SHARINGCITIES

Smart booklet

Electric Bike Sharing

Towards a healthy new mobility model

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LIGHTHOUSE CITY KEY

	Lisbon
	Royal Borough of Greenwich, London
	Milan

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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THE VALUE OF IMPLEMENTING E-BIKES FOR CITIES

WHAT?

Take a bicycle, add an electric motor, and voilà, you have an electric bike, or 'e-bike.' You can add it to a standard bike sharing system, or offer it for long-term rental.

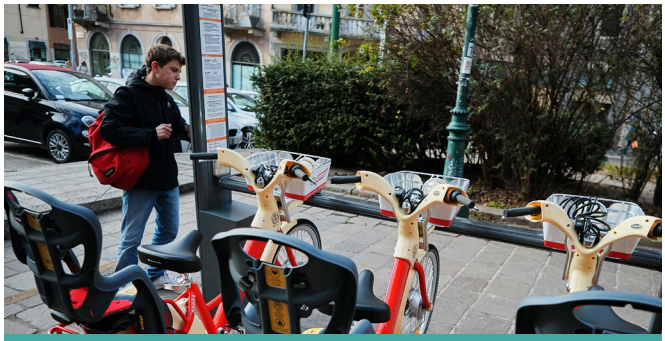
WHY?

Congestion, collisions, air quality, and parking are problems that harm the quality of life in our cities. With electric bikes, cities can reinvent their mobility model, tackling these problems and promoting healthy lifestyles. E-bikes provide clear social, environmental and economic benefits to communities. And residents, visitors and tourists love them!

If Londoners cycled for just **20 minutes** a day, the National Health System could save **€1.9 billion**.

FINANCIAL VALUE

- Save on energy
- Save on health costs
- Earn from subscriptions



In 2018, Milan saved an estimated 1,484 tonnes of CO_2 thanks to its electric bike sharing service.*

ENVIRONMENTAL VALUE

- Lower emissions
- Improve air quality
- Reduce disturbing noise

SOCIAL VALUE

- Promote green lifestyles
- Improve mental health
- Enhance social life
- Increase active lifestyles
- Boost wellbeing

ECONOMIC VALUE

- Make district more attractive
- Encourage tourism

* According to Clear Channel, using the Defra's carbon conversion factor

SHARING CITIES SOLUTIONS

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.

Milan is the first city to employ a mixed-docking approach. Milan has simply added electric bikes to the current bike sharing system. At docking stations, users can choose to take an e-bike or a traditional bike.

Milan has 1,150 electric bikes, 4,280 traditional bikes and 307 docking stations. In 2018, the city registered 3,485,853 uses of the scheme, with an average of 9,500 daily uses.

Thanks to the project, the city deployed 150 e-bikes with a child seat and equipped the project area with 14 new stations, improving the connection between the city centre and peripheral areas. It also tested an optimal level of service through a relocation system.

Lisbon uses an app to encourage users not to overcrowd bike docks, and instead to put the bikes in areas where there is most demand, for example in the empty station at the top of a hill, rather than the nearly full one at the bottom. This improves the availability of bikes without increasing operational costs of relocating bikes.

Lisbon implemented its first bike sharing system in 2017 with 980 bikes, two thirds of which are electric.

The Royal Borough of Greenwich in London is assessing the demand for e-bikes by loaning 30 of them to residents every month. This test is allowing Greenwich to get more insights into the personal habits and preferences of its residents regarding this new technology. It also gives residents first hand experience of the benefits of e-bikes with the aim of encouraging them to buy one.

DO E-BIKES RESPOND TO MY NEEDS?

Your local context, including legislation and cultural conditions, affects the kind of e-bike 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.

The e-bike project in Milan is part of a city e-mobility strategy to make mobility fully electric and reduce car ownership.

Political leadership
Governance
Smart city & data strategy
Citizen engagement
Legal and regulatory

POLITICS, POLICY & REGULATION

In Lisbon, a model with docking stations was chosen for the municipal system so to ensure that no bike would be left abandoned on sidewalks.

