DRIVING EV INTEROPERABILITY ACROSS EUROPE

USER-CHI TECHNICAL WEBINAR – 5 MARCH 2024
14:00 – 15:30

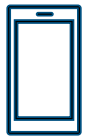
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No [875187]

AGENDA

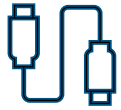
Introduction – why interoperability is key? Marie Rajon Bernard (ICCT)

Recommendations and rules for interoperable charging processes (INFRA)
Divy Gupte & Mariana Moreno Kuhnke (IKEM)

Interoperability, charging and parking platform (INCAR) –challenges, stakeholders and technical development - Alberto Zambrano (ETRA)



INCAR app in practice: demonstration of the tool and first user feedback - Lena Korostylova & André Kleinhaus (VMZ)



Developing standards for electric charging infrastructure - Javier Lopez Rodriguez (UNE)

Roundtable discussion and Q&A

INTRODUCTION – WHY INTEROPERABILITY IS KEY?

Marie Rajon Bernard (ICCT)

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Charging infrastructure user-friendliness – A focus on Interoperability

Marie Rajon Bernard

March 5th 2024
Berlin, Germany

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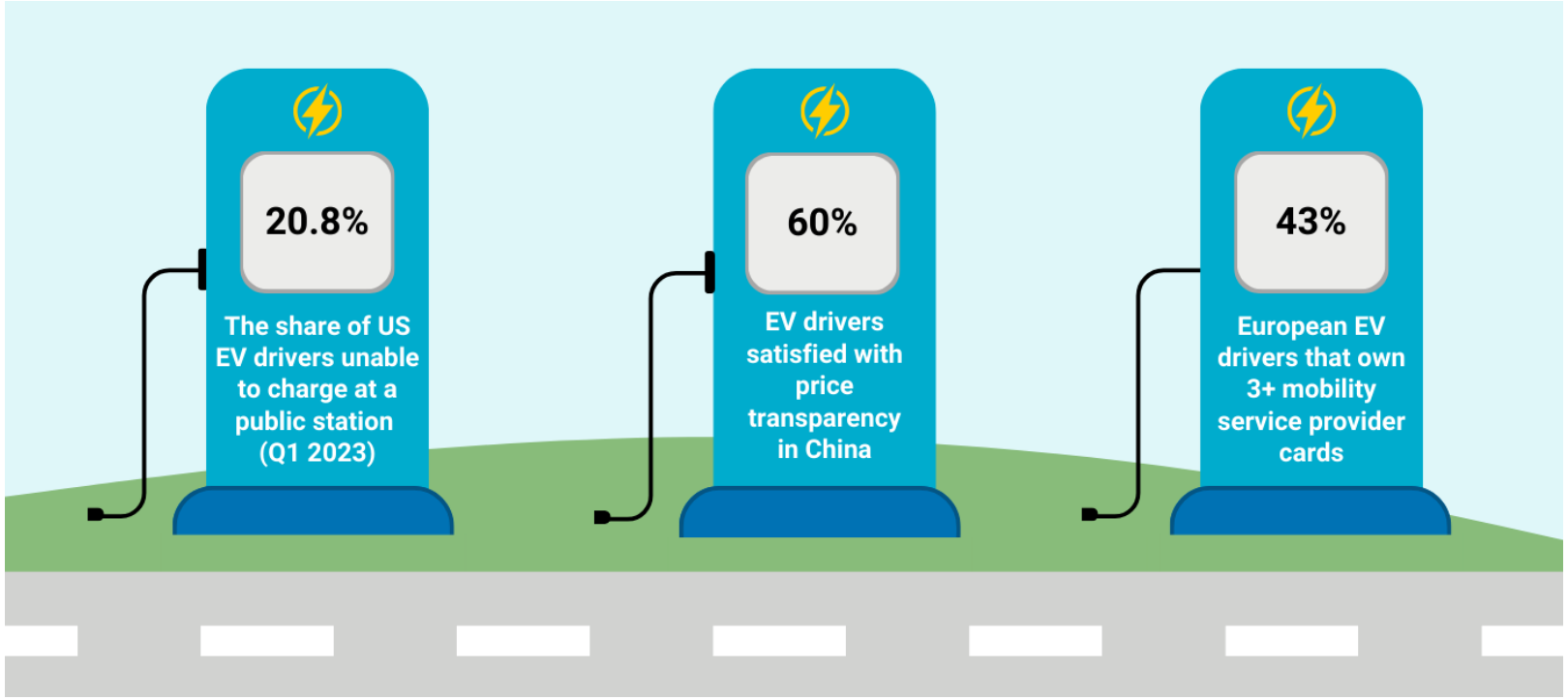
Improving charging infrastructure user-friendliness is critical to unlock mass EV adoption



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What lies behind the charging infrastructure user-friendliness concept?

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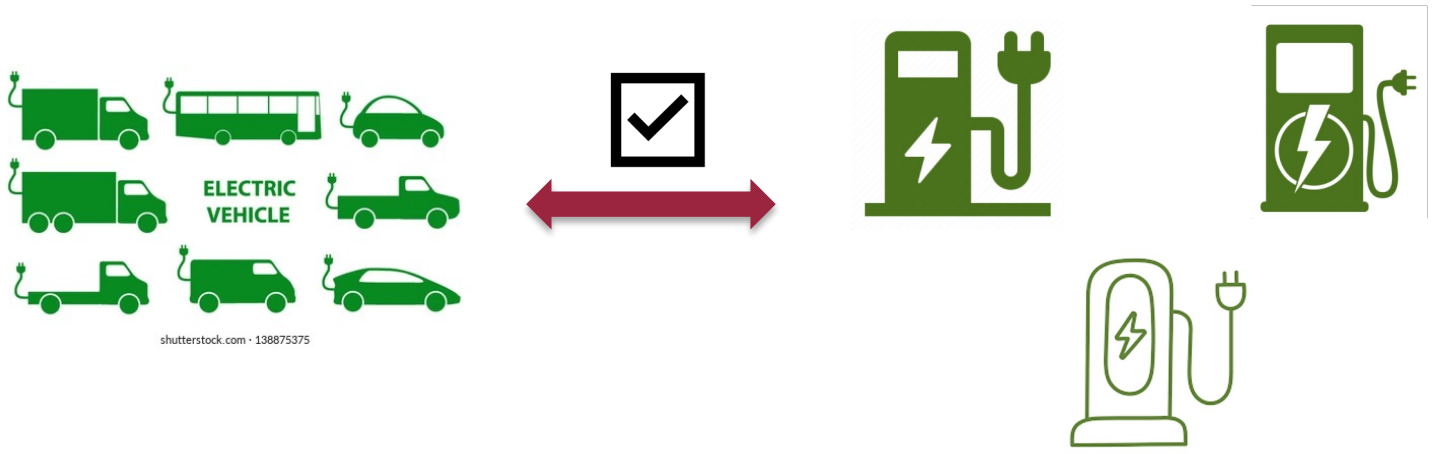
What does interoperability mean?

Any electric vehicle (EV) should be able to charge at any charging station, and any provider of EV charging services should be able to participate barrier-free.



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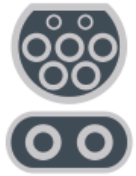
Hardware interoperability

	China	Europe	Japan/Korea	North America	Tesla (everywhere except Europe)
AC	GB/T 	Mennnekes Type 2 	J1772 Type 1 	J1772 Type 1 	NACS 
DC (LDV)	GB/T 	CCS Type 2 	CHAdeMO 	CCS Type 1 	NACS 

New ultra-fast standards in development

MegaWatt Charging Standard (MSC)

ChaoJi

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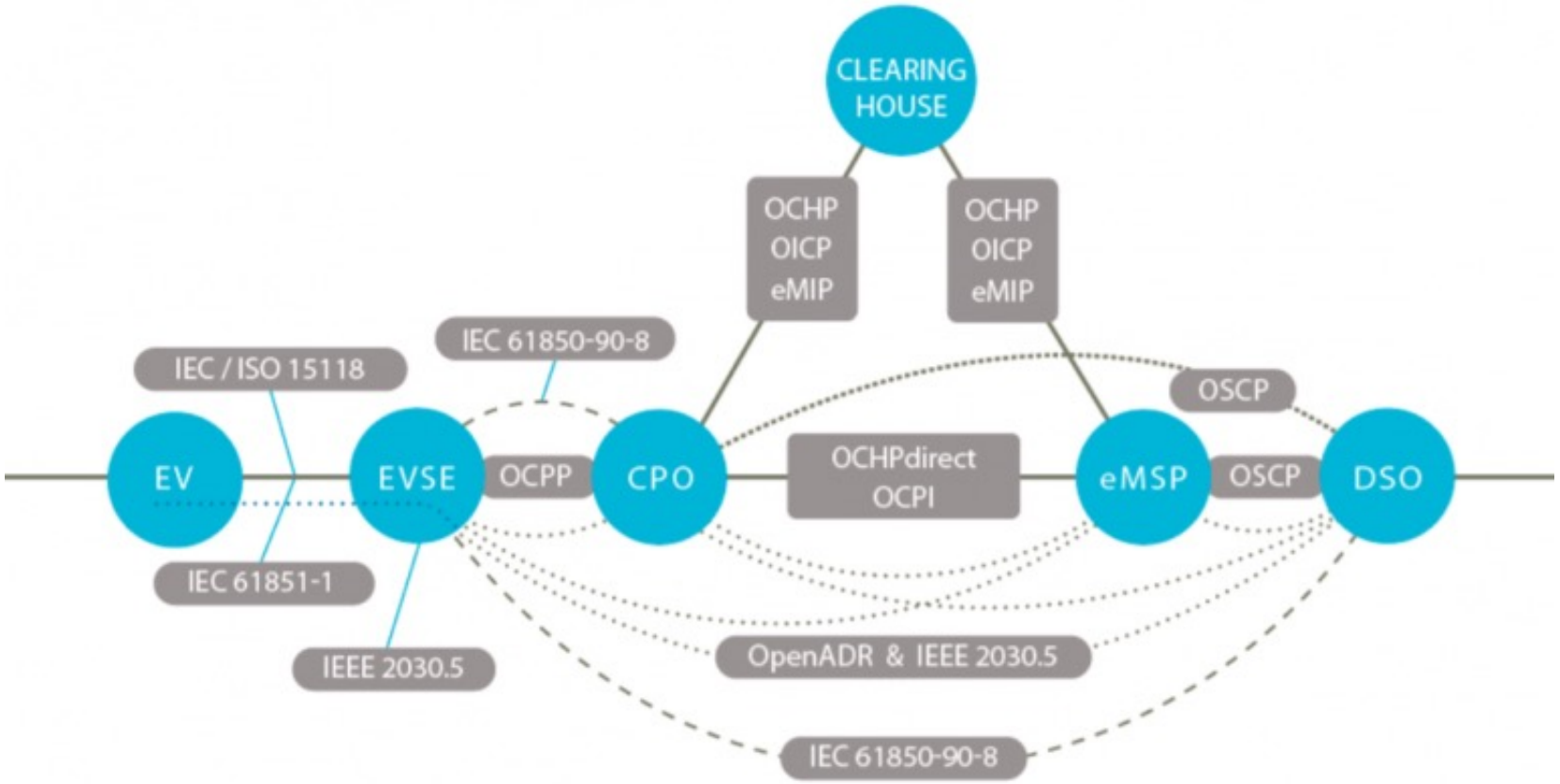
Software interoperability

