USER-CHi
CHARGING YOUR E-MOBILITY FUTURE

D 6.1: DEMONSTRATION CONCEPT AND IMPLEMENTATION PLAN

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Author(s): **Silvia Valero, Rossend Bosch Casadevall, Richard Kemmerzehl, Luca Grzeski, Jussi Saari, Stella Aaltonen, Maria Chiara Cavarretta, Kinga Lőcsei-Tóth**

Co-author(s): **Claudia Baumgartner, Jasmin Rychlik**

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Author(s)	Organisation
Rossend Bosch/ Casadevall, Silvia Valero	AMB
Richard Kemmerzehl/ Luca Grzeski	GEW
Jussi Saari/ Stella Aaltonen	TUR
Kinga Lőcsei-Tóth	BUD
Cavarretta Maria Chiara	ENEL-X
Claudia Baumgartner/ Dr. Jasmin Rychlik	VMZ

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Abstract

The abstract summarizes the approach and focus of the USER-CHI demonstration. It specifies the pilot demonstration in terms of the required USER-CHI products and infrastructure. For this purpose, it describes the demonstration concept and the implementation plan of the User Chi products that will be demonstrated in the different pilot sites (Barcelona, Berlin, Budapest, Rome and Turku). For this purpose, the location chosen for the demonstration of the User Chi products is described and reasons are given why this location was selected. In the infrastructure implementation plan, the technical requirements are described, based on which the organization of the infrastructure for the respective User CHI products is derived. The product-specific user groups are then defined. A brief overview of how the user groups will be acquired and what marketing activities will be planned in advance of and during the demonstration is provided. Thus, D6.1 defines the technical concept and requirements for the upcoming implementation activities in T6.2. It relates to the performed task T6.1 and serves as a basis for the upcoming task T6.2.

Keywords

Interoperability, technical, architecture, features, INCAR, development, testing, documentation, end user

Copyright statement

Executive summary

Report D6.1 defines the approach and focus of the USER-CHI product demonstration at the pilot sites. The deliverable describes the concept of pilot-site specific demonstration and outlines the plan for upcoming implementation of the needed infrastructure (Location, Technology, Implementation activities, etc.) and USER-CHI products required for the demonstration. Thus, D6.1 defines the technical concept and requirements and set the basis for the further product implementation activities in T6.2.

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1. Introduction

1.1 Purpose of the document
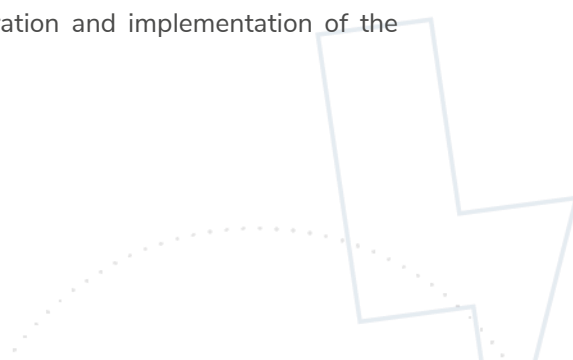
The deliverable will summarize the demonstration approach and focus for USER CHI demonstration and will specify the pilot demonstration with regard to needed charging infrastructure (location, technology) and USER-CHI software components as well as provided services and platforms. Thus, D6.1 defines the technical concept and requirements for upcoming implementation activities in T6.2. Related Task T6.1, T6.2

1.2 Scope of the document

The scope of this document describes the pilot-specific demonstration activities. For this purpose, the technical and organizational tasks required to conduct the demonstration are summarized. The goal is to ensure that the pilot-specific USER CHI solutions are integrated so that they can be utilized by users on site. The demonstration concept and implementation plan refer to the pilot-specific USER CHI solutions and services and establish a timeline for the preparation and implementation of the demonstration. The local pilot implementation plans are closely aligned with the deliverables achieved in WP 2 (design and development of DSS tool), WP 3 (definition of an interoperability framework and platform), WP 4 (smart grid integration) and WP 5 (new technologies development) and the overall technical work plan and milestones.

1.3 Structure of the document

The document is structured into five chapters describing the demonstration concept and the implementation plan of the USER-CHI software components and the provided services and platforms in the different pilot sites (Barcelona, Berlin, Budapest, Rome and Turku). To begin, chapter 2 briefly outlines which pilot-specific USER CHI solutions and services will be implemented and demonstrated. Chapter 3 describes the choice of the location for the pilot-related USER CHI software components, services and platforms provided. The next chapter 4 specifies the charging infrastructure that is required for the demonstration of USER CHI pilot-specific solutions and services. In the following chapter 5 the implementation plan is described, for which the feasibility of infrastructure, the organizational preparation (tendering, contracts), the implementation are outlined. This is followed by a first description of how users are motivated to participate in the demo. In the last chapter, the pilot-specific timeline for the preparation and implementation of the demonstration of is defined.

2. USER CHI Demonstrated Products and Pilot Sites

In the USER CHI pilot sites the USER CHI products will be demonstrated and tested as shown in Figure 1.
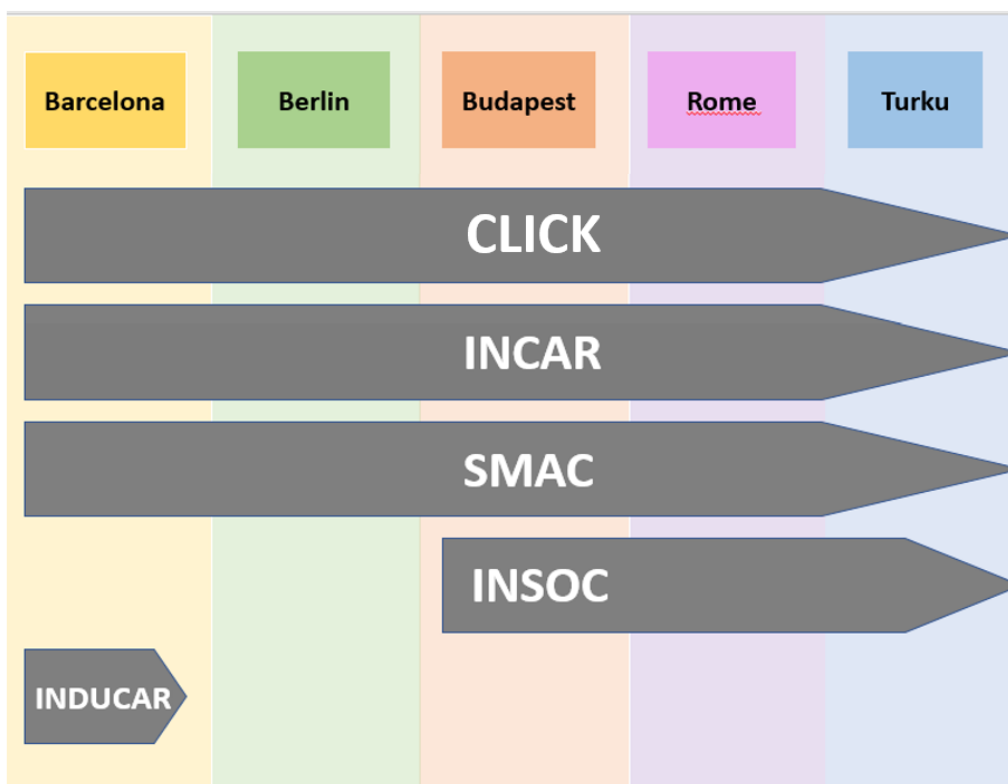
Figure 1 Demonstrated products in the pilot sites

The USER CHI products demonstrated at the pilot site are described in detail in the product descriptions, implementation and lab-testing documents of WP3 (INCAR), WP4 (SMAC), WP5 (IN-

SOC, INDUCAR). Based on these development plans, the product will be set up and demonstrated at the different pilot sites. A detailed description of the product INCAR/SMAC in included in Annex 1.

2.1 Barcelona Pilot Site

The Metropolitan Area of Barcelona (AMB) will act as a node of Mediterranean corridor. AMB wants to keep a reliable and up-to date public charging network. For this reason, the USER-CHI pilot demo gives the opportunity to test new and innovative solutions for electric charging.

An interoperable and energy balancing software test will give the opportunity to the private users and professional EV drivers (taxis, private companies) to facilitate and improve their charging experience. AMB will be providing an ultrafast interoperable charging point to test all this functionalities. Municipal employees will test inductive charging infrastructure to gain a user-friendly charging experience and wireless.

Barcelona pilot site will be installing an innovative RES solution to charge with DC-induction two-wheelers light electrical vehicles (LEV). In principle, the charging station with solar energy supply will be applied to sharing LEV's business models. Other business models are under study. A software for geographic planning will also be tested in AMB's office by the technicians involved in locating new charging stations.

2.2 Berlin Pilot Site

The goal of the Berlin demo is to provide advanced e-charge parking services designed to meet the needs of different user segments. In Berlin, private and commercial users in densely populated areas will be provided with easy and convenient access to charging and parking infrastructure through e-charge parking solutions that offer services such as availability, reservation, booking and billing of charging and parking via web GUIs and smartphone apps. To this end, data- and AI-driven forecasts and recommendations will be made for the future provision of mobility services such as sharing, charging and parking. Based on this, the Berlin demo will provide optimal user-centric charging infrastructure in densely populated urban areas and make an important contribution to various challenges.

By providing easy and interoperable access to charging and parking infrastructure through the INCAR platform, it will ensure that future investments in electric charging network improvements are perfectly aligned with user needs. Using a data-driven and user-centric approach, the optimal locations and charging technologies for e-charge parking will be explored. In the process of providing high and predictable availability of charging stations in public and semi-public spaces, CPO usage and economic viability will be improved, making electric mobility more convenient and affordable for end users.

The solutions will be built, tested and expanded at demo sites managed by Gewobag. The first demo site is equipped with two Qwello chargers and is located in "Prinzenstraße". It has non-

discriminatory access and a newly built parking lot. The Paul-Junius Straße in the east of Berlin was selected as the second demo location, which will be equipped with four charging columns from Qwello. Access to this private parking lot of Gewobag will be controlled by a parking barrier, which will be opened by means of a GSM module via the INCAR app.

2.3 Budapest Pilot Site

Implement Citizens e-Mobility Stations with e-mobility and associated smart city services to cover densely populated areas needs and raise public awareness. RES and storage integration will be demonstrated in the Citizens e-Mobility Stations, together with e-bikes sharing and antitheft proof parking systems. The demonstration will include urban slow charging points for e-vehicles (including LEVs) combined with other functions and an ultrafast charging station attributed to a TEN-T network element close to suburban areas. In terms of the end user applications the city aims to test an integrated platform where charging availability, reservation and booking opportunity is provided.

