

Grant number: 769016  
Project duration: Sept 2018 - Feb 2022  
Project Coordinator: Jacqueline Floch, SINTEF

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



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*GreenCharge Project Deliverable: D7.3*

# Lessons Learned from Roadmap Development in Uptake Cities

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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



## 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:

<i>Power to the people!</i>	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.
<i>The delicate balance of power</i>	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.
<i>Getting the financial incentives right</i>	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.
<i>Showing how it works in practice</i>	GreenCharge is testing all of these innovations in practical trials in Barcelona, Bremen and Oslo. Together, these trials cover a wide variety of factors: <i>vehicle type</i> (scooters, cars, buses), <i>ownership model</i> (private, shared individual use, public transport), <i>charging locations</i> (private residences, workplaces, public spaces, transport hubs), <i>energy management</i> (using solar power, load balancing at one charging station or within a neighbourhood, battery swapping), and <i>charging support</i> (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.

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## Executive Summary

The GreenCharge Deliverable 7.3 - Lessons Learned from Roadmap Development in Uptake Cities - sets out the process by which a group of European cities has been engaged in GreenCharge and coached in how to develop strategies regarding electric mobility.

The GreenCharge Uptake cities were a group of European cities learning from the three GreenCharge pilots through site visits, webinars and further exchanges with each other and the project partners, in particular ICLEI and the City of Bremen. The final result of this work was the development of a roadmap for each city, outlining the development of e-mobility and their plans for the near and long-term future.

The roadmap process was inspired by various existing examples from other projects, including a definition by the EU. In its essence, a roadmap is a strategic plan that defines how a desired future scenario can be achieved over a specific timeframe and within a particular area, such as an urban context. Key to these roadmaps is that they present complex and interrelated information in a single image, and support strategic communication both within local authorities and with the public.

To support the Uptake Cities in their understanding of e-mobility and how to develop strategies, five webinars were organised. These webinars were conducted as a small group information exchange exercise in a closed environment to allow free exchange of questions and ideas on detailed topics relevant to each city. The webinars were moderated by ICLEI, and involved a mixture of internal GreenCharge speakers and invited representatives from external projects and suppliers. Topics covered included the roadmap development process, kerbside parking management, business models, and lessons learnt from the roadmap process.

In addition to the webinars, three site visits – to each of the three GreenCharge pilots – were organised. The aim was to give the Uptake Cities a better understanding of the project and present them with real best practice examples in different European locations. A physical meeting was arranged in Bremen, and online meetings were arranged in Oslo and Barcelona (due to COVID restrictions on travel and meetings). Video footage and material was compiled from the pilot sites in advance to support the online meetings, to give as far of an immersive experience as possible. Each visit included interactive sessions with many opportunities for questions, answers and discussions between the GreenCharge project team and the Uptake Cities.

In order to support the Uptake Cities further, and in between webinars and site visits, further group and 1:1 communications with city representatives was organised.

Uptake Cities were asked for their feedback throughout the programme and at the final webinar. It showed the learning programme was appreciated and that their appetite for meeting the challenges of the transition to e-mobility in their own cities remains. This gives further emphasis to the fact that, although GreenCharge is ending, the learning needs continue to develop as cities advance in the implementation of their e-mobility strategies in the coming years, all from different points in the overall transition.

The work with the Uptake Cities was very successful and led to different and detailed roadmaps that now enable these cities to better plan for their own e-mobility futures. Key lessons learnt from the work with these cities include that planning teams have a limited interaction with the technological component of e-mobility, that tensions with developing traditional sustainable transport choices remain, that the development of roadmaps led to more cross-departmental engagement and communication, and that fuels and energy for e-mobility is still a fairly new topic for transport planners.



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## 1 About this Deliverable

### 1.1 Why would I want to read this deliverable?

This document sets out the process by which a group of European cities has been engaged in GreenCharge and coached in how to develop strategies regarding electric mobility. The output of this work includes a series of roadmaps produced by and tailored to the needs of each Uptake City, which provides direction for these cities as well as providing inspiration to other cities developing and communicating their future electric mobility intentions. This document summarises the interests of local authorities in electric mobility within a sustainable urban mobility planning context and the feedback and lessons taken from this process.

### 1.2 Intended readership/users

The document will be useful for both technology providers and policy makers in becoming informed and being realistic in how electric mobility solutions and services contribute to sustainable mobility in cities. It will be circulated within the CIVITAS community including other projects working on electric mobility and the cities engaged in them.

### 1.3 Structure

This document is structured around the process of defining and creating a roadmap by the GreenCharge Uptake Cities Group.

- Section 2 – introduces who the Uptake Cities are;
- Section 3 – explains what a roadmap is;
- Section 4 – explains how the work on the roadmaps was supported by GreenCharge;
- Section 5 – summarises the approaches followed and the current results/roadmaps;
- Section 6 – feedback and lessons from the Uptake Cities;
- Section 7 – conclusions of working with Uptake Cities on e-mobility.

### 1.4 Other project deliverables that may be of interest

This deliverable is part of a suite of outputs from a wider Work Package (7) on Sustainable Urban Mobility Planning in GreenCharge. Therefore, Deliverables 7.1, 7.2 and 7.4 - which all support the development of electric mobility in a SUMP context – should be of interest. Deliverable 8.5 (Viable Business and Replication Plans) provides a summary of business models that could be viably replicated in cities

### 1.5 Other projects and initiatives

GreenCharge has liaised with a number of related projects and these have been included within the learning programme for the Uptake Cities. This includes MEISTER, PARK4SUMP, and USER-CHI, representatives of which have supported and participated in events reported in this deliverable. Uptake Cities have also been made aware of resources provided by further projects such as SUMP-UP (e.g. the SUMP 2.0 guidance documents) and materials available through the wider CIVITAS programme and platform more generally.



## 2 Who are the GreenCharge Uptake Cities?

The Uptake Cities consist of nine cities who work with GreenCharge, share its vision, and have an interest in its outcome, but are not partners in the project. During the course of GreenCharge, Uptake Cities are committed to:

- *contribute with **user needs and feedback** from a variety of urban contexts across Europe,*
- *act as a first group of **potential replicators** of the solutions developed in GreenCharge,*
- *provide input for innovation management to ensure that the project stays up to date with **market reality and policy changes**.*

The GreenCharge Uptake Cities consisted of:

1. San Sebastian
2. Burgas
3. Budapest
4. Krakow
5. Porto
6. Stockholm
7. Thessaloniki
8. Edinburgh
9. Zagreb

The Uptake Cities provided a letter of support during the proposal writing stage for GreenCharge, and further demonstrated their commitment through a Letter of Involvement at the formal start of the project. Uptake Cities agreed to:

- Participate in five **webinars** hosted by ICLEI across the three years of the project to assist with the development of the roadmap,
- Attend three **study visits** in total to each of the pilot project locations: Barcelona, Oslo, Bremen (funded by GreenCharge),
- Develop a **roadmap** focused on electric mobility using the learning from GreenCharge to support your overall mobility planning,
- Provide **feedback** to ICLEI on their participation in the project for the duration of the project.

This Deliverable supports the successful completion of this programme.



### 3 What is a “Roadmap”?

Roadmaps can take different forms. In the opinion of GreenCharge, a roadmap can be described as follows:

- Roadmap is a **strategic plan** that defines how a desired future scenario can be achieved over a specific timeframe and within a particular area, such as an urban context,
- Roadmaps present complex and interrelated information in a **single image**, and support strategic communication both within local authorities and with the public,
- A vision provides a foundation for a roadmap, not only does it describe a desirable future, but in doing so, it provides a **direction to move towards**,
- Once a roadmap is developed, it should be **revisited periodically** to monitor progress and adjust it to a potentially evolved landscape.

The *EIT Climate-KIC* provides a template roadmap canvas, and envisages a number of sociotechnical elements can be considered within the scope of a roadmap (as indicated in Figure 1).

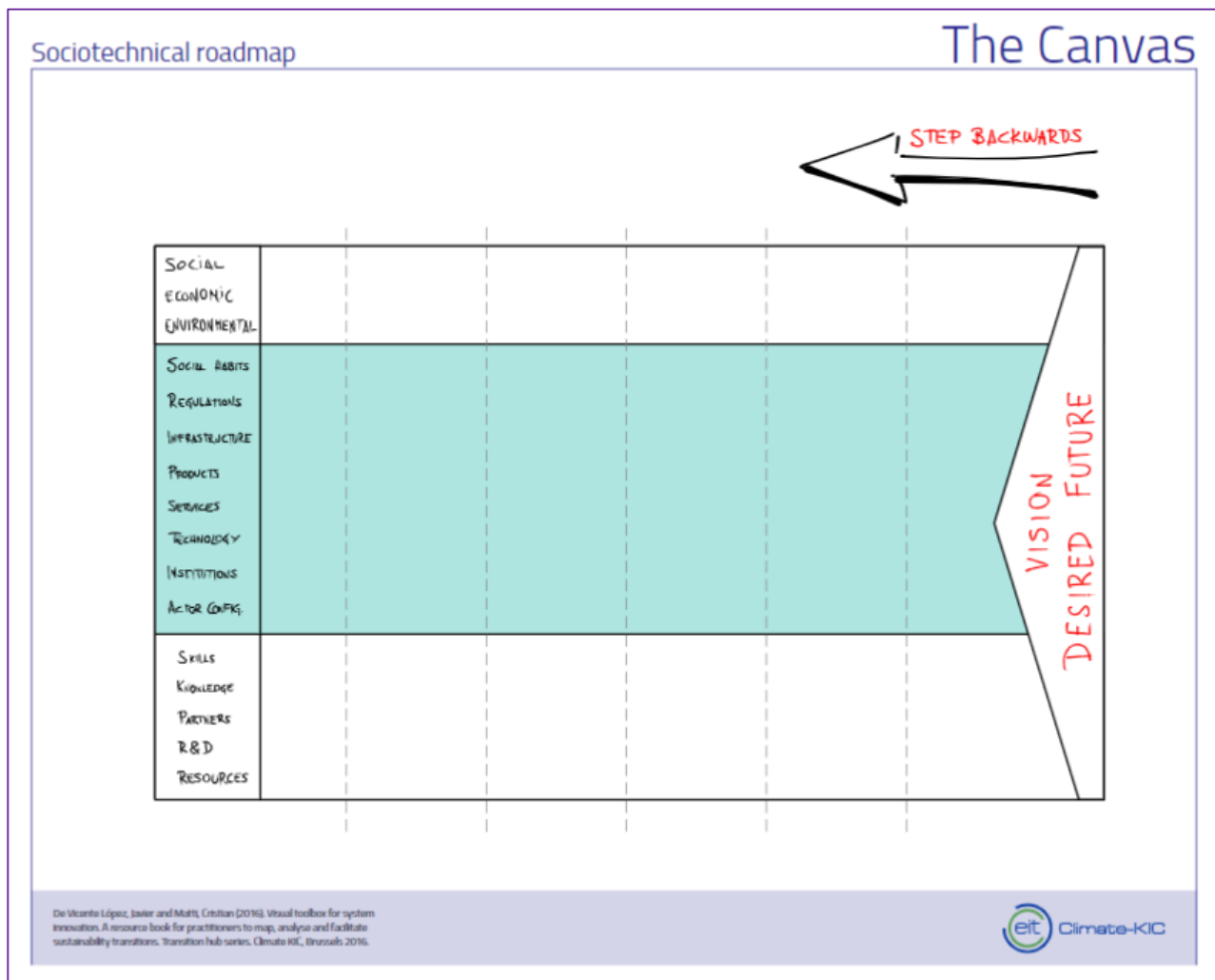


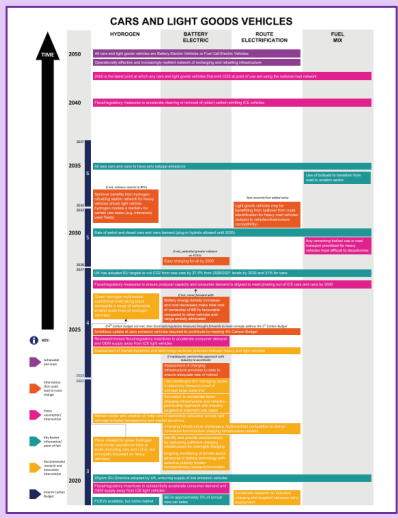
Figure 1: Sociotechnical roadmap template. Source: EIT Climate-KIC

#### 3.1 Further examples of Roadmaps

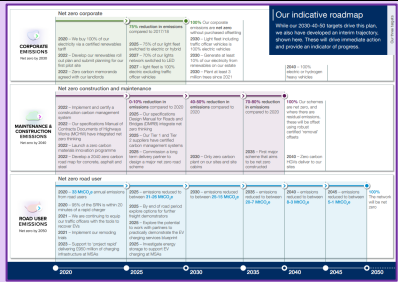
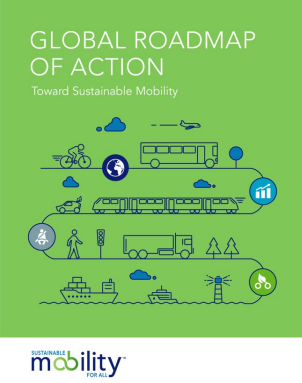
The GreenCharge approach has been informed by roadmap examples, taking best practice to ensure brevity and graphical approaches are favoured to support immediate understanding of cities’ direction of travel for e-mobility. Applications of roadmaps to the field of mobility are exemplified in Table 1 and Appendix A.2.



**Table 1: Examples of roadmaps in the sustainability and mobility sectors**

Example	Aims	Links
<p><b>Road transport</b></p> <ol style="list-style-type: none"> <li>Promote a +400 kilometres range for electric passenger cars</li> <li>Progress and demonstration in urban bus electrification</li> <li>Public and commercial procurement of electric vehicles</li> <li>Certification of electric vehicles performance</li> <li>Development of small and light smart electric vehicles</li> <li>Support local production of batteries, components and electric vehicles</li> <li>Further development of small and light smart electric vehicles</li> <li>Demonstration of electrified road systems for heavy duty vehicles</li> <li>Develop electro-chemical systems for future high-density electric batteries</li> </ol>	<p><b>Strategic Transport Research and Innovation Agenda (STRIA) Roadmap for Transport Electrification</b></p> <p><i>Aims to bring forward, the developments carried out in the the European Green Vehicles Initiative. The Roadmap sets out key priority R&amp;I actions for electric mobility in each transport mode until 2050.</i></p>	<p><a href="https://publications.jrc.ec.europa.eu/repository/handle/JRC109304">https://publications.jrc.ec.europa.eu/repository/handle/JRC109304</a></p>
	<p><b>100% Renewables Cities and Regions Roadmap</b></p> <p><i>Provide guidance for local and regional governments around the globe on how to define a 100% renewable energy roadmap, by making available methodologies, tools and other resources</i></p>	<p><a href="https://renewablesroadmap.iclel.org/">https://renewablesroadmap.iclel.org/</a></p>
	<p><b>Decarbonising UK transport: technology roadmaps</b></p> <p><i>Review of the technology, trialling and deployment needed for a 2050 net zero carbon UK transport system and used to create the UK transport decarbonisation plan.</i></p> <p><i>This plan sets out the UK government's commitments and the actions needed to decarbonise the entire transport system in the UK.</i></p>	<p><a href="https://www.gov.uk/government/publications/decarbonising-uk-transport-technology-roadmaps">https://www.gov.uk/government/publications/decarbonising-uk-transport-technology-roadmaps</a></p> <p><a href="https://www.gov.uk/government/publications/transport-decarbonisation-plan">https://www.gov.uk/government/publications/transport-decarbonisation-plan</a></p>



Example	Aims	Links
	<b>Highways England Net zero highways 2030 / 2040 / 2050 plan</b>  <i>An interim trajectory to drive immediate action and provide an indicator of progress.</i>	<a href="https://nationalhighways.co.uk/netzerohighways/#roadmap">https://nationalhighways.co.uk/netzerohighways/#roadmap</a>
	<b>Global Roadmap of Action Toward Sustainable Mobility</b>  <i>The GRA is a tool that aims to enable any country in the world to measure how far it is from achieving its sustainable mobility ambition, explore more than 180 policy measures that have been tested around the world, and prioritize those that are most impactful and lay out a path forward.</i>	<a href="https://www.sum4all.org/global-roadmap-action">https://www.sum4all.org/global-roadmap-action</a>

Indeed, roadmaps (sometimes also called routemaps) form part of the EU’s strategy development process, and such a summary was put forward as part of the development of the EU’s New Urban Mobility Framework ([https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12916-Sustainable-transport-new-urban-mobility-framework\\_en](https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12916-Sustainable-transport-new-urban-mobility-framework_en); and <https://www.eltis.org/in-brief/news/new-eu-urban-mobility-framework-roadmap-published>).

*“Roadmaps aim to inform citizens and stakeholders about the Commission's work in order to allow them to provide feedback and to participate effectively in future consultation activities. Citizens and stakeholders are in particular invited to provide views on the Commission's understanding of the problem and possible solutions and to make available any relevant information that they may have.”*

In this context, the roadmap stated,

*“The mobility patterns in EU cities are changing, affected by technological, socio-demographic, cultural and environmental factors. ... These problems will continue to be addressed but in often piecemeal and divergent ways at local, regional and national levels. ... This initiative aims to create an enabling EU framework for Member States, regions and cities to develop safe, accessible, inclusive, smart, resilient and zero-emission urban mobility to achieve EU climate and transport policy objectives and targets...”*

### 3.2 Status of Roadmaps in Uptake Cities

The Uptake Cities were asked via interviews during the project (see further in Section 5) to update the project on the status of their wider strategies for mobility and e-mobility. Table 2 summarises the then current status of e-mobility plans. It should be noted that the content of the plans varies between cities and even cities with recent plans in place still see further scope for the additional development of details, such as the geographic locations of deployment, timing, coordination, and funding.



**Table 2: Perception of status of electric vehicle strategies in Uptake Cities. Source: GreenCharge interviews with city representatives**

Stage of Electric Vehicle Strategy/Action Plan	Example Cities
Under redevelopment/renewal	<ul style="list-style-type: none"> <li>Budapest</li> <li>Thessaloniki (mixed status dependent on municipality)</li> </ul>
Existing/current	<ul style="list-style-type: none"> <li>Edinburgh</li> <li>Krakow</li> </ul>
Integrated as part of SUMP	<ul style="list-style-type: none"> <li>Porto (proposed)</li> <li>San Sebastian</li> <li>Stockholm (supported by an “Electrification Pact”)</li> <li>Zagreb</li> </ul>

### 3.3 Related Work and Guidance

As reflected in GreenCharge Deliverable 7.2, a number of guidance documents have emerged during the course of GreenCharge. These have been communicated to Uptake Cities at events and via email. The most prominent examples, aimed at helping local authorities in the process of adopting a roadmap (or action plan) are included in Table 3 below. GreenCharge was part of the review team for the SUMP-Up Electrification Topic Guide.

**Table 3: Examples of relevant external publications on SUMP in e-mobility issued and shared with Uptake Cities during the course of the GreenCharge project**

Publication title	Date	Content of interest to roadmap development	Author/source
<b>Topic Guide: Electrification. Planning for electric road transport in the SUMP context</b>	2019	<i>8 principles relating to electrification and supporting policy measures</i>	SUMP-Up <a href="https://www.eltis.org/mobility-plans/topic-guides#faq-Electrification:-Planning-for-electric-road-transport-in-the-SUMP-context">https://www.eltis.org/mobility-plans/topic-guides#faq-Electrification:-Planning-for-electric-road-transport-in-the-SUMP-context</a>
<b>Topic Guide: Harmonisation of Energy and Sustainable Urban Mobility Planning</b>	2019	<i>Focussing on coordinating Sustainable Energy and Climate Action Plans (SECAPs) with Sustainable Urban Mobility Plans (SUMP) including processes and template</i>	SUMP-Up <a href="https://www.eltis.org/mobility-plans/topic-guides#faq-Harmonisation-of-Energy-and-Sustainable-Urban-Mobility-Planning">https://www.eltis.org/mobility-plans/topic-guides#faq-Harmonisation-of-Energy-and-Sustainable-Urban-Mobility-Planning</a>
<b>Sustainable Electric Mobility: Building Blocks and Policy Recommendations</b>	2021	<i>7 building blocks and policy recommendations aimed at a worldwide audience</i>	SUM4ALL <a href="https://www.sum4all.org/data/files/buildingblocksandpolicyrecommendations_english.pdf">https://www.sum4all.org/data/files/buildingblocksandpolicyrecommendations_english.pdf</a>



Publication title	Date	Content of interest to roadmap development	Author/source
<b>Solution Booklet: Electric Vehicles and the Grid</b>	2020	<i>Lessons learnt, barriers and pilot projects</i>	SCIS Smart Cities Information System <a href="https://smart-cities-marketplace.ec.europa.eu/insights/solutions/solution-booklet-electric-vehicles-grid">https://smart-cities-marketplace.ec.europa.eu/insights/solutions/solution-booklet-electric-vehicles-grid</a>



## 4 Summary of Coaching Methods

This chapter describes how the group of Uptake Cities has received the following:

- first-hand knowledge about the project, through **on-site and online discussions** with the GreenCharge cities with (virtual) **study visits** to the 3 pilot sites,
- a dedicated **distance coaching programme** for the preparation of roadmaps for integration of GreenCharge eMobility solutions in their SUMP, including **5 webinars**.

The feedback and learning from this process has been documented in Section 6.

### 4.1 Webinars

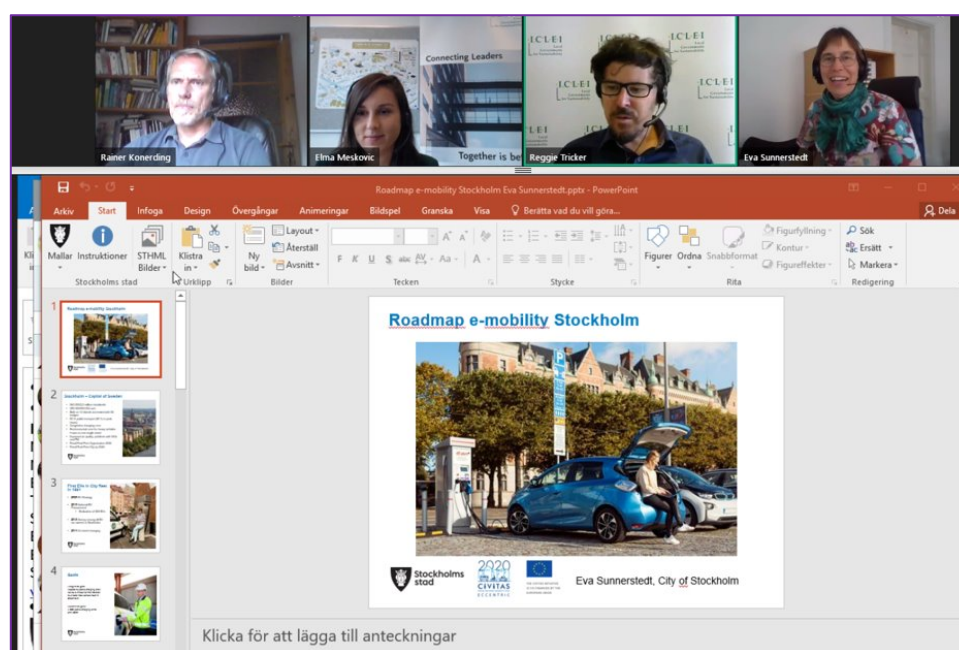
Table 4 sets out the subject matter and expert speakers for each of the internal webinars on the project programme. These webinars were conducted as a small group information exchange exercise in a closed environment to allow free exchange of questions and ideas on detailed topics relevant to each city. For wider dissemination, a short summary report has been produced on key webinars. Evidence through presentations and individual reports of these sessions can be found in the Annexes. The webinars (e.g. Figure 2) were moderated by ICLEI, and involved a mixture of internal GreenCharge speakers and invited external projects (including from related CIVITAS projects and other relevant cities).

**Table 4: Schedule of webinars organised for Uptake Cities during the course of the GreenCharge project**

Topics	Date	Key speakers and presentations. Moderator: ICLEI
<b>1. This is GreenCharge: An Introduction to GreenCharge and Your Uptake Cities Programme</b> (see Appendix A.1)	12 September 2019	<ul style="list-style-type: none"> <li>• Joe Gorman, SINTEF (GreenCharge) - <b>Introduction to the GreenCharge Project</b></li> <li>• Arno Schoevaars, PNO (GreenCharge) - <b>Overview of Business Models Activities</b></li> <li>• Reggie Tricker, ICLEI (GreenCharge) - <b>Recap of Uptakes Cities Group first visit to Bremen in October</b></li> </ul>
<b>2. Roadmap to e-mobility: An introduction into roadmap development for charging infrastructures</b> (see Appendix A.2)	4 June 2020	<ul style="list-style-type: none"> <li>• Elma Meskovic, ICLEI Europe (GreenCharge) - <b>Value and key components of a roadmap</b></li> <li>• Rainer Konerding, City of Hannover - <b>Hannover's Emobility Action Plan</b></li> <li>• Eva Sunnerstedt, City of Stockholm (Meister) - <b>Roadmap e-mobility Stockholm</b></li> <li>• Patricia Bellver Munoz, GRUPOETRA (Meister) - <b>MEISTER Project Overview</b></li> <li>• Diana Galperin, US Environmental Protection Agency (EPA) - <b>discussion on comparisons to USA</b></li> </ul>
<b>3. Kerbside Parking Management for Electric Mobility</b> (see Appendix A.3)	24 March 2021	<ul style="list-style-type: none"> <li>• Beate Lange, City of Bremen (GreenCharge) - <b>Bremen's challenges: Charging in public streetspace</b></li> <li>• Paal Mork, City of Oslo (GreenCharge) - <b>This town ain't big enough for the two of us -</b></li> <li>• Martina Hertel, Difu (Park4SUMP) - <b>Management of parking and considerations for electric mobility</b></li> </ul>
<b>4. Business Models</b> (see Appendix A.4)	14 September 2021	<ul style="list-style-type: none"> <li>• Beate Lange, City of Bremen (GreenCharge) - <b>Roll-out charging infrastructure: The German Way</b></li> <li>• Reggie Tricker, ICLEI (GreenCharge) - <b>How do uptake cities compare to the wider status of business models?</b></li> </ul>



Topics	Date	Key speakers and presentations. Moderator: ICLEI
		<ul style="list-style-type: none"> <li>Carlo Vaghi, FIT Consulting (USER-CHI) - <b>Business Model approach in USER-CHI</b></li> <li>Bas Bosma, EGEN (GreenCharge) - <b>Business model design – The role of cities</b></li> </ul>
<b>5. Roadmaps Resume and Lessons Learnt</b> (see Appendix A.5)	8 February 2022	<ul style="list-style-type: none"> <li>Steven Murrell (City of Edinburgh Council) - <b>City of Edinburgh e-mobility roadmap</b></li> <li>Paul Fenton (City of Stockholm) - <b>City of Stockholm e-mobility roadmap</b></li> <li>Jasmin Miah, ICLEI Europe (GreenCharge) - <b>Roadmaps Resume and Uptake Cities Feedback</b></li> </ul>



**Figure 2: Example of webinar presentations (during Webinar 2)**

## 4.2 Site Visits

Table 5 sets out the site visits to each of the three pilot sites in GreenCharge (Figure 3), each of which is supported by a more detailed summary report in the Appendices. A physical meeting was arranged in Bremen, and a replacement online meeting has been arranged in Oslo and Barcelona (in response to limitations imposed by the COVID pandemic and related travel interruptions, which delayed both the observable progress in the pilot sites and precluded the effective planning and execution of further study visits). Video footage and material was compiled from the pilot sites in advance to support the online meetings, to give as far of an immersive experience as possible. Each session included interactive sessions with many opportunities for questions, answers and discussions between the GreenCharge project team and the Uptake Cities.





