

Sharing Cities

Common Solutions for Shared Challenges



SUPPORTED BY
MAYOR OF LONDON

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Vision

An agile and collaborative smart cities ecosystem that delivers liveable, attractive, and resource-efficient cities.

Sharing Cities is a major international smart cities project addressing some of the most pressing urban challenges facing today's cities such as energy use, low carbon transport and buildings, and harnessing data for the good of the city.

The programme brings together 34 partners from across government, industry and academia to create solutions together. Working collaboratively means solutions have a greater chance of success, sustainability, and scale-up. Our user-centered, city-needs led approach is helping shape the smart city marketplace.

The project draws on €24 million in EU funding. It aims to trigger €500 million in investment and to engage over 100 municipalities across Europe.



European Innovation Partnership

Sharing Cities is a part of a family of 19 programmes that make up the European Innovation Partnership on Smart Cities and Communities (EIP-SCC01).

EIP-SCC01 is a major undertaking supported by the European Commission bringing together cities, industries, SMEs, investors, researchers and other smart city actors to shift the market focus from the delivery of technical solutions to understanding and addressing the needs of the city.

Lighthouse & Fellow cities

The Sharing Cities model is built for scale. Combining three capital cities and two financial hubs, the project aims to shape the market for smart cities through collaboration, replication and scale-up of urban digital services and platforms.

The Sharing Cities consortium brings together six cities:

Lisbon, London, and Milan: The ‘lighthouse’ cities have worked together since 2016 to develop and implement urban digital solutions and new models for collaboration. We have run 10 smart city projects in mobility, energy efficiency, data management and citizen engagement in each of our lighthouse cities.

Bordeaux, Burgas, and Warsaw: The ‘fellow’ cities play an active role in driving the adoption of specific solutions by replicating what worked in the lighthouse cities.

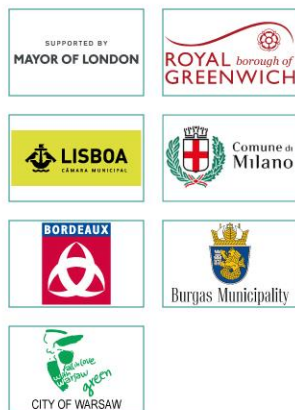
The programme encourages learning and scale-up in at least 100 other cities across Europe and around the world.



Lisbon

Partners

Cities and Public Bodies



Networks and NGOs



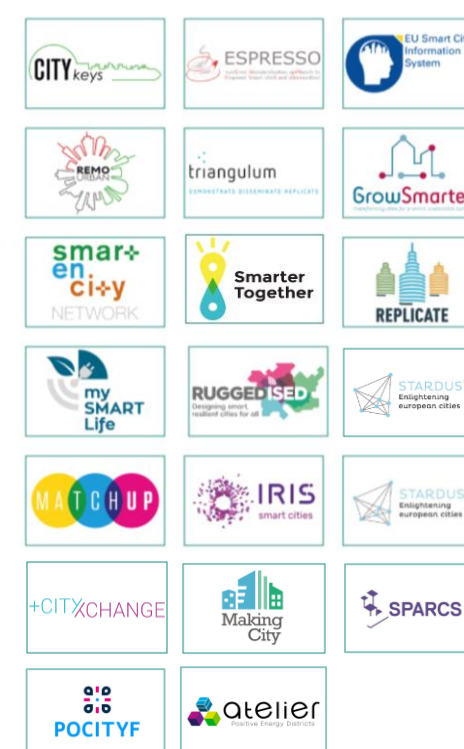
Academia and Research



Industry and Small and Medium-sized Enterprises



European Innovation Partnership on Smart Cities and Communities



Objectives

Scale

We have proven that properly designed and common smart city solutions can be integrated into complex urban environments. We can use this evidence to shift smart city technology from the fringes to the mainstream, scaling up what works and learning from what doesn't. We want to encourage cities to work together to enjoy the benefits of scale (cost, capacity, time) and shared learning.

Digital first

Demonstrate the positive impact of adopting a data-driven approach to city infrastructure. We want to drive the adoption of new digital services that help citizens make better transport choices and use energy efficiently. When scaled up these actions will enhance cities' ability to meet key infrastructure targets.

Open up & accelerate the market

Develop business models and identify investment opportunities to aggregate and replicate smart city solutions in cities of different sizes and maturities. We aim to accelerate the pace of transformative improvements and support sustainability in urban environments by providing the information needed to commission with confidence.