2.4 Rome Pilot Site

Promote private-public investments and innovative solutions, implementing Citizens e-Mobility Stations to offer several charging solutions together with other associated services and in environments able to offer multi-modal transport systems. Smart RES integration and grid impact minimisation will be demonstrated in 3 different applications: charging solutions for LEVs with on-site RES production (INSOC), quick, fast and ultrafast charging points in proximity with the services or motorway like the GRA to test the use of INCAR platform for different type of EVSEs, and a V2G Hub Lab to test the smart charging features of SMAC.

2.5 Turku Pilot Site

Turku aims at developing a Master Plan for charging based on the tools developed in USER-CHI. The demonstrations include several practical demos. In the Harbour area, as an important node in TEN-T corridor, an ultrafast charging point will be implemented and the number of EVSE will be increased to cover the charging needs of high demand events and different types of EVs (e-taxis, e-lorries, e-buses). Another demonstration axe is the slow charging infrastructure in housing cooperatives both for EVs and e-light vehicles for specific user groups. Third demonstration is public e-charging boxes for light e-vehicles with RES production in strategic points of the city.

3. Demonstration Concept and Implementation Plan

3.1 Barcelona Pilot Site

3.1.1 INCAR/SMAC

3.1.1.1 Main Focus

The main focus is to analyse the interoperability between CPO's and EMSP and validate the automatic invoicing based on the USER-CHI INCAR/SMAC product. The smart energy balancing system between charging points will also be analysed.

3.1.1.2 Location

Cornellà de Llobregat is one of the firsts charging stations implemented in AMB charging network and it is very well-known over the EV users and well connected. This station will be enlarged with new equipment capable to support the smart charging profiles coming from the SMAC tool. In this location both INCAR and SMAC will be tested.

In order to enable the test of the features offered by the combination of SMAC with OCPP2.0-compliant CPO backend and charging infrastructure, another location could be needed. This is motivated by the necessity of upgrading the firmware of existing CIRCONTROL equipment in the Barcelona pilot site with the developments taken within the USER-CHI project, in order to enable advanced smart charging features through OCPP 2.0 and ISO15118 protocols. The actual AMB charging infrastructure gives us two possibilities with the existing equipment: Barberà del Vallès or in Montcada i Reixac. These two locations have a Raption 50 charging point with smart charging functionalities to test these extra functionalities.

Figure 2 Cornellà de Llobregat: Test of INCAR and SMAC

3.1.1.3   Infrastructure Implementation Plan

- **Requirement and Feasibility of Infrastructure**

AMB has deployed during the last 5 years a public charging infrastructure consisting in 10 charging stations in different municipalities of the Metropolitan Area. AMB, as a CPO and EMSP, has a service provider that operates and maintains this infrastructure thought a public contract. This provider uses ETRA backend to operate AMB's charging infrastructure and it.

As INCAR is being developed together with SMAC, it was decided to test both products in the same charging station. In this case, the selected location is in Cornellà de Llobregat.

The actual backed that operates AMB's network is being updated (OCPI 2.2) to test INCAR APP. Nowadays Cornellà station has an existing charging point (CC-CA) for three cars but the equipment is quite old and could not meet the OCPP protocol needed to test SMAC.

To be able to assure both tests, AMB enlarges this station with two new charging points. In this case, AMB is building an ultra-fast charging point (CC) and a normal charging point (CA) adjacent to the existing equipment (CC-CA). This new equipment will meet OCPP requirements to test SMAC. If possible, we will update OCPP protocol of the existing charging point to enlarge the test.

In the demo of Barcelona, it has been decided to go beyond the scope of the demonstration taking advantage of the work performed by CIRCONTROL. CIRCONTROL is a manufacturer of recharging points and one of the AMB providers, and in turn, within the framework of the project, it has focused on updating the firmware for its Raption 50 fast-charging model in order to support OCPP 2.0 and ISO 15118 protocols. These Raption 50 is installed nowadays in Montcada i Reixac and Barberà del Vallès.

- **Infrastructure needed**

The charging points have been updated with OCPI 2.2. To go beyond this, an existing charging point of CIRCONTROL model Raption 50 or higher is required. A new ultra-fast charging point (CC) with common power supply is required in addition to the existing device. This includes new state of the art devices with OCPP protocol higher than 1.6. In addition to the existing device, a new normal charge point (CA) and with shared power supply is also required. The new devices will be on the latest OCPP protocol higher than 1.6. In addition, the work provides for 6 parking spaces to be charged simultaneously.

- **Organisation of Infrastructure Implementation**

ETRA, as provider of the backend that AMB uses to operate their Charging Points, has already started the implementation of the OCPP 2.2 protocol on the CPO backend system.

Nowadays AMB charging network is free of charge. To test INCAR system AMB has to be able to test automatic money compensation with others EMSP that is the most interesting feature of the product. Therefore, AMB is providing a stripe account to test this money compensation, even in AMB's charging points the amount payed will be zero.

A provider selected by a tendering process builds the new infrastructure needed. AMB has been working since May 2021 to have this tender finished on time. The contract signature is foreseen at the end of March 2022 and the infrastructure needed to test SMAC is planned to be finished on June 2022.
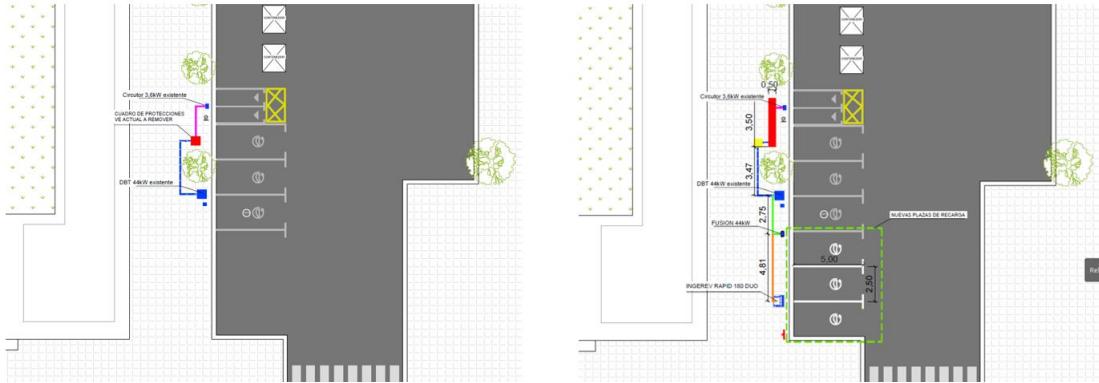
Figure 4 Cornella Charging Station - Current situation vs future enlargement

Figure 3 Previous situation vs works on site

In parallel AMB is requiring to the energy supply company a meeting to clarify the requirements to enlarge the energy needed for this new two equipment. The actual power supply of the station is around 60 kW and we need to enlarge it around 200 kW. When initially built, in 2015, it was foreseen a possible enlargement until 216 kW without major changes but the technical standards have changed since then. So that, we will be adapting the power supply adapted to the existing infrastructure. The energy supply adaptation has to be done to enable USER-CHI product tests.

AMB is also finishing the collaboration document between AMB and the municipality of Cornellà de Llobregat to install this infrastructure in their public domain. This document is needed to define the cost-construction-exploitation conditions of AMB charging station installed in a municipal land.

3.1.1.4   Timeline for Demonstration Implementation

INCAR/SMAC: Implementation of Technology, Platforms and End User Applications - State of Work / Actions										
Month	M 27/ Apri 22	M 28/ May 22	M 29/ June 22	M 30/ Jul 22	M 31/ Aug 22	M 32/ Sept 22	M 33/ Oct 22	...	M 35/ Jul 23	M 48/ Jan 24
Tendering of Charging Infrastructure Implementation	Contract formalisation									
Set Up of Charging Infrastructure										
Development of comunication strategy										
INCAR/SMAC App (Product Deployment, to agree with ETRA)										
Pretest (to agree with ETRA)										
Start: Demo (to agree with ETRA)										
User Feedback										

Table 1 Timeline for Demonstration Implementation: INCAR/SMAC (Barcelona)

3.1.1.5   Definition of User Group

Professional e-drivers that actually use AMB charging network to test interoperability and bal-ancing energy system. Private e-drives that actually use AMB charging network to test interop-erability and balancing energy system. CPO's and EMSP's to test the backend system on IN-CAR/SMAC. In this case AMB. Another public EMSP could be included if finally engaged.

3.1.1.6   User Finding

AMB has already a community of users of its charging network. They can be contacted directly and engage them to participate. AMB as a local administration will try to engage another public EMSP to test INCAR functionalities. AMB is studying the possibility to have INCAR app in the app store during tests instead of the actual APP of Electrolineres. Therefore, we could have the new users registered in INCAR app instead of the Electrolineres AMB.

3.1.1.7   Marketing Activities

The municipality is to be involved, which will provide the infrastructure. The charging station in Cornella will have a billboard. In addition, social media campaigns will be launched and emails will be sent to the actual customers of the charging network. Press communication will be coor-dinated in collaboration with local media and participation in conferences will be promoted. Tech-nical meetings will be arranged with other institutions/facilities/stakeholders/EU projects, Incen-tives will also be provided to participants (merchandising from USER-CHI).

3.1.2 INSOC

3.1.2.1   Main Focus

The main focus lies on testing a new urban solar energy inductive DC-charging station for light electrical vehicles (DC inductive for e-Kick scooters and AC conductive for e-bikes). The station is foreseen to have solar panels in a canopy that will supply energy of charging these vehicles.

3.1.2.2   Location

AMB is working with different municipalities to look for engagement, political interest and best location. Based on this the location for INSOC demonstration will be choosen.

3.1.2.3   Infrastructure Implementation Plan

- **Requirement and Infrastructure needed**

  The product leader will provide the charging stations and AMB has to install them in a public space.

  Because of the business model, AMB foresees to install two canopies that can connect two spaces of interest in the municipality chosen to host the test.

  The main requirement of the test is:

  1. The canopy has to be plugged into the energy supply system to guarantee the charge of the vehicles at night.

  2. AMB has to operate the system as the station is a hardware only and no software is provided.

- **Organisation of Infrastructure Implementation**

  A provider that is selected by a tendering process will install the infrastructure needed and will maintain it during the test. AMB has been working since May 2021 to have this tender finished on time. The contract signature is foreseen at the end of March 2022.

