 wide urban consolidation platform located within the freight village.

1.4.5 Electric freight vehicle with trailers: Cargohopper in Utrecht

Cargohopper is a dedicated inner city delivery service using clean freight vehicles in Utrecht, Netherlands. The service was introduced in 1996 in order to efficiently perform last mile operations for local businesses, especially for tourist venues, restaurants and catering facilities. Currently, an electric powered road train is running on the streets of Utrecht for parcels deliveries using the Cargohopper name. Other innovative vehicles are also used or under development as part of Cargohopper.

1.4.6 Binnenstadservice Nederland

Binnenstadservice Nederland is an innovative concept that has been applied for five years in 11 cities in the Netherlands. Binnenstadservice manages an Urban Consolidation Centre (logistics depot and distribution service) on behalf of retailers and other organizations located in the city centre. Goods for these retailers are delivered to this consolidation centre by freight operators. At this centre, goods are bundled and delivered to shops in the city centre. Simultaneously empties/packaging/paper are returned to the consolidation centre.

1.4.7 Berlin tests of BentoBox in the Laboratory area

The urban freight 'laboratory area' is a small residential and mixed-use business and retail area in a central borough of Berlin, Germany, in which innovative freight transport solutions are tested, studied and presented. The Bentobox technology consists of the use of a new locker bank for parcels storage, and of electrically assisted bikes for final delivery. Bentobox tests were performed in the laboratory area. The project leader, the Senate Department for Urban Development and Environment of Berlin, seeks to use this area for further tests, including e-mobility and smart freight solutions.

1.4.8 ILOS - Intelligent Freight Logistics in Urban Areas, Vienna

The objective of ILOS is the development and definition of indicators to describe the saving potential of transport journeys in urban areas using traffic information obtained through floating car data, as well as the development of appropriate quantification methods to determine these indicators from route analyses in order to achieve a possible saving potential in terms of time or distance. This in turn leads to savings in fuel, emissions and operating costs.

1.4.9 iLadezonen in Vienna, Austria

The project i-Ladezone focuses on two major topics. The first is the development of management methods in order to open delivery opportunities through the efficient and effective monitoring of the occupancy of loading bays by loading vehicles and private cars. The second topic focuses on the development of a management system for keeping the loading bays at maximum availability and reducing impacts on traffic caused by the loading activities. Also included is the development is an intelligent routing application for mobile use by the drivers of the goods vehicles.

1.4.10 Multiuse lanes for freight distribution in Bilbao

'Multiuse lanes' is one of the initiatives developed in Bilbao by the local authority and local stakeholders to improve goods distribution in the city. This initiative consists of the more efficient use of lanes in the city centre streets. In this approach, one of the road lanes will be provided for the loading and unloading of goods at certain time slots, and used for other vehicle activities during the rest of the day.

1.4.11 Logistics tool for delivery management for trade fairs, Messe Basel

At the Exhibition Centre of Basel, the largest in Switzerland, the operator MCH Messe Basel introduced a new logistics booking system. Exhibitors, stand builders and other suppliers have to register in advance via a designated online logistics tool for all deliveries and pick-ups to the venues. All logistic processes are managed and handled by the trade fair's logistics operator. This logistics tools offers a solution for the specific problem of the Messe Basel Exhibition Centre, but is highly transferable to many urban facilities or logistics intensive campuses elsewhere.

1.4.12 Network of four Urban Retail Distribution systems in Lithuania

A market dominance (oligopoly) of a few retail supermarkets in Lithuania has led to an optimised urban logistics solution: four chains operate most of the supermarkets across the country, from small to large scale stores, which are located in every town and city. All these supermarkets are serviced from strategically located logistics centres, at which goods are

loaded as consolidated shipments onto large vehicles, thus reducing the number of trips made to supply each shop and by using optimised routes. The number of vehicles and trips are reduced, leading to a positive impact on traffic & emissions.

1.4.13 Optimisation of waste collection in Maribor

For waste collection rounds in the city of Maribor, Slovenia, a new route optimisation solution has led to savings of 20% in time spent and distance covered by the fleet. The route optimisation makes use of an operational research algorithm that solves the so-called "Chinese postman problem". This algorithm was used by SNAGA, the main urban waste management company. The optimisation is based on high quality data, GIS use and detailed knowledge of day-to-day operations. The solution resulted in more optimal vehicle routes and savings that are beneficial for the public sector.

1.4.14 Zero emission Beer Boat in Utrecht

The beer boat concept was introduced in the city of Utrecht in 1996 in order to perform efficient last mile operations in the delivery of beer to catering and drinking establishments, thereby preserving the historical centre of the city, relieving the pressure on road traffic and complying to labour laws (for carrying barrels and crates). In 2010, the City of Utrecht updated the beer boat with an environmentally-friendly electric boat. Building on its success, in 2012 the City introduced another zero-emission boat for use in carrying other products including waste.

1.4.15 Franprix en Seine: Shop deliveries using waterways in Paris

Franprix supermarket stores in Paris are being supplied through a new multi-modal and urban transport chain solution. In this innovation, the last transport leg between regional distribution centre and retail shop occurs via waterways. The shipment is transported in a special container, sent from the warehouse to a river port in the periphery by truck, then by barge to the centre of Paris, shipped on the Seine River for a distance of 20 km to the Quai de la Bourdonnais in central Paris. From there another truck transports the containers to the shop on a very short trip.

2 Introduction of Cluster 1 Urban Freight

2.1 Introduction

The objective of Cluster 1 is to better understand why selected urban freight solutions represent innovations that are technically feasible, economically profitable in different contexts, sustainable, transferable, and with tangible beneficial impacts.

The report is based on work being carried out in the Cluster 1 of the EC-funded project “Best Practice Factory for Freight Transport” (BESTFACT) which commenced in 2012 and runs for four years. The project is examining best practice in urban freight transport, green logistics, co-modality, and e-Freight.

The objective of this report is to answer the following question: what are the current Best Practices in Urban Freight and what can be better understood on the benefits of these innovations that contribute to meeting policy objectives of reducing environmental impacts and at the same time improving company profitability? A number of studies have been published on methodologies and technologies for improving freight transport efficiency that lead to reductions in environmental impacts (BESTUFS 2007, Browne et al. 2012). The core innovation of the approach presented in this report is to extend such best practice assessment methodologies towards more business oriented factors that are necessary to consider when implementing strategies within the industry and when applying more environmental and carbon efficient solutions within cities (BESTFACT 2013).

After providing and overview of all Best Practice Cases (section 1), and a short thematic introduction and analysis (Section 2), one of the key objectives of this report is to provide an observation and inventory of 5 promising measures evaluated by the end of 2014 (section 3). In this report, all these initial cases and results are presented with a more advanced level of detail – the so called in-depth reviews - illustrating the application of the methodological innovations (section 4). This report ends with a transversal analysis of the solutions observed. At the end, preliminary conclusions and lessons learnt are drawn (section 5).

2.2 Current situation and trends in the field

Two of the core problems faced by existing sustainability strategies in urban freight transport are the relatively small market share of clean technologies and the slow diffusion of technical innovations. As in other business sectors, the technology innovation cycle in freight transport and logistics typically starts with a new idea, then progresses to prototype development and trial, and eventually leads to a full-scale industry or citywide utilisation. But when it comes to clean solutions and electric vehicles, there is a tendency for innovations to remain stuck at the level of small-scale field tests. The difficulty in up-scaling good practices is not well understood. The vast majority of the urban freight sector continues to use diesel trucks and vans, and fleet modernisation is slow.

The main novelties and current trends in urban freight in 2015 are related to Information and Communication Technologies (ICT) (Taniguchi et al. 2015). Among several current trends observed in a recent review by Taniguchi et al. (2015), the most important for a sustainable urban freight and logistics policy are:

- Big data and analysis
- Decision support systems
- E-Commerce and home deliveries
- Energy saving and clean technologies
- Combining passenger and freight transport
- 3-D printing and modular offsite construction
- Land use and logistics sprawl
- Road pricing.

Looking at these trends, it must be noted, at the final year of BESTFACT, that for most of them, such as 3-D printing or combined passengers and freight transport, the BESTFACT team could not find documented good practices in Europe.

Another type of solution, for which no good practice could be found beyond the cases presented in previous years, are the so-called 'alternative' fuel technologies. The only urban logistics cases that are showing convincing results and can be considered Best Practice are electricity and CNG based solutions. Especially hydrogen, biofuels, biogas or other solutions could not be identified in convincing, real business cases.

The key practical output of this report is to give decision makers a detailed knowledge base of success stories and a better understanding about why one solution may be more profitable and beneficial than others. In achieving this objective, BESTFACT has revised the existing methodological approach of best practice evaluation to include a wider range of systematic and new information (Browne et al 2012). Emphasis is put on transferability criteria and on costs and benefits for public and private sector initiatives.

2.3 Cluster topics

The Chapter 1 presents all five cases for the solutions that were selected and inventoried in 2015 in the urban freight cluster of BESTFACT. Like in the years 2012 to 2014, the report of 2015 shows that is difficult to demonstrate some costing issues. Notably missing in most cases is how the solution can contribute to lower the private costs of customers and improve the profitability of the logistics services using the innovation.

Since most cases are running for a period of time that is long enough to allow economic observations, and that a non-profitable case would have been dropped, it can be assumed that the financial balance is beneficial for the running organisation. However, exact costs and revenue data for different clients and different business are not available. Some costs information, however, could be obtained, giving estimates of investments, variable and fixed costs for different cases of sustainable logistics businesses.

On transferability, which seems to be even more challenging to assess than the cost-benefit situation, the information level and quality obtained is variable, but it tends to show that most of the solutions seem transferable.

However, only a few solutions have been effectively transferred to a larger scale, such as low emission zones in Germany, electric vehicles of Distripolis in France or the Binnenstadservice cooperation and consolidation concept in The Netherlands.

2.4 Challenges relating to cluster and topics

Urban freight transport is subject to many challenges, and there are many types of innovative solutions that can be developed that aim to diminish the negative impacts.

Among the numerous problems and gaps mentioned by experts and practitioners, the following list of urban freight challenges was developed from BESTFACT activities carried out between 2012 and 2015, including meetings and workshops, case studies and inventories collected and interviews with operators:

- High costs of electric trucks
- Benefits are difficult to quantify for both public and private sector
- Diesel fuel technology and infrastructure is dominating the market
- Technical difficulties in running alternative fuelled vehicles
- Cooperation for shared use of consolidation centres is difficult
- Lack of IT use for many small companies
- Lack of affordable logistics space within the urban area.

3 Inventory formats

3.1 Low emission zone, city of Rotterdam

1) Basic information	
1.1) Identification	Low emission zone, city of Rotterdam
1.2) Cluster	Cluster 1: Urban Freight
1.3) Responsible authors	Mobycon (Mark Mallens, Ronald Jorna)

2) Scope of practice	
2.1) Approach	☐ Private approach ■ Public approach ☐ Public & private appr.
2.2) Actor classification	City government
2.3) Geographical Area	The Netherlands, Rotterdam
2.4a) Type of city	☒ Large: >1 million inhabitants ☐ Intermediate: 50,000 to 1 million ☐ Small: < 50,000 inhabitants
2.4) Implementation status	Please indicate and explain the status of the case you describe. ☐ Evolving Best Practice ■ Best Practice
	The low emission zone is in place since 2007. Since then, only freight vehicles that have engines equal to or better than Euro IV are allowed in the city centre.
2.5) Date of implementation	September 2007
2.6) Link to other clusters	• Are there existing connections to another cluster topic? No • Can there be future links to other cluster topics? No
2.7) Topics covered	Which topics are covered by the practice? ***Infrastructure and Technology*** ☐ Access to transport networks, infrastructure and nodes ☐ Freight consolidation and transhipment ■ Implementation of low emission technologies ☐ IT-technologies and solutions (for management and administration) ☐ Innovative vehicles, vessels and equipment ☐ ICT (e.g. routing, guidance), transport optimisation ***Organisation and Cooperation*** ☐ Business to business (B2B) solutions, cooperation ☐ Competitive aspects: collaboration (cooperation with competitors), prioritisation (priorities on infrastructure and in nodes)

	☐ Communication between authorities: cooperation, procedures, legal frameworks ■ Communication between businesses and authorities: coordination, consultation ☐ Business models: new form of ownership, risk management ***Operations and Services*** ☐ Business to customer (B2C) solutions (e.g. e-commerce, last mile delivery) ☐ Innovative operational solutions ☐ Value added services, development (or extension) of services ☐ Service quality and sustainability agreements/certification ☐ Transport management, fleet management ***Regulations and Policy*** ■ Access rules and restrictions of urban areas ☐ Land use and spatial planning: assessment and siting of transport facilities and infrastructure ☐ Infrastructure financing: taxation, user charges, PPP ■ Environmental standards and policy ☐ Interoperability and standardisation: vehicles, equipment, loading units, infra-structure ☐ Safety and security: measures, regulations, insurance ***Knowledge, Tools and Methods*** ☐ Modelling and forecasting ☐ Data collection and statistics ☐ Education and training ■ Working and implementation guidelines ☐ Monitoring and benchmarking of processes
2.8) Transport modes	Which transport modes/vehicle types are affected by the solution? ■ Road/ truck ■ Road/ delivery van ☐ Road/ motorcycles, scooter etc. ☐ Bike ☐ Heavy rail ☐ Light rail ☐ Inland waterway vessels ☐ Deep sea vessels ☐ Air freight/cargo planes ☐ Other: please explain …
	Trucks and delivery vans are subject to emission regulations. Other forms of transport are not influenced by these rules.
2.9) Supply chain elements	Only low emission vehicles can enter the designated zone. That means that there's more focus on clean (e.g. electric) vehicles. In the case that companies have only vehicles that are not allowed in the designated zone, they will have to cooperate with local distribution companies that have the right (clean) type of vehicles.
2.10) Which targets can be supported by the implementation?	*For public actors:* ☐ Efficient public spending ☐ Ideal utilisation of infrastructure ☐ Competitive logistics and transport system ■ Acceptance and influence ☐ Balanced provision of goods and services ☐ Increased amenity value ☐ Highest safety and security ☐ Others
	For private actors: ☐ Increased efficiency / productivity of logistics processes ☐ Increased company profitability ☐ Minimisation of financial risks ☐ Increased competitiveness ☐ Increased quality ■ Image ☐ Increased safety and security ☐ Others
	For both actor groups: ■ Limited climate change ■ Reduced emissions ■ Conservation of resources ■ Others? Please specify: Improved health

2.11) End-user benefits	Where do end-users benefit? ☐ Affordable services (e.g. new affordable services or price reductions) ☐ Services in rural areas (new/additional service areas) ☐ Quality of services ☐ Reduced congestions ■ Reduced emissions ■ Reduced climate change ■ Reduced noise pollution ☐ Implementation degree ■ High level of acceptance of solution/practice ☐ Other benefits: (please specify)…

3) Best practice	
3.1) Description of the practice	*Please provide a description of the solution, give details about the **purpose** and the **sustainability objectives**.* The city of Rotterdam installed the low emission zone in 2007. In the centre of the city, the concentrations of particulate matter and nitrogen dioxide in the air are high. These substances are of bad influence to the health of the people living and working in the city. In order to meet European standards for air quality the city had to take steps to improve air quality in the city centre (focussed around lowering No_X and PM_{10}). A major cause of air pollution emissions comes from freight traffic. That is why Rotterdam chose to set guidelines for that particular group first, so that with minimal effort, maximum result could be achieved. Therefore, only trucks that comply to certain environmental requirements (engines equal to or better than Euro 4 norm) can enter downtown Rotterdam. This was not only done in Rotterdam, but also in Amsterdam and Utrecht for example. Because a lot of cities had the same problems, a covenant (guide) was issued, in which the guidelines were described. These guidelines (Euro norm for vehicles, height of fines, age of vehicles) are the same for all cities in The Netherlands that signed the covenant. In the process of writing the covenant, a lot of parties were involved, who all contributed to the final content: • VROM (ministry of Traffic, Spatial Planning and Environment) • VNG (collaboration of all Dutch city councils) • KvK (Chamber of Commerce) • EVO (organisation that represents suppliers of products) • TLN (Transport and Logistics Netherlands) • Several large city councils (e.g. Rotterdam, Amsterdam)

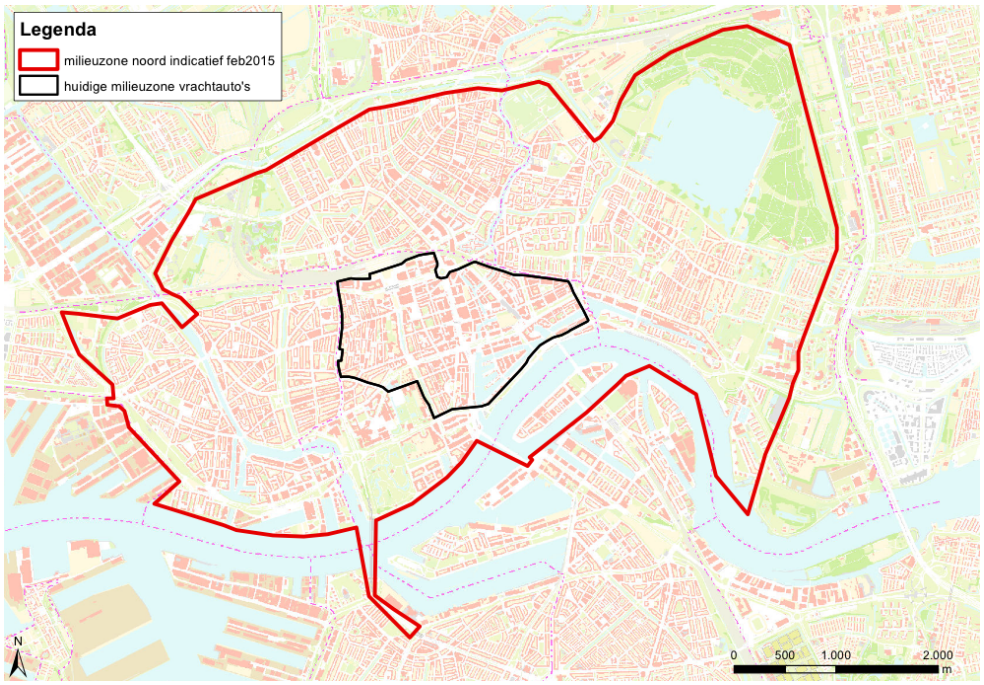
3.2) Technical main characteristics	*What are the technical main characteristics?* In the case of Rotterdam, minimal technology is involved. Controls on compliance to rules is done by so-called 'Special Control Officials', who have the authority to write fines if they see a vehicle that does not comply to rules. They use a smartphone with a special application that can store pictures of license plates and send these to a central server for checking. Based on the outcome (valid or non valid) a fine will be given if applicable. A disadvantage is that only a portion of all offenders will be fined; most likely they will never fine all of them. The city plans to extend the zone in the future, which will result in the use of cameras on entry routes (manual checking by special control officials becomes too time consuming then). That way a much bigger part (if not all) of the offenders will be caught.
3.3) Success factors	*What are the main success factors of the practice? Why does it work so well?* The main success factor was to involve all parties that are influenced by the low emission zone, which resulted in a measure that was supported by a large portion of society.
3.4) Main benefits	*What are the main benefits of the practice? (Compare strategic targets selected in the survey → D2.1)* • *Financial benefits?* - None • *Economic benefits?* - None. • *Benefits in the field of services?* - None. • *Benefits for the society?* - Cleaner air • *Environmental benefits, expressed in CO2 or CO2equivalent?* - Less CO_2 and NO_x emissions • *Other signs/indicators of success?* - One year after introducing the low emission zone Rotterdam conducted an evaluation. That evaluation proved that emissions were indeed lower than the years before, proving that the low emission zone contributed to decreasing NoX and PM_{10} levels.
3.5) Cost indication	A cost indication is not available. Apart from several signs on the street and some enhancements on devices for control officials, a lot of time was invested in the process of making the covenant. This was at the time part of the daily work routine for most people involved.

3.6) Barriers / Limitations	*What were the main barriers and limitations to overcome for the implementation? And how was it managed?* A large portion (approx. 50%) of transporting companies in the Netherlands is not part of any Logistics network. It proved difficult to reach those companies informing them about the new low emission zone in the city. Rotterdam however had a transition year in which they only issued warnings in case of violations. It also took quite some time to define all different vehicle types that drive around, which had a much bigger variety than expected. A prerequisite of signing the covenant was that the vehicles owned by the city also needed to be adapted to comply with the new emission guidelines. That also took more time than expected.
3.7) Common practice before implementation	Before the start of the low emission zone in Rotterdam all types of transport were allowed in the city. There were only restrictions to vehicle height and loading/unloading times.
3.8) Motivation/problem	*What was the main problem or motivation that led to the development and introduction of the new practice?* Increased air pollution mainly caused by delivery vans and trucks with polluting engines.
3.9) Justification of practice	*Why can this case be considered a Best Practice (compare definition in **Dow**)?* Rotterdam was the first major city in the Netherlands to establish a low emission zone. Since then, a lot of cities have followed their example.

4) Transferability	
4.1) Geographical Area	Can the solution be transferred to other countries, regions or cities? ■ Yes ☐ No
	Are there special requirements for the transfer to different countries, regions or cities (e.g. legal system, language barriers, size)? Local (on country level) regulations and laws, since low emission zones in The Netherlands are based on country-wide laws.
4.2) Usability in other domains	Can the solution be transferred to other actors or industries? ■ Yes ☐ No
	Only applicable for local/regional governments.

4.3) Political framework conditions - Regulations	Are there political framework conditions and/or regulations for the best practice case that need to be in place or have to be considered for the transfer of the practice to another domain? ■ Yes ☐ No
	Existing laws and regulations.
4.4) Extensibility	Can the area of the solution be extended or can the practice be used within a different area (e.g. can a city specific solution be used nation wide?) ■ Yes ☐ No
	All areas that are being viewed as over-polluted can be added to the existing low emission zone. This has to be supported by thorough investigation. In addition the low emission zone can be extended to polluting passenger vehicles, which already is the case in e.g. Amsterdam and Utrecht.
4.5) Similar cases	*Are there existing similar cases? If so please indicate and specify what sets this case apart and makes it a better practice.* The cities of Amsterdam, Utrecht, Breda, Den Bosch and The Hague are some of the real-life examples that are in place now. It is expected that the list of cities that will set up comparable zones will grow significantly in the coming years.

5) Additional information	
5.1) Consideration for in-depth analysis	Should this case be further considered for in-depth review? ■ Yes ☐ No
	One of the first major cities to implement these restrictions, set an example for others.
5.2) References	http://www.rotterdam.nl/milieuzone
5.3) Contact for further details	Jerre Sturm j.sturm@rotterdam.nl 06 - 3029 7027
5.4) Date of review	Latest date of update of this format (May 19, 2015)

5.5) Pictures	**Figure 1: Limits for the Low Emission Zone in Rotterdam** (black is the current zone, red is the 2015 extension of the central Zone)  **Figure 2: Signage at entrance of the Low Emission Zone in Rotterdam** 
5.6) Involvement of SME	*Are SME involved in the case? Describe their role or their potential role.* Yes, quite a lot of transport companies, especially the ones with delivery vans, are SMEs.
5.7) Impact on SME	*What is the impact of the case on SME (how can they benefit, what could be the impact on their growth)? Please describe.* They might be faced with investments in new(er) vehicles, which otherwise would not have been the case.

