greencharge2020.eu

GreenCharge Project Deliverable: D6.2

Data Collection and Evaluation Tools

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About GreenCharge

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

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

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

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

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

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

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Executive Summary

This deliverable presents the data collection and evaluation tools to be used to perform the assessment of stakeholder acceptance within GreenCharge project.

The assessment will consist of the computation of the KPIs already defined in deliverable D5.1-D6.1 Evaluation Design and Stakeholder Acceptance Evaluation Methodology and Plan. For most of the KPIs the information required to calculate the KPIs will be based on human interaction. The proposed tools to get this information from users are surveys, interviews, workshops and focus groups.

Surveys are one of the basic tools that will be used to gather user's feedback. According to CIVITAS guidelines, the design of a survey should take into account: objectives of the survey, population to be sampled, relevance of data, precision required, method of measurement, and sampling units. There are several type of surveys, but the ones envisioned to be extensively used in GreenCharge are on-line surveys and paper-format surveys.

Since the population to be sampled is not very big, there is the risk of low participation. However, the size of the sample enables the direct contact and facilitates user engagement. Special attention will be paid to that risk and some mitigation actions has been envisioned such as incentivising including a draw or lottery for participants.

According to CIVITAS analysis, online surveys are the ones with the lowest rate of responses. However, they are very convenient in terms of accessibility to participants (they can provide their answers whenever and wherever it is suitable for them). To mitigate the risks, some incentivising mechanisms will be put in place.

Apart from surveys prepared by GreenCharge partners, additional information can be gathered from external surveys or collaboration with other initiatives. These surveys may help to contextualise the results and for comparison.

Interviews, workshops and focus groups offer a richer interaction with users and enable to capture details that may be overseen in surveys. They have the handicap to gather a group of people in a place for a specific time slot. For efficiency purposes, synergies will be established with other tasks in the project that need also to organise meetings and events such as business model workshops, local reference group meetings, uptake cities meetings and any other relevant dissemination event.

Additional channels to gather user's feedback are user support sections in apps or web pages where users provide comments or complaint about some aspects of the application or service or user satisfaction surveys embedded in apps.

Calculation of KPI analysis will be performed based on data retrieved by the mechanisms previously described. The process is highly manual. In some cases, some categorization of answers may be needed to group and quantify the results. It is not envisioned the used of any additional tool for data processing beyond standard spreadsheets. Eventually, the results may be displayed in an integrated tool for evaluation developed within WP5.

The evaluation process will happen at the end of each iteration of the pilots. For the first iteration, the base line data gathering for most demonstrators will start in February-March 2020 and the evaluation will be completed by July 2020.

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List of Abbreviations

Table 1: List of abbreviations

Abbreviation	Explanation
DoW	Description of Work
SoC	State of Charge
URL	Uniform Resource Locator

1 About this Deliverable

1.1 Why would I want to read this deliverable?

This deliverable presents the tools that will be used for data collections and evaluation of stakeholders acceptance. The reasons that have led to the choice are also explained.

1.2 Intended readership/users

This deliverable is mainly targeting groups of readers:

- Pilot site managers to keep in mind the relevance of data collection and the purpose.
- Business model developers to identify to collaborate in the preparation of surveys, since they might need to collect also feedback from stakeholders
- Dissemination activities organisers to coordinate events that might help to gather survey participants
- As a public delivery it may help to decide on data retrieval processes from users for similar initiatives.

1.3 Other project deliverables that may be of interest

It is recommended first to read D5.1-D6.1 to get familiar with the application of CIVITAS methodology and the definition of KPIs selected to be evaluated in the project and the measures to be pilot in each demonstrator.

1.4 Other projects and initiatives

The evaluation methodology used is based on CIVITAS framework, thus CIVITAS is an initiative relevant for the project.

It might also be of interest to share results with sister projects such as Meister.

2 Context and purpose

In order to assess how the solution developed within GreenCharge project may help to enhance EV usability and the penetration of renewable energy, the user acceptance is as important as the performance of the systems integrated. In this sense, some indicators had been defined to evaluate how the systems and the measures implemented are satisfactory to the different stakeholders. Since the type of information provided by humans is different from that provided by machines, the data collection methods have also to be different.

The task to select the appropriate tools to collect user's feedback, analyse and evaluate it is reported in this deliverable.

3 Surveys

Surveys are a very common mechanism to get feedback from users. They are defined as a research method used to collect data from a pre-defined group of respondents to gain information. They are basically a list of questions, either with pre-defined answers to be chosen (Yes/No, mark from 1 to 10,…), or allowing free answers. There is also a variety of means to conduct surveys; the most popular are by phone, mail, via internet, face-to-face.

It is out of the scope of this deliverable to present a comprehensive study on survey methodology; however, some basic principles are considered to produce effective surveys within GreenCharge. As introduced in deliverable D5.1-D6.1 Evaluation Design/Stakeholder Acceptance Evaluation Methodology and Plan [1], the CIVITAS Framework has been adopted as GreeCharge evaluation methodology. Taking into account the general considerations provided by CIVITAS framework related to Survey methodologies [2], this is how the main aspects will be handled:

- Objectives of the survey: the content of the survey will evolve during the project lifetime; while the first surveys will tackle user needs and expectations, the intermediate and final surveys will gather user experience and satisfaction
- Population to be sampled: since the users and stakeholders involved in the pilot sites are limited, we will try to reach all them. There is a risk of low participation; however, users participating in the pilots are quite motivated and we expect the sharing of first-hand information and the participation in the definition of the services will be engaging mechanisms. For the rest of the population not directly affected by the measures, we will try to get input from public available surveys and other initiatives
- Relevance of data: It is important to minimize the number of questions in order to limit the time needed to complete the survey. Furthermore, the personal data inquiry will be kept to minimum levels; however, some data such as gender and age are thought to be relevant for the analysis.
- Precision required: the precision achieved will be limited by the sample, that in this case is the number of users involved in the pilot site.
- Method of measurement: It is expected to combine different approaches: interview, self-administered questionnaire and personal visit, among others. A more detailed description of them will follow in the next sections.
- Sampling units: The sampling units will be individuals.
- Sample selection: Due to the limited number of populations to be sampled, the selection will be to reach everyone involved in the pilots.