  In parallel AMB is working hard to find the municipality to host this infrastructure. USER-CHI consortium and its contacts are working to engage a sharing company to operate the system.

- **Barriers**

  Nowadays none of the municipalities that make up the Metropolitan Area of Barcelona, including the capital city, gives licences to e-kickscooters sharing companies. To enable this test, engaging a municipality that has to give a provisional licence is necessary. This means of transport is not in the main agenda of the politicians and it is not encouraged. AMB is working on this engagement to be able to do the test. This

will give the opportunity to raise awareness of this mode of transport that needs to be accepted and regulated.

3.1.2.4   Timeline for Demonstration Implementation

INSOC: Implementation of Technology, Platforms and End User Applications - State of Work / Actions										
Month	M 27/ Apri 22	M 28/ May 22	M 29/ June 22	M 30/ Jul 22	M 31/ Aug 22	M 32/ Sept 22	M 33/ Oct 22	...	M 35/ Jul 23	M 48/ Jan 24
Definition of collaboration Reby/AMB/EnelX										
Definition of collaboration AMB/Municipality				Main issue to solve						
Development of comunication strategy										
Deployment of INSOC										
Pretest										
Start: Demo										
User Feedback										

Table 2 Timeline for Demonstration Implementation: INSOC (Barcelona)

3.1.2.5   Definition of User Group

AMB foresees the test with the retrofitted wireless charging e-kickscooters exclusively. AMB actually has its own bike sharing system and wants to test the product with another business model completely different and not represented in the actual public services.

The USER-CHI project together with AMB will have to engage the collaboration of a sharing company to do this test. Both parts are working to find this collaboration.

The user group for this test would be the citizens of the metropolitan area.

We have to consider that there are no existing licenses to operate e-kickscooters sharing companies in Barcelona nor its metropolitan area. Even all this, AMB is engaged to do this test involving one municipality also to raise the awareness of the need to regulate this activity.

Other options are still if AMB cannot finally engage a municipality to do the test. For example: test with both canopies in AMB offices for AMB's workers or test the canopy only for private bikes/e-kickscooters.

3.1.2.6   User Finding

A collaboration with the e-kickscooter sharing company will be initiated to find users. By conducting marketing activities citizens of the municipality will be addressed. Engage ABy MB's and other administration workers to test the product.

3.1.2.7 Marketing Activities

The municipality should be involved, which will provide the infrastructure. Billboards are to be customized. Social media campaigns are also to be launched. Press communication will be done through the local media. Technical meetings will be arranged with other institutions/enti-ties/stakeholders/EU projects. Incentives for participants (merchandising of USER-CHI) are also to be created.

3.1.3 INDUCAR

3.1.3.1 Main Focus

The main focus is to analyse the inductive charging of an e-vehicle and explore possible scalability of the system based on the USER CHI product INDUCAR.

3.1.3.2 Location

For the demonstration of INDUCAR the AMB underground parking lot was choosen.

3.1.3.3 Infrastructure Implementation Plan

- **Requirement and Feasibility of Infrastructure**

  After a deep analysis with the product leader of the implementation of the inductive system, the decision was to implement INDUCAR in some e-cars from AMB's fleet. It was also determined the power supply of the system according to the limitation of the installation of AMB parking lot.

  AMB's cars are Renault Zoe and the development of the system was adapted to this car model.

  However, during the development of the project we found two main barriers:

  1. The responsible of the cars in AMB's did not allow the modification of these cars to install the inductive system.

  2. The existing Renault Zoe from AMB fleet did not have the charging mode required (Combo-CSS) to install INDUCAR product.

  AMB decided to rent two Renault Zoe's to be able to the test and has been allowed to use two parking spaces to install inductive charging points for this cars.

- **Infrastructure needed**

  For the infrastructural equipment, 2 cars (Renault Zoe with CCS combo plug) and 2 inductive chargers with 3G connection installed on parking lots are required.

- **Organisation of Infrastructure Implementation**

    A provider that is selected by a tendering process will provide and install the infrastructure needed. AMB has been working since May 2021 to have this tender finished on time. The contract signature is foreseen at the end of March 2022.

    Even though, the provider and AMB is trying to advance the work to have the cars on time.

    The CCS quick charging system for a Renault ZOE is a new feature (since car edition 2019) that can be included as an extra in the car when you order it. So that, it is difficult to find this product in the Spanish market both to rent or buy. AMB is working hard to find this cars but the reality is that there are not a lot of units available in the country with this feature to rent immediately. The provider of this renting is evaluating the possibility to purchase news cars but it has 6 months of delivery time.

    Because of this reasons, the beginning of demo in Barcelona could be delayed.

    During all this period, AMB has been developing documentation and studding:

    1. Budget and tendering documentation to obtain the provider of the cars.

    2. Meetings with different areas of AMB organisation to implement this demo.

    3. Study and deep search of different options to obtain the cars needed to be retrofitted.

    4. Get information and manage the permits to drive the modified car in the public area. Possibility to make a technical homologation of the car. Understand assurance requirements and coverage during the test.

    5. Contact with transport companies to send the cars to Holand/Germany where they will be retrofitted.

    6. Contacts to study insurance coverage with this modified cars.

    7. Planning the parking lot modification to meet the requirements to install these inductive charging points.

- **Infrastructure Implementation**

    This implementation will be done once the contract is signed. The installation works in AMB parking lots are fast but cars disposal is the critic point in this demo. The demo should be ready to test on July 2022 if the cars are provided by the renting company in the first weeks of April 2022. This issue is the main critical point and can make a huge delay in the timeline. AMB is still confident on the renting of two cars on time to meet the calendar.

3.1.3.4   Timeline for Demonstration Implementation

INDUCAR: Implementation of Technology, Platforms and End User Applications - State of Work / Actions										
Month	M 27/ Apri 22	M 28/ May 22	M 29/ June 22	M 30/ Jul 22	M 31/ Aug 22	M 32/ Sept 22	M 33/ Oct 22	...	M 35/ Jul 23	M 48/ Jan 24
Tendering of Charging Infrastructure Implementation	Contract formalisation									
Provision and transport to depot of INDUCAR EVs		Main barrier, key point, not guaranteed								
Drive permits from the DGT / Homologations										
Works retrofitting activites (IPT)										
Pretest / promotional panels and communication campaigns										
Start: Demo (insurance, organisation)										
User Feedback										

Table 3 Timeline for Demonstration Implementation: INDUCAR (Barcelona)

3.1.3.5   Definition of User Group

AMB staff older than 25 years old and with more than 2 years of experience driving was identified as user group. Coverage needed for insurance requirements.

3.1.3.6   User Finding

AMB has an internal intranet where you can get to all the staff and encourage them to try the wireless EV cars.

3.1.3.7   Marketing Activities

The advertising boards in the parking lots will be customized. Social media campaigns will be launched. Press communication/conferences will run through the local media involved. Technical meetings are held with other institutions/entities/stakeholders/EU projects. Incentives for participants (merchandising of USER-CHI) will be created.

3.1.4 CLICK

3.1.4.1 Main Focus

The main focus lies on the execution and testing of planning process tool for charging infrastructure for Barcelona based on the USER CHI product CLICK.

3.1.4.2 Demonstration Concept

- **User group**

  Urban planners from AMB's technical team were identified as user group. It is studied if urban planners of other administrations that implements charging infrastructure could also be identified as user group.

- **Infrastructure requirements**

  A PC with internet connection and Data files with certain format (still not defined) are required.

- **Access to urban data (city structure data)**

  Product leader already checked all the online urban public data and its formats.

3.1.4.3 Timeline for Demonstration Implementation

CLICK: Implementation of Technology, Platforms and End User Apllications – State of Work/Actions									
Month	M 27/ Apri 22	M 28/ May 22	M 29/ June 22	M 30/ Jul 22	M 31/ Aug 22	...	M 38/ Mar 23	...	M 35/ Jul 23	M 48/ Jan 24
User Definition	Already defined, AMB's technicians								
Implementation of infrastructure	Existing infratructure								
Acess to urban data	Existing data								
Click tool development and start demo in Berlin									
Start: Demo in Barcelona									
User Feedback									

Table 4 Timeline for Demonstration Implementation: CLICK (Barcelona)

3.2 Berlin Pilot Site

3.2.1 INCAR/SMAC

3.2.1.1 Main Focus

Two demonstration sites in Berlin equipped with newly installed Qwello AC chargers will demonstrate the functions of the INCAR and SMAC tools.

3.2.1.2 Location

The demonstration site "Prinzenstraße" is located in the heart of Berlin Kreuzberg and offers a non-discriminatory access to a newly built parking space equipped with two Qwello AC-chargers. A high demand for charging infrastructure at this location is expected as this charging location is frequently used by private e-drivers and mobility providers. The construction and technical installation has started in October 2021 and is almost ready for operations.

Figure 5 Prinzenstraße: Test of INCAR/SMAC

The second location is situated in the east of Berlin and is characterized by a high demand for parking spaces due to a nearby shopping centre "City Point Center". As such, this demonstration site provides ideal conditions for a charging hub with four AC-chargers by Qwello, which will be integrated into a private parking area from Gewobag. At this demonstration site, the parking barrier will be opened via the INCAR app, which makes this pilot site integration then complete. Searching for charging opportunities as well as making reservations and get access to those dedicated spots should be done through INCAR app.

Figure 6 Paul-Junius-Straße: Test of INCAR

3.2.1.3   Infrastructure Implementation Plan

For elaboration of the Infrastructure Implementation Plan in Berlin Gewobag carried out the activities shown in the Figure 7. The results of these activities are summarized in the upcoming sections.
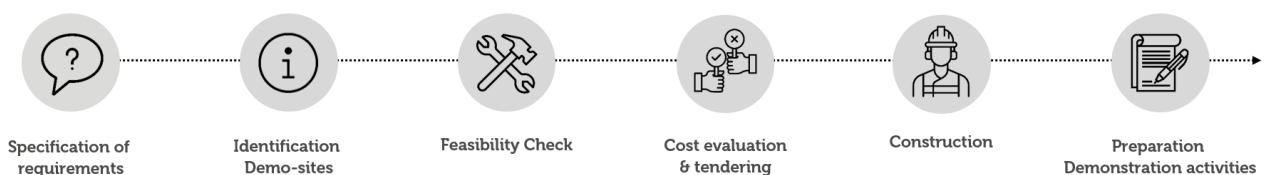
Figure 7 Infrastructure Implementation Plan (Berlin)

- **Requirements and needed Infrastructure**

In the first step, the technical and spatial requirements for the installation of the INCAR/SMAC- specific infrastructure at the demonstration sites were specified by Gewobag's cooperation partners. The suitability of all Gewobag's parking facilities in Berlin for the intended purpose was then evaluated based on the previously set criteria. Eventually, the pre-defined requirements were found to be met by five different parking facilities, of which two were selected as target demonstration sites, namely Prinzenstraße and Paul-Junius-Straße.

