

## The Generation Game: How do we help the Business Models for Electric Mobility and Green Energy work together?

**With electric vehicle technology ownership and use growing strongly in our societies - involving bikes, cars, buses, trams, and trains - we need to start preparing our energy systems and transport infrastructure for this new urban mobility future. For our 2nd newsletter, we talk to Arno Schoevaars whose team is leading our work on business models for GreenCharge. Here's what he has to say...**



Since we commenced GreenCharge in October 2018, we have been working to develop initial business cases for electric mobility using the example projects in our pilot cities. This has shone a spotlight - from a local to a national level - on the different drivers and enablers necessary in providing infrastructure to support strong, electrically-mobile societies. In this second newsletter from GreenCharge, we outline the processes undertaken to date in Barcelona, Bremen and Oslo - involving different stakeholders, in different contexts - but aiming to meet the same overall goal of 'zero-emissions' transport at its point of use.

**"I think the GreenCharge experiments - where we combine local energy in communities and use this for their transport mode - are a really interesting combination that could be inspiring for a variety of cities."**

Business models describe the framework of how we deliver solutions and earn value (often money) from them. Within this system, the motivations of each individual stakeholder vary and need

to be recognised. We are researching and testing these concepts through case studies in cities, supported by computational simulations, covering variables such as energy generation, charging usage and revenue. In this newsletter, we have outlined some of our early learning to date from this work.

**How much are people willing to pay to charge their cars at higher speeds? What is the benefit for electricity providers from local renewable energy generation and investing in installing charging points, when they earn less from selling power and need to change their pricing road maps? How much support from local or national government is needed to building owners, before they modify their own building management plans, to focus more on green energy and electric vehicle infrastructure!**

Policies and implementation of electric mobility projects are developing at different rates around Europe. We have different levels of market maturity, which is also affected by the level of regulation (or, as I prefer, stimulation) exercised by local and national governments; such stimulation includes providing financial benefits to producers, consumers - and those who both

provide and consume energy (as prosumers) - as well as removing the many small scale barriers. As consultancies and service providers, we need to keep ahead of the demands for knowledge and practical experience. Through GreenCharge, we are keeping track of current technology, thinking and behavioural responses and are sharing our own experiences to inform innovation.

Keep in touch with GreenCharge for further information.

Arno Schoevaars, PNO



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 769016



[www.informedcities.eu](http://www.informedcities.eu)

## Introduction to Business Model Processes in Bremen, Barcelona and Oslo



In each of the GreenCharge pilot cities, a **Business Model Innovation Game** has been undertaken with a selection of stakeholders in each city (known as Local Reference Groups). The representation level within the group of people with different backgrounds is depicted by the size of the circles shown in the diagram below:

GreenCharge pilot cities vary according to e-mobility investment and operating costs, revenues, electricity grid governance, renewables share, transport mode characteristics, market demand