Figure 3: Example of Site Visits

Table 5: Schedule of site visits organised for Uptake Cities during the course of the GreenCharge project

Location of Pilot Site Visit	Date	Key speakers/activities. Facilitator: ICLEI and host city.
<b>A. Bremen</b> (see Appendix A.6)	10-11 October 2019	<ul style="list-style-type: none"> <li><b>Welcome to GreenCharge to Uptake Cities</b> (Michael Glotz-Richter and Beate Lange, City of Bremen; Joe Gorman, SINTEF; Reggie Tricker, ICLEI).</li> <li><b>Mobility projects and history</b> (Michael Glotz-Richter and Beate Lange, City of Bremen)</li> <li><b>Site Visit 1-</b> Local walking tour of electro-mobility and Sustainable Urban Mobility Planning (SUMP) in Bremen city centre with Bremen city and technical partners. Example stops include mobility points (“mobil.punkt”), ecargo bike manufacturer and a city micro hub for electric cargo bike operation</li> <li><b>Uptake Cities case study presentations</b> (Balázs Fejes, Budapest; Iñaki Baro, San Sebastian)</li> <li><b>Site Visit 2</b> – “Cycling City” – Public transport tour of electro-mobility and related SUMP aspects around Bremen. Example stops included cycle infrastructure, car sharing provision, neighbourhood mobility projects, e-charging points.</li> </ul>
<b>B. Oslo (online)</b> (see Appendix A.7)	20 January 2021	<ul style="list-style-type: none"> <li><b>Introduction to Oslo and Røverkollen site</b> (Paal Mork, City of Oslo) (Video)</li> <li><b>GreenCharge demos in Røverkollen, grid capacity, and load balancing</b> (Karen Byskov Lindberg, SINTEF)</li> <li><b>Demonstration of how to charge with the GreenCharge app</b> (Kjetil Hetland, Røverkollen housing association) (Video)</li> <li><b>Smart charging with predictions</b> (Terje Lundby, eSMART)</li> </ul>
<b>C. Barcelona (online)</b> (see Appendix A.5)	8 February 2022	<ul style="list-style-type: none"> <li><b>GreenCharge demos in Barcelona</b> (Regina Enrich Sard, Eurecat (supported by videos featuring MOTIT, Atlantis and the Regional Planning Authority of Barcelona)</li> <li><b>Meet the Supplier: Atlantis</b> (Lluís Freixas i Clavell, Atlantis)</li> </ul>



## 4.3 In-Between Learning Activities

In order to support the Uptake Cities, in between webinars and site visits, group and 1:1 communication with them was organised. This took into account the additional pressures on staffing and resourcing faced by local authorities as a result of the COVID pandemic.

### 4.3.1 Email updates

At appropriate points during the project, email updates were provided to local authorities (e.g. Figure 4; this is shown for illustration purposes, and is not intended to be legible). These highlighted useful learning opportunities both within and outside of GreenCharge, such as from related projects, and important news and publications. Uptake Cities were also invited to subscribe directly to the GreenCharge newsletter.

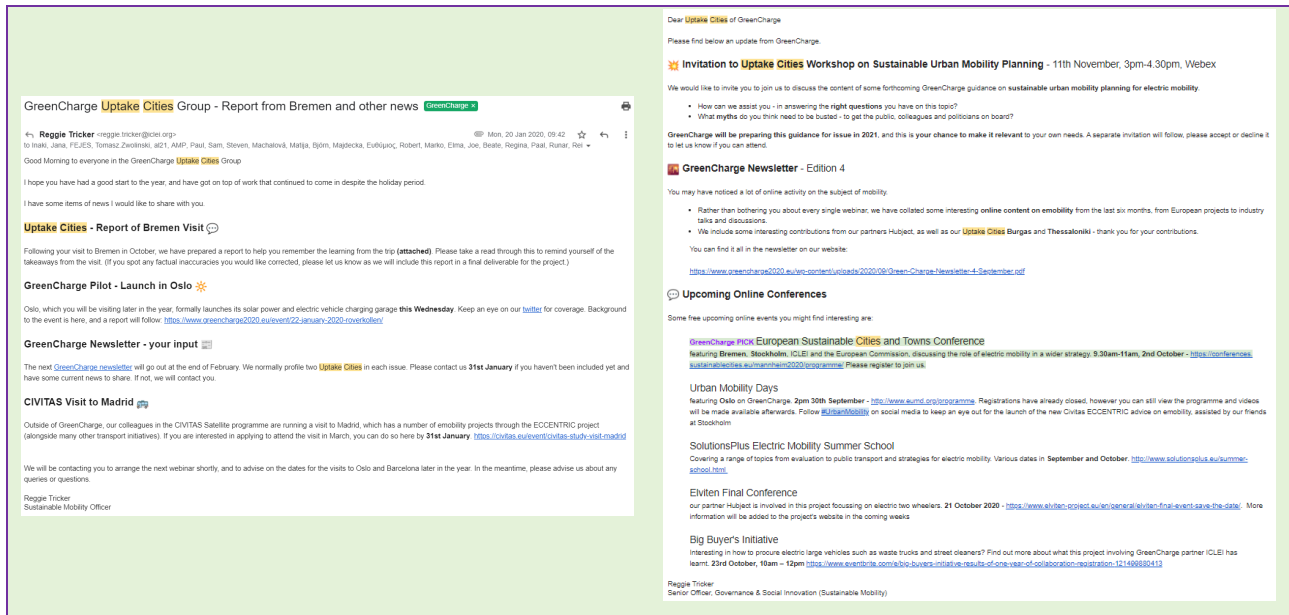


Figure 4: Examples of email updates provided to local authorities

### 4.3.2 1:1 interviews and support

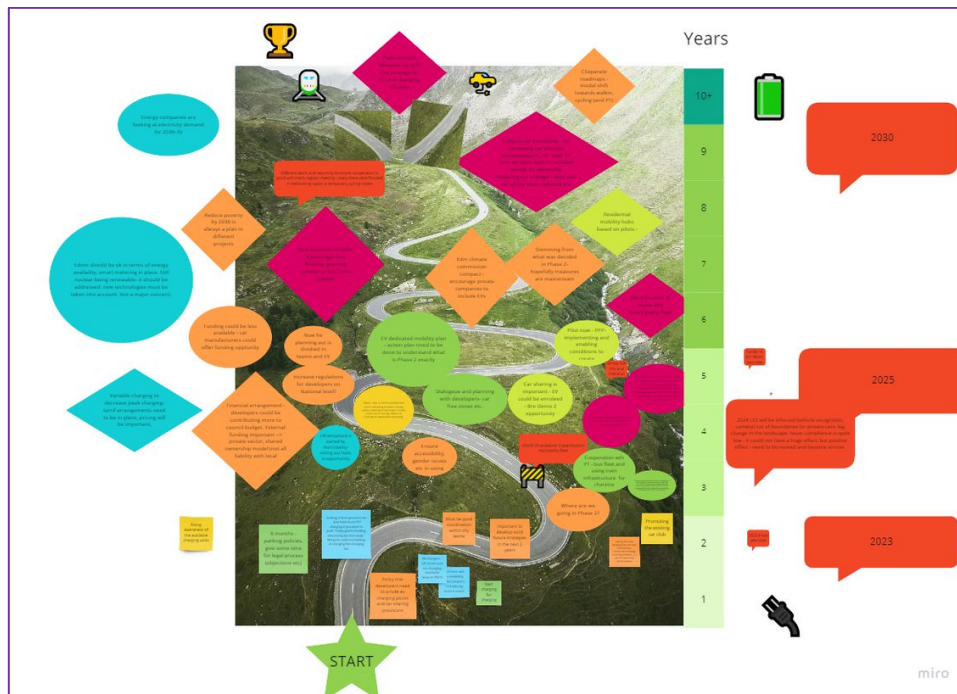
In order to further support the Uptake Cities, and in acknowledgement of the limitations posed by the lack of their ability to meet physically together, a 1:1 meeting was organised with each of the Uptake Cities. These were facilitated by ICLEI, and aimed to cover the following topics:

- **Strategies**
  - What **strategies** currently guide your charging infrastructure planning?
  - Is this a part of a “roadmap”?
  - What has **happened since the start of GreenCharge** compared to what was the EV charging situation like when GreenCharge started in the autumn of 2018?
- **Roadmaps in GreenCharge**
  - What would fit best in terms of evidencing your participation in GreenCharge? Will you be able to develop a **roadmap** in the next 2 months? / Are there any strategy development plans for the next months?
  - What kind of **support** would you need from GreenCharge/ICLEI? What form should this take? When is this needed?
  - What were/are the biggest **hurdles** to developing a roadmap in your city? What is the most helpful? What specific **best practices** do you need? What areas of GreenCharge are most useful for you? What kind of **information** would you like to get in the two remaining webinars and/or site visit?



- With the final **site visit** foreseen for the winter of 2021/22, would you like to/do you think you will be able to travel to Barcelona or would you prefer an online site visit?
- **Summary**
  - In summary, how would you describe the **progress of electric vehicle infrastructure** roll out in your city? SLOW | MEDIUM | FAST
  - In summary, how would you describe the **progress of renewable energy sources** for electric vehicle infrastructure roll out in your city? SLOW | MEDIUM | FAST
  - In summary, how would you describe your judgement over the **level of integration of electric cars with other sustainable modes of transport/electric modes of transport** in broader sustainable urban mobility planning in your city? LOW | MEDIUM | HIGH

In order to support the development of roadmaps, this interview was followed up with further facilitated support by phone, email and online meetings with the Uptake Cities. The City of Edinburgh is a good example of one which took the opportunity for ICLEI to facilitate a roadmap development session between a number of departments within its authority (e.g. Figure 5; this is shown for illustration purposes, and is not intended to be legible); this was the first time that this particular group of internal stakeholders had come together, and it was very much appreciated how GreenCharge could come in independently and objectively and help officers connect across departments.



**Figure 5: Mural created at roadmap development session with City of Edinburgh Council**



## 5 Uptake Cities' Approaches and Roadmaps

Uptake Cities viewed the benefits of having a roadmap to include:

- Bringing together **many past and future initiatives** on one page;
- Addressing activities at **many layers of governance** (multi-municipality/regional/national approaches), as electric mobility planning is often influenced by plans and activities at many levels;
- Assisting **medium term planning** and cross-departmental **coordination**.

Within the broad framework of advice provided to Uptake Cities by GreenCharge, including the specific webinar, examples and 1:1 advice on roadmaps, and in order to increase engagement, local authorities were given freedom to present roadmaps in a way they wished to suit their own local flavour. The results of each local authorities' road-mapping exercise are provided in the sub-sections which follows. These form a solid foundation for further local discussion on each local authority's electric mobility journey, and set a clear and transparent direction that was previously not readily available prior to GreenCharge.



## 5.1 Uptake City Electric Mobility Roadmap: Budapest

Budapest were preparing to refresh their e-mobility strategy across all modes in 2021, which they aimed to include short-medium-and long-term goals, and integrating different forms of mobility. Budapest has 400 charging points and has had different models of payment and patterns of charging at home versus charging on-street. In GreenCharge it is interesting for those managing charging stations; there is a lot of focus on data and several apps in operation.

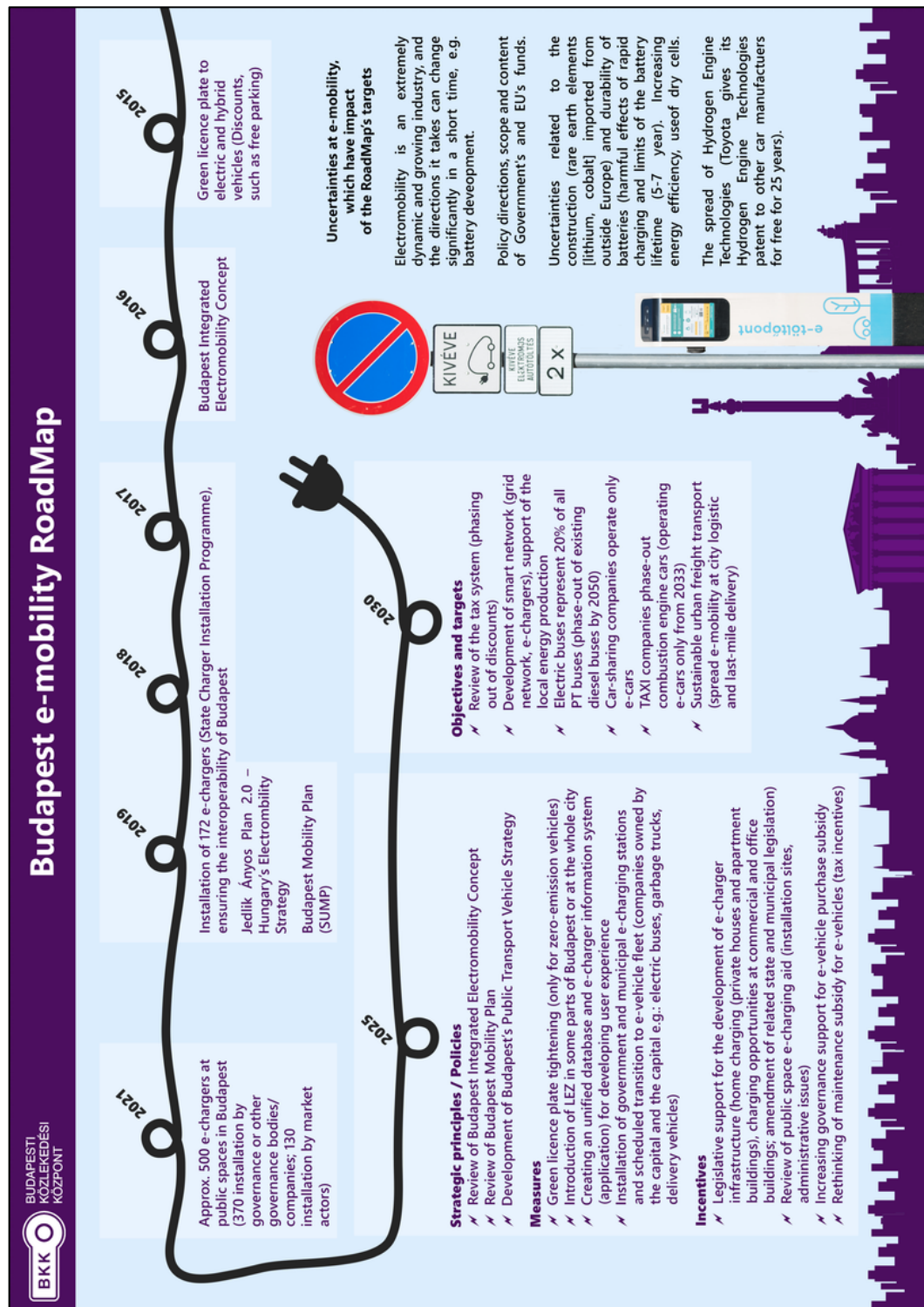


Figure 6: Budapest e-mobility roadmap (BKK, 2021)



## 5.2 Uptake City Electric Mobility Roadmap: Edinburgh

A new mobility plan has been finalised for the city which will be the driving force to introduce action plans. The biggest issue in addition to street chargers will be shared mobility in regard to EVs. Everything was in planning during the development of the roadmap, with 66 charging points to be introduced by March 2022. Responding to personnel/structural changes and coordinating/cooperating across teams was a priority for the city's roadmap. Software is largely covered at a Scotland-wide level, and so local on-street opportunities are where they are focusing, including business models and the public/commercial split between EV charging, as well as enforcement. Best practice examples were also welcome, as they are still at the starting out phase.

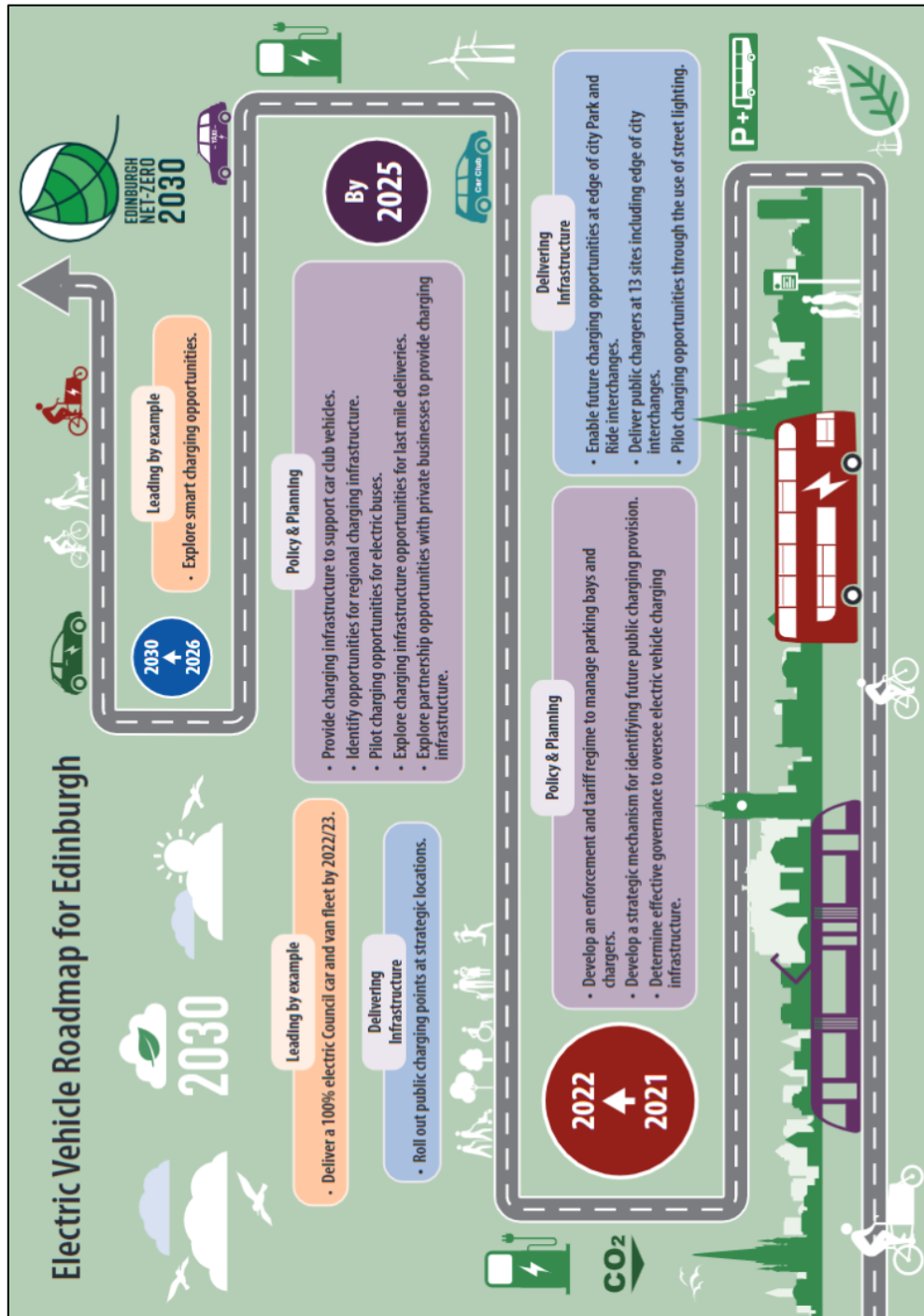


Figure 7: Edinburgh e-mobility roadmap (City of Edinburgh, 2021)



### 5.3 Uptake City Electric Mobility Roadmap: Krakow

A strategy for e-mobility was very fresh (adopted by the council in 2021), with multiple goals including expansion of network of charging stations. A municipal SUMP is being worked on with 14 other municipalities which takes time to coordinate. National law has a strong impact on local e-mobility and fuels strategy. The roadmap would be useful for external communication. In GreenCharge, swapping batteries and business models were of interest, alongside managing energy for charging. Infrastructure specifications are particularly interesting in the context of old town and heritage concerns, reflecting the joint topics of GreenCharge final Informed Cities Forum. Again, sharing best practice examples from a city that is 20 years ahead (maybe also outside of Europe) is helpful so they know what is coming and can potentially pre-empt problems and foresee conflicts.

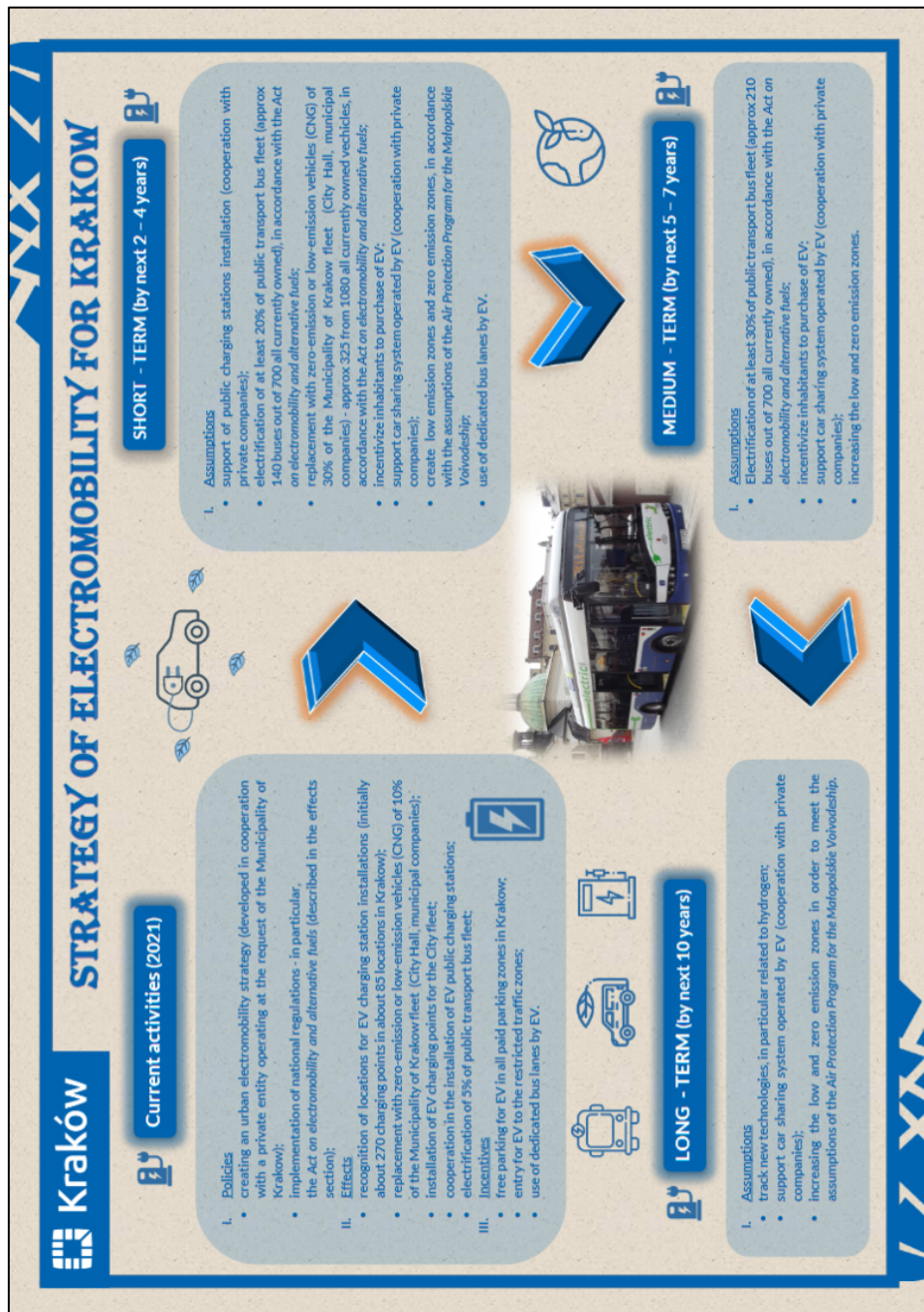
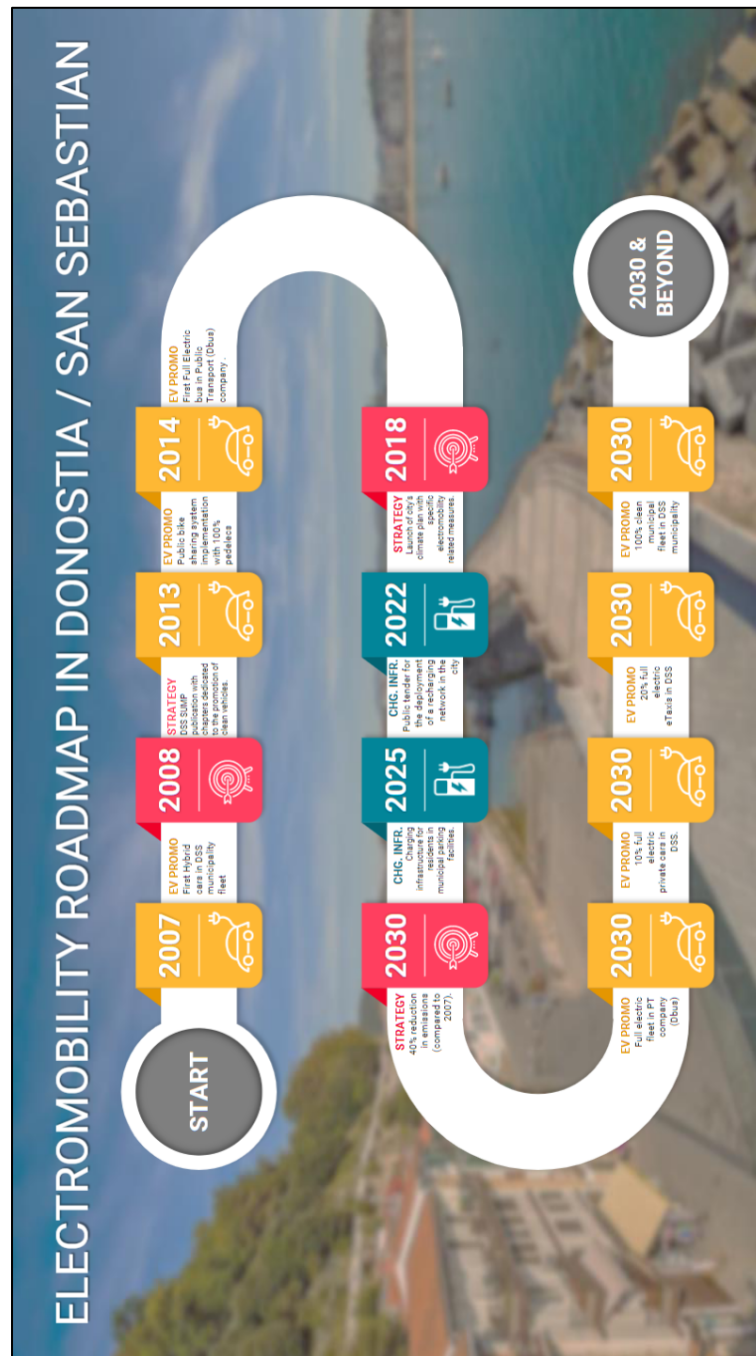


Figure 8: Krakow e-mobility roadmap (City of Krakow, 2021)



## 5.4 Uptake City Electric Mobility Roadmap: San Sebastian

San Sebastian's roadmap was produced in the context of many developments happening since joining GreenCharge. The city's focus is on two main areas: promotion of private EVs, and renewal of the municipal fleet. National rules mean the electric strategy in SUMP is progressively changing. 115 charging points had been implemented by the time of the roadmap development, with the number progressively increasing. The city's priorities include achieving city vitality mixed with charging opportunities. Specific challenges include the management of underground parking facilities for residents – with a requirement for best practice examples. As with other cities, software is outsourced but there is continued interest in wanting carsharing to take off. The overall challenge is how to change people's mindset and the culture regarding private car ownership.