Location 1: Prinzenstraße   Location 2: Küsterstraße   Location 3: Bernauer Straße

Location 4:
City-Point Center

Location 5:
Havemannstr.

Figure 8 Targeted demonstration sites (Berlin)

In the next step, parking facilities at the selected locations were examined with regard to their infrastructural feasibility. Additionally, the availability of all necessary building permissions was clarified and the lacking documentation was applied for. The communication with the local public grid-operator was arranged and all infrastructural requirements have been out together is a list of services in order to start a tendering process.

- **Organisation of Infrastructure Implementation**

The tendering procedure for the constructors of parking and charging infrastructure at the two selected locations was initiated by Gewobag. According to internal tendering obligations different companies have been invited to hand in offers and to visit the chosen demonstration sites. After comparing the different offers, the contract to start the construction was commissioned to the successful tenderer.

The construction and technical installation of charging infrastructure at Prinzenstraße has begun in October 2021 and is nearly completed at this point. The finalized activities include material procurement, acquisition of building permits, excavation of the ground, preparation for the electrical installation, setting of cabinet and mast foundations, grid connection, set-up and installation of the charging points and restoration of the floor covering. The installation of signs is still ongoing and will be completed in the near future. The construction and technical installation of charging and parking infrastructure at Paul-Junius-Straße has not yet begun and is expected to start in April/May 2022. The construction process will be equivalent to the one described above for the first demonstration site Prinzenstraße.

In addition to the infrastructure integration of INCAR/SMAC in Berlin, IKEM is working together with a local grid operator Stromnetz Berlin GmbH on a publication in connection with SMAC. In the focus of this so called 'proof of concept' is the assessment of barriers and benefits of smart

metering solutions and their link to the USER-CHI product, e.g., smart metering solutions compared to the standard measurement methods, as well as explanation of the barriers to providing this data from the point of view of a Berlin DSO. The basis required for this is formed by the obstacles asked about the implementation of SMAC and the findings from the pilot site integration of all cities, which will be evaluate by IKEM after this deliverable. In conclusion, the working process is still ongoing. The outcome of this subcontract will be published in summer 2022. As a result, the publication will benefit the pilot sites, the evaluation process of SMAC and supports the scientific discourse and learn process out of USER-CHI.

3.2.1.4 INCAR/SMAC - Berlin specific Deployment

For the Berlin demonstration, the INCAR app will be developed based on the INCAR platform and CP data provided by Qwello with OCPI 2.2 integrated. It is planned to make the Berlin INCAR app available for initial testing and demonstration with friendly users by July 2022.

Furthermore, the functionalities for opening parking barriers in the demonstration Paul-Junius-Straße will be developed and integrated into the INCAR app. Both demonstration sites will be equipped with Qwello AC chargers. The charging solution is defined by its focus on user friendliness and has implemented most of the relevant user centric functionalities as defined by USER-CHI as outcome of WP1 (in descending order of relevance):

- Charging point status occupied/unoccupied/in maintenance, blocked, charging, reserved (28,9% relevance)

- Monitoring of usage of charging station in place (25,6% relevance)

- Pre-booking (20,2% relevance)

- Contactless payment (18,2% relevance)

- Consumption data of charging session (16,4% relevance)

- Remote authorization of charging through mobile app (13,4% relevance)

- Dynamic navigation to charging point (8,9% relevance)

- Display in the charging point (8,9% relevance)

The installed AC charging solution has implemented the features in the illustrated design:

1. **Easy to spot** thanks to height and illumination as well as optional integration of **5G antennas or WiFi**

2. **Station status** clearly visible with LED

3. Park sensors detect parking violators

4. Symbol-based user communication

5. Comprehensive **contactless payment methods** with credit cards, smartphones, etc.

6. Connection for **22 kW charging**

7. Integrated, 6.0-meter cable for **11 kW charging**

Figure 9 AC Charging Solution (Qwello)

The poles are supplied from a central cabinet per location which enables a flexible modification to the need of the distribution system operator (DSO) and a future complement with smart meter or other means of grid balancing. Qwello is controlling the charging solution via an own backend which enables the reservation function. The Qwello backend will be connected to the INCAR backend and App, based on OCPI 2.2, in a 2-step approach:

1. Showcasing basic functionalities via a OCPI 2.1 proxy

2. Interfacing via consistent OCPI 2.2 protocol

The 1st step should be available approximately in July/August, depending on the implementation process.

INCAR Platform implements the sender interface of HubClientInfo module, which returns the information of connected partners. Additionally, an endpoint is included in order to report the IN-CAR mobile app the available EMSPs with their corresponding Identity service information (Keycloak), intended to be used during the EV driver login. The hub redirects all information related with the smart charging optimizations. The management of this data will be performed by SMAC.

3.2.1.5   Timeline for Demonstration Implementation

Implementation of Technology, Platforms and End User Applications - State of Work / Actions - 15-16th, 2022										
Month	M 27/ Apri 22	M 28/ May 22	M 29/ June 22	M 30/ Jul 22	M 31/ Aug 22	M 32/ Sept 22	M 33/ Oct 22	M 34/ Nov 22	M 35/ Dec 22	M 48/ Jan 24
Tendering of Charging Infrastructure Implementation										
Set Up of Charging Infrastructure										
INCAR App (Product Deployment)				Depends on input (Qwello, Payment. etc.)						
Pretest										
User Findings										
Start: Demo										
SMAC related publication (proof of concept)										

Table 5 Timeline for Demonstration Implementation: INCAR/SMAC (Berlin)

3.2.1.6   Definition of User Group

The main user groups relevant for the Berlin demonstration are EV-drivers in Berlin and Gewobag tenants who own an electric vehicle. In addition Mobility providers operating electric fleets can be further user groups.

3.2.1.7   User Finding / Marketing Activities

In order to make the INCAR app attractive for EV-drivers and to create incentives for e-drivers to use the INCAR app as permanently as possible, the implementation of activities via social media and agencies is currently planned. At present, it is examined how the use of the INCAR app by e-drivers can be supported and promoted through incentives such as the distribution of vouchers. In addition, Gewobag is going to promote the use of newly installed parking and charging spots at both demonstration sites by sending notifications to tenants via the Gewobag Service App.

3.2.2   CLICK

3.2.2.1   Main Focus

The main focus lies on the execution and testing of planning process for charging infrastructure of Berlin based on the USER CHI product CLICK.

3.2.2.2   Demonstration Concept

User Group

The user group consists of different Stakeholder groups (municipal planner, housing company, private companies (potentially).

Infrastructure requirements

A PC with internet connection and Data files with certain format (still not defined) are required. An access to urban data (city structure data) is required.

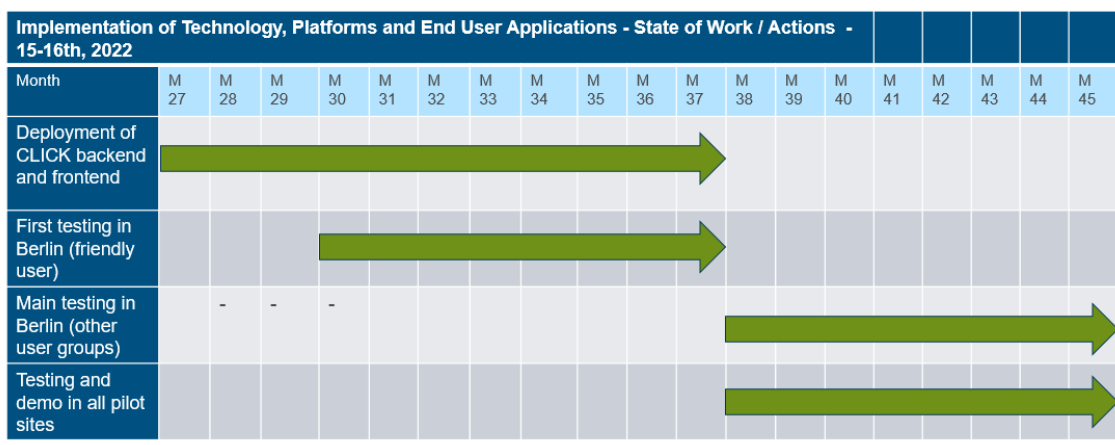### 3.2.2.3   Timeline for Demonstration Implementation

Implementation of Technology, Platforms and End User Applications - State of Work / Actions - 15-16th, 2022																			
Month	M 27	M 28	M 29	M 30	M 31	M 32	M 33	M 34	M 35	M 36	M 37	M 38	M 39	M 40	M 41	M 42	M 43	M 44	M 45
Deployment of CLICK backend and frontend																			
First testing in Berlin (friendly user)																			
Main testing in Berlin (other user groups)	-	-	-																
Testing and demo in all pilot sites																			

Table 6 Timeline for Demonstration Implementation: CLICK (Berlin)

3.3 Rome Pilot Site

3.3.1 INCAR/SMAC

3.3.1.1   Main Focus

The main focus of the Rome Pilot site is to test the INCAR and SMAC functionalities within the Roman environment, leveraging up the distributed infrastructures made available by Enel X Way.

3.3.1.2   Location

Different type of stations were identified for the Rome pilot site dedicated to INCAR and SMAC:

- An Intermodal exchange hub

- A V2G Hub

- An EV ultrafast charging station

The original plan foresaw the deployment of a multi-hub in a totally new space along the main road Cristoforo Colombo. This site, sponsored by RSM, was supposed to host different charging stations (differentiated in size and type) along with other services such as co-working spaces and cafès. Unfortunately, the length of the administrative steps required for th infrastructure implementation plan has been considered not compatible with the timeline and major milestones of the USER-CHI project and as such has required to kick-start the scouting for new sites.

This research has been carried out by Enel X Way by looking at the available EVSEs infrastructures or sites considered compatible for the scope of the project. The scouting process has been iterative and considered the inputs of the Roman partners as well as the existing administrative constraints of the city of Rome (an example: ultrafast charging stations can't be installed on public sites).