Lack of engagement and participation is a potential risk to face. It is envisioned to mitigate this risk by using the most successful mechanisms, in terms of participation, and to offer some kind of simple reward or incentive.

Regarding the first action, in-person data collection such as interviews and face-to-face surveys will be preferred to postal or email surveys. According to CIVITAS guideline [3], in-person data collection has the highest response rate, while mail or internet are amongst the lowest. Additionally, coverage and data quality are also better when in-person methods are used. On the other hand, they require more time and sometimes it is difficult to find suitable time slots for all the interviewees. A combination of different methods will be chosen according to circumstances.

Finally, regarding rewarding participation, we will consider promoting some kind of simple draw or lottery with a modest "prize". Past experiences showed incentivising while keeping the costs reasonably low is an effective technique.

3.1 Online surveys

Online surveys are a replication of traditional surveys where survey respondents were given a questionnaire on paper format. Internet allows to deliver surveys to a huge number of potential respondents through a URL, either by a notification email or in link a webpage or app.

Although a huge number of respondents can be reached, in general, the response rate is low. However, it enables flexibility since respondents can choose the best moment to reply and it is not necessary to be in a specific place at a set time. Combined with reminders and some incentives, they are foreseen as a good tool for GreenCharge. Additionally, the results are gathered automatically in an electronic format, thus making it easier to process afterwards.

The following table is a summary of an overview of different online survey tools available through SINTEF's management system. We have used this list/table to provide an introduction to different tools, although they are not analysed in detail with respect to cost, usability etc.

Table 2: Summary of online survey tools

Survey tool	Description	GDPR compliant	Availability
Netigate	Advanced online surveys Basic safety measures implemented No possibility of anonymous answers	Yes. Servers in EU/EEC (Sweden)	License fee
Confirmit	Advanced online surveys Basic safety measures implemented No possibility of anonymous answers	No. Servers in both EU/EEC and USA.	License fee
Questback	Advanced online surveys Basic safety measures implemented No possibility of anonymous answers	Yes. Servers within EU/EEC (Germany)	License fee
SurveyMonkey	Advanced online surveys Basic safety measures implemented Allows for anonymous surveys	No. Servers in the USA	Subscription
MiPro/ QuenchTec	Advanced online surveys Basic safety measures implemented Allows for anonymous surveys	Yes. Servers within EU/EEC (Sweden)	License through SINTEF
SurveyXact	Advanced online surveys Basic safety measures implemented Allow for FEIDE-log in	Yes. Servers within EU/EEC (Denmark)	Offers test licenses to SINTEF
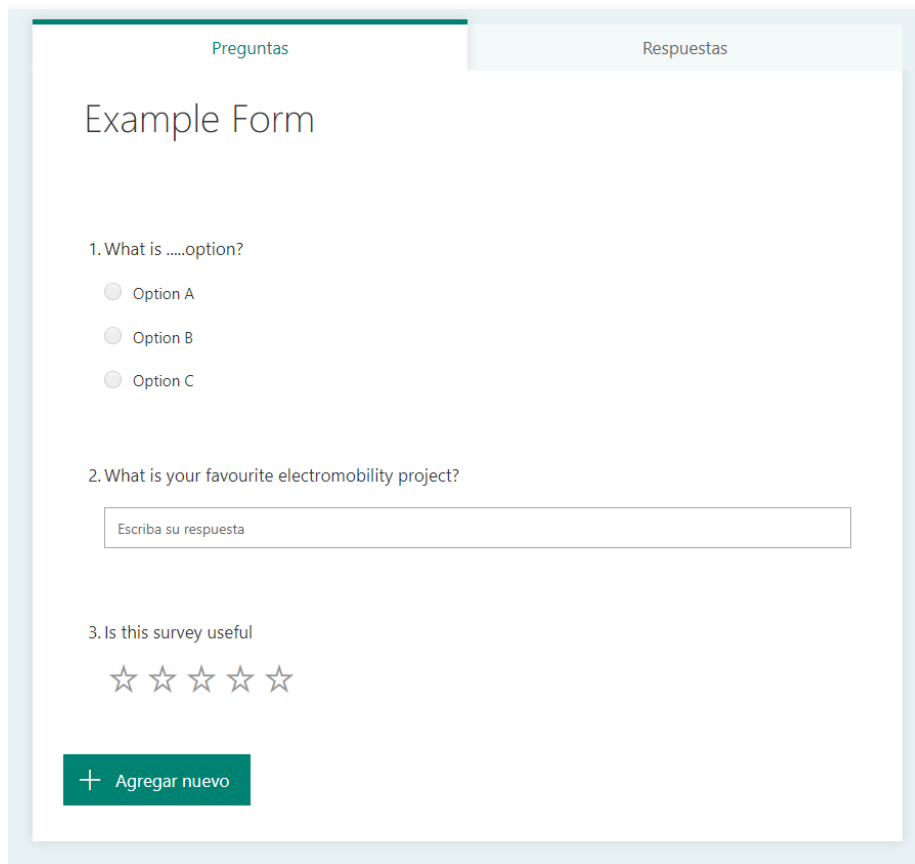
Survey tool	Description	GDPR compliant	Availability
Google forms	Simple online surveys Not suitable for collection of personal data	No. Servers in the USA.	Available to Google users
MS Forms	Simple online surveys Simple safety measures implemented	Yes. European users use servers within EU/EEC (Ireland, Netherlands)	Available to MS Office 365 users (SINTEF, Eurecat use it as corporate tool)

By the time of writing this report, an online survey has already been conducted in Barcelona pilot site. The tests done using MS Forms (MS Office 365) turned out to be satisfactory. Furthermore, being a corporate tool, both for SINTEF and Eurecat organisations, there is no extra associated cost to use it, and it is envisioned to be used in the future for the coming online surveys.