**Figure 9: San Sebastian e-mobility roadmap (City of Donostia/San Sebastian, 2021)**



## 5.5 Uptake City Electric Mobility Roadmap: Stockholm

Stockholm has been involved in other e-mobility projects such as Meister and ECCENTRIC, alongside Greencharge. Its “SUMP” was being revised in 2021, supported by an Electrification Pact with private sector and high level politicians. The e-mobility strategy started in 2009 but sub-parts/action plans have been revised since then. Peak times and grid capacity are an issue for the city. Practical issues surround charging in private villa associations, as an example, such as where to put charging infrastructure and what actually is the best way to determine this. Balancing e-mobility with the city’s other sustainable modes of transport is also a goal in the context of managing and challenging overall car culture.



Figure 10: Stockholm e-mobility roadmap (City of Stockholm, 2021)



## 5.6 Uptake City Electric Mobility Roadmap: Thessaloniki

The transport organisation involved in GreenCharge represents 14 municipalities (a mix of urban and rural). Each municipality must do a plan for EV charging stations, so achieving coordination is a desirable goal. The 2020 electrification law, adopted by the Greek parliament, required Thessaloniki and Athens to align their approach with the new law. The Municipality of Thessaloniki had almost finished its own plan for charging stations, whilst on-street chargers were in planning. Guidance on how to select charging stations, and tackling gaps in knowledge as well as hesitations to embrace e-mobility were among the biggest barriers. Best practice examples need to be adjusted to their early level/context of e-mobility development. Software was less a focus but business models, contracting and tendering processes were important as funding can always be an issue.

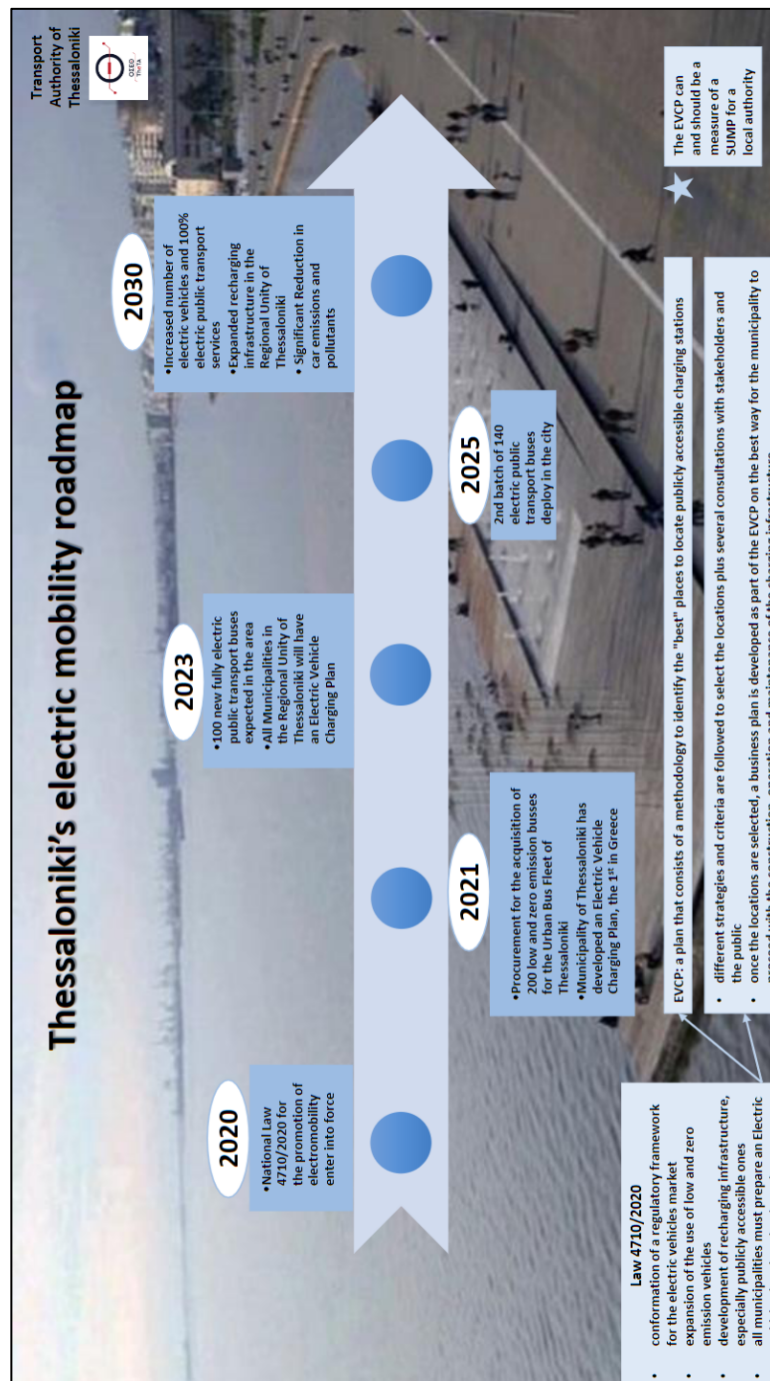


Figure 11: Thessaloniki e-mobility roadmap (Transport Authority of Thessaloniki, 2021)



## 5.7 Uptake City Electric Mobility Roadmap: Zagreb

Zagreb had a strategy on e-mobility as far back as 2013, with a 2019 masterplan for the “three countries” (different parts of Zagreb) adopted, expressing a general ambition for e-mobility. The Urban-e project aimed to help promote e-mobility, and there are currently 70 charging points in the city. Further continued action is important. Business models are very important, especially since the city is still starting out, relatively. The future of electric mobility (drawing a bigger picture) including lessons learnt from GreenCharge pilots were seen as being very useful when available.

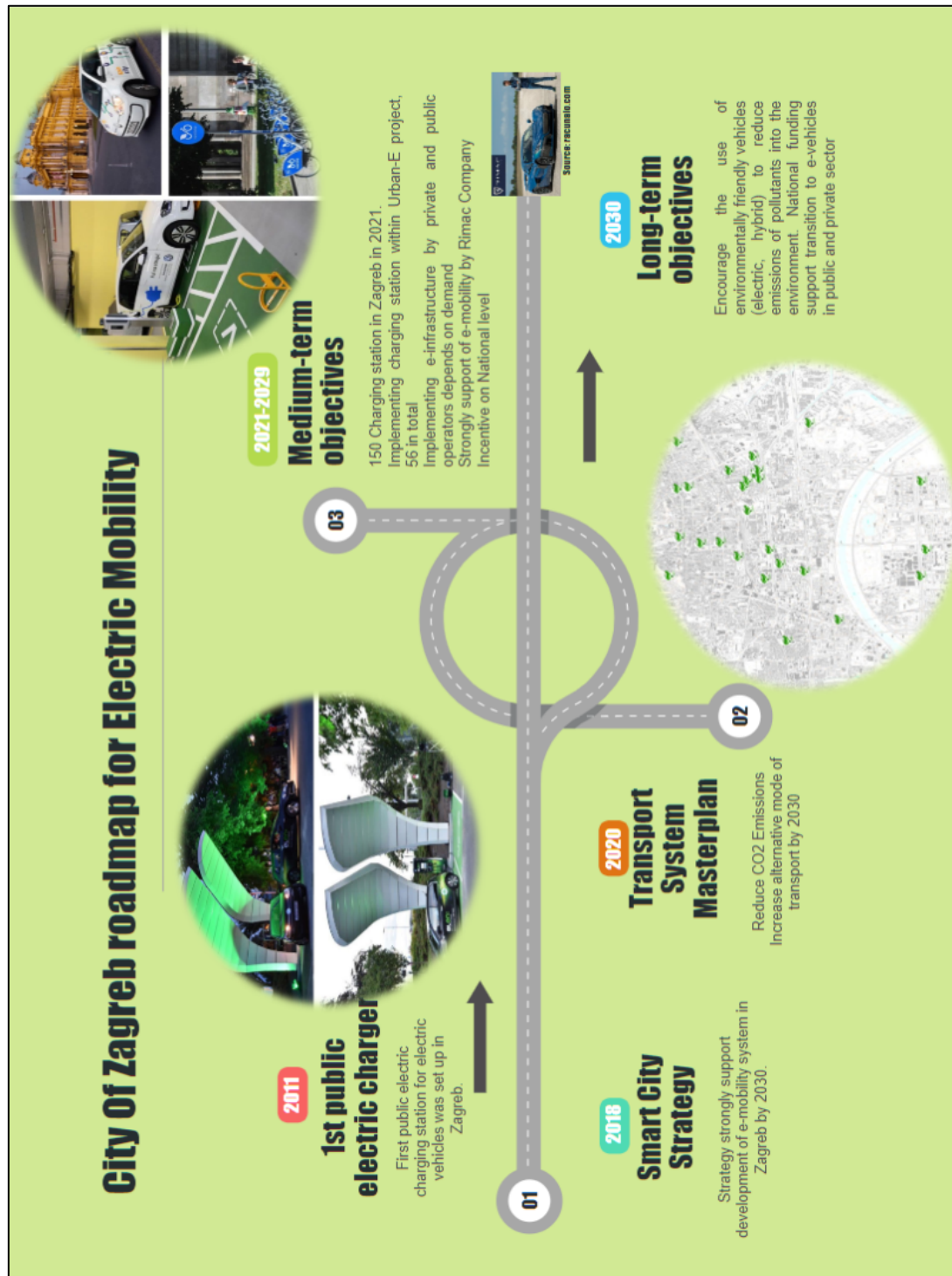


Figure 12: Zagreb e-mobility roadmap (City of Zagreb, 2021)



## 5.8 Roadmap development work by further Uptake Cities

The cities of Burgas and Porto also took an active part in the Uptake Cities programme. Due to the nascent development of e-mobility in **Porto**, they felt unable to develop a roadmap at this stage. During discussions on roadmaps, Porto were planning a new chapter on e-mobility to go into their SUMP, and most of the 17 municipalities in Porto already had their own SUMP. Their progress in charging points (which is driven nationally) is still limited at this stage. Porto retains a strong focus on public transport. In GreenCharge, business models could be interesting, e.g. how much do they pay for charging, who is responsible etc.

Unfortunately, a bereavement in the City of Burgas meant that the city was unable to continue their participation to the final stages of the GreenCharge. Their contribution was much valued.

Updates and developments in Uptake Cities were also prepared and included in the GreenCharge newsletters. This was a chance for such Uptake Cities to communicate their progress and share it with a wider audience (Figure 13; this is shown for illustration purposes, and can be read online<sup>1</sup>).



**Figure 13: Examples of e-mobility development in further Uptake Cities, included in the GreenCharge newsletter**

<sup>1</sup> <https://www.greencharge2020.eu/newsletters/>



## 6 Lessons and Feedback from Uptake Cities

A number of points of feedback were employed during their learning and development programme. During the early stages of the project, local authorities were asked about their priorities within GreenCharge. This was reflected upon at each learning point. It was also reviewed and updated with further insights gained into the relevance of GreenCharge's key results to a public sector mobility planning audience. Final reflections and priorities for action are also included within the roadmaps themselves. The following sections present input from Uptake Cities at the start (Figure 14 to Figure 16), mid-term (Figure 17 to Figure 21) and closing stages (Figure 18 to Figure 26) of the GreenCharge project.

### 6.1.1 Feedback at start of GreenCharge project

During registration, survey responses from Uptake Cities helped guide the development of the learning programme. Here, many modes of transport had interest from them, with electric bikes, buses and cars the top priority (Figure 14), with solar energy the top energy interest (Figure 15).

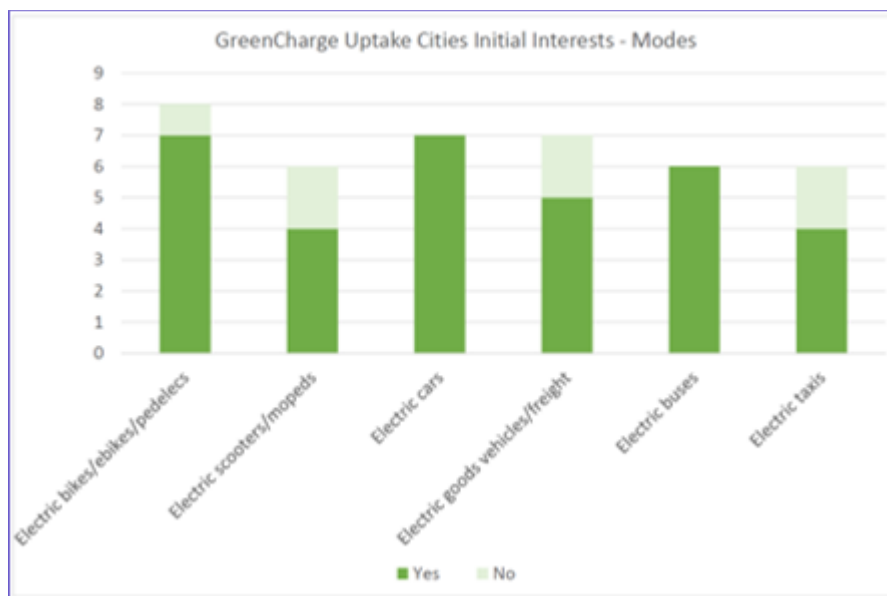
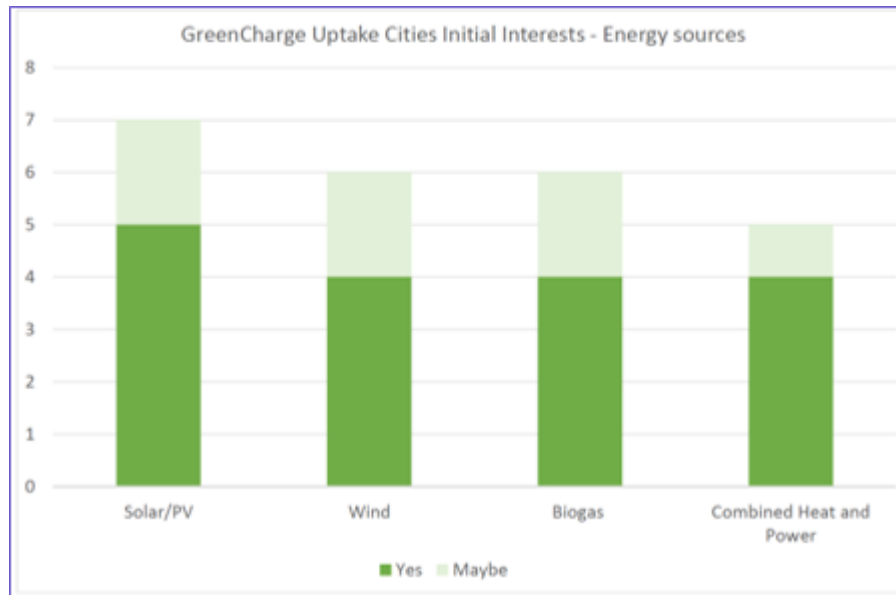


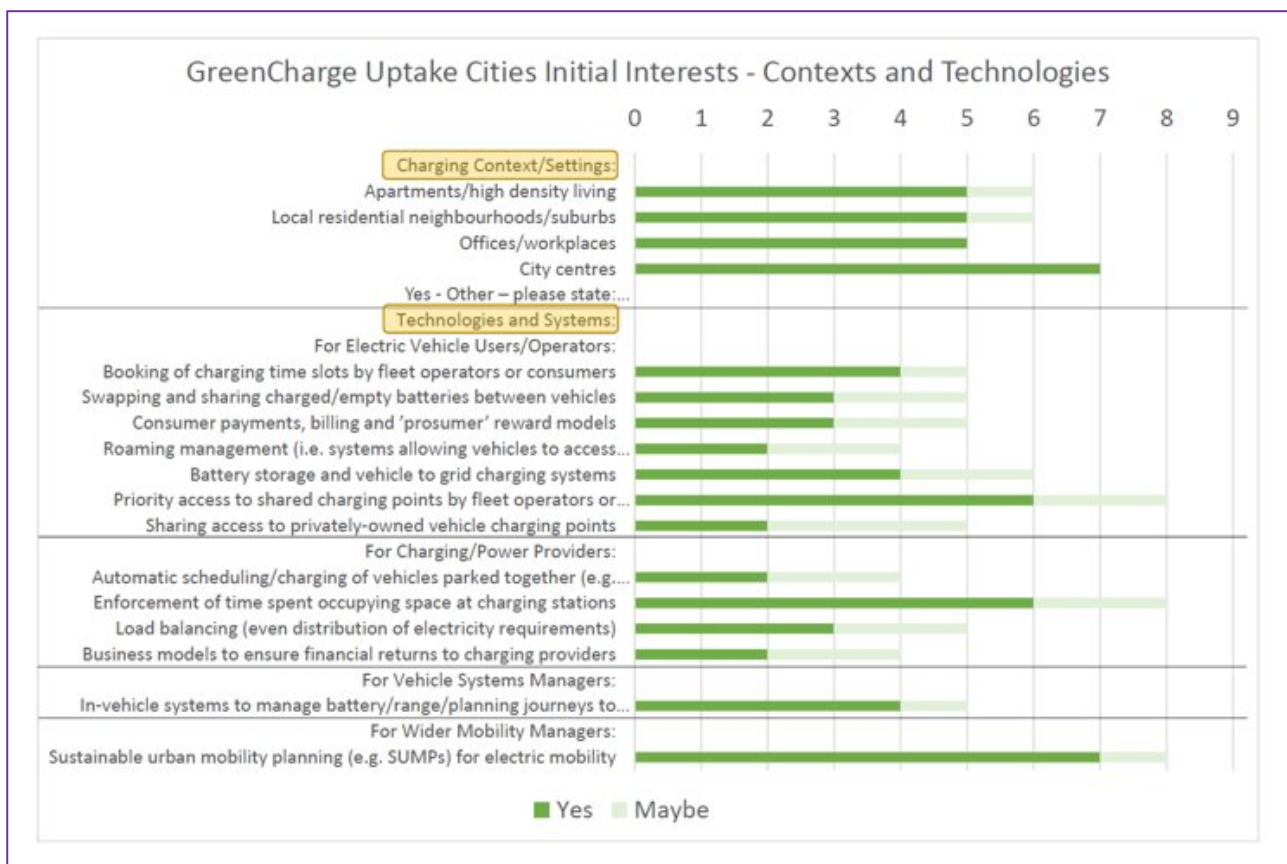
Figure 14: Uptake Cities' interest in modes of electric transport (2018)





**Figure 15: Uptake Cities' interest in energy sources (2018)**

Uptake Cities were most interested in the city centre context, in issues such as priority access and enforcement of charging points, and the general topic of SUMP (Figure 16).

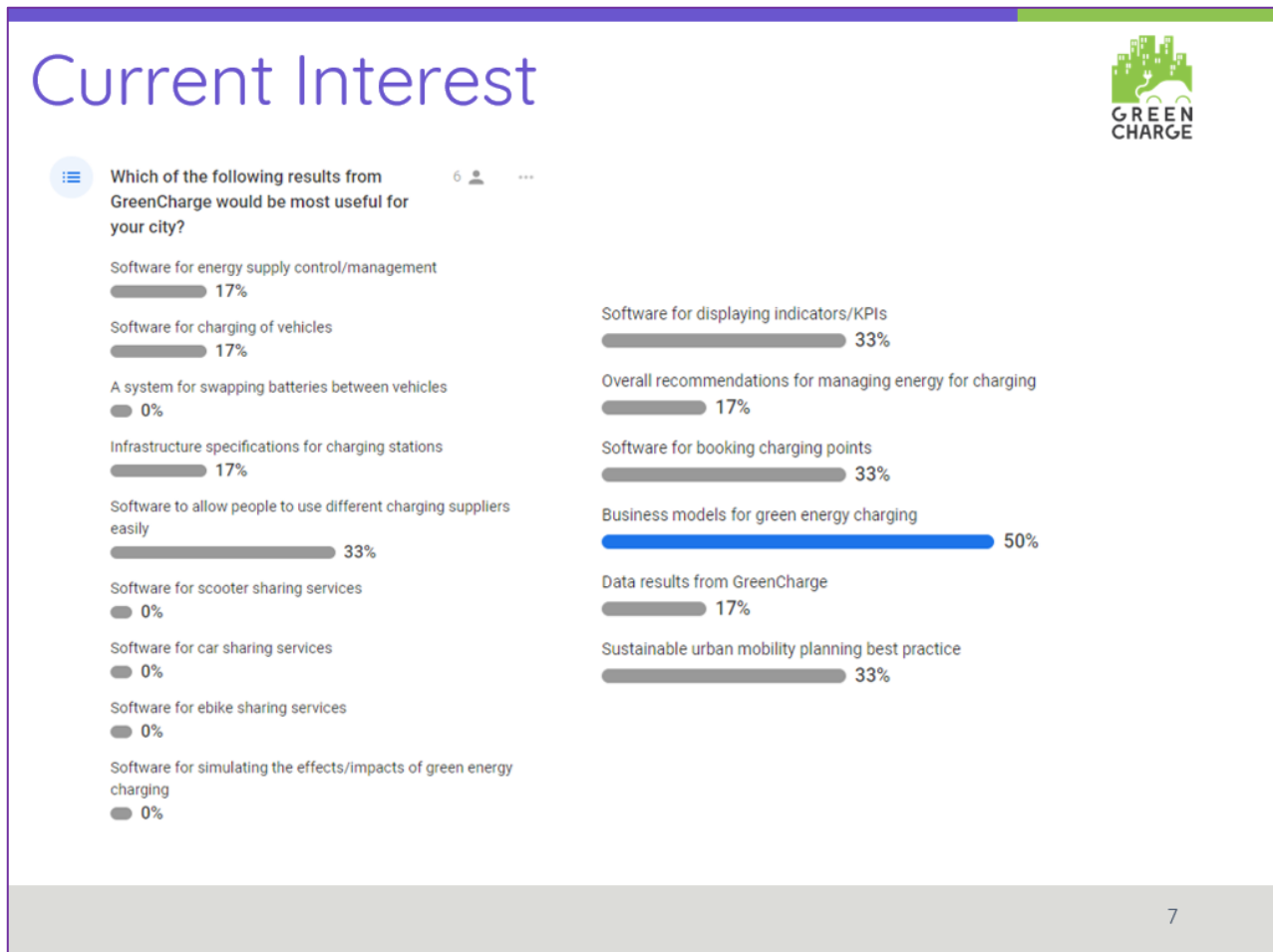


**Figure 16: Uptake Cities' interests in application of results and technologies (2018)**



### 6.1.2 Feedback midway through GreenCharge project

Uptake Cities were again questioned about the applicability of different results from GreenCharge during the project (using an updated list of project outputs; Figure 17). Compared to the initial survey, interest in business models and roaming between operators had relatively increased. Booking of charging and the role of Sustainable Urban Mobility Planning (SUMP) remained an interest. Software systems were seen as less directly within the purview and priority interests of the local authorities themselves, however they were interested in how to evaluate and visualise performance of the system.



**Figure 17: Uptake Cities' updated interest in GreenCharge's Key Exploitable Results (2021)**

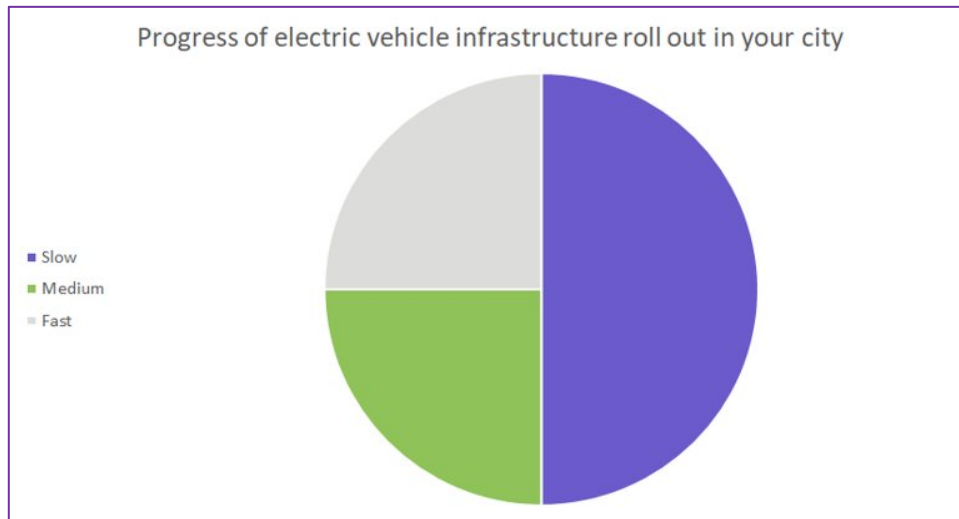
In interviews, Uptake Cities specifically elaborated the following issues to be of importance to them:

- **Planning**
  - Planning geographic/spatial distribution of charging points
    - Wider city planning and placemaking
    - Grid capacity
    - Business cases in low demand areas
  - Multi-level planning and coordination
  - Giving e-mobility appropriate weight in SUMP
- **Operations**
  - Enforcement options
  - Involving and coordinating the private sector land owners
- **Mobility measures**
  - Electric-specific car sharing



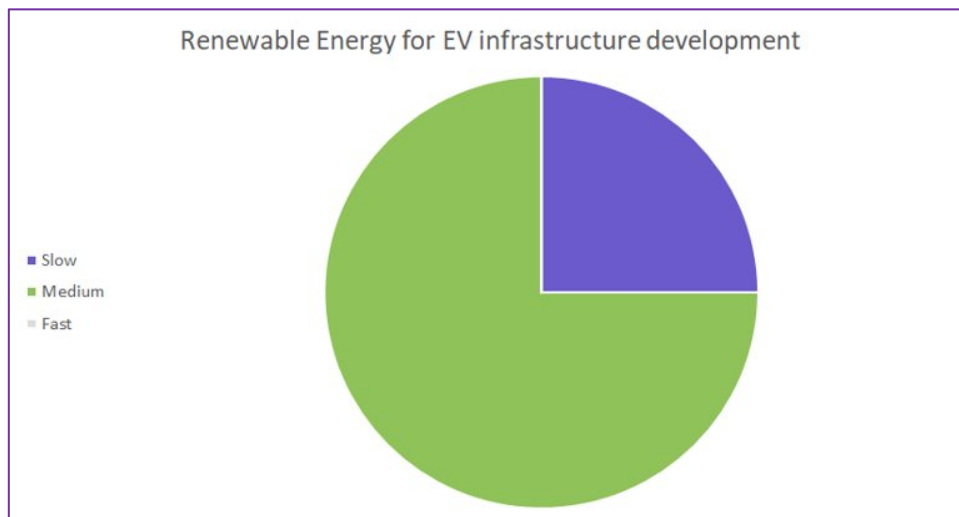
- Low emissions zones
- Public transport + logistics

This enabled GreenCharge recommendations such as Deliverables 7.2 and 8.5 to be informed by their interests. Half of Uptake Cities considered their rate of electric vehicle infrastructure implementation in their city to be “slow” (Figure 18).