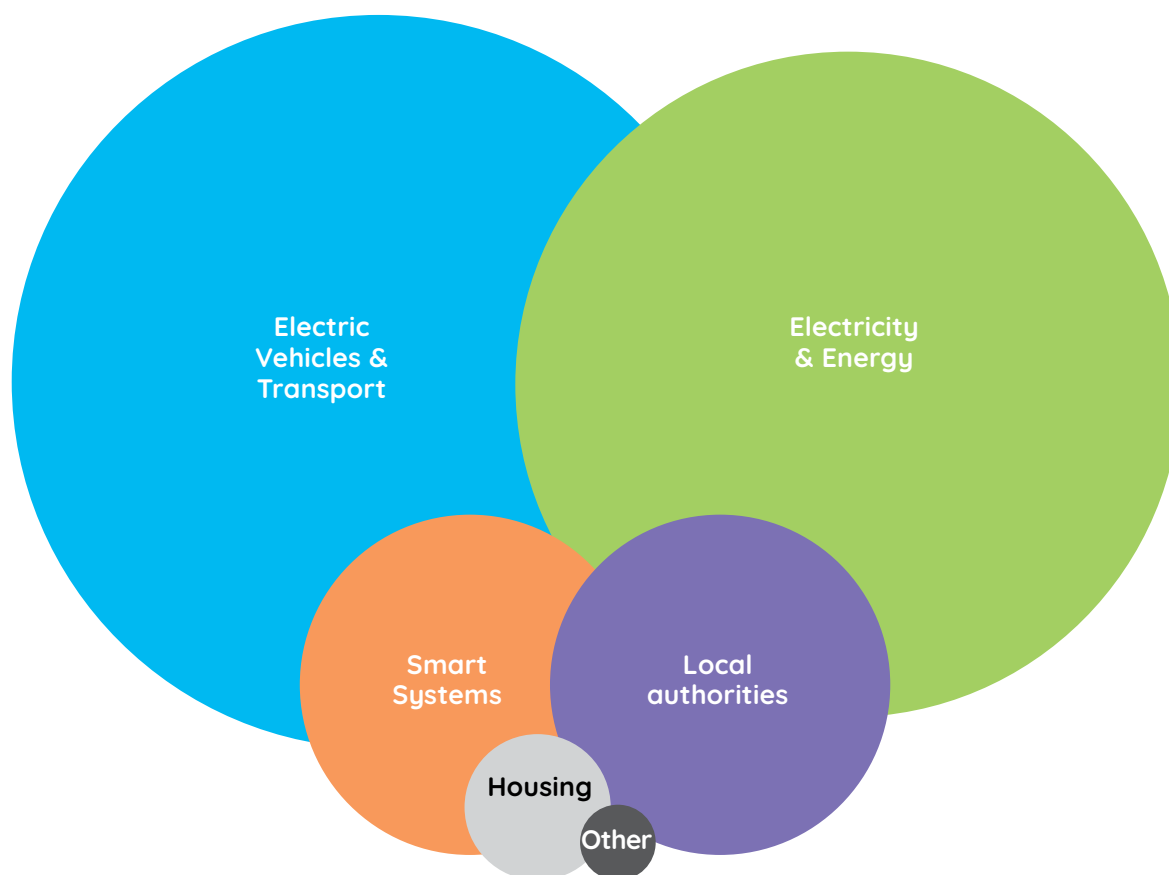
and national policies. These provide diverse testing environments for new electric mobility systems and approaches.

At a national level, many of these aspects have been compared by our GreenCharge partner **Hubject**, through their Electric Mobility Index (HEMI), which shows that Spain, Germany and Norway – hosts to our GreenCharge pilot cities – are among the leading European nations within electric mobility.

GreenCharge will go through two stages to build and define business

models. We are starting with what is known as the **“St. Gallen” business model** concept. An overview is summarised in the diagram on the next page, adapted from our initial research and stakeholder engagement. Further information can be found in Deliverable 3.2 “Initial Version of Business Models,” available soon on the GreenCharge website. This business model will be monitored as it plays out in each city over the course of the GreenCharge project, and adapted and updated – with the help from our Uptake Cities Group – culminating with practical policy recommendations by the end of 2021.

### Make Up of GreenCharge reference groups in the Business Model Innovation Game, by proportion and by sector



# Testing Business Models in GreenCharge



## Barcelona, Spain

### Goal:

to enable a shift away from fossil fuel powered motorbikes and scooters, toward electric ones, and a shift from fossil fuel powered cars, towards electric cars and Light Electric Vehicles (LEVs) such as ebikes. Components of the pilot include:

- 👍 booking, charging and enforcement of private charging points at GreenCharge partner Eurecat's premises
- 👍 optimal and integrated charging station and building management processes
- 👍 Mobility as a Service (MaaS), including the trial of incentives to drop e-scooters near battery hubs (acting as charging stations) through GreenCharge partner MOTIT which operates electric motor scooters in the city
- 👍 upgrade of an e-bike sharing service for commuters in the area of Sant Quirze
- 👍 battery swapping as an alternative to fast charging for LEVs



## Bremen, Germany

### Goal:

to integrate electric cars into car sharing systems, and use of renewables and stationary batteries to balance peak demand from charging. Components of the pilot include:

- 👍 charging EVs at work via a photovoltaic energy supply
- 👍 new housing projects built to avoid the need for privately owned cars
- 👍 charging facilities at intermodal hubs
- 👍 use of second-life car batteries as stationary storage

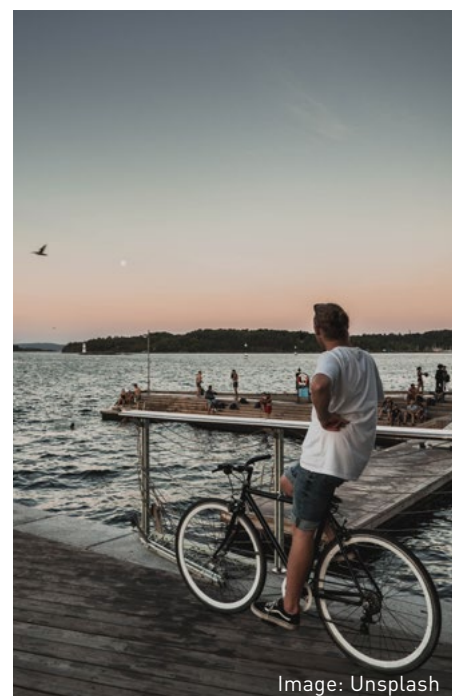


## Oslo, Norway

### Goal:

to provide cost efficient and renewable home charging facilities for inhabitants of 246 flats to manage capacity in the electricity grid and in the availability of charging parking spaces. Components of the pilot include:

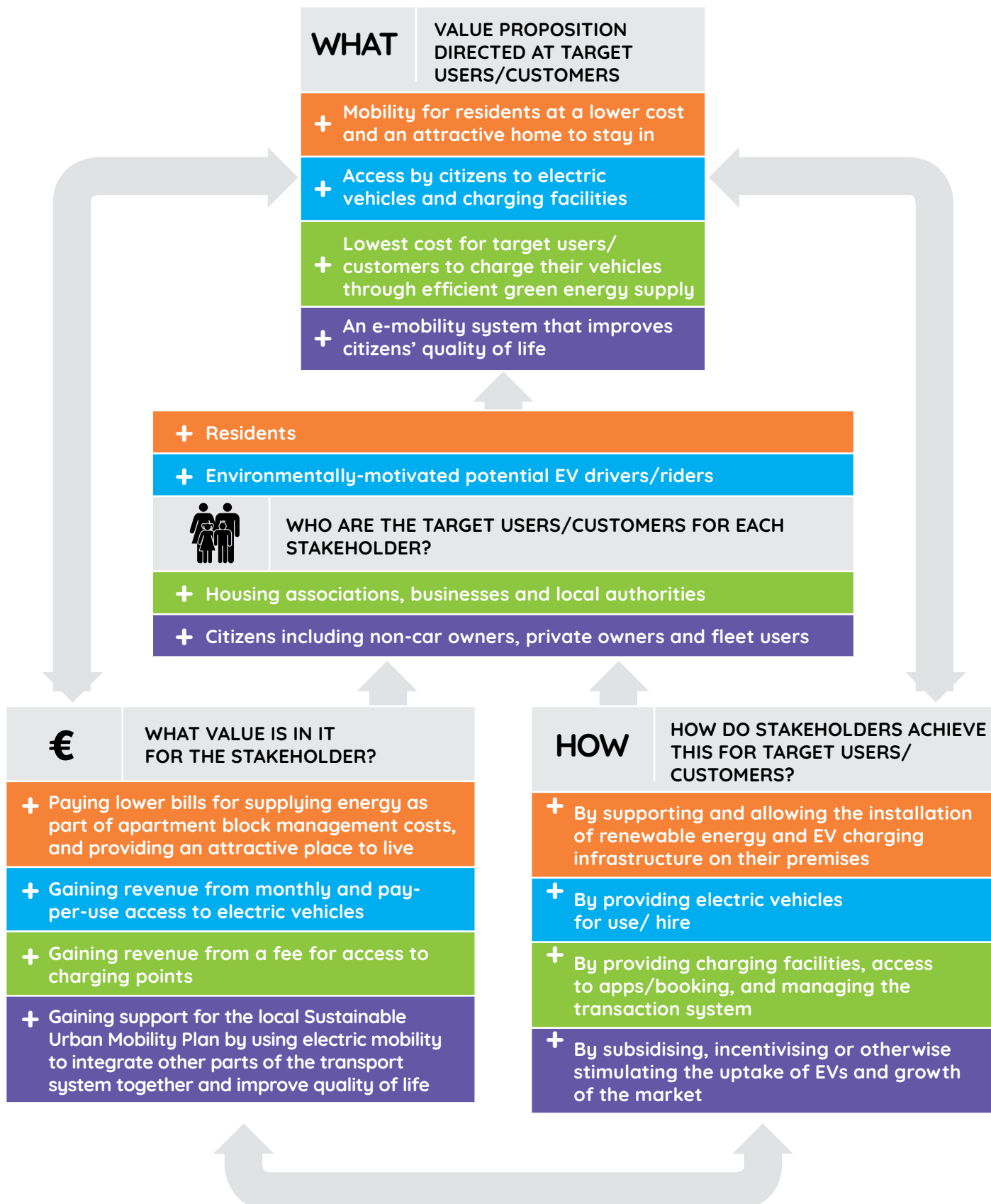
- 👍 booking of charging (both physical space and electrical energy needed) as a means to reduce range anxiety
- 👍 prediction and balancing of energy demand in the neighbourhood
- 👍 flexible sharing of the charging infrastructure between different user categories (e.g. residents and visitors)