MS Forms allows to complete the survey anonymously or using the MS Office 365 user. Users often prefer an anonymous survey. However, for future surveys, if a lottery has to be organised, those users aiming to win the prize should provide a valid email address so that they can be contacted.

The main features when creating a survey are:

- It considers different type of questions: options, text, rating, linkert, date as seen in Figure 3-1
- Sections can be included to facilitate survey structuring
- It allows certain degree of customisation as theme (foreground/background colours), images (logos)
- It is possible to upload files
- It enables to pre-visualise the survey as to be seen on PC and mobile platform
- It uses the browser language; however, it has not been found an easy way to create a multi-language survey

Figure 3-1: Example form using MS Office 365 Forms

The main features when collecting and analysing the survey results are:

- Statistics are calculated automatically (number of participants, time to complete the survey, percentage of each answer)
- Results can be exported in Excel format for further analysis
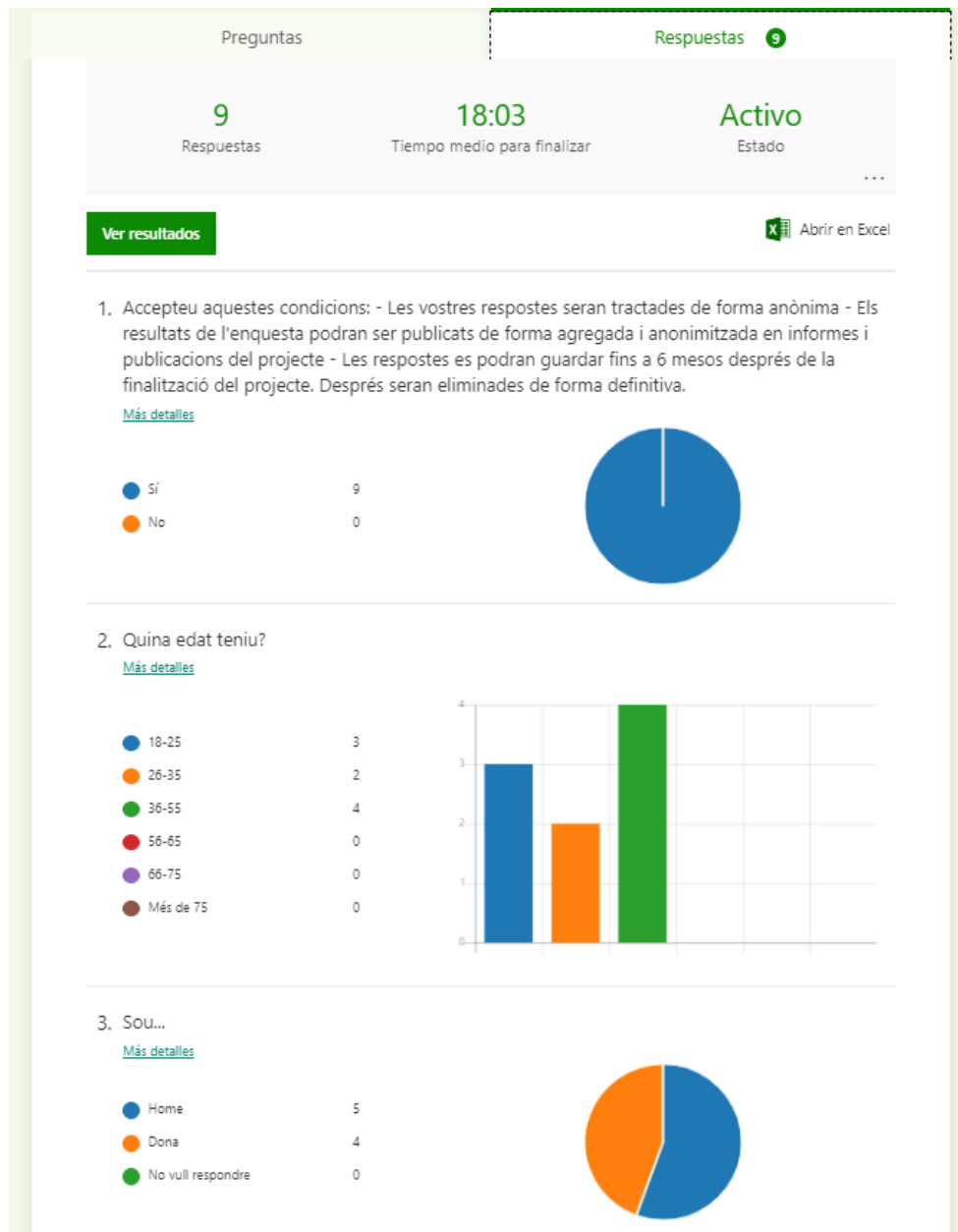
Figure 3-2: Example of survey results using MS Office 365 Forms

The usability has been proven satisfactory both from the survey creator and the survey respondent; with no previous experience a complete survey was done within 4 hours. Tests done among colleagues to validate the understandability and user experience triggered no issues.

A sample of an on-line survey issued to the e-bike sharing service in Sant Quirze demonstrator (Barcelona) can be found in Appendix I.A.1.a)(1)A.1.2.

3.2 Face-to-face surveys

The difference between face-to-face surveys compared to on-line surveys is that the surveyor may assist the surveyed whenever a question is not clear. It might be of interest if the target group is not familiar with new

technologies or has any disability. The support to perform a face-to-face survey may be on paper format or the surveyor may introduce personally the answers on a tablet or similar device. The latter has the advantage that the results are digitally stored, and the analysis is conducted the same way as the on-line surveys. However, the interaction with the respondent might influence the answers of people trying to provide only answers that are socially accepted.

The paper format survey approach may be very useful in events, where participants are asked to complete a survey before leaving. It is a mechanism to be considered in the dissemination events organised by the project. In other circumstances, such as surveying users participating in a demonstrator it is more fruitful to conduct an interview, which offers the opportunity to get more information, once the issue of arranging a time and place for the user has been overcome.

