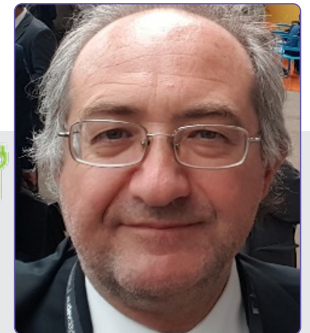


How can we effectively measure the effects of greener electric vehicle charging systems?

GreenCharge tests charging systems that are greener and balanced with available local energy supply. But what are the key performance indicators that help us judge whether we are successful or not? For our 3rd newsletter, we talked to Beniamino Di Martino whose team is leading our work on evaluation for GreenCharge. Here's what he's had to say...



Evaluating the impact of GreenCharge against the various “dimensions” of the “Universe” of “Smart and Sustainable Cities” is crucial for assessing its success. GreenCharge innovations are being evaluated in practical trials in Barcelona, Bremen and Oslo. Together, these trials cover a wide variety of “dimensions”, including: vehicle type, ownership model, charging location, energy source, and management and charging support systems.

To evaluate GreenCharge, we collect research data in three complementary ways: automated data collection by software running at our trials, data on stakeholders' opinions collected through surveys, and data from simulation techniques.

Together, more than 20 environmental, social, economic and operational KPIs – Key Performance Indicators – have been defined, informed by guidelines of the CIVITAS Evaluation Framework. These input into evaluation, suggesting different approaches for the realisation and of innovations in GreenCharge.

In the following pages of this newsletter, we try to explain “simulation”, one of the more technical aspects. This is a computer based technique which

extends the “real Universe” of the three Pilot Cities within a “virtual universe” where several dimensions can be virtually changed (e.g. number and type of electric vehicles, number of charging points). It allows us to study scenarios that cannot easily be demonstrated in real life, without constraints such as lack of time or data, with the increased use of local renewable energy and energy storage, as well as extensive use of the batteries in connected vehicles as an energy source when the vehicles are not needed (“Vehicle to Grid”).

In a practical example, simulation enables us to optimise the use of renewables (e.g. shifting the timing of appliance use – e.g. washing machines, dish washers – and EVs recharging). But how can this work in practice?

At a simple level, can this happen now? Household appliances can be made “smart” by the provision of a simple plug; this was achieved in the COSSMIC project which preceded GreenCharge. In due course, integrated smart households will greatly expand the potential of household energy management, but our GreenCharge research will help us understand to what extent consumers are currently willing to accept such levels of management.

Decision-makers can also benefit from “smart visualisation” of KPIs such as the share of the total energy consumption that is locally produced (green). This influences one of GreenCharge's most important outcome indicators, CO₂ reduction. Through our approaches we hope decision makers will be persuaded to see green energy as a real option for EVs to be charged and managed alongside other local energy needs.

Keep in touch with GreenCharge for further information.

Beniamino Di Martino,
University of
Campania Luigi Vanvitelli



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



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Testing the demands of an energy-smart society

Sounds complicated, right?

Well, simulation – or using computers to help test, or model, different solutions or situations – is a methodology developed by GreenCharge for the evaluation of proposed new charging technologies. Rocco Aversa and Salvatore

Venticinque from the University of Campania Luigi Vanvitelli tell us more on the following pages.

In particular, simulation allows us to imagine GreenCharge innovations being implemented in larger and more diverse neighbourhoods, which manage energy in a “smart” way.

Simulation allows the following options to be tested:



Increases in scale:

- Increased number of connected infrastructures (e.g. more charging points or renewable energy inputs)
- Increased number of active participants (e.g. people wanting to charge cars, scooters, bikes etc.)



