

# STATIONS OF THE FUTURE HANDBOOK

USER-CHI WEBINAR – 12 DECEMBER

10:00 – 11:30



# STATIONS OF THE FUTURE

USER-CHI

Charging your e-mobility future

USER-CHI  
CHARGING YOUR E-MOBILITY FUTURE

*“This document, Stations of the Future, presents the four different stations envisaged by the project team to fulfil the needs and expectations of Electric Vehicle users (including Light Electric Vehicles - LEVs), according to the results obtained in our user research.”*

USER-CHI  
CHARGING YOUR E-MOBILITY FUTURE



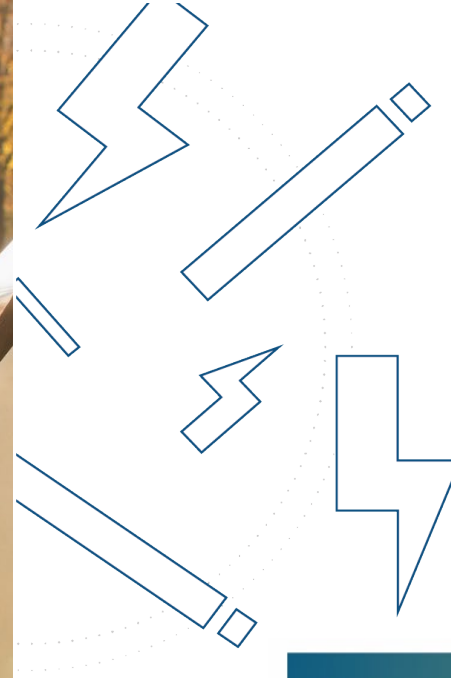
# AGENDA

10:00 – 10:05	Welcome and introduction	Marion Pignel, Eurocities
10:05 – 10:15	USER-CHI general introduction	Angel Moya, ETRA
10:15 – 10:20	Presentation of methodology of the user survey and research	Juan Gimenez, IBV
10:20 – 10:35	Focus on the gender perspective in electromobility	Katharina Csillak, IKEM
10:35 – 10:55	Presentation of the content of the handbook Focus on light stations (LEVs and urban) to be integrated in the urban space	Juan Gimenez, IBV
10:55 – 11:15	Discussion 'How to integrate these stations of the future in the urban space? Challenges, obstacles, and opportunities'	Eurocities USER-CHI cities (Budapest, Turku, AMB, Berlin)
11:15 – 11:25	Q&A	
11:25 – 11:30	Wrap up	Marion Pignel, Eurocities



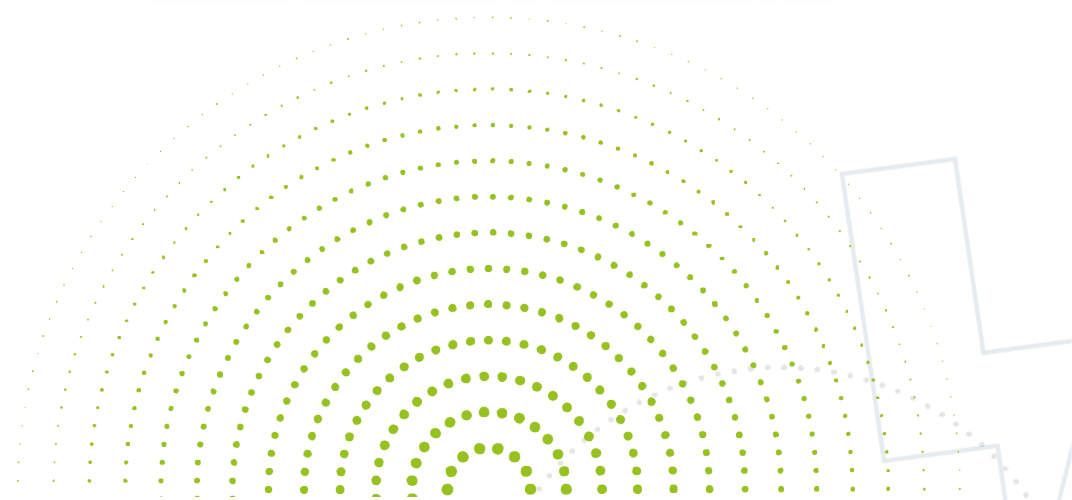


This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No [875187]



# USER-CHi

CHARGING YOUR E-MOBILITY FUTURE





# USER-CHI: PROJECT OVERVIEW

## STATIONS OF THE FUTURE WEBINAR

December 12<sup>th</sup>, 2022

**etra**  - Ángel Moya



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No [875187]



# THE PROJECT

**USER-CHI** is an industry-powered, city-driven and user-centric project which will co-create and demonstrate smart solutions around 7 connecting nodes of the Mediterranean and Scandinavian-Mediterranean TEN-T corridors to boost a massive e-mobility market take-up in Europe.

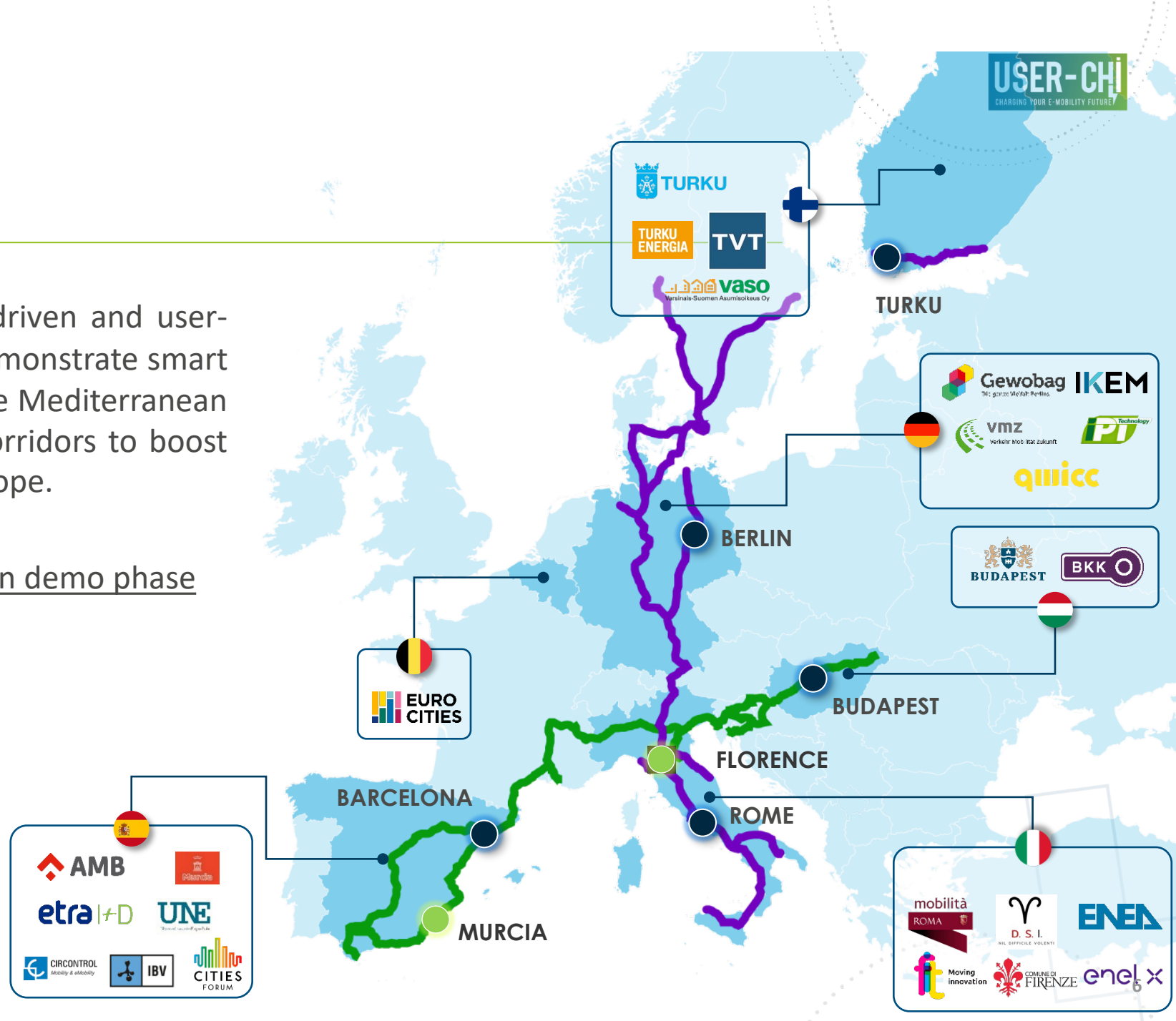
✓ Duration: 2020-2024 (48M) → Now in demo phase

✓ Budget: 17,5M€ / Funding: 14,3M€

✓ 24 partners from 6 EU countries

✓ 5 demo sites + 2 replication cities

✓ Coordinator: **etra** I+D



# THE OBJECTIVES

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1

DESIGN OPTIMISATION OF CHARGING NETWORKS WITH A USER-CENTRIC APPROACH

4

DEVELOPMENT OF INNOVATIVE AND HIGHLY CONVENIENT CHARGING SYSTEMS

2

DEPLOYMENT OF AN INTEROPERABILITY FRAMEWORK AND PLATFORM

5

DEMONSTRATION OF NOVEL BUSINESS AND MARKET MODELS

3

SCALABLE INFRASTRUCTURE ROLL-OUT BY MEANS OF SMART GRID INTEGRATION

6

LEGAL AND REGULATORY RECOMMENDATIONS FOR MASSIVE EV DEPLOYMENT



# THE PRODUCTS



**CLICK** – Charging location and holistic planning kit

Barcelona, Berlín, Budapest, Roma, Turku



**INCAR** – Interoperability, charging and parking platform

Barcelona, Berlín, Budapest, Roma, Turku



**SMAC** – Smart Charging tool

Barcelona, Berlín, Budapest, Roma, Turku



**INSOC** – Integrated solar DC charging for Light Electric Vehicles (LEVs)

Barcelona, Budapest, Roma, Turku, Murcia, Florence



**INDUCAR** – Inductive charging for e-cars

Barcelona



**Stations of the future** handbook



**eMoBest** – e-Mobility replication and best practice cluster



**INFRA** – Interoperability framework

Handbook + transferability cluster + framework

Software

Hardware

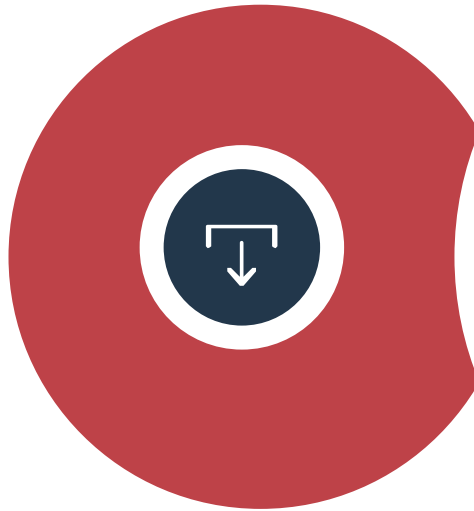


# CLICK – SUPPORT THE PLANNING PROCESS



## Describe your City

City size, number of cars,  
number of EVs, etc.



## Set your Goal

„Become a market leader  
in infrastructure“  
„Extend infrastructure by  
300 charging stations“



## Feed in Data

Districts, neighborhoods,  
statistical areas, special areas  
(e.g. airports), historical  
charging stations usage data,  
traffic model, etc.