A sample of the interview elaborated by SINTEF for Roverkollen demonstrator participants can be found in Appendix I.A.1.a)(1)A.1.1

3.3 Embedded surveys

In the case of the people to be surveyed regularly uses an app or any other type of application, the utilization of such an application to deliver a survey is very efficient. In this case we refer to this kind of surveys as embedded surveys. The particularity of this type of surveys is that they are meant to be very short, such as answering 1 or 2 questions. A typical example is providing a rating (1 to 5 stars), like or dislike and eventually asking the reason for such a rate.

One aspect to be taken into account is that they have not to be issued very often, or at least, the user should have the option to skip it. Otherwise they become an annoyance. Furthermore, they allow to be very specific on the questions and when to issue them since the activity of the user is known by the system. It is envisioned to use this kind of mechanism at least in one of the demonstrator in Barcelona (BCL.D1) in the second iteration.

The way to integrate the results of this kind of surveys will be a manual process. The most likely way is to export the information from the service provider (MOTIT, Eurecat) in csv or Excel format and make the necessary transformations to convert them into the input data to calculate the correspondent KPI.

3.4 External surveys

In order to get more data to perform a comprehensive evaluation it can be helpful to take advantage of the results of surveys conducted outside the project. The sister project Meister[1] circulated a survey to gather information about the situation of electromobility in the cities involved in GreenCharge pilot sites. A similar action can be triggered from GreenCharge project to Meister later in the project. The goal of such action is not directly to get data to compute the KPIs defined in GreenCharge project but to be able to perform a qualitative analysis and comparison between different initiatives and try to understand the influence of some context variables that scape to our control, such as economic fluctuations, political changes in national or international bodies, and alike.

Similarly, surveys conducted by public authorities or academia may of interest to compare and contextualised the results.

Typically, the results of such surveys are published in the form of articles, presentations, infographic material or press releases. Thus, if needed, the data will be imported manually. However, as mentioned before, the goal is to do a qualitative analysis.

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[1] https://meisterproject.eu/

4 Interviews, Focus Groups and Workshops

A valuable mechanism to get users feedback are focus groups and workshops. Using free questions and open discussions let to capture subtleties that cannot be captured in surveys with close questions.

However, the main handicap of focus groups and workshops are the challenge to gather a group of people at a specific time and place.

The data will consist of written text. The interview notes will be stored in a folder separated from the list of contacts. No contact information will be stored together with the notes from the interviews, and the data will be treated anonymously.

The formats chosen to conduct these activities within the project are the following:

- **Individual and group interviews**

   The interviews will be conducted as individual (1 hour) or group interviews (1,5 hours), depending on the budget and participants' availability.

   The interviews will be executed with two researchers present. One responsible for asking questions, and one responsible for taking notes and checking the interview guide.

   The KPIs measured through interviews are the same as the ones described for surveys.

   No contact information will be stored together with the notes from the interviews, and the data will be treated anonymously.

   In the case of group interviews, the researchers are responsible for making sure that everybody gets a chance to speak, and balancing the discussion. If it is not balanced enough, they will add individual interviews with the same participants.

   A guide for conducting interviews elaborated by SINTEF for the Oslo pilot can be found in Appendix I.A.1.a)(1)A.2.

- **Workshops**

   As business model workshops organized by WP3 partners are planned to gather not only project partners but also external individuals and organizations which are relevant stakeholders for the project, WP6 and WP3 partners will go together to arrange most of these workshops both from a business and an evaluation perspective. The first business workshop has been organised in each of the pilot sites within the first semester of the project. In such early stage, there were not specific activities prepared for a WP6 perspective, but it helped to elucidate the different perspectives of the participant stakeholder groups. In the following workshops a more specific content for WP6 will be prepared.

   Similarly, Local Reference Group meetings and Uptake cities group meetings are valuable channels to gather feedback about the measures planned to be implemented and find the key questions to address in the surveys and interviews. That is the case of the questionnaire elaborated by WP7 partners and distributed during the Uptake cities group meeting that took place in October 2019 in Bremen. Once more, the information gathered cannot be directly used to evaluate the KPI defined for GreenCharge but helps to contextualised and to prepare the surveys.

- **Focus groups**
   Focus group are similar to workshops and there are meant to discuss about a particular topic within a group of participants. Contrary to surveys, the discussion is very open. The moderator of the focus group has to take care of the time so that all aspects meant to be discussed are handled. Similarly, the

moderator will avoid participants get lost on other issues that are irrelevant to the discussion, in other words, to lose the focus. Supporting material is often used, such as post-its or cards to trigger discussion and create a more dynamic approach.

A focus group was organised in May 2019 among users of the e-bike sharing service in Sant Quirze del Vallès (Barcelona demonstrator) to capture specific user needs. However, it was cancelled at the last minute because a significant number of prospective attendees were not able to participate. Finally, it was transformed into an on-line survey as it was envisioned as the most convenient method.

5 User support channels

Additional data sources to collect data from users are the support channels in the applications or web sites accessible to participants in the demonstrators. Typically, there is a section to enable users to provide feedback about the application or service. It could be as a web form or redirecting to the e-mail application with a pre-set recipient. Users may send free text or select among a collection of topics.

As an example, in the Oslo pilot, it has been decided to use the housing cooperative's own web page to gather feedback from the user interface of the charging system. Here, a dedicated e-mail-address will be visible. User feedback; information on bugs and other notifications will be collected here.

Another example is the "Contact" section in the booking app for the corporate charging service at Eurecat premises (Barcelona pilot) that enables users to provide complaints, praises, suggestions or any other type of text-free message.

They can be considered as a mechanism to retrieve users' satisfaction, although the feedback will be more qualitative than quantitative. The analysis will be performed manually since the number of messages expected is not huge. An alternative to manually processing is introduced in section 6 . However, it is not envisioned to use it on a regularly basis.

6 Other channels

The social media is becoming an important data source used by companies not only as a marketing channel but also for market analysis, retrieval of user needs or user satisfaction.

The huge amount of data to be processed required the use big data techniques and artificial intelligence to extract relevant information in an automatic manner.