More elaborate technology configurations:

- Wider diversity of technologies
- Increased availability of infrastructure



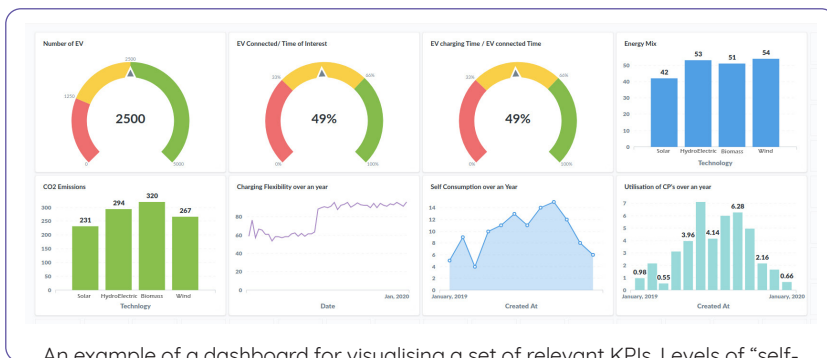
Better data availability:

- Easier interoperability between parts of the system
- More integrated data systems catering for privacy demands
- A greater level of time, budget and effort to analyse and connect data



Greater availability of emergent technologies:

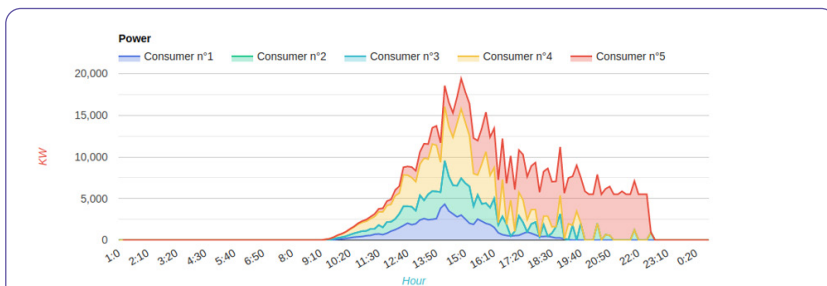
- For example, Vehicle to Grid technologies that are supported by a wider range of e-cars and charge points



An example of a dashboard for visualising a set of relevant KPIs. Levels of “self-consumption”, for example, can be visualised - the amount of energy produced locally that is consumed locally.



Over a day, the supply of local renewable energy (green) reduces the energy supply required from the grid (mid-blue). This can be stored for later use (e.g. overnight charging).



Consumers of energy in households cumulatively have a large impact on peaks of energy demand: smart neighbourhood management can help with this



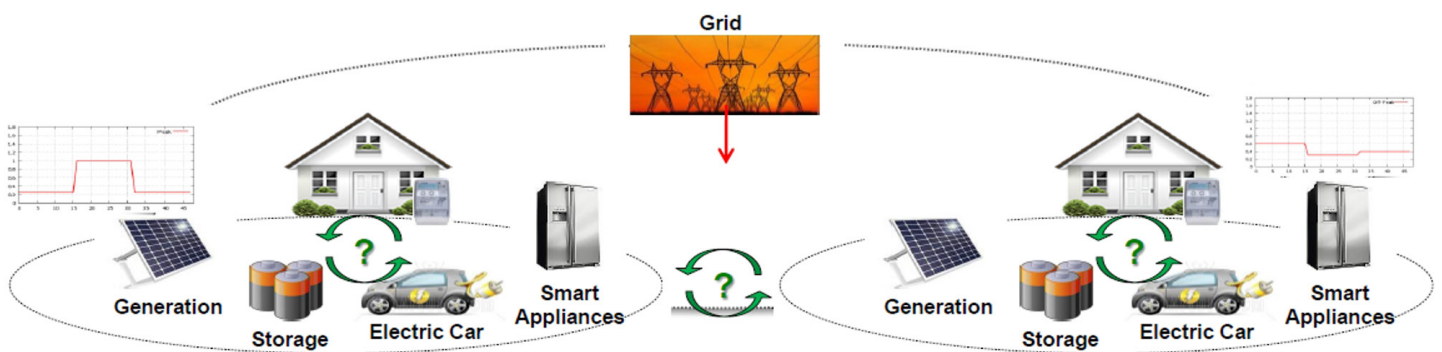
Testing the demands of an energy-smart society

Simulation is allowing GreenCharge to evaluate specific combinations of charging and energy generation during the design stage, when the return on investment, or the capacity and positioning of new charging stations (as well as the acquisition of new e-vehicles), needs to be predicted.

