Smart booklet

E-logistics

E-logistics

Smart parking

Charging points
April 2020

This booklet was prepared through the collective knowledge from Sharing Cities and building on the experience of the wider context of the SCC01 Lighthouse programmes involving 17 projects, 116 cities and hundreds of partners. More information about the Lighthouse programmes can be found [here](#).

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**LIST OF ACRONYMS**

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<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>EV</td>
<td>Electric Vehicle</td>
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<tr>
<td>ICT</td>
<td>Information and Communication Technologies</td>
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**LIGHOUSE CITY KEY**

<table>
<thead>
<tr>
<th>City Name</th>
<th>Country</th>
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<tbody>
<tr>
<td>Lisbon</td>
<td>Portugal</td>
</tr>
<tr>
<td>Royal Borough of Greenwich, London</td>
<td>UK</td>
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<tr>
<td>Milan</td>
<td>Italy</td>
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</table>
THE VALUE OF E-LOGISTICS FOR CITIES

WHAT?

Electric logistics (e-logistics) is an electric fleet of vehicles that transport goods within cities. This can be made up of electric cars or vans, autonomous vehicles or electric cargo bikes. E-logistics is a way to cope with the growing volume of light freight and associated road congestion caused by increasing online purchases.

The development of an efficient electric fleet of vehicles heavily depends on appropriate charging infrastructure and sufficient parking space.

WHY?

The use of electric vehicles (EVs) in city logistics aims to reduce the number of internal combustion delivery trucks. Electrifying the fleet reduces air pollution, while the use of solutions like e-cargo bikes also reduces congestion in city centres. Cities are hubs for the global goods distribution networks and an estimated one half of all road freight mobility takes place in cities. The road congestion and pollution this entails are expected to grow because of the increase of delivery via e-commerce.

The current development of EVs encourages and is facilitated by greater development of charging infrastructure. Dedicated smart parking infrastructure for EVs contributes to the development of e-logistics schemes as it can reduce search time, travel time and emissions while optimising limited parking space.

World Health Organisation reports* clearly show that globally, most urban dwellers are exposed to levels of pollution well above recommended limits. Urban freight contributes substantially to this high level of pollution observed in cities.

Cost reduction in the long term

Emissions savings
Energy savings
Corporate branding, positive imagery of the bike aligning with ethical consumer trends
Time saving, increased interaction with customers
District attractiveness
Health cost savings
Increased energy security due to technologies such as V2G and stationary storage help to promote smart grids and distributed generation

27% of urban transport CO₂ emissions come from goods transport vehicles. In Greenwich, a local business was able to switch 95% of all its journeys from diesel vans to e-cargo bikes.

Carbon reduction
Noise reduction
Traffic reduction (e-cargo bikes)
Reduced need for fossil fuels

Increased mobility
Noise reduction
Improved health and wellbeing
Increased road safety
Reduced congestion

Energy savings
Corporate branding, positive imagery of the bike aligning with ethical consumer trends
Time saving, increased interaction with customers
District attractiveness
Health cost savings
Increased energy security due to technologies such as V2G and stationary storage help to promote smart grids and distributed generation

Cost reduction in the long term

World Health Organisation reports* clearly show that globally, most urban dwellers are exposed to levels of pollution well above recommended limits. Urban freight contributes substantially to this high level of pollution observed in cities.

*https://civitas.eu/sites/default/files/civ_pol-an5_urban_web.pdf
Here are three examples of how cities in the Sharing Cities project are using this technology. These different use cases all respond to local conditions and consider financial (revenues, savings), environmental (air quality, reduced CO$_2$), social (health, safety) and economic (local business development) values.

The project designed and delivered business models and services for e-cargo bikes. A local butcher trialled an electric cargo bike for deliveries and compared the costs and other efficiencies to its existing delivery van. Eventually, thanks to the many benefits, the company purchased an electric cargo bike at the end of the trial period and continues to use it on a regular basis.

The local butcher switched 95% of all journeys from his diesel van to an e-cargo bike resulting in an annual saving of 2,171 kg of CO$_2$ emissions. This was because he found that the e-cargo bike had advantages for efficiency: it was able to take more direct routes, and was less affected by congestion and parking restrictions. This increased convenience for customers, as it made the delivery service more reliable.