In particular, one of the techniques used is called sentiment analysis. Sentiment analysis refers to the computational process capable of interpreting and classifying of emotions (i.e. positive, negative and neutral). using natural language processing, text analysis, computational linguistics and biometrics. It may be applied to voice, image or written text.

It may be very relevant to gather information from stakeholders that are not directly involved in the demonstrators. As CIVITAS methodology establishes, the impact should be evaluated not only for the targeted users but also to other actors that might be indirectly affected.

Although it is out of the scope of the project to develop any tool for sentiment analysis to evaluate stakeholders acceptance, it has been considered the opportunity to align the work of some students from Università degli Studi della Campania (SUN) in the field of big data analysis and machine learning to analyse tweets related to electro-mobility. In any case, this activity is foreseen as an add-on and it is not one of the core tools used for impact evaluation.

7 KPI Processing

The final goal of WP6 is to evaluate user acceptance of the measures implemented in the different demonstrators. The goal will be achieved by gathering data, transforming the raw data into KPIs and analysing the results. The following subsections go into detail on each of the phases.

7.1 Data collection

The data needed in order to calculate the KPIs for stakeholder acceptance (group GC6.*) will be mainly calculated through human interaction using surveys, interviews and workshops. In fact, some of the data required for impact evaluation (group GC5.*), not necessarily focused in stakeholder acceptance, is also to be gathered using human interaction. Only a small part of the information needed for the calculation of GC6.* indicators can be retrieved automatically.

7.1.1 KPIs based on surveys, interviews and workshops

The KPIs related to stakeholder acceptance based on data to be collected by surveys can be found in the following table. They are part of the group society&people, according to CIVITAS classification.

Table 3: Summary of stakeholders acceptance indicators based on data retrieved through surveys

Key	Indicator	Relevance	Frequency
GC6.1	Awareness level	Information regarding the new measures may be disseminated by means of advertisements, leaflets, posters in public transport vehicles, etc. In this context, the core indicator will show what percentage of people has been reached and to what extent they have gained knowledge about the new measures, and thereby, whether or not (or to what degree) such an information campaign has been successful. The core indicator intends to assess whether the awareness of the policies and integrated measures (integrated measure package) has changed since they were implemented	Measurements should be made at least twice during the project, i.e. before the measure is introduced (baseline) and at the end of the project (ex-post). It seems also appropriate to measure the impact after each campaign or event (iteration)
GC6.2	Acceptance level	Acceptance level is defined as the percentage of the population who favourably receive or approve the measure. This indicator is used to assess the acceptance levels of target groups on GreenCharge measures. A measure is deemed to be well-accepted if users are satisfied with its existence and/or use. The core indicator intends to assess satisfaction with the existence and/or use of the measure.	Key indicators GC6.1 and GC6.2 on awareness and acceptance are closely related and should be analysed in conjunction.

Key	Indicator	Relevance	Frequency
GC6.3	Perception of level of (physical) accessibility of service	Accessibility in the context of this core indicator has a broader scope than spatial access to the service. User perception of accessibility should focus the perception of accessibility to services offered by the project (sharing e-scooter service, charging points, …)	Measurements should be made at least twice during the project, i.e. before the measure is introduced (baseline) and at the end of the project (ex-post). It seems also appropriate to measure the impact after each campaign or event (iteration)
GC6.4	Operational barriers	Having a node of access is not a sufficient condition to access a service. Other barriers have still to be overcome to make use of it or prefer it over other (less sustainable) options. Training and information should help to overcome this barrier and enable real equal accessibility for all citizens	Measurements should be made at least twice during the project, i.e. before the measure is introduced (baseline) and at the end of the project (ex-post). It seems also appropriate to measure the impact after each campaign or event (iteration)
GC6.5	Relative cost of the service	This core indicator provides useful information in the context of eMobility and social inclusion. In terms of social inclusion and accessibility, this indicator concentrates on economic accessibility. Many measures may have impacts on the access to eMobility. These include access to EVs, the availability of charging infrastructure, the availability and access to shared EVs, costs, and promotion of eMobility. The core indicator can be used to addresses the charging cost in proportion to average personal income.	Measurements should be made at least twice during the project, i.e. before the measure is introduced (baseline) and at the end of the project (ex-post). It seems also appropriate to measure the impact after each campaign or event (iteration).

There are another group of KPIs which at the moment of their definition, it was expressed they will be collected through surveys. In this case, the term survey has to be understood as a direct request for information to a specific stakeholder, which in most cases is a partner of the project. These KPIs are summarized in the following table.

Table 4: Summary of indicators based on data retrieved through questionnaires

Key	Indicator	Method	Target Stakeholder
GC5.2	Number of parking spaces with charging plug	• Interviews, or public info, from charging companies in a Pilot/City • Charging points of GC Pilots Each pilot should count the number of parking spaces, number equipped with/without charging point and provide information about type (private/shared/max power) and location	Charging point operators
GC5.3	Utilisation of charging points	Surveys delivered to charging operators reporting (daily, monthly, …) charging capacity and (daily, monthly, …) energy charged. However, when possible, it will be calculated from data automatically collected from the systems in place (booking system, charging management system)	Charging points operators

GC5.13	Charging flexibility	• Surveys delivered to EV users about charging habits and preferences, willingness to use flexible charging, savings wanted in return of flexibility, etc.
		• For each specific charging operation (via app)
		  o Minimum state of charge (SoC) demand
		  o The time to reach the target SoC
		  o Current battery SoC
		  o SoC at time of unplugging
		  o Battery capacity
			End users (EV drivers)

GC5.6	Average operating energy costs for charging infrastructure	Request for energy bills, personnel cost and maintenance costs.	Service operators (charging, sharing)
GC5.7	Capital investment cost	Request costs for purchase of infrastructure and equipment, Request the total costs spent in setting up the measure and cover a period from the initiative of the measure preparation until the start of the measure implementation	Service operators (charging, sharing)
GC5.8	Average operating revenue	Request for revenues	Charging point operators Residents EV fleet managers

Key	Indicator	Method	Target Stakeholder
GC6.6	Shared EVs per capita	This indicator is derived by dividing driving age population (18 and over) by the number of shared EVs available from service providers	Sharing operators

7.1.2 Automatic data collection

These indicators relate to stakeholder acceptance where data can be retrieved partially or fully automatically by the systems in place, and are presented in the following table.