# Testing Business Models in GreenCharge



<b>KEY</b>	Perspectives of stakeholders in the GreenCharge system merged from studying the 3 GreenCharge pilots	A housing association	A charging point stakeholder
		An electric vehicle stakeholder	A local authority





## GreenCharge Uptake Cities – What's Up in Krakow and Zagreb



12 Uptake Cities will learn from the three pilot GreenCharge cities, through site visits and an advanced webinar programme. **We have one space left in the programme - if you would like to join us, contact us today.** This participation will culminate in an electric mobility **road map** for each city that will cover issues relating to the construction, configuration and location of charging infrastructure for electric and hybrid vehicles, and their integration into mobility planning

In this issue we hear about electric vehicle strategies from our friends in Krakow and Zagreb

### Krakow – Clean Transport and Green Procurement Comes to Town

**Krakow (as a Municipality) currently has eight public charging points for electric vehicles in 4 stations spread across 3 Park + Ride car parks. 40 charging stations are in the city for electric cars owned by private entities (some of them publicly available).**

The Municipality of Krakow cooperates with external entities in the building of electric vehicle charging stations. Two companies have already signed relevant agreements committing them to establish a network of electric vehicle charging stations and carsharing systems based on electric cars in the city.

Krakow is also investing in green buses. Currently, all public buses are equipped with engines meeting at least the EURO 5 emission standard. At the end of December 2018, the main public transport operator ran 26 “zero-emission” electric buses and 64 hybrids. 28 plug-in charging stations are located within its depots and seven pantograph charging stations located in different regions of the city.

The Clean Transport Zone (CTZ) in Kazimierz district has been in force since January 2019. The CTZ can be accessed by electric cars powered by hydrogen or CNG gas. The right to enter includes the residents (with their existing vehicles without any restrictions).

Owners of electric vehicles may also use separate lanes for buses and park free of charge in the Paid Parking Zones. Additionally, the Municipality of Krakow proposes further improvements, such as the possibility to enter certain streets in restricted traffic zones.

The owners of electric and hybrid vehicles registered in the Municipality of Krakow, after purchasing an “E” type subscription

The Act on Electromobility and Alternative Fuels concerns the need to ensure a sufficient number of electric vehicles in the fleet of the Municipality and municipal companies. A Procurement Group was established under which tender procedures were conducted to acquire charging stations and electric vehicles to fulfil these needs.

for PLN 100 per month, are also able to enter certain streets in the restricted traffic zone. In case of hybrid vehicles, the E subscription also entitles the holder to park in all paid parking zones.



