Grant number: 769016
Project duration: Sept 2018 - Aug 2021
Project Coordinator: Joe Gorman, SINTEF

HORIZON 2020: Mobility for Growth
MG-4.2-2017
Supporting Smart Electric Mobility in Cities
Project Type: Innovation Action

GREEN CHARGE

greencharge2020.eu

GreenCharge Project Deliverable: D1.3

Innovation News & Updates

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2020 CiViTAS
Cleaner and better transport in cities

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About GreenCharge

GreenCharge takes us a few important steps closer to achieving one of the dreams of modern cities: a zero-emission transport system based on electric vehicles running on green energy, with traffic jams and parking problems becoming things of the past. The project promotes:

Power to the people!	The GreenCharge dream can only be achieved if people feel confident that they can access charging infrastructure as and when they need it. So GreenCharge is developing a smart charging system that lets people book charging in advance, so that they can easily access the power they need.
The delicate balance of power	If lots of people try to charge their vehicles around the same time (e.g. on returning home from work), public electricity suppliers may struggle to cope with the peaks in demand. So we are developing software for automatic energy management in local areas to balance demand with available supplies. This balancing act combines public supplies and locally produced reusable energy, using local storage as a buffer and staggering the times at which vehicles get charged.
Getting the financial incentives right	Electric motors may make the wheels go round, but money makes the world go round. So we are devising and testing business models that encourage use of electric vehicles and sharing of energy resources, allowing all those involved to cooperate in an economically viable way.
Showing how it works in practice	GreenCharge is testing all of these innovations in practical trials in Barcelona, Bremen and Oslo. Together, these trials cover a wide variety of factors: *vehicle type* (scooters, cars, buses), *ownership model* (private, shared individual use, public transport), *charging locations* (private residences, workplaces, public spaces, transport hubs), energy *management* (using solar power, load balancing at one charging station or within a neighbourhood, battery swapping), and *charging support* (booking, priority charging).

To help cities and municipalities make the transition to zero emission/sustainable mobility, the project is producing three main sets of results: (1) *innovative business models*; (2) *technological support;* and (3) *guidelines* for cost efficient and successful deployment and operation of charging infrastructure for Electric Vehicles (EVs).

The *innovative business models* are inspired by ideas from the sharing economy, meaning they will show how to use and share the excess capacity of private renewable energy sources (RES), private charging facilities and the batteries of parked EVs in ways that benefit all involved, financially and otherwise.

The *technological support* will coordinate the power demand of charging with other local demand and local RES, leveraging load flexibility and storage capacity of local stationary batteries and parked EVs. It will also provide user friendly charge planning, booking and billing services for EV users. This will reduce the need for grid investments, address range/charge anxiety and enable sharing of already existing charging facilities for EV fleets.

The guidelines will integrate the experience from the trials and simulations. and provide advice on localisation of charging points, grid investment reductions, and policy and public communication measures for accelerating uptake of electromobility.

For more information

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Executive Summary

Electric mobility is a rapidly moving topic area, with very many publicly-funded research projects and activities, and a private sector creating innovation across the supply chain. GreenCharge has a unique selling point in its interaction between electric mobility and renewable energy sources, and this helps focus down on innovation which best exploits such solutions. GreenCharge also has a focus on sustainable mobility, which also helps define an interest in modes of transport such as shared mobility and the efficient production and use of energy.

This Deliverable explains a workable process for the Innovation Manager to collect information from, and exchange information between the inside and outside of the GreenCharge project. Priority areas for knowledge transfer have been identified, including how the charging system interfaces with the availability of energy, and how innovations can be introduced in practical terms within the framework of Sustainable Urban Mobility Plans. GreenCharge's Uptake Cities Group provides a key reference point for knowledge exchange in this regard.

Mechanisms such as a publicly available innovation post box, alongside conferences and meetings with related projects, are methods GreenCharge will use to understand and bind itself to ongoing innovation in the field. GreenCharge will use the range of opportunities to interact internally within the project to identify, analyse and integrate innovation internally, including via emails, calls and face to face meetings between partners. Primary outlets to communicate innovation from inside and outside of the project include the project website and its newsletter, supported by other activities in Work Package 8 relating to communication, dissemination and exploitation.

Innovation from within the project is managed through a mechanism for agreeing the level of protection that should be afforded to new ideas and technologies, through a register of Intellectual Property Rights, so as much of the content from the project as possible remains open or has a fair way of being accessed to enhance the value and replicability on a broader scale of what GreenCharge offers in terms of innovative solutions for truly sustainable electric mobility.

The research leading to these results has received funding from Horizon 2020, the European Union's Framework Programme for Research and Innovation (H2020) under grant agreement n° 769016.

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1. About this Deliverable

1.1. Why would I want to read this deliverable?

This deliverable sets out the role of Innovation Management and the Innovation Manager within GreenCharge. It outlines the early activities already undertaken, as well as the scope of work over the remainder of the project. It specifically identifies which areas innovation can be harvested from within the project, and how GreenCharge innovations can be exploited and (if necessary) protected in their replication.

It also identifies sources of innovation in electric mobility from the world outside of GreenCharge, and how relevant ideas can be introduced to those working in the project to inform their own pilot demonstrations. Hence, for the reader interested in sources of information about state-of-the-art practices in electric mobility and reassurances about the mechanisms that GreenCharge is using to consider these, this is a relevant document.

1.2. Intended readership/users

The intended internal users of this deliverable are members of the GreenCharge consortium developing and applying innovation to pilot demonstrations. Communications and dissemination partners in GreenCharge will need to be aware of the activities and potential for generating public awareness of innovations from inside and outside the project.

This sources and procedures in this document will also be useful to other related Horizon 2020 projects scanning for innovation, and for other external stakeholders seeking to understand the breadth of sources influencing innovation in the electric mobility system and sector. They can use this content for their own innovation management activities.