EV protocols and standards are key to ensuring interoperability.



Why should we care about interoperability?

Consumers

- Convenience
  - Flexibility
  - Easy process
- Pricing
  - Healthy competition
  - Reduced cost
  - Streamlined payment process

Industry

- Reduced cost (unified system)
- Increased utilization

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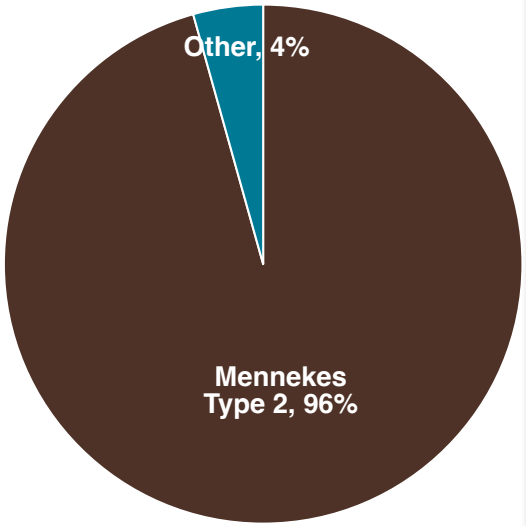
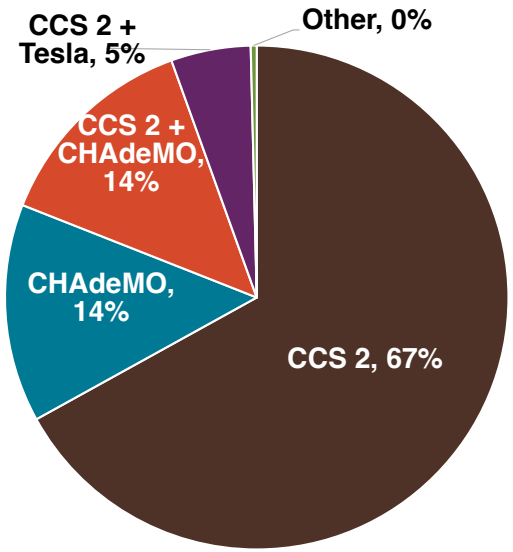
Where are we today? - Connectors

Europe

AC

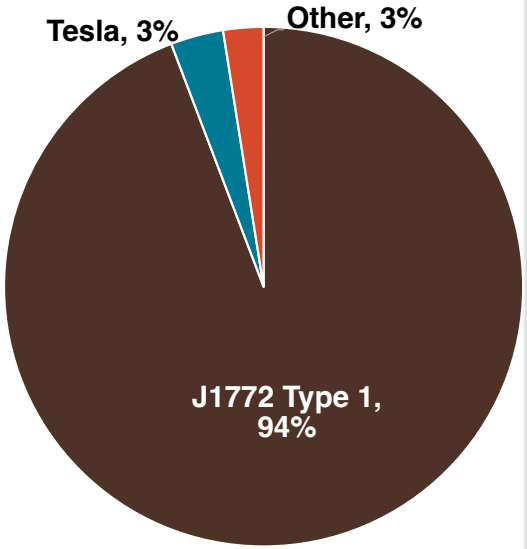


DC

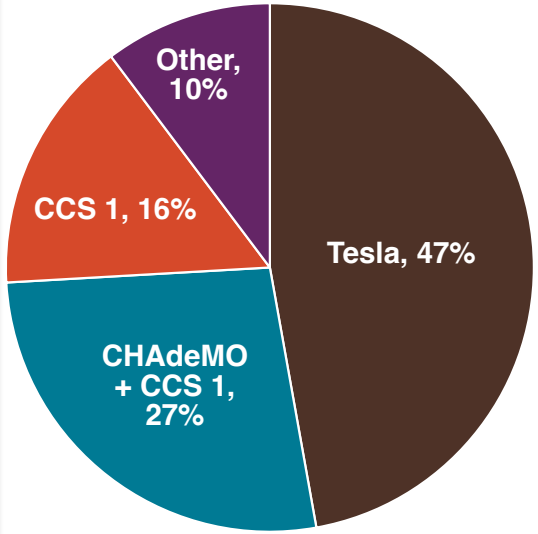


North America

AC



DC



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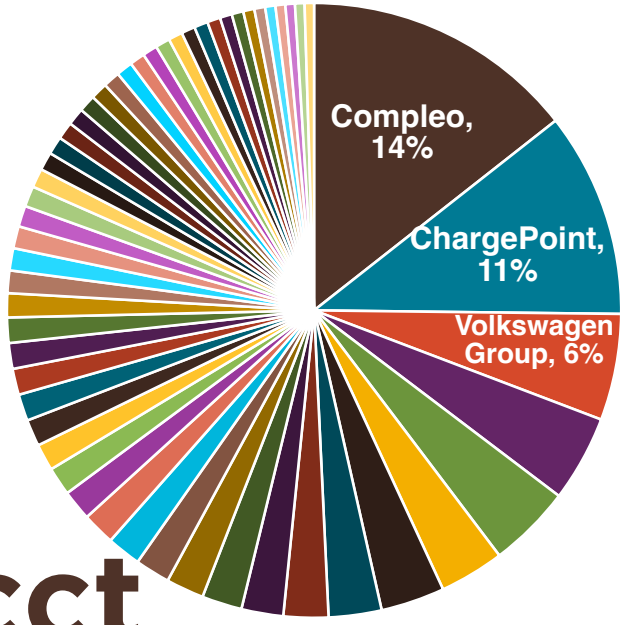
Source: Eco-movement

There are many different CPOs in Europe – Example of Germany

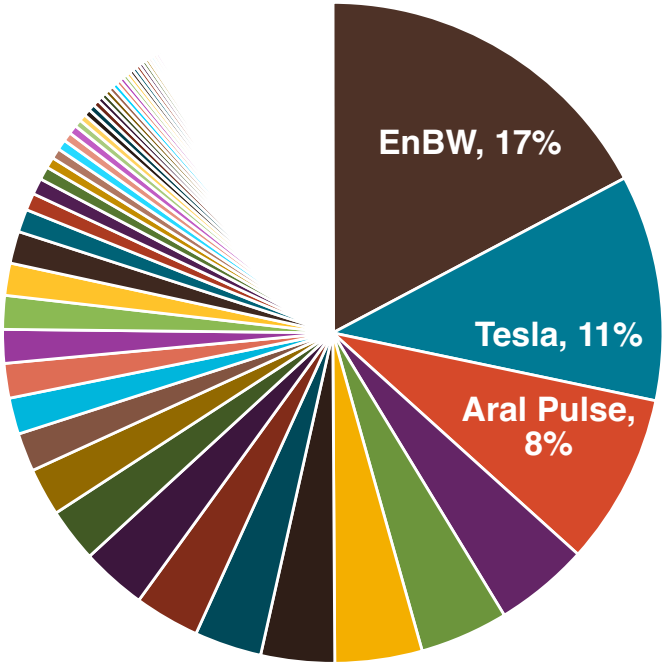
AC

50+



DC

400+



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Source: Eco-movement

Thank you!

mrajonbernard@theicct.org

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RECOMMENDATIONS AND RULES FOR INTEROPERABLE CHARGING PROCESSES (INFRA)

Divy Gupte & Mariana Moreno Kuhnke (IKEM)