Image: City of Krakow

## GreenCharge Uptake Cities – What's Up in Krakow and Zagreb



### Zagreb – A Smart Framework for Electric Services in the City

**Sustainable mobility and improvement of energy efficiency in traffic are one of the key priorities in the City of Zagreb Development Strategy. The aim is to encourage the use of renewable energy sources and ecologically acceptable fuels, and to improve energy efficiency in the production of energy, industry, building stock, traffic, and public lighting.**

To promote e-mobility, the City of Zagreb is constantly improving the conditions towards more usage of e-vehicles. Charging stations for electric vehicles were set up in five public garages (operated by company ZagrebHolding -

Zagrebparking Ltd), among other locations.

In total, there are now 73 filling stations in the City of Zagreb with 43 locations, with a total of 129 connections.

On 26 February 2019, The City Council of the City of Zagreb adopted the Zagreb Smart City Framework Strategy vision up to 2030, which strongly supports the use of innovative operative (primarily electromobility) systems. Goals and activities are focused on all types of mobility which can achieve the transition from fossil fuels to new types of available fuels e.g. electrical energy. This includes the public city transport system, private cars, e-taxi services, e-car sharing systems and traffic systems for logistics.



Images: City of Zagreb





## World News



### Urban Mobility Planning

#### Do cars have too much focus in urban e-mobility?

A study by CREDS suggests electric bicycles are much better than electric cars for cities. Although an improvement over standard cars, electric cars as a sole initiative can still fail to address congestion and physical inactivity in the population.

Read more at:

[www.electrek.co/2019/07/08/study-electric-bicycles-better-than-electric-cars](http://www.electrek.co/2019/07/08/study-electric-bicycles-better-than-electric-cars)

#### City planning in Spain.

Electric vehicles are one thing, but they need to sit in a wider context of city planning with our partner city location Barcelona at the forefront of people-friendly urban superblocks.

Read more at:

[www.vox.com/energy-and-environment/2019/4/8/18273893/barcelona-spain-urban-planning-cars](http://www.vox.com/energy-and-environment/2019/4/8/18273893/barcelona-spain-urban-planning-cars)

#### Proposals in the UK for new homes to be EV-friendly.

The Department for Transport has announced a public consultation on the subject.

Read more at:

[www.autoexpress.co.uk/car-news/107439/electric-car-charge-points-to-be-installed-in-every-new-home](http://www.autoexpress.co.uk/car-news/107439/electric-car-charge-points-to-be-installed-in-every-new-home)

*"Humans were built to transport themselves, and technology such as e-bikes have helped us make active transportation more fun and effective."*

Micah Toll,  
Electrek, July 2019

### Technology

#### Battery swapping reaches rickshaws in India.

Countering a lack of global standards for battery swapping, this initiative moves the practice beyond 2-wheelers.

Read more at:

[www.wired.com/story/india-sun-mobility-electric-rickshaw-bus-battery-swap](http://www.wired.com/story/india-sun-mobility-electric-rickshaw-bus-battery-swap)

#### Taxi charging test for wireless technologies in Oslo.

GreenCharge partner Fortum is piloting a new system for taxis to be able to pick up bite size chunks of energy at drop off/pick up points through induction.

Read more at:

[www.fortum.com/media/2019/03/fortum-and-city-oslo-are-working-worlds-first-wireless-fast-charging-infrastructure-taxis](http://www.fortum.com/media/2019/03/fortum-and-city-oslo-are-working-worlds-first-wireless-fast-charging-infrastructure-taxis)

#### The world's biggest EV maker that you might not have heard of.

Bloomberg reports on the Chinese firm BYD that has evolved from consumer electronics to EVs for the mass market.

Read more at:

[www.bloomberg.com/news/features/2019-04-16/the-world-s-biggest-electric-vehicle-company-looks-nothing-like-tesla](http://www.bloomberg.com/news/features/2019-04-16/the-world-s-biggest-electric-vehicle-company-looks-nothing-like-tesla)

#### Bosch extends electric bike PowerStations in key European tourist areas.

Bosch is the first ebike motor manufacturer to set up a network of dedicated electric bicycle charging stations using France and adjoining countries as a pilot area.