As it was not possible to identify a single site able to host all these different infrastructures, the scouting process has resulted in a further distribution of the above mention stations as described in the table and figure below:

Type of station	EVSE type	Location	Product to test	Benefits of the selected site
Intermodal exchange hub	1 JuiePole 22 kW (+3 kW)	Enel X Store in Corso Francia 212	INCAR	Close to services and cafès
Intermodal exchange hub	2 JuicePole 22 kW (+3kW) + 1Fast (73 kW)	Via val di Cogne 22	INCAR	Close to the last stop of the metro B station "Conca d'oro"
Intermodal exchange hub	1 JuicePole 22 kW (+3 kW)	Viale Giulio Cesare 54	INCAR	Close to the metro A station: "Ottaviano" as well as placed in an avenue rich in shops and services (the main tribunal of the city, banks, gyms)
EV ultrafast charging station	1 High Power Charging Station (HPC) with a dedicated storage system based on supercapacitors technology	Via Flaminia 871	INCAR	Within the Enel X premises (but allowing public access 7/24): the infrastructure is less than 5 km far from the GRA and available for the employees working in the office premises located in that

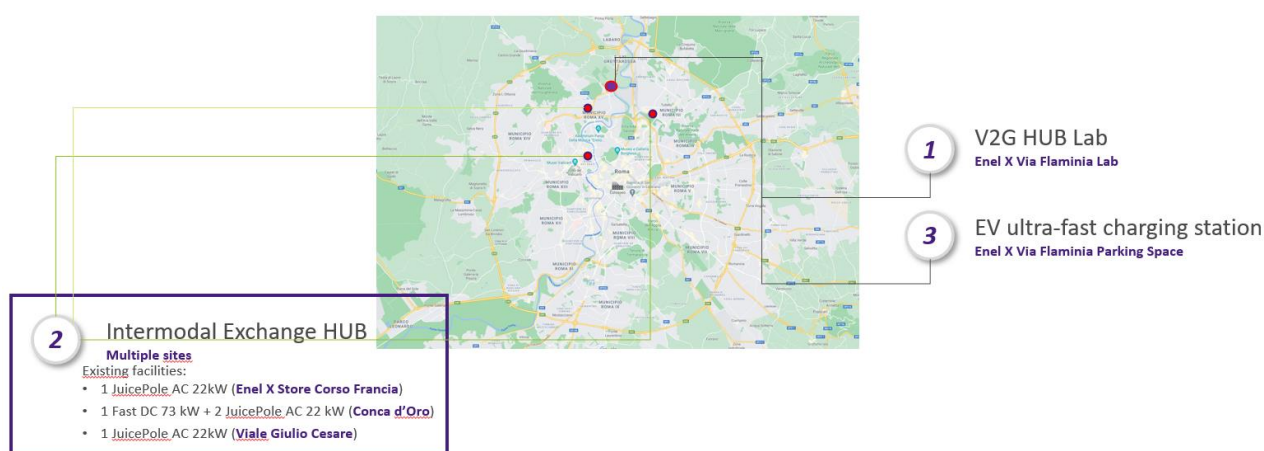| Type of station	EVSE type	Location	Product to test	Benefits of the selected site
				area (not well served by public transport)
V2G Hub	4 V2G EVSEs (power range 15 kW – 25 kW) served by PV panel and a 2nd life ESS	Via Flaminia 871	SMAC	Within the Enel X laboratories: the required environment to allow testing V2G technologies

Figure 10 Rome Pilot Sites for INCAR and SMAC

3.3.1.3   Infrastructure Implementation Plan

The infrastructure Implementation Plan is deployed according the following steps. As the sites involved are many and distributed across the city, certain steps are relevant or even not relevant depending on the status of the EVSEs infrastructure in each site.

- **Requirement and Feasibility of Infrastructure**

    The requirements of each station have been analysed.

    The EVSEs with a lower power rate (the JuicePole and the Fast), that usually require more charging time, benefit from sites surrounded by different services or other transport modalities, This is true for the sites identified for the intermodal exchange hub. It is important

to say that these sites already host the required EVSEs infrastructure: this choice reduces the inherent (mainly administrative) risk behind setting up new sites and allows to test the use of INCAR in charging stations already known by the users.

For the ultrafast charging station the proximity with a high road (like he GRA) has been considered the most important feature to satisfy. The need of a dedicated storage unit meant to hedge the peak demand (which requires space) and the interdiction to install HPC in public spaces, have lead to the Enel X Way premises (and their specific location). This choice has sped up the kick-off of the civil works and facilitates the site project management.The V2G infrastructure required to test the functionalities of SMAC has been identified in the private Laboratory of the Enel X premises in Via Flaminia. This choice will provide the best environment to test SMAC features with V2G EVSEs. The choice of the power range is still under discussion as it is important to consider the site peak power availability and also the availability of the right EVSEs for the project.

- **Organisation of Infrastructure Implementation** (Tender, Contract) and Infrastructure Implementation (Construction)

The Intermodal exchange hub does not require any tender.

The ongoing civil works and the procurement of the ultrafast charging station will rely on existing framework contracts based past beauty contests, while a dedicated tendering process in under preparation for the procurement of the storage unit based on supercapacitors.

The V2G Hub Lab will also rely on an existing framework contracts based past beauty contests for the works, the procurement of the V2G EVSEs infrastructure will instead rely on stock availabilities of affiliated entities.

3.3.1.4   Timeline of Demonstration

The upgrade to the OCPI 2.2. protocol has been planned for September 2022. As notified in the D3.1 the integration with the payment system via stripe is seen as critical/at risk since the payment system currently available for the EVSEs made available is via bank/wire transfer. It has been recently verified that Stripe registration, deposit authorization on the bank account for the services provided are requirements not feasible and as such an alternative solution will have to be identified. Timeline for Demonstration Implementation:
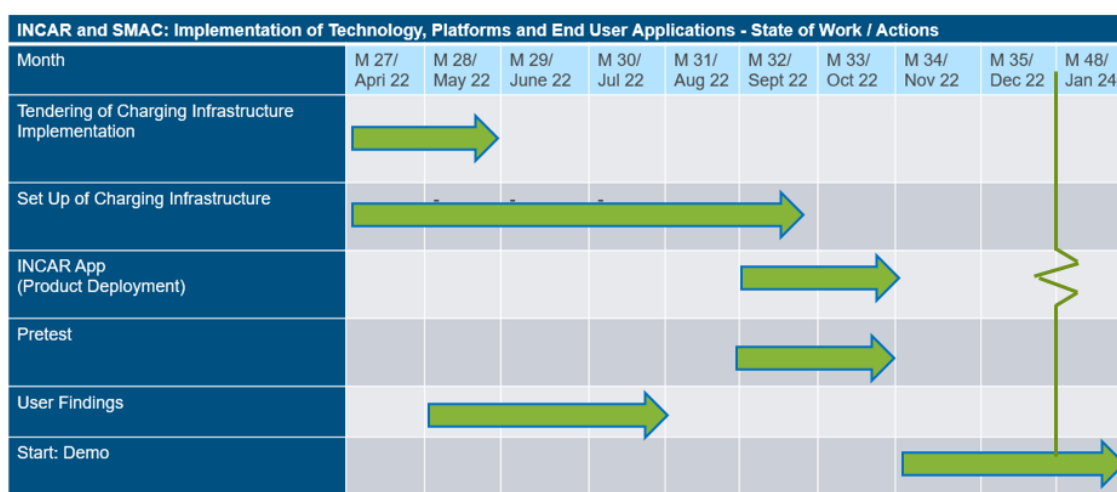

Table 7 Timeline for Demonstration Implementation: INCAR/SMAC (Rome)

3.3.1.5   Definition of User Group and User Finding

The definition of the user group and the user finding is in charge of RSM, the Agency of Rome for the urban mobility, since these type of activities might not be manageable by Enel X Way since it has its own portfolio of users managed trough its proprietary e-Mobility app. The preparation activities will kick-off in May 2022.

3.3.1.6   Marketing Activities

Marketing activities will be defined in the next months among the partners involved in the Rome pilot site with RSM as leader due to the reasons explained in section **¡Error! No se encuentra el origen de la referencia.**. The preparation activities will kick-off in May 2022.

3.3.2 INSOC

3.3.2.1 Main Focus

The main focus lies on testing a modular and flexible charging station for e-Bikes and e-Kick-scooters connected to the grid but with an on-site RES production with a PV canopy.

3.3.2.2 Location

The scouting of the location for the installation site in Rome has seen different site candidates that required a multilateral assessment due to technical and administrative constraints.

Figure 11 Site identified for INSOC installation in Rome: Laurentina – Metro B line

The first candidate has been located very close to the city center but the strict administrative requirements of the Municipal Superintendency (who can apply veto and mandatory requests on the design of the product) have lead to abandon the idea of this very interesting location. An alternative has been proposed by RSM, the Rome Agency for the urban Mobility, who, in agreement with A.T.A.C., the public transport company of the city, has identified a site within the metro station of Laurentina (B line). The site is not only in front of the entry of the metro station but is also very close to several offices and a dedicated buses station for regional commutation. Further, in proximity of the site there is already a small bike parking rack available for the commuters of the metro station.

3.3.2.3   Infrastructure Implementation Plan

- **Needed Infrastructure**

    The infrastructure needed foresees the INSOC product, a low voltage AC connection and a site exposed to the solar light.

- **Organisation of Infrastructure Implementation (Tender, Contract)**

    The product is currently under development. The development has shown some delays due to the innovative nature of the product since it will use a wi-fi DC charging system for the e-kick scooters that necessarily need to be retrofitted. The product will also need to go under a certification process which might be demanding since there is not yet an available standard for such products.

    There is a contract with a manufacturer in charge of the production of the product while Enel X Way will lead the product development and its related compliance.

- **Infrastructure Implementation (Construction)**

    The infrastructure Implementation will be in charge of Enel X Way or one of its affiliated company.