3.2 Brussels Strategic Plan for Urban Freight

1) Basic information	
1.1) Identification	Brussels Strategic Plan for Urban Freight
1.2) Cluster	Cluster 1
1.3) Responsible authors	Marianne Thys, Brussels Mobility, Gabriela Barrera, Polis

2) Scope of practice	
2.1) Approach	☐ Private approach ☐ Public approach ☒ Public & private appr.
2.2) Actor classification	Public authority, retailer, carrier, Logistics Service Providers, shipper, end receiver of urban deliveries
2.3) Geographical Area	Brussels-Capital Region - Belgium
2.4a) Type of city	☒ Large: >1 million inhabitants ☐ Intermediate: 50,000 to 1 million ☐ Small: < 50,000 inhabitants
2.4) Implementation status	Please indicate and explain the status of the case you describe. ☐ Evolving Best Practice ☒ Best Practice
	The strategic Plan was approved in July 2013. Its implementation is started and on-going, measures are foreseen until 2020.
2.5) Date of implementation	July 2013
2.6) Link to other clusters	• Cluster 2 for the rail intermodal links and the waterways related elements of the plan • Cluster 3 for the use of IT for data collection
2.7) Topics covered	Which topics are covered by the practice? ***Infrastructure and Technology*** ☒ Access to transport networks, infrastructure and nodes ☒ Freight consolidation and transhipment ☒ Implementation of low emission technologies ☐ IT-technologies and solutions (for management and administration) ☐ Innovative vehicles, vessels and equipment ☐ ICT (e.g. routing, guidance), transport optimisation ***Organisation and Cooperation*** ☐ Business to business (B2B) solutions, cooperation ☐ Competitive aspects: collaboration (cooperation with competitors), prioritisation (priorities on infrastructure and in nodes) ☒ Communication between authorities: cooperation, procedures, legal frameworks ☒ Communication between businesses and authorities: coordination, consultation ☐ Business models: new form of ownership, risk management ***Operations and Services*** ☒ Business to customer (B2C) solutions (e.g. e-commerce, last mile delivery)

	☒ Innovative operational solutions ☐ Value added services, development (or extension) of services ☐ Service quality and sustainability agreements/certification ☐ Transport management, fleet management ***Regulations and Policy*** ☒ Access rules and restrictions of urban areas ☒ Land use and spatial planning: assessment and siting of transport facilities and infrastructure ☐ Infrastructure financing: taxation, user charges, PPP ☐ Environmental standards and policy ☐ Interoperability and standardisation: vehicles, equipment, loading units, infrastructure ☐ Safety and security: measures, regulations, insurance ***Knowledge, Tools and Methods*** ☒ Modelling and forecasting ☒ Data collection and statistics ☐ Education and training ☐ Working and implementation guidelines ☒ Monitoring and benchmarking of processes
2.8) Transport modes	Which transport modes/vehicle types are affected by the solution? ☒ Road/ truck ☒ Road/ delivery van ☐ Road/ motorcycles, scooter etc. ☒ Bike ☒ Heavy rail ☐ Light rail ☒ Inland waterway vessels ☐ Deep sea vessels ☐ Air freight/cargo planes ☐ Other: please explain …
	Text…
2.9) Supply chain elements	Shippers, LSPs, carriers, receivers
2.10) Which targets can be supported by the implementation?	*For public actors:* ☐ Efficient public spending ☒ Ideal utilisation of infrastructure ☒ Competitive logistics and transport system ☒ Acceptance and influence ☒ Balanced provision of goods and services ☒ Increased amenity value ☐ Highest safety and security ☐ Others
	For private actors: ☒ Increased efficiency / productivity of logistics processes ☐ Increased company profitability ☐ Minimisation of financial risks ☒ Increased competitiveness ☒ Increased quality ☒ Image ☐ Increased safety and security ☐ Others
	For both actor groups: ☒ Limited climate change ☒ Reduced emissions ☒ Conservation of resources ☐ Others? Please specify: …
	Please specify all other and different targets here…
2.11) End-user benefits	Where do end-users benefit? ☐ Affordable services (e.g. new affordable services or price reductions) ☐ Services in rural areas (new/additional service areas) ☒ Quality of services ☒ Reduced congestions ☒ Reduced emissions ☒ Reduced climate change ☒ Reduced noise pollution ☐ Implementation degree

	☒ High level of acceptance of solution/practice ☐ Other benefits: (please specify)…

3) Best practice	
3.1) Description of the practice	The purpose of the strategic plan for urban freight in Brussels Region, in French "Plan stratégique pour le transport de marchandises en Région de Bruxelles-Capitale", is to lower congestion, emissions and other negative externalities due to urban freight transport and heavy goods vehicle traffic. The objectives are sustainability and efficiency, mainly through: • A reduction and an optimisation of the goods vehicle movements within and towards the city • A modal shift from road to waterways and rail • A shift to clean vehicle use for last mile delivery trips • An easier life for van and truck drivers Following quantitative targets were set for the Brussels Region freight transport and logistics sector:

Year	Emission reduction target	Vehicle movement reduction target
2020	-20%	-10%
2030	-50%	-20%
2050	-100%	-30%

3.2) Technical main characteristics	What are the technical main characteristics? 5 main axis of intervention are applied in the freight plan. • Physical structure for urban distribution, notably through the use of distribution centres • Territorial, urban and real estate planning, with the integration of the needs for centralised freight hubs at the planning stage. • Operational measures to increase the efficiency of urban deliveries, with a mix of regulation and infrastructures • Efficient and sustainable transport through innovative research projects • Region as a facilitator of changes, impacting behaviour and organisations of the logistics sector Within these lines, 34 specific measures have been defined, including the participation in the INTERREG IVB LaMiLo project in which an Urban Consolidation Centre pilot was set, defining Delivery Servicing Plans (DSP) or assessing and redesigning freight in pedestrian areas. These measures have been defined with different time-scales until the year 2020.
3.3) Success factors	The main factor for success are the cooperation with the stakeholders, the leading role of the Brussels Region freight unit, the expertise and manpower allocated to the freight plan, identifying resources needed to carry on the different actions defined in the plan, the will-

	ingness of the sector to contribute to the implementation of the plan, and the regular review and impact assessments showing benefits and identifying future action points. There is a beneficial influence through the participation of Brussels to large international projects.
3.4) Main benefits	What are the main benefits of the practice? • Financial benefits: The plan is a public policy, and some elements of the plan will have a financial benefit in terms of reduced congestion and improved delivery time. But as a public sector policy, the plan is neutral and not set-up in a way that would make a difference in the financial benefits for the private sector. • Economic benefits: The main economic benefits are for the business of transport carriers when using electric/clean vehicles. The reduction in adverse health impacts and congestion should be leading to economic benefits for the public. • Benefits in the field of services: Increasing the share of clean freight vehicles will benefit to the image of the carriers involved. • Benefits for the society/Environmental benefits: The targeted reduction in total mileage and total air pollutant and CO2 emission will reduce negative freight externalities such as congestion, accident, health impacts and climate change.
3.5) Cost indication	The total budget of the Brussels Region freight plan implementation is less than 2 million Euro over a period of 3 years (2013-2016, no staff cost included).
3.6) Barriers / Limitations	The main barriers are the inertia of the logistics business, the growth in demand for deliveries also related to population growth, high costs of development and implementation of last-mile projects (e.g. electric/clean vehicles, the difficulties in finding adequate low costs facilities in central area), complex institutional context and limited interregional collaboration, lack of data/difficulties in monitoring the effects of the different measures
3.7) Common practice before implementation	There was limited regulation and very little public intervention before the setting up of the freight plan.
3.8) Motivation/problem	Many threats and weaknesses were identified in Brussels. The main difficulties identified were high level of air pollution, high congestion and lack of space for deliveries in central area.

3.9) Justification of practice	The Brussels freight plan complies with the BESTFACT definition of a Best Practice: • It combines public and private interests • It is innovative through its specific mix of actions related to infrastructure, operations, regulation and monitoring interventions • It has a beneficial impact on the sector and on the negative externalities of freight and logistics such as air quality, congestion and use of urban space. • It is replicable and transferable because the measure taken have already demonstrated their feasibility and applicability

4) Transferability	
4.1) Geographical Area	Can the solution be transferred to other countries, regions or cities? ☒ Yes ☐ No
	Are there special requirements for the transfer to different countries, regions or cities (e.g. legal system, language barriers, size)? No
4.2) Usability in other domains	Can the solution be transferred to other actors or industries? ☒ Yes ☐ No
	Different retailers, large businesses and small SMEs can replicate the successful actions in different economic sectors under the condition that they are active in the city, including construction, service sector. The DSP, one of the elements of the freight plan, can be used as a logistics action, which can be applied for a public administration.
4.3) Political framework conditions - Regulations	Are there political framework conditions and/or regulations for the best practice case that need to be in place or have to be considered for the transfer of the practice to another domain? ☒ Yes ☐ No
	The set-up of a freight plan needs political support, a lot of consultation and an expert team to be well prepared.
4.4) Extensibility	Can the area of the solution be extended or can the practice be used within a different area (e.g. can a city specific solution be used nation wide?) ☒ Yes ☐ No
	In other parts of the city, the region or the country, or elsewhere in Europe

4.5) Similar cases	The London Freight Plan, the Paris Charter of Good Practices, the Gothenburg city logistic policy, all are comparable initiatives. The unique characteristic of Brussels is that it includes infrastructure on top of regulation, DSP, Consolidation Centre, Modal shift, and data monitoring into one single, ambitious plan.

5) Additional information	
5.1) Consideration for in-depth analysis	Should this case be further considered for in-depth review? ☒ Yes ☐ No
	Available detailed information.
5.2) References	Bruxelles Mobilité (2013): Plan transport de marchandises http://www.bruxellesmobilite.irisnet.be/articles/la-mobilite-de-demain/plan-transport-de-marchandises http://www.lamiloproject.eu/
5.3) Contact for further details	Christophe de Voghel, Brussels Mobility cdevoghel@sprb.irisnet.be
5.4) Date of review	Latest date of update of this format (22 June 2015)

5.5) Pictures	 **Figure 3: Full-electric truck and urban consolidation centre of Citydepot, one of the achievements of the Brussels freight plan**
5.5) Pictures	 **Figure 4: Regulation and signage for unloading and urban deliveries in Brussels**

Figure 5: Clean electric van for urban parcels distribution in Brussels

5.6) Involvement of SME	SME as carriers: the Consolidation centre and the delivery business with clean vehicle is operated by SMEs SMEs as shippers: Contracted for parcel transports are not only large businesses, but also to some extend SMEs.
5.7) Impact on SME	The consolidation centre and the clean vehicle solutions are having a beneficial impact on SMEs, if they use the service.

3.3 Environmentally friendly paper supply to municipality buildings: the case of Amsterdam

1) Basic information	
1.1) Identification	**Environmentally friendly paper supply to municipality buildings**
1.2) Cluster	1
1.3) Responsible authors	Pieternel Bakker Assistant project manager Air quality Department City of Amsterdam Pieternel.bakker@ivv.amsterdam.nl

2) Scope of practice	
2.1) Approach	Public & private approach
2.2) Actor classification	• Distribution/transportation (Transmission) • Printers/Copiers/paper (Canon) • City of Amsterdam (Buying Department and Airquality Department)
2.3) Geographical Area	Netherlands, Amsterdam
2.4a) Type of city	☒ Large: >1 million inhabitants ☐ Intermediate: 50,000 to 1 million ☐ Small: < 50,000 inhabitants
2.4) Implementation status	
	Currently running. March 2014 up until the end of 2015
2.5) Date of implementation	March 2014
2.6) Link to other clusters	• Are there existing connections to another cluster topic? • Can there be future links to other cluster topics? Cluster 2: clean vehicles
2.7) Topics covered	***Infrastructure and Technology*** • Freight consolidation and transhipment • Implementation of low emission technologies • IT-technologies and solutions (for management and administration). *(Software link between Transmission and Canon)* • Innovative vehicles, vessels and equipment ***Organisation and Cooperation*** • Communication between authorities: cooperation, procedures, legal

	frameworks • Communication between businesses and authorities: coordination, consultation • Business models: new form of ownership, risk management ***Operations and Services*** • Innovative operational solutions • Transport management, fleet management ***Knowledge, Tools and Methods*** • Working and implementation guidelines • Monitoring and benchmarking of processes
2.8) Transport modes	**Road/ truck**
2.9) Supply chain elements	Warehousing, storage, bundling of goods Transportation
2.10) Which targets can be supported by the implementation?	*For public actors:* • Acceptance and influence • It is an example for other products *For private actors:* • Increased efficiency /productivity of logistics processes (for Canon this is the case) • Image • It is an example for other clients
	For both actor groups: • Reduced emissions • Reduced distance
	Please specify all other and different targets here…
2.11) End-user benefits	Where do end-users benefit? • Reduced emissions • Reduced noise pollution • High level of acceptance of solution/practice • Same level of quality • Less deliveries

3) Best practice	
3.1) Description of the practice	A4 paper (for use by the city of Amsterdam), is delivered at the 40 municipal and borough buildings in a smarter and environmentally-friendly way. It's being transported by an electric truck from a warehouse at the border of the city. This reduces the number of polluting rides through the city. <u>Purpose & objectives:</u> - less km's (bundling)

	- zero emission km's (clean vehicles)
3.2) Technical main characteristics	Transhipment, clean vehicles, bundling, storage, ordering procedure, software
3.3) Success factors	• Public-private cooperation. There was a good cooperation between the A4-paper supplier Canon and the City of Amsterdam, and the different departments of the City of Amsterdam. • The interesting tender and the good proposition of Transmission • The willingness of the different boroughs to order the paper in a slightly different way
3.4) Main benefits	Benefits for the society: better air quality
3.5) Cost indication	There is a small gap between the discount of the main supplier and the costs of transportation and storage by the LSP. This small difference is paid by the Air quality department of the City of Amsterdam
3.6) Barriers / Limitations	There were no limitations or barriers, but beware of procurement rules. And beware of the fact that this is only possible when the supplier is willing to abandon the distribution part of the contract. The supplier needs to be willing to give a discount (pay for the transportation by another party).
3.7) Common practice before implementation	Before, the A4-paper was directly delivered on call, by Canon with a regular diesel truck.
3.8) Motivation/problem	The main motivation was to improve the air quality, gain experience with sustainable public procurement and serve as an example for future projects (with other products).
3.9) Justification of practice	

4) Transferability	
4.1) Geographical Area	Can the solution be transferred to other countries, regions or cities? Yes
	Are there special requirements for the transfer to different countries, regions or cities (e.g. legal system, language barriers, size)? No, I don't expect any barriers. It depends on the willingness of suppliers (of for example paper or coffee) to participate. Otherwise you should wait until the end of the contract.
4.2) Usability in other domains	Can the solution be transferred to other actors or industries? Yes, I think that also other cities/companies can organise their product deliveries in this way. In all offices people use paper, coffee etc.
4.3) Political framework conditions - Regulations	Are there political framework conditions and/or regulations for the best practice case that need to be in place or have to be considered for the transfer of the practice to another domain? No

	Please give a reason for your evaluation
4.4) Extensibility	Can the area of the solution be extended or can the practice be used within a different area (e.g. can a city specific solution be used nation wide?) Yes, other cities, other companies, other products
	Please give a reason for your evaluation see above
4.5) Similar cases	Delivery and Servicing Plans in London

5) Additional information	
5.1) Consideration for in-depth analysis	Yes
5.2) References	http://frevue.eu/environmentally-friendly-paper-supply-to-municipality-buildings/
5.3) Contact for further details	Pieternel Bakker 0031(0)6-20919182
5.4) Date of review	9 June 2015
5.5) Pictures	 **Figure 6: Electric truck of Cargohopper, subcontractor of Transmission**
5.6) Involvement of SME	Cargohopper is an SME, subcontractor of Transmission, the Logistics Service Provider which was winning the tender. The SME “Cargohopper” is involved as carrier.
5.7) Impact on SME	SME can be benefiting from this case as subcontractors.

3.4 Paris LEZ

1) Basic information	
1.1) Identification	Low Emission Zone project in Paris and support to craftsmen and to the commercial transport activities
1.2) Cluster	CL1
1.3) Responsible authors	Christophe Rizet (IFSTTAR)

2) Scope of practice	
2.1) Approach	☐ Private approach ☒ Public approach ☐ Public & private appr.
2.2) Actor classification	Which branches of industry, which type of authority or what other type of actor groups are involved? Name all possible. City of Paris, craftsmen and carriers working in the city, French National State notably fort the help to funding electric vehicles
2.3) Geographical Area	From which country (and city) does the practice originate? France (Paris)
2.4a) Type of city	☒ Large: >1 million inhabitants ☐ Intermediate: 50,000 to 1 million ☐ Small: < 50,000 inhabitants
2.4) Implementation status	Please indicate and explain the status of the case you describe. ☒ Evolving Best Practice ☐ Best Practice
	The LEZ in Paris will progressively start in 2015, step by step; a plan has been set up to support small craftsmen and transport companies that might be put in difficulties with the new rules.
2.5) Date of implementation	What year (or more specific date if possible) was the new solution implemented? 1 July 2015 (first step) : ≤ Euro 2 heavy trucks, buses and coaches are banned from 8 am to 8pm. 1 July 2016 (second step) : ≤ Euro 2 heavy trucks, buses and coaches are banned 24h all the week and other vehicles ≤ Euro 1 are banned from Monday to Friday. From 2017 to 2020, all vehicles ≤ Euro 2, 3 & 4 will be gradually banned.

2.6) Link to other clusters	• Are there existing connections to another cluster topic? No • Can there be future links to other cluster topics? Possible connection with CL3 for the enforcement which may use RFID
2.7) Topics covered	Which topics are covered by the practice? ***Infrastructure and Technology*** ☐ Access to transport networks, infrastructure and nodes ☐ Freight consolidation and transhipment ☒ Implementation of low emission technologies ☐ IT-technologies and solutions (for management and administration) ☐ Innovative vehicles, vessels and equipment ☐ ICT (e.g. routing, guidance), transport optimisation ***Organisation and Cooperation*** ☐ Business to business (B2B) solutions, cooperation ☐ Competitive aspects: collaboration (cooperation with competitors), prioritisation (priorities on infrastructure and in nodes) ☒ Communication between authorities: cooperation, procedures, legal frameworks ☐ Communication between businesses and authorities: coordination, consultation ☐ Business models: new form of ownership, risk management ***Operations and Services*** ☐ Business to customer (B2C) solutions (e.g. e-commerce, last mile delivery) ☐ Innovative operational solutions ☒ Value added services, development (or extension) of services ☐ Service quality and sustainability agreements/certification ☐ Transport management, fleet management ***Regulations and Policy*** ☒ Access rules and restrictions of urban areas ☒ Land use and spatial planning: assessment and siting of transport facilities and infrastructure ☐ Infrastructure financing: taxation, user charges, PPP ☒ Environmental standards and policy ☐ Interoperability and standardisation: vehicles, equipment, loading units, infrastructure ☐ Safety and security: measures, regulations, insurance ***Knowledge, Tools and Methods*** ☐ Modelling and forecasting ☐ Data collection and statistics ☐ Education and training ☐ Working and implementation guidelines ☒ Monitoring and benchmarking of processes
2.8) Transport modes	Which transport modes/vehicle types are affected by the solution? ☒ Road/ truck ☒ Road/ delivery van ☐ Road/ motorcycles, scooter etc. ☐ Bike ☐ Heavy rail ☐ Light rail ☐ Inland waterway vessels ☐ Deep sea vessels ☐ Air freight/cargo planes ☐ Other: please explain …
	Paris LEZ is about conventional (diesel and gasoline) road vehicles but will have an impact on electric and gas road vehicles; It may also have an impact on other modes (rail and waterways).
2.9) Supply chain elements	No direct impact on the other elements of the supply chain in the short run. But a LEZ may also have an impact on the modernization of the transport sector

2.10) Which targets can be supported by the implementation?	*For public actors:* ☐ Efficient public spending ☐ Ideal utilisation of infrastructure ☒ Competitive logistics and transport system ☒ Acceptance and influence ☐ Balanced provision of goods and services ☐ Increased amenity value ☐ Highest safety and security ☐ Others	*For private actors:* ☐ Increased efficiency / productivity of logistics processes ☐ Increased company profitability ☐ Minimisation of financial risks ☐ Increased competitiveness ☐ Increased quality ☒ Image ☐ Increased safety and security ☐ Others
	For both actor groups: ☐ Limited climate change ☒ Reduced emissions ☐ Conservation of resources ☐ Others? Please specify: …	
	Please specify all other and different targets here… The LEZ may have an impact on the modernization of the transport sector in Paris. Actions planned to support small commercial transport companies that might be put in difficulties with the new rules, are designed to foster the acceptance of the LEZ and to keep the health and competitiveness of the logistics in the City.	
2.11) End-user benefits	Where do end-users benefit? ☐ Affordable services (e.g. new affordable services or price reductions) ☐ Services in rural areas (new/additional service areas) ☐ Quality of services ☐ Reduced congestions ☒ Reduced emissions ☒ Reduced climate change ☐ Reduced noise pollution ☐ Implementation degree ☐ High level of acceptance of solution/practice ☐ Other benefits: (please specify)	

3) Best practice	
3.1) Description of the practice	Please provide a description of the solution, give details about the **purpose** and the **sustainability objectives**. The city of Paris wants to become a leader on air quality improvement measures and wishes to reach 50 % non diesel deliveries in Paris by 2017, 100 % by 2020. A realistic plan and effective measures have been announced in Feb 2015.