Read more at:

[www.bosch-ebike.com/en/everything-about-the-ebike/stories/powerstations](http://www.bosch-ebike.com/en/everything-about-the-ebike/stories/powerstations)



Image: Greencharge

One of GreenCharge's test sites in Bremen, featuring a battery storage system using second life batteries from early electric car models.

## World News



### Electric Vehicle Markets

#### Used electric car market doubles in The Netherlands.

Figures suggest early EV adopters are now putting their cars on the market making more second-hand models available.

[Read more at \(in Dutch\):](#)

[www.parool.nl/nederland/elektrisch-tweedehandsje-rukt-op-b13fcad0](http://www.parool.nl/nederland/elektrisch-tweedehandsje-rukt-op-b13fcad0)

#### Uber's e-bikes spread across North America.

The red electric-assisted bikes are proving a popular mode of shared urban transport in cities such as Montreal.

[Read more at:](#)

<https://montrealgazette.com/news/local-news/ubers-jump-electric-bikes-hit-streets-of-montreal>

<https://montrealgazette.com/news/local-news/ubers-jump-electric-bikes-hit-streets-of-montreal>

### EVs and the Environment

#### What could be the impact of lithium exploration for EVs?

No one answer exists, but there could be negative impacts far away from the clean urban environments that EVs are intended to help create. Bloomberg presents a report from Chile.

[Read more at:](#)

[www.bloomberg.com/news/features/2019-06-11/saving-the-planet-with-electric-cars-means-strangling-this-desert](http://www.bloomberg.com/news/features/2019-06-11/saving-the-planet-with-electric-cars-means-strangling-this-desert)

#### Can solar cars reduce the need for charging stations altogether?

Whilst currently an expensive option, technologies exist and this article discusses the feasibility of wider roll out.

[Read more at:](#)

[www.urbanmobilitydaily.com/the-potential-of-solar-batteries-for-electric-vehicle-manufacturers](http://www.urbanmobilitydaily.com/the-potential-of-solar-batteries-for-electric-vehicle-manufacturers)

### GreenCharge Publications



#### Looking for more information on electric mobility planning?

Then check out the 'Electric mobility in Sustainable Urban Mobility Planning (SUMP)' leaflet, which is now available on the GreenCharge website:

[www.greencharge2020.eu/public-materials](http://www.greencharge2020.eu/public-materials)



Image: Greencharge

### Related Projects and Resources

#### The SIMPLA project preceded GreenCharge in the Horizon 2020 research programme, and was completed in 2019.

"SIMPLA supports local authorities in harmonising their SEAPs (Sustainable Energy Action Plans) and SUMP (Sustainable Urban Mobility Plans)."

Final SIMPLA recommendations and materials including recorded webinars are available from:

[www.simpla-project.eu](http://www.simpla-project.eu)

### GreenCharge Diary



#### Project Meeting and Uptake Cities Visit in Bremen

8-11 October 2019.

#### Project Meeting and Uptake Cities Visit in Oslo

June 2020

Keep an eye on our website for other public electric mobility-related conferences and events:

[www.greencharge2020.eu](http://www.greencharge2020.eu)





## In Brief

### GreenCharge Newsbits



#### Barcelona project meeting held in March 2019.

A number of workshops were held including those on the motivations of different parties in the electric mobility system and software information flows and needs.

#### GreenCharge smart power and solar units introduced in Oslo.

The pilot site at Røverkollen has 246 apartments and the aim is to control energy consumption to allow more electric cars charge on the local grid through local renewable energy support.

[Read more at \(in Norwegian\):](#)

[www.sintef.no/siste-nytt/roverkollen-boretslag-vil-gi-alle-muligheten-til-a-kjore-elbil](http://www.sintef.no/siste-nytt/roverkollen-boretslag-vil-gi-alle-muligheten-til-a-kjore-elbil)

#### Simulation workshop held in Italy.

The University of Campagna, one of our project partners, organised a workshop to focus on advanced modelling of potential electric charging scenarios (Work Package 5). This focused on the overall scope of simulation and technical requirements of the simulator, including coding and software interfaces.