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

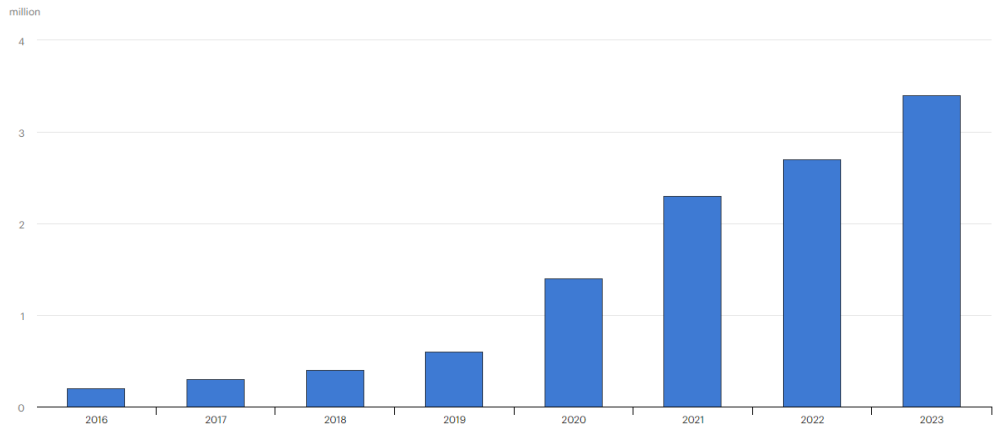
Recommendations on Interoperability Framework:

Insights from the INFRA research paper

IKEM

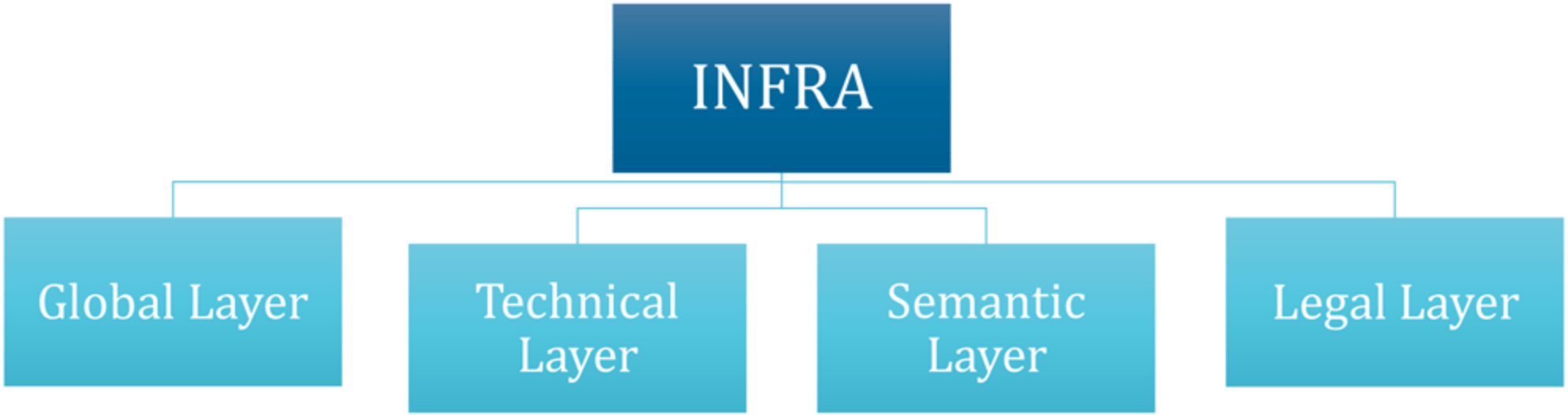
Introduction

- Rising number of EV users in Europe.
- Need for convenient charging possibilities.
- Goal: Accessible and interoperable charging infrastructure “anywhere” and “anytime” across the EU.
- INFRA offers minimum requirements for a unified and user-friendly rollout of the EV charging infrastructure.



Source: IEA

Four layers of Interoperability



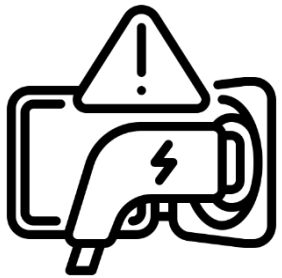
Source: Csillak, K., Moreno Kuhnke, M.(2022)

Minimum requirements within Global Layer

- A common goal among the stakeholders is crucial.
- Distribution of roles and responsibilities.
- Early involvement of stakeholders in organisation and execution phase.
- Communication and cooperation between stakeholders.

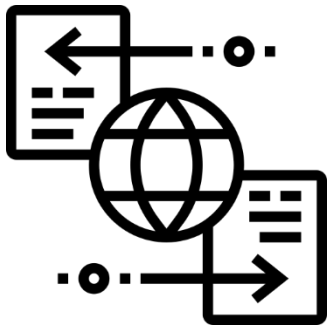
Minimum requirements within Technical Layer

- **Prerequisites for the physical connection of charging point to the distribution grid.**
- **Uniform Charging Plugs Components.**
- **Standardized plug components for LEVs.**
- **Implementation of smart metering infrastructure.**



Minimum requirements within Semantic Layer

- Open Charging Protocols for Communication.
- Consistent payment & authentication systems.
- Secure and Transparent Accounting Services.
- Data Availability for Infrastructure Planning.
- Availability of parking data for Park & Charge services.
- Availability of routing services for roaming and charging platforms.



IKEM

Minimum requirements within Legal Layer: Overview

- Uniform implementation of specifications of the (then in force) Alternative Fuels Infrastructure Directive (AFID)
- Simplification of administrative approval proceedings for public charging points
- Legal enablement of reservation of parking spots and charging spots in (semi-) public spaces
- Enforcement of CPOs obligation to allow to recharge the EV on an ad-hoc basis
- Establishment of directly binding obligation on metering devices in the EU in compliance with the Measuring Instruments Directive
- Compliance with regulation on data protection
- Unified requirements on data sharing processes for e-roaming (platforms)
- Uniform regulation of vehicle to grid charging/reverse charging

Minimum requirements within Legal Layer 1

- **Requirement 1 – Uniform implementation of specifications of the (2021 in force) Alternative Fuels Infrastructure Directive (AFID)**

  → **AFIR – Regulation (EU) 2023/1804** on the deployment of alternative fuels infrastructure
  adopted on the 13 September 2023

  → **Technical specifications – way forward with AFIR**

- **Requirement 2 – Simplification of administrative approval proceedings for public charging points**

Minimum requirements within Legal Layer 2

- **Requirement 3 – legal enablement of reservation of parking spots and charging points in (semi-) public spaces**

  → **Barcelona – Endolla (reservation 20 min. in advance; 12 hours charging)**

- **Requirement 4 – enforcement of the CPOs obligation to offer the possibility to recharge the EV on an ad-hoc basis**

- **Requirement 5 – establishment of directly binding obligation on metering devices in the EU in compliance with the Measuring Instruments Directive**

Minimum requirements within Legal Layer 3

- **Requirement 6 – compliance with the regulations on data protection regarding the personal data**

  → **“Bundesdatenschutzgesetz”**

  → **Data sharing**

- **Requirement 7 – unified data sharing processes for e-roaming or e-roaming platforms**
- **Requirement 8 – uniform regulation of vehicle to grid charging/reverse charging**

cybersecurity

Conclusions

- **Communication between the stakeholders is essential from the organisational point of view.**
- **Need to follow technological advancements closely, and necessary adoptions should be made at an early stage.**
- **Technical and semantical specifications (solutions) should be integrated into legal acts at EU level as soon as their are ready.**
- **Even though progress: The AFIR needs to be further developed to be able to guarantee the interoperability of the recharging infraestructure along the TEN-T.**

Divy Gupte
divy.gupte@ikem.de

Mariana Moreno Kuhnke
mariana.moreno-kuhnke@ikem.de

Institut für Klimaschutz,
Energie und Mobilität e.V.

Magazinstraße 15 – 16
10179 Berlin

info@ikem.de
www.ikem.de

INCAR

INTEROPERABILITY, CHARGING AND PARKING PLATFORM

Alberto Zambrano, Telecom Eng., ETRA I+D
azambrano.etraid@grupoetra.com

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

05/03/2024

Marie has an electric car and lives in Berlin.

…but her car’s battery is running low.

Using the same integrated app, she pays to use a fast charger to fill up her car within 15 minutes. Enough time to answer some emails.

Marie needs to drop off her son at school, then attend multiple meetings around the city…

But Marie isn’t worried. She uses an app to find a charging point near her son’s school.

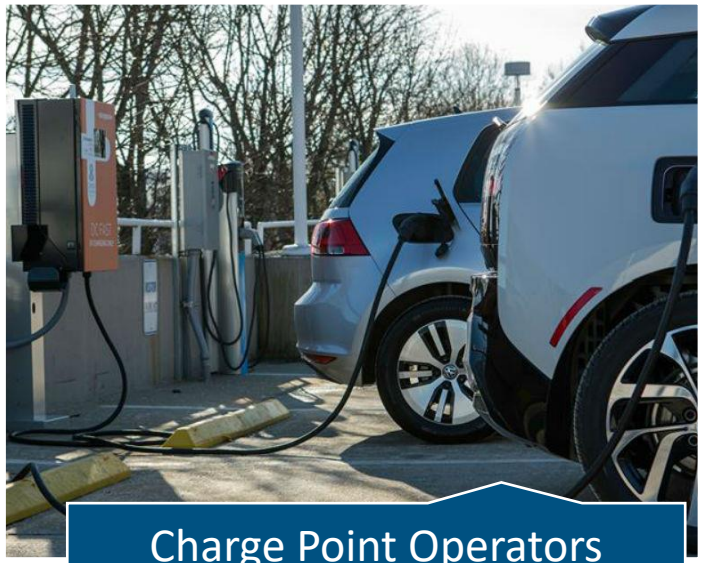
She unplugs her car and drives to her meeting – the roads are less busy as many people chose an ebike over their car.

THIS IS JUST ONE OF MANY VISIONS FOR EMOBILITY IN EUROPE ENABLED BY USER-CHI.

The challenge

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

EV drivers



Charge Point Operators
Electromobility Services Providers

The challenge

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

Where can I find a charger?