But what is an energy-smart neighbourhood?

This means that the generation and use of electricity is balanced, not only within an individual household, but across a number of homes sharing the same main electricity grid supply. Demand

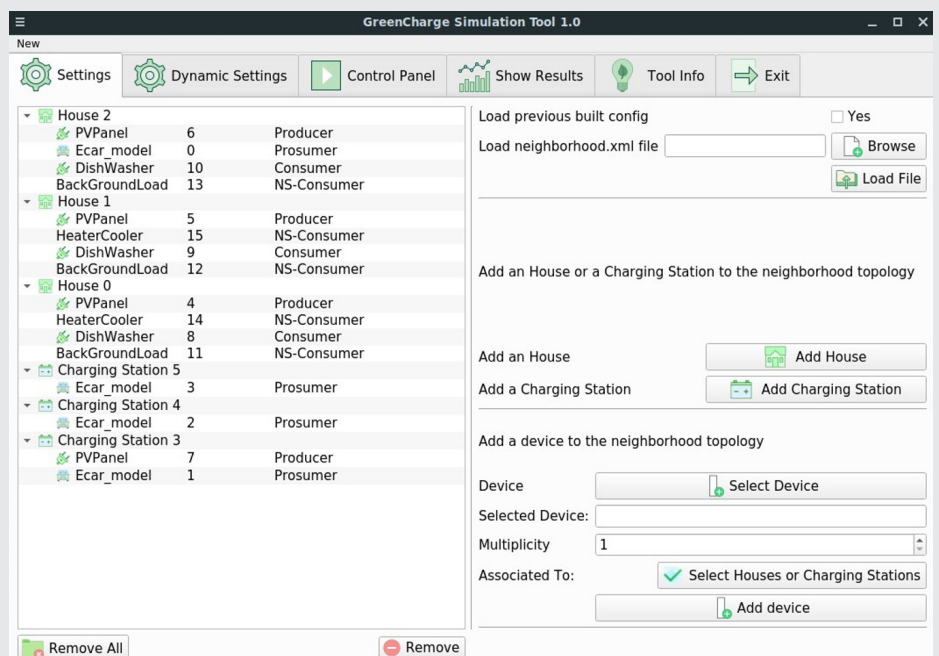
for energy from uses such as vehicle charging is moderated, so that maximum use is made of renewable energy according to energy need, and demand on the grid is kept within practical limits, both within a household and across households (as shown in the picture below).



The GreenCharge system has been designed to simulate an Energy Smart Neighbourhood, computing the best time to switch-on smart devices, or to charge batteries or electric vehicles.

So, through using a simulation it is possible to configure when energy consuming devices (such as a washing machine, dishwasher, etc.) use energy to coincide with availability from energy producing or storage devices (e.g. solar panel and battery). A user, in this case the home owner, can set parameters such as an Earliest Start Time and a Latest Finish Time - to make sure the dishes are done, the clothes are washed, and the vehicle charged, but not necessarily all done at the same time, but still ready when needed.

Note: The GreenCharge simulator, extends a simulation tool developed by a previous FP7 project (CoSSMic).



GreenCharge Uptake Cities – What’s up in Budapest and Donostia / San Sebastian?



Up to 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.** In this issue we hear about electric vehicle strategies from our friends in Budapest and Donostia / San Sebastian.

Budapest – Rapid revolutions in electric mobility

Budapest’s first Sustainable Urban Mobility Plan (SUMP) was developed by the City’s transport authority, BKK Centre for Budapest Transport, and approved by the Municipality in May 2019.

Budapest’s approach to e-mobility recognises that electric vehicles still result in cars on their streets and the requirement for car parking spaces. Therefore, as opposed to swapping all traditional cars, which use internal combustion engines, with electric vehicles, they plan to enhance the city’s public transport system, where the share of electric trips is already around 66 percent.