Table 5: Summary of indicators based on automatic data collection

Key	Indicator	Method	Target Stakeholder
GC6.1	Awareness level	Alternative methods to surveys, which will be the main data source, are: • Visits to the webpage. • Number of new registrations after a campaign	Charging point operators

7.2 Data processing

Data processing will be a mainly a manual process consisting on extracting conclusions from the analysis based on detailed notes from the interviews, workshops, focus groups, feedback through user support channels and some type of surveys, with open questions.

The analysis may involve a process of categorization to derive some figures and allow comparisons among demonstrators and also to infer trends as the trials progress.

For online surveys or option-based questions the answers are already categorized.
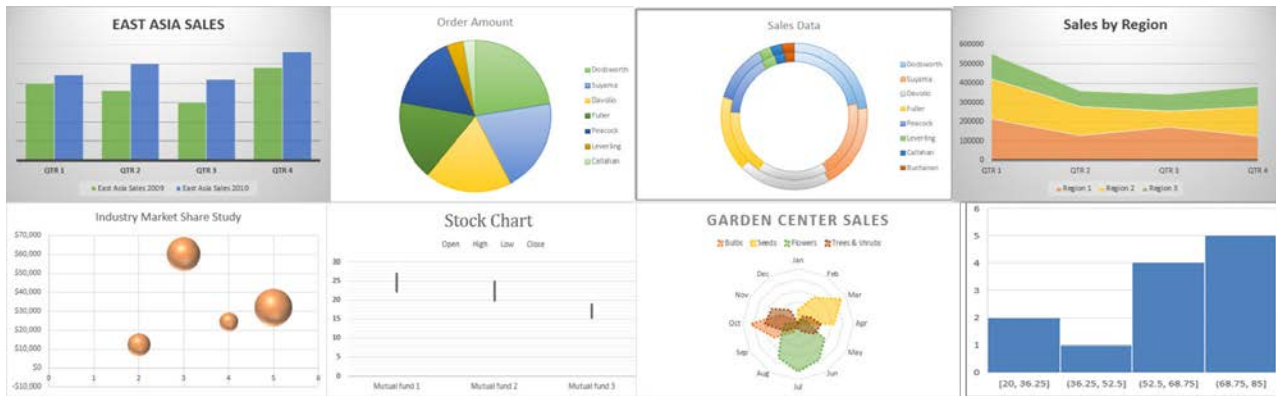
It is not envisioned to develop specific tools for computation of KPIs. The standard spreadsheets offered by Microsoft (MS Excel) can be used. As an open source alternative Google Sheets or Apache OpenOffice Calc could be used. However, the partners involved in WP6 assessment process are more familiar with MS Excel and their organisations use Microsoft Office as a corporate tool, thus license fee is not an issue.

7.3 Data visualisation

As mentioned in the previous subsection, the main tool for evaluation will be MS Excel. This tool allows graphical representation of data in the form of charts: bar, line, pie and doughnut, stock, histogram, area, scatter plot, bubble, radar or combo. The figure below shows a view of the type of charts to be potentially used for analysis and results visualisation (extracted from Microsoft Office Support[2]).

The variety offered is envisioned to be sufficient for the data analysis and presentation of results.

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[2] https://support.office.com/en-us/article/available-chart-types-in-office-a6187218-807e-4103-9e0a-27cdb19afb90

Figure 7-1: Example of chart types offered MS Excel of potential use

Additionally, there is an on-going task for alignment of representation of KPIs in a common tool for WP5 and WP6. The evaluation tool to be developed within WP5 is meant to calculate and visualise the KPIs (GC5.* group). In the case of the stakeholder acceptance KPI (GC6.* group) the calculation process is difficult to automate; however, efforts are put in finding a way to visualise them in a common tool for evaluation. The mechanism will be through the exchange of the results of the KPI already calculated with the proper format to be stored in the evaluation tool data base.

8 Planning

The pilot planning activities were presented in the Implementation plan deliverables (D2.4, D2.10, D2.17) for Oslo, Bremen and Barcelona respectively. Some of evaluation activities were dependent on implementation and deployment activities that have experienced delays. Furthermore, efforts to be input in these blocking activities had also affected the progress on WP6 activities.

In this section we present an updated plan for activities related to evaluation of stakeholders acceptance for each demonstrator in the three pilot sites. The description of each demonstrator can be found in the above mentioned deliverables D2.4, D2.10 and D2.17. In the planning, the activities are presented in the form of milestones, meaning that the activity is closed when the milestone is reached. The specific milestones presented in this section are defined specifically for evaluation – they come in addition to the overall project milestones defined in the DoW. The milestones here defined are:

Table 6: Milestones for evaluation planning activities

Id	Milestone
M1	Scope published to users
M2	Demo fully deployed
M3	Strategy defined for KPI collection
M4	Base line data gathered
M5	Real data gathered from deployed demos (1st iteration)
M6	KPI analysis completed (1st iteration)
M7	Real data gathered from deployed demos (2nd iteration)
M8	KPI analysis completed (2nd iteration)

The focus is set on planned and on-going activities for the first iteration of the demonstration activities (dark shade), while plans for second iteration is only given at very high level (light shade). Due to particularities of individual demonstrators, and some delays that have arisen during the execution of the project, it has not been possibly to fully align the execution of all demonstrators, at least for the first iteration.

	2020												2021							
	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	April	May	June	July	Aug
OSL.D1 (garage charge)	M1	M3	M4	M5			M2			M6							M7	M8		
OSL.D2 (sharing charging points)			M1			M3					M5	M2 M6					M7	M8		
BRE.D1 (booking for priority)		M1															M7	M8		
BRE.D2 (car sharing)			M1		M2 M5		M6										M7	M8		
BCL.D1 (e-scooter charging)	M2	M1 M3	M2 M4		M5		M6										M7	M8		
BCL.D2 (Corporate charging booking)		M1 M3 M4	M2			M5	M6										M7	M8		
BCL.D3 (e-bike sharing)		M3	M1 M2 M4		M5		M6										M7	M8		

Figure 8-1: Planning of milestones related to evaluation activities

On the other hand, some activities related to stakeholder acceptance and user feedback have already been conducted in the form of interviews, meetings and surveys. In the following table we summarize the most important ones.