Is it free?

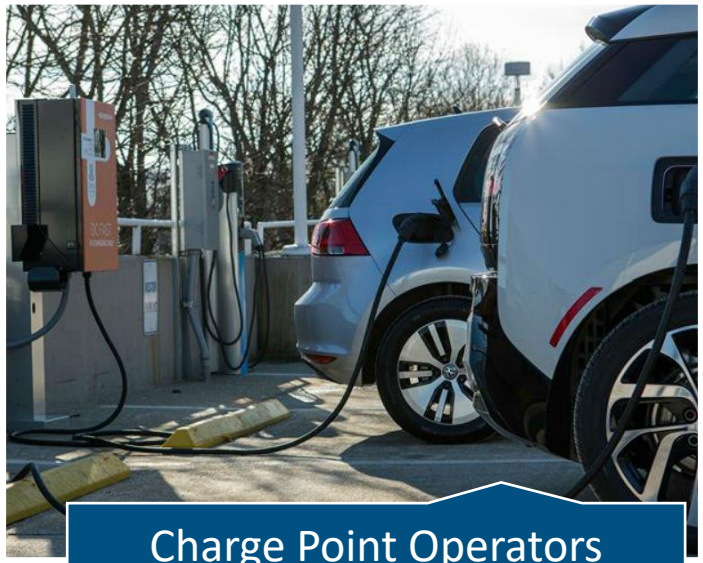
Can I reserve it?

Do I need to register with the charger owner?

How will I pay for the service?

The challenge

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



Charge Point Operators
Electromobility Services Providers

How can we get more visibility? And access to more chargers?

How can we simplify the contractual requirements and processes?

The challenge

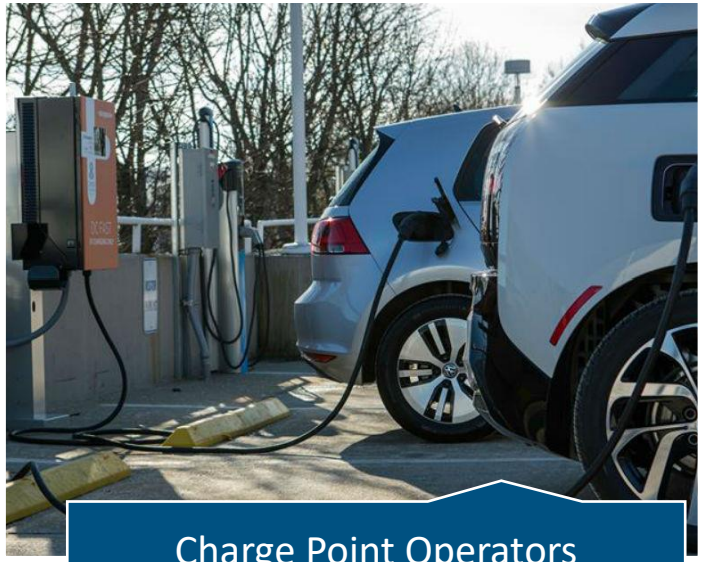
The main objective of the INCAR Platform is to solve currently faced challenges in terms of interoperability among the different actors of the electromobility domain

Which services can we enable to foster electromobility adoption?

Are there any actors not being properly addressed?

The challenge

EV drivers
Casual EV drivers



Charge Point Operators
Electromobility Services Providers
MicroCPOs

Technical challenges and decissions

Enable seamless operation across multiple CPOs and EMSPs...
... considering both roles may coexist in single entities

Protocols

- Landscape: OCPI, OICP, OCHP, eMIP...
- Open protocols foster adoption and avoid vendor lock-in

Architecture

- Software as a Service
- Multitenancy
- Scalable by design

Technical challenges and decissions

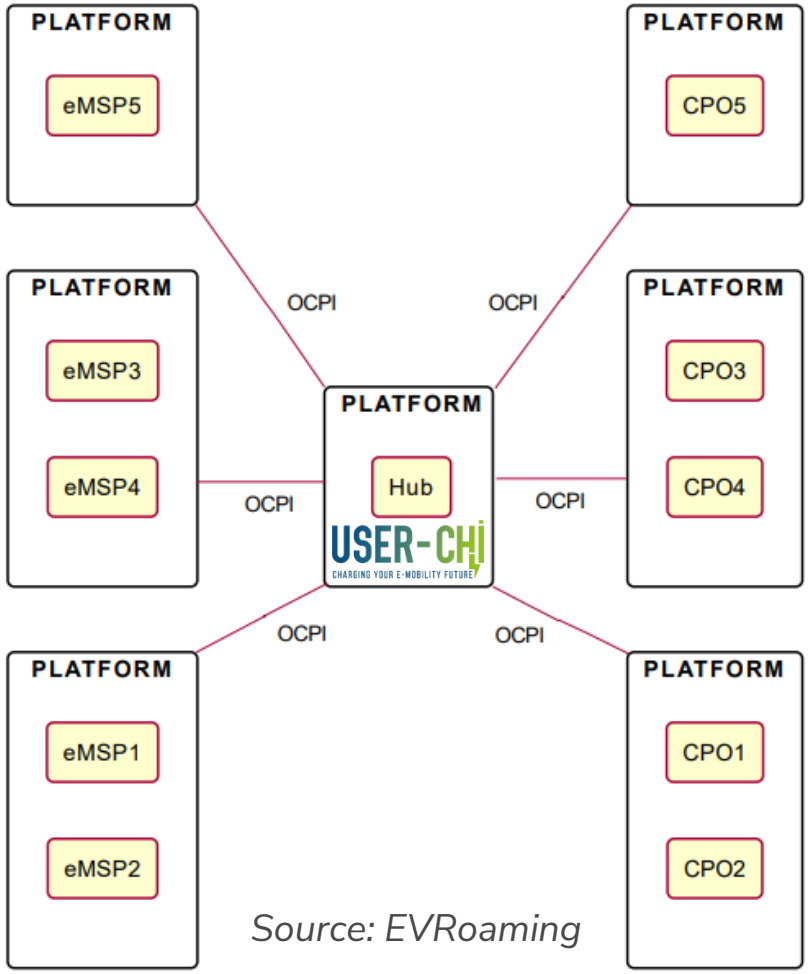
OCPI 2.2.1

Open Charge Point Interface

HUB topology

- Single contract and integration between INCAR and CPO/EMSP partner required

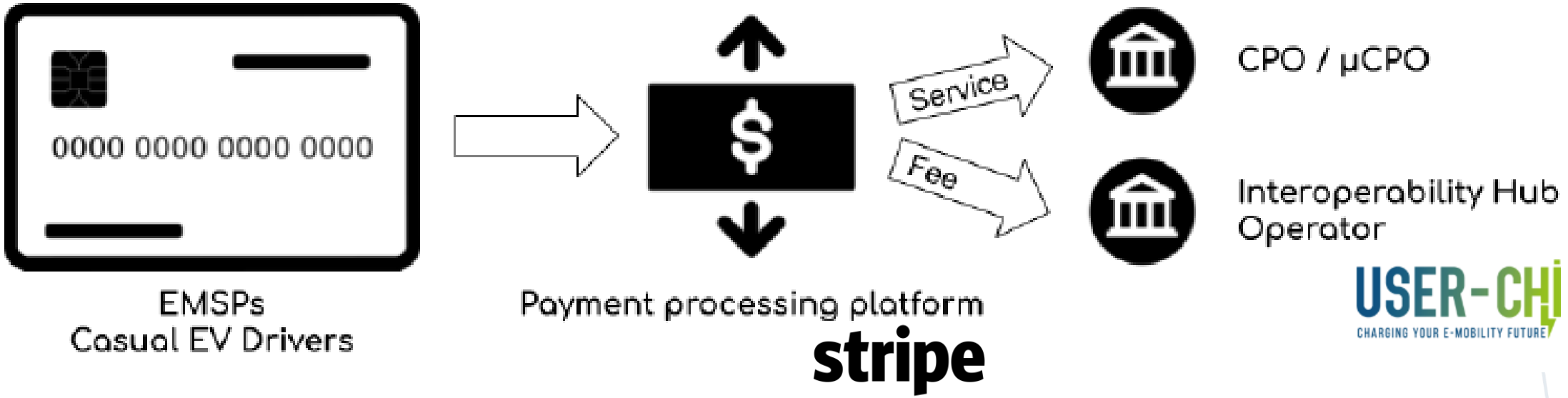
- Seamless access to elements from other partners
- EMSPs customers have access to any charger from any CPO
- CPOs gain visibility



Source: EVRoaming

Technical challenges and decissions

What about payments?

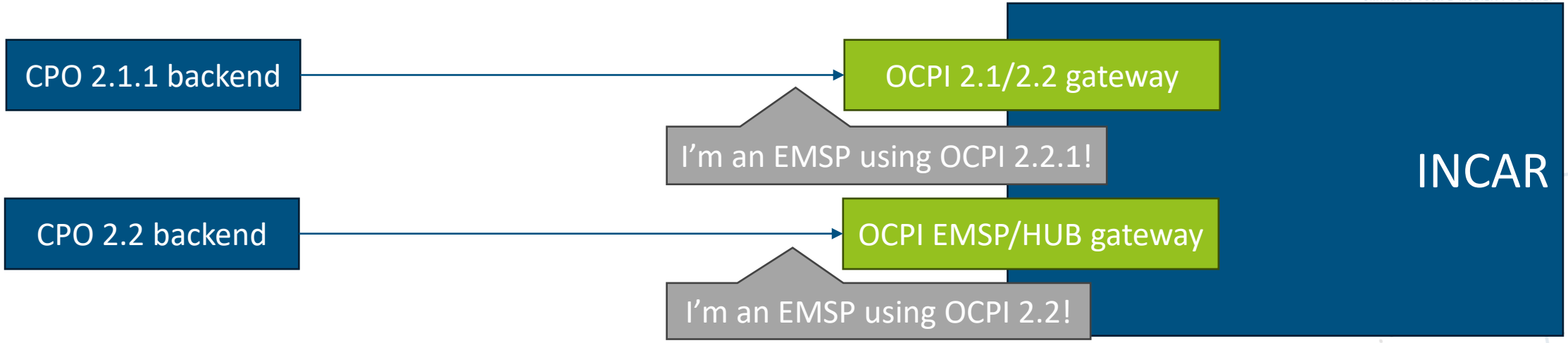


Technical challenges and decissions

Barriers and overcomings

- Most widely adopted version of OCPI is v2.1.1
- Entities have internal processes tailored to peer-to-peer contract schemes

Implementation of gateways and data model converters



Technical challenges and decissions

What about microCPOs...?