Share & collaborate for society

Enhance mechanisms for public engagement and improve local governments' capacity for policy making and service delivery through collaboration and co-design, resulting in outcomes that are better for citizens, businesses and visitors.

Solutions



Building retrofit

Install energy efficient measures in existing public, social and private building stock. This can link to other solutions, like the integrated energy management system, to optimise energy performance.



Shared e-mobility

A portfolio of linked initiatives supporting the shift to low carbon shared mobility solutions. Specifically: Electric Vehicle (EV) carsharing; e-bikes; eV charging; smart parking; e-logistics.



Digital Community Engagement

Shift perceptions and change behaviours towards sustainable smart city services through rewards in exchange for continued and improved citizen engagement.



Smart lampposts

Integrated smart lighting with other smart service infrastructures (EV charging; smart parking; traffic sensing; flow data; wifi).



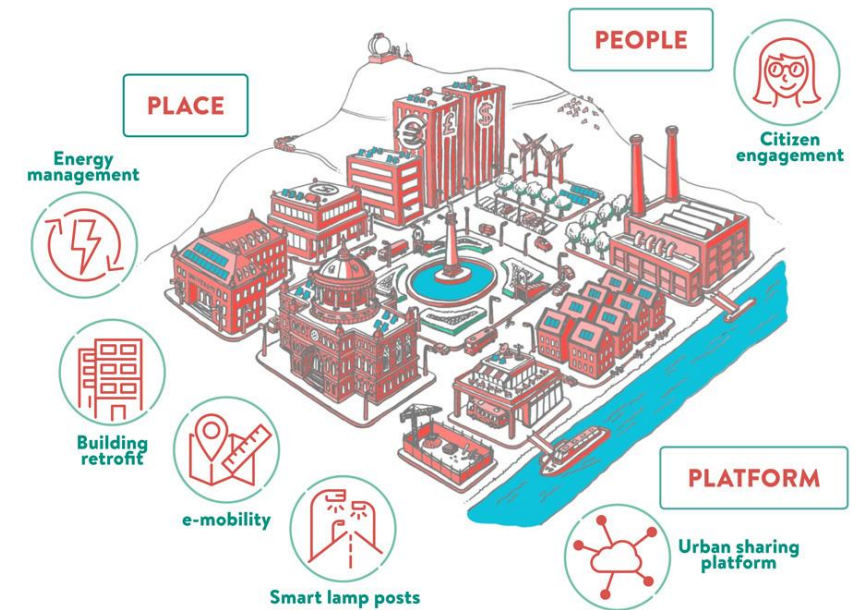
Sustainable energy management systems

An advanced controls system and interface that integrates and optimises performance of energy assets in a district to support sustainable energy management.



Urban data sharing platform

A way to manage data from a wide range of sources including sensors and traditional statistics. The platform uses common principles, open technologies and standards.



Our Offer

Digital districts & opportunity areas

We have access to investment ready technology that can help to create digital districts in new developments or regeneration projects. Well-connected and adaptable districts will be better placed to react to the impact of COVID-19 and any future crises that may arise.

Energy efficiency

As citizens are encouraged to spend more time in their homes due to COVID-19, the quality of housing becomes increasingly important. Through our work on retrofitting buildings to improve energy efficiency, demand side response and Sustainable Energy Management Systems, we can help to ensure that more people live in low carbon and well-connected homes.

Performance monitoring information

We have collected information before and during the COVID-19 crisis, meaning we can see first-hand the impact that it has had on certain aspects of our cities.

Use case menu

We are building up a menu of uses for smart infrastructure that encompasses support for vulnerable people, culture and night-time economy, transport, sustainability, connectivity, and the economy.

IoT Framework

We are working with London Boroughs via LOTI to develop a common framework to commission Internet of Things technology with more confidence and with more of an outcomes focus.

Access to city networks

Sharing Cities is well networked within the UK and with international partners. This includes:

- UK Smart Cities Group (15 UK cities)
- EU Horizon 2020 EIP-SCC01 (100+ European cities)
- EU Smart Cities Information System
- Open and Agile Smart Cities (OASC)
- G20 Smart Cities Alliance

Playbooks

Sharing Cities has captured the experiences of deploying smart technology solutions and the lessons learned along the way in a series of playbooks. Cities and partners can use this research to reduce barriers, speed up procurement and deployment processes, and ensure a consistent approach.