Pilot	Action	Tool
Barcelona	Oct. 2018 – Meet current and potential Local Reference Group Members to present GC and gather feedback and interest	Interviews (individual)
	Nov. 2018 – Business model workshop with partners and Local Reference Group	Workshop
	March 2019 – Meet potential Local Reference Group Members	Interviews (individual)
	April 2019 – Meet potential Local Reference Group Members	Interviews (individual)
	April 2019 – Meet third parties involved in e-bike St. Quirze demonstrator	Meeting
	April 2019 – Contact potential Eurecat users	E-Mailing, Face-to-Face meetings and Phone Calls
	May 2019 – Survey to e-bike sharing users (St. Quirze demonstrator)	Online survey
	Jan. 2020 – Meet third parties involved in e-bike St. Quirze demonstrator	Meeting
Bremen	Oct. 2018 – Assembly Local Reference Group – presenting GC objectives	Meeting
	Jan. 2019 – Carsharing workshop	Workshop

Pilot	Action	Tool
	June 2019 - On-site publicity campaign to attract more registered users for the public CarSharing demonstrator site	Promotional event
Oslo	Oct. 2018 - Meet board of housing association to share information and expectations	Workshop
	Nov. 2018 – Meet Local Reference Group	Workshop
	Nov. 2018 – Survey preparation and guidelines for interviews	Survey/Interview
	Apr. 2019 - Meeting for residents of Røverkollen housing cooperative	Informative meeting
	Apr. 2019 – Meeting some GC partners, housing association board and energy provider	Business model Workshop
	Aug. 2019 - Communication of Green Charge. Broadcast.	Mass Media (TV programme ZDF and ARTE)

9 Conclusions

After performing the analysis on different tools for data collection and evaluations it can be concluded that:

- Surveys are one of the main tools to be used to gather users' opinion on different aspects relevant to GreenCharge project
- Other mechanism to be used are interviews and workshops that enables to gather more detailed information
- Low participation is a potential risk that has to be handled. Thus the most suitable data collection tool should be selected in each situation taking into account the users profiles, time availability and type of information required. Incentivising mechanism should be developed.
- Data processing and analysis will be mainly a manual process. No specific tool for data processing is foreseen to be developed. Standard spreadsheets tools such as MS Excel will be used.
- Synergies with other activities within the project and beyond will help to increase efficiency.
- Planning of activities related to data gathering for later analysis should not be overseen.
- It is not possible to align the data collection and evaluation activities in all demonstrators. However, it will be very helpful to join efforts and share experiences.

10 References

[1] D5.1-D6.1Evaluation Design and Stakeholder Acceptance Evaluation Methodology and Plan, GreenCharge, December 2019.

[2] Annex 8 – Survey methodologies, CIVITAS

[3] Evaluation approach findings RIA CIVITAS guidelines, CIVITAS, 14-11-2017

A Appendix A

A.1 Appendix 1: Survey samples

This section compiles some samples of the surveys already prepared and conducted in some of the pilot sites.

A.1.1   Oslo pilot: Survey (this is the survey from Nov 2018, it has been revised for Nov 2019)

Use of e-car and access to charging points

Survey Nov 2018 for "Røverkollen Housing Cooperative"

Purpose with the survey

More and more people choose to buy electric cars. The Board of Røverkollen Housing Cooperative therefore wishes to conduct a survey of needs and wishes for the charging of electric vehicles also in the garage.

The survey is answered anonymously. None of the questions below include personal information that can be traced back to you as a person. Consent for participation is therefore given by answering the survey.

Answer sheets are delivered in the board mailbox in Sverre Iversen Road 7 within x.x.2018.

Background for the survey

Statistics from Statistics Norway show that more new electric cars are already registered than petrol, diesel and hybrid cars. In addition, the Government has set a goal that all new cars should be emissions-free by 2025. This goal is set as part of the National Transport Plan for 2018-29. Today, it is only possible to charge electric cars with the four joint charging points outside the buildings at Røverkollen. It is desirable to eventually establish the possibility of charging in the garage as well.

Regards, the Board

Questions

1.   What is your age group?

☐ 18–25   ☐ 25–35   ☐ 35–55   ☐ 55–65   ☐ 65–75   ☐ Over 75

2.   How many people in your household have a driving license for car (class B)?

☐ 0   ☐ 1   ☐ 2   ☐ 3 or more

3.   Do the household have a car, or have a car at one's disposal?

☐ owns, number   ☐ borrows /rents   ☐ Do not have a
of cars: car

See next page

4. **If you have a car**: Do you have a parking spot in the housing cooperatives' garage?

   ☐ Yes, number: _____ ☐ No, I do not need a place

5. **If you have a car**: Do you have a commercial vehicle? (e.g. taxi or van)

   ☐ yes, profession (voluntary): _____ ☐ No, I do not have a commercial vehicle

6. **If you have a car:** How often do you use the car you use the most?

   ☐ several times a day ☐ Daily ☐ 3–4 times a week ☐ 1–2 times a week ☐ More seldom than once a week

7. **If you have a car**, How many electric vehicles or chargeable hybrid cars?

   Number of el-cars: _____ Number of chargeable hybrid cars: _____

8. **If you have el-car or chargeable hybrid car**: How often do you have to charge the chargeable car you use the most?

   ☐ Daily ☐ 3–4 times a week ☐ 1–2 times a week ☐ more seldom than once a week

9. Do you have plans to buy el-car or chargeable hybrid car?

   ☐ Yes, clear plans ☐ Yes, within 2 years ☐ No, however I need car in my everyday life ☐ No, I do not need a car in my everyday life ☐ I already possess ☐ Not relev

10. How important is it for you <u>today</u> that charging possibilities are available in parking spots in the garage for the housing cooperative?