**Figure 18: Uptake Cities’ view of electric vehicle infrastructure progress (2021)**

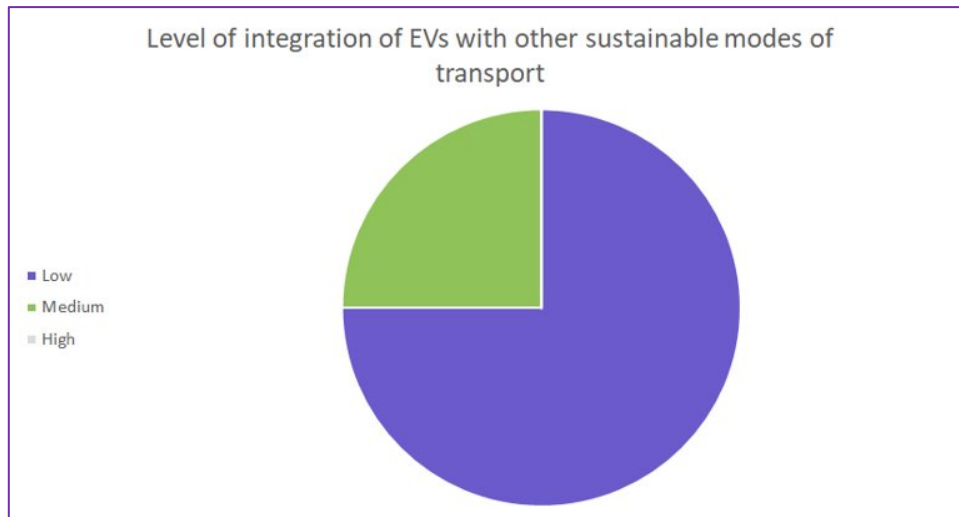
From the perspective of transport planners, the progress of renewable energy infrastructure provision in their local authority was seen to be moving more quickly than EV infrastructure (Figure 19). However, it should not be inferred that this was always referring to additional local renewable energy as distinct from broader grid composition developments.



**Figure 19: Uptake Cities’ view of renewable energy infrastructure progress (2021)**

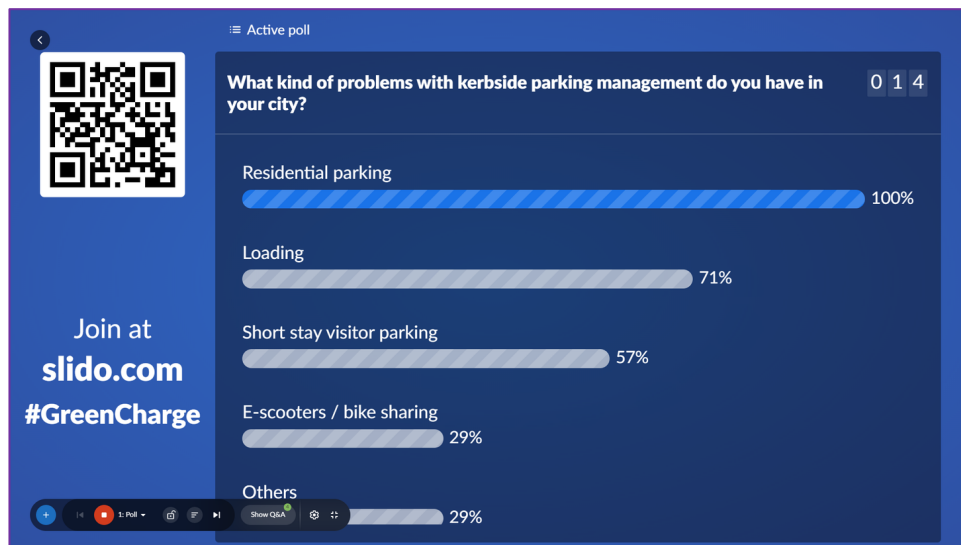
Local authorities also deemed that there was significant scope for further consideration of how to integrated electric vehicles including cars into the broader sustainable mobility mix and system (Figure 20).





**Figure 20: Uptake Cities' view of electric vehicle integration (2021)**

Uptake Cities were able to confirm that residential car parking and provision for electric vehicles remained an issue for them (Figure 21).



**Figure 21: Uptake Cities' views on parking issues in their cities (2021)**

### 6.1.3 Feedback at the conclusion of the GreenCharge project

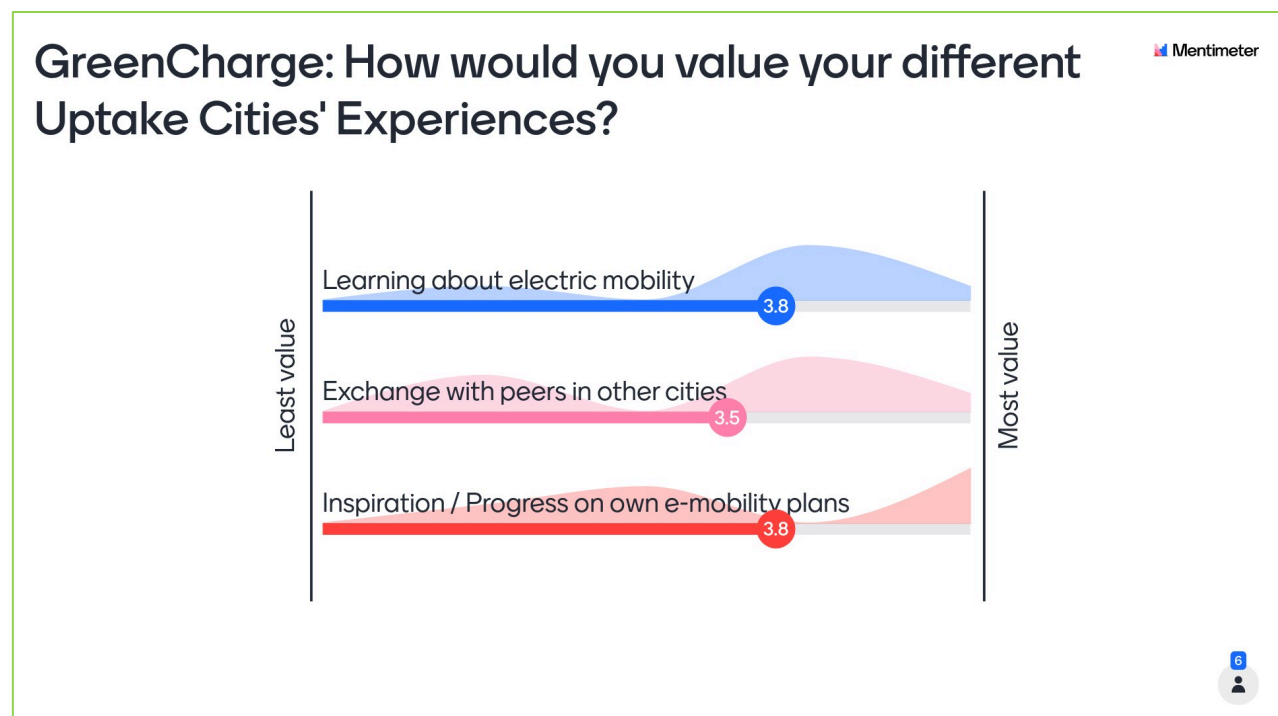
Uptake Cities were asked for their feedback on lessons learnt during the project at the final webinar on 8<sup>th</sup> February 2022. This shows the learning programme was appreciated and that their appetite for meeting the challenges of the transition to e/mobility in their own cities remains. Issues they highlighted learning about are included in Figure 22.





**Figure 22: Uptake Cities' valued learning themes in GreenCharge (2022)**

On average, the Uptake Cities valued all elements of their learning experiences (within the context of the limitations on solution development and exchange posed during the COVID pandemic), as shown in Figure 23.

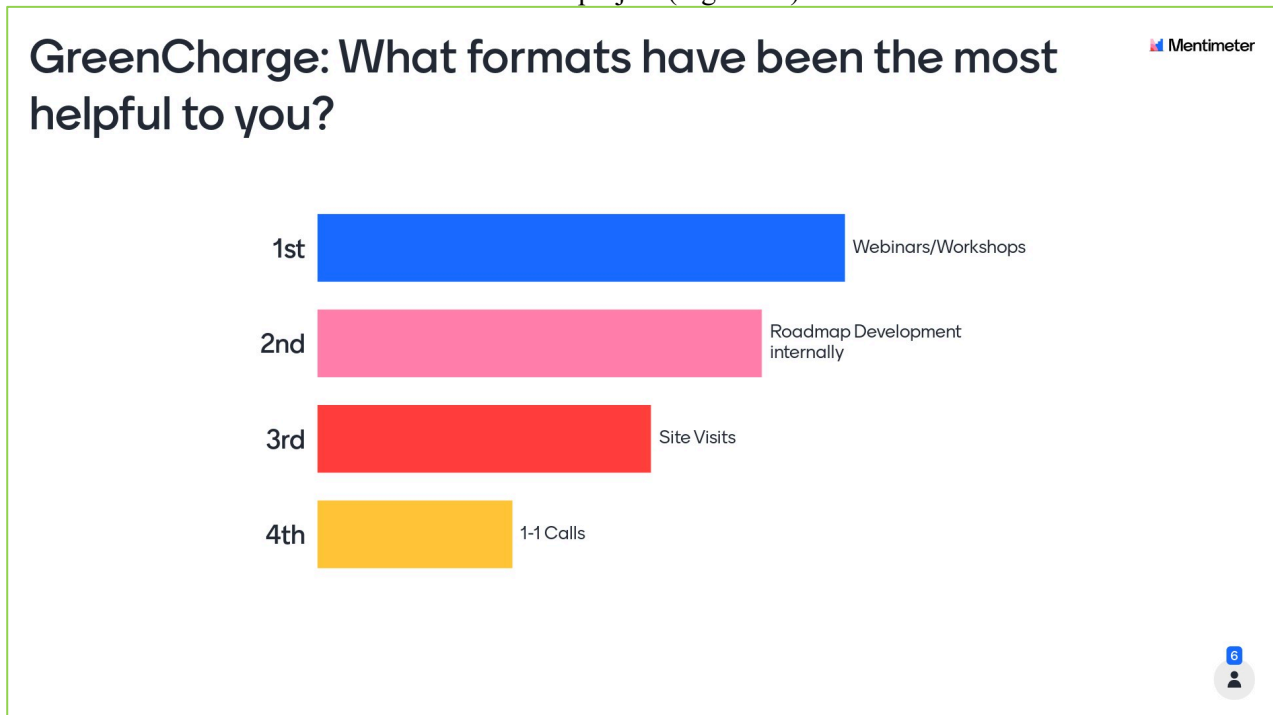


**Figure 23: Uptake Cities' valued learning activities in the project (2022)**

Despite the need to conduct more learning online than was planned at the start of the project, this was seen as helpful, and supported the internal, offline development of cities' roadmaps in between formal engagements

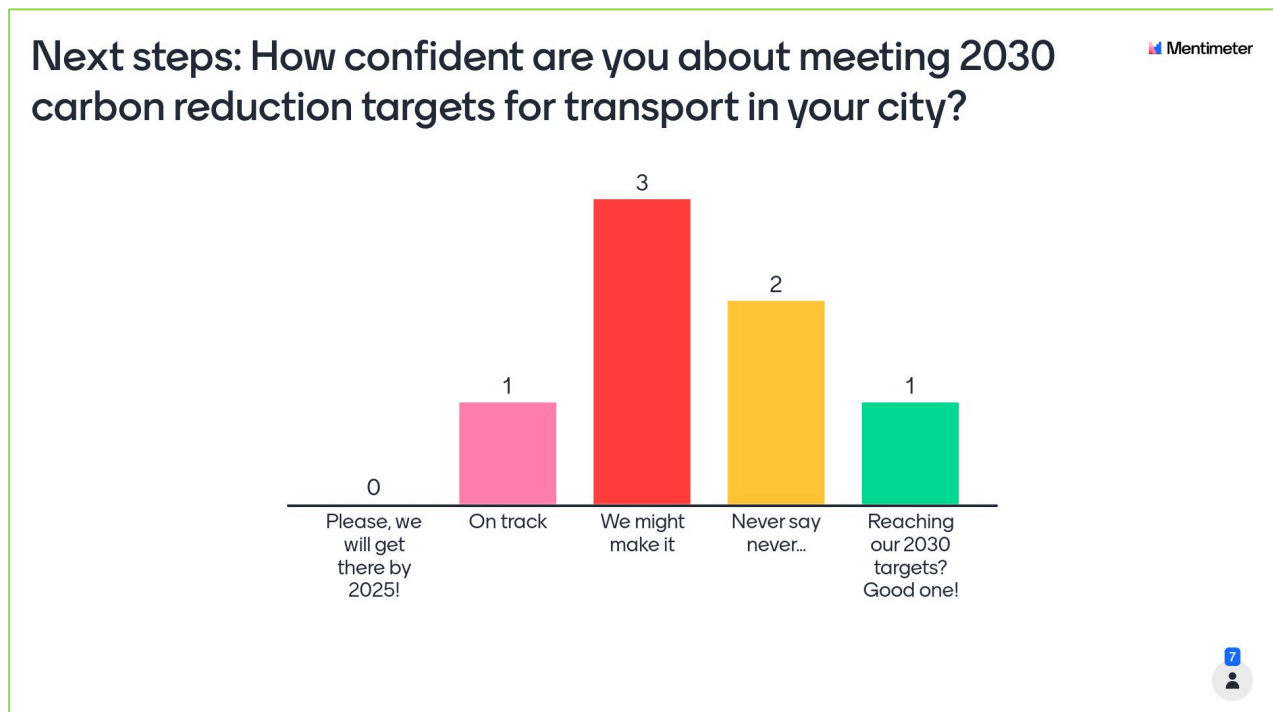


with the project (Figure 24).



**Figure 24: Uptake Cities’ views on learning formats available to them during the project (2022)**

Participants personal opinions were that there were still challenges ahead in meeting the carbon reduction targets, such as those contributing to “Fit for 55” (55% overall reductions in carbon by 2030) across the EU (Figure 25).



**Figure 25: Uptake Cities’ participants’ personal feelings regarding the realism of climate targets (2022)**



This gives further emphasis to the fact that although GreenCharge is ending, the learning needs continue to develop as cities advance in the implementation of their e-mobility strategies in the coming years (Figure 26). Uptake Cities will be made aware of GreenCharge's final deliverables including its Exploitation Strategy at the end of the project, as well as opportunities to become involved in further research, innovation and support activities as partners become aware of opportunities following the project.

## Next steps: What are your priorities for new eMobility learning topics for the next coming 3 years in your city?



**Figure 26: Uptake Cities' priority continuing learning and development themes following the end of GreenCharge (2022)**



## 7 Conclusions

The conclusions of the lessons learnt through the Uptake Cities programme are as follows.

### 7.1 Limited current interaction with technological components with transport planning teams

GreenCharge's fundamental focus on technology presented a challenge for interacting with Uptake Cities, whose focus often lay in strategic issues such as planning, funding and siting of electric vehicle infrastructure. Detailed specifications of EV charging systems were not a priority of the representatives involved in the Uptake Cities programme – sometimes these issues were taken care of by procurement teams, or at the regional or national level. The advantages of being able to specify systems that can later be integrated, share data, and provide assistance with smart energy management were not fully embraced or an immediate priority for transport planning teams more focussed on immediate e-mobility roll out. Cities do not always choose to take on the role as the orchestrator, given their often limited resources and expertise, and are frequently subject to market pressures, products on offer from suppliers, and political pressures. Practical guidance and examples are still in demand, however, and not currently seen as fully available to Uptake Cities from the wider guidance environment; it is important these examples reflect the varying contexts of cities (from starting out to well developed). Concerns regarding local energy management are usually, though not exclusively, seen as an external factor, rather than something intrinsic to their own development and planning of e-mobility.

### 7.2 Slow development of e-mobility, and tensions with retaining a focus on developing traditional sustainable transport choices

Local authorities involved as Uptake Cities had ranging levels of preparedness for electric charging, with the number of public car charging points in single figures in some cities, and no more than double figures in many others. Resourcing of strategic planning for electric vehicles is subject to the same pressures and drawbacks as many other services in local government and areas of transport provision. Many teams had a focus on electrifying their public transport systems, and felt that car charging had become something that had become a necessary imposition upon them; they were in a position of reacting to public and political demands in real time, whilst still needing to balance and cater for existing priorities in other modes of transport. This includes placemaking within cities to reduce the use and dominance of the car overall.

### 7.3 Multiple layers of governance affect e-mobility roll out

Multiple levels of government are involved in electric mobility strategy and roll out, and this also happens across multiple sectors (such as climate and mobility, as well as between strategic and operational planning services). It is often the case that the local level of transport organisation works across different scales and can be subdivided between different municipalities, and/or arms-length organisations take control of different aspects of mobility service provision such as public transport. In many cases, communication channels are often not sufficiently well worn to facilitate a fluid and coordinated e-mobility development process. State or national level government can play a strong role in legislation, promotion and incentivisation, and sometimes in the direct implementation or operational controls (e.g. pricing) on the ground locally. This further puts local authorities in a reactive situation.

The setting of the precise controls, remit and influence of local authorities in the e-mobility sphere is still an evolving situation. In particular, this concerns local smart energy generation and management, which is still discussed somewhat remotely from mainstream transport strategy and planning activities (aside from small pilot or demonstration projects). This discussion must develop to run side-by-side with the increase in electric vehicles, requiring further information and active engagement with transport planners to ensure a coherent e-mobility message can be developed which includes the complexities of energy provision and management. The cumulative energy demands across cities and regions may yet to be commonly agreed between the various stakeholders involved; often, it is assumed green grid energy can support e-mobility through the procurement of green energy tariffs, without recognising there may be an overreliance on grid make up which may be limited and/or displacing green energy from other energy demands (such as industry) to meet “zero carbon”



credentials for e-mobility. Recognising the limits of such reliances may also help fuel attention on greater investment in *additional* local renewable energy generation capacity in the future.

#### **7.4 Successful engagement process induced local e-mobility roadmaps**

The roadmaps development programme, including webinars and site visits, has enabled local authorities to reflect on their own progress, open up new communication channels, gain new insights, network with their contemporaries in other parts of Europe, and prepare a simple and memorable visual device around which to coalesce their e-mobility intentions – in the form of a roadmap. Whilst many longer forms of planning exist, there is a demonstrable value in distilling complex ideas and goals developed over long periods of time in the past and into the future, into one single page. Whilst they appear simple, behind them lies many internal meetings and discussions, as well as broader published strategies, over the course of GreenCharge to agree on the essence of the city's e-mobility proposals.

#### **7.5 A diffuse research and innovation arena for e-mobility**

Local authorities seek practical knowledge of best practice, but this is sometimes hidden from their gaze in plain sight in the context of a plethora of simultaneous and overlapping research and recommendations being published, all competing for their attention, time and understanding. Further work must be undertaken to synthesise, evaluate, curate and communicate the current state of the art on e-mobility so this is of genuine use to practitioners in the most time efficient way possible for them. With time, ever more information is emerging from both public and private sector domains, as proposed “solutions” and “innovations” grow ever larger. Further coordination of this knowledge is required to support e-mobility.

#### **7.6 Electric transition as something that is happening to local authorities rather than being driven by them**

Roadmaps are one way to help local authorities assert more control over their e-mobility plans. As impacts and further challenges emerge during the growth in e-mobility, requirements may become clearer. The Avoid-Shift-Improve framework remains a guiding framework that should help local authorities to continue to place cars at the bottom of the mobility hierarchy, whilst acknowledging the areas where electric cars do provide a potential advantage over internal combustion-engine cars. Delivering the shared mobility economy to simultaneously reduce car ownership whilst at the same time replacing the private car fleet with electric vehicles (at scale) remains the Holy Grail and its path remains uncharted.

#### **7.7 Fuels and energy as a new development area for transport planners**

Dealing with the fuelling of privately owned transport modes has historically not been within the purview of local authorities (aside from the function of approving petrol filling station planning applications). This continues to be the interest and expertise of the private sector, but new relationships must be formed given the scale of EV charging needed to support electric vehicles. In some streets, this is a rocky road, with poorly thought through siting of inappropriate charging infrastructure impeding the quality of life and accessibility for those choosing the lowest-polluting modes of transport (e.g. walking and cycling). Few local communities are also conversant with local energy planning or management of their own energy needs. Smart energy neighbourhoods are not readily a subject matter engaged with in SUMPs. Further education on such topics is needed to bring this on a par with traditional aspects of transport planning and highways engineering, so mistakes can be rapidly transferred and avoided by all who follow.



## **A Appendix A**

- A.1 This is GreenCharge: An Introduction to GreenCharge and Your Uptake Cities Programme – Webinar Presentation**
- A.2 Roadmap to e-mobility: An introduction into roadmap development for charging infrastructures – Webinar Presentation and Summary Report**
- A.3 Kerbside Parking Management for Electric Mobility – Webinar Presentation and Summary Report**
- A.4 Business Models – Webinar Presentation**
- A.5 Barcelona Site Visit, Roadmaps Resume and Lessons Learnt – Summary Report**
- A.6 Bremen Site Visit – Summary Report**
- A.7 Oslo Site Visit – Summary Report**



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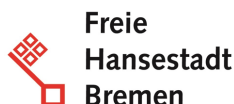
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## **A Appendix A**

### **A.1 This is GreenCharge: An Introduction to GreenCharge and Your Uptake Cities Programme – Webinar Presentation**



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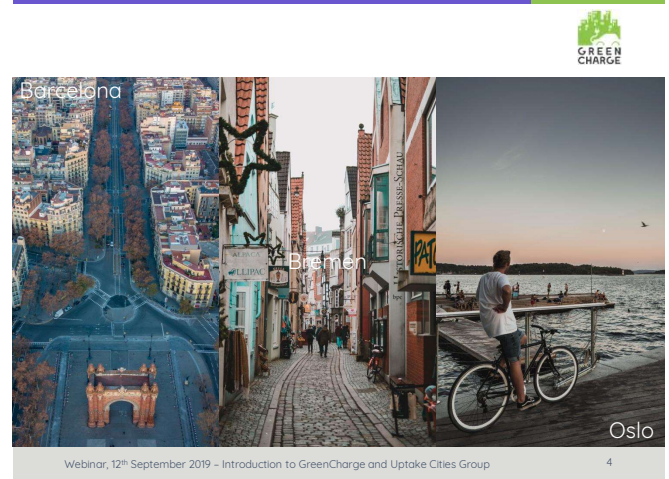


## Welcome to GreenCharge

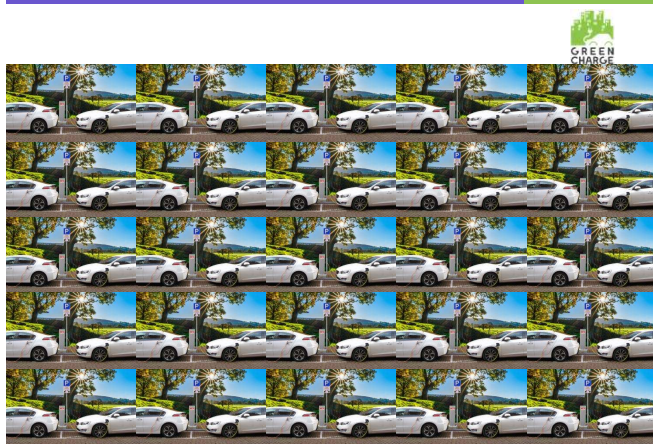
GreenCharge takes us a few important steps closer to achieving one of the dreams of modern cities: **a zero emission transport system based on electric vehicles running on green energy**, with traffic jams and parking problems becoming things of the past.

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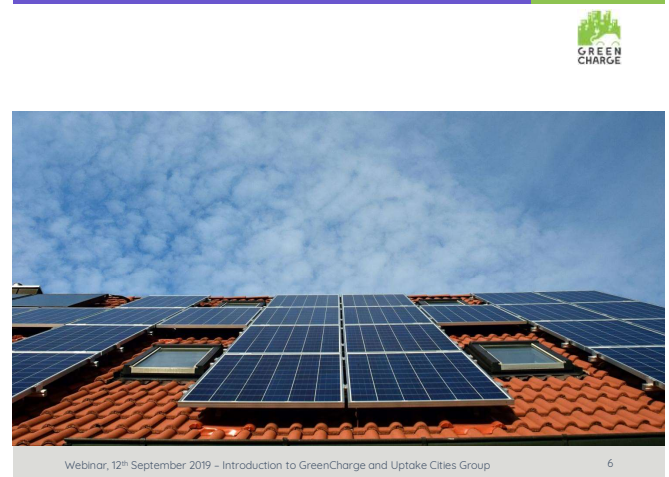
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## Housekeeping



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## Today's GreenCharge webinar



**Reggie Tricker**  
ICLEI Europe  
GreenCharge Uptake  
Cities Group  
Coordinator



**Joe Gorman**  
SINTEF  
GreenCharge Project  
Coordinator



**Arno Schoevaars**  
PNO Consulting  
GreenCharge  
Communications and  
Business Models

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## Today's GreenCharge webinar



- **11.10** - Introduction to the GreenCharge Project
- **11.25** - Overview of Business Models Activities
- **11.40** - Recap of Uptakes Cities Group first visit to Bremen in October



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## Welcome to you as Uptake Cities



Budapest



Krakow



San Sebastian



Zagreb



Burgas



Ploiesti



Stockholm



Edinburgh



Porto



Thessaloniki

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## Objectives of GreenCharge



### 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.

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## Objectives of GreenCharge



### 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.

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## Objectives of GreenCharge



### 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**. *More on this later in this presentation....*

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## Showing how it works in practice



The special focus areas of the **Bremen** pilot are

- Combining the promotion of e-cars with **car sharing**, and
- The use of **stationary batteries** to balance peak demand from charging in private car parks

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## Showing how it works in practice



The aims of the **Barcelona** pilot are

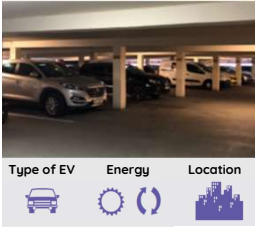
- Replacing the existing fleet of fossil **motorbikes and scooters** with electric ones
- Improving the management of **Light Electric Vehicles (LEVs)** such as e-bikes
- Enabling **electric car charging** at workplaces ...