1.3. Structure

This deliverable includes:

- Identification of relevant external projects and other initiatives for GreenCharge to monitor for innovation
- Next steps for harvesting items of innovation from within and outside of the project, and related feedbacks
- Procedures for updating and agreeing areas of Intellectual Property within the project and options for levels of protection

1.4. Other project deliverables that may be of interest

The deliverable is closely connected with a number of other GreenCharge deliverables and Work Packages, the most important of which include:

- Deliverables 1.1 - *Data Management Plan*, and Deliverable 9.1 - *Ethics*. These include references to commercial exploitation and the open use of research data, which should be considered alongside Intellectual Property Rights issues covered by this deliverable.
- Deliverable 1.4 - *Summary of Project Achievements*, and Deliverable 7.2 - *Recommendations and Guidelines for Integrating Electric Mobility into SUMPs*. These deliverables will be final outputs from the project that will remark on the innovations identified from both within and outside the project, and their applicability for wider replication.
- Deliverables 2.7, 2.13, 2.20 - *Technical Monitoring Report and Feedbacks* for each pilot city, and Deliverables 2.8, 2.15, 2.21 - *Final Report: Lessons Learned and Guidelines* for each pilot city. These provide, respectively, the opportunity for gaining learning from the pilots, and for this learning to be communicated outside world to assist with the replication of innovation.
- Deliverable 3.1 - *Stakeholder Analysis Report*. This scopes out stakeholders involved in the delivery of charging innovations, and the areas of the supply chain that can be monitored for innovation (from

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charging infrastructure to energy suppliers, vehicle manufacturers and local authorities). It also provides an initial summary of other European projects active in these areas. This information has informed the content of this Deliverable.

- Deliverable 3.2 - *Initial Version of Business Models.* Chapter 3 provides a detailed description of the innovation potential specifically referring to business models.
- Deliverable 4.2 - *Final Architecture Design and Interoperability Specification*, and Deliverable 4.5 - *Final Version of Integrated Prototype*. The software development in Work Package 4 is likely to be one of the key sources of intellectual property from the project and therefore links to the registry described within this Deliverable.
- Deliverable 5.5 – *Final Result for Innovation Effects Evaluation*. This will analyse the success of the innovations introduced in GreenCharge pilots and therefore inform recommendations for wider exploitation.
- Deliverable 7.3 - *Lessons Learned from Roadmap Development in Uptake Cities*. This document will record the inputs from Uptake Cities into innovation management.
- Deliverable 8.1 - *Communication Strategy and Plan*. This identifies some primary conferences and industry publications which can act as mechanisms for exchanging information on innovations (further developed through Deliverables 8.2 and 8.3 on *Dissemination and Exploitation,* including relationship with standards), and has requirements for the GreenCharge website to be used to communicate news on innovation.
- Deliverable 8.4 - *Newsletters*. The six newsletters include a summary of key current European and global news on e-mobility, and this task helps identity innovation to be further analysed through the innovation management task. *Innovation News & Updates*

1.5. Other projects and initiatives

- **INEA** - GreenCharge is funded by the *Innovation and Networks Executive Agency* (INEA), which works across Directorates to oversee Horizon 2020 projects. GreenCharge sits alongside a number of other projects under the *Smart, green and integrated transport* and *Secure, clean and efficient energy* parts of the Horizon 2020 programme. A recent brochure *Making European cities greener - Towards clean and smart mobility*[1] included GreenCharge under the topic of *Electric Mobility in Cities* alongside **Eliptic, Meister, Elviten**, and **Steve**. These projects are therefore the immediate contact points for GreenCharge, particularly with GreenCharge partners Bremen involved in Eliptic and Hubject in Elviten. The context of GreenCharge within other immediate projects funded by INEA is shown in Figure 1-1.
- **CIVITAS** - GreenCharge is officially part of the CIVITAS initiative, which forms one major group of projects under the INEA programme (another separate but relevant part being Smart Cities and Communities). CIVITAS is a network of cities for cities dedicated to cleaner, better transport in Europe and beyond. See www.civitas.eu for more information. A list of current research projects under the CIVITAS' umbrella can be found here: https://civitas.eu/projects/research, and this is further explored in Section 2.2.

MEISTER is GreenCharge's immediate "sister" project (also under the CIVITAS' umbrella) and received funding from Horizon 2020 under the same topic[2] as GreenCharge. See www.meisterproject.eu for more information. Collaboration with MEISTER is expected to involve the most intense interactions, with an initial meeting already held at the CIVITAS Forum in 2019, and further interactions planned during the project which are likely to concentrate on crossover areas such as business models, key performance indicators, sustainable urban mobility planning, and final dissemination events.

[1] INEA (2019) Making European cities greener Towards clean and smart mobility https://ec.europa.eu/inea/sites/inea/files/urban_mobility_brochure_2019_web.pdf