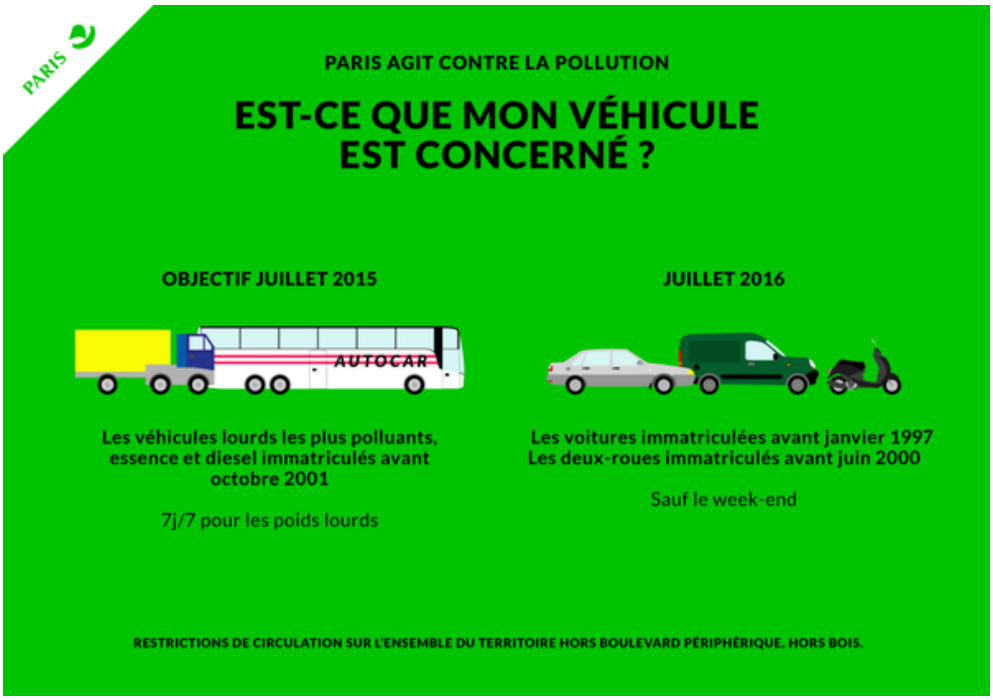
3.2) Technical main characteristics	What are the technical main characteristics? The restricted area is the city of Paris except the ring-road ("boulevard périphérique"). In the first step, from 1 July 2015, heavy trucks, buses and coaches ≤ Euro 2 are banned from 8am until 8pm every days; in the second step, from 1 July 2016, heavy trucks, buses and coaches ≤ Euro 2 will be banned 24/7 and other vehicles ≤ Euro 1 will be banned from Monday to Friday. Then, third step, between 2017 and 2020, all vehicles ≤ Euro 2, 3 & 4 will be gradually banned. The control will be manual in the first step (vehicles will be stopped and controlled by the municipal police). In the second step, the control will still be manual but with the implementation of a national stickers system, and enforced by the national police. In the future (from 2017) automated control (RFID) is being envisaged. An exemption system is being defined for very specific vehicles.
3.3) Success factors	What are the main success factors of the practice? Why does it work so well? For the mitigation of pollution in LEZ, enforcement is a key issue. Furthermore, actions that are additional to the LEZ are taken to support craftsmen and small companies, including commercial transport, to prevent too much stress in this crucial activity. The city of Paris offers: • Commercial vehicles in self-service ('Utilib') • Development of a network of charging stations for natural gas and electricity • Development of secured spaces for storage and recharging of electric LGVs • Project to book a time slot everyday for deliveries made only by clean vehicles • Free parking for electric, gas and hybrid vehicles on Paris streets (already exists for electric vehicles) • Facilitated access to credit for fragile companies • Financial assistance for small companies wishing to replace an old vehicle by a "clean" vehicle (gas or electricity) : Maximum 15% of vehicle price: € 3000 for LGV < 2.5 t ; € 6000 for LGV > 2.5 t ; € 9000 for HGV ; total of 12 million € budget. In return, the beneficiaries have to keep their vehicles for 3 years minimum, not buy a new combustion vehicle < Euro 5 in this period, and participate in an anonymous survey on the vehicle use. NB: additional financial assistance is provided by the French state (maximum € 10,000 or 27% of purchase price)
3.4) Main benefits	What are the main benefits of the practice? The main benefits of the LEZ will be environmental. The main benefits of the support to commercial transport activities will be mainly economic.

3.5) Cost indication	If available, give indication of costs For the financial assistance to replace old vehicles for small companies, the city of Paris plans a budget of 12 millions €. The cost of enforcement is not yet known.
3.6) Barriers / Limitations	What were the main barriers and limitations to overcome for the implementation? And how was it managed? In France a national plan called ZAPA had been set up in 2010 to implement such LEZ ; 8 cities, including Paris, started preliminary studies. But in 2013 the project was abandoned by the French ministry of Environment, who found that this plan would be ecologically inefficient, would penalize the poorest citizens and could be perceived as socially unfair. When deciding the new LEZ, the city of Paris decided to help the change in vehicles and took many precautions to protect small enterprises using vans.
3.7) Common practice before implementation	Please specify what the common practice was before the implementation. Many LEZ have been implemented in Europe and all over the world. The Impact of such traffic limitations on the transport sector has hardly been analysed before the implementations.
3.8) Motivation/problem	What was the main problem or motivation that led to the development and introduction of the new practice? The high concentrations of pollutants in the air, mainly particulate matter and NOx, are far above European standards for air quality and have a negative impact on people's health. Road traffic is one of the major contributors to these emissions. Within the road traffic, the share of freight is much higher in emissions than in traffic expressed in vehicle kilometres. On the other hand, logistics is a very necessary activity for the city and many small companies are using very old and very polluting vans and trucks. The City of Paris has to be cautious on the impact of a LEZ on these small companies.
3.9) Justification of practice	Why can this case be considered a Best Practice? A LEZ is a sustainable and impactful public sector policy, and is widely considered a transferable good practice. But until today, before Paris, no French city had implemented it yet. Paris has learned from the examples of many other cities in Europe, including Berlin, London and Goteborg, trying to take account of their experiences. The information on the LEZ policy is publicly available.

4) Transferability	
4.1) Geographical Area	Can the solution be transferred to other countries, regions or cities? ☒ Yes ☐ No

	Are there special requirements for the transfer to different countries, regions or cities (e.g. legal system, language barriers, size)? Each city is a different case but, when implementing a LEZ, they all have to be cautious about the economic impact of the new regulation on the freight transport industry.
4.2) Usability in other domains	Can the solution be transferred to other actors or industries? ☒ Yes ☐ No
	Please give a reason for your evaluation. A LEZ may also deal with other pollutant industry.
4.3) Political framework conditions - Regulations	Are there political framework conditions and/or regulations for the best practice case that need to be in place or have to be considered for the transfer of the practice to another domain? ☒ Yes ☐ No
	EU standards on air quality have been an important factor of decisions of the LEZs and on the other hand, the national tax system on fuels, as well as subventions on electric vehicles have a high impact on pollution. National laws, for example on the institutional authority for road management or on stickers for the characteristics of vehicle emissions, may also be necessary.
4.4) Extensibility	Can the area of the solution be extended or can the practice be used within a different area (e.g. can a city specific solution be used nation wide?) ☒ Yes ☐ No
	Please give a reason for your evaluation When elaborating the LEZ, the municipality of Paris suggested that these measures should be arranged with the surrounding municipalities, the region Ile-de-France and the surrounding municipalities: to be efficient the LEZ should cover the whole urban area. In France and in Europe many areas are too polluted and should, sooner or later have restrictions on authorized vehicles. Most citizen hope that the control on all vehicle emissions will become more and more strict. Furthermore, a local LEZ like in Paris will displace the old vehicles out of the LEZ, probably in other cities, this is why the question of local pollutants should be considered on a national or EU level.
4.5) Similar cases	Are there existing similar cases? If so please indicate and specify what sets this case apart and makes it a better practice. Many LEZ have been implemented in Europe and harmonisation of these LEZ are necessary, at the national level and through Europe. Coordination between car manufacturing industry, public authorities and freight operators in order to reach a better supply of commercial vehicles with the needs of freight operators.

5) Additional information	
5.1) Consideration for in-depth analysis	Should this case be further considered for in-depth review? ☒ Yes ☐ No
	Please give reasons why this case should be (or should not be) considered for in-depth review
5.2) References	References and sources used to provide the given information : Réduction des Emissions du Transport de Marchandises en Ile de France (RETMIF), to be published in 2015, IFSTTAR-ADEME
5.3) Contact for further details	If personal contacts were established please provide the name, email and telephone number
5.4) Date of review	Latest date of update of this format : 22/06/2015
5.5) Pictures	**Figure 7 and 7a: LEZ specifications & details of rules in public awareness campaign**



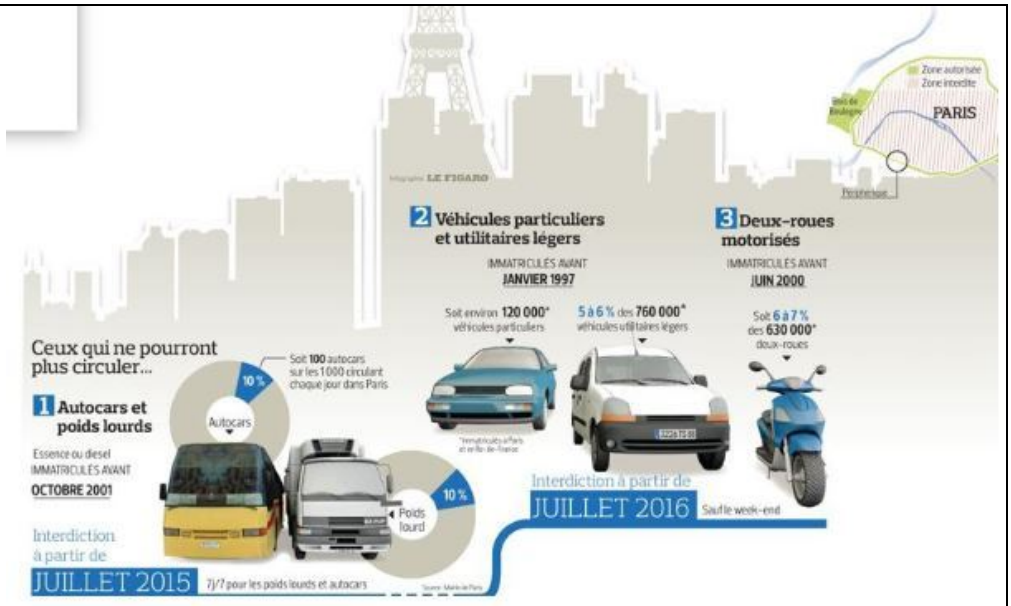
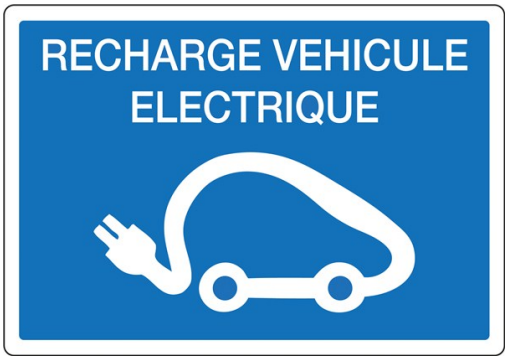


Figure 8: Utilib, the electric freight vehicle for shared use in Paris LEZ

Figure 9: Logo of charging point for electric vehicles in the LEZ



5.6) Involvement of SME	Are SME involved in the case? Describe their role or their potential role. Paris makes its best to protect small enterprises which could be put in trouble by the LEZ

5.7) Impact on SME	What is the impact of the case on SME (how can they benefit, what could be the impact on their growth)? Please describe. Craftmen and very small enterprises are often using old polluting vans and may have difficulties of funding new electric vans. So the Municipality of Paris set up 'Utilib' (a service of sharing of commercial vehicles) and a financial help for buying new electric or gas vehicles.

3.5 CityLog EMF

1) Basic information	
1.1) Identification	CityLog EMF (efficient, modular, flexible) - Electro-Multifunction-Vehicle
1.2) Cluster	Cluster 1: Urban Freight
1.3) Responsible authors	HET Hochleistungs-, Eisenbahn- und Transporttechnik Entwicklungs-GmbH

2) Scope of practice	
2.1) Approach	☒ Private approach ☐ Public approach ☐ Public & private appr.
2.2) Actor classification	Construction, F&E, new drive technology (fuel cell), new materials, electrical engineering
2.3) Geographical Area	Austria (Salzburg)
2.4a) Type of city	☐ Large: >1 million inhabitants ☒ Intermediate: 50,000 to 1 million ☐ Small: < 50,000 inhabitants
2.4) Implementation status	Please indicate and explain the status of the case you describe. ☒ Evolving Best Practice ☐ Best Practice
	The first prototype of the CityLog EMF was ready in 2012. It was introduced in October last year at the same time as HET got presented the award “workplaces through innovations” (“Arbeitsplätze durch Innovation”) in Salzburg (Austria). Now HET works on the second demonstration-vehicle. It was tested and driven in 2014/15 in Klagenfurt (Austria). The technical process, certification and permission are planned for 2016.
2.5) Date of implementation	2012 (prototype ready) 2016 (serial production)
2.6) Link to other clusters	• Green Logistics and Co-modality
2.7) Topics covered	Which topics are covered by the practice? ***Infrastructure and Technology*** ☒ Access to transport networks, infrastructure and nodes ☐ Freight consolidation and transhipment ☒ Implementation of low emission technologies ☐ IT-technologies and solutions (for management and administration) ☒ Innovative vehicles, vessels and equipment ☐ ICT (e.g. routing, guidance), transport optimisation ***Organisation and Cooperation***

	☐ Business to business (B2B) solutions, cooperation ☒ Competitive aspects: collaboration (cooperation with competitors), prioritisation (priorities on infrastructure and in nodes) ☐ Communication between authorities: cooperation, procedures, legal frameworks ☒ Communication between businesses and authorities: coordination, consultation ☐ Business models: new form of ownership, risk management ***Operations and Services*** ☒ Business to customer (B2C) solutions (e.g. e-commerce, last mile delivery) ☐ Innovative operational solutions ☐ Value added services, development (or extension) of services ☐ Service quality and sustainability agreements/certification ☒ Transport management, fleet management ***Regulations and Policy*** ☒ Access rules and restrictions of urban areas ☐ Land use and spatial planning: assessment and siting of transport facilities and infrastructure ☐ Infrastructure financing: taxation, user charges, PPP ☒ Environmental standards and policy ☐ Interoperability and standardisation: vehicles, equipment, loading units, infrastructure ☐ Safety and security: measures, regulations, insurance ***Knowledge, Tools and Methods*** ☐ Modelling and forecasting ☐ Data collection and statistics ☐ Education and training ☐ Working and implementation guidelines ☐ Monitoring and benchmarking of processes
2.8) Transport modes	Which transport modes/vehicle types are affected by the solution? ☐ Road/ truck ☒ Road/ delivery van ☐ Road/ motorcycles, scooter etc. ☐ Bike ☐ Heavy rail ☐ Light rail ☐ Inland waterway vessels ☐ Deep sea vessels ☐ Air freight/cargo planes ☐ Other: please explain …
	CityLog EMF can replace the delivery vans for the last mile on inner city transports.
2.9) Supply chain elements	Freight companies, terminals, warehouses, transport
2.10) Which targets can be supported by the implementation?	*For public actors:* ☐ Efficient public spending ☐ Ideal utilisation of infrastructure ☒ Competitive logistics and transport system ☒ Acceptance and influence ☐ Balanced provision of goods and services ☐ Increased amenity value ☒ Highest safety and security ☐ Others
	For private actors: ☒ Increased efficiency / productivity of logistics processes ☐ Increased company profitability ☐ Minimisation of financial risks ☒ Increased competitiveness ☐ Increased quality ☒ Image ☒ Increased safety and security ☐ Others

	For both actor groups: ☒ Limited climate change ☒ Reduced emissions ☒ Conservation of resources ☐ Others? Please specify: …
	Please specify all other and different targets here…
2.11) End-user benefits	Where do end-users benefit? ☐ Affordable services (e.g. new affordable services or price reductions) ☐ Services in rural areas (new/additional service areas) ☒ Quality of services ☐ Reduced congestions ☒ Reduced emissions ☒ Reduced climate change ☒ Reduced noise pollution ☐ Implementation degree ☐ High level of acceptance of solution/practice ☐ Other benefits: (please specify)…

3) Best practice	
3.1) Description of the practice	**Purpose:** • Development of a flexible, economic, quiet, space-saving and modular constructed vehicle with futuristic drive concept for the transportation of goods and persons in sensible traffic areas. • Alternative drivetrain concept: fuel cell (hydrogen-driven) • Usage of newest materials and integration of energy-recovery-systems • Strait construction for strait alleys • Euro-pallets suitable • Single vehicles link-able to a flexible, rail-loose “train” with an electronic shaft for maximal addition of deliveries and for energy efficiency – leading to enormous operational flexibility • Expansion of usage for in-house traffic or person-transports at mass-events, e.g. Olympic games • Safety: Modern sensor technology and different safety-systems prevent crashes; the laser-shaft realize, if persons stand between the vehicles, then the trailed vehicles behind stand still until the way is free again. **Sustainability objectives:** The electronic-vehicle with fuel-cell drive reduces the CO_2-emission in inner cities. With the use of hydrogen only water steam resp. demineralized water is rejected. The hydrogen, which is necessary for the drive, is a waste product of the steelmaking industry. So, the fuel for the CityLog EMF is an available waste product, which is rarely used until now. The usage of CityLog EMF can eliminate traffic jams, waiting times and can also trigger an emission reduction. The vehicles can pass other vehicles or trucks because of the strait construction and the electronic shaft.

3.2) Technical main characteristics	Because of the single wheel drive, the single wheel control and the 360°-rotation of the four wheels of every vehicle, the whole train is extremely flexible and agile. The CityTrain can drive for- and backward and also in the square angle to the side. This can be a target especially in strait alleys, if there is no place to turn the whole train. The change from one side of the street to the other is easy with the sideward drive. The use of modern sensory eliminates accidents. The electronic shaft realize, if persons or other things stand between the vehicles. If this is the case, the vehicles behind the persons drive not until the way is free again
3.3) Success factors	The Citylog EMF is cost-efficient and price-competitive (buy + fuel). His high load-weight capacity of 2.2 tonnes means a lot of goods on a little, street vehicle. Also the point “zero-emission” is a success factor. And also the flexibility is a reason, why the system works so well. The number of vehicles is very flexible and every vehicle can be linked or unlinked at every time and place.
3.4) Main benefits	• Economic benefits? Investment costs are at the same area as similar trucks with fossil engines. The costs per litre of fuel (hydrogen) are about 50 cent. • Benefits in the field of services? Service and maintenance are simple. Service interval is 2 years. Repairs can be done by the owner himself (Ikea-principle – usage of simple parts, which can be changed simply) • Benefits for the society? Lower traffic in inner cities – they will be more attractive for citizens as well as for tourists • Environmental benefits, expressed in CO2 or CO2equivalent Engine is hydrogen – no emissions (only water steam), no CO2, no noise. Hydrogen exists as a waste product in some industries or can be generated with the energy of photovoltaic.
3.5) Cost indication	1 single CityLog EMF-vehicle will cost about 30.000 € (depends on the body – e.g. simple containers are cheaper than a cooling container)
3.6) Barriers / Limitations	The main barrier is the certification and the permission. Both are enormous cost-intensive and both must be done from the first point on to the whole vehicle, because there is no vehicle to compare (especially the hydrogen-drive). Also a barrier is the electronic shaft. As well at the single vehicle, also at the electronic shaft, not the technic as such, is the real problem, but more the street authorisation and certification – new things must be tested and controlled more than other.

3.7) Common practice before implementation	We do sale in Europe and the USA. At the moment we have interested parties for about 1.000 vehicles. Before we do the serial production, a demonstration-prototype will be used in Klagenfurt (Austria) for about 1 year. So we can see how it works under real conditions (e.g. in winter or with full-load).
3.8) Motivation/problem	The motivation for the development of Citylog EMF was the installation of bollards in the city centre of Salzburg. Only vehicles with special authorisation can be drive to the shops there until this time. Our Citylog EMF is very straigt, so that he can drive through the bollards without get them down.
3.9) Justification of practice	The Citylog EMF can be considered a Best Practice, because many cities have a problem with too much traffic in the inner city (special problem at pedestrian areas). If shops, restaurants etc. in inner cities use the Citylog EMF for the delivery, they are much more flexible at the one hand. At the other hand, less traffic means more pedestrians, which in turn means more potential shoppers.

4) Transferability	
4.1) Geographical Area	Can the solution be transferred to other countries, regions or cities? ☒ Yes ☐ No
	Certification Europe: TÜV (MOT), USA: UL
4.2) Usability in other domains	Can the solution be transferred to other actors or industries? ☒ Yes ☐ No
	The body can be changed to seats – so not goods, but persons can be transported, e.g. in theme parks, stadiums, mass events
4.3) Political framework conditions - Regulations	Are there political framework conditions and/or regulations for the best practice case that need to be in place or have to be considered for the transfer of the practice to another domain? ☒ Yes ☐ No
	Lobby for hydrogen-drive; hydrogen-petrol stations; environment-zones in inner cities
4.4) Extensibility	Can the area of the solution be extended or can the practice be used within a different area (e.g. can a city specific solution be used nation wide?) ☒ Yes ☐ No
	Originally the system was created especially for old city centres with small street (like Salzburg – Getreidegasse), but it can be used in all other cities, for indoor-transport, at theme parks and many other places more.

4.5) Similar cases	There are no similar cases, because it is a transportation vehicle for 2,2 tonne gross weight per vehicle, which can be linked to a train of more vehicles. The drivetrain is a fuel cell, with hydrogen is the fuel type. The vehicle is designed with the same load capacity as diesel-vans, but zero emissions.

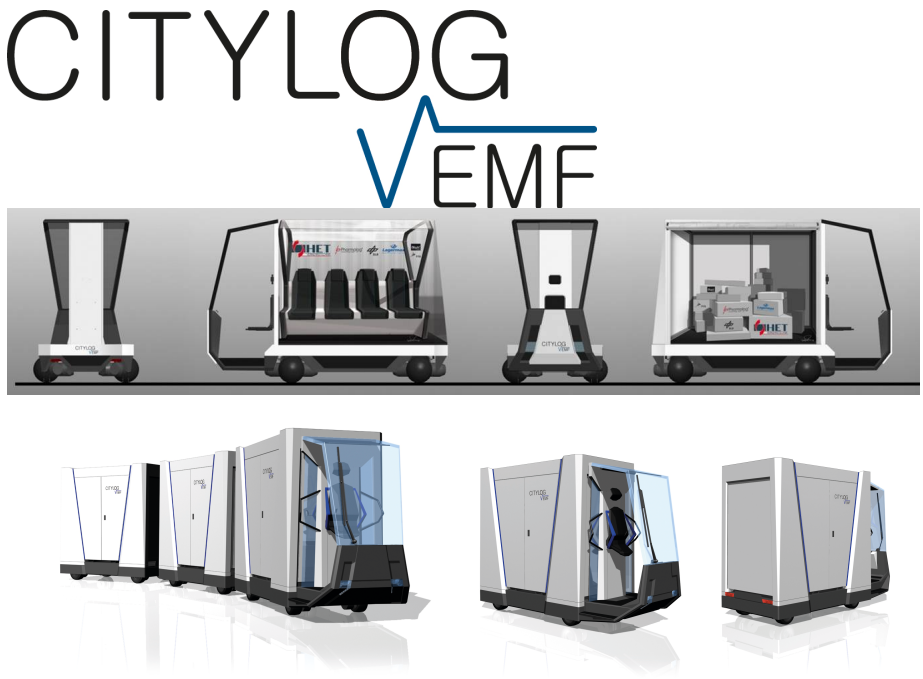
1. Additional information	
5.1) Consideration for in-depth analysis	Should this case be further considered for in-depth review? ☒ Yes ☐ No
	The project should be considered for in-depth review, because it is an extremely futuristic and environmental-friendly solution for the last mile on the transportation chain.
5.2) References	HET (2015) CityLog EMF. http://zebus.at/wp-content/uploads/2015/03/HET_CityLog.pdf
5.3) Contact for further details	Mrs. Mag. Sonja Kern Sonja.kern@het-engineering.com +43 676 840 722 201
5.4) Date of review	17/06/2013 16/06/2015 – in depth information
5.5) Pictures	 **Figure 10: CityLog EMF prototype design**

Figure 11: Citylog EMF prototype tests in Klagenfurt

Source: HET 2015

	 **Figure 12: CityLog EMF prototype at HET test site**
5.6) Involvement of SME	Phormolog OG is involved in the project as designer. Phormolog is an industrial design company, so they work together with our engineers and create a good-looking functional vehicle
5.7) Impact on SME	Phormolog OG is a 2-men company. So, HET have only those two persons as contacts. They have no long chain of commands. Phormolog can benefit, because they design a world new transport-solution, which can (and should) be used all over the world.