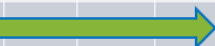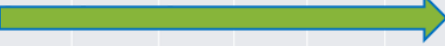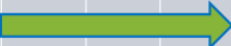### 3.3.2.4   Timeline for Demonstration Implementation

Table 8 Timeline for Demonstration Implementation: INSOC (Rome)

3.3.2.5   Definition of User Group and User Finding

Through a dedicated   bilateral meeting the characterization of the user group and the consequent business model has been discussed among the Rome demo partners. The Agency for the Urban Mobility (RSM) has identified the private users (owner of e-bikes) and potentially also e-bikes/e-kick scooters sharing companies as potential users for the demo. The choice of the site confirms this direction. User finding preliminary activities will kick-off in the month of May 2022. Marketing Activities

3.3.2.6   Marketing Activities

Marketing preliminary activities will kick-off in May 2022: on-site panels and indications plus the use of the RSM platform in coordination with A.T.A.C. who owns the site will be pivotal for the effectiveness of the marketing campaign.

3.3.3 CLICK

3.3.3.1   Main Focus

City of Rome is carrying on the Electric Mobility Plan and RSM constantly updates the map of the plants in relation to the level of construction. The georeferenced information is superimposed on the map of the reports of installation needs advanced by citizens, in order to facilitate the matching of supply and demand for charging systems. The Click tool will support the existing information and provide a more complete information for all companies and charging point operators and for the Sustainable Mobility Department involved in the planning process for charging infrastructure in cities

3.3.3.2   Demonstration Concept

- User of different Stakeholder groups (municipal planner, housing company, private companies (potentially)
- Infrastructure requirements
- Access to urban data (city structure data)

3.3.3.3   Timeline for Demonstration Implementation

CLICK: Implementation of Technology, Platforms and End User Applications - State of Work / Actions										
Month	M 27/ Apri 22	M 28/ May 22	M 29/ June 22	M 30/ Jul 22	M 31/ Aug 22	M 32/ Sept 22	M 33/ Oct 22	M 34/ Nov 22	M 35/ Dec 22	M 48/ Jan 24
User Definition										
Implementation of Infrastructure		-	-	-						
Access to urban Data										

The timeline will be filled our after an internal meeting and next feedback with the partners.

3.4 Turku Pilot Site

3.4.1 INCAR/SMAC

3.4.1.1   Main Focus

The main focus is to analyse the interoperability between CPO's and EMSP based on the USER CHI INCAR/SMAC product. The smart energy balancing system between charging points will also be analysed.

3.4.1.2   Location

Turku will demonstrate INCAR and SMAC in two different sites. One is residential building operated by VASO in Pääskyvuori area. This building complex is being built during the project and original completion date was late 2022 and parking area during summer 2022, but ongoing covid-19 situation and Ukraine war delays the building process. As the building construction will be delayed, the INCAR demonstration is started in another VASO location that will also have compatible charging points. The SMAC demonstration starts after construction is ready to do so.

Other site is Turku Energia's (later "TE") new headquarters office building in Kupittaa area. New building will be state of the art energy efficient building that will fulfil Leed certificate in platinum level. These new offices are finished in June 2022. Building site is ready in time to build charging points in summer 2022 and thereafter start demonstrations.

3.4.1.3   Infrastructure Implementation Plan

- **Requirement and Feasibility of Infrastructure**

Technical solution can be divided to two different segments: hardware and software side. Softwire side is same in both demonstration sites, needing a backend for the charging points that can support INCAR application. Basically this means backend that supports OCPI 2.2

protocol. In Finland, there were no operators that had already implemented OCPI 2.2, so there was a need to find an external partner that could work with project team timeline and provide the software side of the project. This side of the project had to be tendered.

Other side of the requirement listing and tendering was the charger hardware. Chargers to be demonstrated on VASO site are 22 kW Type2 chargers, with functionalities which enable the demonstration of USER-CHI products. Chargers that are purchased to TE demonstration site are of both 22 kW Type2 charger type and of Vehicle-to-Grid (V2G) charger type. As V2G is a quite new technology and chargers are just entering market, the listing of requirements and ecaluation of hardware feasibility was a more challenging task. We needed to check that chargers are compatible with INCAR backend also.

- **Organisation of Infrastructure Implementation (Tender, Contract)**

Turku consortium needed an external partner to handle the needed EV charging software and service integrations in the project. Tendering process started in spring 2021 by contacting companies that had the needed technical experience and capabilities to carry out this kind of software and service integration project. As it was predicted, OCPI 2.2 implementation was the main issue that controlled tendering process. Offers had broad range of cost, which made choosing partner easier. Tendering process resulted in a contract with IGL-Technologies Ltd. The chosen partner will develop and test the needed integrations with INCAR back-end system and function as a local technical charging services provider during the demonstrations project. The software and service integration partner started the work for USER-CHI project tasks in autumn 2021.

The next tendering process concerned charger hardware. Chargers for VASO and TE sites were tendered separately. V2G chargers are more complicated to tender, and market is still undeveloped. Therefore V2G charger hardware tendering could not be carried out as traditional tendering based on fixed requirements and many received binding offers as end result of the tendering. Tendering process is about to finish and suitable chargers will be installed to demonstration sites.

- **Infrastructure Implementation (Construction)**

Construction timeline is controlled by building construction process. At TE demonstration site the building works are ready, so the preconditions are fulfilled for charging point construction during summer 2022. Thereby charging points can be installed on time for the demonstration phase. The construction works at VASO demonstration site will be delayed due the Ukraine war and delivery problems on some of the components. Chargers will be installed as soon as possible. VASO demonstration will be started on other location for charger installation, if reasonably possible.

3.4.1.4   INCAR/SMAC Turku specific Deployment

To deploy the products developed in USER-CHI project, many preparations need to be done locally as well. The most important of these is the development work that is being done by the chosen local EMSP IGL-Technologies Ltd (in the following "IGL"). The back-end system of IGL will be integrated with INCAR back-end system.

The technical integration project of OCPI integration between INCAR and IGL back-end systems is divided into 10 phases. The duration of each phase is 1-2 months and includes development and testing of certain general data communication and OCPI integration functionalities. After all functionalities have been tested and developed, a product-oriented test usage period of OCPI integration will be carried out.

After technical integration project, the INCAR and SMAC operational end-to-end functionalities will be tested at Turku demo charging stations. The functional testing will be also divided in phases, in order to carry out the functional tests systematically and to be able to catch functional failures, bugs and other make any other remarks related to testing.

3.4.1.5   Timeline for Demonstration Implementation

Table 9 Timeline for Demonstration Implementation: INCAR/SMAC (Turku)

3.4.1.6   Definition of User Group

Main user group consists of Vaso tenants and Turku Energia employees. This user group consist of both professionals that are working with charging points and common electric car users. Professional users are testing back-end tools both in INCAN and in SMAC. Common users will test INCAR app usability

3.4.1.7   User Finding

Most of the users can be found from tenants and employees. Common users will be found trough stakeholder groups that are part of our local project steering group.

3.4.1.8   Marketing Activities

Vaso and Turku Energia will market their own demonstration sites internally and externally. Marketing campaign will be done by city of Turku to boost all demonstrations, more from that under CLICK implementation information.

3.4.2 INSOC

3.4.2.1 Main Focus

INSOC demonstration in Turku will focus on secure parking and charging for electric bikes. Electric bikes market has been growing fast in last few years and need for charging and parking along side of that. INSOC will be one solution for that need.

3.4.2.2 Location

Turku will demo INSOC in two different sites. One of the sites is in city centre and will support both Logomo entertainment center and new railway station that will be built in few years. This site will be facilitated by City of Turku. INSOC will be installed in bike garage that will have solar panels and battery storage.

Other demonstration site is operated by TVT in Mäntymäki residential area. Residential properties that will be demonstration area are being built now and are finished in summer 2022. INSOC will be implemented among regular bike parking and will be connected to buildings own PV system.

3.4.2.3 Infrastructure Implementation Plan

- **Needed Infrastructure**

Finland has a harsh winters and that creates different demand on infrastructure than in other countries. We wanted to have closed solution to cover INSOC and the bikes from the weather. City of Turku did the planning of bike garage outside project and found a good place for it. Bike garage supports the demonstration and biking in general. Bike garage will have Solar panels and battery storage installed and that hade to be planned also.

TVT will install the solar panels on the roof of residential building that will be finished in July 2022. TVT´s demonstration is a INSOC charging system for e-bikes in a new housing building. The charging station is built on the inside yard of new apartment buildings. There will be also separate charging box inside the building in the bike garage and a senior scooter charging place as said in GA.

- **Organisation of Infrastructure Implementation (Tender, Contract)**

City of Turku tendered bike garage outside of the project. Garage was submitted to permit process on start of the 2022 and process will take few months. Solar panels and batteries could be sourced internally trough Turku Energia. Internals like bike stands and bike service station could be acquired through our own city suppliers.

TVT´s new residential building and inside yard´s construction is tendered outside the project. Solar panels, batteries and electrical wiring inside and outside below the yard will be tendered with help of Turku Energia.

- **Infrastructure Implementation (Construction)**

Both City of Turku and TVT will start construction in summer and are ready to start demonstration and testing in September 2022, when INSOC product arrives.
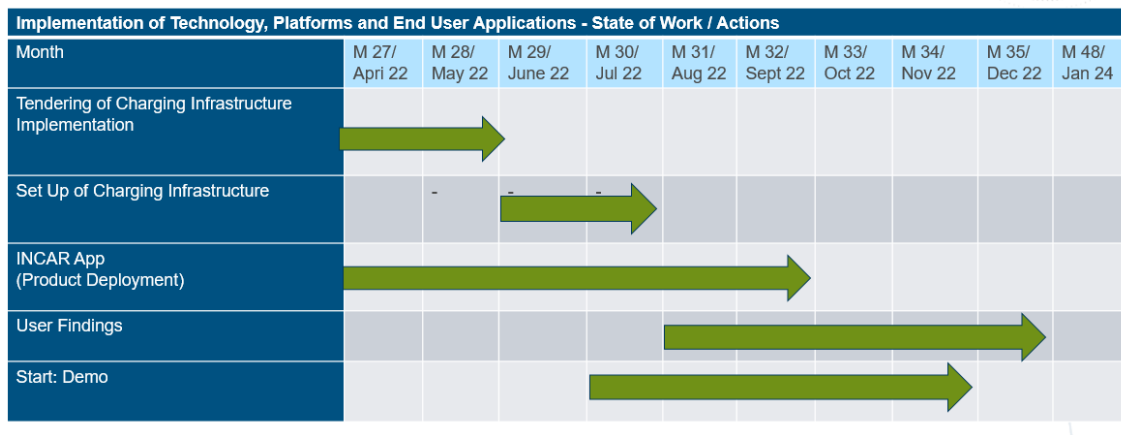
3.4.2.4 Timeline for Demonstration Implementation

Table 10 Timeline for Demonstration Implementation: INSOC (Turku)

3.4.2.5 Definition of User Group

User groups will consist of TVT tenants and Turku citizens. In the Mäntymäki area close by INSOC demonstration will be brand new residential area for almost 1000 inhabitants and consist of 500 apartments. Main part of TVT´s tenants are from low- or middle-income groups.