#### Linking with other projects at the CIVITAS Forum.

Project Coordinator Joe Gorman presented at the CIVITAS Forum, attended by those involved in the wider group of projects under the CIVITAS Initiative: [www.civitas.eu](http://www.civitas.eu)

The presentation and discussion covered the topic "Electric Mobility: Dream or Doable?"

News to share?  
Contact us or share it  
with us on Twitter  
[@GreenCharge2020](https://twitter.com/GreenCharge2020)



Image: Fotolia



Discussion group at the CIVITAS Forum in Graz, October 2019, featuring Joe Gorman, GreenCharge project coordinator (centre) and representatives from other projects and local authorities.

Image: Greencharge



## Feature Photo



Image: Greencharge

The GreenCharge project welcomed its first visit from our Uptake Cities Group, visiting a number of sites in Bremen to help inform electric mobility "road maps" they will be creating as part of the project. Pictured here at the electric mobility company Rytle, based in Bremen.

### Puzzled



Solve the **conundrum** in this newsletter to be in with a chance of winning a pack of coffee to help you get through the day. The special GreenCharge-procured coffee arrived in Europe, transported across the Atlantic by sailing boat.

R E E F A N T I C



Image: Patrick Schiffer, www.badische-zeitung.de

### What 9 letter word do these letters make?

To enter the competition, email your answer to: [info@greencharge2020.eu](mailto:info@greencharge2020.eu) by **30 November 2019**. A random draw will be undertaken and prizes sent in time for the winter break.

Your information will only be used for the purpose of this conundrum and will not be retained for any further marketing. Winner(s) should accept the requirement to provide their name and photo with the prize for use in reasonable publicity, for example in future newsletters and GreenCharge reports. GreenCharge reserves the right to select an alternative prize dependent on availability. Only one winner will be chosen.

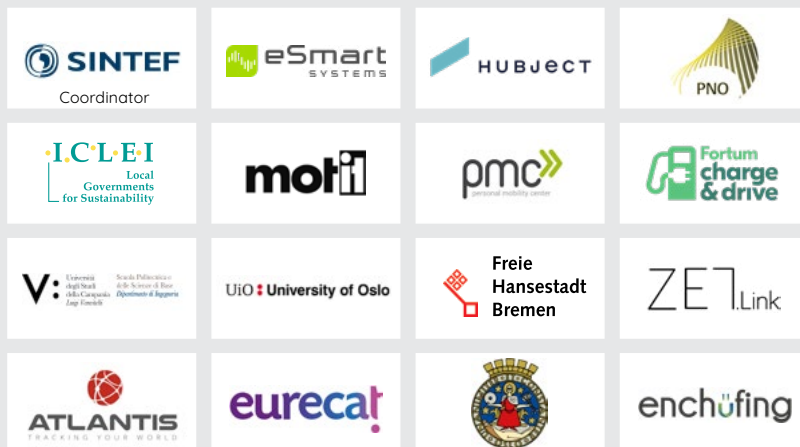
## Who are We?



The GreenCharge partners at the second project meeting in Barcelona, Spain in March 2019.

Image: Greencharge

### Project Partners



Interested in finding news from our technical partners?  
Check out their news pages:  
[ATLANTIS](#) | [ESMART](#) | [EURECAT](#) | [FORTUM](#) | [HUBJECT](#)  
[ICLEI](#) | [OSLO UNI](#) | [PNO](#) | [SINTEF](#)



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 769016



[www.informedcities.eu](http://www.informedcities.eu)



Twitter: [GreenCharge2020](#)  
LinkedIn: [GreenCharge Project](#)  
Email: [info@greencharge2020.eu](mailto:info@greencharge2020.eu)

[www.greencharge2020.eu](http://www.greencharge2020.eu)

In our next newsletter (published through Informed Cities):  
**Focus on Electric Vehicle Technology and Management**  
Due Spring 2020! Previous copies at: [www.greencharge2020.eu/newsletters](http://www.greencharge2020.eu/newsletters)

Received this from a friend? Sign up on our [website](http://www.greencharge2020.eu).