4 In-depth reviews

4.1 Low emission zone, city of Rotterdam

1) Basic information	
1.1) Identification	Low emission zone, city of Rotterdam
1.2) Cluster	Cluster 1: Urban Freight
1.3) Responsible authors	Mobycon (Mark Mallens, Ronald Jorna)

2) Scope of practice	
2.1) Approach	☐ Private approach ■ Public approach ☐ Public & private appr.
2.2) Actor classification	City government
2.3) Geographical Area	The Netherlands, Rotterdam
2.4a) Type of city	☒ Large: >1 million inhabitants ☐ Intermediate: 50,000 to 1 million ☐ Small: < 50,000 inhabitants
2.4) Implementation status	Please indicate and explain the status of the case you describe. ☐ Evolving Best Practice ■ Best Practice
	The low emission zone is in place since 2007. Since then, only freight vehicles that have engines equal to or better than Euro IV are allowed in the city centre.
2.5) Date of implementation	September 2007
2.6) Link to other clusters	• Are there existing connections to another cluster topic? No • Can there be future links to other cluster topics? No
2.7) Topics covered	Which topics are covered by the practice? ***Infrastructure and Technology*** ☐ Access to transport networks, infrastructure and nodes ☐ Freight consolidation and transhipment ■ Implementation of low emission technologies ☐ IT-technologies and solutions (for management and administration) ☐ Innovative vehicles, vessels and equipment ☐ ICT (e.g. routing, guidance), transport optimisation ***Organisation and Cooperation*** ☐ Business to business (B2B) solutions, cooperation ☐ Competitive aspects: collaboration (cooperation with competitors), prioritisation (priorities on infrastructure and in nodes)

	☐ Communication between authorities: cooperation, procedures, legal frameworks ■ Communication between businesses and authorities: coordination, consultation ☐ Business models: new form of ownership, risk management ***Operations and Services*** ☐ Business to customer (B2C) solutions (e.g. e-commerce, last mile delivery) ☐ Innovative operational solutions ☐ Value added services, development (or extension) of services ☐ Service quality and sustainability agreements/certification ☐ Transport management, fleet management ***Regulations and Policy*** ■ Access rules and restrictions of urban areas ☐ Land use and spatial planning: assessment and siting of transport facilities and infrastructure ☐ Infrastructure financing: taxation, user charges, PPP ■ Environmental standards and policy ☐ Interoperability and standardisation: vehicles, equipment, loading units, infra-structure ☐ Safety and security: measures, regulations, insurance ***Knowledge, Tools and Methods*** ☐ Modelling and forecasting ☐ Data collection and statistics ☐ Education and training ■ Working and implementation guidelines ☐ Monitoring and benchmarking of processes
2.8) Transport modes	Which transport modes/vehicle types are affected by the solution? ■ Road/ truck ■ Road/ delivery van ☐ Road/ motorcycles, scooter etc. ☐ Bike ☐ Heavy rail ☐ Light rail ☐ Inland waterway vessels ☐ Deep sea vessels ☐ Air freight/cargo planes ☐ Other: please explain …
	Trucks and delivery vans are subject to emission regulations. Other forms of transport are not influenced by these rules.
2.9) Supply chain elements	Only low emission vehicles can enter the designated zone. That means that there's more focus on clean (e.g. electric) vehicles. In the case that companies have only vehicles that are not allowed in the designated zone, they will have to cooperate with local distribution companies that have the right (clean) type of vehicles.
2.10) Which targets can be supported by the implementation?	*For public actors:* ☐ Efficient public spending ☐ Ideal utilisation of infrastructure ☐ Competitive logistics and transport system ■ Acceptance and influence ☐ Balanced provision of goods and services ☐ Increased amenity value ☐ Highest safety and security ☐ Others *For private actors:* ☐ Increased efficiency / productivity of logistics processes ☐ Increased company profitability ☐ Minimisation of financial risks ☐ Increased competitiveness ☐ Increased quality ■ Image ☐ Increased safety and security ☐ Others
	For both actor groups: ■ Limited climate change ■ Reduced emissions ■ Conservation of resources ■ Others? Please specify: Improved health

2.11) End-user benefits	Where do end-users benefit? ☐ Affordable services (e.g. new affordable services or price reductions) ☐ Services in rural areas (new/additional service areas) ☐ Quality of services ☐ Reduced congestions ■ Reduced emissions ■ Reduced climate change ■ Reduced noise pollution ☐ Implementation degree ■ High level of acceptance of solution/practice ☐ Other benefits: (please specify)…

3) Best practice	
3.1) Description of the practice	*Please provide a description of the solution, give details about the **purpose** and the **sustainability objectives**.* The city of Rotterdam installed the low emission zone in 2007. In the centre of the city, the concentrations of particulate matter and nitrogen dioxide in the air are high. These substances are of bad influence to the health of the people living and working in the city. In order to meet European standards for air quality the city had to take steps to improve air quality in the city centre (focussed around lowering No_X and PM_{10}). A major cause of air pollution emissions comes from freight traffic. That is why Rotterdam chose to set guidelines for that particular group first, so that with minimal effort, maximum result could be achieved. Therefore, only trucks that comply to certain environmental requirements (engines equal to or better than Euro 4 norm) can enter downtown Rotterdam. This was not only done in Rotterdam, but also in Amsterdam and Utrecht for example. Because a lot of cities had the same problems, a covenant (guide) was issued, in which the guidelines were described. These guidelines (Euro norm for vehicles, height of fines, age of vehicles) are the same for all cities in The Netherlands that signed the covenant. In the process of writing the covenant, a lot of parties were involved, who all contributed to the final content: • VROM (ministry of Traffic, Spatial Planning and Environment) • VNG (collaboration of all Dutch city councils) • KvK (Chamber of Commerce) • EVO (organisation that represents suppliers of products) • TLN (Transport and Logistics Netherlands) • Several large city councils (e.g. Rotterdam, Amsterdam)

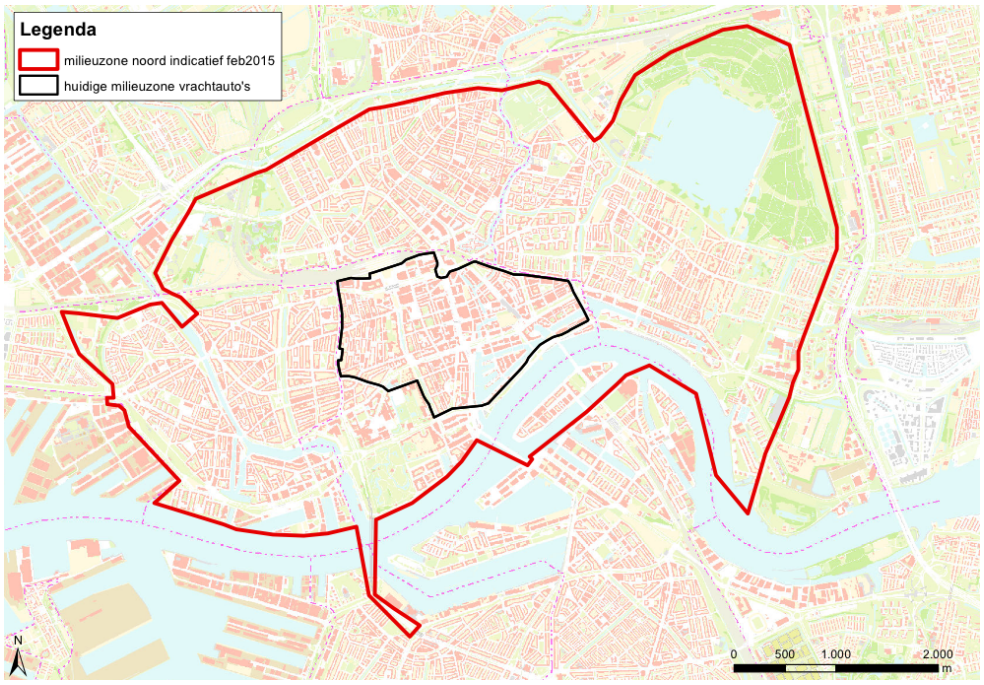
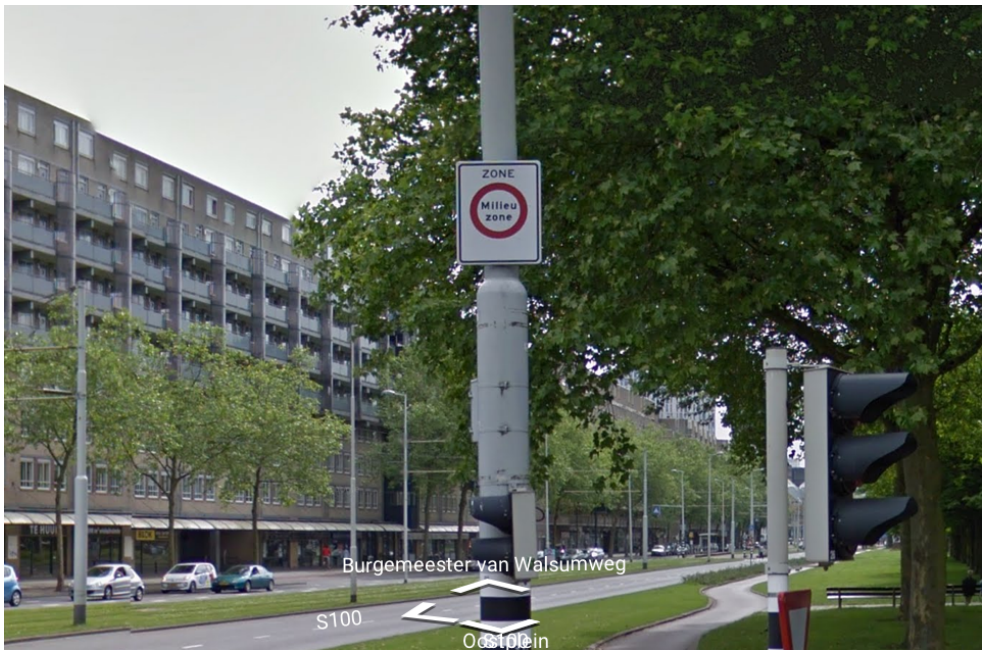
3.2) Technical main characteristics	*What are the technical main characteristics?* In the case of Rotterdam, minimal technology is involved. Controls on compliance to rules is done by so-called 'Special Control Officials', who have the authority to write fines if they see a vehicle that does not comply to rules. They use a smartphone with a special application that can store pictures of license plates and send these to a central server for checking. Based on the outcome (valid or non valid) a fine will be given if applicable. A disadvantage is that only a portion of all offenders will be fined; most likely they will never fine all of them. The city plans to extend the zone in the future, which will result in the use of cameras on entry routes (manual checking by special control officials becomes too time consuming then). That way a much bigger part (if not all) of the offenders will be caught.
3.3) Success factors	*What are the main success factors of the practice? Why does it work so well?* The main success factor was to involve all parties that are influenced by the low emission zone, which resulted in a measure that was supported by a large portion of society.
3.4) Main benefits	*What are the main benefits of the practice? (Compare strategic targets selected in the survey → D2.1)* • *Financial benefits?* - None • *Economic benefits?* - None. • *Benefits in the field of services?* - None. • *Benefits for the society?* - Cleaner air • *Environmental benefits, expressed in CO2 or CO2equivalent?* - Less CO_2 and NO_x emissions • *Other signs/indicators of success?* - One year after introducing the low emission zone Rotterdam conducted an evaluation. That evaluation proved that emissions were indeed lower than the years before, proving that the low emission zone contributed to decreasing NoX and PM_{10} levels.
3.5) Cost indication	A cost indication is not available. Apart from several signs on the street and some enhancements on devices for control officials, a lot of time was invested in the process of making the covenant. This was at the time part of the daily work routine for most people involved.

3.6) Barriers / Limitations	*What were the main barriers and limitations to overcome for the implementation? And how was it managed?* A large portion (approx. 50%) of transporting companies in the Netherlands is not part of any Logistics network. It proved difficult to reach those companies informing them about the new low emission zone in the city. Rotterdam however had a transition year in which they only issued warnings in case of violations. It also took quite some time to define all different vehicle types that drive around, which had a much bigger variety than expected. A prerequisite of signing the covenant was that the vehicles owned by the city also needed to be adapted to comply with the new emission guidelines. That also took more time than expected.
3.7) Common practice before implementation	Before the start of the low emission zone in Rotterdam all types of transport were allowed in the city. There were only restrictions to vehicle height and loading/unloading times.
3.8) Motivation/problem	*What was the main problem or motivation that led to the development and introduction of the new practice?* Increased air pollution mainly caused by delivery vans and trucks with polluting engines.
3.9) Justification of practice	*Why can this case be considered a Best Practice (compare definition in **Dow**)?* Rotterdam was the first major city in the Netherlands to establish a low emission zone. Since then, a lot of cities have followed their example.

4) Transferability	
4.1) Geographical Area	Can the solution be transferred to other countries, regions or cities? ■ Yes ☐ No
	Are there special requirements for the transfer to different countries, regions or cities (e.g. legal system, language barriers, size)? Local (on country level) regulations and laws, since low emission zones in The Netherlands are based on country-wide laws.
4.2) Usability in other domains	Can the solution be transferred to other actors or industries? ■ Yes ☐ No
	Only applicable for local/regional governments.

4.3) Political framework conditions - Regulations	Are there political framework conditions and/or regulations for the best practice case that need to be in place or have to be considered for the transfer of the practice to another domain? ■ Yes ☐ No
	Existing laws and regulations.
4.4) Extensibility	Can the area of the solution be extended or can the practice be used within a different area (e.g. can a city specific solution be used nation wide?) ■ Yes ☐ No
	All areas that are being viewed as over-polluted can be added to the existing low emission zone. This has to be supported by thorough investigation. In addition the low emission zone can be extended to polluting passenger vehicles, which already is the case in e.g. Amsterdam and Utrecht.
4.5) Similar cases	*Are there existing similar cases? If so please indicate and specify what sets this case apart and makes it a better practice.* The cities of Amsterdam, Utrecht, Breda, Den Bosch and The Hague are some of the real-life examples that are in place now. It is expected that the list of cities that will set up comparable zones will grow significantly in the coming years.

5) Additional information	
5.1) Consideration for in-depth analysis	Should this case be further considered for in-depth review? ■ Yes ☐ No
	One of the first major cities to implement these restrictions, set an example for others.
5.2) References	http://www.rotterdam.nl/milieuzone
5.3) Contact for further details	Jerre Sturm j.sturm@rotterdam.nl 06 - 3029 7027
5.4) Date of review	Latest date of update of this format (May 19, 2015)

5.5) Pictures	**Figure 13: Limits for the Low Emission Zone in Rotterdam** (black is the current zone, red is the 2015 extension of the initial central Zone):  **Figure 14: Signage at entrance of the Low Emission Zone in Rotterdam** 
5.6) Involvement of SME	*Are SME involved in the case? Describe their role or their potential role.* Yes, quite a lot of transport companies, especially the ones with delivery vans, are SMEs.

5.7) Impact on SME	*What is the impact of the case on SME (how can they benefit, what could be the impact on their growth)? Please describe.* They might be faced with investments in new(er) vehicles, which otherwise would not have been the case.

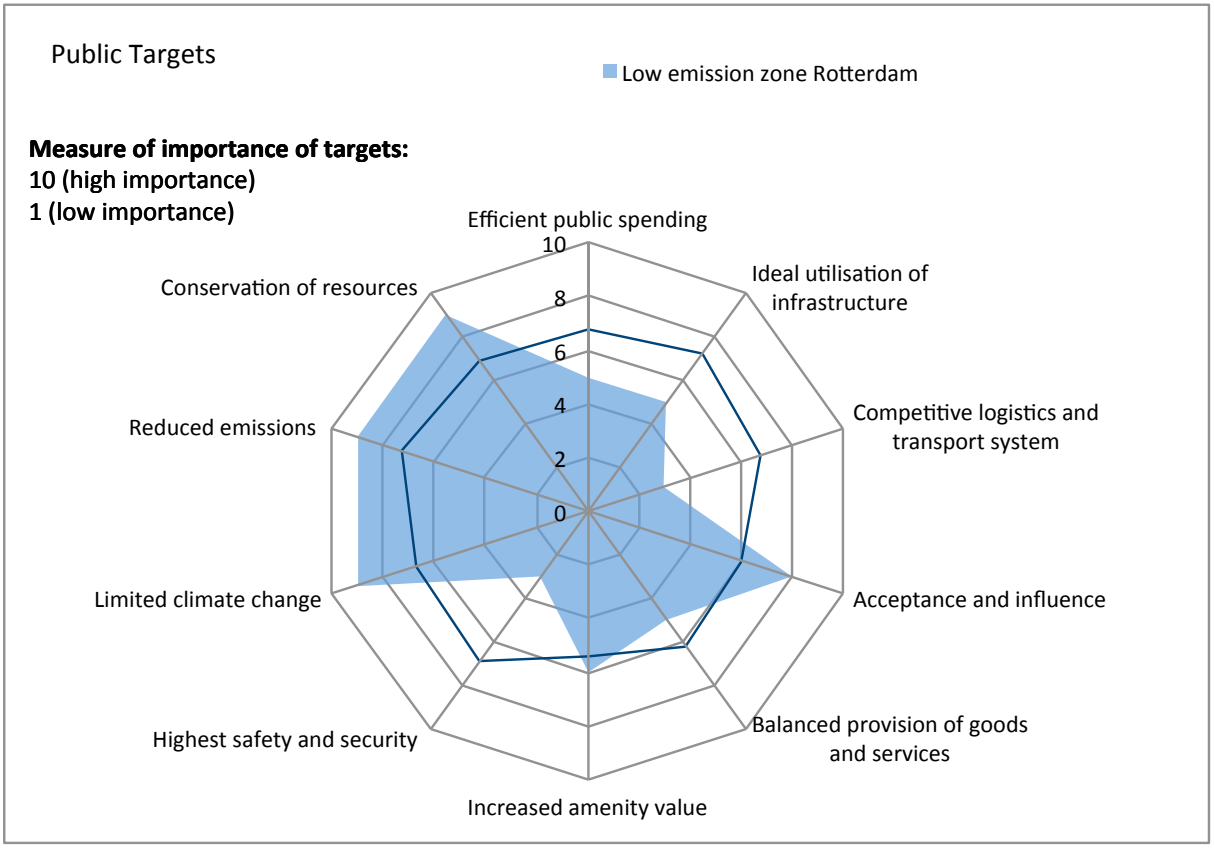
6) In-depth information	
6.1) Costs	• *What are the (estimated) costs (e.g. investments, operation)* Not known specifically. Costs for maintaining the low emission zone are mainly for having controlling officers. They also have some equipment (smartphones), but that is standard outfit and not only used for enforcing rules and regulations of the low emission zone. • *What financing is presently applied/planned (partnership, private, public funding)* It was an effort of only the city council, no other parties were involved in implementing the low emission zone in Rotterdam.
6.2) Benefits / Strengths	• Rotterdam made sure to have alternate routing, so trucks can always find a way around the low emission zone. • The low emission zone is compact and clearly bordered. • Everyone can get 12 exemptions per year, to meet suppliers that only occasionally visit the city centre. • Tariffs for exemptions are equal in all Dutch cities, to create a level playing field.
6.3) Weaknesses	Transport companies complain about the difficulty/impossibility to enter the zone. Branch organisations state that also passenger cars (older and polluting types) should be excluded from the city centre, same as trucks, which is understandable. Not all bottlenecks (zones with high pollution) in the city are part of the low emission zone at the moment. Even though additional measures can be taken, that is not always enough to lower emissions to the desired levels.
6.4) Implementation steps	*What are the different actions necessary in the implementation steps and how long does each step take (estimates)?*

	1. Preparation: … Involve all parties that are influenced in the process. Have a clear definition of goals. Make clear that everyone can have a part in developing the plans. *Estimated to take 6 to 12 months.*	*2. Implementation: …* Keep important stakeholders involved when implementing changes. *Estimated to take 1 month (not much more than placing road signs).*	*3. Operation: …* Organise enforcement of rules, either by manual labour or by using cameras and a backup system. *This is an ongoing process.*
	Which actors are relevant in the process? Transport organisations, citizens, neighbour cities (if zone is near city border).		
6.5) Process	*Please give detailed information on the process of implementing the best practice. How was the initial process and experience and what can be expected for (future) transferability?* The main problem is to get all actors on par with the goals. Because there are many actors involved with different expectations, this is a delicate process of fine tuning. And everyone needs to be informed correctly throughout the process. For Rotterdam, as they now have a low emission zone in place, expanding it will be somewhat easier, because the initial ideas do not change. Transporters entering the city are already familiar with rules, as are SME's and residents. It is not likely they will cause big problems when expanding the zone.		
6.6) Technical feasibility	*Is this practice feasible in technical terms?* Not in the current situation. Technical restrictions are limited to the enforcement of rules and regulations through camera use, but that is something that will likely be implemented in a later stage. Next to that, camera use is a well-known practice in other cities, so this shouldn't be a problem.		

7) Cluster specific information	
7.1) Before-after comparison of distribution systems	*Graph of the distribution system before and after trial starts, if available* Not applicable. In general distribution system did not change due to introduction of low emission zone.
7.2) Before-after comparison of impacts	Rotterdam has implemented the low emission zone in 2007. They have conducted an internal evaluation in 2008. In 2010, a nationwide evaluation was done that also included other cities. That is the latest information known. The relevant results for Rotterdam from that report are: NO_2 emissions have dropped 5% (-0,032 µg/m^3)

	NO_x emissions dropped 1% PM_{10} emissions dropped 17% (-0,047 µg/m³) Also, all city buses comply to the Euro V norm for emissions.
7.3) Before-after trial description	The trial in this case was setting up a low emission zone. Before that, no regulations concerning emissions were in place. Since that meant that the city could not meet European goals, something had to be done. Getting a low emission zone in place for averting pollution by heavy traffic would get them in the right place. The 'trial' started in 2007 and the low emission zone is still in place, proving its worth because much less pollutants are expelled into the air nowadays (see 7.2) and the air is cleaner. For now, the low emission zone is in the city centre, north of the river. In the future, areas outside of the current one will be included in the low emission zone to expand it all the way up to the city ring. Then, most likely cameras will be installed to check the compliance to regulations, instead of having people doing that.