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## Showing how it works in practice



There is a particular single focus in **Oslo**

- providing cost efficient **residential electric car charging facilities** for inhabitants of 246 flats including rooftop photo-voltaic panels

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## Consortium



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## Project Outputs – Our Advice to You



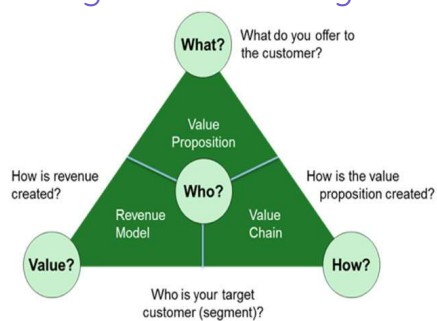
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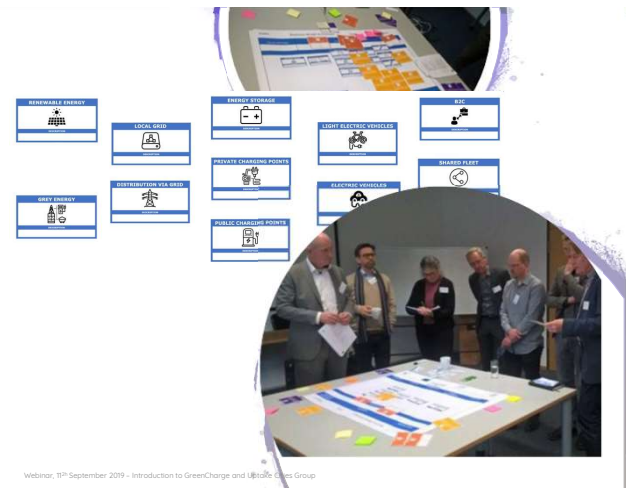
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## How to create the business case for green e-mobility?



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## 1. What?

= **VALUE PROPOSITION DIRECTED AT CUSTOMERS**



- A **housing association** provides...
  - Mobility for residents at a lower cost** and an attractive home to stay in
- An **electric vehicle provider** provides...
  - Access by citizens to electric vehicles** and charging facilities
- A **charging point provider** provides...
  - Lowest cost for customers** to charge their vehicles through efficient green energy supply
- A **local authority** provides...
  - An e-mobility system that improves **citizens' quality of life**

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## 2. How?

= **HOW DO PROVIDERS ACHIEVE THIS FOR CUSTOMERS?**



- |   |   |
|---|---|
| A <b>housing association</b> does this by...        | By supporting and allowing the <b>installation</b> of renewable energy and EV charging infrastructure on their premises |
| An <b>electric vehicle provider</b> does this by... | By providing <b>electric vehicles</b> for use/ hire   |
| A <b>charging point provider</b> does this by...    | By providing charging facilities, access to <b>apps/booking</b> , and managing the transaction system                   |
| A <b>local authority</b> does this by...            | By subsidizing, incentivizing or otherwise <b>stimulating</b> the uptake of EVs and growth of the market                |

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## 3. Why? (Value)

= **WHAT VALUE IS THERE FOR EACH PARTNER?**



- |  |   |
|--|---|
| A <b>housing association</b> achieves value by...        | Paying <b>lower bills</b> for supplying energy as part of apartment block management costs, and providing an attract place to live  |
| An <b>electric vehicle provider</b> achieves value by... | Gaining <b>revenue</b> from monthly and pay-per-use access to electric vehicles   |
| A <b>charging point provider</b> achieves value by...    | Gaining <b>revenue</b> from a fee for access to charging points   |
| A <b>local authority</b> achieves value by...            | Gaining support for the local <b>Sustainable Urban Mobility Plan</b> by using electric mobility to integrate other parts of the transport system together and improve quality of life |

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## Next Steps for Business Models in GreenCharge..

- The GreenCharge **pilot cities vary** according to **local investment and operating costs for e-mobility, revenues, electricity governance and renewables mix, transport mode characteristics, market demand and national policies.**
- This provides a **diverse testing environment** for new electric mobility systems and approaches.
- Pilots will be **monitored** and **business models updated** over the course of the project.
- You can **interact with this process as Uptake Cities**, so you can **more easily replicate them in your own cities**

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## Communications: How do we publicise our (and your) work?

<https://www.greencharge2020.eu>  
including Newsletters  
<https://twitter.com/GreenCharge2020>  
<https://www.linkedin.com/company/greencharge-project/>  
Contact us with  
[news:info@greencharge2020.eu](mailto:news:info@greencharge2020.eu)



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## What is our Uptake Cities Group partnership?



Uptake Cities group receive **first-hand knowledge** about the GreenCharge:

- a) a programme for the preparation of roadmaps for integration of GreenCharge eMobility solutions in SUMPs
  - **5 webinars**
- b) on-site discussions with the GreenCharge cities
  - **Study visits** to the 3 pilot sites
  - Final conference (optional)

**You tell us what is innovative...and what is not!**

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## a) Proposed webinar topics



1. Introduction and business models *(- today)*
2. Evaluation Frameworks
3. Sustainable Urban Mobility Plans (SUMP)
4. Communication and Stakeholder Engagement
5. Producing the 'Roadmap'

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## b) Proposed site visits

1. **Bremen**, October 2019 – shared and electric mobility
2. **Oslo**, 2020 (TBC) - high density living and electric mobility
3. **Barcelona**, 2020 (TBC) - light electric vehicles (two wheelers)



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## Your Outputs in GreenCharge

- A **roadmap in each city** for the construction, configuration and location of charging infrastructures
- Integration of roadmaps into SUMPs



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## Uptake Cities: A reminder



Uptake Cities will help GreenCharge by:

- contribute with **user needs and feedback** from a variety of urban contexts across Europe,
- act as a first group of **potential replicators** of the solutions developed in GreenCharge.
- provide **input for innovation management** to ensure that the project stays up to date with market reality and policy changes.

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## Agenda for Bremen study visit



**DAY 1: Thursday 10 October 2019 (12:00 – 17:30)**

**12:00 - 13:00 Check-in and Lunch – provided by GreenCharge**

**13:00 - 14:00 Welcome to GreenCharge to Uptake Cities**

**14:00 - 14:30 Welcome and introduction from City of Bremen**

**14:30 - 16:30 Site Visit 1- Local walking tour of electro-mobility in Bremen city centre**

**16:30 - 17:30 Reflections/Wrap-up**

**19:00 Uptake Cities Dinner**

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# Agenda for Bremen visit

DAY 2 - Friday 11 October 2019 (9:00 - 13:30)
9:00 - 10:00 Uptake Cities case studies
10:00 - 12:00 Site Visit 2 - Cycling tour of electro-mobility around Bremen
12:00 - 12:30 Reflections/Wrap-up
12:30-13:30 Lunch - provided by GreenCharge / networking
13:30 Goodbye



# Thank you!

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## **A Appendix A**

### **A.2 Roadmap to e-mobility: An introduction into roadmap development for charging infrastructures – Webinar Presentation and Summary Report**



Image:  
Shai Pal,  
Unsplash

# Roadmaps to E-Mobility

## Report of Uptake Cities Internal Webinar #2

Webinar Date: 04 June 2020,  
15:00 – 16:30

Prepared by ICLEI Europe  
Elma Meskovic  
Reggie Tricker

Last Updated: 09 June 2020



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



# Introduction

- The GreenCharge project coordinates an **Uptake Cities Group** (UCG). This document summarises the second webinar – on e-mobility roadmaps – of the five included as part of the Uptake Cities webinar e-learning programme
- One of the objectives of having cities involved in GreenCharge is to help them develop an **e-mobility roadmap** for their respective city
- In order to do so, the cities emphasised during the Uptake City study visit to **Bremen in October 2019** the need to have an introductory webinar on roadmaps
- With every city coming from a different starting point with regards to e-mobility, these webinars are designed to allow GreenCharge to **exchange expertise and learning** between a range of cities
- The information presented within this webinar will be useful during a later stage in the process when Uptake Cities produce a roadmap to accelerate the adoption of electric mobility solutions
- Whilst the webinar was held internally to aid the free exchange of ideas, this note summarises key learning points that are of wider interest



# Main Participants

## Invited Organisations

- City of **Zagreb**
- City of **Edinburgh**
- City of **Porto**
- City of **Burgas**
- City of **Budapest**, BKK
- City of **Krakow**
- City of **San Sebastian**
- City of **Oslo**
- City of **Bremen**
- Novadays
- IKEM
- GRUPOETRA
- Gewobag
- PNO
- US Environmental Protection Agency

## GreenCharge Technical Partner Representatives

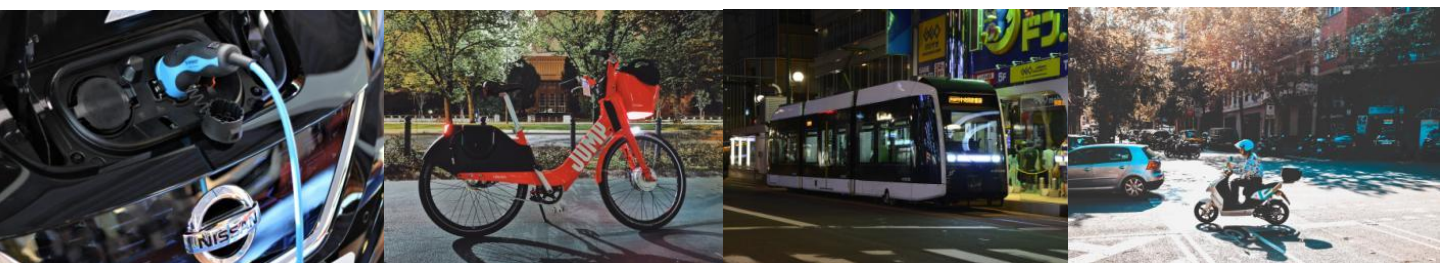
- Beate Lange (**City of Bremen**)
- Rebecca Karbaumer (**City of Bremen**)
- Reggie Tricker (ICLEI Europe)

## Speakers

- Elma Meskovic (ICLEI Europe)
- Rainer Konerding (**City of Hannover**)
- Eva Sunnerstedt (**City of Stockholm**)
- Patricia Bellver Muñoz (GRUPOETRA – MEISTER project)

## Acknowledgements

- We acknowledge the inputs and assistance from the City of Bremen in supporting the organisation of the webinar.





# Structure of Report

This report summarises the proceedings of the one and a half hours of the webinar, which were each subdivided into

- a) **Introductory roadmaps presentation** (Elma Meskovic)
- b) **Example from Hannover** (Rainer Konerding)
- c) **Example from Stockholm** (Eva Sunnerstedt)
- d) **Q&A** regarding presentations (questions collected through a written form during webinar)
- e) **Discussion including MEISTER** (Patricia Bellver Muñoz)



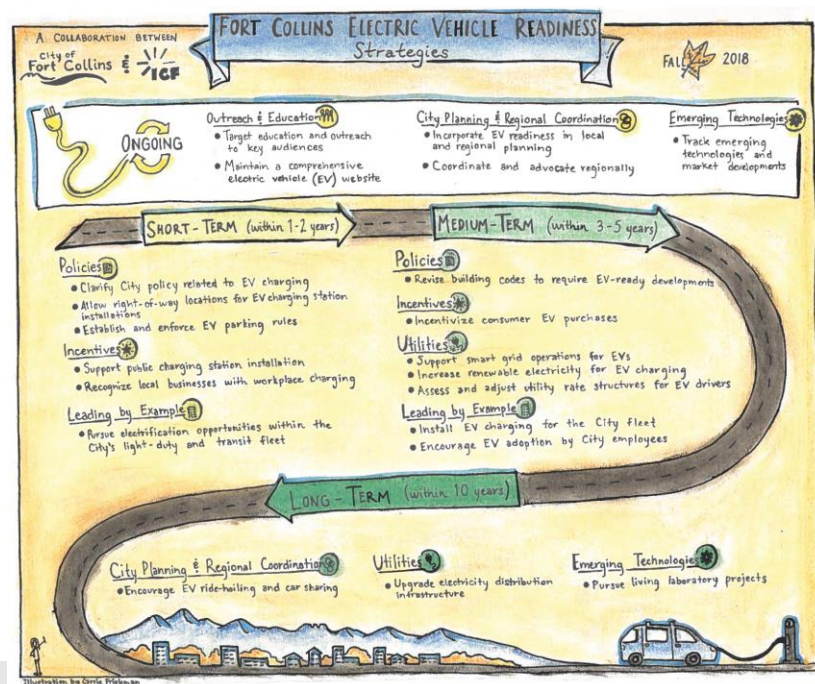
# Introductory presentation: What is a roadmap?



## Points from presentation on roadmaps

- Roadmap as a strategic plan that defines how a **desired future scenario** can be achieved over a specific timeframe and within a particular area, such as an urban context
- Roadmaps can take different forms
- Roadmap Example 1: **City of Fort Collins** (Colorado, US) developed roadmap to identify measures and related actions that it could implement to increase the use of electric vehicles throughout Fort Collins as well as Northern Colorado
- Roadmap Example 2: **i3-food project** developed a roadmap for the rapid and easy market uptake of a food processing technology
- Important to remember that we can only predict the future up to a certain point. Due to the Covid-19 situation, we cannot say anything about electric vehicle growth with **certainty**
- Roadmaps present complex and interrelated information in a **single image**, and support strategic communication both within local authorities and the public
- A **vision** provides a foundation for a roadmap, not only does it describe a desirable future, but in doing so, it provides a direction to move towards
- Once a roadmap is developed, it should be **revisited periodically** to monitor progress and adjust it to a potentially evolved landscape

A road-mapping process usually results in a graphical representation that links a current situation with a desired future one via technologies, products, policies, and knowledge



## References

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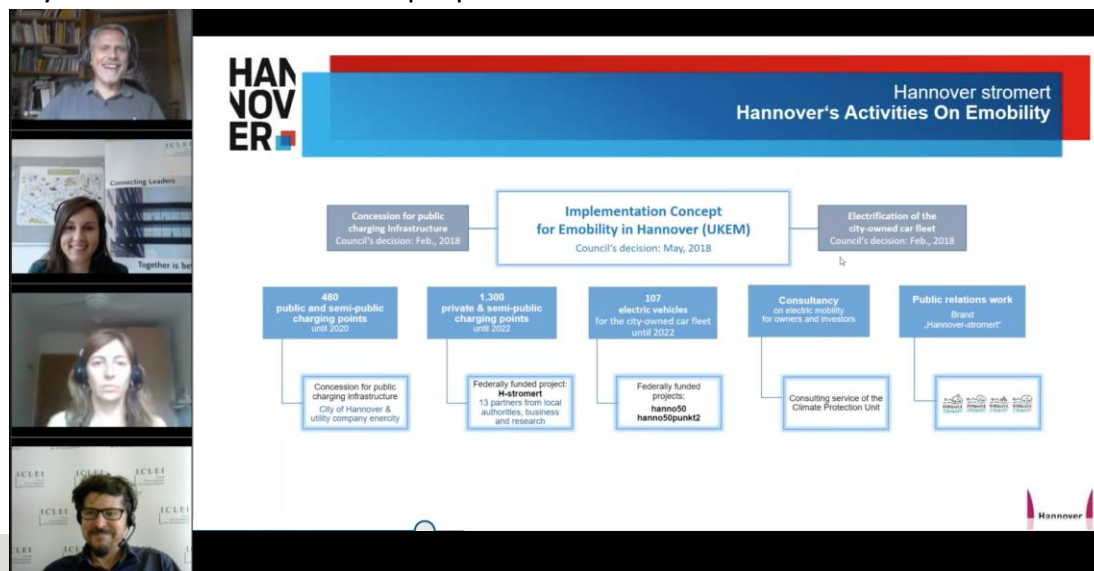


# City Focus: Spotlight on Hannover



## Points from presentation on electric mobility in Hannover

- Hannover has a long tradition of climate protection, **going back to the 90s**
- In the process of creating third climate action plan, this time for 2030
- Developed an e-mobility action plan in 2017, in part due to the fact that this was financially **supported by the national ministry for the environment**
- Public transport is planned by the region, not the city. The city is ahead when it comes to having an e-mobility plan, and the region is presently working on one
- The public transport provider – ÜSTRA – is running 7 electric buses and 60 hybrid buses in the city. The provider expects to increase the number of electric buses to 51 by 2023. The **federal government has given subsidies** for these buses
- E-mobility concept is divided into 3 main chapters:
  - **how to bring charging infrastructure into the city;**
  - **how to place the municipality itself at the forefront of e-mobility** (e.g., allow for staff charging at the workplace); and
  - **creating awareness among individuals and companies** about the benefits of electric vehicles
- In 2018, launched an EU tender for a **concession** on public charging infrastructure, demanding the installation of 480 charging points in public and semi-public spaces. A local utilities corporation, energy AG, won the concession. The cost, approx. 10 million Euro, will be covered by the utilities
- The **city fleet** is currently comprised of 40 electric cars. The target is to increase this to 100-300 electric cars by 2025
- As a result of a Funding project 2018-2022, 1,300 private and semi-public **charging points** will be installed by 2022. The Federal Ministry for Economic Affairs and Energy awarded the city 16 million Euros for this purpose



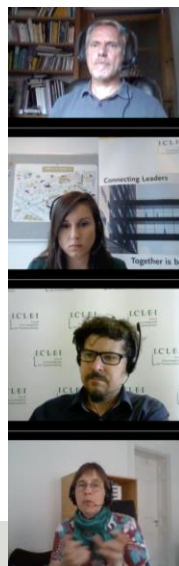


# City Focus: Spotlight on Stockholm

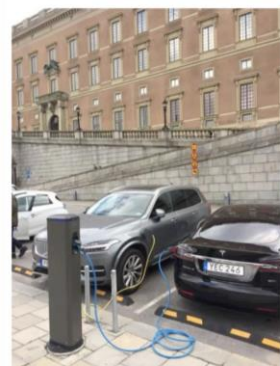


## Points from presentation on electric mobility in Stockholm

- 50,000 cars in Stockholm Municipality (over **20,000 of these being electric**)
- Number of electric vehicles **increased by 35%** since 2018, and the number of charging sessions increased by 46%
- First electric vehicles to city fleet were purchased in **1994**, and even 4 fast chargers were installed in the 1990s
- **In 2009, wrote EV strategy (e-mobility roadmap)**
- Started national EV **procurement** with other municipalities in Sweden and with private companies in 2010. As a result, purchased over 1000 electric vehicles
- **2014** started with on-street charging. City has charging streets, which refers to several charging units that are located side-by-side. At the moment, 200 on-street charging units are in operation
- Another 5,000 **possible locations** for on-street charging have been identified. City has signed agreements with 5 different actors to put up charging units
- City's short-term **goal** is to have 4,000 public charging units by 2022, the long-term strategy is to achieve a state in which access to public charging does not hinder the transition to fossil-free vehicles
- **Stockholm Parking Company** runs a lot of parking facilities - have around 1300-1400 charging units indoors in parking garages, schools, sports arenas, etc. When building a new facility, ensure that at least 20% of it includes electric charging
- **Access Right Agreements** are signed with private actors, who then put up charging infrastructure at their own expense
- **Home charging is most appreciated and liked by electric vehicle users**, partially due to the time saved by not having to go to a filling station. There is now state funding available for the installation of home charging



## 30 Charging Streets so far in Stockholm (=200 charging units)





# Q&A round



**E-buses also utilise the tram power source. Assuming that both modes serve different routes, does such charging occur at bus/tram interchanges?**

- *Rainer: There is a grid for the trams. At certain stations, the buses meet the trams. At one of these, where there is a terminal point for the buses, there is a pantograph station. Here, the buses take the direct current electric power from the grid of the trams. The next step for Hannover is to make some fast charging stations for the public to be used there, as well. The city is in cooperation with utility provider on this and hopes that these fast charging stations will run in some months.*

**What was the main driver for the early City fleet development in Stockholm?**

- *Eva: In a 90s, it was air quality and noise. Now it is CO2, air quality and noise. Energy efficiency, of course, as well.*

**Are there human considerations (like proximity to services, etc) for the charging streets or is it just infrastructure?**

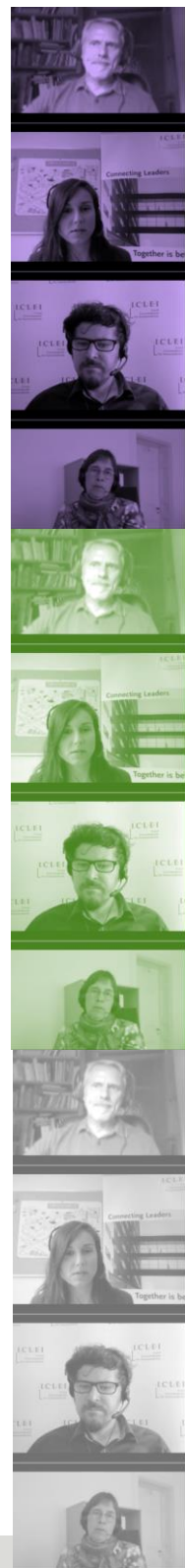
- *Eva: In Stockholm, everything is close. When the city was carrying out street mapping, the city looked more into where does the infrastructure work from a traffic point of view (e.g. looking out for pedestrian lane).*

**What model was used for Stockholm's car parking company: Private company working to a contract? Municipality-owned company? Also, did the parking spaces/buildings already belong to the municipality?**

- *Eva: Stockholm parking company is 100% owned by the city. Their purpose of the company is to provide parking spaces – and they also now provide charging with the parking places. The company is required to give revenue to the city. They need to work on a commercial basis, so they cannot rebate. They should function as any other company, and they have to play on the market like everyone else.*

**How does this relate to practice in the USA?**

- *Diana Galperin (US EPA): Localities are experimenting and doing interesting things. The mass concentration of electric vehicles in one space in the cities highlighted in Europe is interesting for us, to see a window into the future of what could happen.*





# Sister project: **MEISTER**



## Points from presentation on MEISTER project

- Coordinated by ETRA
- Pilot cities: Stockholm, Malaga, and Berlin
- 4 main objectives:
  - Define **sustainable business models** for e-mobility;
  - Develop **e-mobility, interoperable platform**;
  - **Integrate e-mobility into city Sustainable Urban Mobility Plans (SUMPs)**; and
  - **Integrate electric vehicles into smart grids**
- Core product is the **eMobility Expertise Centre (EeMEC) and eSUMPS knowledge base**. EeMEC is a technical, legal, and financial support centre that will enable the transferability of best practices and successful solutions from the pilot cities to others, and will enable the assessment of local governments in the eSUMPs process and urban planning
- One can be part of EeMEC via memberships, and special membership will be offered to cities
- To learn more about EeMEC and read up on MEISTER more generally, visit <https://meisterproject.eu>

**MEISTER products**

P4. MEISTER European eMobility Expertise Centre (EeMEC) and eSUMPS knowledge base

**Description:**  
Technical, legal and financial support centre aimed at facilitating:

- Transferability of best practices from MEISTER pilot sites to other cities
- Assessment to local governments in the eSUMPs process and urban planning by engineering and consultancy firms

**Added-value services:**

- Technical, legal and economic feasibility of alternatives assessment
- Transferability of successful solutions for e-mobility implementation
- e-mobility services information available in a knowledge database for learning purposes

etra I+D



# Next Steps for Uptake Cities in GreenCharge

## Autumn & Winter 2020/2021

- The next physical **study visit** is proposed to be in Oslo in January 2021, with a focus on **e-mobility in Winter**. This will be a great opportunity to demonstrate different approaches taken by Oslo, and Norway as a whole, to ensure that electric cars, bikes, and buses are able to run all year round
  - This is tentative, nothing is yet confirmed. In the event that a face-to-face meeting is not possible, the study visit may take the form of an on-site remote webinar
- **ACTIONS:** Uptake Cities to share vision and goals that their city has developed for e-mobility. If the city does not yet have these, share ideas of what the vision and goals for e-mobility would contain if it did
  - The vision and goals will be shared during webinar #3, the date and topic of which are still to be confirmed

### Contacts

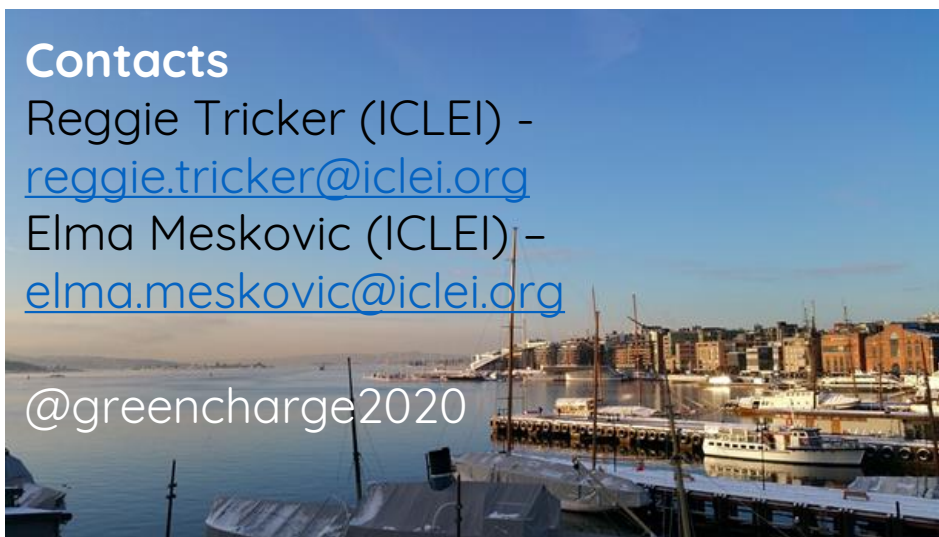
Reggie Tricker (ICLEI) -

[reggie.tricker@iclei.org](mailto:reggie.tricker@iclei.org)

Elma Meskovic (ICLEI) -

[elma.meskovic@iclei.org](mailto:elma.meskovic@iclei.org)

@greencharge2020



Source: André Neufeld / Pixabay.com



## **A Appendix A**

### **A.3 Kerbside Parking Management for Electric Mobility – Webinar Presentation and Summary Report**





# Kerbside parking management for electric cars

Report of Internal  
Uptake Cities  
Webinar #3

Webinar Date: 24 March 2021,  
14:00 – 15:30

Prepared by ICLEI Europe  
Jasmin Miah  
Reggie Tricker



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



# Introduction

- The GreenCharge project coordinates an Uptake Cities Group (UCG). This document summarises the third webinar – on kerbside parking management – of the five included as part of the Uptake Cities webinar e-learning programme.
- One of the main obstacles in creating charging infrastructure for electric vehicles in cities is parking space
- Some of the main problem areas with kerbside parking management identified during the webinar include: residential parking (for 100% of the uptake cities), loading (71%), and short stay visitor parking (57%)
- The information presented within this webinar will be useful for Uptake Cities that are producing a roadmap to accelerate the adoption of electric mobility solutions as part of the GreenCharge project.