INCAR supports direct communication with chargers via OCPP
Owners can register in INCAR and enable their chargers

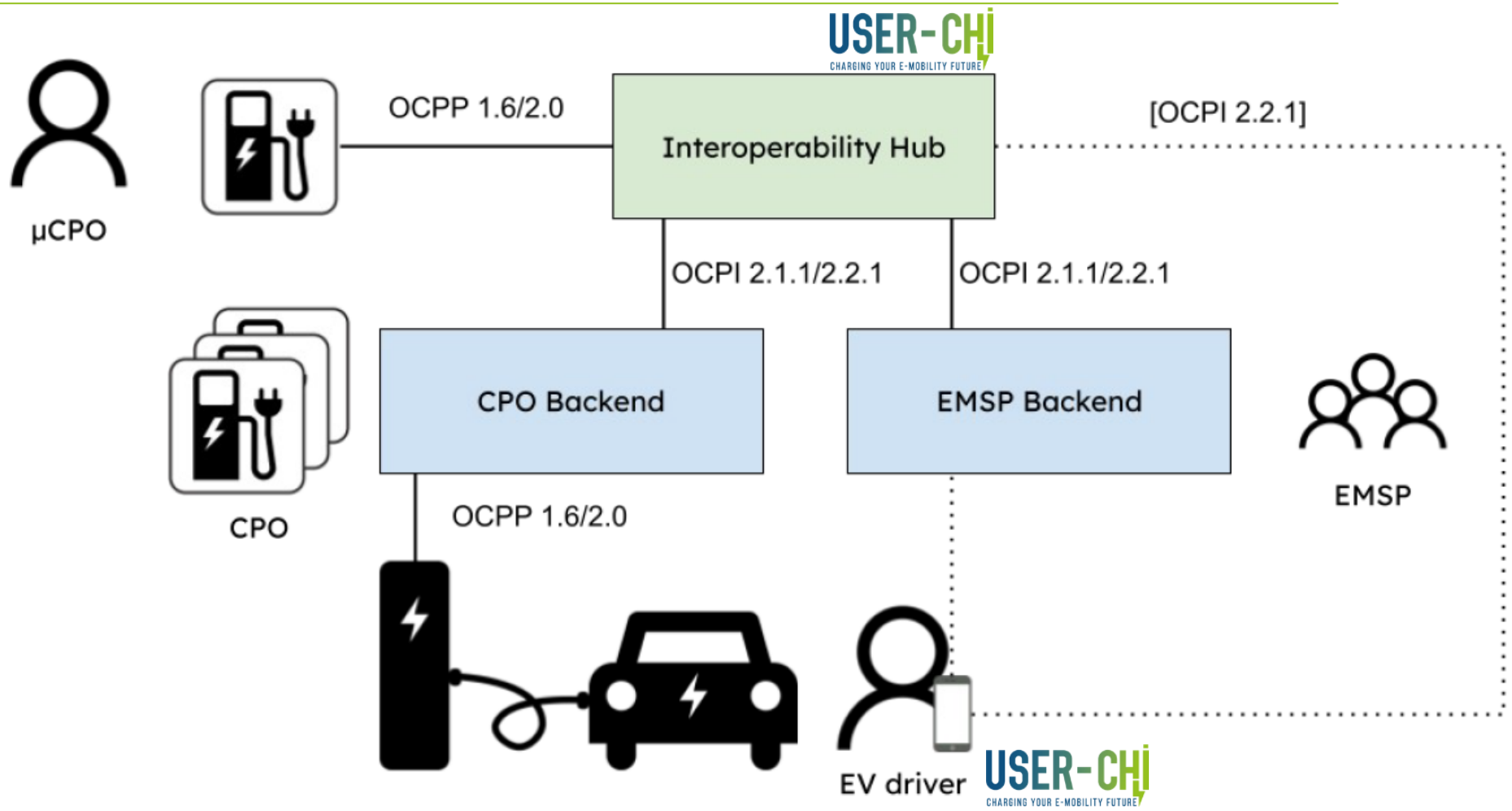
...and casual drivers?

INCAR App for Android and iOS is part of the solution
Enables access to the network of chargers of any CPO and microCPO
Facilitates payment with credit card

Get the INCAR App!

Android iOS

The solution



The solution

TVT

USER-CHI
CHARGING YOUR E-MOBILITY FUTURE

TURKU

IGL TECHNOLOGIES

CITY OF TURKU

BERLIN

quello

BUDAPEST

COMPLEO

AMB Àrea Metropolitana de Barcelona

BARCELONA

FLORENCE

Città di FIRENZE

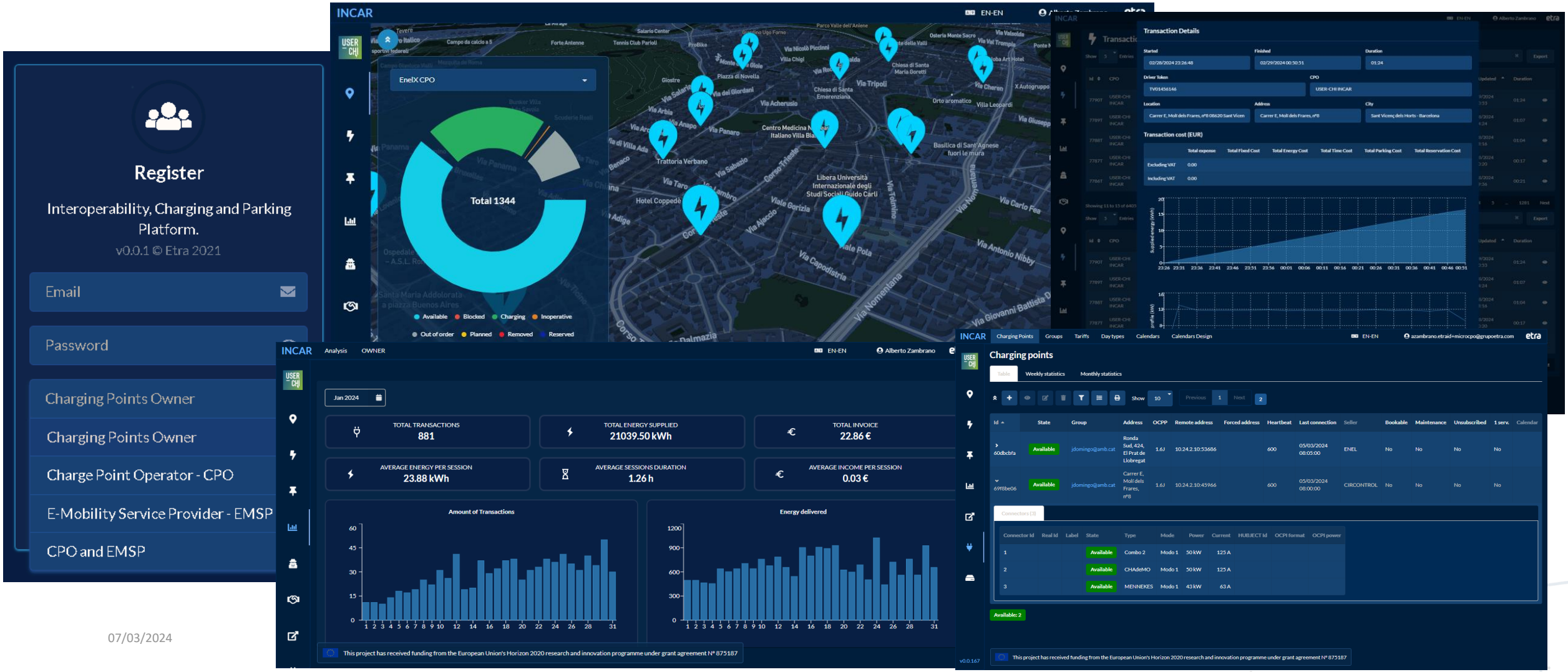
ROME

enel x

Ayuntamiento de Murcia

MURCIA

The solution



THANK YOU!