8) Evaluation of strategic targets



4.2 Brussels Strategic Plan for Urban Freight

1) Basic information	
1.1) Identification	Brussels Strategic Plan for Urban Freight
1.2) Cluster	Cluster 1
1.3) Responsible authors	Marianne Thys, Brussels Mobility, Gabriela Barrera, Polis

2) Scope of practice	
2.1) Approach	☐ Private approach ☐ Public approach ☒ Public & private appr.
2.2) Actor classification	Public authority, retailer, carrier, Logistics Service Providers, shipper, end receiver of urban deliveries
2.3) Geographical Area	Brussels-Capital Region - Belgium
2.4a) Type of city	☒ Large: >1 million inhabitants ☐ Intermediate: 50,000 to 1 million ☐ Small: < 50,000 inhabitants
2.4) Implementation status	Please indicate and explain the status of the case you describe. ☐ Evolving Best Practice ☒ Best Practice
	The strategic Plan was approved in July 2013. Its implementation is started and on-going, measures are foreseen until 2020.
2.5) Date of implementation	July 2013
2.6) Link to other clusters	• Cluster 2 for the rail intermodal links and the waterways related elements of the plan • Cluster 3 for the use of IT for data collection
2.7) Topics covered	Which topics are covered by the practice? ***Infrastructure and Technology*** ☒ Access to transport networks, infrastructure and nodes ☒ Freight consolidation and transhipment ☒ Implementation of low emission technologies ☐ IT-technologies and solutions (for management and administration) ☐ Innovative vehicles, vessels and equipment ☐ ICT (e.g. routing, guidance), transport optimisation ***Organisation and Cooperation*** ☐ Business to business (B2B) solutions, cooperation ☐ Competitive aspects: collaboration (cooperation with competitors), prioritisation (priorities on infrastructure and in nodes) ☒ Communication between authorities: cooperation, procedures, legal frameworks ☒ Communication between businesses and authorities: coordination, consultation ☐ Business models: new form of ownership, risk management ***Operations and Services*** ☒ Business to customer (B2C) solutions (e.g. e-commerce, last mile delivery)

	☒ Innovative operational solutions ☐ Value added services, development (or extension) of services ☐ Service quality and sustainability agreements/certification ☐ Transport management, fleet management ***Regulations and Policy*** ☒ Access rules and restrictions of urban areas ☒ Land use and spatial planning: assessment and siting of transport facilities and infrastructure ☐ Infrastructure financing: taxation, user charges, PPP ☐ Environmental standards and policy ☐ Interoperability and standardisation: vehicles, equipment, loading units, infrastructure ☐ Safety and security: measures, regulations, insurance ***Knowledge, Tools and Methods*** ☒ Modelling and forecasting ☒ Data collection and statistics ☐ Education and training ☐ Working and implementation guidelines ☒ Monitoring and benchmarking of processes
2.8) Transport modes	Which transport modes/vehicle types are affected by the solution? ☒ Road/ truck ☒ Road/ delivery van ☐ Road/ motorcycles, scooter etc. ☒ Bike ☒ Heavy rail ☐ Light rail ☒ Inland waterway vessels ☐ Deep sea vessels ☐ Air freight/cargo planes ☐ Other: please explain …
	Text…
2.9) Supply chain elements	Shippers, LSPs, carriers, receivers
2.10) Which targets can be supported by the implementation?	*For public actors:* ☐ Efficient public spending ☒ Ideal utilisation of infrastructure ☒ Competitive logistics and transport system ☒ Acceptance and influence ☒ Balanced provision of goods and services ☒ Increased amenity value ☐ Highest safety and security ☐ Others *For private actors:* ☒ Increased efficiency / productivity of logistics processes ☐ Increased company profitability ☐ Minimisation of financial risks ☒ Increased competitiveness ☒ Increased quality ☒ Image ☐ Increased safety and security ☐ Others
	For both actor groups: ☒ Limited climate change ☒ Reduced emissions ☒ Conservation of resources ☐ Others? Please specify: …
	Please specify all other and different targets here…
2.11) End-user benefits	Where do end-users benefit? ☐ Affordable services (e.g. new affordable services or price reductions) ☐ Services in rural areas (new/additional service areas) ☒ Quality of services ☒ Reduced congestions ☒ Reduced emissions ☒ Reduced climate change ☒ Reduced noise pollution ☐ Implementation degree

	☒ High level of acceptance of solution/practice ☐ Other benefits: (please specify)…

3) Best practice	
3.1) Description of the practice	The purpose of the strategic plan for urban freight in Brussels Region, in French "Plan stratégique pour le transport de marchandises en Région de Bruxelles-Capitale", is to lower congestion, emissions and other negative externalities due to urban freight transport and heavy goods vehicle traffic. The objectives are sustainability and efficiency, mainly through: • A reduction and an optimisation of the goods vehicle movements within and towards the city • A modal shift from road to waterways and rail • A shift to clean vehicle use for last mile delivery trips • An easier life for van and truck drivers Following quantitative targets were set for the Brussels Region freight transport and logistics sector:

Year	Emission reduction target	Vehicle movement reduction target
2020	-20%	-10%
2030	-50%	-20%
2050	-100%	-30%

3.2) Technical main characteristics	What are the technical main characteristics? 5 main axis of intervention are applied in the freight plan. • Physical structure for urban distribution, notably through the use of distribution centres • Territorial, urban and real estate planning, with the integration of the needs for centralised freight hubs at the planning stage. • Operational measures to increase the efficiency of urban deliveries, with a mix of regulation and infrastructures • Efficient and sustainable transport through innovative research projects • Region as a facilitator of changes, impacting behaviour and organisations of the logistics sector Within these lines, 34 specific measures have been defined, including the participation in the INTERREG IVB LaMiLo project in which an Urban Consolidation Centre pilot was set, defining Delivery Servicing Plans (DSP) or assessing and redesigning freight in pedestrian areas. These measures have been defined with different time-scales until the year 2020.
3.3) Success factors	The main factor for success are the cooperation with the stakeholders, the leading role of the Brussels Region freight unit, the expertise and manpower allocated to the freight plan, identifying resources needed to carry on the different actions defined in the plan, the will-

	ingness of the sector to contribute to the implementation of the plan, and the regular review and impact assessments showing benefits and identifying future action points. There is a beneficial influence through the participation of Brussels to large international projects.
3.4) Main benefits	What are the main benefits of the practice? • Financial benefits: The plan is a public policy, and some elements of the plan will have a financial benefit in terms of reduced congestion and improved delivery time. But as a public sector policy, the plan is neutral and not set-up in a way that would make a difference in the financial benefits for the private sector. • Economic benefits: The main economic benefits are for the business of transport carriers when using electric/clean vehicles. The reduction in adverse health impacts and congestion should be leading to economic benefits for the public. • Benefits in the field of services: Increasing the share of clean freight vehicles will benefit to the image of the carriers involved. • Benefits for the society/Environmental benefits: The targeted reduction in total mileage and total air pollutant and CO2 emission will reduce negative freight externalities such as congestion, accident, health impacts and climate change.
3.5) Cost indication	The total budget of the Brussels Region freight plan implementation is less than 2 million Euro over a period of 3 years (2013-2016, no staff cost included).
3.6) Barriers / Limitations	The main barriers are the inertia of the logistics business, the growth in demand for deliveries also related to population growth, high costs of development and implementation of last-mile projects (e.g. electric/clean vehicles, the difficulties in finding adequate low costs facilities in central area), complex institutional context and limited interregional collaboration, lack of data/difficulties in monitoring the effects of the different measures
3.7) Common practice before implementation	There was limited regulation and very little public intervention before the setting up of the freight plan.
3.8) Motivation/problem	Many threats and weaknesses were identified in Brussels. The main difficulties identified were high level of air pollution, high congestion and lack of space for deliveries in central area.

3.9) Justification of practice	The Brussels freight plan complies with the BESTFACT definition of a Best Practice: • It combines public and private interests • It is innovative through its specific mix of actions related to infrastructure, operations, regulation and monitoring interventions • It has a beneficial impact on the sector and on the negative externalities of freight and logistics such as air quality, congestion and use of urban space. • It is replicable and transferable because the measure taken have already demonstrated their feasibility and applicability

4) Transferability	
4.1) Geographical Area	Can the solution be transferred to other countries, regions or cities? ☒ Yes ☐ No
	Are there special requirements for the transfer to different countries, regions or cities (e.g. legal system, language barriers, size)? No
4.2) Usability in other domains	Can the solution be transferred to other actors or industries? ☒ Yes ☐ No
	Different retailers, large businesses and small SMEs can replicate the successful actions in different economic sectors under the condition that they are active in the city, including construction, service sector. The DSP, one of the elements of the freight plan, can be used as a logistics action, which can be applied for a public administration.
4.3) Political framework conditions - Regulations	Are there political framework conditions and/or regulations for the best practice case that need to be in place or have to be considered for the transfer of the practice to another domain? ☒ Yes ☐ No
	The set-up of a freight plan needs political support, a lot of consultation and an expert team to be well prepared.
4.4) Extensibility	Can the area of the solution be extended or can the practice be used within a different area (e.g. can a city specific solution be used nation wide?) ☒ Yes ☐ No
	In other parts of the city, the region or the country, or elsewhere in Europe

4.5) Similar cases	The London Freight Plan, the Paris Charter of Good Practices, the Gothenburg city logistic policy, all are comparable initiatives. The unique characteristic of Brussels is that it includes infrastructure on top of regulation, DSP, Consolidation Centre, Modal shift, and data monitoring into one single, ambitious plan.

5) Additional information	
5.1) Consideration for in-depth analysis	Should this case be further considered for in-depth review? ☒ Yes ☐ No
	Available detailed information.
5.2) References	Bruxelles Mobilité (2013): Plan transport de marchandises http://www.bruxellesmobilite.irisnet.be/articles/la-mobilite-de-demain/plan-transport-de-marchandises http://www.lamiloproject.eu/
5.3) Contact for further details	Christophe de Voghel, Brussels Mobility cdevoghel@sprb.irisnet.be
5.4) Date of review	Latest date of update of this format (22 June 2015)

5.5) Pictures	 **Figure 15: Full-electric truck and urban consolidation centre of Citydepot, one of the achievements of the Brussels freight plan**
5.5) Pictures	 **Figure 16: Regulation and signage for unloading and urban deliveries in Brussels**

Figure 17: Clean electric van for urban parcels distribution in Brussels

5.6) Involvement of SME	SME as carriers: the Consolidation centre and the delivery business with clean vehicle is operated by SMEs SMEs as shippers: Contracted for parcel transports are not only large businesses, but also to some extend SMEs.
5.7) Impact on SME	The consolidation centre and the clean vehicle solutions are having a beneficial impact on SMEs, if they use the service.

6) In-depth information	
6.1) Costs	• The total costs of the Brussels freight plan are estimated to remain below 2 million Euro for a period of 3 years (2013 to 2016). • The funding is a public funding, mostly from the region and for some actions, extend funding is coming from European projects like Lamilo (e.g. Brussels Mobility supported the UCC operator with a grant of 200.000€, in addition to this, the operator invested 60.000€)

<table>
<tr><td>6.2) Benefits / Strengths</td><td colspan="3">The full (quantitative) evaluation of the plan has not been performed yet. However, one of the measures, the UCC within LaMilo can be used as an example:

For a limited amount of public money on the short term, the Brussels Capital Region now benefits from a private funded long-term UCC. The first conclusion of the trial is that this kind of activity can be profitable for its operator but also for logistics service providers using it (none of them chose to withdraw from the UCC).

Before starting the pilot and during the operations, Brussels Mobility ran a broad consultation with the local public and private stakeholders. On the one hand this allowed to adapt the offer and the communication strategy to the needs thanks to their expertise. On the other hand it has been used as a sounding board to present the UCC to a broad range of actors.

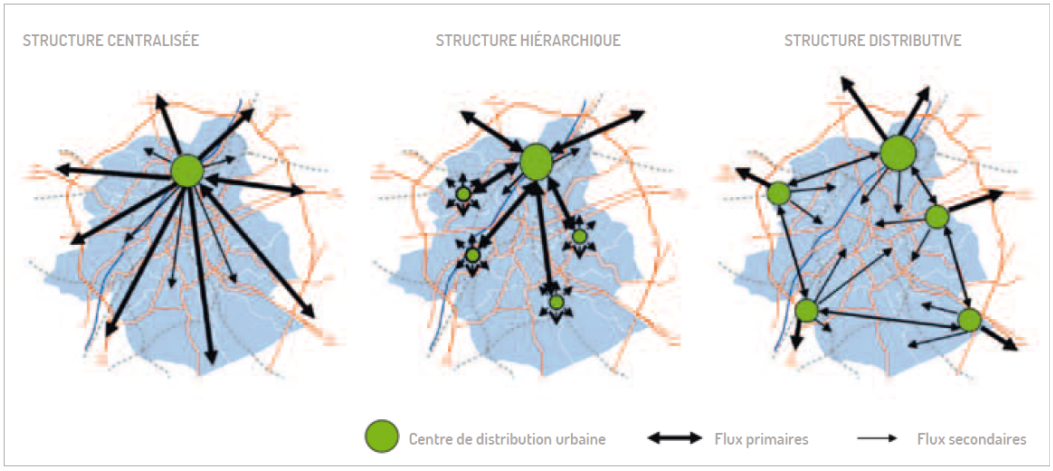
Choosing the right company to operate the UCC was a key element to succeed. In addition to experience and a sufficiently robust business model, which were analyzed in-depth during the tendering process, other aspects are deemed significant. Neutrality of the operator is one of them.

In order to attract logistics service providers and above all retailers, it is very important to develop tailor made services. This way, this UCC provides a solution for public authorities (traffic reduction), logistics service providers (no need to take care of the complicated last mile) and retailers (lack of storage, difficult to start an e-commerce activity etc.).</td></tr>
<tr><td>6.3) Weaknesses</td><td colspan="3">• Weaknesses will depend on the difficulties within each of the measures identified, such as: Difficulties with the increase of port operations or slow uptake of electric/clean vans on the market
• So far no undesired secondary or external effects of setting such a plan have been observed.</td></tr>
<tr><td rowspan="3">6.4) Implementation steps</td><td colspan="3">What are the different actions necessary in the implementation steps and how long does each step take (estimates)?</td></tr>
<tr><td>1. Preparation: 2 years of intensive consultation with all stakeholders. Many years of thematic preparation and exchanges with experts.</td><td>2. Implementation: Continuous implementation, with some activities such as unloading regulation immediately implemented, other such as port development being medium –term.</td><td>3. Operation: Citydepot started operation after winning the tender for the Urban Consolidation Tender and finding its first clients for parcels and pallets deliveries.</td></tr>
<tr><td colspan="3">Brussels Region, carriers, shippers, consultants, end receivers</td></tr>
</table>

6.5) Process	2011	Study to elaborate the strategy and organization of 4 workshops with actors
	2013 January	Approval of a project of plan by the Government
	2013 January - May	Stakeholders Consultation
	2013 July	Approval of the plan. Actions carried out so far:
	2013	Consultation with local actors and new way for the deliveries in a city center street (Louise)
	2014-2015	LaMiLo pilot of urban consolidation center (6 months - CityDepot) through EU INTERREG funding
	2014	Two Delivery servicing plans: ULB (university) - Fortis (bank)
	2015	Pedestrian zone in the city center, studies on-going
	Every year 2-3 workshops with different actors take place, freight surveys continue	
	Each part of the plan has a dedicated budget allocated as a public sector funding and manpower. Each element of the plan consists of different sets of actions undertaken, which are defined until 2020	
6.6) Technical feasibility	The Brussels freight plan, in its specific combination of actions, is an innovative urban freight solution that is technically feasible, in general. The DSP is an action that is still to be considered a prototype, not operational at full scale. The port development is on-going and not implemented at full scale. The urban consolidation centre set up within the LaMiLo project will continue with private funding	

7) Cluster specific information

7.1) Before-after comparison of distribution systems



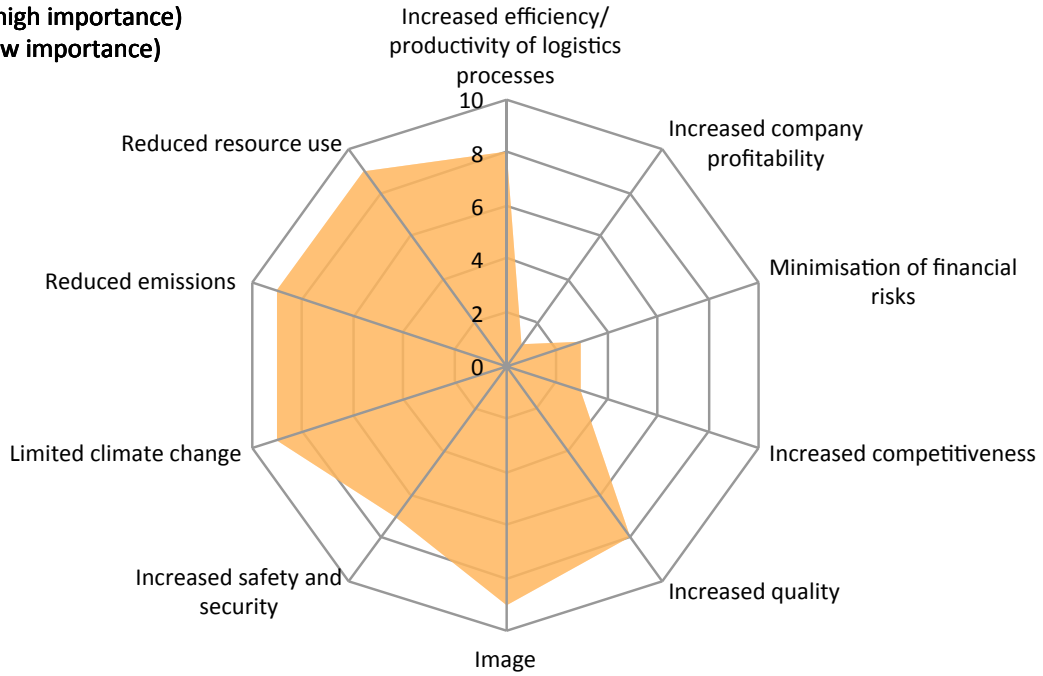
Source: Buck Consultants, 2011

7.2) Before-after comparison of impacts	**Figure 18: Before-after comparison of logistics system with consolidation centre (above)** A full comparison on of the measures identified in the plan is not applicable. However, the UCC set in the LaMiLo project can serve as an example: With only seven logistics service providers involved in the trial, the evaluation of the pilot showed a reduction of kilometers driven between the warehouse of the client logistics service providers and the delivery address by 48% (21% in urban area), which can be explained by the fact that a transporter uses now one truck instead of several vans to reach Brussels. CO_2 emissions decreased by 7% and NO_x emissions by 13%. For the same amount of goods, the number of deliveries decreased by 6,3% and the number of roundtrips by 10%. Few retailers chose to use value added services during the pilot even if those interesting tools are now at their disposal.
7.3) Before-after trial description	The plan foresees the trial of different solutions and these trials are on-going. Some examples include: • DSP • Port development • Consolidation Centre For the LaMiLo UCC example: Before the pilot there was no UCC, each transporter delivered directly the retailers, which means the last mile started at their warehouse and not in the city. For this reason, they used vehicles which were most of the time not appropriate for both the highway and the city centre. Some addresses were also delivered several times by several logistics service providers the same day (up to 3 out of the 7 seven transporters involved in the pilot). Brussels Mobility launched the UCC in collaboration with a private company, CityDepot, which has been subcontracted after a call for expression of interest. Brussels Mobility had two main objectives: • Improve the deliveries in Brussels by optimizing the flows to reduce the congestion and the environmental impact while keeping or improving the level of service thanks to value added services. • Support a private company during the starting phase to create a privately-funded UCC on the long term. The UCC is a 1000m^2 warehouse close to the city centre and easily reached from the highway. By delivering the goods in a logistics warehouse instead of at the retailer's door, they may be able to use one bigger truck instead of several vans. Logistics service providers pay for each parcel or pallet delivered by the UCC operator. Retailers can decide to be delivered at the UCC in order to consolidate several deliveries and/or choose a better delivery time in the day. They can also benefit from a broad range of tailor made services, including off-site storage, parcel pick-up, waste removal. Depending on their needs and possibilities, they decide what they are ready to pay for. All the goods delivered at the UCC are then gathered by destination and loaded into more environmental friendly small trucks or vans. In order to stay neutral and to spread the costs, the operator chose to focus on the consolidation of the goods and subcontract the transport activity to local actors

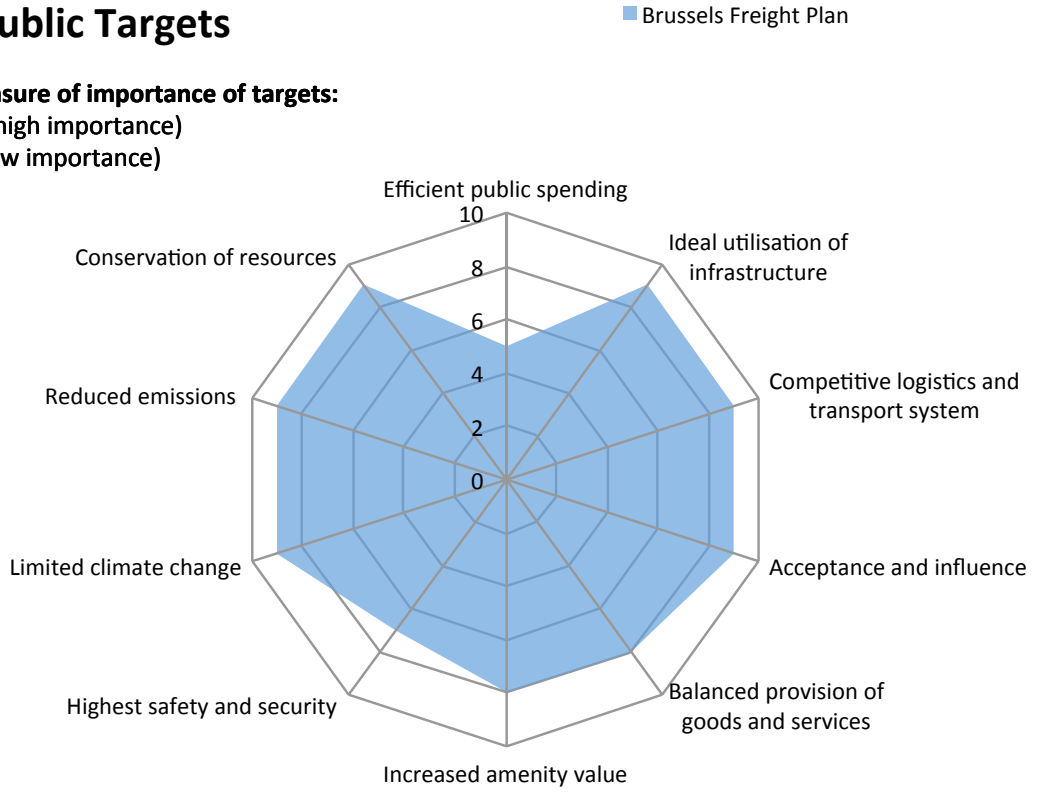
8) Evaluation of strategic targets

Private Targets

Measure of importance of targets:
10 (high importance)
1 (low importance)



Public Targets



Measure of importance of targets:
10 (high importance)
1 (low importance)

4.3 Environmentally friendly paper supply to municipality buildings: the case of Amsterdam

1) Basic information	
1.1) Identification	**Environmentally friendly paper supply to municipality buildings**
1.2) Cluster	1
1.3) Responsible authors	Pieternel Bakker Assistant project manager Air quality Department City of Amsterdam Pieternel.bakker@ivv.amsterdam.nl