## Get recommendation

Number of charging points  
and technology by area



# CLICK: SUPPORT THE PLANNING PROCESS

[CLICK](#) [HOME](#) [PROFILES](#) [REGISTER](#) [LOGIN](#)

## CHARGING INFRASTRUCTURE LOCATION CONCEPT DEVELOPMENT KIT

START YOUR PLANNING PROCESS HERE:

ABOUT US

PROJECT

FUNDING

This website is part of a project that has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No [875187]

© CLICK 2022 Version: 2 [Privacy](#)



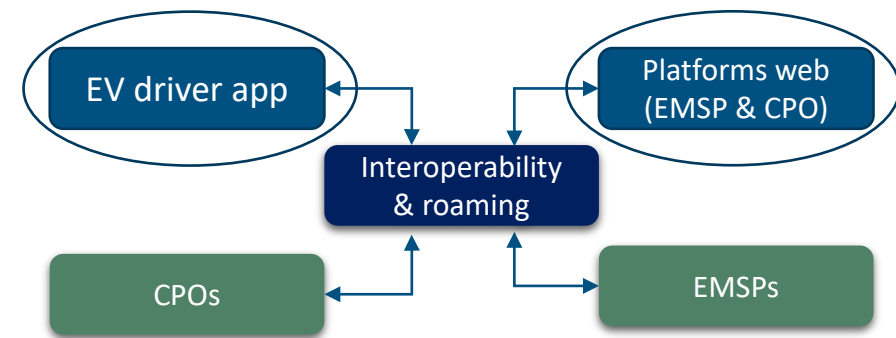
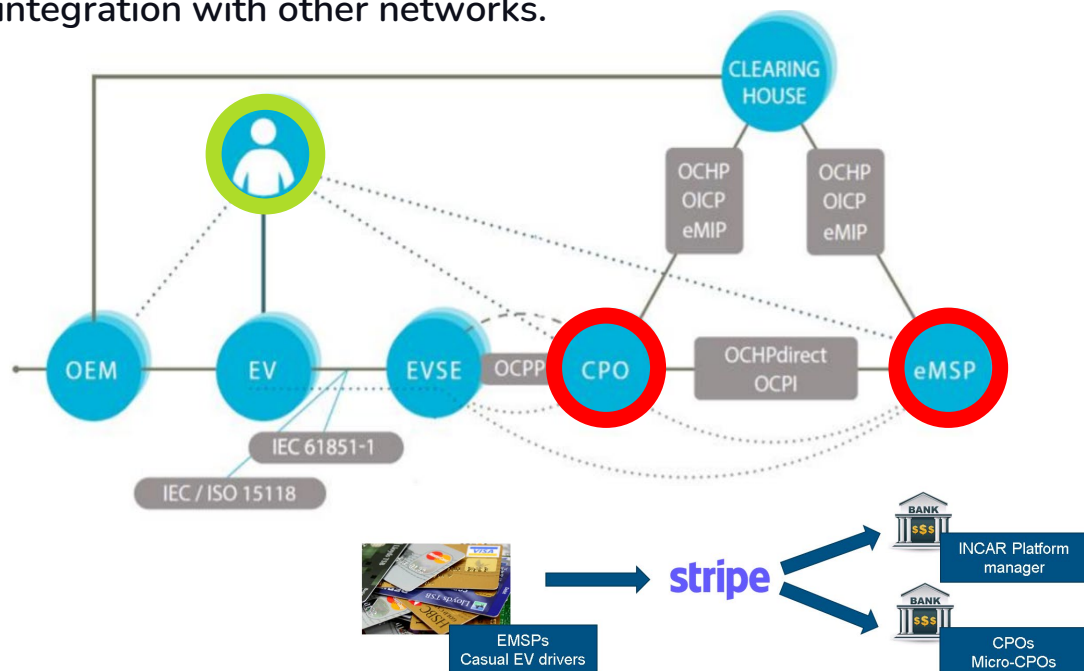


# INCAR: INTEROPERABILITY, CHARGING AND PARKING PLATFORM

## Motivation and one of the main barriers

Barrier: Lack of accessibility and interoperability of the network.

Currently, the largest portion of public charging is managed by eMSPs and CPOs. Those companies tend to operate their respective networks as islands, lacking communication or integration with other networks.



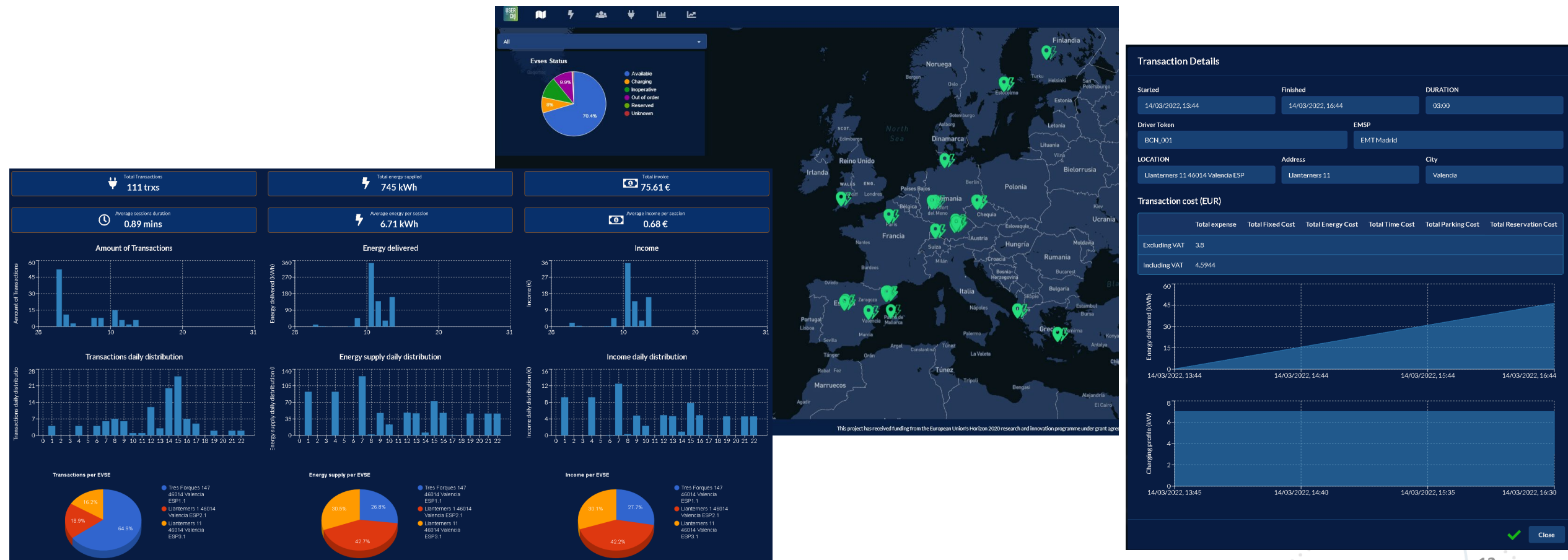
- Electromobility hub concept based on OCPI 2.2
  - Support to CPOs & eMSPs (user interface)
  - Support to micro-CPOs (charge Point owners)
  - Support to casual EV drivers (mobile app)
- Interoperability among eMSPs and CPOs with all charging services included (booking, routing, charging, payment)

INCAR is an integrated solution to ensure interoperability and full accessibility among European charging stations and with a set of common user-friendly smart services to all the EV drivers



# INCAR: INTEROPERABILITY, CHARGING AND PARKING PLATFORM – WEB FOR CPO, EMSP

## ❖ Visualization of relevant information for EMSPs and CPOs

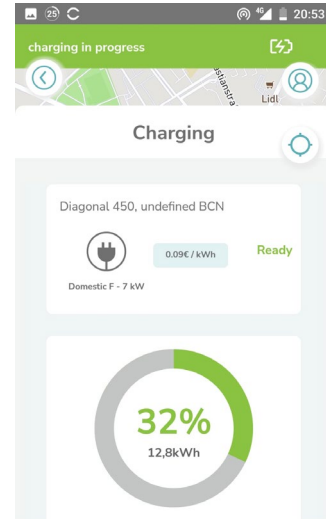
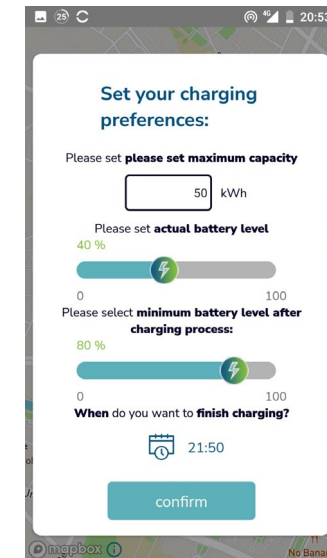
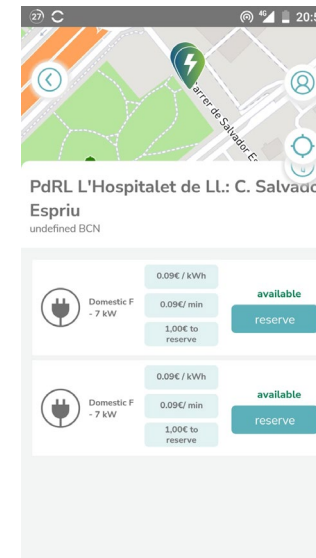
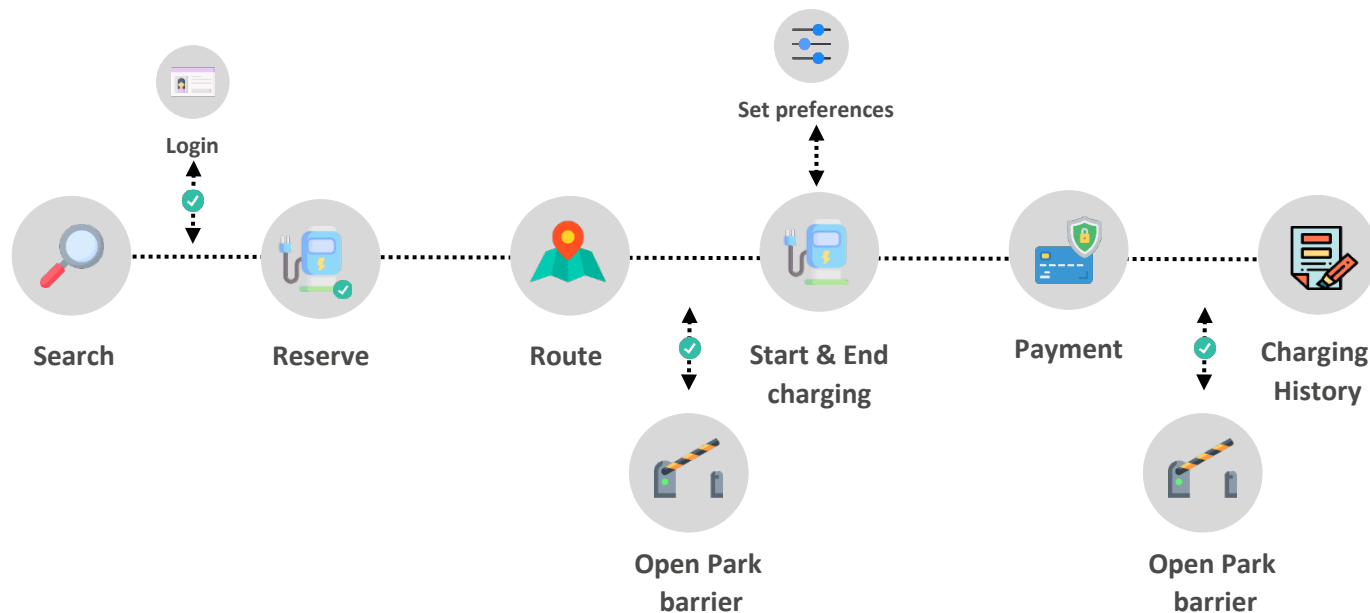




# INCAR: INTEROPERABILITY, CHARGING AND PARKING PLATFORM – APP FOR EV DRIVERS

- ❖ Mobile application available out-of-the-box
  - ❖ Integrated EMSP's drivers get immediate access to it
  - ❖ Access point to casual drivers
  - ❖ Potential to be exploited as white label app for EMSPs

- ❖ Visualization of relevant information for EV driver





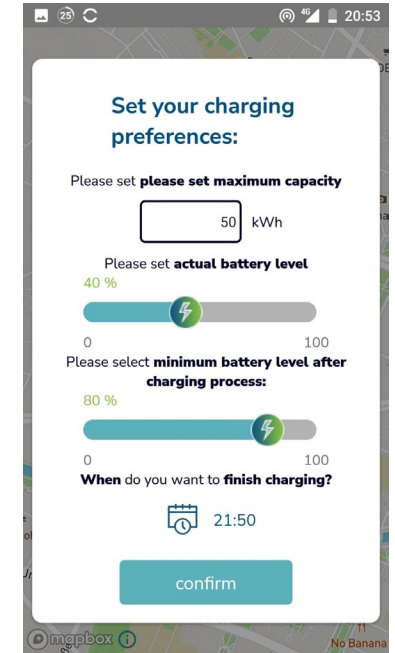
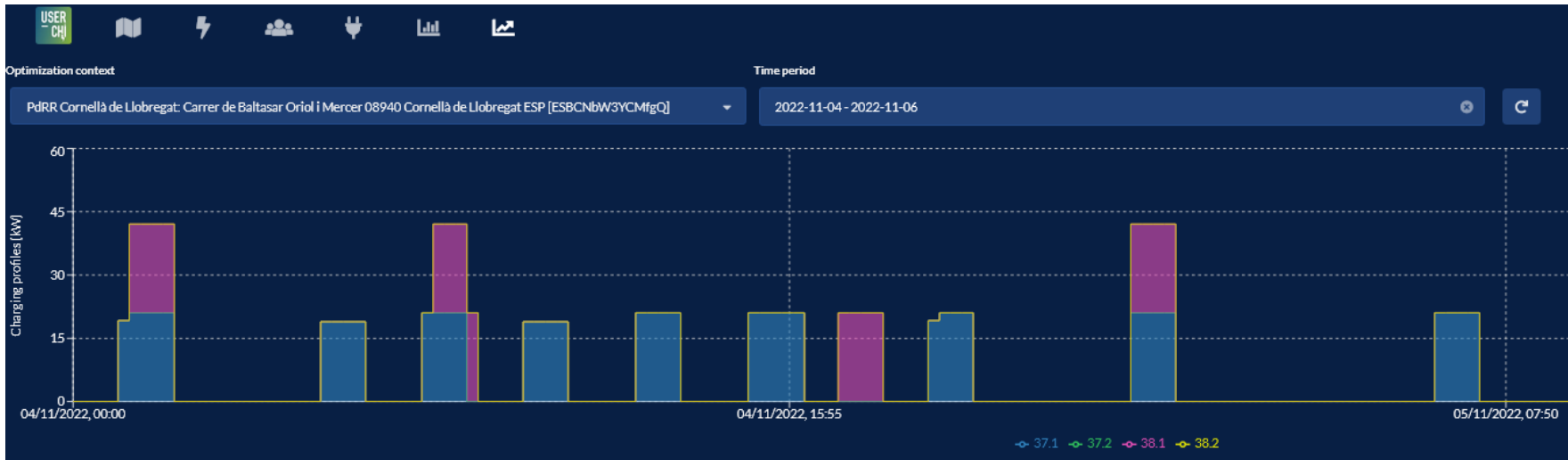