Security
Lifestyles
Demography
Cultural heritage

SOCIAL & CULTURAL CONDITIONS

CITY 'PHYSIOLOGY'

Climate
Assets and infrastructure
Natural assets
Geography

Lisbon is very hilly and the implementation of their e-bike sharing scheme has transformed how people think about moving around the city.

ECONOMIC PERFORMANCE

Market readiness
Technology
Performance
Investment
Appetite for risk and innovation
Entrepreneur ecosystem

Greenwich currently has no existing e-bike sharing infrastructure and had to start deployment from scratch, applying different models to understand and better match the local demand.

TECHNICAL OPTIONS

E-bike schemes can be implemented in various ways but most city schemes will include the four components displayed below. They are the main technical options to consider when setting-up or upgrading a scheme to electric bikes.

E-bike system

- E-bike design and structure.
- The battery will influence the performance of the bike, as well as the price. How long it lasts and how long it takes to recharge are the key elements to keep in mind. Some systems also allow for a detachable battery to be added to the bike. The battery can be carried by users or easily replaced with charged ones by the operator.
- Ancillaries: such as basket, bell, lights might influence the unit price.

Docking system

- Dock design and components: use a minimal design to take up less space and reduce costs, also have in mind how many bikes can park in each dock.
- Lock system and design: how the bike locks and unlocks in the dock, such as entering a code or unlocking with a card.
- Charging: does the station charge the bike's battery directly or does that require an external party?
- Information panel for instructions, as well as payment.

Service access system

- Service interfaces: ensure that your scheme supports the use of several interfaces such as app websites and also an information panel which accepts card payment and tracks the availability of bikes and stations.
- Payment method: ensure several different payment methods such as credit card, ATM or PayPal online to attract a greater demand.
- Age limitations are an important element to have in mind to avoid incidents with minors.
- Service availability: another key element that can ensure safety is limiting the service at night.
- Marketing: ensure that instructions are explained in a simple way, in multiple languages (for tourists) and that you spread information about the benefits of using e-bikes.

Control system

- A digital platform ensures the good management of the system for relocation, charging and maintenance.
- Connectivity is an important component to ensure tracking of the bike for users, as well as operators with SIM or GPS.

FUNDING AND FINANCING

OWNERSHIP

Cities' ownership of the biking scheme is key to gaining control of data and managing road safety. Both Lisbon and London's scheme are 100% publicly owned, while in Milan, the infrastructure and the bicycles are the property of Azienda Trasporti Milanesi, a company owned by Milan Municipality.

SELECTION OF A BUSINESS MODEL

Finding the right business models and financing options is an important part of launching an e-bike scheme. Thinking long-term not short-term is also vital. Cities may elect to own and operate the bike assets, or lease the operation to a private company.

BUDGET TO EXPECT FOR A PILOT PROJECT

Cost per e-bike (cost of total e-bike infrastructure and units divided by number of bikes) in each city:

- Milan: €2,000
- Lisbon: €1,300
- Greenwich: €1,925

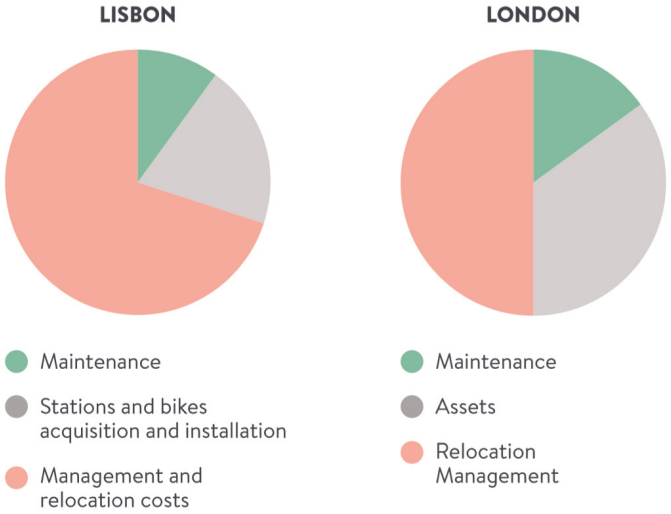
Few cities deploy bikes at optimum scale, often constrained by other budget priorities. However, based on lifecycle analysis, you get the best value for money when you buy over 1,000 electric bikes. Make the case for major investment, or you lose out on these economies of scale in the long run!