# Attendees



## Uptake Cities represented

- City of **Budapest**, BKK
- City of **Edinburgh**
- City of **Krakow**
- City of **Porto**
- City of **San Sebastian**
- City of **Stockholm**

## Consortium partners:

- Jacqueline Floch (SINTEF)
- Anne Ingeborg (PNO)

## GreenCharge Technical Partners

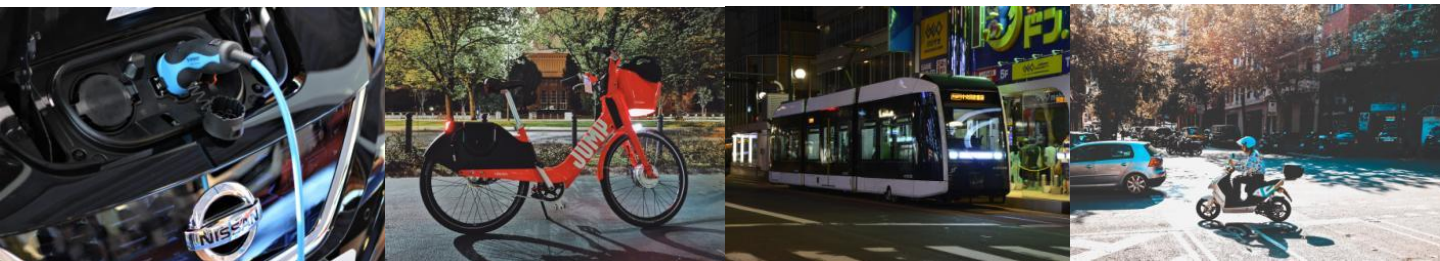
- Beate Lange (City of Bremen)
- Michael Goltz-Richer (City of Bremen)
- Reggie Tricker (ICLEI Europe)
- Jasmin Miah (ICLEI Europe)

## Speakers

- Jasmin Miah (ICLEI Europe)
- Beate Lange (City of Bremen)
- Paal Mock (City of Oslo)
- Martina Hertel (Difu)

### Acknowledgements

We acknowledge the inputs and assistance from the City of Bremen in supporting the organization of the webinar.





# Structure of Report

- This report summarises the proceedings of the one and a half hours of the webinar, which was subdivided into:
  - a) **Introductory presentation** by Bremen (Beate Lange)
  - b) **Kerbside parking managing examples** from Oslo (Paal Mork)
  - c) **Kerbside management strategies** from external expert Martina Hertel (difu)
  - d) **Uptake Cities examples** / photo sharing
  - e) **Discussion** & follow-up questions



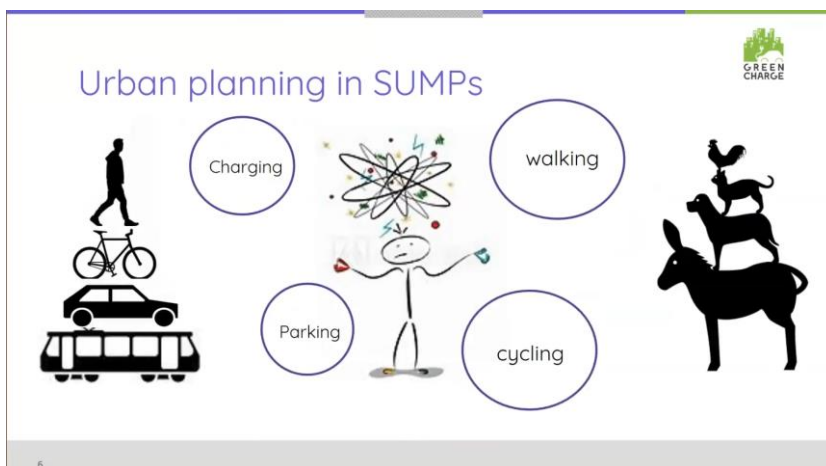


# Introductory presentation: Bremen's challenges: Charging in public street-space (Beate Lange)



## Main points:

- 50% of people charge at home, **only 20% in public**
- **Narrow** residential streets create a lot of competing demands that need to be solved before setting up charging infrastructure
- Space needs to be distributed **equitably**



- The number as well as the **size of cars** have become a problem
- One of the ways forward is to use collective intelligence (= **public participation**) and listen to the people's concerns and ideas
- **But not everyone can be made happy so: be cautious, "there is a bumpy road ahead"**



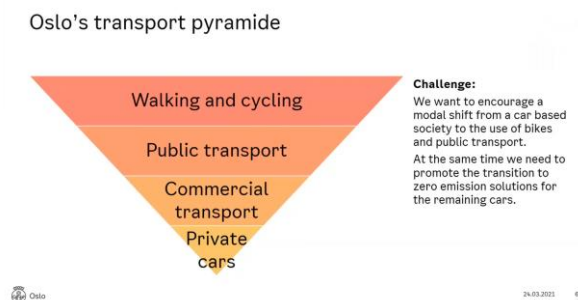
# Kerbside parking management examples from Oslo:

“This town ain’t big enough for the two of us” (Paal Mork)



## Main points:

- **Coexistence** of different modes of mobility is one of the biggest challenges in Oslo!
- One of Oslo’s official city targets is to improve **air quality** with core measures such as emissions reductions, modal shifts in transport, and the creation of spaces for people
  - **Walking and cycling** have the highest priority with private cars being the lowest



- Finding the balance between getting people out of cars while pushing for EVs is not easy
- Currently there are 1882 normal chargers on the street and 38 fast chargers for private users
- **Biggest risk:** if you cannot find a charging spot easily: unwillingness to switch to electric cars
- **Bike paths** have a higher priority and can make kerbside parking decisions complex
- Oslo’s charging strategy includes helping people charge themselves/at home, e.g. as part of GreenCharge, charging is done within a **housing cooperative** (in the garage) and no space is taken up with kerbside parking



# Management of parking and considerations for electric mobility

(Martina Hertel, Difu / Park4SUMP)



## Main points:

- Good parking management is the most underdeveloped policy area within SUMPs
- **Park4SUMP** has identified 7 key topical areas
  - Focus in presentation on technical innovation and parking standards
- Examples from project city partners:

## Trondheim

- Eliminated parking fees for electric vehicles but this was **“too” successful** → fees reintroduced as well as a maximum parking time for all vehicles in inner city area
- Key to such rules: **enforcement!**

## Freiburg

- e-charging within their **“mobility hubs”** (also part of electric car-sharing)
- Car-free district Vauban has no kerbside parking; only in **garages**

## Rotterdam

- is ahead in parking management in general: kerbside parking is very **expensive**; garages less expensive
- Try to encourage the use of **park and ride** stations
- Identified next step: **coding** the kerb / multi-use of kerbs

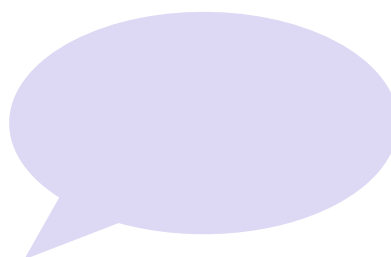


- **Key question for kerbside management: what can I do?**
  - E.g bicycle infrastructure / parking, autonomous vehicles, taxi stands
  - Bike sharing on the street is better than on the sidewalk → avoid taking space away from pedestrians!!!
  - Electric charging stations should also be near public transport, especially outside of city centre
  - In Munich, they introduced micro-hubs near the kerb (e.g. bikes for last-mile delivery)
  - Aspern/Vienna has no residential parking in area but only neighbourhood garages (works particularly well with new neighbourhoods)
  - Generally, in particular in existing neighbourhoods, mobility hubs are important parts of the solution
  - Pick-up/drop zones and loading areas are important and need to be established

→ Most important: we have to redefine public spaces and kerb access!



# Q&A



- **Why don't we integrate parking management in SUMPs enough?**
  - Martina: Because cities often focus only on pull measures and less on push measures; **Push** measures are not sexy (and thus less likely to make it into SUMPs) but **we need both!**
- **In addition to pricing, are there other relevant tools that cities have had good experiences with; more than just kerbside management?**
  - Paal: In Oslo, we are planning a **zero emission zone** in the centre of Oslo; the city of Bergen is also planning it; right now they are also evaluating the feasibility/legal basis for this
  - Martina: Trondheim also has a toll-road system but there were a lot of complaints so it was put on hold; congestion got so bad that it was reintroduced; **money from tolls** is used to make public transport emissions-free
  - Jacqueline (GreenCharge coordinator): a lot of people have electric cars and **traffic is increasing** and it is very challenging to find the right model; EV car-owners are complaining about costs
- **Putting charging points on roads rather than footways – principle approach in Edinburgh; are there any frameworks to recommend etc.?**
  - Martina: agrees **not to take away space from pedestrians** when it can be avoided. It depends on national/regional law, but charging stations might not be allowed to be installed on the street if that is not what the street is legally “designed” for



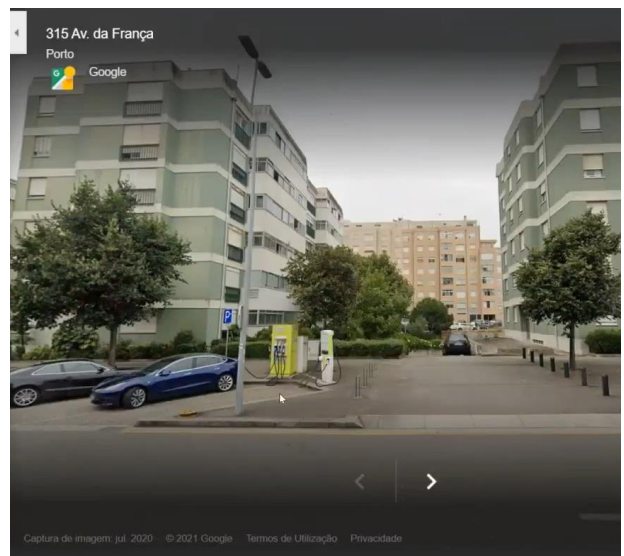
# Uptake Cities Stories

## Edinburgh:

- Still deciding about the specific designs they want to take forward;
- General approach:
  - **In city centre:** rapid chargers
  - **As you get away from city centre:** more of a mix; also for use by residents
  - **In outer ring:** park and ride sites; slow chargers for commuters

## Porto:

- The numbers of EVs is low; but number is increasing
- There are some charging points in residential areas





# Uptake Cities Stories

## Zagreb:

- There are some electric charging points recently installed via an EU project
- 150 charging stations in city; not that many on the kerbside yet; many locations at intermodal stations
- They are developing a strategy
  - 30,000 parking places in the city – a lot of room for positive changes

## Budapest:

- There are about 400 on street chargers in Budapest (200 by government; 200 by private sector)
- Because of COVID, parking in all of Hungary was made free of charge
- Size of vehicles (including EVs) a big problem
- Lots of parking conflicts in Budapest; including the use of EV parking spots by ICE vehicles
- On street charging stations more expensive than at home
- 1000 carsharing vehicles in Budapest: about half are electric; most users live in city centre





# Next Steps for Uptake Cities in GreenCharge

## Autumn & Winter 2021

- The next **scheduled webinar** will take place in the summer of 2021 and will look at the issue of financing
- The next **physical study visit** will be in **Barcelona** in the fall of 2021 (TBC).
  - This is tentative, nothing is yet confirmed. In the event that a face-to-face meeting is not possible, the study visit may take the form of an on-site remote webinar.
- **Uptake Cities Roadmap development**
  - The Uptake Cities will have created roadmaps to further electric mobility / charging infrastructure in their city
- The 9<sup>th</sup> **Informed Cities Forum** will take place in 26-28 October 2021 and act as the final conference of the GreenCharge project  
<https://informedcities.eu/events/9th-informed-cities-forum/>



## **A Appendix A**

### **A.4 Business Models – Webinar Presentation**





## Today's Session



- Please **introduce yourselves** in the **chat** → Feel free to **discuss** the session
- The main session will be **recorded** for the purposes of sharing with Uptake Cities unable to attend and edited for wider communication purposes
- Any **questions** in the chat can be raised at the end – **invitation to turn on your cameras**

## Business Model helpers



**Beate Lange**

GreenCharge and City of Bremen



**Reggie Tricker**

GreenCharge and ICLEI



**Uptake Cities Group**

GreenCharge



**Carlo Vaghi**

USER-CHI and FIT Consulting



**Reinhard Scholten and team**

GreenCharge and EGEN

## Running order



14.00 **Welcome** and why we are here (BREMEN)

14.05 **What we know** from uptake cities group conversations about business model challenges (ICLEI)

14.15 Pitch and Q&A: The **User-Chi** Perspective (USER CHI)

14.30 Pitch and Q&A: The **GreenCharge** Perspective (EGEN)

14.45 **Discussion** and further questions

15.05 **Roadmap reminder**

15.10 Plans for **end of project**

End 15.15

## Introduction from the City of Bremen

Beate Lange



## How do uptake cities compare to the wider status of business models?

Reggie Tricker





## One of three project “pillars”



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.



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## Interests from Uptake Cities



### What

- Business models important but still **room to development** knowledge

### Who

- Is this something just for the infrastructure providers, or **something the cities to be concerned with too?**
- Who **makes the money** – who should make the money?
- Long term issues of **who pays for electricity** for charging – and how to calculate use (e.g. shared housing)

### Where

- Encouragement of enterprises to supply charging points on **private land**
- Adding charging to **non-attractive areas** (can be city centre as well as periphery) – potential support from freight sector
- Funding the **first batch of charging stations** is a challenge for cities

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## Interests from Uptake Cities



### How

- Getting the right **price offer/options for on-street charging** when it can be cheaper for people to charge at their own home – some issues are out of cities' hands (e.g. state/national subsidies and electricity pricing)
- How **regulatory** should local authorities be, as opposed to giving the market flexibility?
- How do energy taxation and regulations hinder **self generation**

### When

- Need to consider potential for **radical increase** in demand and consider population change

### Why

- Not always practised to separate the **policy and political imperative** from the 'business case'

...lots of implications on ability to be "smart"

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## Means used by other leading cities worldwide (ICCT, 2020)



- **100% electric vehicle goals**

- Low emission **zones**

- EV-ready **building standards**

- **Fleet** conversion (e.g. taxi, municipal, car sharing)

- Public sector **incentives** to provide charging infrastructure

- Direct **purchase subsidies** and tax reduction (national/regional)

- **But... local/city incentives** then preferential access to lanes and parking –scaled back over time

“Setting all-electric goals is a critical first step for cities to set follow-on action plans, policies, and city agency responsibilities.”

Between -3 (China) and 35 (USA) EVs per public charger

Between <-3 and -7 (China) public chargers per 1000 residents

## Business model innovation for electric vehicle futures. (CATAPULT, 2018)



- **Transformations needed for business model innovation**
  - New/experimental **energy tariffs**
  - Greater **electricity provider control** in times of stress (e.g. user incentivisation)
  - Minimum geographic **coverage standards**
  - Ability to lock consumers into **longer term energy user contracts** (in exchange for home charging infrastructure supply)
  - **City coordination role** including land use and planning
  - **City government role as an energy supplier**
- Much work on business models remains unquantified

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## Business model innovation for electric vehicle futures. (CATAPULT, 2018)



- **Most promising business models type based on**
  - **Vehicle leasing** (better sharing) rather than ownership models
    - **Either via electricity company or the local authority**
    - One variant is to include electric mobility in **wider mobility packages**

### City Government needs

- A **coherent and accessible charge network**
- Strong and collaborative **partnerships with energy system stakeholders**
- **Integrated service approaches** to mobility



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## The USER-CHI Perspective

Carlo Vaghi

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## The GreenCharge Perspective

Reinhard Scholten and team

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## Discussion

### Your questions

Ideas...

- What is the **best way/place to spend money** to incentivise EV use, and how can local authorities make this fair to non-car owners (within the context of their SUMP)?
- What is the best way cities can help ensure business models have **longevity**? (e.g. operators do not suddenly withdraw important services)
- What is the most important **system specification** that cities can ask for to help make sure business models are successful? (e.g. during procurement)

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## Closing messages

Reggie Tricker

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## Thank you for your roadmaps

- Please submit remaining ones



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**Final GreenCharge conference**

Register now at:  
<https://informedcities.eu/events/20th-informed-cities-forum/>  
 25-26 October 2021

**Sessions on:**

- The role of science in decision making
- Repurposing mobility: the cases of Bremen, Oslo and Barcelona
- The future of electric mobility: which electric vehicle "fairytale" will you fall in love with?
- Rethinking energy sources for mobility

**informed cities**

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## Future programme

- No further site visits



- Closing webinar to gain final feedback and present conclusions

- GreenCharge to finish February 2022

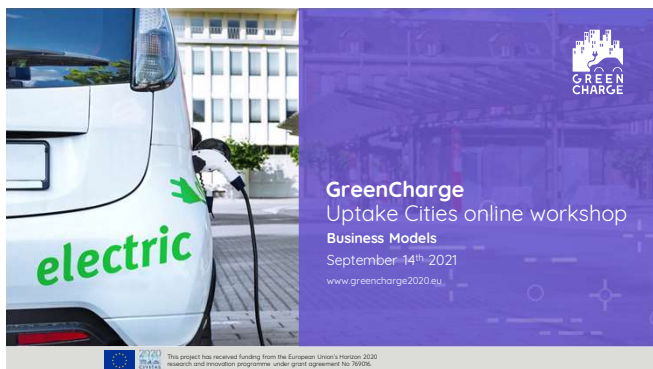


<https://twitter.com/GreenCharge2020>

<https://www.linkedin.com/company/greencharge-project/>

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

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## **A Appendix A**

### **A.5 Barcelona Site Visit, Roadmaps Resume and Lessons Learnt – Summary Report**





# Barcelona Virtual Site Visit and Roadmaps Resume

Report of Internal  
Uptake Cities Final Site  
Visit and Final Webinar

Webinar Date:  
08 February 2022,  
14:00 – 15:30

Prepared by ICLEI Europe  
Jasmin Miah  
Reggie Tricker



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



# Introduction

- The GreenCharge project coordinates an Uptake Cities Group (UCG). This document summarises the fifth and final webinar – a resume of the Uptake Cities Group’s experience – as well as the third and final (online) site visit to **Barcelona**
- **Part 1.** The Barcelona site visit introduced the UCG to the three Barcelona pilots of the GreenCharge project. A virtual guided tour including maps and video experiences helped created the feeling of being on-site and allowed for potential questions to be raised
- **Part 2.** The webinar gave the UCG a chance to reflect back on their **experience as Uptake Cities**, including their **roadmaps** which present their outlook, and share any final thoughts or ideas with the other Uptake Cities on mobility planning in their city. It assists with a forward look on the **exploitation** of the work undertaken by themselves as cities and by partners in the GreenCharge project
- This report summarises the presentations and discussions in the 90 minute webinar including the virtual site visit



# Attendees



## Uptake Cities represented

- City of **Budapest**, BKK
- City of **Edinburgh**
- City of **Krakow**
- City of **Zagreb**
- City of **San Sebastian**
- City of **Stockholm**

## GreenCharge Technical Partners

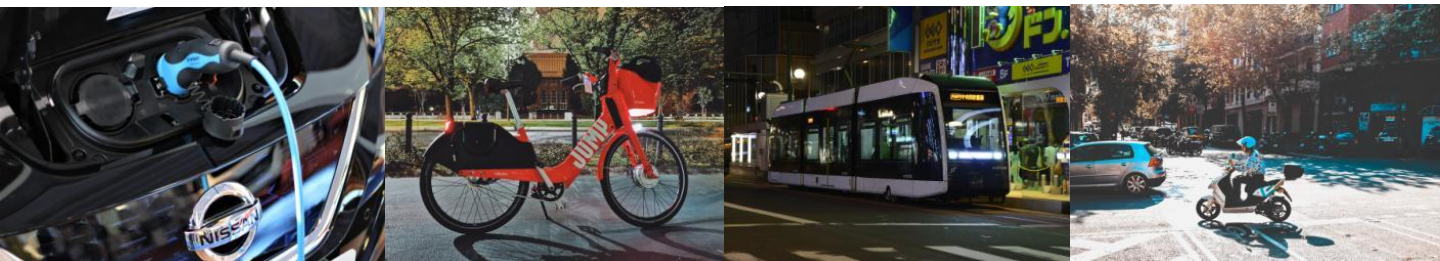
- Anne Kathrina Schwientek (City of Bremen)
- Reggie Tricker (ICLEI Europe)
- Jasmin Miah (ICLEI Europe)

## Speakers

- Regina Enrich Sard (Eurecat)
- Lluís Freixas i Clavell (Atlantis)

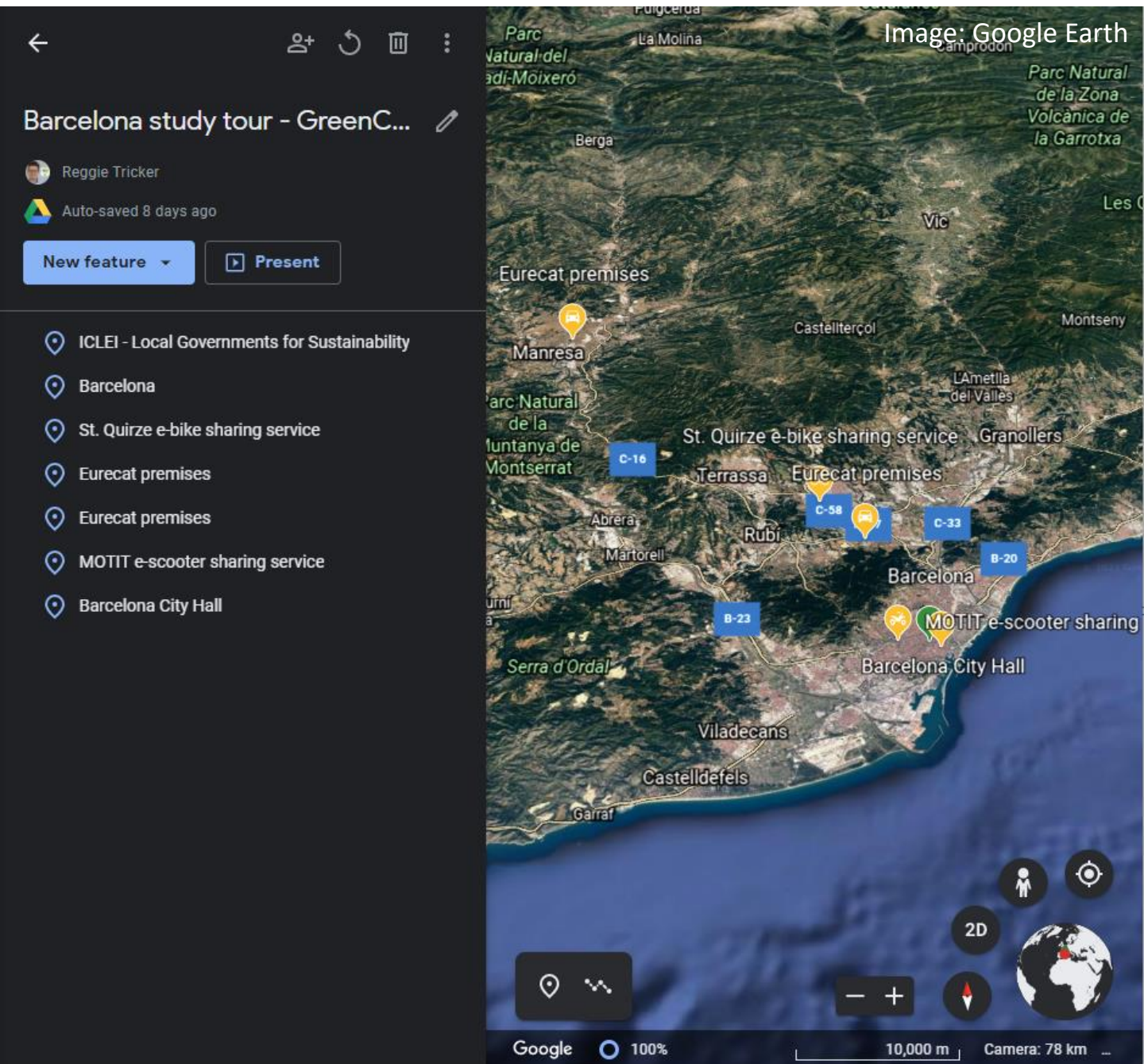
## Further consortium partners:

- Jacqueline Floch (Sintef)





# Part 1. Barcelona virtual site visit - overview





# Barcelona Demonstrator 1: ebike sharing (Regina Enrich Sard)



## Screenshots of site visit

**Stop 1: eBike share at public transport hubs. Is this something that your city would subsidise (i.e. financially support)?**

Response	Count
Yes - the city itself	1
Yes - the transport operator	0
No - must be self-funding	1
Not sure - let's talk about it	3

**Stop 1: eBike share at public transport hubs. What methods would you use to analyse mobility patterns around potential hubs?**

**Barcelona demonstrator: green e-bike sharing service**

**St. Quirze e-bike sharing service**

Image: Google Earth

## Barcelona demonstrator: green e-bike sharing service

- What:** Commuters can cover the last mile when using public transport with a sustainable alternative based on an e-bike sharing service supported by digital technologies.
- Why?** The lack of door-to-door public transportation alternatives for commuters leads to the use of private fuel-based cars causing traffic congestions and pollution.
- Our aim:** To provide a green mobility option for commuters, enriching their user experience with information about their trips and increasing service reliability and fleet control through real time monitoring.

### Target groups:

- Sustainable multimodality:
  - Commuters
  - Municipalities
  - Public transport operators
- Operation & Management
  - Light electric vehicles sharing operators
  - Charging points installers

### Innovative features:

- Optimal and coordinated use of energy for charging
- Optimal transport of energy for charging to reduce the need for grid investments

### Enabling features (state of the art):

- Shared electric vehicles for Mobility as a Service
- Use of energy locally produced by 1.3 kW solar panels
- Use of a 1.3 kWh stationary battery to match local production and demand

### Contributors:

- Enchufing (commissioning of charging points, solar panels and batteries)
- Atlantis (IoT devices, back-end software and app)
- Eurecat (energy management software)



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

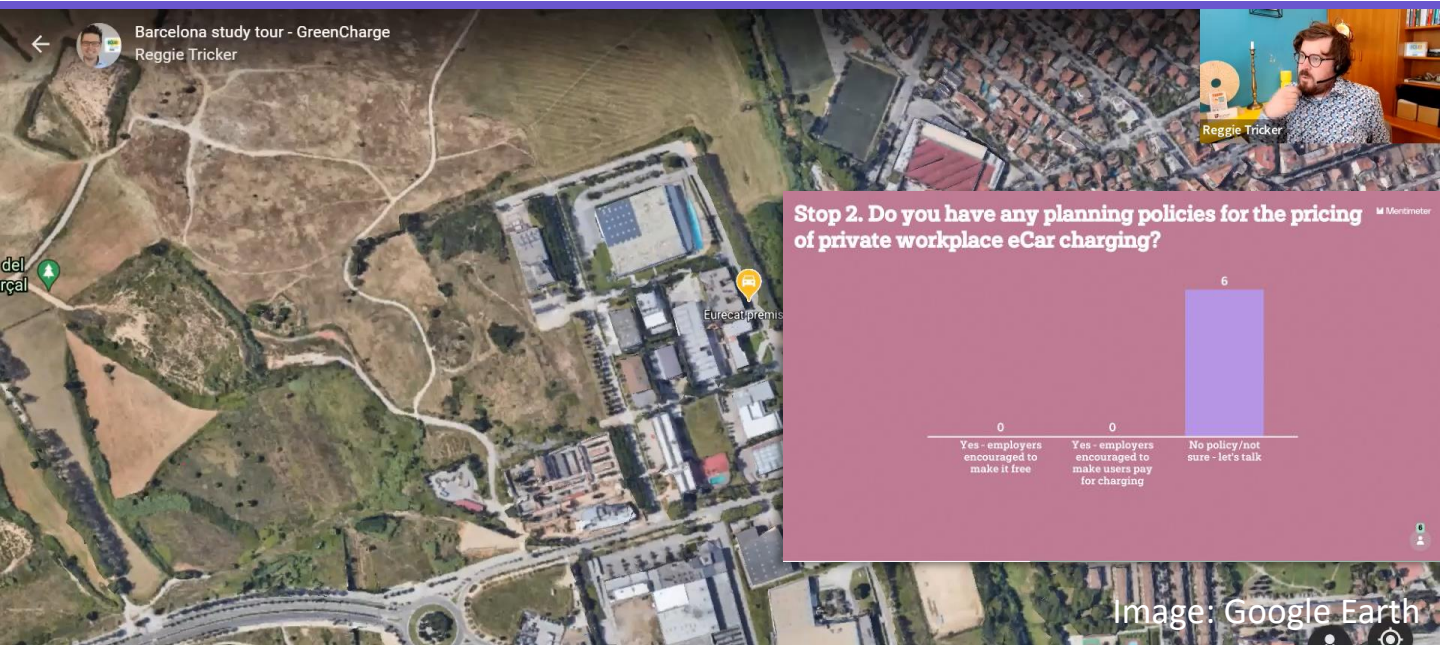
More about the Barcelona pilots can be found here:  
<https://www.greencharge2020.eu/pilot-sites-barcelona/>



# Barcelona Demonstrator 2: car charging at work (Regina Enrich Sard)



## Screenshots of site visit



## Barcelona demonstrator: charging at work



### Target groups:

- Owners of electric cars
- Companies (employers)
- Facility managers

### What:

Offer the possibility to charge at work for employees owning an electric car through shared charging points and optimal use of energy to minimize cost and environmental impact.