# SMAC: SMART CHARGING TOOL

## ❖ Required **inputs**:

- Optimization context (static info): supply point contracted capacity (kW) / supply point injection limit (kW) / local storage capacity (kWh) / opportunity Cost (€/slot)
- Dynamic inputs (demand, generation forecasts, energy prices...)
- EV characteristics and driver preferences (SoC %, capacity (kWh), máx. battery level %, time)

## ❖ **Output**: dynamic management of demand (generation of optimum charging profiles)



## SMAC main features:

- Smart charging as a service
- Infrastructure-level optimization
- Flexibility services to grid operators

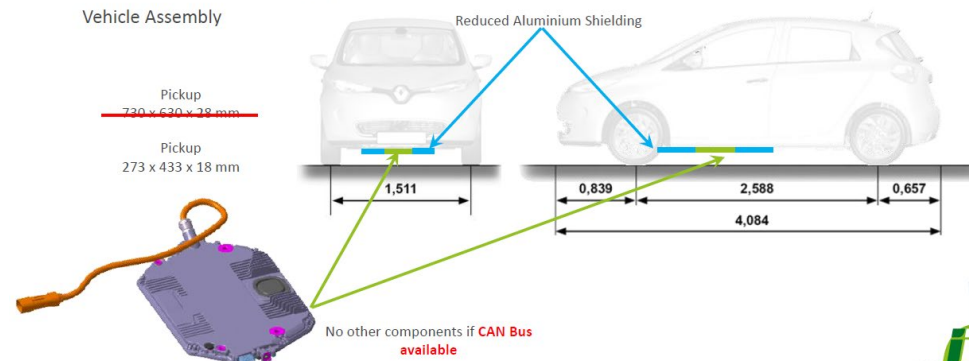


# INDUCAR: INDUCTIVE CHARGING FOR E-CARS

- ✓ User friendly charging procedure
- ✓ Less maintenance, less vulnerable
- ✓ Larger cable-free charging points infrastructure
- ✓ Positioning as elementary function of wireless charging
- ✓ FOD vehicle specific teach in progress
- ✓ 2 e-cars / 3'6 kW



Innovative Wireless Charging – Z-Mover Concept  
Vehicle Assembly



From Air gap previous design to Z-mover design



## INSOC: INDUCTIVE WIRELESS CHARGING FOR E-KICK SCOOTERS



- ❖ Possibility of charging 6 e-scooter by inductive wireless chargers and 6 bikes by schucko.
- ❖ Wireless charger doesn't need to keep track of cords and cables which often get lost or broken.
- ❖ The wireless charger reduces the likelihood of power surge to the e-scooter.

Integrated Solar DC-Charging for LEVs: easily replicable and scalable low-power DC-charging station for LEVs, with integrated theft-proof parking and on-site produced RES.

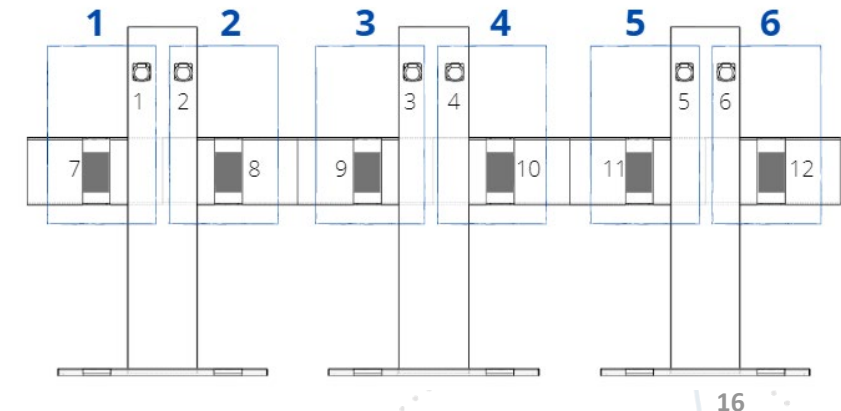


❖ **Advantages** for the final user and the stakeholder involved in the urban mobility:

- No need to bring/use/insert cables
- Extra lock during the charging session

❖ For the municipalities and sharing companies:

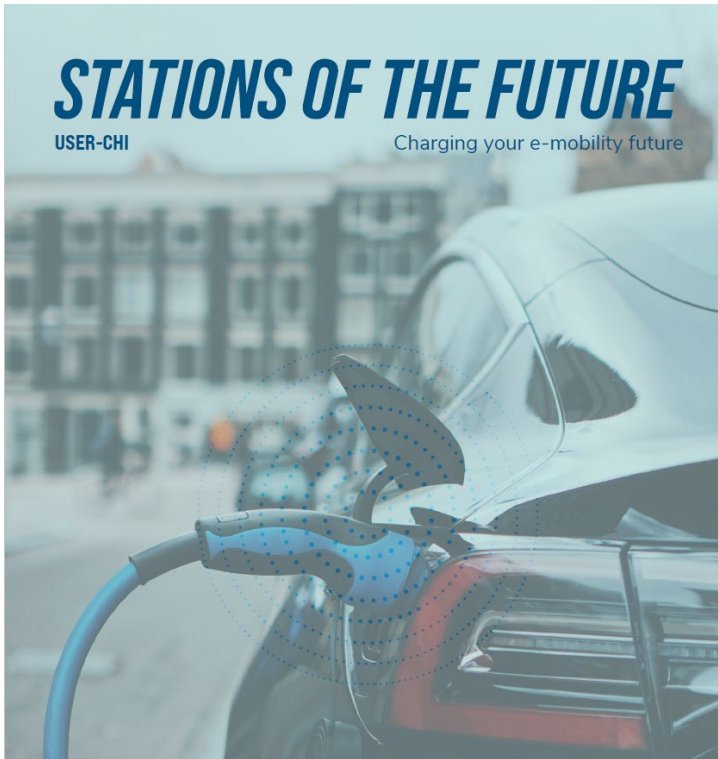
- The charging modalities imposes to the user to properly place the LEV
- Smooth charging experience







# STATIONS OF THE FUTURE HANDBOOK



Set of guidelines and recommendations to design the perfect user-centric charging station of the future

- Typology of the charging points
- Power (kW)
- Connectors and cables (if any)
- Access and authentication methods
- Payment and billing features
- Electricity source
- Associated services offered in the stations
- Gender issues
- Accessibility for disabled people

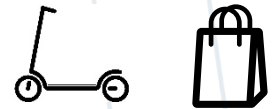



Presentation of the content of the handbook

10:35 – 10:55

Focus on light stations (LEVs and urban) to be integrated in the urban space

**Purpose:** to accelerate the widespread usage of EVs, encouraging users of different social groups and market segments to overcome existing acceptance barriers, and therefore providing viable BM to private stakeholders.





# THE STATIONS OF THE FUTURE FOR USER-CENTRIC ELECTROMOBILITY

ONLINE WEBINAR  
DECEMBER 12<sup>TH</sup>, 2022

Juan Giménez





08/12/2022



This project has received funding from  
the European Union's Horizon 2020  
research and innovation programme  
under grant agreement No [875187]

# A user-centric project

## Qualitative research

- **2. Netnography**  
621 end users, 3 EU countries (Norway, Spain, Germany)
- **3. Delphi Questionnaire**  
57 professionals, 5 EU countries (Finland, Germany, Hungary, Italy, Spain)
- **4. Field Diary**  
131 end users, 5 EU countries (Finland, Germany, Hungary, Italy, Spain)

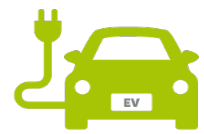
## Quantitative research

- **5. Survey**  
2,737 participants, 6 EU countries (Finland, Germany, Hungary, Italy, Norway, Spain)

## Co-Creation

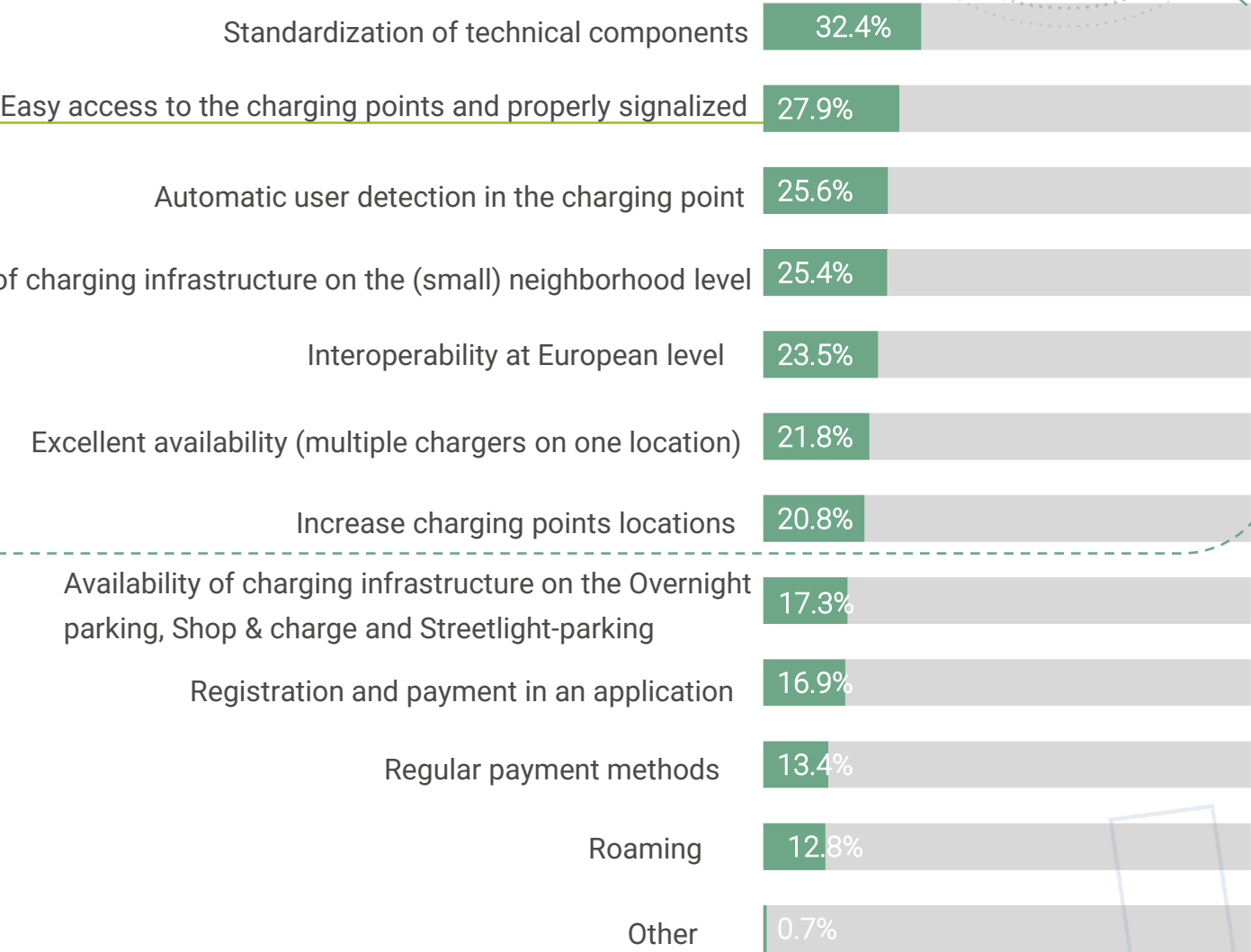
- **6. 2 Workshops**  
End users (5) & professionals (11), and professionals (30), 4 USER-CHI products: INCAR, INSOC, INDUCAR and SotF