[2] https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/mg-4.2-2017

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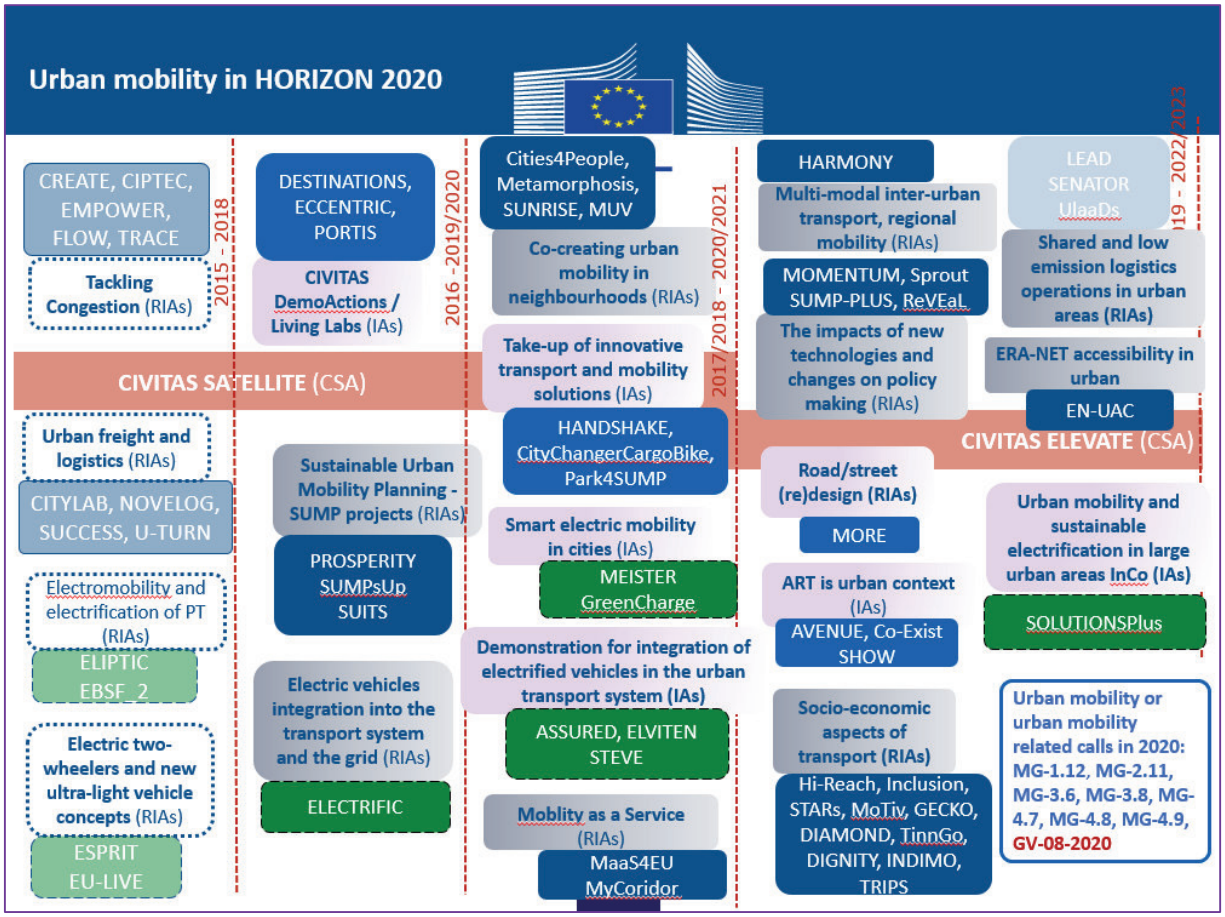

Figure 1-1: Presentation slide given by INEA at the SUMPs-Up Final Conference, March 2020 (modified to show electric mobility-centred projects in green fill/long dashed outline)

As relationships with other projects form a substantive part of Innovation Management, these links are further discussed in Section 2.

1.6. Goal of the deliverable

The goal of this Deliverable is to describe the objectives and the process of innovation management of the GreenCharge project. This Deliverable is defined by Task 1.3 on Innovation Management which is articulated within the Grant Agreement, as follows:

> *"This task covers the activities of the Innovation Manager role and will ensure that the project is aligned with the development of the state of the art technologies and the market possibilities. It will monitor* ***internal and external activities*** *(relevant European projects and initiatives),* ***market development*** *(new products, technologies and services),* ***European policy*** *with respect to eMobility and relevant* ***scientific results*** *for understanding the market and technical problems, threats and opportunities, analyse the input from the* ***Uptake Cities Group****, respond to external and internal opportunities and obstacles, and suggest changes and actions for technical management if necessary."*
> (Source: GreenCharge Grant Agreement; emphasis added)

Deliverable 1.3 aims to collect and describe *"new initiatives, new research results, new products and new user needs that are of relevance to eMobility. The overview will be continuously updated until the end of the project"* (Source: GreenCharge Grant Agreement). In brief, this means monitoring:

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- **New initiatives** – such as identifying links with newly funded research projects (e.g. SolutionsPlus, http://www.solutionsplus.eu/ including GreenCharge partner ICLEI's World Secretariat)
- **New research results** – such as assessing recommendations arising from the final reports of recently-completed research projects (e.g. SIMPLA, http://www.simpla-project.eu/en/guidelines/)
- **New products** – such as new services provided for mobility in cities and new means of charging and providing customer interfaces (e.g. Mobility as a Service, or MaaS)
- **New user needs** – such as seeking feedback from stakeholders such as local authorities (through the Uptake Cities Group) and other direct customers (such as the users of the demonstration projects in the pilot cities)

The innovation process for GreenCharge includes collection of ideas and information regarding relevant activities and initiatives outside of the project, communication within the project consortium and possibly recommend changes or adjustments to the project based on new insight from this horizon scan. This deliverable is therefore a snapshot in time of a longer, continuous process to be undertaken by the Innovation Manager. The GreenCharge Innovation Manager was originally Sonja Pajkovska of Hubject, but responsibility was transferred to Reggie Tricker of ICLEI in February 2020.

1.7. The scope and challenges of innovation in GreenCharge

GreenCharge has ambitious goals of bringing us closer to achieving a zero-emission transport system based on electric vehicles running on green energy. This is a paradigm shift compared to today's transport system, which to a large degree is based on the use of fossil fuelled vehicles. GreenCharge's USP ("unique selling point") is the high level of attention and importance it places on the integration with locally produced renewable energy with electric mobility. Such a paradigm shift requires innovations at several levels and in several areas.

Innovation Management in GreenCharge is a continuous process, starting on day one of the project and continuing throughout its lifetime. The scope innovations in GreenCharge is potentially rather wide, and spans the areas of charging infrastructure and interfaces, energy supply and management, as well as housing and transport provision (as broadly identified in the stakeholder analysis and "value chain" in Deliverable 3.1). Broad areas of innovations in GreenCharge covering these perspectives are identified in Table 1.