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www.userchi.eu

info@userchi.eu

INCAR APP IN PRACTICE

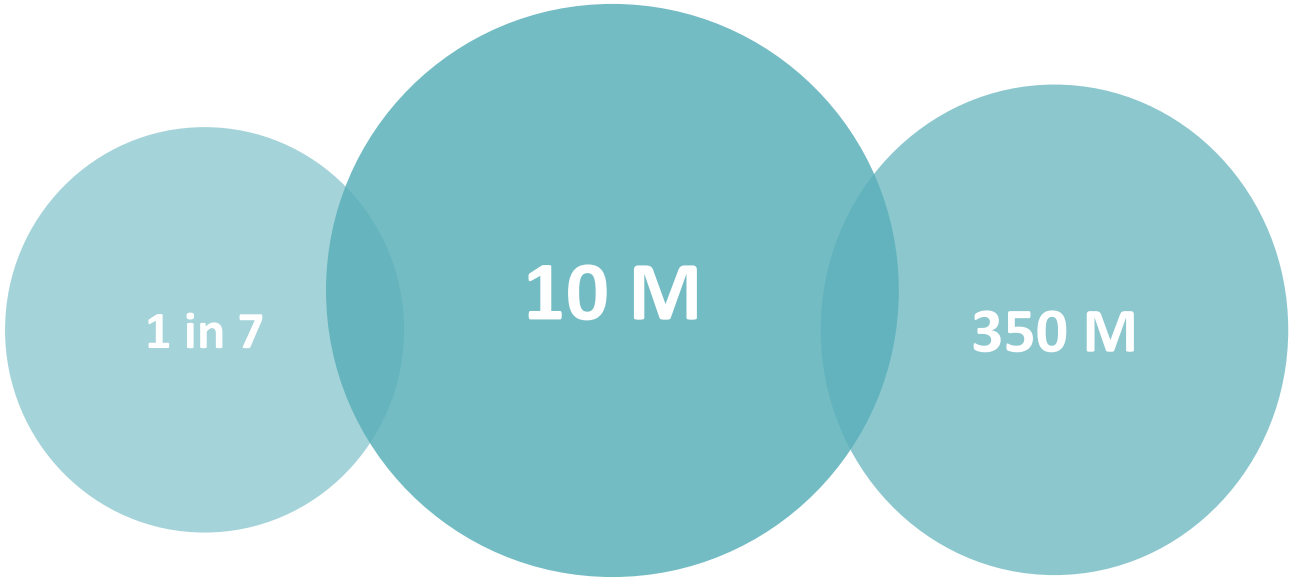
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No [875187]

Date: **05/02/2024**
Author: **André Kleinhaus, Lena Korostylova**

Agenda

1. Introduction (2min)
2. Problem Definition (2min)
3. Showcasing Solution = Demonstration of INCAR (5min) evtl. +2min
4. User Testimonials/ Success Stories/ Learnings (2min)
5. Interactive Activity (2min)
6. Call to Action (1-2min)

Introduction



2022

EV sales exceeded 10 million, with 14% of all new cars sold being electric.

1 in 7

One in every seven passenger cars bought globally in 2022 was an EV.

2030

The global electric car stock expands to almost 350 million vehicles by 2030.

Challenges

Charging Spot Availability

Difficulty in finding available charging spots

Complex Payment Processes

Navigating through multiple payment methods and platforms

Lack of Information

Real-time information about the availability and status of charging station

Inconsistent Charging Experiences

Inconsistent charging experiences across different charging stations

Limited Interoperability

Lack of interoperability between different charging networks and platforms

Solution INCAR

Reservation

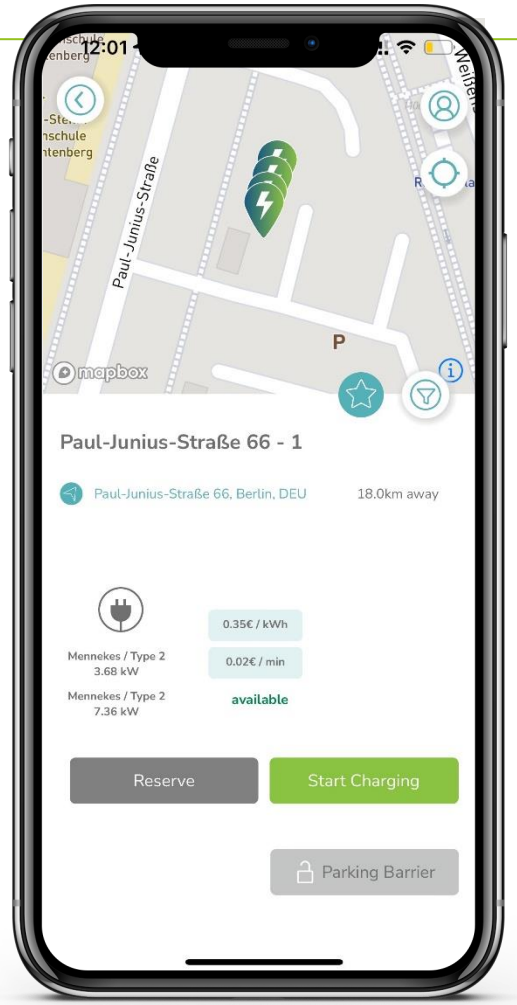
Charging

Payment

Feedback and Learnings

I had trouble identifying the charging stations, but I could easily cancel and restart the charging.

Charging and payment went smoothly!

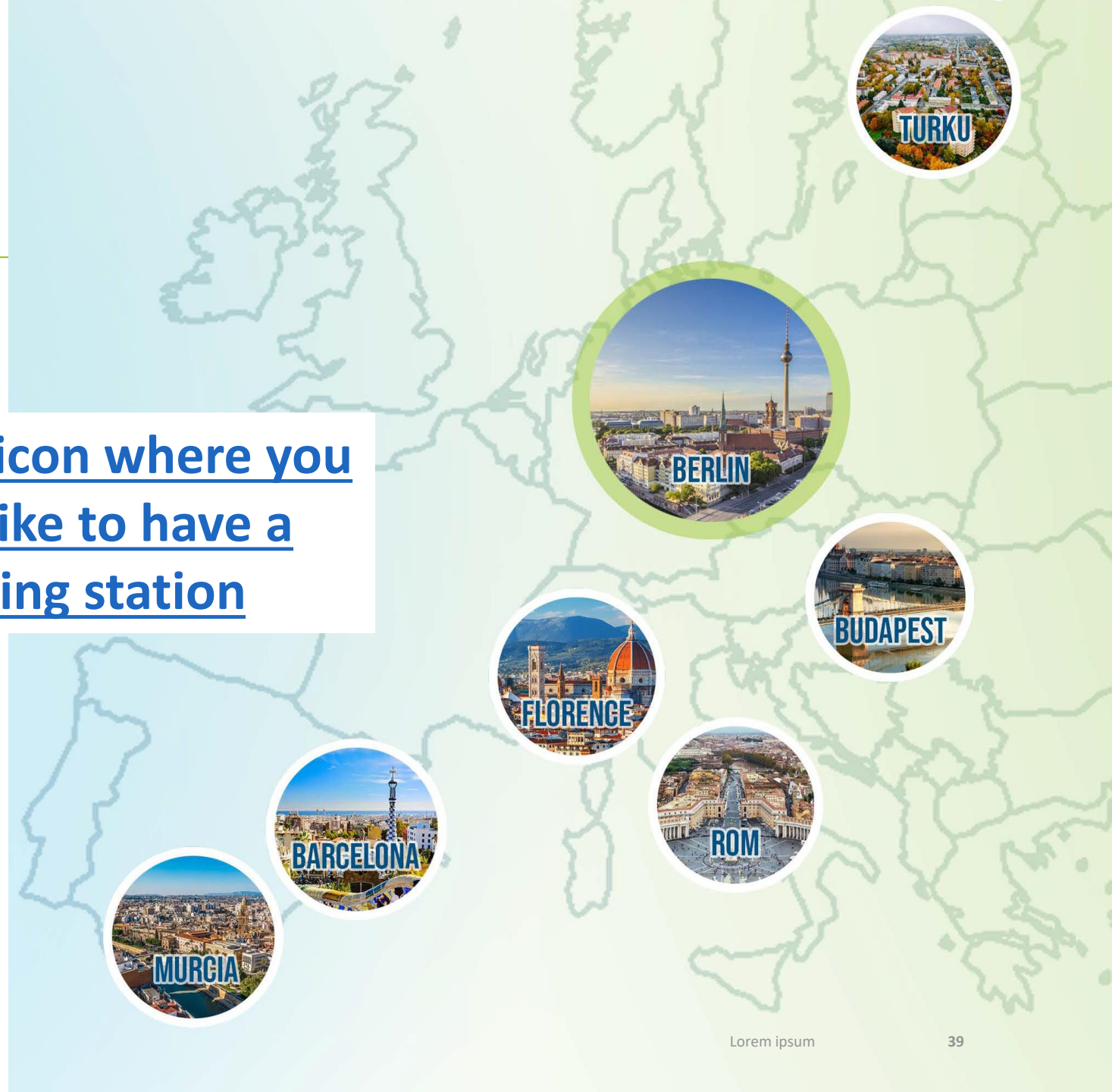


Charging process without any problems - keep it up.

Please improve payment method settings.