The refurbishment of the M3 metro line, line extensions to the tramway system, and the purchase of new tram and trolleybus vehicles increases the efficiency of the public transport system. The use of new technologies allows for the

recuperation of the braking energy, electricity savings, and extended wireless trolleybus running. In the current bus fleet (c. 1500 vehicles), Budapest runs 19 fully electric buses, as well as 40 diesel-electric hybrids.

In the greater region of Budapest, there are currently around 8,000 electric cars (representing c. 1 percent share), out of which more than 50 percent are fully electric, and the remainder hybrid. They can be charged at 280 public charging points in the city, out of which 30 are fast chargers. There are currently 51 electric taxis in the city and three carsharing companies operating 450 fully electric vehicles.

The national e-mobility strategy (Jedlik ÁnyosPlan), was approved in 2015 and updated in 2019. It introduced the green licence plate for electric vehicles and several discounts, such as financial support for the purchase of e-vehicles and exemptions from registration and company car tax. Municipalities introduced free parking for vehicles equipped with green licence plates in the charged parking zones to support e-mobility. As this sector is rapidly growing, further regulations and subsidies will come in the near future.



Image: City of Budapest



GreenCharge Uptake Cities - What's up in Budapest and Donostia / San Sebastian?

Donostia / San Sebastian - catering for urban transport needs and setting an example

The City of San Sebastian first started working with electric mobility in 2007. Since then, the City introduced hybrid public transport vehicles in 2011, Europe's first public, 100 percent e-bike hire fleet in 2013, and electric buses in 2014. The City now has 50 charging sockets, across 20 charging point locations, including 4 fast charging locations. Further expansion to the network is upcoming.

The city of Donostia/San Sebastian is taking a two-pronged approach toward e-mobility, focusing on charging infrastructure and the promotion of electric vehicles.

A network of charging points is being deployed in order to cater for the demand for public recharging by both citizens and visitors. For those sectors in which the use of vehicles is unavoidable, electric vehicles are promising

short-term solution to reduce urban emissions.

The deployment of electric vehicles undoubtedly requires efficient coordination with the other actors and systems involved in urban mobility, so that their integration affects the urban space as little as possible, while maintaining the strategies envisaged in the sustainable urban mobility plan (SUMP) with regard to the rational use of the private vehicle.

At the same time, the City's municipal offices are gradually renewing their fleets of vehicles, both for public transport and internal services, with clean vehicles. This is done in order to set an example, illustrating that alternative energies are a reality and capable of meeting the daily needs of the city.



Image City of Donostia / San Sebastian

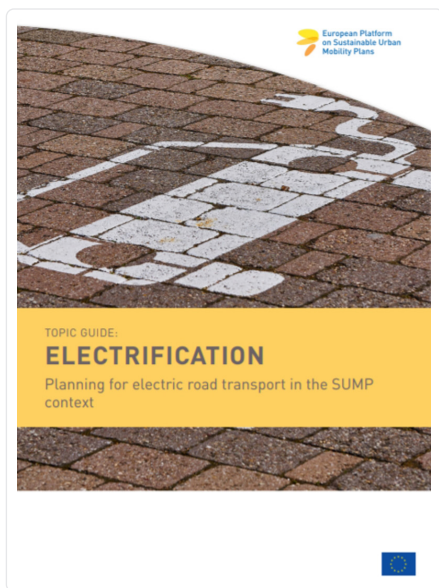
World News



Urban Mobility Planning

New Electrification SUMP guide

The SUMPs-Up project has published its final recommendations, including a specific topic guide on electrification.



Read more at: www.sumps-up.eu/fileadmin/user_upload/Tools_and_Resources/Publications_and_reports/Topic_Guides/electrification_planning_for_electric_road_transport_in_the_sump_context.pdf

Edinburgh launches its range of public hire ebikes

Edinburgh becomes the latest Scottish city to introduce electric bikes as part of its hire bike range, alongside those already in Stirling and Glasgow.

Read more at: www.edinburghnews.scotsman.com/news/transport/e-bikes-arrive-edinburgh-just-eat-bike-scheme-extended-2018781

Technology

Is battery swapping the future for electric scooters?