Innovation Management requires understanding of both market and technical issues as well the user perspective of life as an individual, company or public organisation, such as a city municipality. These stakeholders bring different expectations of what innovation means in practice across the private and public sector, from technology solutions to new policy approaches.

GreenCharge is in a position to develop greater mutual understanding between these sectors, and through understanding how expectations vary across the different partners in its own consortium GreenCharge (which includes everyone from city networks to software designers) can consider how differing perspectives may be mapped onto the outside world so everyone can deliver electric mobility solutions with greater levels of knowledge, understanding and competence.

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Table 1: Scope of Innovation Management in GreenCharge

Value Chain "Building Block" (Source: Deliverable 3.1)	Areas of possible innovation	Remarks on relevance to GreenCharge
Charging	Multi-modal charging points Advances in charging speeds Solutions such as vehicle-to-vehicle, vehicle-to-everything, wireless, regenerative and on-the-move charging systems (reducing the requirement for fixed charging points/stations)	**High**. A focus area in GreenCharge (WP4) is on the software and management within charging points and charging systems, primarily to balance user requirements with renewable energy availability. The physical infrastructure design and performance is of less direct relevance. However, solutions which introduce entirely different concepts of charging which negate the need for charging points (as currently known) are important to know so GreenCharge innovations can be prepared to be adapted to new systems and contexts.
Energy	New forms of energy supply (e.g. advances in locally renewable energy production technologies) New energy management systems, including distributed grid systems New battery storage systems or availability	**Medium**. A prerequisite of GreenCharge is the input of renewable energy supply, however the precise energy supply and development of new generation technologies are not key focus for the project. Innovations should be flexible towards different sources of supply, and overall increases in the energy mix from storage and local renewables. GreenCharge's integration with green energy and how focus on supply and demand can be managed form its Unique Selling Point (USP)
Electric Vehicles	New forms of electric vehicles (e.g. LEVs, SUVs) Models of service provision (e.g. private ownership, shared mobility) Internal vehicle design (e.g. battery swapping), linking to Charging, above Component manufacturing and disposal techniques (including battery component sourcing)	**Medium-Low**. The design of electric cars and their drivetrains and internal propulsion systems are of a lower level of focus to GreenCharge, aside from SUMP aspirations (WP7) which favour efficient vehicles which are less resource and space intensive in their use and production. New forms of vehicles which contribute towards SUMP goals, such as LEVs including e-bikes, e-scooters, e-cargobikes, etc. are of relevance particularly in ensuring interfaces with charging opportunities
End User	Consumer preferences and acceptance, and variation (e.g. geographic and demographic, including gender) New user interfaces such as Mobility as a Service (MaaS)	**Medium**. GreenCharge has direct mechanisms to survey consumers in its pilot sites (WP2) and growth in EV ownership (desired and actual) and this is of relevance in determining the scale of replication of innovations. Examples of innovative user interfaces are of relevance in the customisation of GreenCharge's own apps (WP4)

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Value Chain "Building Block" (Source: Deliverable 3.1)	Areas of possible innovation	Remarks on relevance to GreenCharge
"Other"	Urban and transport planning approaches, such as car free neighbourhoods/cities	**High**. GreenCharge (WP7) works with Uptake Cities who provide key reference points for innovative urban mobility policies alongside other cities in the CIVITAS community.

The uptake of these new innovations is supported by attractive, and possibly new, business models; multistage business model development and innovation is covered separately in Work Package 3 – *Business Model Design and Prototyping*.

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1.7.1. Specific areas out of scope

Like every project, it is not feasible for GreenCharge to be able to identify and consider *every* innovation relating to the fast moving and expansive world of electric mobility. It is therefore important to identify on which areas to focus, and others where those working more deeply on projects and initiatives in related fields can do a more thorough job. It is therefore proposed that innovation related to the public transport, logistics and electric mobility sectors will not be closely tracked through this project, but that partner experiences (for example Bremen in Eliptic, and ICLEI in BuyZet) can be used to assess the application of innovations in these areas to inform GreenCharge's final recommendations, without highly detailed monitoring of these fields during the course of the project.

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2. Related Projects

As introduced in Section 1.5, the range of EU projects which include electric mobility elements is wide. This section outlines some of the most relevant examples to Innovation Management in GreenCharge.

2.1. Method of Identification and Shortlisting

To identify and achieve a good range of these projects, the following sources have been reviewed.

- Existing reviews in GreenCharge, including in Deliverables 3.1 and 8.1
- EU websites and online catalogues/databases, including **INEA**[3] and **Cordis**[4] using key search terms
- Websites and newsletters of known projects
- General internet and social media content search using key search terms
- **CIVITAS Forum** in 2019, networking with projects such as **EV Energy**, **Meister** and **CleanMobilEnergy** including through a dedicated GreenCharge workshop (Figure 2-1)

Figure 2-1: Tweet from GreenCharge partner ICLEI of GreenCharge workshop at the CIVITAS Forum in 2019, liaising with projects such as CleanMobilEnergy.

[3] https://ec.europa.eu/inea/en/horizon-2020/h2020-transport/projects-by-field/392
[4] https://cordis.europa.eu/projects/en

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Relevant projects have been further filtered and shortlisted according to their fit with GreenCharge and its USP, considering:

- Inclusion of electric mobility
- Inclusion of renewable energy as an explicit aim or component
- Currency (i.e. date of publication in terms of relevance to innovation)
- Fit with GreenCharge's demonstration projects (e.g. modes of transport or contexts)

2.2. CIVITAS Projects

As identified in Section 1.5, CIVITAS is the central research, innovation and coordination programme relevant to GreenCharge. INEA has funded 91 Horizon 2020 projects on urban transport and mobility, 33 of which fall within CIVITAS. The most relevant projects are shown in Table 2.