# 1.5. ELECTROMOBILITY PLANS

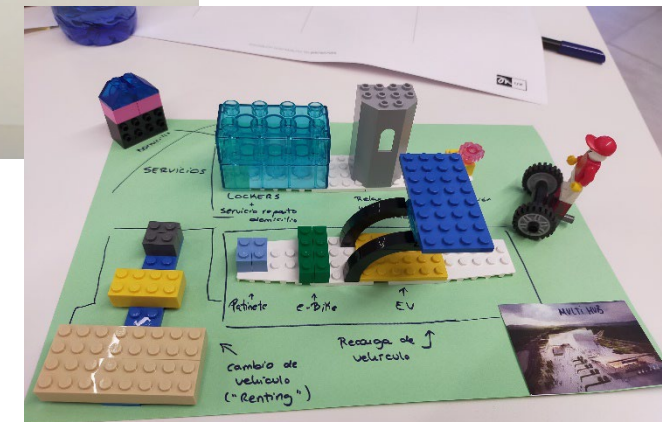
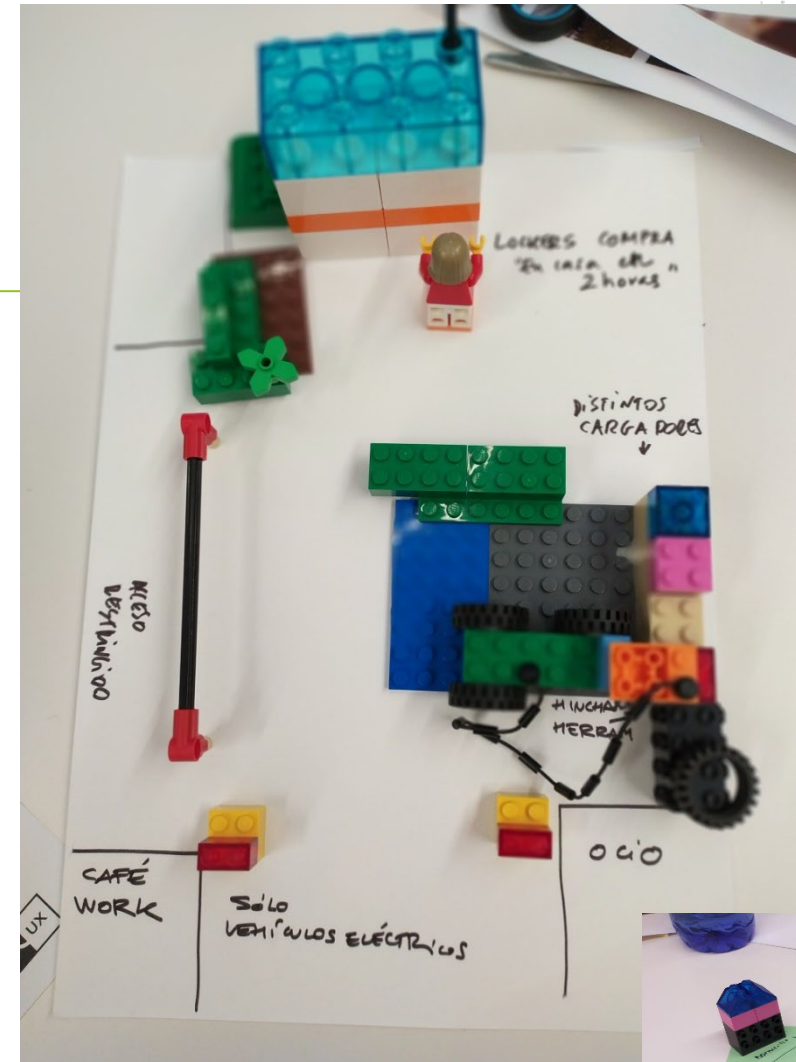
Thinking in a new generation of charging stations: which are your expectations regarding features they should have? (Check the most relevant three options)





# Co-creation workshop

- **Intermodal station.** Public and private medium distance and last mile transport.
- Spaces integrated into **nature**.
- Indoor / outdoor.
- Connections with walking and bike path.
- Parking for electric vehicles.
- **EV charging and LEV** in separate areas.
- **Anti-theft / safe zone.**
- High time flexibility.
- Locations on highways, accesses to the city and **key points** of the city such as shopping centers, universities, hospitals, public transport stations.
- Management similar to a **civic center** (multiple activities and interests in coexistence).



# SotF

## CONCEPT SOLUTIONS TO

# Charging station of the future

## eBikes — eScooters

## Vehicle charging — EV + LEV

<sup>1</sup>Separate zones

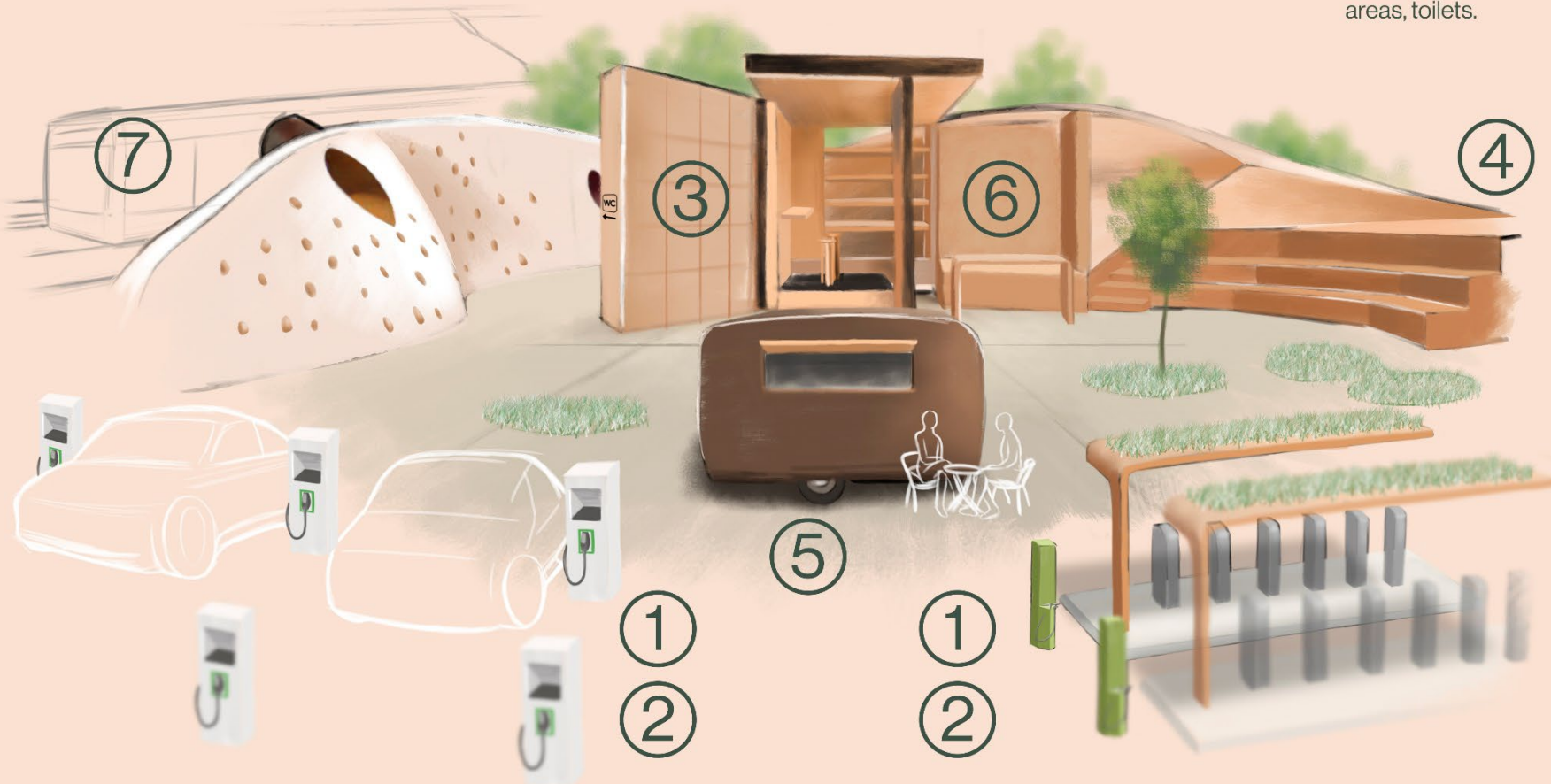
## Intermodal

Medium-distance transport — «last mile».

**In harmony with nature — “green space”**

## Multi-service — holistic concept

<sup>2</sup>Maintenance & repair of vehicles,  
<sup>3</sup>courier service,  
<sup>4</sup>leisure, <sup>5</sup>cafeteria,  
<sup>6</sup>coworking,  
<sup>7</sup>physical activity areas, toilets.



**Main concepts:**  
Charging  
EV&LEV,  
Intermodal,  
Sustainable,  
Additional  
services, Civic  
center

# StationOfTheFuture: concept enrichment. Which are the features and functionalities you miss?





## INSOC

**Main concepts:**  
Solar surface,  
Secure parking,  
Modal hub,  
Sustainable  
mobility, Urban  
Furniture

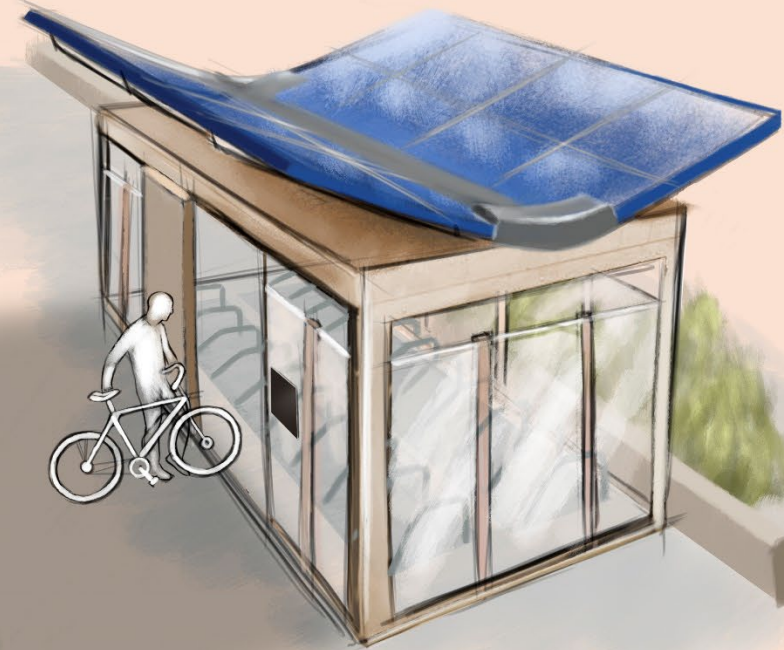
CONCEPT SOLUTIONS TO

# Solar charging for LEVs

eBikes — eScooters — eMotorbikes

**Solar street lamps**  
— solar energy  
system for LEVs in  
urban areas

For quick charging  
of individual LEVs  
while strolling  
around town.



**Shelter —  
secured parking  
space for LEVs**  
For overnight  
parking of light  
electric vehicles.

Reinforced with  
double factor  
security: App +  
in-place screen to  
unlock physical  
access.

# INSOC concept enrichment. Which are the features and functionalities you miss?

vandalism proof  
dso grid permit  
grid connection  
availability signal  
battery swapping  
private and sharing use  
wireless charging  
attractiveness 4 endusers  
availability  
storage 4 pv  
instruction for being eco  
green decoration  
avoid degradation phenom  
streetlights connection  
modularity  
differ size levs  
different chargers  
reservation  
smaller solutions  
size of pv



# Four different Stations

		Technologies	Services / User demands	Location
<b>Intermodal Station</b>	Electric cars – eBikes – eScooters – Public transport	<ul style="list-style-type: none"> <li>Chargers for LEVs</li> <li>Shared electric scooters (eScooters), electric-assist bicycles (eBikes) and electric mopeds.</li> <li>Slow chargers. Low power chargers (AC, Inductive charging)</li> <li>Fast chargers (DC)</li> <li>Pay for charging (not parking), interchangeable payment method (credit cards; contactless payment; subscription, cash, ...)</li> <li>Rental and shared vehicle area</li> </ul>	<ul style="list-style-type: none"> <li>Standard and fast chargers</li> <li>Inductive charging for EVs + Maintenance + Parking lot</li> <li>Chargers for LEVs</li> <li>Intermodal ticketing point</li> <li>Cafeteria</li> <li>Toilets</li> <li>Lockers &amp; Courier service</li> <li>Coworking &amp; resting area</li> </ul>	<ul style="list-style-type: none"> <li>Nature integrated</li> <li>Anti-theft / safe zona</li> <li>Railway station, city accesses, university campuses</li> <li>Big space is required</li> </ul>
<b>Urban Station</b>	Electric cars – eBikes – eScooters - Electric vans	<ul style="list-style-type: none"> <li>Slow chargers (AC)</li> <li>Fast chargers (DC)</li> <li>Parking &amp; Charging booking</li> <li>Restricted access</li> <li>Interchangeable payment method (credit cards; contactless payment; subscription, cash, ...)</li> </ul>	<ul style="list-style-type: none"> <li>Parking &amp; Charging service for LEVs and EVs</li> <li>Lockers &amp; Courier service</li> <li>Logistics</li> <li>Short stays</li> <li>Loading/Unloading area</li> </ul>	<ul style="list-style-type: none"> <li>City Center</li> <li>Neighborhood</li> <li>Shopping area</li> </ul>
<b>Highway Station</b>	Electric cars – Electric vans	<ul style="list-style-type: none"> <li>Fast chargers (DC)</li> <li>Charging booking</li> </ul>	<ul style="list-style-type: none"> <li>Interchangeable payment method (credit cards; contactless payment; subscription, cash, ...)</li> <li>Cafeteria</li> <li>Toilets</li> <li>Coworking &amp; resting area</li> <li>Vehicle maintenance</li> <li>Playground / Physical activity</li> </ul>	<ul style="list-style-type: none"> <li>Highway</li> </ul>
<b>LEV Station</b>	eBikes – eScooters – eMopeds	<ul style="list-style-type: none"> <li>Photovoltaic panels connected to grid</li> <li>Modularity</li> <li>Battery storage cabinets / Battery swapping</li> <li>AC chargers</li> <li>Charging booking</li> </ul>	<ul style="list-style-type: none"> <li>Secure parking</li> <li>Vertical parking</li> <li>Interchangeable payment method (credit cards; contactless payment; subscription, cash, ...)</li> </ul>	<ul style="list-style-type: none"> <li>Chargers in urban furniture, street lights and benches</li> <li>Bus canopies, underground</li> <li>University campus</li> </ul>