2) Scope of practice	
2.1) Approach	Public & private approach
2.2) Actor classification	• Distribution/transportation (Transmission) • Printers/Copiers/paper (Canon) • City of Amsterdam (Buying Department and Airquality Department)
2.3) Geographical Area	Netherlands, Amsterdam
2.4a) Type of city	☒ Large: >1 million inhabitants ☐ Intermediate: 50,000 to 1 million ☐ Small: < 50,000 inhabitants
2.4) Implementation status	
	Currently running. March 2014 up until the end of 2015
2.5) Date of implementation	March 2014
2.6) Link to other clusters	• Are there existing connections to another cluster topic? • Can there be future links to other cluster topics? Cluster 2: clean vehicles
2.7) Topics covered	***Infrastructure and Technology*** • Freight consolidation and transhipment • Implementation of low emission technologies • IT-technologies and solutions (for management and administration). *(Software link between Transmission and Canon)* • Innovative vehicles, vessels and equipment ***Organisation and Cooperation*** • Communication between authorities: cooperation, procedures, legal

	frameworks • Communication between businesses and authorities: coordination, consultation • Business models: new form of ownership, risk management ***Operations and Services*** • Innovative operational solutions • Transport management, fleet management ***Knowledge, Tools and Methods*** • Working and implementation guidelines • Monitoring and benchmarking of processes
2.8) Transport modes	**Road/ truck**
2.9) Supply chain elements	Warehousing, storage, bundling of goods Transportation
2.10) Which targets can be supported by the implementation?	*For public actors:* • Acceptance and influence • It is an example for other products *For private actors:* • Increased efficiency /productivity of logistics processes (for Canon this is the case) • Image • It is an example for other clients
	For both actor groups: • Reduced emissions • Reduced distance
	Please specify all other and different targets here…
2.11) End-user benefits	Where do end-users benefit? • Reduced emissions • Reduced noise pollution • High level of acceptance of solution/practice • Same level of quality • Less deliveries

3) Best practice	
3.1) Description of the practice	A4 paper (for use by the city of Amsterdam), is delivered at the 40 municipal and borough buildings in a smarter and environmentally-friendly way. It's being transported by an electric truck from a warehouse at the border of the city. This reduces the number of polluting rides through the city. <u>Purpose & objectives:</u> - less km's (bundling)

	- zero emission km's (clean vehicles)
3.2) Technical main characteristics	Transhipment, clean vehicles, bundling, storage, ordering procedure, software
3.3) Success factors	• Public-private cooperation. There was a good cooperation between the A4-paper supplier Canon and the City of Amsterdam, and the different departments of the City of Amsterdam. • The interesting tender and the good proposition of Transmission • The willingness of the different boroughs to order the paper in a slightly different way
3.4) Main benefits	Benefits for the society: better air quality
3.5) Cost indication	There is a small gap between the discount of the main supplier and the costs of transportation and storage by the LSP. This small difference is paid by the Air quality department of the City of Amsterdam
3.6) Barriers / Limitations	There were no limitations or barriers, but beware of procurement rules. And beware of the fact that this is only possible when the supplier is willing to abandon the distribution part of the contract. The supplier needs to be willing to give a discount (pay for the transportation by another party).
3.7) Common practice before implementation	Before, the A4-paper was directly delivered on call, by Canon with a regular diesel truck.
3.8) Motivation/problem	The main motivation was to improve the air quality, gain experience with sustainable public procurement and serve as an example for future projects (with other products).
3.9) Justification of practice	

4) Transferability	
4.1) Geographical Area	Can the solution be transferred to other countries, regions or cities? Yes
	Are there special requirements for the transfer to different countries, regions or cities (e.g. legal system, language barriers, size)? No, I don't expect any barriers. It depends on the willingness of suppliers (of for example paper or coffee) to participate. Otherwise you should wait until the end of the contract.
4.2) Usability in other domains	Can the solution be transferred to other actors or industries? Yes, I think that also other cities/companies can organise their product deliveries in this way. In all offices people use paper, coffee etc.

4.3) Political framework conditi-ons - Regulations	Are there political framework conditions and/or regulations for the best prac-tice case that need to be in place or have to be considered for the transfer of the practice to another domain? No
	Please give a reason for your evaluation
4.4) Extensibility	Can the area of the solution be extended or can the practice be used within a different area (e.g. can a city specific solution be used nation wide?) Yes, other cities, other companies, other products
	Please give a reason for your evaluation see above
4.5) Similar cases	Delivery and Servicing Plans in London

5) Additional information	
5.1) Consideration for in-depth analysis	Yes
5.2) References	http://frevue.eu/environmentally-friendly-paper-supply-to-municipality-buildings/
5.3) Contact for further details	Pieternel Bakker 0031(0)6-20919182
5.4) Date of review	9 June 2015
5.5) Pictures	 **Figure 19: Electric truck of Cargohopper, subcontractor of Transmission**

5.6) Involvement of SME	Cargohopper is an SME, subcontractor of Transmission, the Logistics Service Provider which was winning the tender. The SME "Cargohopper" is involved as carrier.
5.7) Impact on SME	SME can be benefiting from this case as subcontractors.

6) In-depth information			
6.1) Costs	It is almost cost neutral, since Canon saves some money on transportation, which is performed at a discount rate. Transmission takes over the transportation. The small difference in costs (also for the storage in the warehouse) is publicly funded.		
6.2) Benefits / Strengths	• Less paper deliveries • Lower CO2 emissions, Lower NO2 emissions, Lower PM10 emissions, Less emitted pollutants, Lower noise emissions		
6.3) Weaknesses	• Dependence on willingness of product supplier to cooperate • Slightly different order procedures		
6.4) Implementation Steps	What are the different actions necessary in the implementation steps and how long does each step take (estimates)?		
	1. Preparation: Extensive talks between the buying department and air quality department in order to determine which product (paper, coffee?) is suitable for a distribution project. (months)	2. Implementation: - Extensive talks between the buying department, (paper) supplier and air quality department in order to determine what to demand in the tender and how to design the process. - writing the tender - judging the offers (months)	3. Operation:

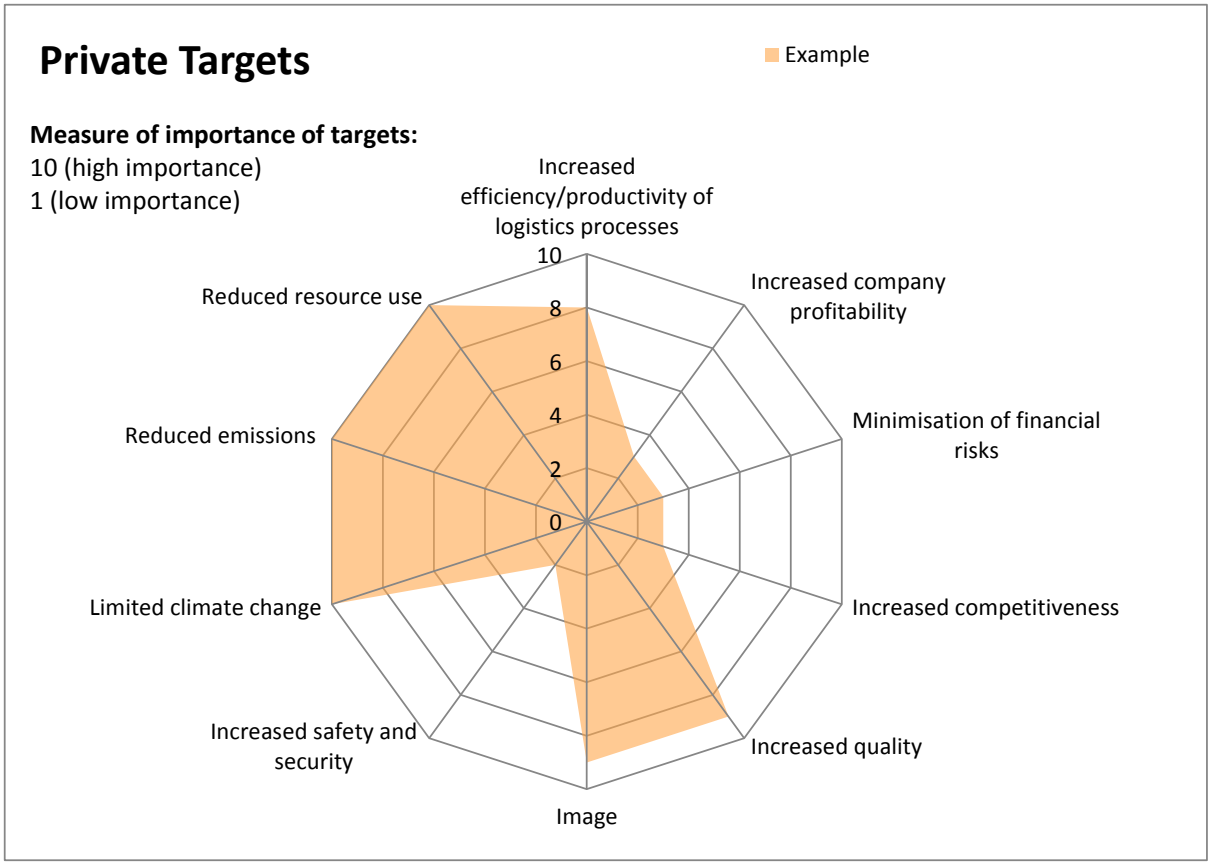
	Which actors are relevant in the process?
	• Distribution/transportation (Transmission)
	• Printers/Copiers/paper (Canon)
	• City of Amsterdam
	  ○ Buying Department
	  ○ Air Quality Department
	  ○ Boroughs		

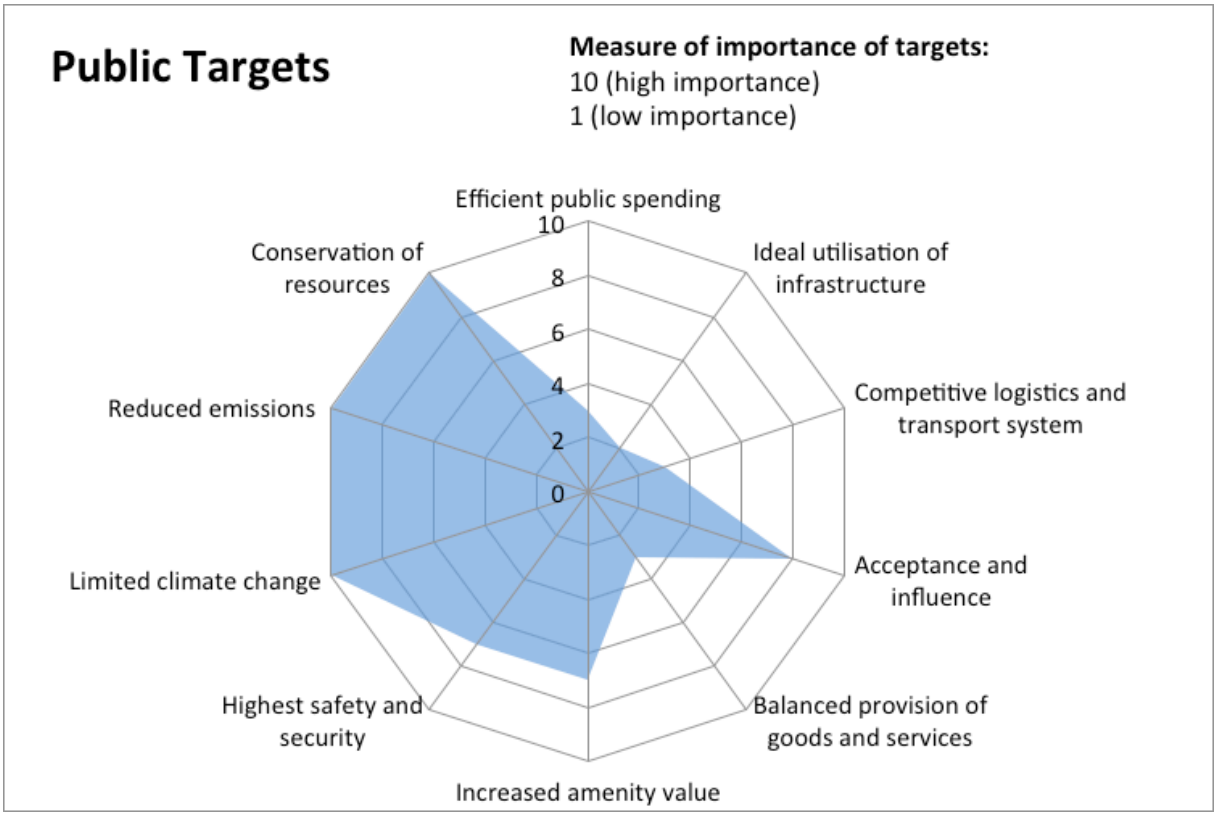
6.5) Process	At the end of 2011 the Municipality (the Air quality department and the procurement Department) started to investigate which products would be suitable for delivery in a more environmentally friendly way. Paper appeared to be suitable. The new paper supplier (Canon) was immediately enthusiastic to be involved. In 2012 this led to a pilot: the paper meant for the City Hall was		

	being delivered with an electric truck from a DC at the border of the City. So the pilot started with one office building, one location. The experiences were good. The receivers of the paper and for the paper supplier, Canon, evaluated the pilot positively. Because of the positive reactions it was decided to scale-up and tender the paper distribution to all municipality buildings. All the partners were enthusiastic to employ this with other products (the buying department) or with other clients (Canon). After the first evaluation of this new procedure, the municipality got in touch with other suppliers to hear whether this might also be an interesting solution for other products that the municipality buys. “The experience that we obtained in this project, we can very well use in new tenders” says Mila Milovic, contract manager. The A4 paper contract will finish in November of 2015 (also for the paper distribution with EVs). The buying department (of the Facility products and services), decided to continue with the clean distribution concept. Therefore, in the new A4 paper tender beyond 2015, it will be a requirement that the new supplier delivers the paper at the same distribution centre at the border of the city as is now the case. From that distribution centre it will be further distributed to the different offices with the electric truck. The contract with the transport-company with the EV’s, is prolonged for 1 year. In 2016 a new tender will be prepared for the transportation/distribution of the A4 paper and it is planned that this might also apply to other facility products. This new contract will start in November 2016. The Municipality of Amsterdam is experimenting with adding requirements regarding smart logistics and/or clean vehicles. Municipality of Amsterdam is in a starting phase, now having experience with a limited amount of tenders of products, services and projects. Examples (among others): A4 paper (see above), mover-services and a renovation/building project. The University of applied sciences researched the mobility footprint of the own purchases of the Municipality of Amsterdam. That information can be used to focus on the tenders of products, services and projects with the largest mobility footprint.
6.6) Technical feasibility	Very feasible. You need a distribution company with EV’s, a software system to order paper which is connected to the system of the distribution company and a warehouse is needed.
7) Cluster specific information	
7.1) Before-after comparison of distribution systems	Before: Classical urban freight distribution with regional consolidation centre of a large shipper, and final last mile deliveries with diesel trucks of a sub-contractor. After: Centralised consolidation storage for paper, with final delivery using a full-electric truck and a lower frequency.
7.2) Before-after comparison of impacts	100% air pollutant emission reduction for the final last mile transport movements. Substantial reduction of mileage.
7.3) Before-after trial description	Not only the vehicle category changed from diesel to full-electric, also the Municipality supplies were delivered by a different Logistics Provider. The paper supplier remains the same.

	The use of a central storage place allow to deliver less frequently and to reduce mileage, compared to the before situation.

8) Evaluation of strategic targets





4.4 Paris LEZ

1) Basic information	
1.1) Identification	Low Emission Zone project in Paris and support to craftsmen and to the commercial transport activities
1.2) Cluster	CL1
1.3) Responsible authors	Christophe Rizet (IFSTTAR)

2) Scope of practice	
2.1) Approach	☐ Private approach ☒ Public approach ☐ Public & private appr.
2.2) Actor classification	Which branches of industry, which type of authority or what other type of actor groups are involved? Name all possible. City of Paris, craftsmen and carriers working in the city, French National State notably fort the help to funding electric vehicles
2.3) Geographical Area	From which country (and city) does the practice originate? France (Paris)
2.4a) Type of city	☒ Large: >1 million inhabitants ☐ Intermediate: 50,000 to 1 million ☐ Small: < 50,000 inhabitants
2.4) Implementation status	Please indicate and explain the status of the case you describe. ☒ Evolving Best Practice ☐ Best Practice
	The LEZ in Paris will progressively start in 2015, step by step; a plan has been set up to support small craftsmen and transport companies that might be put in difficulties with the new rules.
2.5) Date of implementation	What year (or more specific date if possible) was the new solution implemented? 1 July 2015 (first step) : ≤ Euro 2 heavy trucks, buses and coaches are banned from 8 am to 8pm. 1 July 2016 (second step) : ≤ Euro 2 heavy trucks, buses and coaches are banned 24h all the week and other vehicles ≤ Euro 1 are banned from Monday to Friday. From 2017 to 2020, all vehicles ≤ Euro 2, 3 & 4 will be gradually banned.

2.6) Link to other clusters	• Are there existing connections to another cluster topic? No • Can there be future links to other cluster topics? Possible connection with CL3 for the enforcement which may use RFID
2.7) Topics covered	Which topics are covered by the practice? ***Infrastructure and Technology*** ☐ Access to transport networks, infrastructure and nodes ☐ Freight consolidation and transhipment ☒ Implementation of low emission technologies ☐ IT-technologies and solutions (for management and administration) ☐ Innovative vehicles, vessels and equipment ☐ ICT (e.g. routing, guidance), transport optimisation ***Organisation and Cooperation*** ☐ Business to business (B2B) solutions, cooperation ☐ Competitive aspects: collaboration (cooperation with competitors), prioritisation (priorities on infrastructure and in nodes) ☒ Communication between authorities: cooperation, procedures, legal frameworks ☐ Communication between businesses and authorities: coordination, consultation ☐ Business models: new form of ownership, risk management ***Operations and Services*** ☐ Business to customer (B2C) solutions (e.g. e-commerce, last mile delivery) ☐ Innovative operational solutions ☒ Value added services, development (or extension) of services ☐ Service quality and sustainability agreements/certification ☐ Transport management, fleet management ***Regulations and Policy*** ☒ Access rules and restrictions of urban areas ☒ Land use and spatial planning: assessment and siting of transport facilities and infrastructure ☐ Infrastructure financing: taxation, user charges, PPP ☒ Environmental standards and policy ☐ Interoperability and standardisation: vehicles, equipment, loading units, infrastructure ☐ Safety and security: measures, regulations, insurance ***Knowledge, Tools and Methods*** ☐ Modelling and forecasting ☐ Data collection and statistics ☐ Education and training ☐ Working and implementation guidelines ☒ Monitoring and benchmarking of processes
2.8) Transport modes	Which transport modes/vehicle types are affected by the solution? ☒ Road/ truck ☒ Road/ delivery van ☐ Road/ motorcycles, scooter etc. ☐ Bike ☐ Heavy rail ☐ Light rail ☐ Inland waterway vessels ☐ Deep sea vessels ☐ Air freight/cargo planes ☐ Other: please explain …
	Paris LEZ is about conventional (diesel and gasoline) road vehicles but will have an impact on electric and gas road vehicles; It may also have an impact on other modes (rail and waterways).
2.9) Supply chain elements	No direct impact on the other elements of the supply chain in the short run. But a LEZ may also have an impact on the modernization of the transport sector

2.10) Which targets can be supported by the implementation?	*For public actors:* ☐ Efficient public spending ☐ Ideal utilisation of infrastructure ☒ Competitive logistics and transport system ☒ Acceptance and influence ☐ Balanced provision of goods and services ☐ Increased amenity value ☐ Highest safety and security ☐ Others	*For private actors:* ☐ Increased efficiency / productivity of logistics processes ☐ Increased company profitability ☐ Minimisation of financial risks ☐ Increased competitiveness ☐ Increased quality ☒ Image ☐ Increased safety and security ☐ Others
	For both actor groups: ☐ Limited climate change ☒ Reduced emissions ☐ Conservation of resources ☐ Others? Please specify: …	
	Please specify all other and different targets here… The LEZ may have an impact on the modernization of the transport sector in Paris. Actions planned to support small commercial transport companies that might be put in difficulties with the new rules, are designed to foster the acceptance of the LEZ and to keep the health and competitiveness of the logistics in the City.	
2.11) End-user benefits	Where do end-users benefit? ☐ Affordable services (e.g. new affordable services or price reductions) ☐ Services in rural areas (new/additional service areas) ☐ Quality of services ☐ Reduced congestions ☒ Reduced emissions ☒ Reduced climate change ☐ Reduced noise pollution ☐ Implementation degree ☐ High level of acceptance of solution/practice ☐ Other benefits: (please specify)	

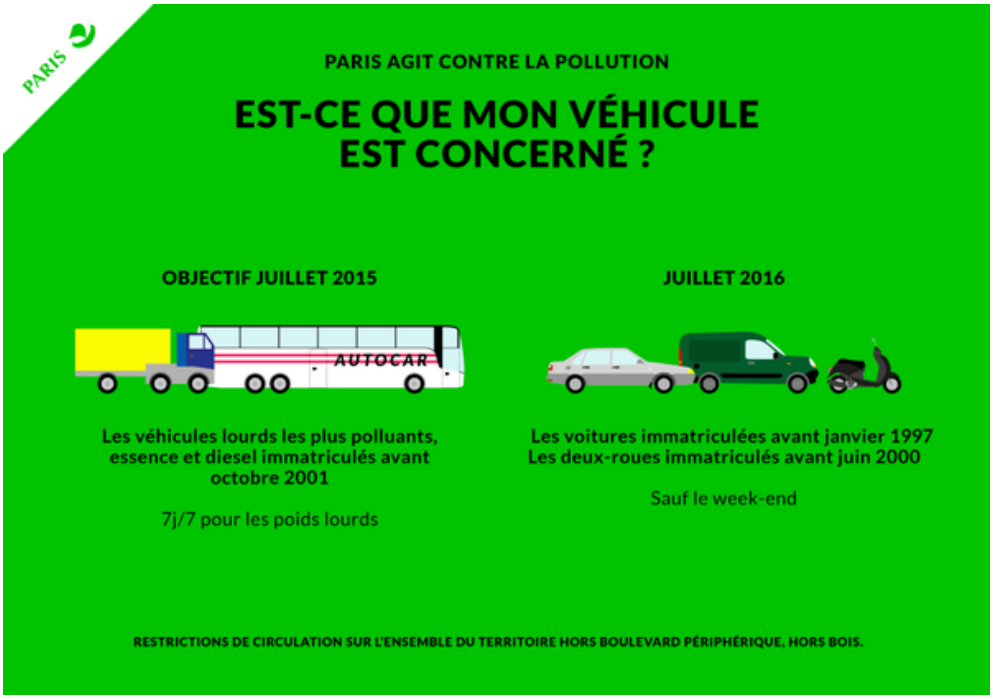
3) Best practice	
3.1) Description of the practice	Please provide a description of the solution, give details about the **purpose** and the **sustainability objectives**. The city of Paris wants to become a leader on air quality improvement measures and wishes to reach 50 % non diesel deliveries in Paris by 2017, 100 % by 2020. A realistic plan and effective measures have been announced in Feb 2015.