### Why?

The uncertainty of finding access to charging points contributes to dissuading car buyers to shift to electric cars.

### Our aim:

To make the life of electric cars' drivers easier and to minimise investment costs in charging infrastructures.

### Innovative features:

- Booking of charging point
- Maximising charging infrastructure usage
- Optimal and coordinated use of energy to meet preferences and constraints

### Enabling features (state of the art):

- Private charge points for collective use
- Use of solar energy produced locally
- ICT: sensors, software applications (apps, monitor, control)
- eRoaming - multiple premises accessibility

### Contributors:

- Eurecat (charging point operator, facility manager, software provider for booking and energy management)
- Hubject (eRoaming operator)



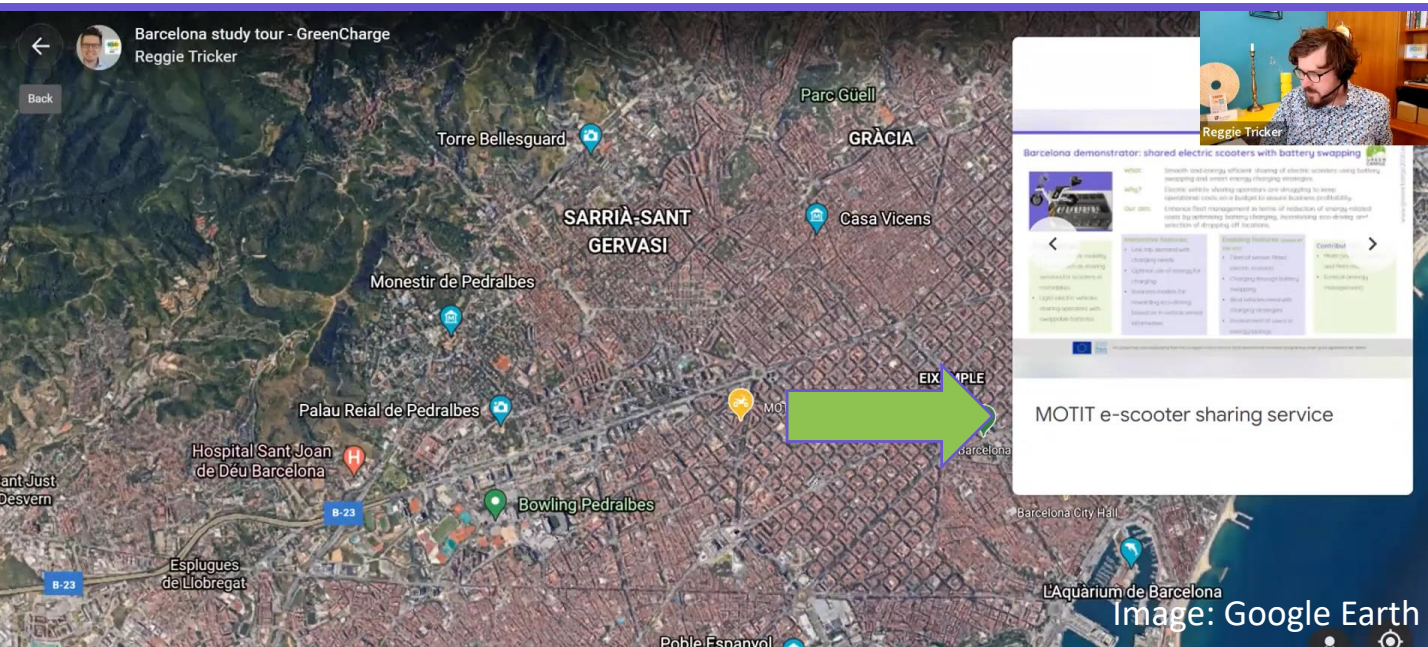
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 769016.

More about the Barcelona pilots can be found here:  
<https://www.greencharge2020.eu/pilot-sites-barcelona/>



# Barcelona Demonstrator 3: e-scooter battery swapping (Regina Enrich Sard)

## Screenshots of site visit



## Barcelona demonstrator: shared electric scooters with battery swapping



### What:

Smooth and energy-efficient sharing of electric scooters using battery swapping and smart energy charging strategies.

### Why?

Electric vehicle sharing operators are struggling to keep operational costs on a budget to assure business profitability.

### Our aim:

Enhance fleet management in terms of reduction of energy-related costs by optimising battery charging, incentivising eco-driving and selection of dropping off locations.

### Target groups:

- Users of electric mobility services such as sharing services for scooters or motorbikes
- Light electric vehicles sharing operators with swappable batteries

### Innovative features:

- Link trip demand with charging needs
- Optimal use of energy for charging
- Business models for rewarding eco-driving based on in-vehicle sensor information

### Enabling features (state of the art):

- Fleet of sensor-fitted electric scooters
- Charging through battery swapping
- Bind vehicles need with charging strategies
- Involvement of users in energy savings

### Contributors:

- Motit (sharing operator and fleet manager)
- Eurecat (energy management)



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

More about the Barcelona pilots can be found here:  
<https://www.greencharge2020.eu/pilot-sites-barcelona/>



# Meet the Supplier – Atlantis (Lluís Freixas i Clavell)



- In GreenCharge, they are involved in the Barcelona demonstrator #1 – e-bike sharing
- Atlantis is a technology company based in Barcelona
- Develop mobility solutions – for companies and individuals
- Work in over 16 countries with +250 clients



We are specialists in the development of solutions based on advanced digital technologies applied to mobility. We offer services to companies and individuals, responding to a multitude of needs.

## Businesses

Multi-platform solutions to help companies, which manage mobile resources (cars, machinery, etc.), to improve their competitiveness and/or their Digital Transformation.

Food Service

Security/Safety

Technical services

Machinery

Facilities

...

## Individuals

Solutions for private vehicle users looking for security and improving the user experience.

Atlantis Moto

Atlantis Car

Atlantis Van

Atlantis Scooter

Atlantis eBike

...



Atlantis IT S.L.U. (ATLAN)  
ES-08013 Barcelona  
Spain  
<http://www.atlantisit.eu/>

Contact: Ricard Soler  
[rsoler@atlantis-technology.com](mailto:rsoler@atlantis-technology.com)

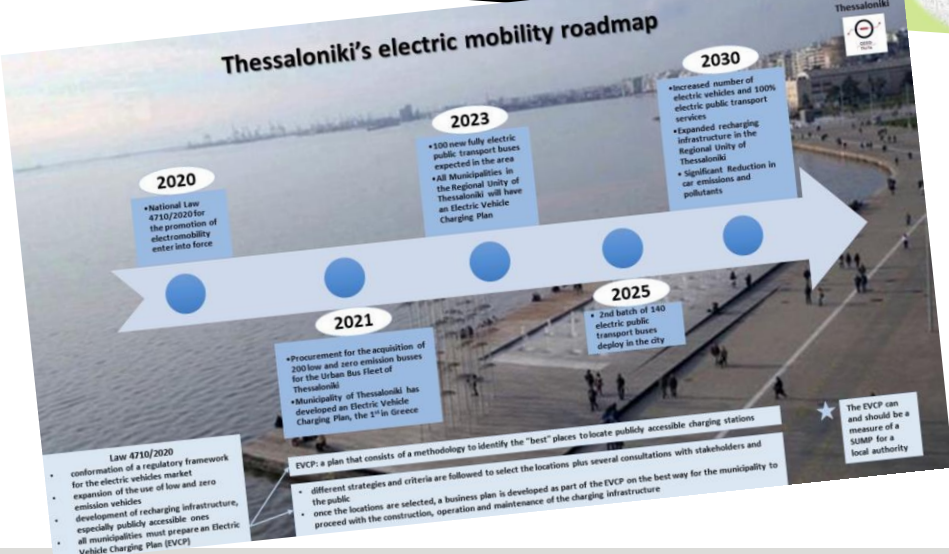
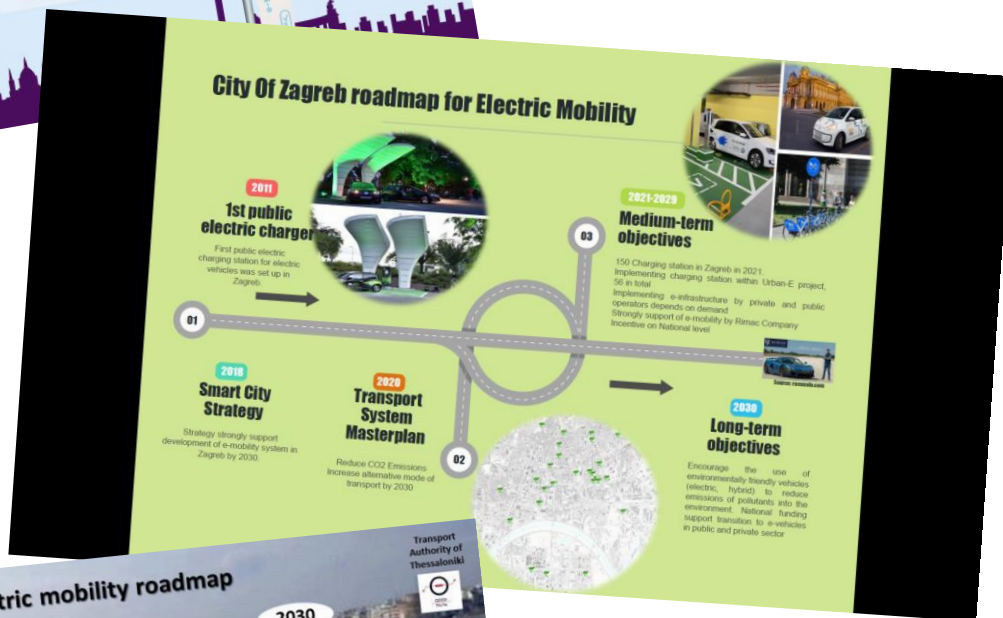
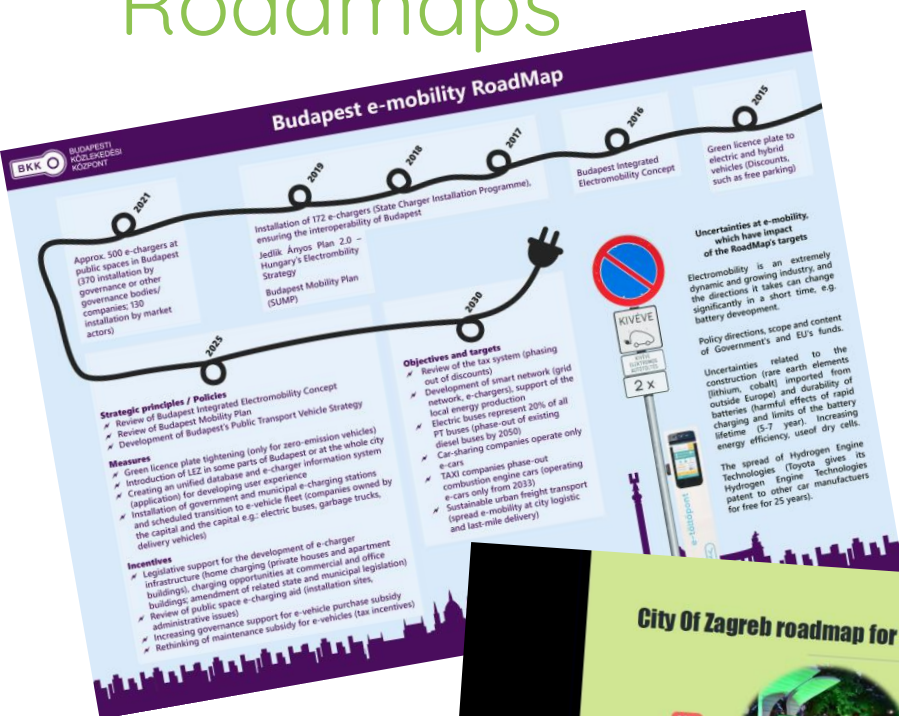


## Part 2. Uptake Cities Resume



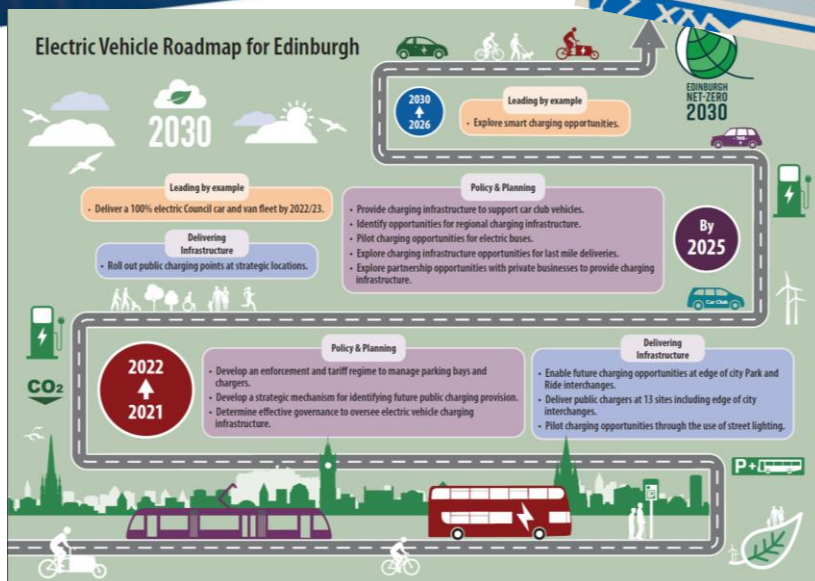
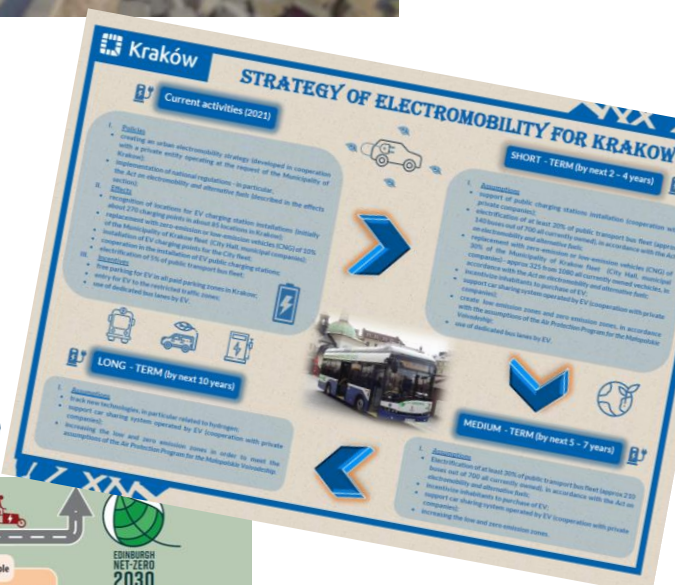


# The Uptake Cities' Roadmaps





# The Uptake Cities' Roadmaps





# Uptake Cities' GreenCharge experience – Lessons Learnt

**Reflection: What particular eMobility topics have you valued learning about over the last 3 years?**

Mentimeter

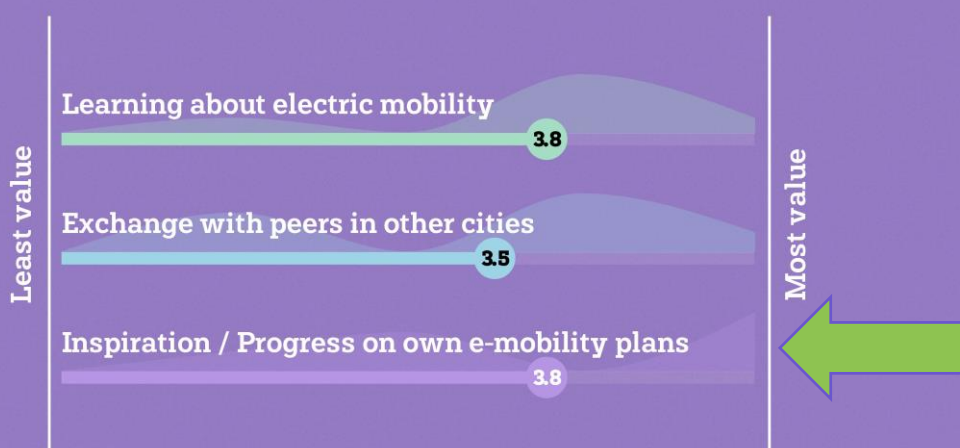




# Uptake Cities' GreenCharge experiences – Summary

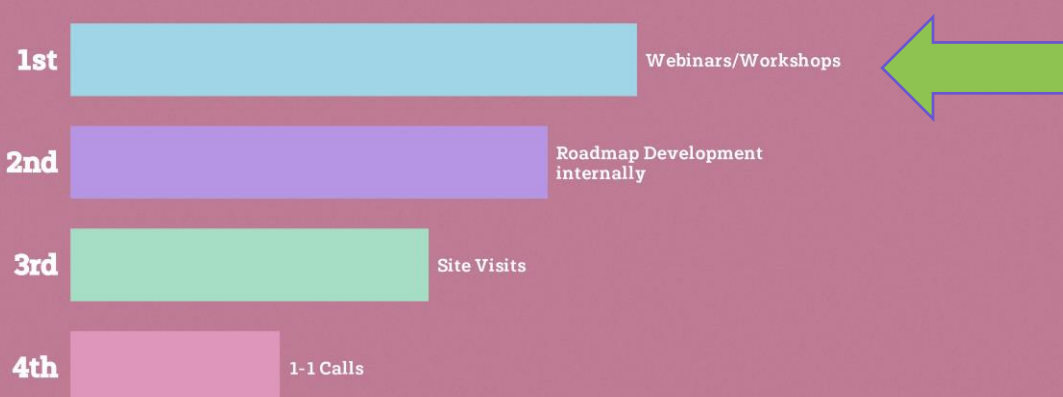
## GreenCharge: How would you value your different Uptake Cities' Experiences?

Mentimeter



## GreenCharge: What formats have been the most helpful to you?

Mentimeter



6



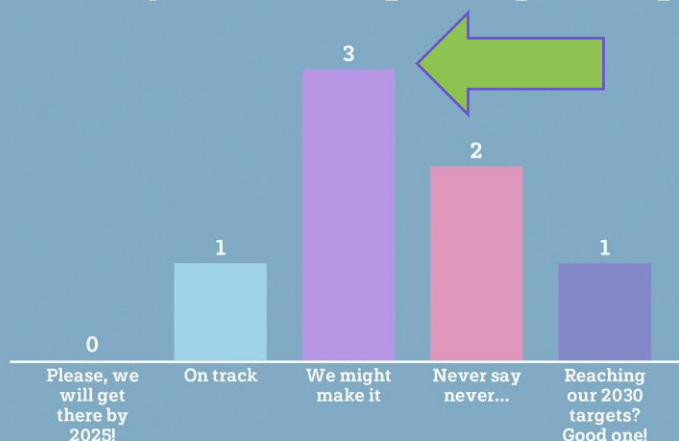
# Uptake Cities' GreenCharge experience – Mobility Planning

**Next steps: What are your priorities for new eMobility learning topics for the next coming 3 years in your city?**



**Next steps: How confident are you about meeting 2030 carbon reduction targets for transport in your city?**

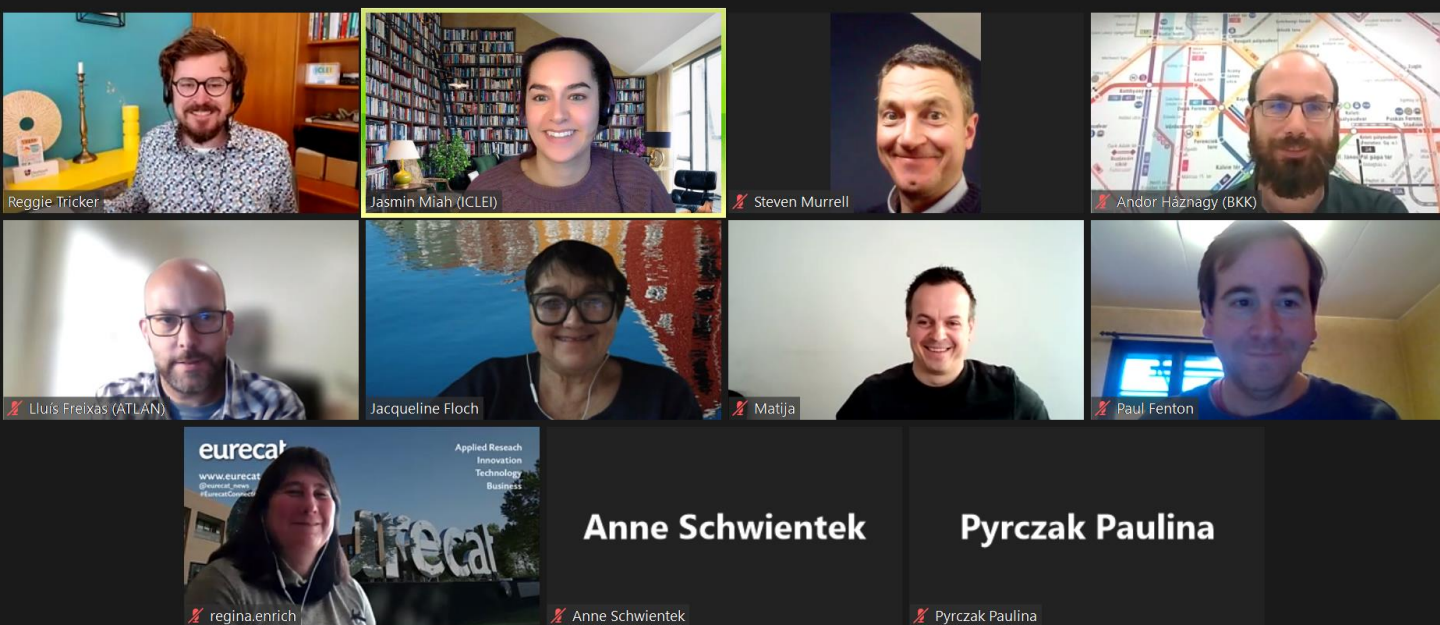
Mentimeter



7



# Farewell from the GreenCharge Uptake Cities Group



*„The roadmap is really useful for us because in the next months we will update the actual mobility strategy... And we will use all the knowledge we got and experiences from the project.“*

*„We really heard you ... Thanks for your efforts [despite the remote conditions].“*

*„Thank you for helping the city improve e-mobility.“*



## **A Appendix A**

### **A.6 Bremen Site Visit – Summary Report**





# Uptake Cities in Bremen

## Report of Study Visit

Visit Date: October 2019  
Report Date: December 2019

Prepared by ICLEI Europe  
Reggie Tricker  
Marko Horvat  
Elma Meskovic



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



# Introduction

- The GreenCharge project coordinates an Uptake Cities Group (UCG). This document represents the first of three reports summarising visits by the UCG to each GreenCharge pilot site.
- These visits are designed to allow GreenCharge to exchange expertise and learning between a range of cities at different stages of progress in implementing mobility solutions.
- GreenCharge supports UCG visits to its three cities (pilot sites in Bremen, Oslo, and Barcelona) plus a webinar e-learning programme.
- Each Uptake City will use this information to produce a roadmap to accelerate the adoption of electric mobility solutions.
- The findings from this process will be included within GreenCharge Deliverable 7.3 *Lessons Learned from Roadmap Development in Uptake Cities*, within the wider context of Work Package 7 on *Electricity in Sustainable Urban Mobility Planning*.



# Main Attendees

## GreenCharge Uptake Cities Group

- Matija Vuger (City of Zagreb)
- Björn Sjölander (City of Stockholm)
- Carmo Tovar (City of Porto)
- Jana Koleva (City of Burgas)
- Milena Perpelea (City of Ploiesti)
- Iñaki Baro (City of San Sebastian)
- Balázs Fejes (City of Budapest, BKK)
- Efthymios Kaliampakas (City of Thessaloniki/TheTA)
- Joanna Majdecka (City of Krakow)

## GreenCharge Technical Partners

- Joe Gorman (SINTEF, Project Coordinator)
- Reggie Tricker (ICLEI Europe)
- Marko Horvat (ICLEI Europe)

## GreenCharge Pilot Site Representatives

- Michael Glotz-Richter (City of Bremen)
- Beate Lange (City of Bremen)
- Regina Enrich (EURECAT, Barcelona)
- Paal Mork (City of Oslo)

## Acknowledgements

- We acknowledge the inputs and assistance from the City of Bremen in organizing the study tour and providing insights into the sustainable urban mobility planning process in Bremen.





# Structure of Report

- This report summarises the proceedings of two half days of the site visit, which were each subdivided into
  - a) introductory presentations
  - b) study tour
  - c) reflection and recording of learning (collected through a written form and group discussion/feedback)

## **DAY 1: Thursday 10 October 2019 (12:00 – 17:30)**

- Presentations - Introductions (Welcome to GreenCharge to Uptake Cities, Reggie Tricker, ICLEI; Overview of Bremen, Michael Glotz-Richter, City of Bremen)
- Site Visit 1- Visit by tram to electro-mobility in Bremen city centre (including visit to Rytle cycle logistics company)
- Reflections

## **DAY 2 - Friday 11 October 2019 (9:00 – 13:30)**

- Presentations - Uptake Cities case studies (Balázs Fejes, Budapest; Iñaki Baro, San Sebastian)
- Site Visit 2 – Walking tour of electro-mobility around Bremen (focused on car sharing points)
- Reflections



# Introductions from the Uptake Cities

An exercise was carried out where Uptake Cities interactively introduced each other and compared their emobility progress.

- *Cities organised themselves in a virtual map of Europe across the floor, introducing who they are and where they are from*
- *Cities arranged themselves in a line in order of the number electric car charging points in their city*
- *Cities arrange themselves in a circle. Each takes a step forward according to if they have:*
  - *Electric car charging points*
  - *Electric buses*
  - *Electric bike sharing*
  - *Electric scooter sharing (mopeds or scooters)*
  - *Local renewable energy charging*
  - *Battery energy storage for e-vehicles*

This exercise confirmed a range of emobility progress within the UCG, with some leading examples through to those just starting out.