# THANK YOU!

# ELECTRIC CHARGING INFRASTRUCTURE AND GENDER EQUALITY

Main results from a literature-based overview  
for USER-CHI



## AGENDA

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### 1. INTRODUCTION

Overview, motivation and relation to Station of the Future Handbook



### 2. RESULTS

Conducted from the literature review



### 3. APPROACHES & RECOMMENDATIONS

In conjunction with the USER-CHI project

# Introduction

## Main results from publication

Csillak, K. and Kamenz, S. (202x): Electric Charging Infrastructure and Gender Equality: A literature-based overview for USER-CHI (H2020 project). Open Research Europe. [Work Title]

## Motivation

- The need for further information to recognize gender bias throughout the implementation process of the project.
- Knowledge gap between gender topics related to charging infrastructure
- Gap in research

**How can the future charging points be designed and implemented in a gender-equal way?**

Electric Charging Infrastructure and Gender Equality: A literature-based overview for USER-CHI (H2020 project)

Katharina Csillak\*, Sophie Kamenz

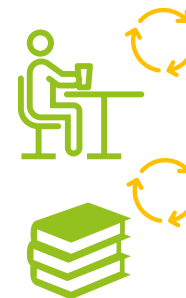
Mobility Department, Institute for Climate Protection, Energy and Mobility (IKEM), 10179 Berlin, Germany

\*Corresponding author: [Katharina.Csillak@ikem.de](mailto:Katharina.Csillak@ikem.de)

### Abstract

The paper investigates aspects of gender equality in the implementation process of charging infrastructure with the Innovative solutions for USER centric Charging Infrastructure project (short: USER-CHI) as reference. The USER-CHI project offers possible solutions for user-friendly e-Mobility with a higher replicability in Europe surrounding the Mediterranean and Scandinavian Trans European Network corridors. In this regard, the need for further information of recognizing gender bias in the implementation process arose. Therefore, the paper combines insights from the project's product development and a literature review effects of gender bias in infrastructure and mobility planning. It aims at providing knowledge about gender-specific differences in user needs which then can be incorporated into the design of charging infrastructure.

The term "gender bias" is generally understood as "prejudiced actions or thoughts based on the gender-based perception that women are not equal to men in rights and dignity". In light of this, electric cars do not appear to be the default solution in regards to particular needs of women influencing women's mobility. Therefore, the recommendations made in this paper focus on the accessibility of electric mobility for women while setting the goal to a gender neutral access to this type of mobility.



Peer-Review Process

Publishing  
Approx. End of 2022



## Relation to Station of the Future Handbook

The handbook includes guidelines and recommendations to design the perfect user-centric charging station.

Frameworks have a potential to recognize Gender Equality:

- To combine all aspects, we've identified in the paper
- To raise awareness
- To give a guidance for public or private financing
- To promote special tariffs & business models

### **AND WHAT ABOUT THE GENDER ISSUES?**

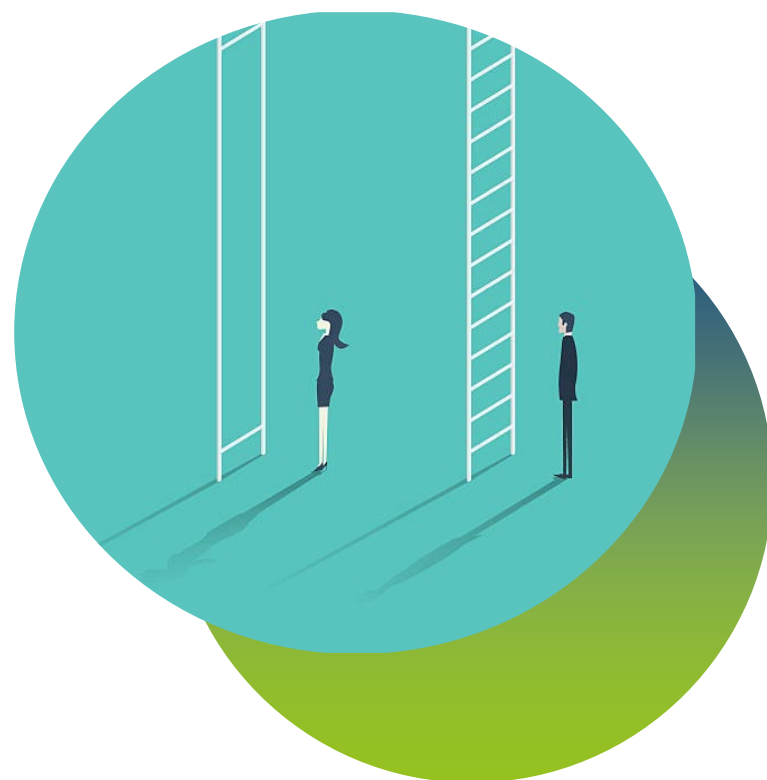
„Based on our research, women tend to park in private parking. On the other hand, women would like to have more charging points at home. Both results could be related to security reasons as the risk of sexual harassment is higher for women in public spaces. From the gender perspective, there are two different dominant patterns and needs associated. This should be addressed when planning charging stations in the future.” (SotFH, p. 8)



# RESULTS

conducted from literature research

## Results conducted from literature research



- Main inequalities documented in the EU Gender Equality Strategy 2020-2025
  - Such as: gender based violence, gender stereotypes, gender pay gap, gender care gap, gender imbalances in decision-making processes in politics
- Concept of gender inequality mirrored in city and especially infrastructural planning
  - ➔ may be framed as gender bias in infrastructure encompassing **prejudiced actions based on the gender-based perception that women are not equal to men in rights and dignity**
- Sparsely amount of research concerning gender equality in electric charging infrastructure but noteworthy amount in regards to general infrastructure
  - ➔ approach: **transfer performance of current findings to relatively untouched topic of ECI**

## Results conducted from literature research



### Mobility patterns

- Men displaying longer, more linear travel patterns whilst women often travel shorter distances with more complex travel chains
- Different mobility patterns directly interacting with the concept mobility of care



### Financial aspects

- Women are less likely to own private electric vehicles
- 27.4 % compared to 72.6 % EVs are owned by men
- Reasons: gender-pay gap, employment in part-time jobs, restricted employment catchment area



### Security aspects

- Risk of injuries
- Risk of sexual harassment leading to development of safety mechanisms restricting women from travelling or choosing more extended but safer routes



# APPROACHES AND RECOMMENDATIONS

in conjunction with the User-Chi project





# Approaches and recommendations in conjunction with the User-Chi project

## Planning

Example: CLICK - Planning tool provides recommendations of position, amount and technology for municipalities

### Possible ways to recognize Gender Equality in planning:

- Inclusion of gender-sensitive data regarding *mobility of care*
- Inclusion of criteria of neighborhoods regarding *financial aspects*
- Highlighting locations, that follow *specific needs or habits*
- Recommending fast-charging stations regarding *rapid mobility patterns*



**CLICK**

„Charging infrastructure Location Concept development Kit“

# Approaches and recommendations in conjunction with the User-Chi project

## Design

Examples:

INSOC - Integrated Solar DC Charging for Light Electric Vehicles

INDUCAR - Inductive Charging for e-CARs

### Recognized Gender Equality aspects in design:

- Transport modes (cycling) regarding *mobility of care & local mobility*
- Inclusive design like *roofed, spacious charging point*, possible to add e.g., *storage areas, children sitting areas, parking area for cargo bikes*
- Highlighting locations, that follow *specific needs or habits*
- Wireless charging as *time efficient solution with higher safety*



**INSOC**



**INDUCAR**



Station of the Future  
**Handbook**

## Conclusion

*It remains to be said, however, that the current approach to planning and implementing charging infrastructure projects **is largely oriented towards the status quo** and as a result carries the existing gender bias in the field of general infrastructure on to new fields such as charging infrastructure.*

*It can be assumed that in future projects of planning and implementation of charging infrastructure projects, **criteria leading to an adjustment of gender inequality will be increasingly included.***

Source: Csillak & Kamenz (2022): Paper „Electric charging infrastructure and gender equality – a literature-based overview for User-Chi (H2020 project)”,



# THANK YOU!

CONNECT WITH  
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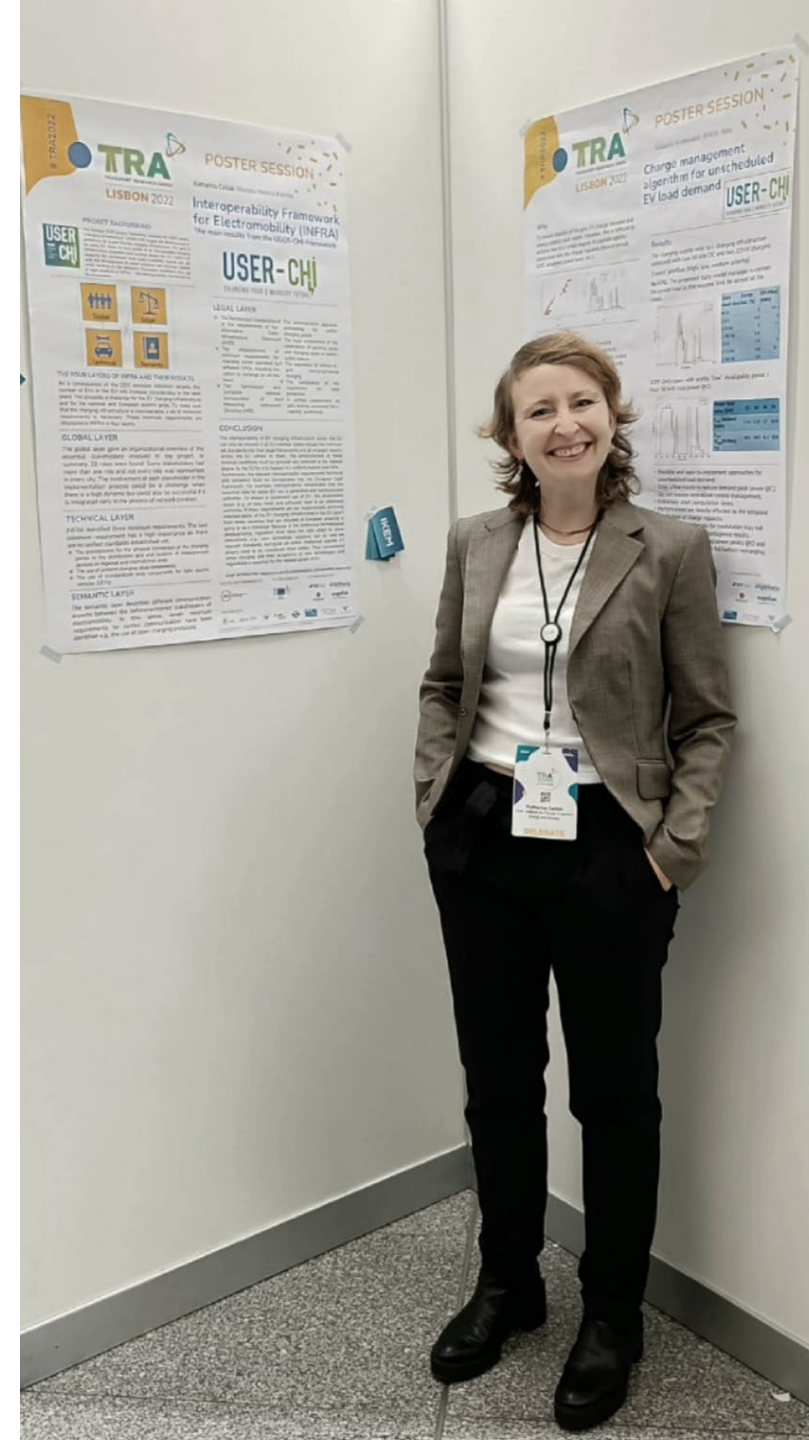
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# THE STATIONS OF THE FUTURE HANDBOOK: A PRODUCT OF THE USER-CHI PROJECT

ONLINE WEBINAR  
DECEMBER 12<sup>TH</sup>, 2022



# ***STATIONS OF THE FUTURE***

USER-CHI

Charging your e-mobility future



**USER-CHI**  
CHARGING YOUR E-MOBILITY FUTURE



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the European Union's Horizon 2020  
research and innovation programme  
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# Introduction

USER-CHI is a research and innovation project, aimed at unlocking the massive potential of electromobility in Europe, from a user-centric perspective. Following a user driven innovation approach, the project performed a deep qualitative and quantitative research of charging needs, demands and requirements of citizens and users in six different European countries: Norway, Finland, Hungary, Germany, Italy and Spain. As a result of this research work, subjective perception of charging options, decision influences and acceptance barriers have been analysed to define the innovative features and value-added services needed and expected in the next generation of future charging stations.