1,000 “GoStations” have been introduced across Taiwan.

Read more at: <https://electrek.co/2019/09/23/check-out-gogoros-giant-new-battery-swap-stations-for-its-electric-scooters>

What's the future for urban air mobility?

New flying electric-powered vehicles are being tested across Europe.

Read more at: www.theguardian.com/world/2020/mar/07/are-flying-taxis-ready-for-lift-off

Bus batteries with an afterlife

Gothenburg (Sweden) is already finding uses for bus batteries once they have reached the end of their

useful capacity for public transport vehicles –powering services in residential buildings.

Read more at: www.themayor.eu/en/repurposed-e-bus-batteries-supply-gothenburg-homes-with-energy

Can electric vehicles actually charge each other?

A patented e-bike energy transfer technology has been developed.

Read more at: <https://medium.com/zoov/zoov-ebike-sharing-service-introduces-the-first-patented-inter-bike-energy-transfer-technology-at-6c252b97539c>

"The revolution in cycling has hit the streets of Edinburgh as a brand new fleet of e-bikes was launched."
Edinburgh Evening News, March 2020



Image: Just Eat Cycles

World News



Electric Vehicle Markets

What could the road ahead for e-mobility be?

A new report looks at recent progress and future trends to assess car and vehicle manufacturer readiness.

Read more at:

www.mckinsey.com/industries/automotive-and-assembly/our-insights/the-road-ahead-for-e-mobility

E-bikes lead the way

300 million electric bikes expected to be on the streets by 2023.

Read more at:

www.caranddriver.com/news/a30364809/electric-bikes-future

Are second-hand sales the way to a “just” electric mobile society?

While electric cars are expensive, accelerating the second hand market may be a way to ensure the poorest in society also have access to clean vehicles.

Read more at:

<https://greenallianceblog.org.uk/2019/11/12/electric-mobility-should-benefit-the-poorest-in-our-society>

GreenCharge Publications



Looking for more information on electric mobility planning?

Then check out the GreenCharge website for all our latest publications. Updated on a continuous basis.

www.greencharge2020.eu/deliverables

EVs and the Environment

How quickly are cities progressing to renewable energy?

Renewables in Cities 2019 Global Status Report reviews the actions that cities are taking across policy, markets, business models and participation.

Read more at:

www.ren21.net/reports/cities-global-status-report

How can dockless scooter contractors be encouraged to charge with green energy?

Lime offers chargers a \$160 clean energy credit when they sign up, which will be deducted from their electric bill.

Read more at:

www.citylab.com/environment/2019/09/lime-electric-scooter-clean-energy-battery-climate-change/598759

How do different electric transport modes compare with combustion-engine vehicles?

Studies and data don't always tell the same story, but the importance of management and maintenance alongside the direct use of vehicles is highlighted here.

Read more at:

<https://travelandmobility.tech/infographics/carbon-emissions-by-transport-type/#15906>



Related Projects and Resources

CleanMobilEnergy

CleanMobilEnergy is an ongoing project and part of the Interreg programme. It focuses on developing a smart energy management system integrating renewable energy and electric vehicles.

“CleanMobilEnergy will make it possible for renewable energy sources to be used locally, so electric vehicles can be charged with 100% renewable energy offered at an optimum price.”

Information on the four pilot sites including videos are available from: www.nweurope.eu/projects/project-search/cleanmobilenergy-clean-mobility-and-energy-for-cities

GreenCharge Newsbits



Bremen and Sorrento project meetings held in October 2019 and February 2020

The Bremen meeting included a visit to Bremen's pilot sites, while a special meeting in Sorrento (Italy) represented GreenCharge's mid-point and a chance to review progress and focus areas.

Formal launch of GreenCharge pilot in Oslo

The first electric vehicles were connected to the pilot smart charging system at the pilot site at Røverkollen. This was attended by users, the Mayor of Oslo and GreenCharge representatives.