3.4.2.6 User Finding

User group will be find during marketing campaign. TVT tenants and citizens overall will be encouraged using INSOC by some incentives.

3.4.2.7 Marketing Activities

TVT will market to their own tenants internally and externally to the local community. Marketing campaign will be done by city of Turku to boost all demonstrations, more from that under CLICK implementation information.

3.4.3 CLICK

3.4.3.1 Main Focus

City of Turku with its project partners are creating city wide charging master plan. Turku will use CLICK tool to define future of the charging network in city and steer development in companies and housing companies. CLICK will be used to create map for all companies and charging point operators to show charging demand and suggestions for new points. CLICK will also help City of

Turku and other project partners to help plan charging infrastructure in their own properties and connect it to public charging infra.

3.4.3.2   Demonstration Concept

- **Different Stakeholder groups** (municipal planner, housing company, private companies (potentially)

The master plan process will involve several stakeholder groups. These will be engaged through workshops in which the outcomes of the CLICK tool will be demonstrated.

- **Infrastructure requirements**

Current state and the plans for five next years has been identified. The developed master plan process defines possible locations for the infrastructure.

- **Access to urban data (city structure data)**

The master plan will be developed through close work with the city planners and traffic planners. The data is gathered and then used in CLICK.

3.4.3.3   Timeline for Demonstration Implementation

Implementation of Technology, Platforms and End User Applications - State of Work / Actions - 15-16th, 2022										
Month	M 27/ Apri 22	M 28/ May 22	M 29/ June 22	M 30/ Jul 22	M 31/ Aug 22	M 32/ Sept 22	M 33/ Oct 22	M 34/ Nov 22	M 35/ Dec 22	M 48/ Jan 24
User Definition										
Implementation of Infrastructure										
Access of urban data										
Start: Demo										

Table 11 Timeline for Demonstration Implementation: CLICK (Turku)

3.4.3.4   Definition of User Group

CLICK will used and demonstrated by City of Turku city and traffic planners. TVT and VASO will be involved in masterplan, but are testing CLICK also individually in their company properties.

3.4.3.5   User Findings and marketing activities

Users are found internally from project partners respective companies and from city employees. In support of charging master plan City of Turku will create marketing campaign to accelerate mobility electrification and charging infrastructure development. Marketing campaign is divided to different segments, one part is focused for citizens and car owners, second part is focused for housing companies and house owners, and last part is focused for companies.

3.5 Budapest Pilot Site

3.5.1 INCAR/SMAC

3.5.1.1 Main Focus

In Budapest the main focus of the interoperability, charging platform and smart charging tool is to set up a working, upscalable real life cooperation between stakeholders, analyse the interoperability between CPO's and EMSP and assess user reactions and feedback. Another focus is to test a smart energy distribution/balancing system to analyse electric grid usage, considering user needs, charging habits, and the characteristics and limitations of the current electric grid.

3.5.1.2 Location

There will be three demonstration sites in Budapest. An evaluation table was created to select the three sites. In the table, all the possible sites have been rated by the location and the connection with frequented transport routes. Above these viewpoints, the traffic volume, the accessibility and the integrability into the existing network have been also considered. On the basis of the points mentioned above, the demonstration sites are near to frequented railway stations and public transport stops.

Figure 12 Three Demonstration Sites: Budapest

Two of our demonstration sites are situated in the Pest side of Budapest. The first one is Keleti railway station (Keleti pályaudvar), where we receive the international and intercity trains. A high

demand for charging infrastructure at this location is expected as this location is frequently used by private e-drivers and transport service providers.

The second site is located in the heart of Budapest, next to Nyugati railway station (Nyugati pályaudvar). This location is characterized by a high demand for parking spaces due to a nearby shopping centre "Westend" and railway station.

The third location is situated in the Buda side of Budapest. This site is next to a national bus station and a railway station in a housing estate area. This site is very well-known over the commuters, EV users and well connected the TEN-T network.

3.5.1.3   Infrastructure Implementation Plan

- **Requirement and Feasibility of Infrastructure**

  As Budapest (BUD, BKK) is not operating currently any e-charging points/stations and as a municipality Budapest does not intend to step into this market, it is fundamental to involve an adequate partner (CPO, EMSP). Along with the involvement of DSO for electricity supply, the Open Charge Point Interface (OCPI) has to be updated. Currently, there are ongoing discussions between Budapest partners, the consortium leader and E-ON Hungary in order to involve E-ON in the project, as a charge point operator and e-mobility service provider.

  Regarding the infrastructure, the city of Budapest has created a mobility point concept, which defines three type of service levels. Based on the service level, we distinguished three types of Mobility Points:(Micro) Mobility Point: in densely populated areas, in every 150 meters for micromobility vehicles only (bicycle, roller, cargo bicycle),

  Mobility Point: in a densely populated area next to micromobility vehicles, dedicated carsharing and shared scooter parking every 250-300 meters,

  Mobility Station: in larger intermodal/ transport junctions, a larger built-up Mobiliy Point for shared modes of transport with additional services (for example: delivery pick-up point, luggage storage, etc.).

  Budapest has installed more than one hundred micromobility points and in 2022 more than five hundred will be installed.
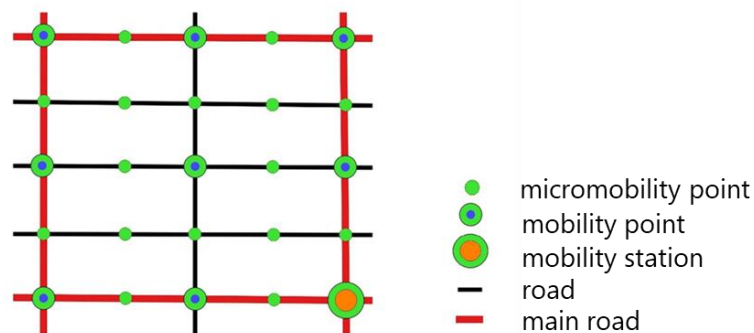
Figure 13 Overview: Mobility Point Concept (Budapest)

The design of e-mobility station (including street furniture, traffic regulation order, citybranding matching design elements) all add to the user experience, it is treated as important as the technical solutions. In the mobility stations e-charging infrastructure will be implemented as well next to the mobility solutions to provide charging option along with the mobility offer, additionally information can be found also on physical signs about the usage of the software and system.

- **Organisation of Infrastructure Implementation (Tender, Contract, Construction)**

Infrastructure implementation will be carried out partly by Budapest and companies of the Municipality (surrounding street furniture, traffic regulation order, branding, information signs and design) and partly by the involved EMSP/CPO (charging point construction). All sites are located on areas owned and handled by the Municipality.

3.5.1.4   Timeline for Demonstration Implementation

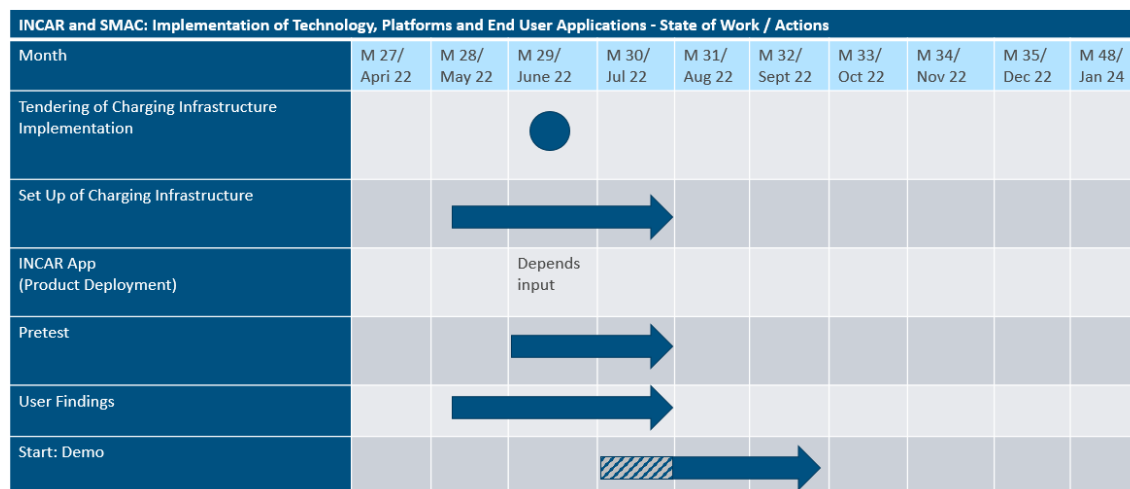| INCAR and SMAC: Implementation of Technology, Platforms and End User Applications - State of Work / Actions										
Month	M 27/ Apri 22	M 28/ May 22	M 29/ June 22	M 30/ Jul 22	M 31/ Aug 22	M 32/ Sept 22	M 33/ Oct 22	M 34/ Nov 22	M 35/ Dec 22	M 48/ Jan 24
Tendering of Charging Infrastructure Implementation			●							
Set Up of Charging Infrastructure		→→→								
INCAR App (Product Deployment)			Depends input							
Pretest		→→→								
User Findings		→→→								
Start: Demo				▨→→→						

Table 12 Timeline for Demonstration Implementation: INCAR/SMAC (Budapest)

3.5.1.5   Definition of User Group

The main user groups relevant for the Budapest demonstration are EV-drivers in the city, who own an electric vehicle. In addition, Mobility providers, shared mobility service providers operating electric fleets can be further user groups.

3.5.1.6   User Finding / Marketing Activities

In order to make the INCAR app attractive for EV-drivers and to create incentives for e-drivers to use the INCAR app as permanently as possible, the implementation of activities via social media and agencies is planned. The city of Budapest and BKK are going to promote the use of newly installed parking and charging spots using social media and organizing local community and press events.

3.5.2 INSOC

3.5.2.1   Main Focus

In Budapest the INSOC demonstration will focus on supporting citizens and sharing initiatives to use LEVs as a complementary tool to public transport. Other main focus is to exploit the solar capacity of Budapest. The demonstration project has a strong connection to the EUKI financed Budapest – Solar Powered pathfinder project, where Budapest wants to demolish the legal, administrative, behavioural, technical barriers of urban solar integration. The city develops its solar capacity cadastre map, which will be a basis for rooftop solar investments, as well as solar capacity building for e-mobility.