## STATIONS OF THE FUTURE

This document, Stations of the Future, presents the four different stations envisaged by the project team to fulfil the needs and expectations of Electric Vehicle users (including Light Electric Vehicles - LEVs), according to the results obtained in our user research.

# Highlights



## THE UPCOMING SCENARIO IN MOBILITY IS

## ELECTROMOBILITY

Plug-in hybrid electric vehicles became the most popular type of passenger electric vehicles in the European Union in November 2020. This technological transition is supporting today the development of electromobility, but to foster a widespread use of electromobility, we need to provide appropriate charging infrastructure.

# The Context

## Electromobility and the USER-CHI project

# HOW MANY CHARGERS DO WE NEED? AND WHAT TYPE?

Although amount of chargers is quite different between Norway and Germany-Spain, Norwegians consider that the charging infrastructure is still an unsolved issue. This suggests that even in Norway the charging infrastructure has not overcome the required critical threshold, or perhaps there is something else...

## NUMBER OF EV CHARGE INFRASTRUCTURE PER POPULATION

	GERMANY	NORWAY	SPAIN
Tesla Supercharger	1/1.000.000	1/70.000	1/700.000
Tesla Dest Charger	1/100.000	1/37.000	1/100.000
Charging Point	1/10.000	1/2.000	1/9.000
Connector	1/4.500	1/900	1/3.400

# ELECTROMOBILITY IS ONLY A QUANTITATIVE PROBLEM, OR QUALITATIVE ASPECTS ALSO MATTER?

## TRENDS IN EVs

- Better availability of charging facilities
- Energy saving and greener environment
- Standardization of core components
- Ubiquitous and environmentally friendly
- Diversified charging modes
- Digital and intelligent charging
- Tighter control for safety and privacy protection
- Charging infrastructure is a node for multi-network convergence

## OUR AIM

In order to achieve the project aims, USER-CHI is focused in defining the charging infrastructures for EVs and LEVs that create value for customers, the industry and the society.

How do we boost electromobility?

It's a matter of quantity, but the qualitative matters



## ACORDING TO OUR RESEARCH, CAR ELECTROMOBILITY HAS REQUIREMENTS:

### MUST-BE REQUIREMENTS

- Availability of a dense charging point network in cities and in highways, including promoting the installation of charging points at drivers' home and in public parking lots. For professional drivers the city charging network is critical, while for private drivers the most critical point is charging when they arrive home, in private chargers or public chargers.
- A procedure for booking a charging point that ensures its availability when the driver arrives.

### INCREMENTAL GAIN REQUIREMENTS

- Charging point status: occupied-unoccupied-in maintenance, blocked, charging, or reserved.
- Standardization of technical components and signalization.
- Paying with credit cards; contactless payment.
- Employing app utilities without subscription.
- Increase the amount of fast charging points; fast charge in highways.
- Automatic user detection in the charging point.
- Interoperability among charging points, at European level.
- A unique application for routing, booking and paying; pre-booking.



### DESIRABLE REQUIREMENTS

- Additional services to perform activities when charging the battery. We could differentiate between:
  - Services at urban charging points, like shopping malls or mobility hubs.
  - Services at the charging points on route, in long range trips.
- Monitoring utilities like remaining charging time, percentage of charge in real time, power limitation to obtain a lower price, different criteria for fixing fees, or service interruption alarm, are interesting features for managing the waiting time when charging.
- Sustainability: users perceive electromobility as sustainable, and this value must be present in all the charging process.

# What did we find out?

## There are basic drivers, valuable requirements and desirable features

## AND WHAT ABOUT LEVs IN ELECTROMOBILITY?

### INCREMENTAL GAIN REQUIREMENTS (FOR LEVs)

- Specific free charging points for LEVs in urban areas.
- Lighter e-Bikes (they are currently heavier than conventional bikes).
- Safer e-Scooters.



## AND WHAT ABOUT THE GENDER ISSUES?

### What differences do they make in electromobility?

Based on our research, women tend to park in private parking. On the other hand, women would like to have more charging points at home. Both results could be related to security reasons as the risk of sexual harassment is higher for women in public spaces. From the gender perspective, there are two different dominant patterns and needs associated. This should be addressed when planning charging stations in the future.

Does everybody need the same?

LEVs have specific requirements. And women have a different experience ...



## That's why we are proposing Stations of the Future

It is USER-CHI's contribution to design the charging stations that electromobility users demand, and the requirements for its successful deployment.

Why are we  
releasing this  
handbook?

It's a USER-CHI  
contribution to  
electromobility

## Intermodal station of the future

Citizens e-mobility stations + Logistics Hubs + E-taxi stops + City centre park&charge



Before  
introducing our  
concept  
designs ...

... a little  
explanation about  
how we tackled  
the business  
models definition

Date: 31/01/2022  
Author(s): Gabriele Pistilli, Fabio Cartolano



CONCEPT SOLUTIONS TO

# Intermodal station of the future

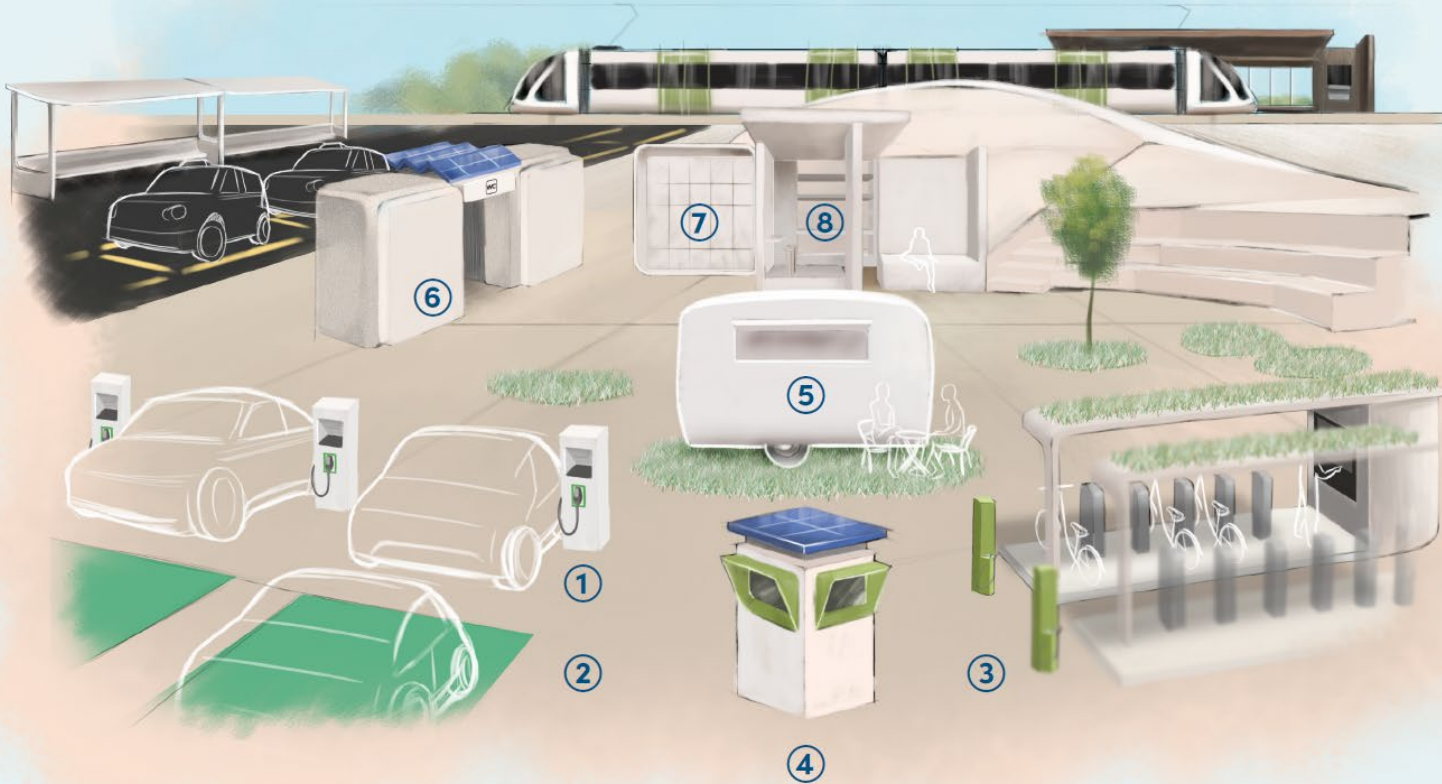
Electric cars — eBikes — eScooters — Public transport

## Services

①Chargers & ②inductive  
charging for EVs + vehicle  
maintenance + parking lot

③Chargers for LEVs  
④Intermodal ticketing point  
⑤Cafeteria

⑥Toilets  
⑦Lockers & courier service  
⑧Coworking & resting area



USER-CHI — Stations of the Future

## The Intermodal Station of the Future

A station to  
support the  
multimodal  
mobility



# Intermodal station of the future

Electric cars — eBikes — eScooters — Public transport

## SERVICES

- ① Standard and fast chargers
- ② Inductive charging for EVs + vehicle maintenance + parking lot
- ③ Chargers for LEVs
- ④ Intermodal ticketing point
- ⑤ Cafeteria
- ⑥ Toilets
- ⑦ Lockers & courier service
- ⑧ Coworking & resting area

## TECHNOLOGY

- Ø Chargers for LEVs
- Ø Shared electric scooters (e-scooters), electric-assist bicycles (e-bikes) and electric mopeds
- Ø Slow chargers. Low power chargers (AC, inductive charging)
- Ø Fast chargers (DC)
- Ø Pay for charging (not parking), payment method interchangeable (credit cards; contactless payment; subscriptions, cash...)
- Ø Rental and shared vehicle area

## LOCATION

- Ø Nature-integrated
- Ø Anti-theft/safe zone
- Ø Railway station, city accesses, university campuses
- Ø Big space is required

# Intermodal Station main features

- Services
- Technology
- Location

# Intermodal station of the future

Electric cars — eBikes — eScooters — Public transport

## THE BUSINESS

### PARTNERS

Electromobility  
Service Providers  
CPOs  
Grid Infrastructure  
Managers  
Energy supplier  
companies

### ACTIVITIES & RESOURCES

Power grid  
characteristics  
Deals with most  
important energy  
suppliers  
Roaming deals with  
different CPOs  
Strategic locations

## THE VALUE

To stop and charge in strategic  
intermodal locations  
Standard, fast, and ultra fast  
chargers  
Vehicles maintenance  
Rental and shared mobility  
services  
Intermodal ticketing  
Lockers, courier and logistics  
services  
Sharing of logistics areas  
Coworking & resting areas  
Grid balancing solutions  
Energy storage solutions

## THE MARKET

### RELATIONSHIP & CHANNELS

Harmonized  
charging standards  
Providers roaming  
solutions  
Apps

### SEGMENTS

Private drivers  
PT companies  
Electromobility  
providers  
Logistics operators

## THE FLOW

### OUT

Electricity grid  
upgrade  
Charging point  
installation  
Land setting and  
adaptation  
Maintenance

### IN

Private vehicles  
recharging  
Business vehicles  
charging  
Maintenance services  
Ancillary general  
services  
Ancillary logistics  
services  
EV drivers' data