3.2) Technical main characteristics	What are the technical main characteristics? The restricted area is the city of Paris except the ring-road ("boulevard périphérique"). In the first step, from 1 July 2015, heavy trucks, buses and coaches ≤ Euro 2 are banned from 8am until 8pm every days; in the second step, from 1 July 2016, heavy trucks, buses and coaches ≤ Euro 2 will be banned 24/7 and other vehicles ≤ Euro 1 will be banned from Monday to Friday. Then, third step, between 2017 and 2020, all vehicles ≤ Euro 2, 3 & 4 will be gradually banned. The control will be manual in the first step (vehicles will be stopped and controlled by the municipal police). In the second step, the control will still be manual but with the implementation of a national stickers system, and enforced by the national police. In the future (from 2017) automated control (RFID) is being envisaged. An exemption system is being defined for very specific vehicles.
3.3) Success factors	What are the main success factors of the practice? Why does it work so well? For the mitigation of pollution in LEZ, enforcement is a key issue. Furthermore, actions that are additional to the LEZ are taken to support craftsmen and small companies, including commercial transport, to prevent too much stress in this crucial activity. The city of Paris offers: • Commercial vehicles in self-service ('Utilib') • Development of a network of charging stations for natural gas and electricity • Development of secured spaces for storage and recharging of electric LGVs • Project to book a time slot everyday for deliveries made only by clean vehicles • Free parking for electric, gas and hybrid vehicles on Paris streets (already exists for electric vehicles) • Facilitated access to credit for fragile companies • Financial assistance for small companies wishing to replace an old vehicle by a "clean" vehicle (gas or electricity) : Maximum 15% of vehicle price: € 3000 for LGV < 2.5 t ; € 6000 for LGV > 2.5 t ; € 9000 for HGV ; total of 12 million € budget. In return, the beneficiaries have to keep their vehicles for 3 years minimum, not buy a new combustion vehicle < Euro 5 in this period, and participate in an anonymous survey on the vehicle use. NB: additional financial assistance is provided by the French state (maximum € 10,000 or 27% of purchase price)
3.4) Main benefits	What are the main benefits of the practice? The main benefits of the LEZ will be environmental. The main benefits of the support to commercial transport activities will be mainly economic.

3.5) Cost indication	If available, give indication of costs For the financial assistance to replace old vehicles for small companies, the city of Paris plans a budget of 12 millions €. The cost of enforcement is not yet known.
3.6) Barriers / Limitations	What were the main barriers and limitations to overcome for the implementation? And how was it managed? In France a national plan called ZAPA had been set up in 2010 to implement such LEZ ; 8 cities, including Paris, started preliminary studies. But in 2013 the project was abandoned by the French ministry of Environment, who found that this plan would be ecologically inefficient, would penalize the poorest citizens and could be perceived as socially unfair. When deciding the new LEZ, the city of Paris decided to help the change in vehicles and took many precautions to protect small enterprises using vans.
3.7) Common practice before implementation	Please specify what the common practice was before the implementation. Many LEZ have been implemented in Europe and all over the world. The Impact of such traffic limitations on the transport sector has hardly been analysed before the implementations.
3.8) Motivation/problem	What was the main problem or motivation that led to the development and introduction of the new practice? The high concentrations of pollutants in the air, mainly particulate matter and NOx, are far above European standards for air quality and have a negative impact on people's health. Road traffic is one of the major contributors to these emissions. Within the road traffic, the share of freight is much higher in emissions than in traffic expressed in vehicle kilometres. On the other hand, logistics is a very necessary activity for the city and many small companies are using very old and very polluting vans and trucks. The City of Paris has to be cautious on the impact of a LEZ on these small companies.
3.9) Justification of practice	Why can this case be considered a Best Practice? A LEZ is a sustainable and impactful public sector policy, and is widely considered a transferable good practice. But until today, before Paris, no French city had implemented it yet. Paris has learned from the examples of many other cities in Europe, including Berlin, London and Goteborg, trying to take account of their experiences. The information on the LEZ policy is publicly available.

4) Transferability	
4.1) Geographical Area	Can the solution be transferred to other countries, regions or cities? ☒ Yes ☐ No

	Are there special requirements for the transfer to different countries, regions or cities (e.g. legal system, language barriers, size)? Each city is a different case but, when implementing a LEZ, they all have to be cautious about the economic impact of the new regulation on the freight transport industry.
4.2) Usability in other domains	Can the solution be transferred to other actors or industries? ☒ Yes ☐ No
	Please give a reason for your evaluation. A LEZ may also deal with other pollutant industry.
4.3) Political framework conditions - Regulations	Are there political framework conditions and/or regulations for the best practice case that need to be in place or have to be considered for the transfer of the practice to another domain? ☒ Yes ☐ No
	EU standards on air quality have been an important factor of decisions of the LEZs and on the other hand, the national tax system on fuels, as well as subventions on electric vehicles have a high impact on pollution. National laws, for example on the institutional authority for road management or on stickers for the characteristics of vehicle emissions, may also be necessary.
4.4) Extensibility	Can the area of the solution be extended or can the practice be used within a different area (e.g. can a city specific solution be used nation wide?) ☒ Yes ☐ No
	Please give a reason for your evaluation When elaborating the LEZ, the municipality of Paris suggested that these measures should be arranged with the surrounding municipalities, the region Ile-de-France and the surrounding municipalities: to be efficient the LEZ should cover the whole urban area. In France and in Europe many areas are too polluted and should, sooner or later have restrictions on authorized vehicles. Most citizen hope that the control on all vehicle emissions will become more and more strict. Furthermore, a local LEZ like in Paris will displace the old vehicles out of the LEZ, probably in other cities, this is why the question of local pollutants should be considered on a national or EU level.
4.5) Similar cases	Are there existing similar cases? If so please indicate and specify what sets this case apart and makes it a better practice. Many LEZ have been implemented in Europe and harmonisation of these LEZ are necessary, at the national level and through Europe. Coordination between car manufacturing industry, public authorities and freight operators in order to reach a better supply of commercial vehicles with the needs of freight operators.

5) Additional information	
5.1) Consid-eration for in-depth analy-sis	Should this case be further considered for in-depth review? ☒ Yes ☐ No
	Please give reasons why this case should be (or should not be) considered for in-depth review
5.2) Refer-ences	References and sources used to provide the given information : Réduction des Emissions du Transport de Marchandises en Ile de France (RETMIF), to be published in 2015, IFSTTAR-ADEME
5.3) Contact for further details	If personal contacts were established please provide the name, email and telephone number
5.4) Date of review	Latest date of update of this format : 22/06/2015
5.5) Pictures	**Figure 20: LEZ specifications & details in public awareness campaign** 

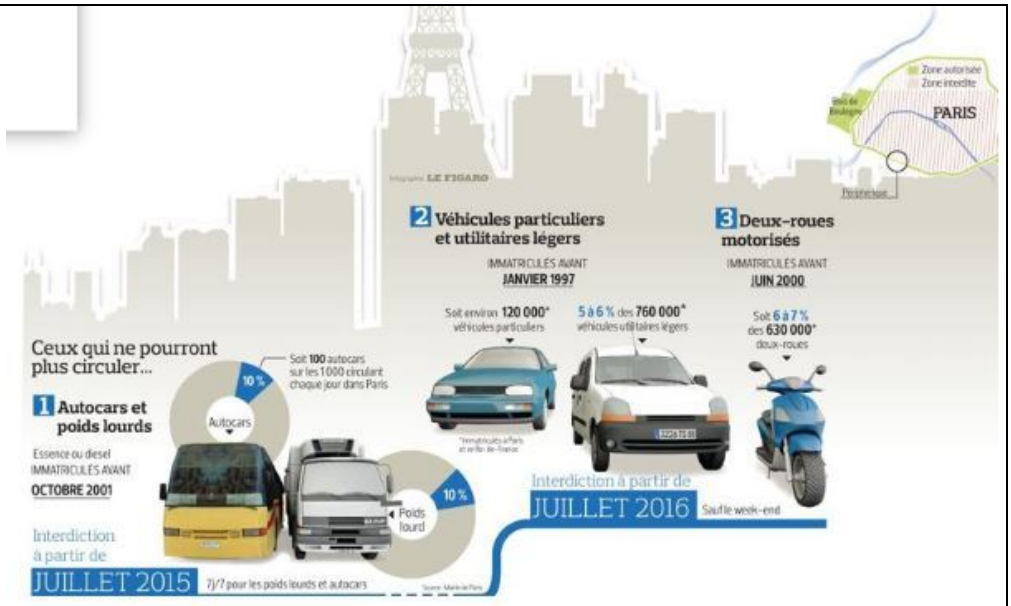
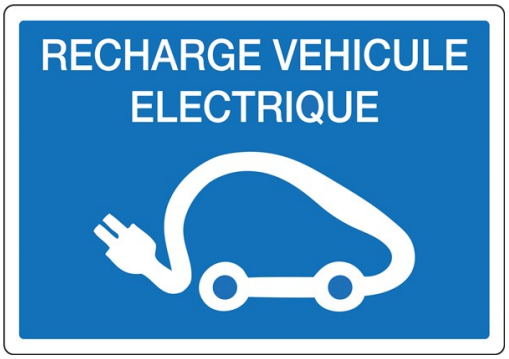


Figure 21: Utilib, the electric freight vehicle for shared use in Paris LEZ

Figure 22: Logo of charging point for electric vehicles in the LEZ



5.6) Involvement of SME	Are SME involved in the case? Describe their role or their potential role. Paris makes its best to protect small enterprises which could be put in trouble by the LEZ

5.7) Impact on SME	What is the impact of the case on SME (how can they benefit, what could be the impact on their growth)? Please describe. Craftmen and very small enterprises are often using old polluting vans and may have difficulties of funding new electric vans. So the Municipality of Paris set up 'Utilib' (a service of sharing of commercial vehicles) and a financial help for buying new electric or gas vehicles.

6) In-depth information	
6.1) Costs	• What are the (estimated) costs (e.g. investments, operation) Cost for the city: The Municipality of Paris budget for the financial assistance to replace of old vehicles for small companies is 12 millions € ; The cost of enforcement is not yet known. Costs for companies will probably vary according to their size: large companies should be able to displace their old vehicles to other regions, out of the LEZ, while small enterprise which don't have this possibility, will have to sell them. • What financing is presently applied/planned (partnership, private, public funding) Small companies wishing to replace an old vehicle by a "clean" vehicle (gas or electricity) may benefit from a maximum subvention of 15% of vehicle price: € 3000 for LGV < 2.5 t ; € 6000 for LGV > 2.5 t ; € 9000 for HGV ; 12 million € budget and from additional financial assistance provided by the French state (maximum € 10000 or 27% of acquisition price). In return, the beneficiaries have to keep their vehicles for 3 years minimum.
6.2) Benefits / Strengths	• Cost-benefit ratio, cost per output unit, share of private investments • Utilisation rate of networks, time losses • Profits, debt • Units per delivery, mileage per delivery, total mileage • Developed market size, market share • Frequency of service, access times to networks, accessibility • No. of accidents, no. of incidents with hazardous goods • CO2 emissions, GHG emissions, emitted pollutants, noise immissions • Energy used, space used, sealed surface • Other benefits? It is too early to quantify the benefits of Paris LEZ with such indicators

<table>
<tr><td>6.3) Weaknesses</td><td colspan="3">• What are the main weaknesses of the project, concept, strategy, initiative?

Today, the LEZ project is only in the city of Paris, while the pollution is all over the urban area, much broader than the city.

• What are the main risks?

There is a risk than pollution, eg particulate matters, arrive from to Paris even if not emitted inside the city.

• Are there undesired secondary or external effects?

A possible secondary effect is to change the structure of the transport sector in the city, replacing the numerous very small craftsmen by large companies</td></tr>
<tr><td rowspan="3">6.4) Implementation steps</td><td colspan="3">What are the different actions necessary in the implementation steps and how long does each step take (estimates)?</td></tr>
<tr><td>1. Preparation: …

Take account of the many experiment of LEZ all over Europe and consult the different stakeholders.

This step can take about half a year.</td><td>2. Implementation: …

The LEZ should be published well in advance so that people and companies can change their vehicles progressively, all the more early as the constraints of Euro standards are demanding; several years in advance would be desirable for a binding LEZ</td><td>3. Operation: …

Enforcement is critical for the success of a LEZ.

The budget for financial help to replace old vehicles should be properly assessed.</td></tr>
<tr><td colspan="3">Which actors are relevant in the process?

All the stakeholders should be associated to the preparation of the decision : carriers and their associations but also shippers, van and truck manufacturers and salers, electricity providers, etc.</td></tr>
<tr><td>6.5) Process</td><td colspan="3">Please give detailed information on the process of implementing the best practice. How was the initial process and experience and what can be expected for (future) transferability?

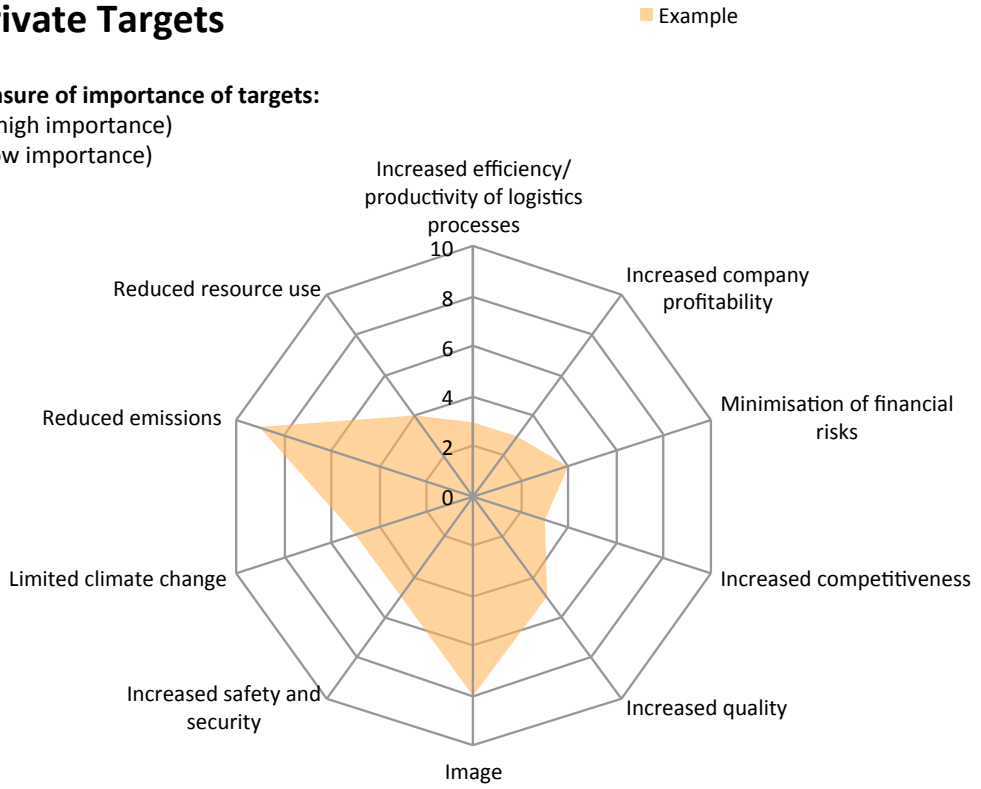
As mentioned before, the French national experiment of ZAPA was abandoned in 2013 and now Paris is starting a new experiment, on a smaller scale, taking account of the past experience as well as experiences from other European cities. As LEZ will very probably be implemented in most of EU cities, a European assessment of such regulations should be done, including for the economical impacts.</td></tr>
<tr><td>6.6) Technical feasibility</td><td colspan="3">Is this practice feasible in technical terms?

A common view of ongoing experiment of LEZ in Europe is feasible and could be done with the help of existing networks of Cities involved in sustainable development.</td></tr>
</table>

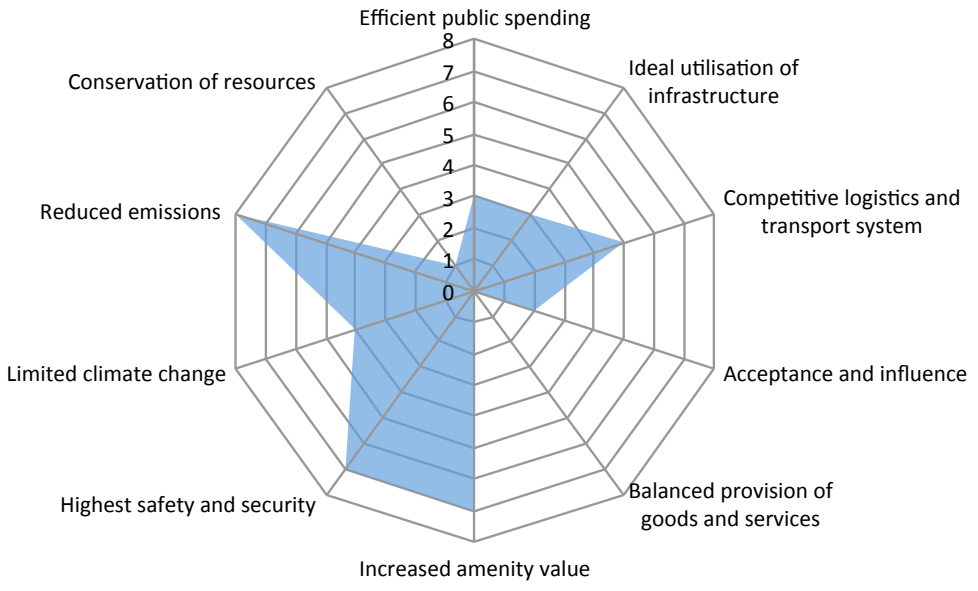
7) Cluster specific information	
7.1) Before-after comparison of distribution systems	The distribution systems should not change that much because of the LEZ.
7.2) Before-after comparison of impacts	In other European cities whose experience has been analysed, the main impact of such a LEZ are on the structure of the fleet (% of the different Euro norms in the fleet): the LEZ allows for an acceleration of the renewal of the fleet, which, in turn, allows for a reduction of pollutants emissions. The impact on global traffic and on hubs location is not quantifiable. The impact on emissions should correspond to a renewal of the fleet of several years in advance, according to the minimum Euro norm accepted to enter the LEZ.
7.3) Before-after trial description	The first trial in France was the ZAPA plan of the ministry of environment. As stated before, it was abandoned in 2013 as inefficient and socially unfair. But the pollution continued to grow and EU continued to threaten the main cities of very important fines for non compliance with the standards of air quality. The LEZ is only a part of the decisions concerning pollution and road traffic Paris took to try to solve the problem. Concerning private operators, the large carriers operating in Paris had defined their own strategy before the implementation of the LEZ as GEODIS with its Distripolis Project.

8) Evaluation of strategic targets

Private Targets



Public Targets



4.5 CityLog EMF

1) Basic information	
1.1) Identification	CityLog EMF (efficient, modular, flexible) - Electro-Multifunction-Vehicle
1.2) Cluster	Cluster 1: Urban Freight
1.3) Responsible authors	HET Hochleistungs-, Eisenbahn- und Transporttechnik Entwicklungs-GmbH

2) Scope of practice	
2.1) Approach	☒ Private approach ☐ Public approach ☐ Public & private appr.
2.2) Actor classification	Construction, F&E, new drive technology (fuel cell), new materials, electrical engineering
2.3) Geographical Area	Austria (Salzburg)
2.4a) Type of city	☐ Large: >1 million inhabitants ☒ Intermediate: 50,000 to 1 million ☐ Small: < 50,000 inhabitants
2.4) Implementation status	Please indicate and explain the status of the case you describe. ☒ Evolving Best Practice ☐ Best Practice
	The first prototype of the CityLog EMF was ready in 2012. It was introduced in October last year at the same time as HET got presented the award “workplaces through innovations” (“Arbeitsplätze durch Innovation”) in Salzburg (Austria). Now HET works on the second demonstration-vehicle. It was tested and driven in 2014/15 in Klagenfurt (Austria). The technical process, certification and permission are planned for 2016.
2.5) Date of implementation	2012 (prototype ready) 2016 (serial production)
2.6) Link to other clusters	• Green Logistics and Co-modality
2.7) Topics covered	Which topics are covered by the practice? ***Infrastructure and Technology*** ☒ Access to transport networks, infrastructure and nodes ☐ Freight consolidation and transhipment ☒ Implementation of low emission technologies ☐ IT-technologies and solutions (for management and administration) ☒ Innovative vehicles, vessels and equipment ☐ ICT (e.g. routing, guidance), transport optimisation

	Organisation and Cooperation ☐ Business to business (B2B) solutions, cooperation ☒ Competitive aspects: collaboration (cooperation with competitors), prioritisation (priorities on infrastructure and in nodes) ☐ Communication between authorities: cooperation, procedures, legal frameworks ☒ Communication between businesses and authorities: coordination, consultation ☐ Business models: new form of ownership, risk management ***Operations and Services*** ☒ Business to customer (B2C) solutions (e.g. e-commerce, last mile delivery) ☐ Innovative operational solutions ☐ Value added services, development (or extension) of services ☐ Service quality and sustainability agreements/certification ☒ Transport management, fleet management ***Regulations and Policy*** ☒ Access rules and restrictions of urban areas ☐ Land use and spatial planning: assessment and siting of transport facilities and infrastructure ☐ Infrastructure financing: taxation, user charges, PPP ☒ Environmental standards and policy ☐ Interoperability and standardisation: vehicles, equipment, loading units, infrastructure ☐ Safety and security: measures, regulations, insurance ***Knowledge, Tools and Methods*** ☐ Modelling and forecasting ☐ Data collection and statistics ☐ Education and training ☐ Working and implementation guidelines ☐ Monitoring and benchmarking of processes
2.8) Transport modes	Which transport modes/vehicle types are affected by the solution? ☐ Road/ truck ☒ Road/ delivery van ☐ Road/ motorcycles, scooter etc. ☐ Bike ☐ Heavy rail ☐ Light rail ☐ Inland waterway vessels ☐ Deep sea vessels ☐ Air freight/cargo planes ☐ Other: please explain …
	CityLog EMF can replace the delivery vans for the last mile on inner city transports.
2.9) Supply chain elements	Freight companies, terminals, warehouses, transport
2.10) Which targets can be supported by the implementation?	*For public actors:* ☐ Efficient public spending ☐ Ideal utilisation of infrastructure ☒ Competitive logistics and transport system ☒ Acceptance and influence ☐ Balanced provision of goods and services ☐ Increased amenity value ☒ Highest safety and security ☐ Others
	For private actors: ☒ Increased efficiency / productivity of logistics processes ☐ Increased company profitability ☐ Minimisation of financial risks ☒ Increased competitiveness ☐ Increased quality ☒ Image ☒ Increased safety and security ☐ Others

	For both actor groups: ☒ Limited climate change ☒ Reduced emissions ☒ Conservation of resources ☐ Others? Please specify: …
	Please specify all other and different targets here…
2.11) End-user benefits	Where do end-users benefit? ☐ Affordable services (e.g. new affordable services or price reductions) ☐ Services in rural areas (new/additional service areas) ☒ Quality of services ☐ Reduced congestions ☒ Reduced emissions ☒ Reduced climate change ☒ Reduced noise pollution ☐ Implementation degree ☐ High level of acceptance of solution/practice ☐ Other benefits: (please specify)…

3) Best practice	
3.1) Description of the practice	**Purpose:** • Development of a flexible, economic, quiet, space-saving and modular constructed vehicle with futuristic drive concept for the transportation of goods and persons in sensible traffic areas. • Alternative drivetrain concept: fuel cell (hydrogen-driven) • Usage of newest materials and integration of energy-recovery-systems • Strait construction for strait alleys • Euro-pallets suitable • Single vehicles link-able to a flexible, rail-loose “train” with an electronic shaft for maximal addition of deliveries and for energy efficiency – leading to enormous operational flexibility • Expansion of usage for in-house traffic or person-transports at mass-events, e.g. Olympic games • Safety: Modern sensor technology and different safety-systems prevent crashes; the laser-shaft realize, if persons stand between the vehicles, then the trailed vehicles behind stand still until the way is free again. **Sustainability objectives:** The electronic-vehicle with fuel-cell drive reduces the CO_2-emission in inner cities. With the use of hydrogen only water steam resp. demineralized water is rejected. The hydrogen, which is necessary for the drive, is a waste product of the steelmaking industry. So, the fuel for the CityLog EMF is an available waste product, which is rarely used until now. The usage of CityLog EMF can eliminate traffic jams, waiting times and can also trigger an emission reduction. The vehicles can pass other vehicles or trucks because of the strait construction and the electronic shaft.