Table 2: Priority related CIVITAS electric mobility projects

Project/Programme Name	Subject Matter regarding EVs	Status
Eccentric, Horizon 2020 (CIVITAS)	Planning, pilots and testing of electric vehicles including vans, cargo bikes, bicycles, shared bikes, buses and taxis, and charging points/hubs, across Stockholm, Madrid, Munich and Turku.	September 2016 - August 2020
Meister, Horizon 2020 (CIVITAS)	Developing platforms for electric mobility with pilots (including Berlin, Gothenburg and Malaga)	September 2018 – August 2020

2.3. Smart Cities Projects

Smart Cities cover a variety of funding calls, but in many cases an electric mobility component is included. INEA has funded 14 Smart Cities projects within Horizon 2020. Many of these projects are currently running,with substantial levels of funding, and those most relevant to innovation in GreenCharge are shown in Table 3.

Smart Cities projects exist in a different community of projects, events and conferences to CIVITAS projects, and therefore additional effort will need to be made to draw connections. However, as these projects are often not solely mobility-focussed, they offer additional wider insight into concepts such as energy smart neighbourhoods in the context of wider consumer energy requirements and management.

Table 3: Priority related Smart Cities electric mobility projects

Project/Programme Name	Subject Matter regarding EVs	Status
Invade, Horizon 2020 (Smart Cities)	Energy storage for renewable energies including pilots with EVs (including Stavanger and Noord-Brabant)	January 2017 - December 2019
MySmartLife, Horizon 2020 (Smart Cities)	Renewable energy pilots with integration with electric mobility and energy storage elements (logistics, public transport, cars, bikes, car sharing) (including Nantes, Hamburg and Helsinki)	December 2016 - November 2021
Smarter Together, Horizon 2020 (Smart Cities)	Electric mobility pilots including fleets, car sharing, bikes with renewable energy integration (including Lyon, Munich, Vienna)	February 2016 - January 2021
SmartEnCity, Horizon 2020 (Smart Cities)	Electric mobility including taxis with renewable energy and energy storage in pilots (including Tartu)	February 2016 - July 2021

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Project/Programme Name	Subject Matter regarding EVs	Status
MatchUp, Horizon 2020 (Smart Cities)	To be confirmed if Match Up is doing anything to integrate renewables and mobility, even though it is doing both of them separately.	October 2017 - September 2022
Ruggedised, Horizon 2020 (Smart Cities)	Renewables including wind and solar power solutions integrated with emobility (including Umea, Glasgow, Rotterdam).	November 2016 - October 2021
Ready, Horizon 2020 (Smart Cities)	Integration of solar renewables and district heating with electric mobility through pilots (including in Aarhus and Växjö)	December 2014 – November 2019
Stardust, Horizon 2020 (Smart Cities)	Photovoltaic roof with battery storage and EV charging points (Pamplona) and other emobility measures, e.g. bikes, taxis, cars, logistics, (including Trento, Tampere)	October 2017 - September 2022

A number of further projects such as SPARCS, +CityXchange, Iris and RemoUrban have possible electric mobility content (TBC) and will be contacted to establish the potential for connections.

2.4. Interreg Projects

Interreg funds a number of closely related projects. The level of funding and the geographical scope of Interreg projects is relatively modest compared to typical Horizon 2020 RIA/IA projects, but some are nevertheless very relevant for GreenCharge to consider (Table 4).

Table 4: Priority related Interreg electric mobility projects

Project/Programme Name	Subject Matter regarding EVs	Status
Efficience, Interreg	Planning, pilots and testing of electric vehicles focused public transport in Central Europe (including Leipzig, Budapest, Bergamo, Vienna, Gdynia, Maribor, Pilsen)	April 2019 – March 2022
EV Energy, Interreg	Renewable energy and transport interfaces, particularly balancing energy inputs and vehicle demands through ICT through policy initiatives across regional areas including in the Western Netherlands, Stockholm, Lithuania, Catalonia and Lazio.	January 2017 - June 2021
CleanMobilEnergy, Interreg	Integration of various renewable energy sources, storage devices, electric vehicles and optimisation of energy consumption through one unique smart energy management system adapted to pilots in Arnhem, London, Schwäbisch Gmünd and Nottingham covering different types of renewable energy, storage and electric vehicles as well as different contexts and diverse city environments.	2017 - 2021

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2.5. Other projects and programmes

Table 5: Other priority related electric mobility projects

Project/Programme Name	Subject Matter regarding EVs	Status
Elviten, **Horizon 2020**	Demonstration of light electrified vehicles (bicycles, scooters, tricycles and quadricycles) in Genoa, Rome, Bari, Trikala, Berlin, Malaga.	November 2017 – October 2020
EMaaS, **ERA-NET EM EUrope**	Pilot Mobility as a Service cloud based projects and business models aimed at encouraging electric vehicle sharing and corporate fleet use in Sweden (Gothenburg, Westcoast, Stockholm, Lund, Tranås, Varberg, Trollhättan, Mölndal and Knivsta), Austria, Netherlands, and Hungary.	February 2018 – TBC
Green eMotion, **7th Framework Programme**	Business models, user acceptance and requirements for renewable energy integration for EVs, through demonstrations in 12 regions (including Copenhagen, Bornholm, Ireland, Barcelona, Berlin, Malaga, Malmo, Rome, Strasbourg).	March 2011 – February 2015
Simpla	Focussing on the interface between Sustainable Energy Action Plans (SEAPs) and Sustainable Urban Mobility Plans (SUMPs) in local authorities across a number of countries (including Italy, Spain, Austria, Bulgaria, Croatia, Romania) including recommendations on measures such as 'green car parks'.	February 2016 -January 2019

2.6. Other sources of Innovation

It is recognised that a great deal of innovation happens outside of EU-funded projects, driven from the private sector as well as locally and nationally-funded public sector initiatives. Such initiatives will be picked up through the methods outlined in the following section, which include reviews of external news publications, attendance at conferences outside of the EU project arena, and knowledge of the GreenCharge consortium partners. This includes, for example, keeping aware of applications to the Transformative Action Award (managed by ICLEI) and using Hubject's knowledge of activities in the electric mobility industry across Europe.