It had further advantages for customer relations: the positive impression that the bike gives aligns with ethical consumer trends, and cycling staff increased interaction with customers. It also meant that a wider pool of staff was able to do deliveries. Those staff reported an overall positive experience of the switch. It also increased their physical activity levels, bringing health and wellbeing benefits that contribute to fewer sick days.
Milan implemented an e-logistics service with e-vans and e-bikes together with supermarkets working as urban consolidation or distribution centres.

Main achievements include:

» Nine e-vans and two e-cargo bikes providing mass-market retail and home delivery services. The 11 vehicles are located in four mass-market retail distribution centres. They are used for home deliveries of Carrefour shops.

» Installation of 11 EV charging points (nine wall-box 22 kW and 2 wall-box 7 kW).

» E-logistics service started in January 2019 and will last at least until December 2020.

» Service data is integrated into the Urban Sharing Platform through an Application Programme Interface.

In Lisbon, 140 EVs and 10 e-vans are being used by different municipal services. The goal was to enhance smart and sustainable urban logistics by showing the benefits, and to motivate local services and businesses to adopt these solutions.

The main achievements include:

» Specification, procurement and deployment of a long-term EV loan scheme, aggregating EV sharing and e-logistic demand for the municipal fleet. 140 EVs have been deployed and dedicated to logistics services of the municipality;

» Development and installation of 140 mobility monitoring devices within EVs;

» Integration of data with the smart fleet management platform.
Your local context, including legislation and cultural conditions, affects the kind of e-logistics system that is ideal for your city, and the adjustments to the standard model that you may have to make. Here is a brief overview of key factors you will have to consider when planning your approach.

Lisbon has set a policy for some city zones called ZER — Zonas de Emissões Reduzidas (Low Emission Zones) where high emission vehicles are not allowed to circulate. The municipality is setting the pace to achieve carbon neutrality goals by replacing the municipal fleet with EVs. Those are allowed to circulate in every city zone including the ZER.

An increasing number of logistics operators are using EVs in cities. Cities should prepare dedicated infrastructure that can be used by both personal and corporate vehicles. Connected infrastructure should provide the necessary sensing data for corporations to be able to optimise their own routes based on charging station availability and therefore, ensure their economic sustainability.

Last mile deliveries are rocketing due to the spread of e-commerce, causing even more traffic in cities and degrading air quality. The transition from fossil fuels to EVs and also light (or low carbon) transport modes, such as cargo bikes, will have a huge impact on the logistics sector.
Within an e-logistics system, innovative solutions are focused on technical actions and logistics actions. Most of them are either:

» targeting new ways of planning trips/routes for urban freight through Information and Communication Technologies (ICT) and digitalisation (real-time/dynamic information and georeferenced systems);

or

» fostering zero-emission logistics in major urban areas by electrifying vehicles that are currently running on fossil fuels and creating appropriate infrastructure.

The e-logistics components at city level:

**Policy actions**

» These determine the conditions in which urban freight logistics operations can take place, specifying times, locations, vehicle constraints, etc. In most cases this lies within municipal competence.

**Technical actions**

» These determine the means of planning trips and communication (e.g. through ICT) within urban freight logistics as well as the means of moving the freight across the city (e.g. types of vehicles).

**Logistics actions**

» These determine the operational conditions for urban freight transport (e.g. delivery hours and frequency, means used, exact delivery locations, etc.).

Additionally, any e-logistics scheme requires some critical elements:

- **Electric vehicles (e-vans or e-cargo bikes or e-cars)**
- **Electric charging infrastructure**
- **Partnerships with business retailers or private sector**
- **Optimisation of logistics EV routing**

» As the number of logistics operators in the city increases, special treatment should be given to those that use EVs. Cities must prepare dedicated infrastructure that can be used by both personal and corporate vehicles. This connected infrastructure should provide all necessary sensing data for corporations to optimise their own routes based on charging station availability.
## FOR EV CHARGING POINTS*