You will find detailed guidance on formulating a value proposition for smart solutions, in economic, social, environmental, and financial terms; and a practical roadmap to roll-out solutions, including strategic and technical design, ownership structures, business models, financing options and routes to market, stakeholder engagement and communications, and safeguarding citizen interests.

The playbooks cover:

- The Digital Social Market
- E-Bike Sharing Schemes
- Building Retrofits
- Sustainable Energy Management Systems
- Smart Lampposts
- E-Mobility

The first set of playbooks is now available on the [Sharing Cities website](#).





Case study: Sustainable Energy Management System (SEMS)

The opportunity

The Sustainable Energy Management System (SEMS) is an advanced modular system that centralises information and control of local energy systems and devices. It optimises the energy network to achieve cost savings, social benefits and environmental improvements.

National and regional carbon reduction targets are instigating a dramatic shift in how energy is produced, distributed and consumed at every scale. Rapid electrification of our transport and heating systems is essential in meeting these targets and our ability to supply electricity through local, renewable power is crucial. Integrating policy objectives across multiple sectors has been an insurmountable challenge to date, creating inefficiencies and underperformance; however, SEMS internalises decision making across all energy vectors to identify and implement the best course of action based on your stated objectives and within the constraints of the system.

The London Context

A zero-carbon London will not be achieved only through top-down policy; it also requires bottom-up action from local stakeholders. The SEMS approach supports local areas to consider the current and future energy system, the interactions within the system and to optimise current and planned assets.

Early development work of SEMS in the Royal Borough of Greenwich has indicated potential cost savings of 10% for the operation of a local heat network, maximising self-consumption from installed solar PV and reducing peak electricity demand, supporting the distribution network operator, and relieving constraint areas to provide new EV charging infrastructure at lower costs.

Smart Districts

The modular nature of SEMS makes the technical solution highly adaptable. The larger the geographic scale and the greater the diversity of energy assets/systems, the higher the potential returns. However, multiple competing stakeholders can add significant complexity. Therefore, SEMS is an ideal solution at a district level, in developments with an obvious lead organisation; this could be a local authority, management company or city administration.

Developing a SEMS will rarely be a stand-alone solution. The costs of implementation are considerably reduced if it is considered along with other interventions, such as new communications infrastructure, building construction or utilities provision. The data connections and information generated from SEMS also creates opportunity for other solution providers to develop services and solutions that add additional value.

A new approach

SEMS is already demonstrating added value. The city simulation tool, developed to assess the performance of SEMS' optimisation algorithms, is supporting investment decisions by showing how new assets would perform within the local system.

The Sharing Cities Digital Social Market is also complementing SEMS by rewarding residents for making positive behaviour changes; benefiting themselves, stakeholders and the wider area. The emergence of new products and services, such as time-of-use energy tariffs and heat-as-a-service, also complement SEMS as they become inputs into the optimisation problems – delivering higher savings and efficiency.

The future landscape of the energy system is changing. While the detail is uncertain, the direction is established; and the role for integrated systems connecting energy assets and leveraging the increased data availability to optimise across ever-growing networks will become increasingly important as the necessity and scrutiny of reducing our carbon emissions at lowest cost intensifies.



Case study: E-mobility

The opportunity

Emerging mobility trends in cities present challenges both for local authorities and citizens alike. These can have negative impacts including worsening congestion, poor air quality, increased likelihood of collisions and a lack of parking spaces. All these factors can impact the quality of life in cities. Sharing Cities' three lighthouse cities tested a variety of e-mobility schemes. In this section we've highlighted some of the programme's most successful solutions.

London: Supporting the Greenwich Low Emission Neighbourhood programme

In an effort to encourage modal shift away from cars, the borough has implemented a business model and service for e-cargo bikes, and introduced an e-bike sharing scheme allowing residents and car owners to rent an e-bike for a month, and later opt to buy the bike at a discounted price. The success of the scheme has led to an expansion of the fleet to 30 e-bikes and a wider geographical coverage.

The borough has upgraded its lampposts with LED lighting, electric vehicle charging points (EVCP) and smart parking sensors connected in an integrated system. E-vehicle and coach parking spaces are equipped with sensors integrated into the road surface and which communicate occupancy in real time. EVCP supplier installs points at no cost to the borough; they operate the points and receive all revenues, and points are integrated into the wider Source London network.