Relevant sources of up to date news, to be reviewed on a quarterly basis in the production of the GreenCharge newsletter (WP8) (Figure 2-2), also managed by the Innovation Manager, include:

- Google News Alerts
- Urban Mobility Week Newsletter
- Eltis Newsletter
- Shared-Use Mobility Centre Newsletter
- Smart Cities Dive Newsletter
- Electrek
- Wired
- Bloomberg
- Business Green

The research leading to these results has received funding from Horizon 2020, the European Union's Framework Programme for Research and Innovation (H2020) under grant agreement n° 769016.

Figure 2-2: Screenshots of innovation news featured in the first two GreenCharge newsletters (available for download at https://www.greencharge2020.eu/newsletters/)

Some examples of areas of innovation identified from outside of GreenCharge in the initial stages of the project include:

- Electric bicycle charging through solar power at Aldi stores in Germany (https://www.aldi-sued.de/de/infos/aldi-sued-a-bis-z/e/)
- Solar powered electric car charging ports in Dundee, Scotland (https://www.theguardian.com/uk-news/2019/aug/16/dundee-green-revolution-charging-hubs-electric-cabs-scotland) and Barcelona (https://sustainablecities.eu/transformative-actions-database/?c=search&action_id=5ic0min5)
- Electric bicycle recharging stations in France (https://www.bosch-ebike.com/en/everything-about-the-ebike/stories/powerstations/)
- Battery swap stations for electric scooters in Taiwan (https://electrek.co/2019/09/23/check-out-gogoros-giant-new-battery-swap-stations-for-its-electric-scooters/)
- Inter-bike energy transfer technology in Paris (https://medium.com/zoov/zoov-ebike-sharing-service-introduces-the-first-patented-inter-bike-energy-transfer-technology-at-6c252b97539c)
- Wireless taxi charging in Oslo (https://www.fortum.com/media/2019/03/fortum-and-city-oslo-are-working-worlds-first-wireless-fast-charging-infrastructure-taxis)

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3. The process supporting innovation

Coordinated by the Innovation Manager of GreenCharge, the innovation management process is a continuous process which involves looking "outside in" as well as "inside out". A dedicated session at each GreenCharge plenary meeting will be held on Innovation Management, though as these occur at a less frequent rate than at which innovation occurs within and outside the project, this will be supplemented by more regular internal mechanisms such as emails, telcos and face to face meetings.

3.1. "Outside-in"

During the initial phase of the project, relevant sources of information have been identified, as discussed in Section 3. Table 6 sets out the framework for how this work is envisaged to continue for the remainder of the project.

Table 6: Activities relating to collecting innovation knowledge from outside Greencharge

Activity	Responsible Person	Frequency	Reporting
Research new innovation in the public domain	Innovation Manager	Quarterly	Newsletters. Direct to Work Package leaders via email link to an internal log/spreadsheet for a response within two weeks. Ranking of significance and applicability for wider uptake during bi-annual plenary meetings.
Research new EU-funded projects on electric mobility	Innovation Manager	Quarterly	Links added to GreenCharge website. Direct to Work Package leaders via email link to an internal log/spreadsheet for a response within two weeks.
Physical meetings with priority projects	Innovation Manager and/or Coordinator and/or Technical Manager (and partners, where relevant)	At least twice per year	Email update to Work Package leaders. Briefing at plenary meetings.
Attendance at conferences	Innovation Manager and/or Coordinator and/or Technical Manager (and partners, where relevant)	At least twice per year (but in line with D8.1 and D8.2 which cover communications, dissemination and exploitation)	Note of interactions and workshops emailed to Work Package leaders.

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Activity	Responsible Person	Frequency	Reporting
Industry knowledge and day to day working	All partners	Ongoing (at least once per month)	Partners will use the GreenCharge "postbox" (or email) to send matters they find during their day to day life working in the field for the Innovation Manager to consider.
Consultation with Uptake Cities	Innovation Manager and Work Package 7 Leader	At least bi-monthly	Responses from Uptake Cities and short summaries.

One related project will be featured in each of the GreenCharge newsletters (Figure 3-1). The GreenCharge website has a dedicated page for the newsletters which features the project's innovation news and updates at https://www.greencharge2020.eu/newsletters/. The website will be updated with links to related projects, and this will be updated on a quarterly basis as the Innovation Manager becomes aware of new opportunities to foster collective innovation.

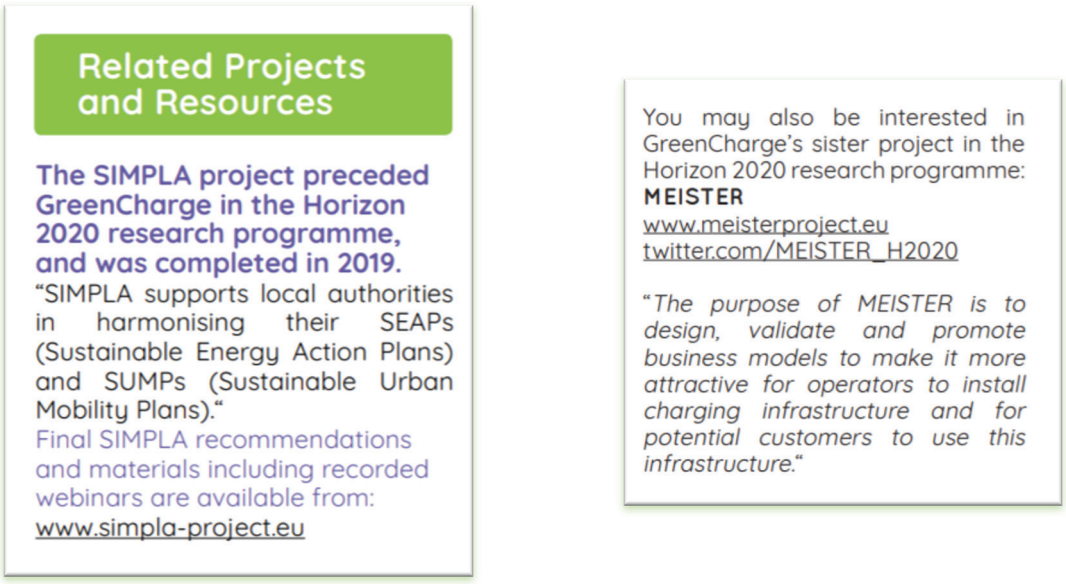

Figure 3-1: Related projects as featured in the first two GreenCharge newsletters