# Introduction from the City of Bremen

- The City of Bremen provided an overview of its sustainable urban mobility planning activities, highlighting particularly the role of car sharing stations and cycling infrastructure improvements that have allowed it to moderate car use in the city over time



- A copy of a similar presentation by Michael Glotz-Richter may be downloaded from the CIVITAS website:
- [https://civitas.eu/sites/default/files/documents/carsharing\\_bremen.pdf](https://civitas.eu/sites/default/files/documents/carsharing_bremen.pdf)



# Uptake Cities Focus: Spotlight on Budapest



## Points from presentation on electric mobility in Budapest

- BKK oversees a number of transport service providers
- 23 very autonomous districts. No regional level governance, just city and state
- Sustainable Urban Mobility Plan (SUMP) passed in spring 2019. City of Budapest did a separate Sustainable Energy Action Plan
- 330 cars per inhabitant in the city
- 66% of Budapest public transport trips currently electrified, mostly trams
- Car sharing - 450 electric cars plus internal combustion engine (ICE) cars
- Issues with electric buses due to operation, problem with hills and winter
- Tendering is a way of improving bus vehicle standards
- C 4000 fully electric vehicles in Budapest
- State-driven electric charging point programme across Hungary. 22kw mainly and a few DC 50kw. State operates most of them and some electricity providers plus some at supermarket and petrol station
- 8 new bridges planned across the river in Budapest, 6 in the city centre
- Bike sharing was a way of priming citizens for sharing private mobility
- Financing - a lot of developments funded by EU, including trams and trolley buses, plus some government funds
- Time taken to phase out private cars in response to car sharing an issue
- Power grid is centralised so difficult to introduce local renewables. High nuclear energy mix, but little renewable

## BUDAPEST – city overview

- Economic, touristic, social, educational, transport hub of the region
- **1.750.000 inhabitants, 525 km<sup>2</sup>**
- **Divided into Buda and Pest by the River Danube**
- **Complex, two-tier municipal system**
  - Municipality of Budapest (Mayor of Budapest)
  - 23 districts – 23 municipalities and mayors
- **Metropolitan region (80 towns/villages)**
  - Further 800 000 inhabitants



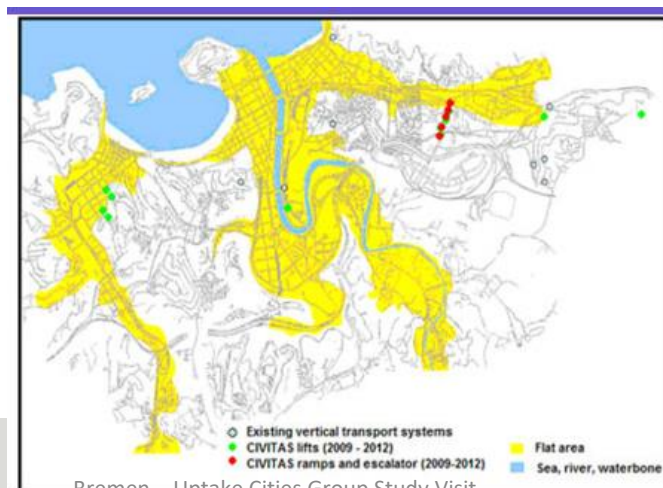


# Uptake Cities Focus: Spotlight on San Sebastian



## Points from presentation on electric mobility in San Sebastian

- One tenth the size of Budapest, 30km from France
- 49% walking modal split
- 50:50 flat and hills; CIVITAS supported lifts and escalators. 30 items of vertical equipment - automated driverless and free lifts
- 2007 first steps for clean mobility with hybrid police cars
- 2008 SUMP
- 30 hybrid ebuses. Full electric buses still in test phase. 250km range with buses meets city requirements
- Car sharing difficult in a small city. Trial 2012-14 was not continued in the urban environment. Car sharing focussed for journeys outside of the city now (Budapest also thinks car sharing should not operate in centre of town but business case poorer)
- First 100% pedelec bike share system in 2013. 3rd generation ebike share system about to be tender, with some non-assisted bikes too.
- 59 charging sockets, 25 new points in 2020. 4 fast chargers
- Electric motorbikes being renewed and new electronic buses and REPLICATOR project
- Implementation plan for emobility ongoing, combining infra and promotion
- Electrificate campaign during Mobility Week to encourage employers to try an electric car for a week. So far employers want to use bus lanes for e-cars but public transport very good so city is protecting it
- Renewable energy split not known, but ebike providers asked to say where energy would come from but not asked for local renewables.



Bremen – Uptake Cities Group Study Visit

Bremen, 11<sup>th</sup> October 2019 – Bremen Site Visit



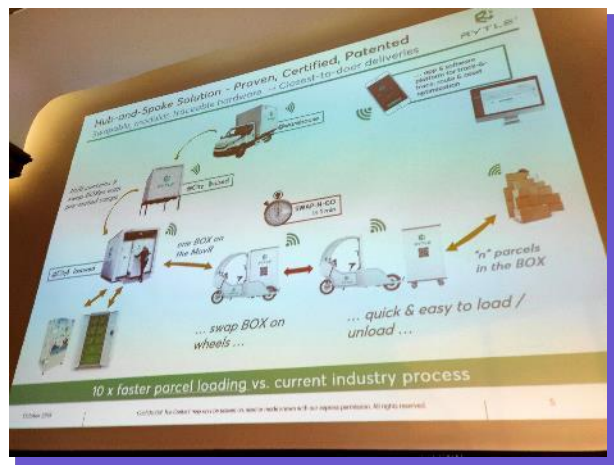
Proportion of  
population living in  
**flat and hilly areas:**  
**50%**



# Study Tour 1 – Electric Cargo Bike Logistics



- Participants were invited to a seminar at the Rytle company, a local start-up company specializing in cargo bike logistics, with question and answer session, and trial
- An electric cargo bike system that accepts euro-pallet loads and “swap boxes” decanted from a larger vehicle was demonstrated





# Study Tour 1 – Electric Cargo Bike Logistics



## Points from presentation on electric cargo bike mobility

- 1 vehicle or 200 parcels is the norm per zip code
- 50 parcels go into a box, and then 9 boxes go into a hub which fits into a van
- Generally the cargo bikes can go 70km but 30-40km is standard distance
- Bikes can travel up to 15% gradient e.g. from parking garages with 200kg load
- Some commercial sensitives over sharing customer data to sort parcels into boxes through the supply chain. So couriers sort themselves into box size loads
- Business models are very important and crucial, alongside the software and the hardware
- On street bike charging points not a key issue. Portal charging system could use hubs to store and charge batteries
- Traditional delivery vehicles are starting to cause congestion amongst themselves. Bicycle friendly cities are in fact now better for freight
- Most of the larger truck manufacturers only limited electric trucks, mostly used for promotional purposes
- What Three Words concept is used for accurate targeting of vehicles to addresses

## Industry acronyms:

- CEP - courier express parcel delivery





# Study Tour 2

- Participants were taken on a tour of car sharing stations, learning about design, siting and complementary sustainable urban mobility measures, such as cycling improvements
- This demonstrated the success with deploying car sharing on a neighbourhood-scale at fixed locations which mix EVs and non-electric vehicles





# Learning points from study tours

## - 1. Sustainable Urban Mobility Planning

### A. Innovation

Participants shared the following points from the Study Tour on areas they found positive and innovative.

- Integrated, user-oriented strategy based on consumer needs instead of tech-oriented approach
- Pedestrians and cyclists have become an important focus of the city planning
- A system of circulation in the city area allowing only pedestrians, cyclists, residents, and service vehicles to go through
- Introduction of bicycle lanes and pedestrianisation and strict control of pavement/cycle lane/road space, according to the city's political priorities and challenges
- Redesign of road surface to better serve cycling, and creation of a bicycle street and bicycle zone
- Reduced car parking spaces in new residential areas



# Learning points from study tours

## - 1. Sustainable Urban Mobility Planning



### B. Replication

Participants shared the following points from the Study Tour on things they thought would help replication in their own city.

- Ways to give courage to the politicians to do what is best for the city without being afraid of the few that will complain.
- Establishing what the citizens' needs are and reconciling/matching them with the priorities of the municipality to address the gap in expectations. Cooperation in order to gain more political support
- Strategic planning (in the field of mobility and urban planning in general), policy-making and decision-making processes to reduce cars in the city to avoid congestion and pollution, with city planning in new areas focused on car sharing and cycling
- For example, success stories from other cities encourages politicians to back new ways of organising mobility and pushing innovation, reducing car ownership
- Make space for the bikes, and make infrastructure mental and physical
- Regulations, restrictions and certification
- Replicate “ADAC Award” for GreenCharge to highlight good practices - "Michelin star" award



# Learning points from study tours

## - 1. Sustainable Urban Mobility Planning

### C. Knowledge Gaps

Participants shared the following points from the Study Tour on things they would still needed to know.

- How to better plan the urban space and mobility. How did you manage to overcome all the obstacles? How to persuade the public and politicians to give cars less space and priority. Change management

Is there a special way Bremen enabled politicians to be brave?

*Politicians ride bikes, not hiding in a black limousine, leading by example...*

Michael Glotz-Richter, City of Bremen

- Collaboration between "local politicians" (district mayors) and citizens
- MaaS - Mobility as a Service. How to combine infrastructure measures with smart measures in an integrated approach
- How to adapt solutions to a local context (e.g. port, tourism)
- Failures and worst practices, e.g. problems with electric public transportation
- More about Oslo (in general)



# Learning points from study tours

## - 2. **Car Sharing**



### **A. Innovation**

Participants shared the following points from the Study Tour on areas they found positive and innovative.

- Design of Mobilpunkt. Decentralised car-sharing, with many, frequent small customer-oriented car sharing stations near to houses in neighbourhoods
- Collaboration with companies in the siting and installation of a car sharing system – based on feeling not just science
- Electric car sharing, and combined carpool with public charging for electric cars
- Blue is advisory marking at Mobil point, making implementation slightly easier
- Help provided by the call centre office. Customer service and proximity important with car sharing. If car isn't back you get a taxi paid to the next Mobil point
- Mindshift from car driving to car sharing



# Learning points from study tours

## - 2. Car Sharing

### B. Replication



Participants shared the following points from the Study Tour on things they thought would help replication in their own city.

- Building connection with fire brigade/waste collectors to support removal of cars from congested streets
- Considering many small car sharing stations rather than big hubs, and creating a "Mobility island" - where bike sharing, car sharing, e-charging, and similar services are provided
- Engaging and meeting with more private car sharing actors, and how to bring car sharing service providers into the city
- Consumer-centric car sharing based on needs/gains and satisfaction level
- Rethinking free-floating carsharing to partially a station-based approach
- Legislation that is more flexible around parking - legislation cannot keep up with real life development



# Learning points from study tours

## - 2. Car Sharing

### C. Knowledge Gaps

Participants shared the following points from the Study Tour on things they would still needed to know.

- Plan for electrifying car sharing
- Legal framework
- The car sharing survey
- Who are the car sharing companies





# Learning points from study tours

## - 3. Cycle Logistics

### A. Innovation

Participants shared the following points from the Study Tour on areas they found positive and innovative.

- The interchangeable "pod" concept with smaller boxes fitted for cargo bikes to link with pick-up points. Cargo trucks are able to park up, with forward delivery by cargo bikes
- Proposed standardisation not only for city logistics, but for the whole supply chain of logistics
- Last metre (not just last mile) delivery concept
- Inclusion of the "what 3 words" addressing mechanism, enabling more efficiency in the delivery
- Sensors for pollution are included in the bicycles

### B. Replication

Participants shared the following points from the Study Tour on things they thought would help replication in their own city.

- Change of legislation around parcel delivery
- Availability of space for off-and on loading, and charging of bikes
- Public authorities' role in helping market driven businesses with hub space and market openings for these businesses
- Incentivisation of deliveries with cargo bikes, building on existing services like the post letters
- Flexibility of being able to locate portable hubs

### C. Knowledge Gaps

Participants shared the following points from the Study Tour on things they would still needed to know.

- How the routing algorithm determines the "optimal" delivery route, based on what parameters (distance? time? energy?)



# Learning points from study tours

## - 4. **Charging Infrastructure**

### **A. Replication**

Participants shared the following points from the Study Tour on things they thought would help replication in their own city.

- Car charging - successful business models, collaboration with stakeholders and utility companies
- Know-how and implementation of the charging infrastructure

### **B. Knowledge Gaps**

Participants shared the following points from the Study Tour on things they would still needed to know.

- Business models for PV charging (i.e. PVs on garage rooftops), Renewable Energy Systems for the purposes of the bike sharing system and parking.
- More information about charging infrastructure regarding electromobility.



# Next Steps for Uptake Cities in GreenCharge

## Spring 2020

- The next **webinar** will focus on assisting Uptake Cities understand different options for road maps to progress with electric mobility planning and implementation
  - *A Doodle poll will be circulated to agree a date*

## The next site visits will be arranged for:

- Oslo – June 2019
- Barcelona – September 2019





## **A Appendix A**

### **A.7 Oslo Site Visit – Summary Report**



Image:  
Andre Ouellet,  
Unsplash

# Uptake Cities in Oslo

## Report of Study Visit (Online)

Visit Date: 20 January 2021,  
13:00 – 15:00

Prepared by ICLEI Europe  
Elma Meskovic  
Reggie Tricker

Last updated: 17 March 2021



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



# Introduction

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- GreenCharge supports UCG visits to its three cities (pilot sites in Bremen, Oslo, and Barcelona) plus a webinar e-learning programme.
- The study visit to Oslo – focusing on e-mobility in Winter – would have been the second to have been held physically. Due to circumstances brought on by the Covid-19 pandemic, however, the visit was put off until a mini virtual study tour had to be held in its place.
- These visits are designed to allow GreenCharge to exchange expertise and learning between a range of cities at different stages of progress in implementing e-mobility solutions.
- Each Uptake City will use the information presented during the study visit to produce a roadmap to accelerate the adoption of electric mobility solutions.



# Main Attendees

## Invited Organisations

- City of [Bremen](#)
- City of [Brno](#)
- City of [Budapest](#), Bkk
- City of [Burgas](#)
- City of [Dresden](#)
- City of [Edinburgh](#)
- City of [Krakow](#)
- City of [Ploiesti](#)
- City of [Porto](#)
- City of [San Sebastian](#)
- City of [Stockholm](#)
- City of [Thessaloniki](#), TheTa
- City of [Zagreb](#)

## GreenCharge Technical Partners

- Jacqueline Floch (SINTEF, Project Coordinator)
- Reggie Tricker (ICLEI Europe)
- Elma Meskovic (ICLEI Europe)
- Marko Horvat (ICLEI Europe)

## Speakers

- Paal Mork (City of Oslo)
- Karen Byskov Lindberg (SINTEF)
- Kjetil Hetland (Røverkollen)
- Terje Lundby (ESMART)

## Acknowledgements

- We acknowledge the inputs and assistance from the City of Oslo in organising the virtual study tour and providing insights into winter time electric vehicles and charging in Oslo.

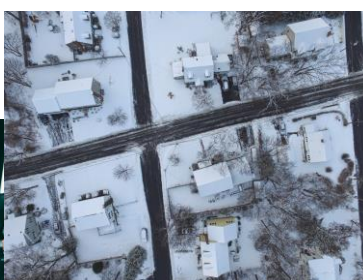
and all GreenCharge partners



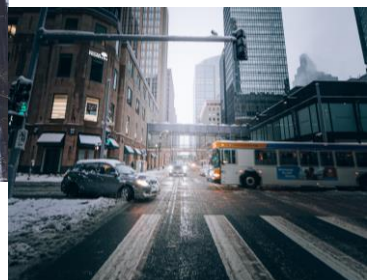
Source: Herr Bohn, Unsplash



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Source: Josh Hild, Unsplash



# Structure of Report

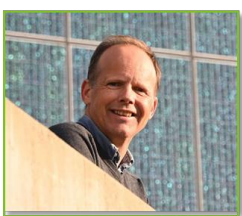
- This report summarises the proceedings of the two hours of the mini virtual study visit, which were subdivided into:

## Video tours:

- a) **Introduction to Oslo and Røverkollen site** (Paal Mork, City of Oslo) (Video)
- b) **Demonstration of how to charge with the GreenCharge app** (Kjetil Hetland, Røverkollen housing association) (Video)

## Presentations:

- c) **GreenCharge demos in Roverkollen, grid capacity, and load balancing** (Karen Byskov Lindberg, SINTEF)
  - d) **Smart charging with predictions** (Terje Lundby, eSMART)
- Q&A with the experts**





# Study Tour 1 – Introduction to Oslo and Roverkollen



## Overview of tour

- Paal took participants on a virtual drive in a Tesla down a snowy road in Oslo to debunk the myth that rain and snow lead to a lower range in electric vehicles due to cold batteries.
- The tour featured a street that went from being very congested to now a **space for recreation and pedestrians**, a fortress from the 12th century, the City Hall, and the Roverkollen pilot area.





# Study Tour 1 – Introduction to Oslo and Roverkollen



## Points from presentation on winter charging and EVs in Oslo

- As long as necessary precautions are taken, there **should not be any problems with driving EVs during Winter**.
- One thing that may pose a challenge is **charging**, especially for individuals living in a city apartment without any possibility for private parking.
- EVs might require slightly **more charging time in Winter**, as batteries may need to heat up before charging.
- More than **2,000 charging stations**, installed throughout the city, have been provided by the City of Oslo.
- The City of Oslo is offering **support to housing cooperatives** that are investing in charging infrastructure.
- Once challenge for housing cooperatives can be **limited grid capacity**. The GreenCharge project aims to address this by offering solutions that can secure charging possibilities for EV owners, including those who live in housing cooperatives with limited grid capacity.
- The Roverkollen pilot demonstrates **smart charging and local energy production**, thereby showing that EV charging is possible even when grid capacity is limited.
- **Public chargers** have been installed in Roverkollen and EV owners can book a timeslot via a mobile app to ensure that they are able to charge when they arrive. All one has to do is download the app, indicate the time of arrival, and charge.

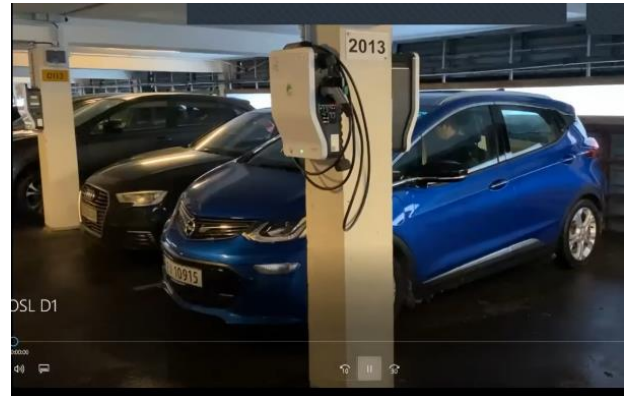




# Study Tour 2 – Charging

## Use of the GreenCharge app

- Kjetil Hetland, the chairman of the housing community at Roverkollen, took participants into the garage to see how **charging an EV** looks like in practice.
- EV owners enter the amount they want to charge in an app and the time they will depart. The system then calculates how much power is needed and ensures that the **right amount of charging is provided before departure**.



- If everyone were to charge their EVs at the same time, this would exceed grid capacity. **Smart charging** is a way to avoid this.
- For an additional cost, it is possible to choose a **priority setting** which prioritises power to the EV.



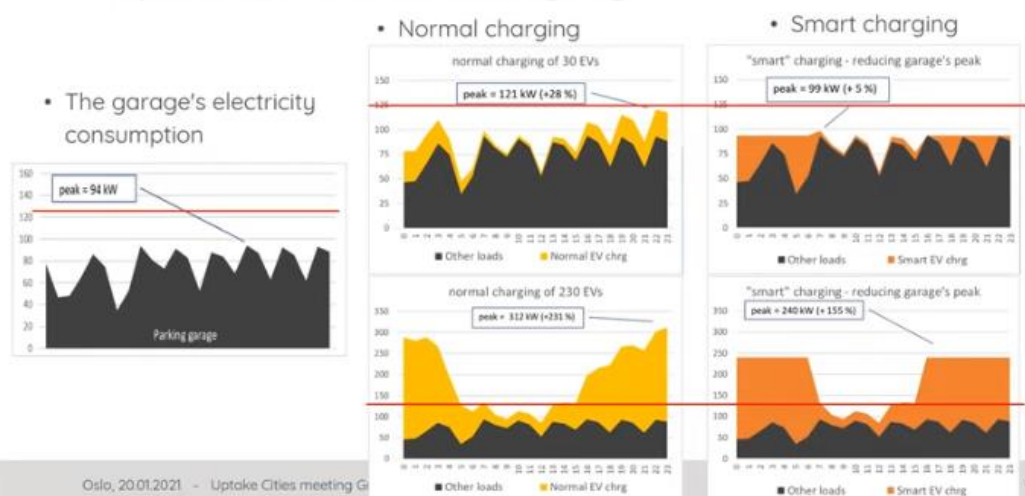
# Presentation 1 – GreenCharge demos in Røverkollen



## Points from presentation on the GreenCharge demos in Røverkollen, grid capacity, and load balancing

- The City of Oslo has a goal to **cut greenhouse gas emissions 95%** by 2030. Considering that 40% of total emissions come from transport, e-mobility is seen as a means by which to achieve this ambitious goal.
- **70% of Oslo's residents live in apartments** and have limited access to charging facilities, thus creating an obstacle to achieve the City's electric mobility targets.
- The Oslo pilot involving the resident housing cooperative consists of **two demos**:
  - (i) allowing for charging at the private parking spaces of residents living in the apartments, and
  - (ii) installing four outdoor chargers for visitors.
- The housing cooperative consists of five apartment blocks and a large, **four-storey garage** with 230 parking spots.
- The garage includes **solar PVs on the roof, a basement with a stationary battery**, and new bus bars on each floor, allowing its electric grid to handle the charging of 230 EVs.
- Of the 60 charging boxes that have been installed in the garage, 35 are currently operating.
- Increasing the availability of **charging possibilities incentivises the purchase of EVs**. Prior to GreenCharge there were 15 EVs in the garage, today there are 35.
- **Smart charging** distributes charging so that peak power is not increased. For the garage to be able to accommodate 230 EVs, both smart charging and reinforcement of the garage's intake capacity is needed.
- It is important for residents to have the possibility to charge at their **private parking spot**, and this circumvents the need for having to move the car after charging.

## Impact of smart charging





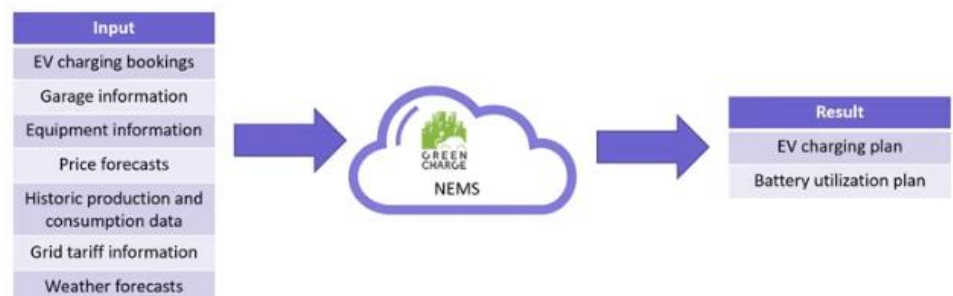
# Presentation 2 – Smart charging with predictions



## Points from presentation on smart charging in the GreenCharge demo site

- Smart charging, the installation of solar PVs, and the use of the battery have made it possible to **increase EV charging capacity** in the garage.
- The **Neighbourhood Energy Management System (NEMS)** was installed to find an EV charging plan that is able to respond to charging demand in the most optimal and cheapest way.
- NEMS uses **various inputs** to determine optimal charging plans, e.g. charging bookings, price forecasts, historic production and consumption data, weather forecasts (useful to predict power production), as well as garage, equipment, and grid tariff information.
- Based on new booking information, NEMS develops a new **plan for the garage and utilization of the battery**, which is then distributed to different charging points in the garage.
- ESMART develops a plan for different zones in the garage, while ZET (another company in ESMART) takes the plan and develops **plans for each charging point** from it.
- A plan is made **every 15 minutes** for the next 48 hours.
- If there are any communication issues as a result of several systems simultaneously interacting with one another, the charging points would still know what to do for the next 48 hours.

## The NEMS finds an optimal charging plan using various input





# Q&A round



## What is needed to have something similar (charging spots in housing cooperative)?

- *Kjetil: **Several different elements** are needed, namely power from grid, infrastructure (i.e. floors/garage) so that chargers can connect to the grid, an adequate number for use spread across the different floors.*



## Are you considering to upscale the PV capacity at Roverkollen when more EVs show up at the garage?

- *Karen: We will not increase the size of PV within the framework of GreenCharge. It is a modular installation, so it is **simple to extend it**, but this will be up to the housing association.*
- *Kjetil: There are no plans to upscale the PV capacity for now. **Adding more battery will probably be more useful** than adding PV at this moment.*



## Do you plan to use vehicles for electricity storage along with the batteries, i.e. Vehicle2grid?

- *Kjetil: **Some vehicles have the possibility to store electricity**, and some do not. The problem lies with the warranty, if you use it in reverse, you lose the warranty, so OEMs have to enable this.*

## Is charging in public streets going to be mainly DC charging?

- *Paal: It needs to **combine fast and normal charging**. It may not be possible to provide enough slow chargers for EVs in the future, so fast chargers needed to meet charging demand. Fast charging are likely the best solution for logistics and taxi stands.*
- *Kjetil: From a consumer perspective, there is only a need to charge for daily usage (40km, between 6-8Kw, could be achieved with one hour of normal charging). For daily usage, there is need for an **AC charger**. Fast charging is for times when one has an empty battery and needs to fill it up quickly (e.g. on the road). In Norway, **fast chargers are placed at gas stations and restaurants**, for example.*
- *Budapest: In Budapest, DC charging is the only way to go. **Fast charging is not the best for batteries**, and is only available where it is needed. The focus is rather on slow and medium charging as much as possible.*



## What is the situation like in Porto, by comparison?

- *Porto: Currently Porto has an app for booking charging. Winter charging is currently not a topic of discussion due to the lack of snow and proper Winter cold - however, with climate change this may change. There are problems in city centre in Porto when it comes to parking/charging due to the **compact nature** of the area. If someone wants private charging, they can ask and install it for their own use. The city is currently focusing on public transportation and making it greener with more electric buses.*



## Regarding the charging for visitors, does the app have a reservation limit? What happens if a timeframe is booked, but the person does not show up - i.e. is the timeframe freed for other users?

- *Paal: These are **issues that are still being tackled** at the moment in an effort to find solutions. If any city has experience, they are encouraged to share learning with GreenCharge.*
- *Stockholm: Berlin and Malaga will be testing bookable charging spots as part of the **MEISTER** project. In Stockholm, the possibility to demonstrate something similar was also explored, but charging operators were not interested in the idea.*





# Next Steps for Uptake Cities in GreenCharge

## Summer & Winter 2021

- Webinar 4
- Distance online coaching
- Development of individual roadmaps for integrating eMobility into SUMP

### Contacts

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Source: Felipe Furtado, Unsplash