3.2) Technical main characteristics	Because of the single wheel drive, the single wheel control and the 360°-rotation of the four wheels of every vehicle, the whole train is extremely flexible and agile. The CityTrain can drive for- and backward and also in the square angle to the side. This can be a target especially in strait alleys, if there is no place to turn the whole train. The change from one side of the street to the other is easy with the sideward drive. The use of modern sensory eliminates accidents. The electronic shaft realize, if persons or other things stand between the vehicles. If this is the case, the vehicles behind the persons drive not until the way is free again
3.3) Success factors	The Citylog EMF is cost-efficient and price-competitive (buy + fuel). His high load-weight capacity of 2.2 tonnes means a lot of goods on a little, street vehicle. Also the point “zero-emission” is a success factor. And also the flexibility is a reason, why the system works so well. The number of vehicles is very flexible and every vehicle can be linked or unlinked at every time and place.
3.4) Main benefits	• Economic benefits? Investment costs are at the same area as similar trucks with fossil engines. The costs per litre of fuel (hydrogen) are about 50 cent. • Benefits in the field of services? Service and maintenance are simple. Service interval is 2 years. Repairs can be done by the owner himself (Ikea-principle – usage of simple parts, which can be changed simply) • Benefits for the society? Lower traffic in inner cities – they will be more attractive for citizens as well as for tourists • Environmental benefits, expressed in CO2 or CO2equivalent Engine is hydrogen – no emissions (only water steam), no CO2, no noise. Hydrogen exists as a waste product in some industries or can be generated with the energy of photovoltaic.
3.5) Cost indication	1 single CityLog EMF-vehicle will cost about 30.000 € (depends on the body – e.g. simple containers are cheaper than a cooling container)
3.6) Barriers / Limitations	The main barrier is the certification and the permission. Both are enormous cost-intensive and both must be done from the first point on to the whole vehicle, because there is no vehicle to compare (especially the hydrogen-drive). Also a barrier is the electronic shaft. As well at the single vehicle, also at the electronic shaft, not the technic as such, is the real problem, but more the street authorisation and certification – new things must be tested and controlled more than other.

3.7) Common practice before implementation	We do sale in Europe and the USA. At the moment we have interested parties for about 1.000 vehicles. Before we do the serial production, a demonstration-prototype will be used in Klagenfurt (Austria) for about 1 year. So we can see how it works under real conditions (e.g. in winter or with full-load).
3.8) Motivation/problem	The motivation for the development of Citylog EMF was the installation of bollards in the city centre of Salzburg. Only vehicles with special authorisation can be drive to the shops there until this time. Our Citylog EMF is very straigt, so that he can drive through the bollards without get them down.
3.9) Justification of practice	The Citylog EMF can be considered a Best Practice, because many cities have a problem with too much traffic in the inner city (special problem at pedestrian areas). If shops, restaurants etc. in inner cities use the Citylog EMF for the delivery, they are much more flexible at the one hand. At the other hand, less traffic means more pedestrians, which in turn means more potential shoppers.

4) Transferability	
4.1) Geographical Area	Can the solution be transferred to other countries, regions or cities? ☒ Yes ☐ No
	Certification Europe: TÜV (MOT), USA: UL
4.2) Usability in other domains	Can the solution be transferred to other actors or industries? ☒ Yes ☐ No
	The body can be changed to seats – so not goods, but persons can be transported, e.g. in theme parks, stadiums, mass events
4.3) Political framework conditions - Regulations	Are there political framework conditions and/or regulations for the best practice case that need to be in place or have to be considered for the transfer of the practice to another domain? ☒ Yes ☐ No
	Lobby for hydrogen-drive; hydrogen-petrol stations; environment-zones in inner cities
4.4) Extensibility	Can the area of the solution be extended or can the practice be used within a different area (e.g. can a city specific solution be used nation wide?) ☒ Yes ☐ No
	Originally the system was created especially for old city centres with small street (like Salzburg – Getreidegasse), but it can be used in all other cities, for indoor-transport, at theme parks and many other places more.

4.5) Similar cases	There are no similar cases, because it is a transportation vehicle for 2,2 tonne gross weight per vehicle, which can be linked to a train of more vehicles. The drivetrain is a fuel cell, with hydrogen is the fuel type. The vehicle is designed with the same load capacity as diesel-vans, but zero emissions.

2. Additional information	
5.1) Consideration for in-depth analysis	Should this case be further considered for in-depth review? ☒ Yes ☐ No
	The project should be considered for in-depth review, because it is an extremely futuristic and environmental-friendly solution for the last mile on the transportation chain.
5.2) References	HET (2015) CityLog EMF. http://zebus.at/wp-content/uploads/2015/03/HET_CityLog.pdf
5.3) Contact for further details	Mrs. Mag. Sonja Kern Sonja.kern@het-engineering.com +43 676 840 722 201
5.4) Date of review	17/06/2013 16/06/2015 – in depth information
5.5) Pictures	 **Figure 23: CityLog EMF prototype design**

Figure 24: Citylog EMF prototype tests in Klagenfurt

Source: HET 2015

	 **Figure 25: CityLog EMF prototype at HET test site**
5.6) Involvement of SME	Phormolog OG is involved in the project as designer. Phormolog is an industrial design company, so they work together with our engineers and create a good-looking functional vehicle
5.7) Impact on SME	Phormolog OG is a 2-men company. So, HET have only those two persons as contacts. They have no long chain of commands. Phormolog can benefit, because they design a world new transport-solution, which can (and should) be used all over the world.

6) In-depth information	
6.1) Costs	• Estimated investment costs: Investment: 30.000 Euro per single vehicle - serial production from 250 vehicles or more • Estimated maintenance costs: The fuel cell itself implies almost no operational cost, only specific parts have to be maintained in regular intervals • Estimated operational cost: Fuelling: about 9 Euro per kg • Financing presently applied/planned Financing will be guaranteed with national and international funding and with private money from the developing company.
6.2) Benefits / Strengths	**Competitive logistics and transport systems**: Logistics in the future will be confronted with new legislative framework conditions that very often target lower emissions. This is only one reason, why logistics and transport companies have to evaluate their used fleets, trucks and vehicles and why in special cases the purchase of new vehicles with low or zero emission like CityLog will be an suitable alternative. **Acceptance and influence**: Public actors and stakeholders could positively increase acceptance within potential users, if they operate such alternative vehicles within their own fleets and provide positive statements and best practice examples in operation. **Highest safety and security**: The complete vehicle system is geared to safety and security of the driver, the cargo and of course all other traffic partners within the area of operation (e.g. driving assistant system, highest security of H2-tank). **Increased efficiency / productivity of logistics processes**: With the electronic drawbar more vehicles could be linked, although still having a single drive system in each vehicle. This means, that every vehicle could be linked or unlinked on any time from the “train”. There is no need for a specific logistics planning concerning the sequence of the vehicles. As each vehicle can be separated from the “train” to a single logistics unit, it is not important, which vehicle in the row is the first for loading/unloading etc. **Image**: The usage of the CityLog supports a “green” strategy and image of a company. Today many companies try to achieve green and environmental friendly operations. The implementation of CityLog will support an alternative logistics approach and an innovative and green company image. **Limited climate change, Reduced emissions, Conservation of resources**: CityLog uses no fossil fuel, so emissions are nearly zero. If you use H2 from alternative energy (wind, sun, water) the system can be operated absolutely “green” from the generation until the usage. Energy can be stored in the form of H2, so no energy must be wasted - sun energy at daytime, water at night.

<table>
<tr><td>6.3) Weaknesses</td><td colspan="3">• The main weakness nowadays is the less number of hydrogen stations. The private installation of a station will be a good but cost intensive alternative.

• The main risk is, that hydrogen wouldn’t become a common fuel of the future, which is depending on many framework parameters.</td></tr>
<tr><td rowspan="3">6.4) Implementation steps</td><td colspan="3">What are the different actions necessary in the implementation steps and how long does each step take (estimates)?</td></tr>
<tr><td>1. Preparation:
5 years
(2010 – 2014)

Research & Development
Prototype 1</td><td>2. Implementation:
4 years
(2015 – 2018)

Prototype 2
Tests at company areas
Further development of electronic drawbar</td><td>3. Operation:

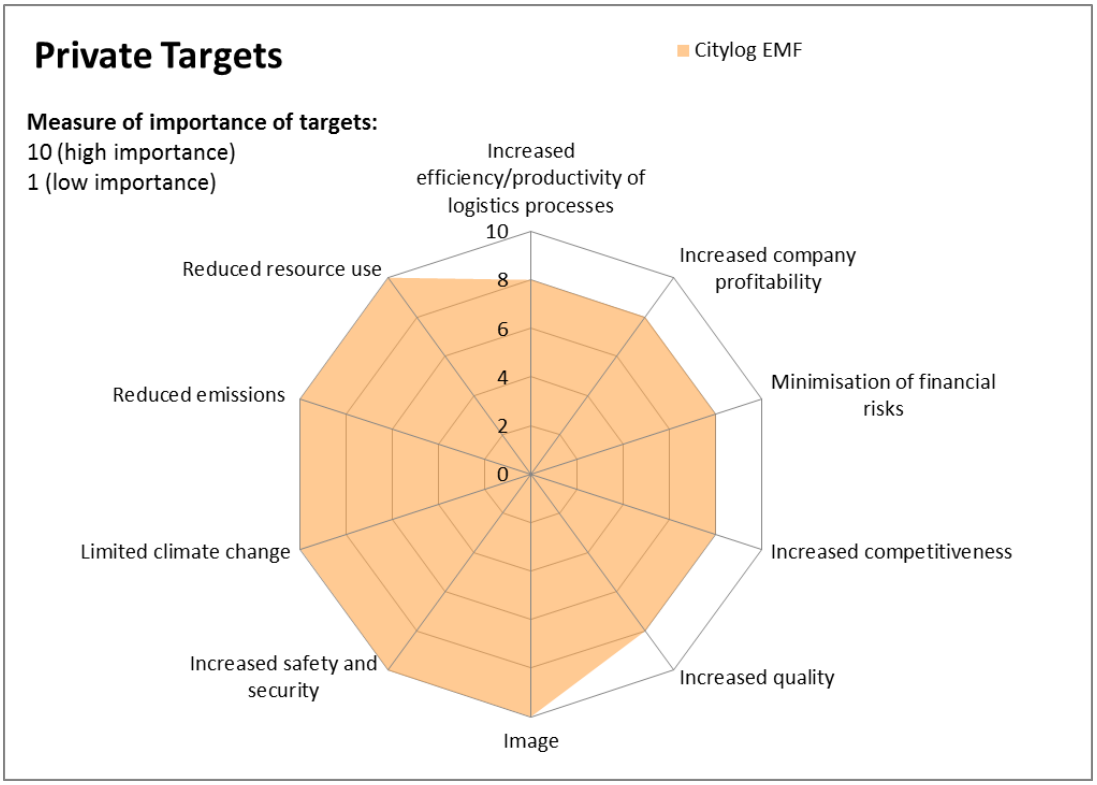
2018

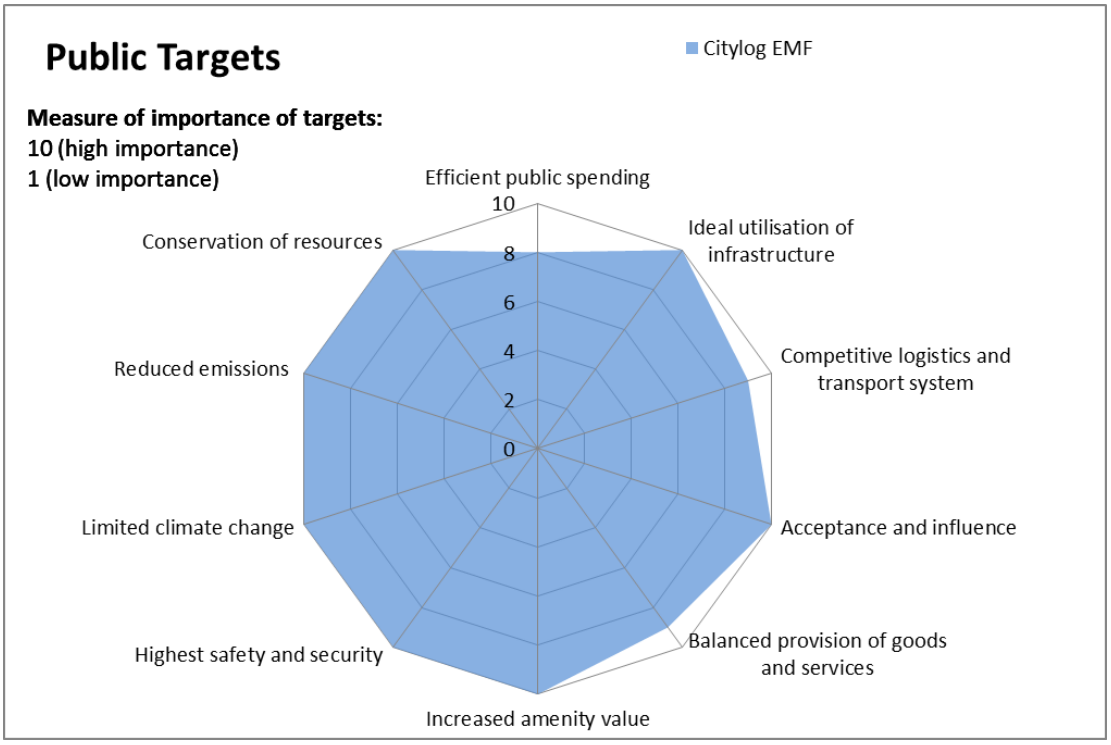
Certification
Start of serial production</td></tr>
<tr><td colspan="3">Which actors are relevant in the process?
• R&D-partner
• Designer
• Manufacturers
• MOT (TÜV)
• and many others</td></tr>
<tr><td>6.5) Process</td><td colspan="3">Please give detailed information on the process of implementing the best practice. How was the initial process and experience and what can be expected for (future) transferability?
• Manufacturing of the second prototype vehicle in 2015 with (local) partners.
• After the complete vehicle is ready for operation, it will be used for test-usage in an Austrian logistic company.
• With these tests the Citylog will be optimized for serial production concerning mechanic, electric and also customer needs.
• Additionally the electronic drawbar and an energy management system especially for the fuel cell vehicle would be further developed.</td></tr>
<tr><td>6.6) Technical feasibility</td><td colspan="3">Is this practice feasible in technical terms?
The project itself can be realised in technical terms, singular problems have to be evaluated and monitored especially regarding the electronic parts (e.g. electronic drawbar, drive-by-wire).</td></tr>
</table>

6.7) Placement of the case	Indicate the transport and market volumes, market share, market penetration and financial competitiveness • Transport and market volumes: High volume achievable in the future because of various usage possibilities and use cases • Market share: In inner city logistic there is a tendency of up to 35% of transport events until the year 2030 that could be supported. • Market penetration: CityLog is at the moment a new, innovative and alternative product for logistics. Actually on the market there are only fossil fuel driven trucks and some electric vehicles available. With different environmental laws the companies will evaluate alternatives like the CityLog. • Financial competitiveness: A 3,5 to truck costs less lower than two CityLog vehicles, which cover together 4,4 to. CityLog operation costs are really low, because many mechanical parts, which normally must be checked every year, are not necessary for a CityLog and the fuel cell itself does not imply operational costs. Especially important is an indication of potential effect in full scale, lead time impact and ability to scale up a solution. • Until the full scale it will take about 4 years from 2015 on. In this time some “lead users” should be generated, which will test the CityLog in different usage scenarios. With those results the CityLog could be optimized to a full scale ready vehicle.

7) Cluster specific information	
7.1 Reduction in CO_2, NOx, SO_2 and PM vehicle exhaust emissions	• CO_2-emission: 100% reduction at the level of vehicle exhaust and excluding emissions from electricity generation (this applies for the other types of emissions below as well) → Reason: no fossil fuel is used • NOx-emission: 100% reduction → Reason: no fuel with NOx-emission is used • SO_2-emission: 100% reduction → Reason: no sulphurous fossil fuel is used • PM-emission: about 60% reduction → Reason: no fuel from diesel or Otto-motor and lower tyre wear and brake particles because of lower speed
7.2 Reduction in total energy and fuel consumption	The usage of CityLog means a 100% reduction of fossil fuel consumption at the vehicle exhaust level. Energy consumption itself is not reduced but it could be used from alternative energy sources (e.g. wind, water, sun). This alternative energy could be stored as H2 at the time when it is generated, so no energy has to be wasted.
7.3 Total cost savings or average improvements in reliability, depending which is more relevant to the given case	• Improvements of reliability in the logistics system: About 50% → Reason: lower speed, drive assistant system based on newest research/development results, which helps the driver in being more reliable.

8) Evaluation of strategic targets





5 Synthesis within the cluster

5.1 Topics covered

In this report, all cases relate to clean vehicle use. Most cases involve cooperation between public and private sector.

Due to the lower number of cases and the focus on public policies, not all Cluster 1 topics have been covered from the 5 inventories performed in 2015 (Table 1). Missing were more business and services oriented topice.

Table 1: Coverage of BESTFACT topics for each case

Case ► / Topics ▼	1	2	3	4	5	Total
Infrastructure and Technology						
Access to transport networks, infrastructure and nodes		X			X	2
Freight consolidation and tran-shipment		X	X			2
Implementation of low emission technologies	X	X	X	X	X	5
IT-technologies and solutions (for management and administration)			X			1
Innovative vehicles, vessels and equipment			X		X	2
ICT, transport optimisation						0
Organisation and Cooperation						
B2B solutions, cooperation						0
Competitive aspects					X	1
A2A		X	X	X		3
B2A, A2B	X	X	X		X	4
Business models			X			1
Operations and Services						
B2C		X			X	2
Innovative operational solutions		X	X			2
Value added services, develop-ment/extension of services				X		1
Service quality and sustainability agreements/certification						0
Transport management, fleet management			X		X	2
Regulations and Policy						
Access rules and restrictions of urban areas	X	X		X	X	4
Land use and spatial planning	X	X		X		3
Infrastructure financing						0
Environmental standards and policy	X			X	X	3
Interoperability and standardisa-tion						0
Safety and security						0
Knowledge, Tools & Methods						

Modelling and forecasting		X				1
Data collection and statistics		X				1
Education and training						0
Working and implementation guidelines	X		X			2
Monitoring and benchmarking of processes		X	X	X		3

In Table 1 and 2, Cases are numbered from 1 to 5 according to overview on page 1.

5.2 Strategic targets covered

Acceptance, image and low emissions are the three targets covered by all cases.

Table 2: Coverage of cases according to strategic targets of BESTFACT

Targets supported by Cluster 1 cases	*1*	*2*	*3*	*4*	*5*	*Total*
Public sector						
Efficient public spending						0
Ideal utilisation of infrastructure		X				1
Competitive logistics and transport system		X		X	X	3
Acceptance and influence	X	X	X	X	X	5
Balanced provision of goods and services		X				1
Increased amenity value		X				1
Highest safety and security					X	1
Others: Attractive inner-city						0
Private sector						
Increased efficiency / productivity of logistics processes		X	X		X	3
Increased company profitability						0
Minimisation of financial risks						0
Increased competitiveness		X			X	2
Increased quality		X				1
Image	X	X	X	X	X	5
Increased safety and security					X	1
For both actor groups						
Limited climate change	X	X			X	3
Reduced emissions	X	X	X	X	X	5
Conservation of resources	X	X			X	3
Others? Reduced congestion, low noise, health benefits etc.	X		X			2

Source: Section 3 Inventories and Section 4 in-depth reviews, see above

5.3 Regional coverage

As in previous reports, the main characteristic of an Urban Freight case is that it has been developed ‘bottom-up’. The solutions are coming from separated initiatives that have not been centrally planned or coordinated together. There is no international initiative in 2015.

Due to the low number of cases in 2015, and due to the low number of partners responsible for the case studies, it was not possible to obtain case studies from countries other than from Western and Central Europe, which are France, Belgium, The Netherlands and Austria.

Table 3: Coverage of cases according to regions and geographical entities

Geographical Coverage	**CL1** inventories
International	
Europe	
EU	
Multi country (CL1_Lean&Green)	
Northern Europe	
Western Europe	4
Eastern Europe	
Southern Europe	
Central Europe	1

Source: Section 3 Inventories and Section 4 in-depth reviews, see above

5.4 Transversal analysis and concluding remarks

Understanding why and how a solution works, and using a typology of cities

Following Table is presenting the size of the cities in which the 11 BP solutions have been implemented.

Table 4: Coverage of cases according to size of cities

Size of city	**CL1** inventories
Large > 1 mio inhabitants	4
Intermediate < 1 mio & > 50,000 inhabitants	1
Small < 50,000 inhabitants	0

Source: Section 3 Inventories and Section 4 in-depth reviews, see above

Most of the cities are large cities above 1 mio inhabitants. But the explanations are not given, why a certain solution could or could not work in a smaller city. On many occasions, business leaders and decision makers in public sector were asked about the usefulness of the Best-fact case studies. Their answers tend to show that the understanding of the working mechanisms of a solution is the key information that is needed by entrepreneurs and public sector decision makers. Why a solution works and how it works, both technically and from the management point of view, is by far the most important point.

The size of the city, in any case, was never a crucial point for decision making.

Understand the mechanisms of a Best Practice helps the transfer

The understanding (why and how) is also needed for the transfer of solution, in order to understand how to apply the solution and adapt it to the particular situation of another business or another city.

The explanations of the inventories and in-depth give enough background to understand what the mechanisms are, which make the solution work.

This enables the business to replicate the solution and eventually adapt it to their specific business conditions.

References

Browne, M., Allen, J., Nemoto, T., Patier, D. and Visser, J. (2012) Reducing social and environmental impacts of urban freight transport: A review of some major cities. Procedia-Social and Behavioral Sciences 39, 19-33

Taniguchi, E., Thompson, R.G. and Yamada, T. (2015) : New Opportunities and Challenges for City Logistics. In : The 9th International Conference on City Logistics, Tenerife, Canary Islands, Spain, 17-19 June 2015, 1-11.