3.2. "Inside-Out"

In reality, the transfer of knowledge often involves an exchange, and many of the "Outside-in" activities will also be opportunities for "Inside-out" knowledge transfer, particularly interactive events like face to face meetings and conferences. Some additional opportunities for knowledge transfer outside of the project specific to innovation are in Table 7 below. This should be cross-referenced with deliverables in Work Package 8 for wider communications and exploitation activities, and collaboration with this work package will be ongoing.

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Table 7: Activities relating to collecting innovation knowledge inside GreenCharge

Activity	Responsible Person	Frequency	Reporting
Interviews with Work Package leaders identifying new innovations within GreenCharge that could be relevant to the outside world	Innovation Manager and WP leaders	At least every three months (or at significant project development milestones) including interviews for GreenCharge newsletter frontispieces	Internally via existing meetings and telcos. Externally via Newsletters and GreenCharge deliverables, and other means as agreed (e.g. social media, news story on GreenCharge/CIVITAS/other websites, dedicated workshop or conference presentation).
Monitoring of where GreenCharge can contribute to wider European policy and practice	Innovation Manager	Ongoing (at least once a month)	Evidenced through contribution to external publications, news items, conference presentations etc.
Publishing GreenCharge knowledge	GreenCharge partners	Regularly according to GreenCharge Milestones and Deliverables schedule, and communications and exploitation plans (D8.1, 8.2, 8.3)	Evidenced through inclusion in deliverables, scientific papers, conference presentations etc.

3.2.1. Examples of Inside-Out Activities to Date

In terms of wider mobility projects, the Innovation Manager was responsible for reviewing the content of the 2nd Edition of the Sustainable Urban Mobility Planning guidance (created through the SUMPs-Up project, coordinated by GreenCharge partner ICLEI) including the "*Electrification*" Topic Guide[5], and links to GreenCharge and renewable energy were introduced within the guidance (Figure 3-2) including to the GreenCharge *Electric Mobility in SUMP* brochure (2019). The Innovation Manager, through involvement in WP7, will ensure that cross-links are made to the guidance produced in WP7 as well as the SUMP knowledge base proposed through the Meister project[6].

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Figure 3-2: SUMP Electrification Topic Guide, with references to GreenCharge and renewables content introduced by the GreenCharge Innovation Manager

GreenCharge partner the University of Campagnia has also organised an upcoming Smart and Sustainable Mobility Conference scheduled for April 2020, at which a number of GreenCharge and external experts on the topic (including the Innovation Manager) will be presenting. Further information can be found at: https://www.greencharge2020.eu/event/ssum-2020/.

GreenCharge events are also an opportunity for the project to present itself to the outside world. There are various mechanisms including:

- **Reference Groups** in each pilot city
- **Open Days** at selected plenary meetings
- **Uptake Cities** visits, where each pilot city showcases its GreenCharge demonstrations and supporting mobility initiatives in the city, and a report is produced giving further insight specifically directed at the needs and questions from Uptake Cities as to how electric mobility techniques and innovations can be transferred effectively

3.3. Use of the Uptake Cities Group

The Uptake Cities Group exists both to provide insights into the project but in exchange to learn from GreenCharge. A survey was undertaken at the inception of the project for the Uptake Cities to give their views on the areas of the project most of interest. The results of this (an example is shown in Figure 3-3) will be borne in mind when selecting the priority areas to share with them and others. Priority areas include:

- Sustainable Urban Mobility Planning
- City centre contexts
- Enforcement of time spent at charging stations, booking and priority access

The research leading to these results has received funding from Horizon 2020, the European Union's Framework Programme for Research and Innovation (H2020) under grant agreement n° 769016.