<table>
<thead>
<tr>
<th>Ownership</th>
<th>Lisbon</th>
<th>Milan</th>
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<tbody>
<tr>
<td></td>
<td>Municipality</td>
<td>Private, operator keeps revenues</td>
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<table>
<thead>
<tr>
<th>Selection of a financing scheme</th>
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<th>Milan</th>
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<tbody>
<tr>
<td></td>
<td>Financed by the municipality and Sharing Cities</td>
<td>Private investment co-financed by the European Commission in the Sharing Cities framework</td>
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<table>
<thead>
<tr>
<th>Revenues</th>
<th>Lisbon</th>
<th>Milan</th>
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<tbody>
<tr>
<td></td>
<td>Savings from not using gas</td>
<td>Usage fees and advertising</td>
</tr>
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<table>
<thead>
<tr>
<th>Indication of pricing</th>
<th>Lisbon</th>
<th>Milan</th>
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<tbody>
<tr>
<td></td>
<td>Model: cooperative fleet</td>
<td>Model: usage model or subscription model (monthly fee differentiated by type of service normal charge, fast charge)</td>
</tr>
<tr>
<td></td>
<td>Payback period: 10 years</td>
<td>Costs: About €15,000 per charging point in public space. About €1 million for the whole project — 10 mobility areas and photovoltaic power plant to supply about 500,000 km/year (real zero emissions EVs)</td>
</tr>
<tr>
<td></td>
<td>Costs: €73,950 (+VAT)</td>
<td></td>
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## FOR SMART PARKING*

<table>
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<tr>
<th>Ownership</th>
<th>Lisbon</th>
<th>Milan</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Data-as-a-service grant/concession</td>
<td>100% private</td>
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<th>Selection of a financing scheme</th>
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<th>Milan</th>
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<tr>
<td></td>
<td>Project financed by the municipality (EMEL) and Sharing Cities</td>
<td>Financed by Sharing Cities and A2A</td>
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<table>
<thead>
<tr>
<th>Scheme cost</th>
<th>Lisbon</th>
<th>Milan</th>
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<tbody>
<tr>
<td></td>
<td>Revenues from management and optimisation gains on usage and prevention of abuse</td>
<td>Revenues coming from EV charge usage efficiency, fines for illegal parking, paid parking fees, and advertising</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Indication of pricing</th>
<th>Lisbon</th>
<th>Milan</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Model: Three ‘use cases’ have been tested with parking sensors, regular parking management, control of EV charging parking spaces, and control of loading and unloading goods parking spaces.</td>
<td>Model: Sensors integrated into two platforms, one for users, the second for the municipality to analyse data; four use cases tested - EV charging parking; public parking; logistics parking; disabled parking</td>
</tr>
<tr>
<td></td>
<td>Costs: Sensor Unit Cost: €1,250</td>
<td>Payback period: 2 years</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Costs: €1,000 unit (including sensors, installation and service)</td>
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*EV charging points and smart parking are not necessary for Greenwich deployment model.
COMMON CHALLENGES AND RECOMMENDATIONS

HIGH COSTS
High costs of data sharing to make the e-logistics solutions well connected and function in an efficient way.

To reduce the costs of data sharing, it is crucial to ensure a proper Wi-Fi or low-range wide-area network connection.

INCREASE IN GRID DEMAND FROM MORE EVS
Smart energy system that reduces peaks of demand and manages the charging solutions of vehicles according to the grid demand and production.

Bidirectional charging, using car batteries as a source of electricity, can also help.

UNCERTAIN LEGAL FRAMEWORK
A new market that has an uncertain legal framework can jeopardise the sustainability of the solution.

Dialogue with the relevant public local administration and the national level to avoid any legal change that would affect the business models’ sustainability.

LESS PARKING SPACE FOR CONVENTIONAL CARS
Dedicated parking spots for e-logistics vehicles or the installation of charging points is made at the expense of parking space for conventional cars.

A strong political engagement supporting a long-term strategy will justify the temporary inconvenience for residents.
About Sharing Cities

Sharing Cities is a project to improve the lives of citizens across Europe, testing smart solutions for cleaner, more efficient cities. New systems for urban energy management, building retrofit, e-mobility and smart lampposts, are cutting carbon emissions in cities as well as making everyday life more affordable, comfortable and convenient for residents. Sharing Cities is testing and evaluating these smart city solutions together with citizens and creating channels to make them more affordable and better tailored to cities’ needs. They are doing this through fostering international collaboration between cities and the private sector.

Additional information on Sharing Cities can be found on the website: [http://www.sharingcities.eu](http://www.sharingcities.eu)

More information

Additional information and guidance about other smart cities projects can be found on the Smart Cities Information System’s website: [https://smartcities-infosystem.eu/solutionbooklets](https://smartcities-infosystem.eu/solutionbooklets)