Interactive Activity

Place the icon where you would like to have a charging station



Your Turn

Reserve, charge and pay with INCAR

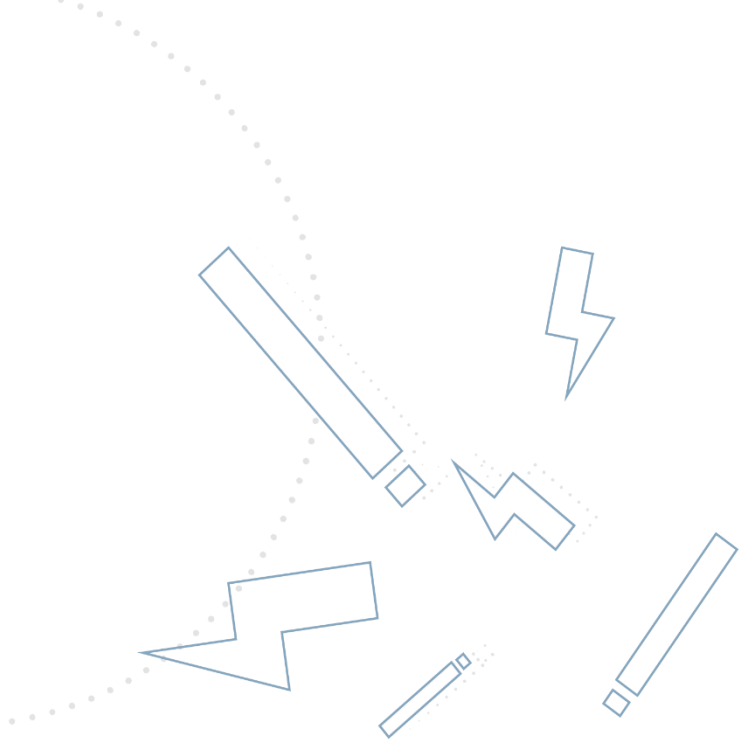
Download on the App Store

GET IT ON Google Play

DEVELOPING STANDARDS FOR ELECTRIC CHARGING INFRASTRUCTURE

Date: **04/03/2024**
Author: **Javier López (UNE)**
Project Manager Transport Means
jlopezr@une.org

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

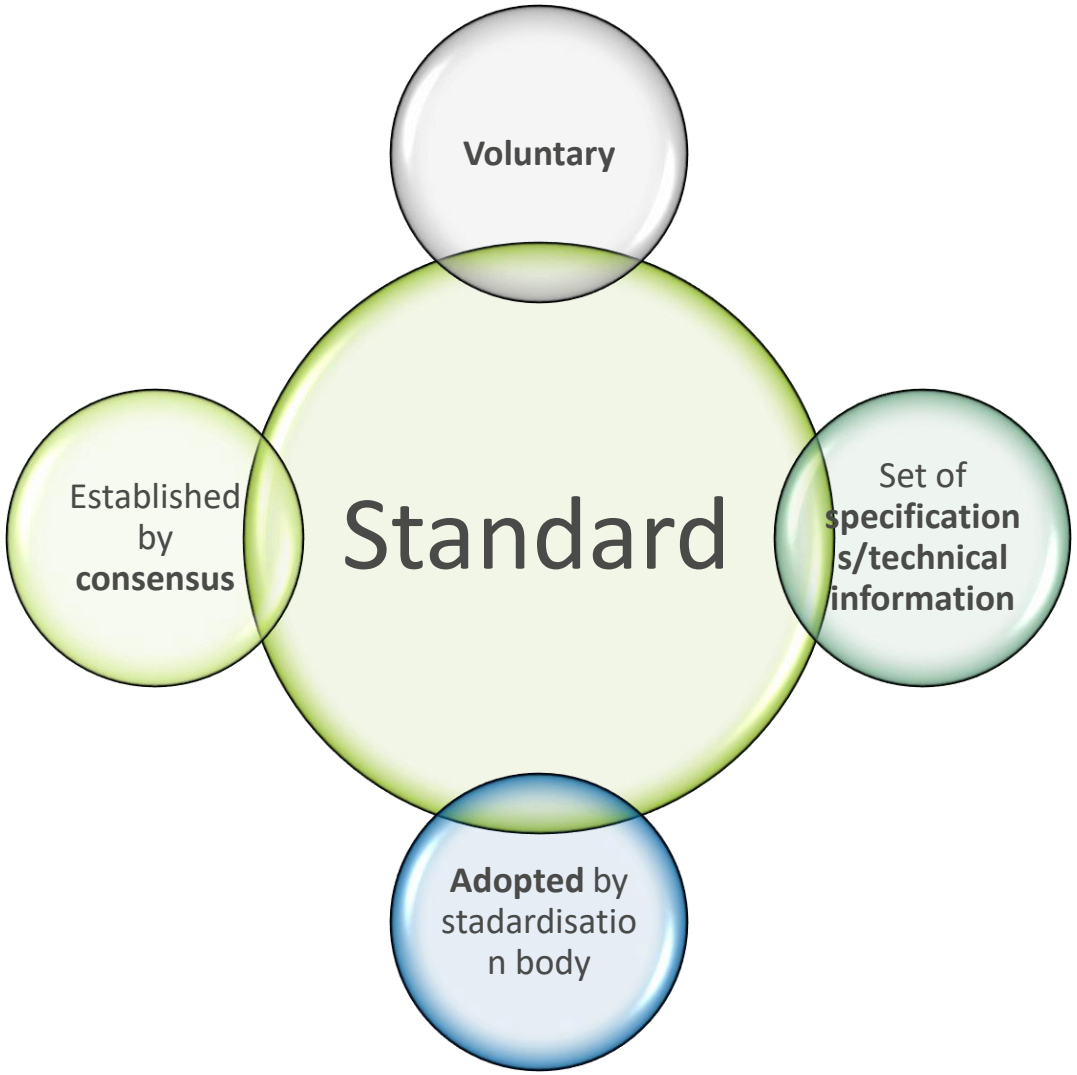


UNE- The Spanish Association for Standardisation

UNE Normalización Española

- Non-profit, private and independent organization
- Spanish official National Standardization Body since 1986
- > 150 responsibilities in different international technical bodies (ISO, IEC, CEN and CENELEC and ETSI)

Standards


Voluntary
Established by consensus
Standard
Set of specifications/technical information
Adopted by stadardisation body

Standards

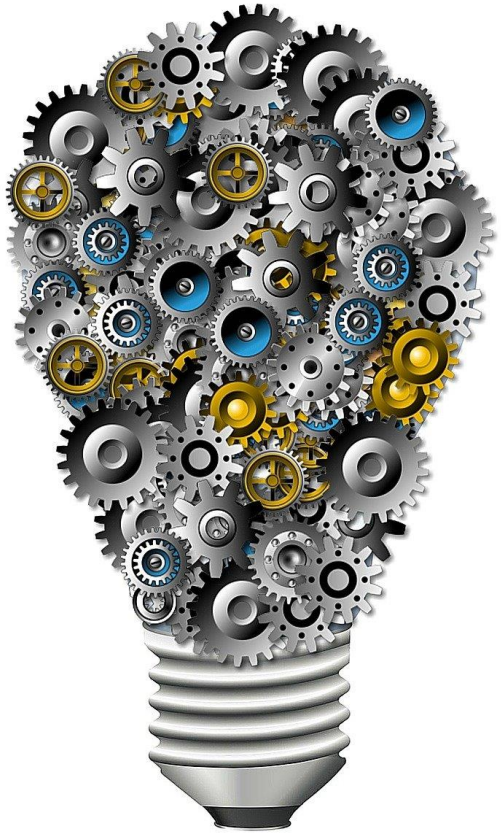
Provide a basis for mutual understanding among individuals, businesses, public authorities and other kinds of organizations

Facilitate communication, commerce, measurement and manufacturing

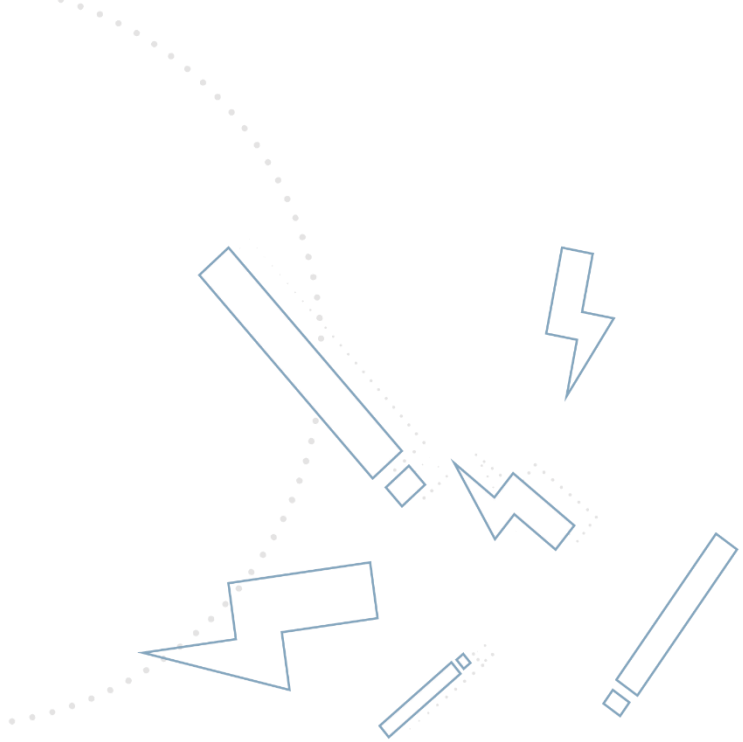
Benefit: reduce costs, enhance performance and improve safety

Ensure the compatibility of different components/products/services

Standardisation in R&I projects



- Tool to boost the project impact
- Ensures compatibility and interoperability
- Provides the distribution and transfer of knowledge
- Facilitates market acceptance of innovations



Standards for electric charging infrastructure

USER-CHI is an industry-powered, city-driven and user-centric project which will boost a large-scale e-mobility market take up in Europe, by means of developing integrated smart solutions, novel business models and new regulatory framework conditions.