3.5.2.2   Location

The demonstration area is next to the City Hall building in the downtown area, so called City Hall Park, which is a large mobility hub (metro, tram, bus, trolley bus lines). This location is ideal for a first testing period, because on the one hand, it is a municipality owned area which makes the deployment process easier, and on the other hand it is a semi-public space and thus more pro-tected.

3.5.2.3   Infrastructure Implementation Plan

Requirement and Infrastructure needed:

The product leader will provide the charging station and the Municipality of Budapest has to in-stall it in a public space. For the implementation of INSOC, the infrastructure works need to be done by September 2022 (electricity connection, traffic sign, signals, etc.). They will be completed by municipal companies.

Organisation of Infrastructure Implementation (Tender, Contract):

The installation of the product will be subcontracted, as the Municipality has no technical capacity or knowledge installing it. Subcontracting procedure starts when Enel-X provides the technical details, preferably by June 2022.

Infrastructure Implementation (Construction):

Implementation starts when Enel-X provides the product, preferably in September 2022.

3.5.2.4 Timeline for Demonstration Implementation

INSOC: Implementation of Technology, Platforms and End User Applications - State of Work / Actions											
Month	M 27/ Apri 22	M 28/ May 22	M 29/ June 22	M 30/ Jul 22	M 31/ Aug 22	M 32/ Sept 22	M 33/ Oct 22	M 34/ Nov 22	M 35/ Dec 22	M 48/ Jan 24
Deployment of INSOC						→				
Pretest						→				
User Finding Activities		-	-	-				→		
Start: Demo						→				

Table 13 Timeline for Demonstration Implementation: INSOC (Budapest)

3.5.2.5 Definition of User Group

User groups will consist of the Budapest citizens, but for the first testing period only the Municipality workers, later it will be for semi-public use. Furthermore, the involvement of the sharing companies will be considered as well. In Budapest, there are several e-scooter sharing companies, but currently there are no sharing companies for e-bike.

3.5.2.6 User Finding

At first, the Municipality's and BKK's workers will be involved to test the product. Then, it will open to the citizens. BKK and the Municipality of Budapest are currently in negotiations on the business model to be applied. Once the available legal, financial and human resources have been determined, Budapest will be able to decide on the exact scope of users, their scheduled involvement and the users' role at the project.

3.5.2.7 Marketing Activities

Marketing campaign will be done by the city of Budapest to boost all demonstrations. In case of the INSOC product, the Municipality will promote the testing on its communication platforms (newsletter, posters etc.) in order to inform its employees and encourage them to use the product.

3.5.3 CLICK

3.5.3.1 Main Focus

The city of Budapest will use CLICK tool to optimise the location and planning of new charging infrastructure in the city, matching the users' needs, preferences and habits, with the existing charging technologies and typologies available in the market.

3.5.3.2 Demonstration Concept

The user group will consist of different stakeholder groups, potentially urban planner, carsharing operators (who have their own charging stations installed in the city), Hungarian E-mobility Association, public transport operator of Budapest and other potentially stakeholders.

Infrastructure requirements:

For the implementation of CLICK a PC with internet connection and Data files with certain format (still not defined) are required. The possible locations for the infrastructure have not been decided yet.

Access to urban data (city structure data):

The close work with the city planners and traffic planners is required to gather city structure data which will be used in CLICK.

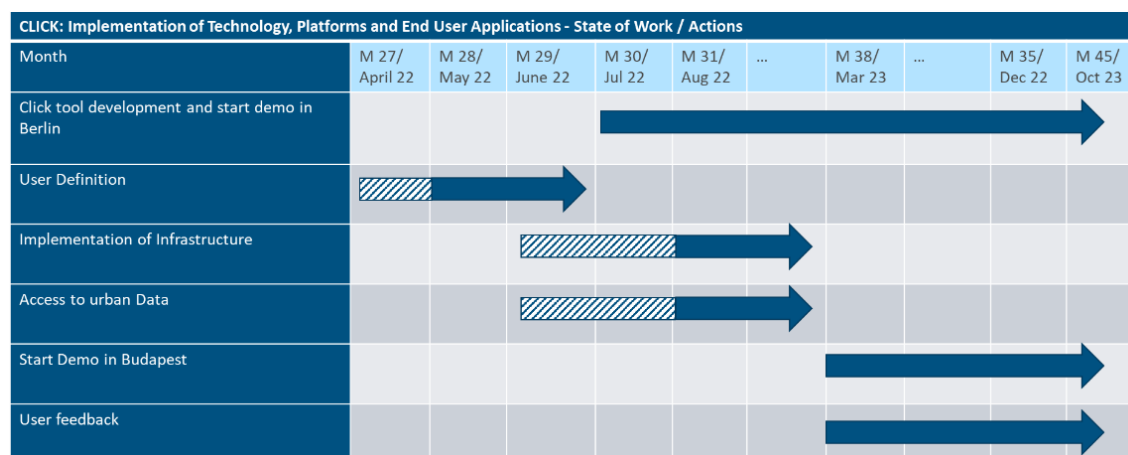#### 3.5.3.3 Timeline for Demonstration Implementation

CLICK: Implementation of Technology, Platforms and End User Applications - State of Work / Actions										
Month	M 27/ April 22	M 28/ May 22	M 29/ June 22	M 30/ Jul 22	M 31/ Aug 22	...	M 38/ Mar 23	...	M 35/ Dec 22	M 45/ Oct 23
Click tool development and start demo in Berlin							➡			
User Definition	▨	➡								
Implementation of Infrastructure			▨	➡						
Access to urban Data			▨	➡						
Start Demo in Budapest							➡			
User feedback							➡			

Table 14 Timeline for Demonstration Implementation: CLICK (Budapest)

Annex 1: Cloud-based infrastructure for INCAR and SMAC

At the beginning of the introduction about which products will be demonstrated in the pilot sites, a brief overview of the cloud-based infrastructure of INCAR and SMAC will be given, which will be demonstrated in all 5 pilot sites. INCAR and SMAC are two software solutions developed in the USER-CHI project.

The main objective of the INCAR Platform is to solve currently faced challenges in terms of interoperability among the different actors of the electromobility domain, CPOs and EMSPs. This includes one of the main barriers identified at the moment, which corresponds to the automation of the economic compensations among all involved partners. Further details on the design and implementation of the solution can be found on deliverables D3.1 and D3.3.

The main objective of the SMAC service is to provide CPOs the ability to implement smart charging strategies over the Charging Points under their control, giving them the possibility to outsource the calculation of those optimum profiles to a third-party service provider (the Smart Charging Service Provider actor - SCSP). This approach will help them to optimize their energy-related costs, enable a better utilization of renewable energy sources and allow their participation as active actors in the smart grid management, both as participants of implicit demand-side management strategies and explicit demand-side management campaigns. Further details on the design and implementation of the solution can be found on deliverables D4.2 and D4.3.

A special remark on the design of these solutions is that SMAC has been design as a service which to be offered within the INCAR Platform. This means that, from the perspective of its targeted end-users (CPOs), both INCAR and SMAC are offered as a bundle of services.

From the deployment perspective, both solutions have been developed under the Software-as-a-Service paradigm, meaning that the pilot sites do not require installation of these solutions on their premises. Both solutions will be deployed in the cloud, accessible under publicly available endpoints, and integrable with the EMSPs and CPOs backend systems of the pilot sites by communicating with those endpoints. The main prerequisites for the pilot sites' corresponding backends is that they are compliant with the communication protocol required by INCAR and SMAC, and they have access to internet.
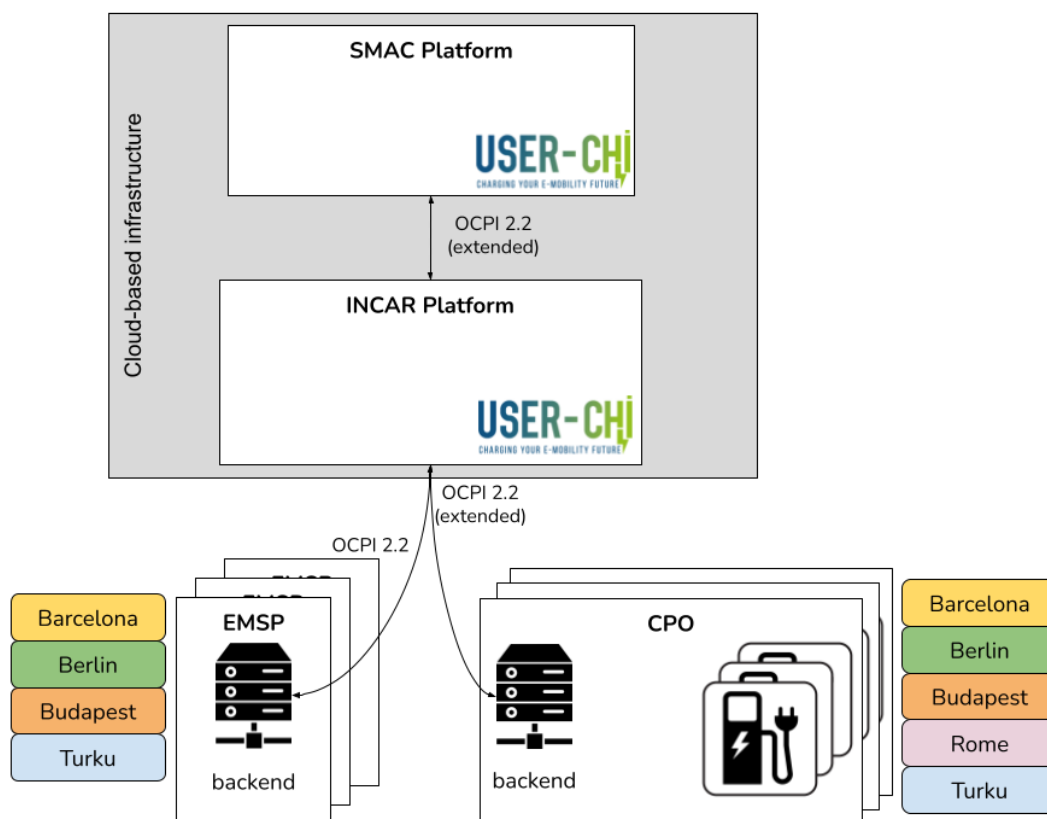
Figure 14 Deployment structure of INCAR and SMAC solutions