SCHEME COST

The cost distribution of the scheme for both Lisbon and Milan is:

- 70% **management and relocation costs** (moving the e-bikes from full to empty stations)
- 15% **assets** (station and bike acquisition and installation)
- 15% **maintenance**

Cost distribution of the scheme:



PRICING AND INCOME FOR THE CITY

The e-bike scheme also generates revenue that can be reinvested into the service.

Both Lisbon and London's revenue comes entirely from the usage fares while Milan takes in 80% of its revenue in through advertising. It pays for itself! The payback period in Milan is estimated at just eight years.

Examples of pricing for users:

Greenwich	Lisbon	Milan
-	-	Without subscription: €0.25 first half hour[1]
-	€2 daily	€4.50 daily
-	-	€9 weekly
€11 monthly[2]	€15 monthly	-
-	€25 yearly	€36 yearly

1. Every following half hour the price increases, e.g. if used for one hour it will cost the user €0.75 (€0.25 for the first half hour + €0.50 for the second half hour)
2. Greenwich scheme is based on a month-long bike hire.

COMMON CHALLENGES AND RECOMMENDATIONS

EXPLORE THE CO-DESIGN PROCESSES

It is hard to choose the best location for e-bikes to make sure that people actually use them.

Use online participation tools, such as interactive maps where residents choose locations that work for them. People are experts on their own needs.

EXPLORE THE DOCK MODEL

It is not obvious which docking model to choose. The experience of the dockless model for both Milan and Lisbon has been challenging as most of the bikes were damaged or affected pedestrians' safety.

Lisbon trialled dockless bikes and found that the lack of proper precautions hindered use of sidewalks and streets, and vehicle parking. Ultimately, it became a public safety issue. Alternatively, a docking model seems to be a more reliable solution for cities as it gives more control to the operator to monitor its bike fleet.

ORGANISE WORKSHOPS AND USE THE TEMPLATES

Collecting data to support the business case takes a long time and the ownership of this data is always an issue if multiple stakeholders are involved in the scheme.

It is important to create and sign data sharing contracts to collect data and evaluate impact if private operators are involved in the bike scheme.

Using templates providing the basis for data collection and organising workshops to capture data with relevant stakeholders helps to facilitate the process.

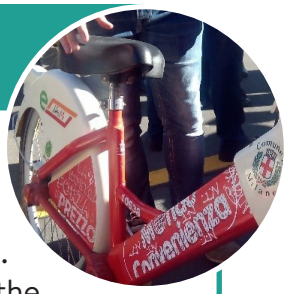
USE THE SHARING CITIES METRICS TOOL

Evaluating benefits and impacts on public value remains a challenge.

The identification of key metrics is crucial to evaluate the e-bike sharing scheme performance, the social, economic and environmental benefits, and to enable benchmarks considering the results achieved by other cities.

APPLY FLEXIBLE PRICING AND EXPLORE ADVERTISING AND SPONSORS

It is important to find sustainable revenues to ensure return on investment.



Using advertising helped Milan to recover the cost of the e-bike scheme. Having a flexible usage fee based on different types of subscriptions helps to capture a bigger demand. You can also consider sponsors to finance the bikes.

CONSIDER APPLYING THE USER CREDIT AND RECHARGE SOLUTION

Whether it is a free-floating model or a dock model, relocation management and recharging batteries are important costs that can impact the economic viability of the scheme. Without relocation, popular destinations become overcrowded, while common starting points empty quickly.

One way that Lisbon is trying to cope with relocation costs is to offer credits to users who relocate e-bikes to preferred locations. One of the electric scooter companies copes with the recharge costs by paying people to recharge the scooters in their homes over night.

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

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

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