The borough's Urban Sharing Platform is a successful example of how data from a broad range of suppliers including smart parking, e-bikes, e-Cargo bikes, EV charging and sustainable energy sources can be combined and appropriately shared to demonstrate CO₂ and financial savings.

Milan: Expanding the e-bike sharing network

As a leader in e-mobility with a large conventional bike sharing scheme already in place, adding e-bikes to the mix presented some challenges. For example, the existing docking stations infrastructure couldn't be used to recharge e-bikes. So instead, the scheme requires vans to circulate between docks to swap the e-bikes' batteries. The vans are also used to reallocate bikes where needed, using an intelligent algorithm.

It guarantees that bikes are available in all stations of the network. E-bikes have been added to Milan's BikeMi regular bike scheme, as part of a citywide e-mobility strategy to reduce car ownership. The scheme's success means that the city now plans to extend it more widely. It is also launching e-bikes with child seats to provide improved access for families.

Lisbon: Creating a cycling culture from scratch

The Portuguese capital rolled out its first bike sharing scheme in 2017 through Sharing Cities to help realise its new city strategy for mobility.

As Lisbon lacked a cycling culture or tradition, it was vital to plan and deploy the scheme carefully. The pilots proved a big success however, so the scheme, called GIRA, was rapidly expanded to across almost the entire city. It is owned and run by EMEL, the municipal mobility company that also manages the city's parking infrastructure.

The scheme now has 810 bikes, around 50 per cent of which are e-bikes, and 81 docking stations. Lisbon plans to expand the scheme further, especially in the residential suburbs. As an indirect result, the city has increased bike lanes too, with provision expected to double to almost 200km by 2022.



Case study: Greenwich Energy Hero

The opportunity

The Royal Borough of Greenwich brought together two Sharing Cities solutions to demonstrate how energy management can be augmented by citizen engagement. The Digital Social Market encourages citizens to engage with and use sustainable services, shifting perceptions and changing behaviours through rewards. The Sustainable Energy Management System centralises information and controls many local energy systems and devices.

Greenwich Energy Hero was offered as a service to households in the Royal Borough of Greenwich. It brings awareness to balancing the demand and supply of electricity, and has tested households' ability to change their behaviours and patterns of electricity consumption in return for rewards.

The approach

A new residential demand side response service was co-designed with local residents by the multi-disciplinary project team: Kiwi Power, the Future Cities Catapult and the Royal Borough of Greenwich.

The Greenwich Energy Hero app displays live electricity usage and energy saving tips, as well as users 'hero status' which reflects points they have earned for interacting with the service.

Greenwich Energy Heroes are asked to reduce their electricity for a temporary period through an app notification. Users are allocated points based on their reduction in electricity from their baseline during an alert, and for other engagement in the service. Their points can be converted into vouchers or a donation to a local charity at quarterly intervals.

All households in Greenwich were eligible. By installing CT clamps on electricity meters and linking this to the app, households of all types can engage with the demand side response. They do not need an electric car, household appliances connected to the internet, or solar panels installed to receive rewards for eco-friendly behaviour and changing their electricity consumption patterns.

Key insights and outcomes

Key achievements in this project have been effective communication of the idea of demand side response to users, with a regular cohort of users responding to alerts and demonstrably reducing their energy use.

“This app is easy to use. We are a lot more conscious about when we turn lights and appliances on and off, and we have a much better idea now of how much energy each appliance uses. A great tool to help bring energy bills down and help the environment”
— David, Greenwich Energy Hero user

In a survey of users:

79% of users indicated that the live usage tab, where users can keep an eye on their real-time electricity usage, was the most enjoyed app feature.

69% of people said that they took part in Greenwich Energy Hero to help the electricity grid, so more renewable energy can be used in the future.

95% of people have been talking to others about the project.

When taking part in a Peak Energy Alert, users stated that the three easiest ways of reducing or delaying electricity were:

- Washing machines, dishwashers or tumble driers (95%)
- Household chores (vacuum, ironing etc.) (63%)
- Charging small personal devices (mobile phone, laptop, etc) (53%).

In the first point conversion period, 92% of those that took part donated their points to the Bexley Community Hospice, the Mayor's chosen charity.

“This is a fantastic way to reduce electricity usage, make Greenwich greener and donate to a wonderful charity that contributes so much to the Royal Borough of Greenwich.” — Cllr Mick Hayes, Mayor of the Royal Borough of Greenwich

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