Read more at:

<https://twitter.com/GreenCharge2020/status/1219938572003958789>



Tell us your innovation news

GreenCharge has set up a new way for you to engage with the project and tell us your innovation news. What new electric vehicle solutions or services have you seen, that might be of use to make green energy for electric vehicles more effective and efficient? Please tell us using our simple form at:

www.greencharge2020.eu/innovation

Sharing Innovation in Electric Mobility

GreenCharge would like to hear from you if you have news or innovation to share related to electric mobility and green energy. This short form allows you to provide information to the project's Innovation Management team.

This data is collected by GreenCharge partner ICLEI Europe and will be shared with GreenCharge partners for the purposes of innovation management, including discussion in public forums and deliverables (aside from individual data under "About You", and unless opted out under "Confidentiality of Innovation").

This form will be active for the duration of the GreenCharge project (until August 2021) and submissions regularly picked up and reviewed by the GreenCharge Innovation Manager.

You can find out more about [GreenCharge](http://www.greencharge2020.eu) on our main website.



This form is managed with JotForm with whom ICLEI has a data processing agreement a requirement under the General Data Protection Regulation (GDPR). By submitting your data, you agree to your data being used and stored in accordance with these regulations and ICLEI Europe's privacy and [data protection](#) policies alongside the GreenCharge Data Management Plan. For any questions, please [contact us](#).

Title/name/subject of innovation or project

Short description of innovation or project

e.g. one paragraph

GreenCharge Diary

Smart and Sustainable Mobility workshop in Caserta, Italy

April 2020 (TBC)