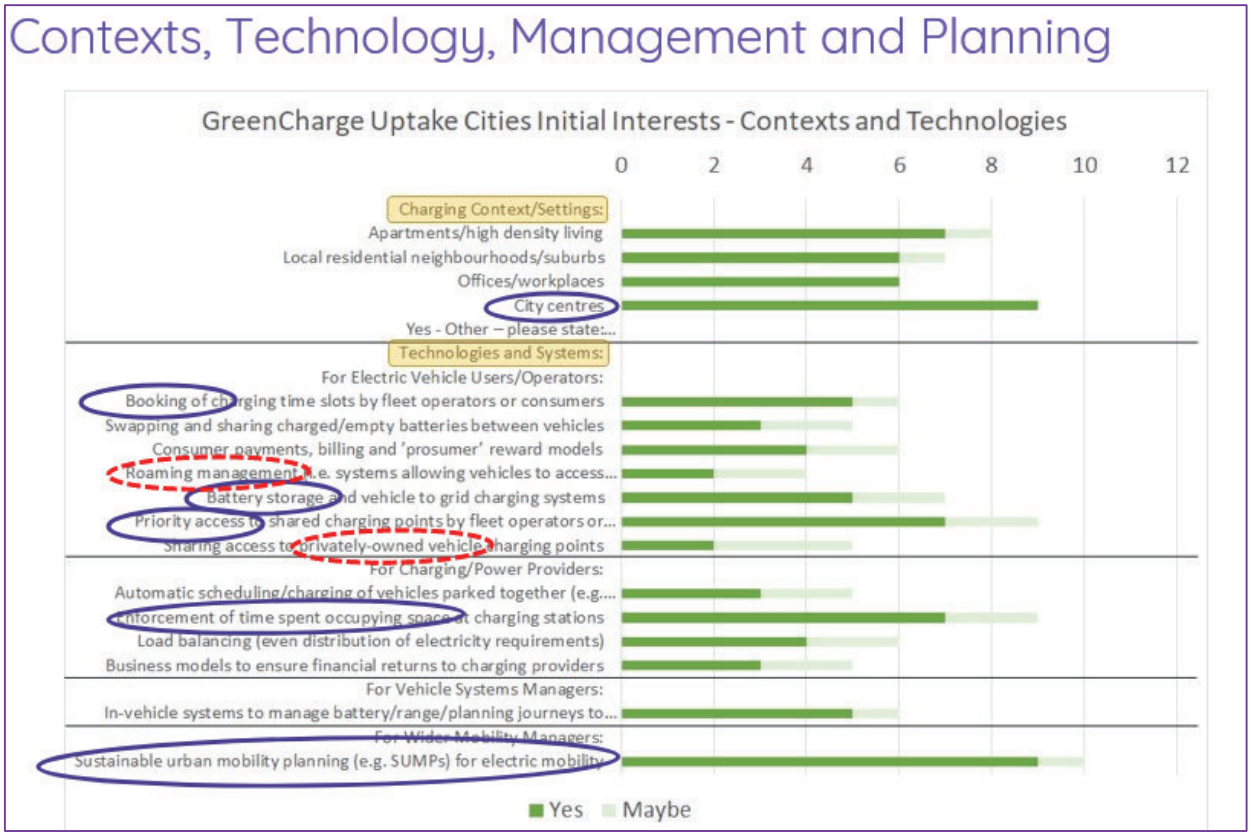

Figure 3-3: Input from Uptake Cities on their priority areas of interest in the GreenCharge project (Source: GreenCharge survey undertaken as part of Work Package 7)

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3.4. Structure of the Data Collection for Innovation Management

An innovation data collection tool for information from the outside world has been piloted on GreenCharge's internal SharePoint system for the collection and registration of innovation information and ideas. Partly due to the user-friendliness of the SharePoint system, this is now being replaced by a more user-friendly JotForm system which has successfully been used for the collection of data from project partners in other projects (such as SUMPs-Up and Handshake). This link is available from the innovation page of the project website (www.greencharge2020.eu/innovation). A benefit is that innovation can also be collected from external parties, including Uptake Cities, members of Reference Groups, related projects and even outside innovators and entrepreneurs who wish to share their news and ideas with the project.

Data collected is summarised and communicated within the project and externally, as indicated in the sections above, which includes review by the Innovation Manager and relevant partners involved in the topics such as technology, business models, and SUMP.

Fields used in the data collection include the following:

- Title
- Short description
- Submitted by (name, email, organisation)
- Area of significance (charging, energy, vehicles, SUMP, other)
- Source with link (e.g. article, website, newsletter, publication, internal GreenCharge, others)
- Of special interest to which Work Package(s)

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4. Identification and Management of Intellectual Property (IP)

It is acknowledged that GreenCharge will develop innovations, in terms of technology or processes, from the investment in partner activity partially funded by GreenCharge ("foreground knowledge"), supplemented by the knowledge and expertise brought by partners' experience and related activities that are encouraged to be brought into GreenCharge from outside of the project ("background knowledge"). As an innovation project, GreenCharge also relies on partners and stakeholders outside of the project to facilitate test demonstrations bringing in additional resources and goodwill.

Therefore, as significant investment in time and resource use occurs, it is necessary to bring clarity as to which results arising from the project, or background brought to the project and necessary for exploitation of its results, may deserve additional recognition and/or protection, and how this is shared across the project and its partners. In line with the ethos of the Horizon 2020 programme, however, the first principle should be on supporting widespread replication rather than solely maximising the profitability from individual innovations in terms of commercial exploitation or private interest. It is hoped, however, for the success of products, that the two are mutually compatible.

In order to manage the process in such a way as to maximise innovation potential, it is necessary to have procedures in place to:

1. Clearly identify items of intellectual property (background brought to the project as well as foreground developed in the project) that has exploitation potential. "Exploitation" in this context means any form of *use* of the item (commercial or otherwise) outside or after the project.
2. For each identified item of IP: reach agreement on ownership, including - for items that are jointly owned - the percentage ownership share of each owner.
3. For each identified item of IP: The IPR mechanism(s), if any, to be used for protection of the IP.

An assessment of the above was made during development of the proposal, and registered in a table referred to as the *IPR Directory* that was included within the Grant Agreement. One of the tasks of the Innovation Manager is to maintain and develop the IPR Directory as the project proceeds. In the first half of the project (i.e. until the date on which this version of this deliverable was produced), this did not need much attention, as the information originally registered remained valid. However, as technological and other results are now starting to emerge, the consortium needs to review and revise the IPR Directory.

A detailed discussion will be held with partners at the plenary meeting scheduled for Oslo in June 2020, by which time responsibilities for and contributions to development of different parts of the project will be well understood, and the IPR Directory can be updated on that basis. This also coincides with the further development of the Exploitation Strategy in WP8 and a further assessment of the standards against which GreenCharge innovations should perform.

The IPR Directory will be stored on the GreenCharge internal SharePoint system (confidential), and controlled by the Innovation Manager. It will be updated following dedicated discussion events with partners. In the event of any disagreements amongst partners about the content of the IPR Directory, procedures agreed within the project for decision-making and conflict resolution will be applied.

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5. Future Work

While this deliverable is formally the final deliverable from the Innovation Management task in D1.3, the activities, procedures and tables here described will continue to be followed and maintained until the end of the project. The data collection described in section 3.4 will continue, and its current status can be checked at any time via the link provided on the project website.

If it is considered useful, a revised version of this deliverable can be produced to provide an update on the status of innovation management activities.

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