# Intermodal Station business model

- Citizens e-mobility
- Logistics Hubs
- e-Taxi stops
- CC park&charge

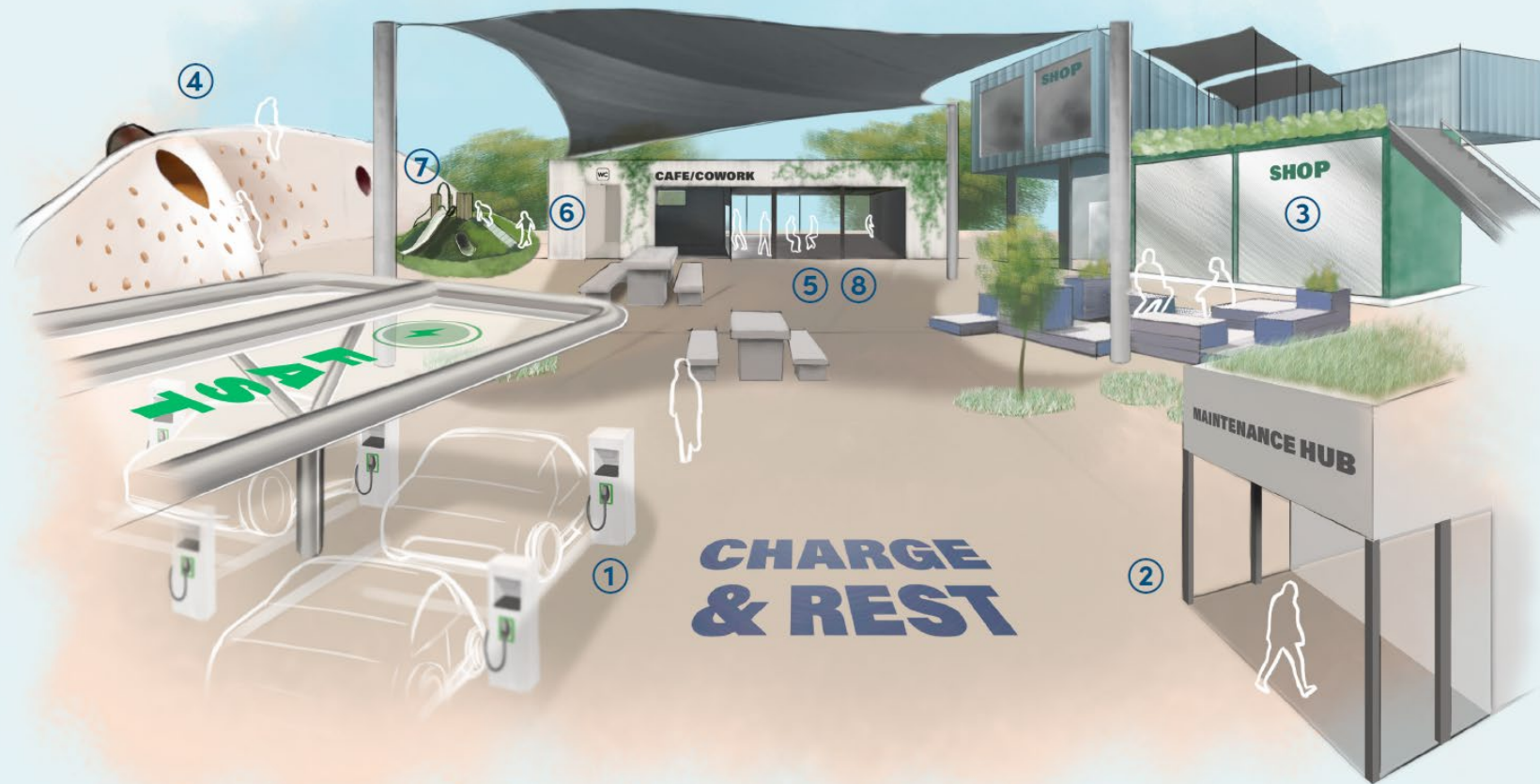
CONCEPT SOLUTIONS TO

# Highway station of the future

Electric cars — Electric vans

## Services

- ① Fast chargers + parking lot
- ② Vehicle maintenance
- ③ Shops
- ④ Fitness/Playground zone
- ⑤ Cafeteria
- ⑥ Toilets
- ⑦ Playground
- ⑧ Coworking & rest area



USER-CHI — Stations of the Future

## The Highway Station of the Future

A station to  
support the long  
range  
electromobility

SPECIFICATIONS FOR

# Highway station of the future

Electric cars — Electric vans

## SERVICES

- ① Fast chargers
- ② Vehicle maintenance + parking lot
- ③ Shops
- ④ Physical activity zone
- ⑤ Cafeteria
- ⑥ Toilets
- ⑦ Playground
- ⑧ Coworking & resting area

## TECHNOLOGY

- ✓ Fast chargers (DC)
- ✓ Booking of chargers

## LOCATION

- ✓ Nature-integrated
- ✓ Highway
- ✓ Big space is required

## Highway Station main features

- Services
- Technology
- Location



# Highway station of the future

Electric cars — Electric vans

## THE BUSINESS

### PARTNERS

Highway operators and concessionaries  
CPOs  
Grid Infrastructure Managers

### ACTIVITIES & RESOURCES

Analysis of relevant pools of attraction  
Power grid characteristics  
Roaming deals with different CPOs  
National electrical assets

## THE VALUE

To stop and charge in strategic highway locations  
Fast and ultra fast chargers  
Multiple ancillary services for different e-transport modalities  
Grid balancing solutions  
Energy storage solutions  
Emergency and ad-hoc support for EVs  
Provision of mobile charging stations

## THE MARKET

### RELATIONSHIP & CHANNELS

Booking of chargers  
Providers roaming solutions  
Parking & charging points for trucks  
Highway administrations and operators visibility

### SEGMENTS

Private drivers  
Professional EV drivers  
Logistics operators

## THE FLOW

### OUT

Electricity grid upgrade  
Charging point hardware (specific for heavy vehicles)  
Maintenance  
Staff, security

### IN

Logistics vehicles recharging  
Private vehicles recharging  
Business vehicles charging  
Ancillary general services  
EV drivers' data

## Intermodal Station business model

- Citizens e-mobility
- Special Events
- e-Trucks
- Mobile charging



CONCEPT SOLUTIONS TO

# LEV chargers of the future

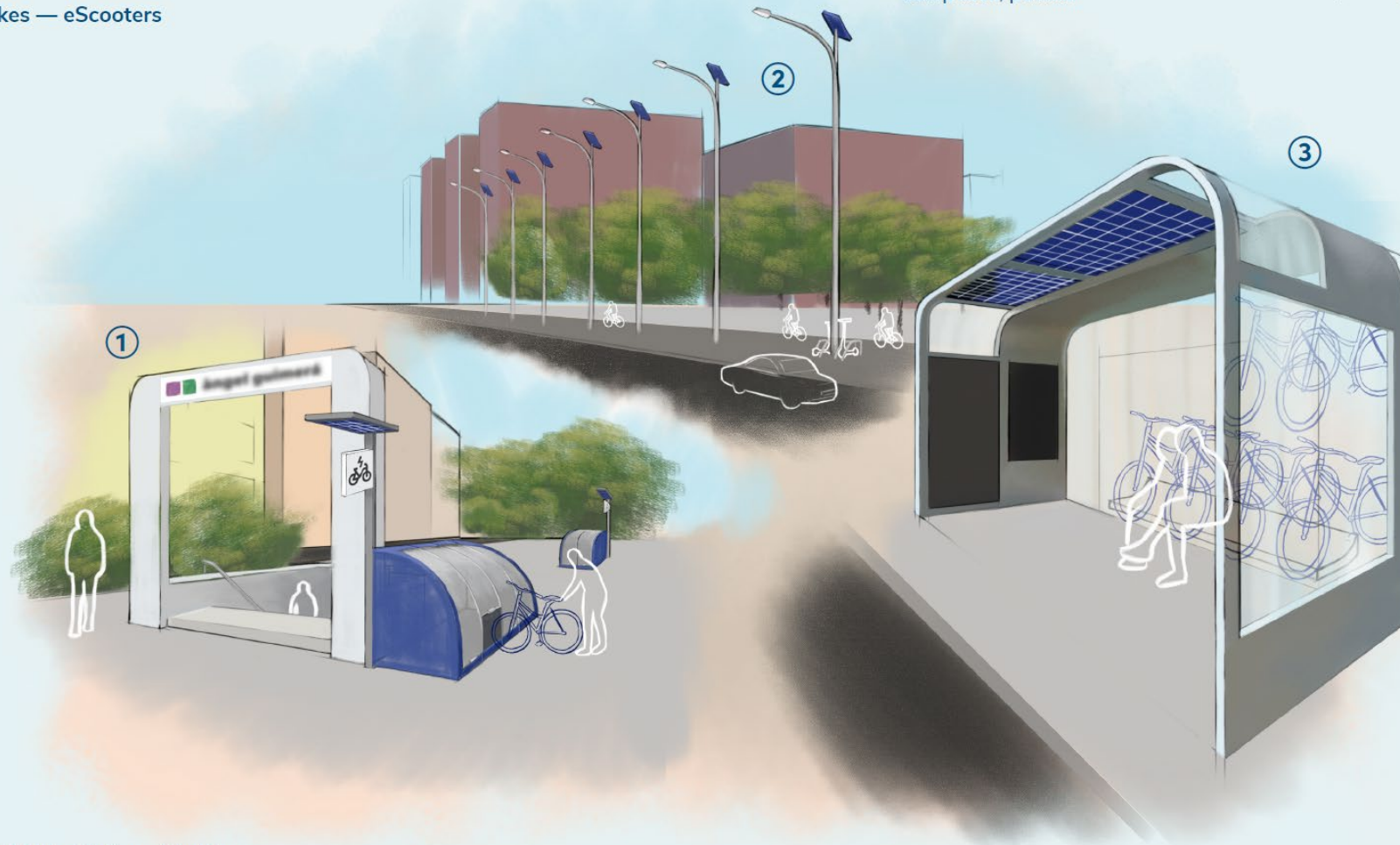
eBikes — eScooters

## Services

① Shelter+charger modules in underground stations

② Solar powered chargers in streetlamps in university campuses, parks...

③ Solar powered chargers integrated in bus canopies, with vertical parking of LEVs



USER-CHI — Stations of the Future

## The LEV chargers of the Future

A station to support the active, multimodal and sustainable mobility

# LEV chargers of the future

eBikes — eScooters

## SERVICES

- ① Secure parking
- ② Vertical parking
- ③ Chargers for LEVs
- ④ Interchangeable payment method (credit cards; contactless payment; subscription; cash...)

## TECHNOLOGY

- ☑ Photovoltaic panels connected to grid
- ☑ Modularity
- ☑ Battery storage cabinets / Battery swapping
- ☑ AC chargers
- ☑ Charging booking

## LOCATION

- ☑ Chargers in urban furniture, streetlamps and benches
- ☑ Integrated in bus canopies or by underground stations
- ☑ Near university campuses

## LEV chargers main features

- Services
- Technology
- Location

# LEV chargers of the future

eBikes — eScooters

## THE BUSINESS

### PARTNERS

Electromobility  
Service Providers  
CPOs  
Sharing mobility  
operators  
Location owners

### ACTIVITIES & RESOURCES

Engagement with  
users and citizens  
Analysis of relevant  
pools of attraction  
Analysis and design  
of public space  
Municipal electrical  
assets

## THE VALUE

To stop and charge LEVs at  
strategic locations in the city  
Charging infrastructure and  
services tailored to cities specific  
features and to different vehicle  
models  
Secure parking  
eBikes sharing services  
Cargo-bikes for couriers and  
logistics services  
loading/unloading areas Battery  
storage cabinets/Battery  
swapping  
Solar powered chargers

## THE MARKET

### RELATIONSHIP & CHANNELS

Different payment  
solutions  
Harmonized  
charging standards  
Providers roaming  
solutions  
Strategic urban  
location visibility  
Apps

### SEGMENTS

Private LEV drivers  
Cargo-bike logistics  
operators

## THE FLOW

### OUT

Electricity grid  
upgrade  
Charging point  
installation  
Maintenance

### IN

Private LEVs  
recharging  
Business LEVs  
charging  
Fees for parking  
LEV drivers' data