    ☐ very important ☐ a bit important ☐ not very important ☐ not important ☐ not relevant

11. How important do you think it will be for you in 3 years that there is charging opportunities on the parking spots in the garage for the housing cooperative?

    ☐ very important ☐ a bit important ☐ not very important ☐ not important ☐ not relevant

12. How likely is it that you would like to use car sharing? (if the cars are available in close

proximity to the housing cooperative)

☐ very likely ☐ a bit likely   ☐ not very likely   ☐   completely ☐ not relevant
                                                                       unlikely

13. If you have / want to get an electric car, do you want to share the charging point with others through a booking
     system if this can reduce your expenses?

☐ Yes, that ☐ No, I would
will   be rather have my
important   own charging point

A.1.2   Barcelona pilot: Survey (this is the on-line survey from May 2019, it replaces a Focus Group that was cancelled)

E-bike sharing service user needs and mobility preferences

Survey May 2019 for Sant Quirze e-bike sharing service users

Purpose with the survey

The main purpose of the survey is to retrieve information about the user needs to help to better define new functionalities to be included in the service. Furthermore, it is intended to serve as base line data collection for the usage of the service and mobility preferences.

The survey is answered anonymously. The personal information about age and gender is kept to a minimum and it is not mandatory to answer all questions. None of the questions can be traced back to the respondent as a person. The survey is delivered by the townhall, there is no direct contact between the respondents and Eurecat. A letter explaining the project, the purpose of the survey and the data treatment is attached.

The respondents were given nearly a month to reply and several reminders were issued.

Introduction to the survey. Consent request

Initial survey of users of electric bicycle service for industrial zone.

We would appreciate very much if you answered this question about your experience with electric bicycle service in the industrial zone of Sant Quirze del Vallès. It will help us capture real needs and implement improvements within the GreenCharge project.

- Answer with the utmost sincerity, but if you are not comfortable with any questions, leave it blank

- If you have any remark about a question, add it to the answer box of some questions or at the end of the questionnaire

- If you have general comments, add them to the bottom of the questionnaire

1.Do you accept these conditions:

- Your answers will be treated anonymously

- The results of the survey may be published anonymously and in reports and publications of the project

- Answers can be saved up to 6 months after the project is completed. Then they will be eliminated permanently.

You need to answer to continue

- ☐ *Yes*
- ☐ *No*

Questions

Section 1: Tell us about you

We would need some socio-demographic information

2.How old are you?

○ 18-25

○ 26-35

○ 36-55

○ 56-65

○ 66-75

○ Over 75

3.You are...

○ Male

○ Female

○ I don't want to answer

4.Do you live in Sant Quize del Vallès?

○ 25 km away (or more)

○ 10-25 km away

○ Less than 10 km away

5.Your choice for a mobility option is based on...

☐ Time/speed

☐ Cost

☐ Convenience (confort)

☐ Environmental impact

Section 2: The e-bike sharing service
The following questions are related to the e-bike sharing service for Sant Quirze industrial zone, as it is today

6.How did you get to know about the e-bike sharing service?

7.Do you use it regularly?

○ Yes

○ No

8.How many times have you use it?

○ More than 50

○ 50 to 25

○ 25 to 10

○ Less than 10

○ None

9. Why do you use the e-bike sharing service? Or why not?

10. If possible, would you use it for other time slots? Or other purposes?

○ Yes

○ No

○ It depends

11. When? Why? On which is depends?

12. Do you know other people that may like to use the sharing service as well?

○ Many

○ Some

○ None

13. Why don't they use it?

14. Are you a user of any other sharing service?

15. Which ones?

16. According to your user experience with the e-bike sharing service, would you buy your own an e-bike?

Section 3: How can we improve the service
Within the framework of the GreenCharge project we propose to add new technologies to the service that facilitate their use. These measures include the development of a smartphone app. Your opinion will help us design this app to include the features that are useful to you.

17. Tell us at least one thing that you like about the e-bike sharing service

18. Tell us at least one thing that you don't like about the e-bike sharing service

19. Make a proposal for improvement

20. We may improve the registration process if ….
(some ideas: it is an on-line process through an app, we can link the user and the bike in user at any moment, …)

21. We may improve the incidences and notification process if ….

22. What is your opinion on booking? What is your proposal to manage booking offenses (anyone not returning the bike on time, anyone not using the bike s/he has booked,…)

23. Are you satisfied with current security measures? How can security be improved?

24. If security measures were satisfactory, would you bring your own e-bike?

25. What would you like the app to have? Usage history? Carbon footprint? Service usage?

26. Do you think it should include a bike trip planner? Or it is not necessary since you already know the route?

27. Would you be willing to pay for the sharing service? Who do you think should manage/operate it?

28. Any further question, suggestion, comment you would like to share with us?

A.2 Appendix 2 : Interview guide for group- and individual interviews (adjust to number and group of residents participating)

General

- What is the situation in your household with respect to car ownership and use?
- What are your thoughts on electric vehicles and charging (future scenario)?
  - o Do you have or do you plan to buy an EV? Why?
- What are your thoughts on car sharing? Are you interested in car sharing?

The process

- What is your experience on the process of installing private charging in the housing cooperative?
- Did you understand the information, did you miss any information? What?
- What is your opinion of the housing cooperative board in this process?

User experience with the installed charging system

- If you have an EV; what is your experience with the installed charging system?
  - o What are you most and least satisfied with?
  - o What do you think of the user interface/ app?
  - o What do think about priority charging, and have you used it?
  - o How satisfied are you with the capacity of the system? Do you always get charging when you need it?

Costs

- What do you think about the price level of the system? What would be a reasonable price?
- Do you have an understanding of the financial support to the housing cooperative from Oslo municipality/ Green Charge/ OBOS? Has this support affected your opinions on EV/ charging?

Suggestions for improvements

- What is the most hassle with the charging system today?
- Do you have suggestions for improvements?

- Do you have anything to add?

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