Standards for electric charging infrastructure

Strategic objectives	Products
• Design optimisation of charging networks with a user-centric approach • Deployment of an interoperability framework and platform • Scalable infrastructure roll-out by means of smart grid integration • Development of innovative and highly convenient charging systems • Demonstration of novel business and market models • Legal and regulatory recommendations for massive EV deployment	• CLICK- Charging location and holistic planning kit • INCAR – Interoperability, charging and parking platfor • SMAC – Smart Charging tool • INSOC – Integrated solar DC charging for Light Electric Vehicles (LEVs) • INDUCAR – Inductive charging for e-cars • Stations of the future handbook • eMoBest – e-Mobility replication and best practice cluster • INFRA – Interoperability framework

Standards for electric charging infrastructure

CEN-CENELEC WS “Innovative solutions for user centric charging infrastructure for electric vehicles”

CWA 1 “User centric charging infrastructure for electric vehicles – Guidelines for operators to implement advanced smart charging and management strategies“

CWA 2 “User centric charging infrastructure for electric vehicles – Charging stations of the future – Stations models considering users’ expectations“

CWA 1 “User centric charging infrastructure for electric vehicles – Guidelines for operators to implement advanced smart charging and management strategies“

This document provides guidance in terms of **smart charging, interoperability** and **payment** and **accounting processes** among the different actors of the electromobility domain (Charging Point Operators-CPO, eMobility Service Providers-eMSP, micro-CPOs and Smart Charging Service Providers-SCSP), to set up a series of **homogenous strategies and methodologies** that facilitate the implementation of advanced functionalities in the electromobility operator systems.

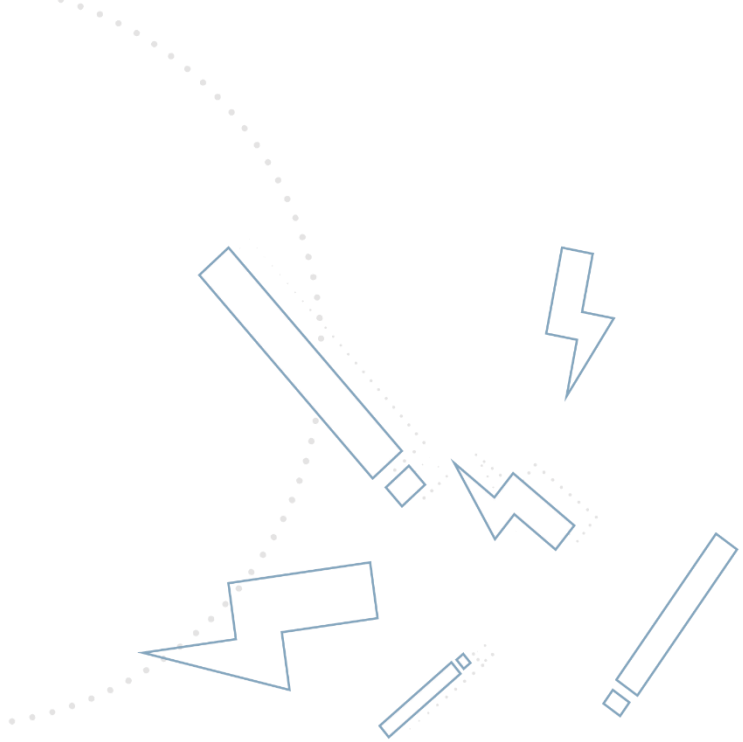
The provided **smart charging strategies** will help the operators to optimize their energy-related costs, enabling a better utilization of renewable energy sources and allowing their participation as active actors in the smart grid management, both as participants of implicit strategies and explicit campaigns.

This document also includes the framework to be followed by the operators in the implementation of the **smart charging as a service** and for the implementation of **automation** of the economic compensations among all involved actors.

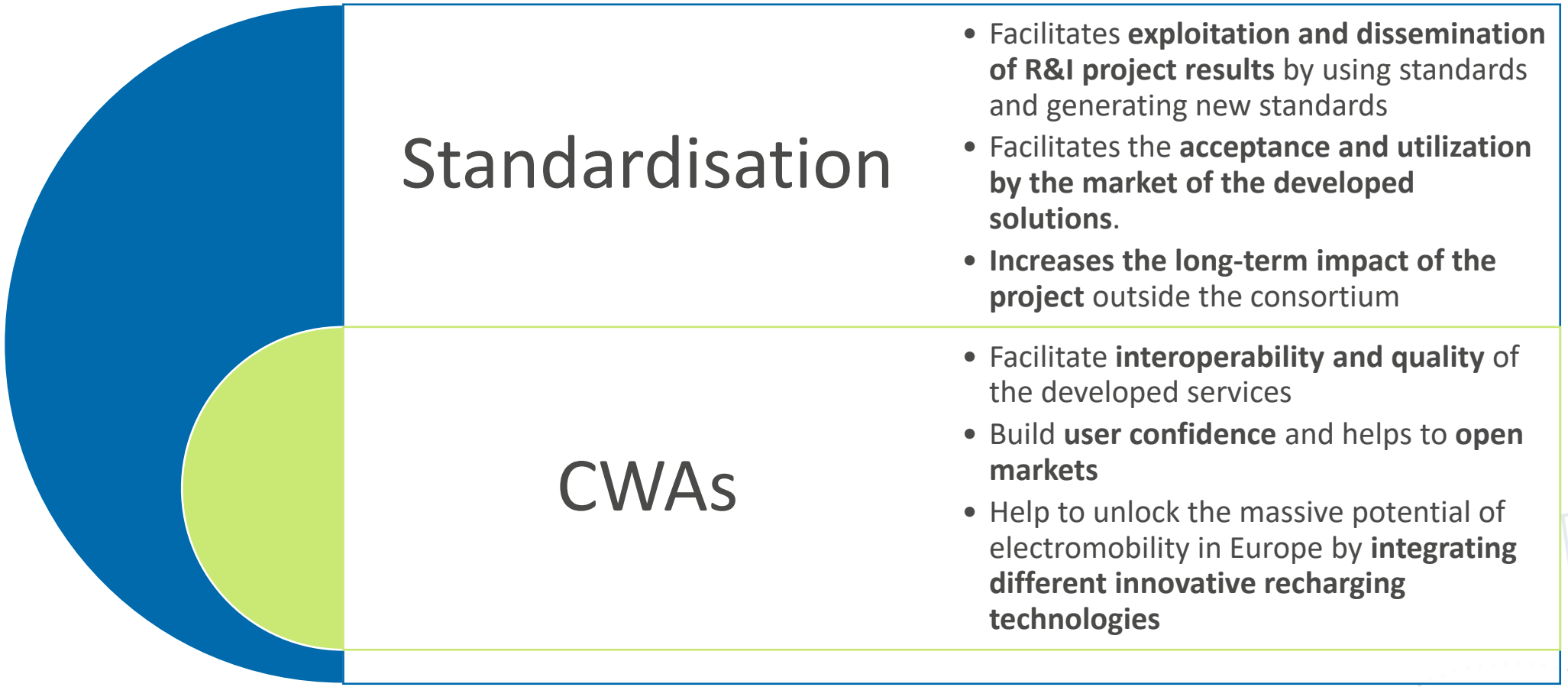
CWA 2 “User centric charging infrastructure for electric vehicles – Charging stations of the future – Stations models considering users’ expectations“

This CWA provides guidelines for the stations of the future to fulfil the needs and expectations of Electric Vehicle (EV) users. This document includes design features for the charging stations that electromobility users demand, and recommendations for its successful deployment.

- Intermodal station
- Urban station
- Highway station
- LEV chargers



Conclusions

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USER-CHI
CHARGING YOUR E-MOBILITY FUTURE

6 OBJECTIVES

1. DESIGN OPTIMISATION OF CHARGING NETWORKS WITH A USER-CENTRIC APPROACH
2. DEPLOYMENT OF AN INTEROPERABILITY FRAMEWORK AND PLATFORM
3. SCALABLE INFRASTRUCTURE ROLL-OUT BY MEANS OF SMART GRID INTEGRATION
4. DEVELOPMENT OF INNOVATIVE AND HIGHLY CONVENIENT CHARGING SYSTEMS
5. DEMONSTRATION OF NOVEL BUSINESS AND MARKET MODELS
6. LEGAL AND REGULATORY RECOMMENDATIONS FOR MASSIVE EV DEPLOYMENT

8 PRODUCTS

Soft

INCAR – Interoperability, charging and parking platform

SMAC – Smart Charging tool

CLICK- Charging location and holistic planning kit

Hard

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

INDUCAR – Inductive charging for e-cars

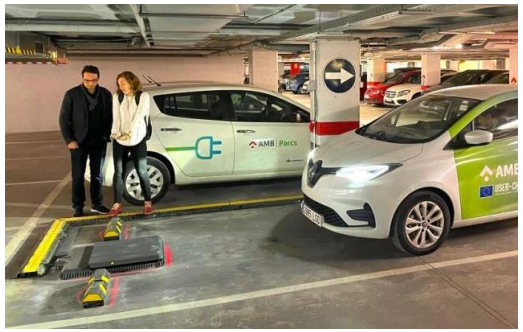
Stations of the future handbook

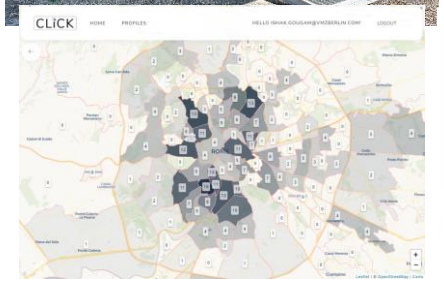
eMoBest – e-Mobility replication and best practice cluster

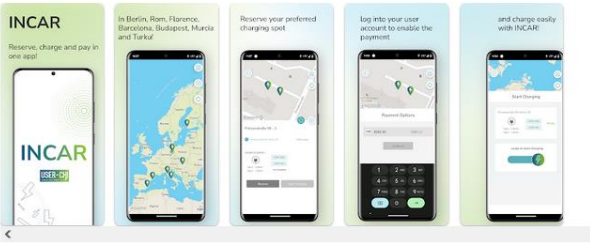
INFRA – Interoperability framework

7 EU CITIES ALONG 2 TEN-T

Barcelona · Budapest · Berlin · Turku · Rome · Murcia · Florence







THANK YOU!

Join us for USER-CHI final event
18 June
Brussels and online

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