# LEV chargers business model

- Citizens e-mobility
- CC park&charge



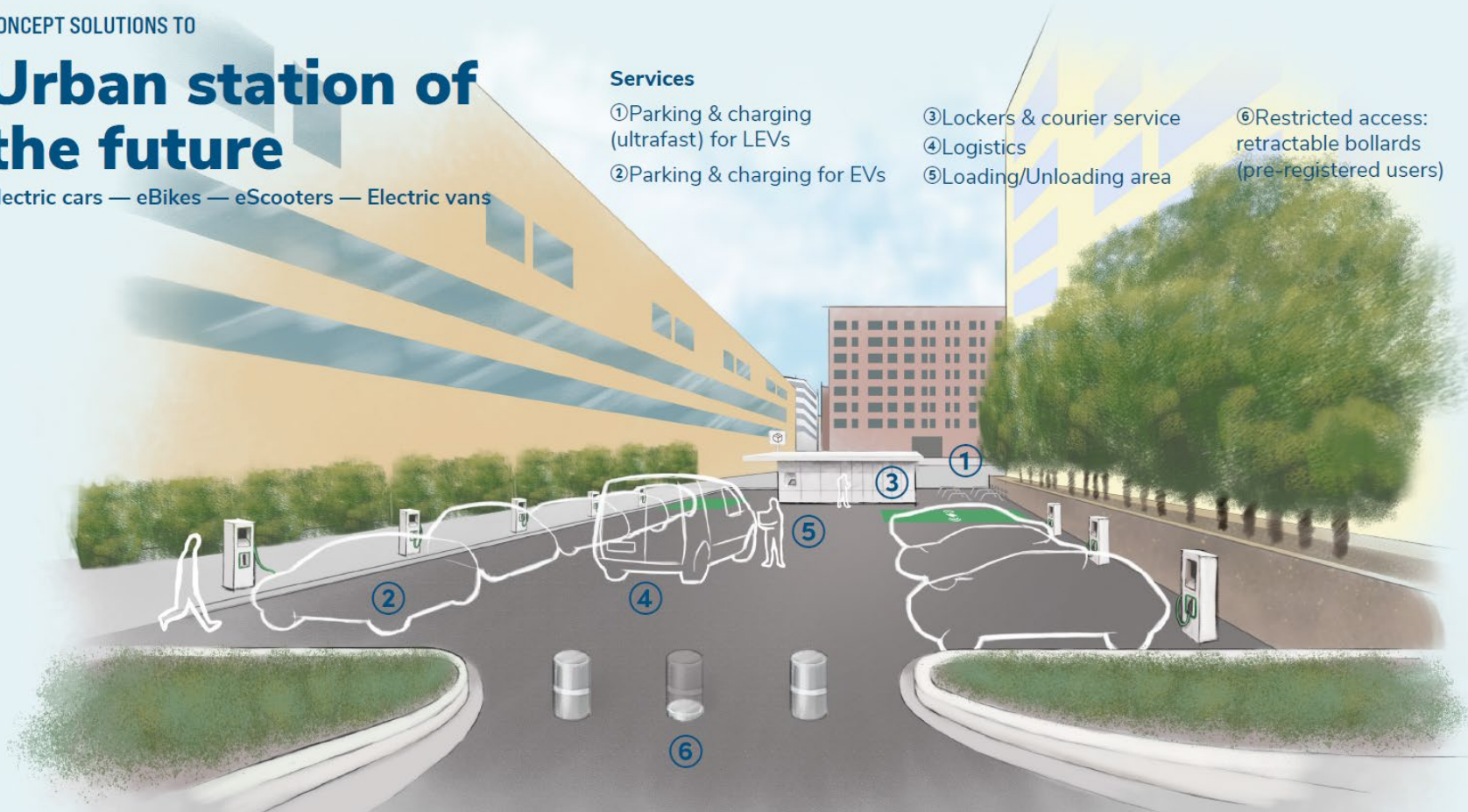
CONCEPT SOLUTIONS TO

# Urban station of the future

Electric cars — eBikes — eScooters — Electric vans

## Services

- ① Parking & charging (ultrafast) for LEVs
- ② Parking & charging for EVs
- ③ Lockers & courier service
- ④ Logistics
- ⑤ Loading/Unloading area
- ⑥ Restricted access: retractable bollards (pre-registered users)



USER-CHI — Stations of the Future

## The Urban Station of the Future

A station to support the new mobility in the cities

# Urban station of the future

Electric cars — eBikes — eScooters — Electric vans

## SERVICES

- ① Parking & charging (ultrafast) for LEVs
- ② Parking & charging (AC & DC) for EVs
- ③ Lockers and courier service
- ④ Logistics
- ⑤ Loading/Unloading area
- ⑥ Short stays

## TECHNOLOGY

- ✓ Slow chargers (AC)
- ✓ Fast chargers (DC)
- ✓ Parking & charging booking
- ✓ Restricted access
- ✓ Pay for charging (not parking), payment method interchangeable (credit cards; contactless payment; subscriptions, cash...)

## LOCATION

- ✓ City centre
- ✓ Neighbourhood
- ✓ Shopping area

## Urban Station main features

- Services
- Technology
- Location



# Urban station of the future

Electric cars — eBikes — eScooters — Electric vans

## Urban Station business model

- Logistics Hubs
- e-Taxi stops
- CC park&charge

### THE BUSINESS

#### PARTNERS

Electromobility  
Service Providers  
CPOs  
Grid Infrastructure  
Managers  
Local authorities/  
Mobility agencies

#### ACTIVITIES & RESOURCES

Identification of local  
conditions as  
neighbourhoods  
traffic type  
Analysis of relevant  
pools of attraction  
Power grid  
characteristics  
Municipal electrical  
assets

### THE VALUE

To stop and charge in strategic  
locations in the city  
Charging infrastructure and  
services tailored to cities'  
features and to different vehicle  
models  
Shared mobility services Lockers,  
courier and logistics services  
Loading/unloading areas

### THE MARKET

#### RELATIONSHIP & CHANNELS

Different payment  
solutions  
Harmonized  
charging standards  
Providers roaming  
solutions  
Parking&Charging  
booking  
Apps

#### SEGMENTS

Private drivers  
Charging at home  
Charging at office  
Charging during  
shopping  
Taxi corporations

### THE FLOW

#### OUT

Electricity grid  
upgrade (especially  
for DC fast charging  
points)  
Charging point  
hardware  
Charging point  
installation  
Land procurement

#### IN

Logistics vehicles  
recharging  
Private vehicles  
recharging  
Business vehicles  
charging  
EV drivers' data

# Some conclusions

- A Handbook to promote electromobility, based on user needs and expectations regarding the charging process of EVs.
- We intend to promote the electromobility in cities, but also in the long range.
- The Handbook relates every concept to different business models that have been defined and assessed with relevant European cities.
- Our concepts aim to be a reference to support electromobility actors to implement the facilities their cities need to boost a more sustainable and active mobility.





# THANK YOU!

# DISCUSSION

*'How to integrate these stations of the future  
in the urban space?'*

*Challenges, obstacles, and opportunities'*



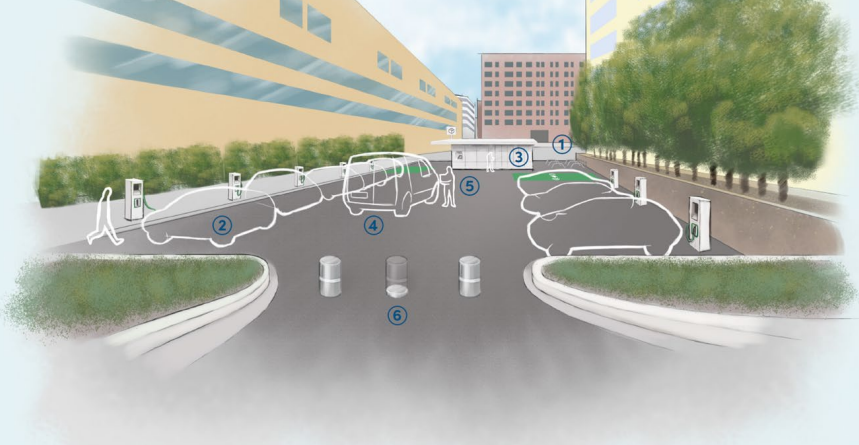
CONCEPT SOLUTIONS TO

## Urban station of the future

Electric cars — eBikes — eScooters — Electric vans

### Services

- ① Parking & charging (ultrafast) for LEVs
- ② Parking & charging for EVs
- ③ Lockers & courier service
- ④ Logistics
- ⑤ Loading/Unloading area
- ⑥ Restricted access: retractable bollards (pre-registered users)



USER-CHI — Stations of the Future

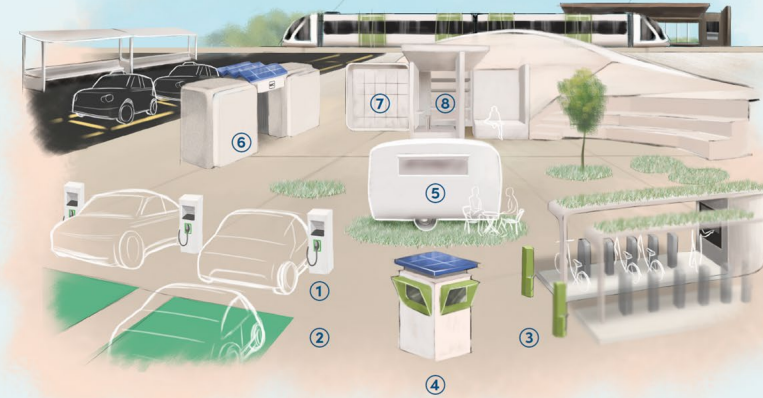
CONCEPT SOLUTIONS TO

## Intermodal station of the future

Electric cars — eBikes — eScooters — Public transport

### Services

- ① Chargers & ② inductive charging for EVs + vehicle maintenance + parking lot
- ③ Chargers for LEVs
- ④ Intermodal ticketing point
- ⑤ Cafeteria
- ⑥ Toilets
- ⑦ Lockers & courier service
- ⑧ Coworking & resting area



USER-CHI — Stations of the Future

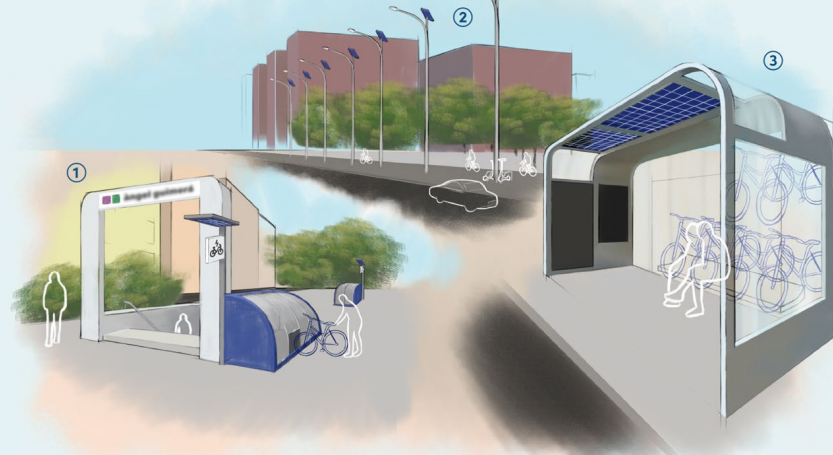
CONCEPT SOLUTIONS TO

## LEV chargers of the future

eBikes — eScooters

### Services

- ① Shelter+charger modules in underground stations
- ② Solar powered chargers in streetlamps in university campuses, parks...
- ③ Solar powered chargers integrated in bus canopies, with vertical parking of LEVs



USER-CHI — Stations of the Future

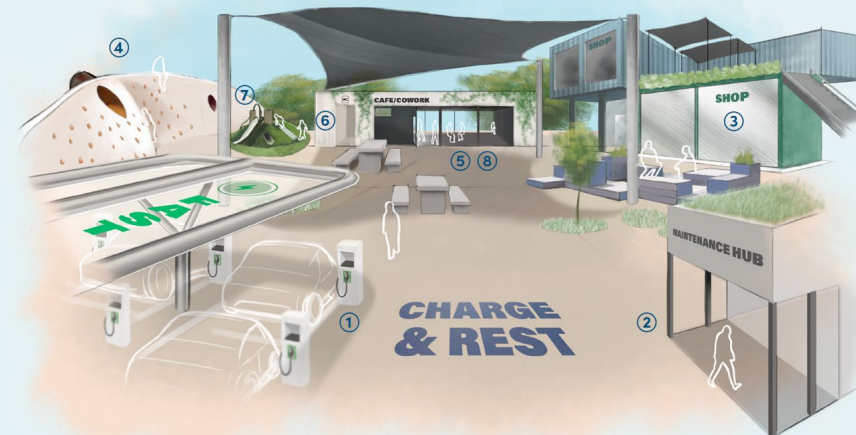
CONCEPT SOLUTIONS TO

## Highway station of the future

Electric cars — Electric vans

### Services

- ① Fast chargers + parking lot
- ② Vehicle maintenance
- ③ Shops
- ④ Fitness/Playground zone
- ⑤ Cafeteria
- ⑥ Toilets
- ⑦ Playground
- ⑧ Coworking & rest area



USER-CHI — Stations of the Future

# ***STATIONS OF THE FUTURE***

USER-CHI

Charging your e-mobility future

**USER-CHI**  
CHARGING YOUR E-MOBILITY FUTURE

# Q&A

**USER-CHI**  
CHARGING YOUR E-MOBILITY FUTURE



09/12/2022







# THANK YOU!

## ANY QUESTIONS OR COMMENTS?

### CONNECT WITH US:

-  Twitter: [@Userchi\\_H2020](https://twitter.com/Userchi_H2020)
-  LinkedIn: <https://bit.ly/2W7M3mW>
-  Website: [www.userchi.eu](http://www.userchi.eu)
-  Email: [info@userchi.eu](mailto:info@userchi.eu)



USER-CHI Project • 1st  
Charging your e-mobility future  
1w •


After two intensive days of study visit in Berlin, it is time to sum-up and say thank you to all the partners and cities involved.  
During this two days, we learned a lot about Berlin's strategy for public ...see more



Ángel Moya and 35 others



USER-CHI Project • 1st  
Charging your e-mobility future  
1w •

USER-CHI solutions in actions!  
Curious about our INCAR app?   
Reserve, charge and pay effortlessly with one app, so ...see more



Unterwegs im E-Auto im sonnigen Berlin konnten wir es uns nicht nehmen lassen unsere INCAR App weiter zu testen und einen Abstecher zum Laden nach Kreuzberg zu ma ...see more



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1mo •



Join us online at our [#EURegionsWeek](#) workshop on user-centric charging infrastructure in cities ...see more