GreenCharge at the European EV Charging Summit

May 2020

Project Meeting and Uptake Cities Visit in Oslo

June 2020

Uptake Cities Visit in Barcelona

September 2020

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

www.greencharge2020.eu

News to share? Contact us or share it with us on Twitter @ GreenCharge2020



Image: Fotolia

Feature Photo

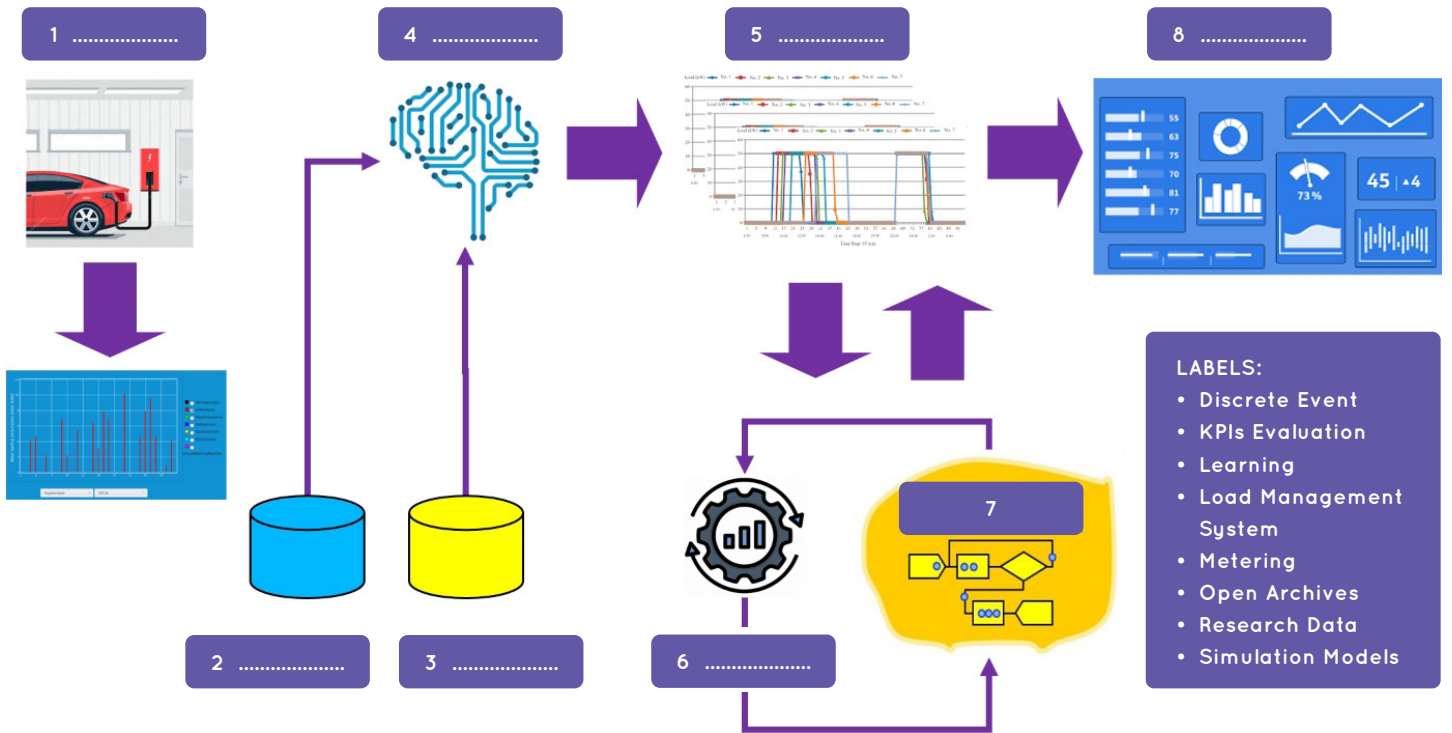


Image: City of Oslo

GreenCharge pilot site launch in Oslo, with address from the Mayor of Oslo, Raymond Johansen

Puzzled ?????

Can you name each step in the simulation process?
Match the labels to the workflow!



The answer to the last newsletter's "REEFANTIC" conundrum was...
Thanks to all who took part.

I N T E R F A C E

Who are We?

Missed a copy?
See our previous newsletters at:
www.greencharge2020.eu/newsletters

Issue 1:
Introduction to Pilots

Issue 2:
Business Models

Electric Mobility Newsletter
Issue 1 | February 2019

A Warm Welcome to Advances in Electric Mobility and Green Energy

I suppose you know the story about how the emperor Nero played his fiddle while Rome burned? In these days when we read ever more pessimistic reports about global warming, it's easy to feel that our planet - not just Rome - is burning up...

The project will develop and demonstrate a range of renewable energy technologies partnered with different modes of transport in a range of commercial and domestic charging settings, with the aim of making it easier to integrate zero-emission vehicles into the way we all travel.

It will make it easier to charge electric vehicles and use green energy. And all this will be based on solid business models that ensure financial viability - we are not 'happy idealists'!

I am delighted to share this newsletter. It is the first in a series of six. Our project is built around 3 case study cities, and we will use this first newsletter to introduce these to you. We hope to extract a great deal of information from the case studies and will use them to help a further 12 'follower' cities develop mobility roadmaps.

Our newsletter is not just a way for us to boast about our work (though that is also true). It is also a way to establish contact with those interested in the topics we work on. We hope you enjoy reading it and also feel free to contact us any time.

Feedback to help guide the content of future issues, or to establish direct contact.

Just email me at: info@greencharge2020.eu or visit us at: www.greencharge2020.eu

Joe Gorman
Project Coordinator, GreenCharge

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

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Electric Mobility Newsletter
Issue 2 | October 2019

The Generation Game: How Do We Help the Business Models for Electric Mobility and Green Energy Work Together?

With electric vehicle technologies, ownership and use growing strongly in our societies - across bikes, cars, buses, trams, and trains - we need to start preparing our energy systems and transport infrastructure for this new urban mobility future. To do this, we need to start talking to those who have the most direct role in 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. The hat 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-emission transport at its point of use.

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 a national level. 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 handling charging points when they earn less from selling power and need to charge their pricing road model? How much support from local or national government is needed to build power, before they modify their own building management plans to focus more on green energy and electric vehicle infrastructure?

Policy 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 lack of) currently provided by local and national governments. Such situations include 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 constraints 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 experience to inform innovation.

Keep in touch with GreenCharge for further information.
Anna Schwaiblmair, PNO

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Project Partners

 Coordinator			

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

2020 CIVITAS
Cleaner and better transport in cities

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