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#RTRConference2023

eCharge4Drivers

Electric Vehicle Charging Infrastructure for Improved User Experience

Christina Anagnostopoulou

Project Manager

ICCS

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eCharge4Drivers in a Nutshell

Call identifier: H2020-LC-GV-2018-2019-2020

Topic: GV-10-2017 “Demonstration (pilots) for integration of electrified L-category vehicles in the urban transport system”

EC funding: 14,424,526.39 €

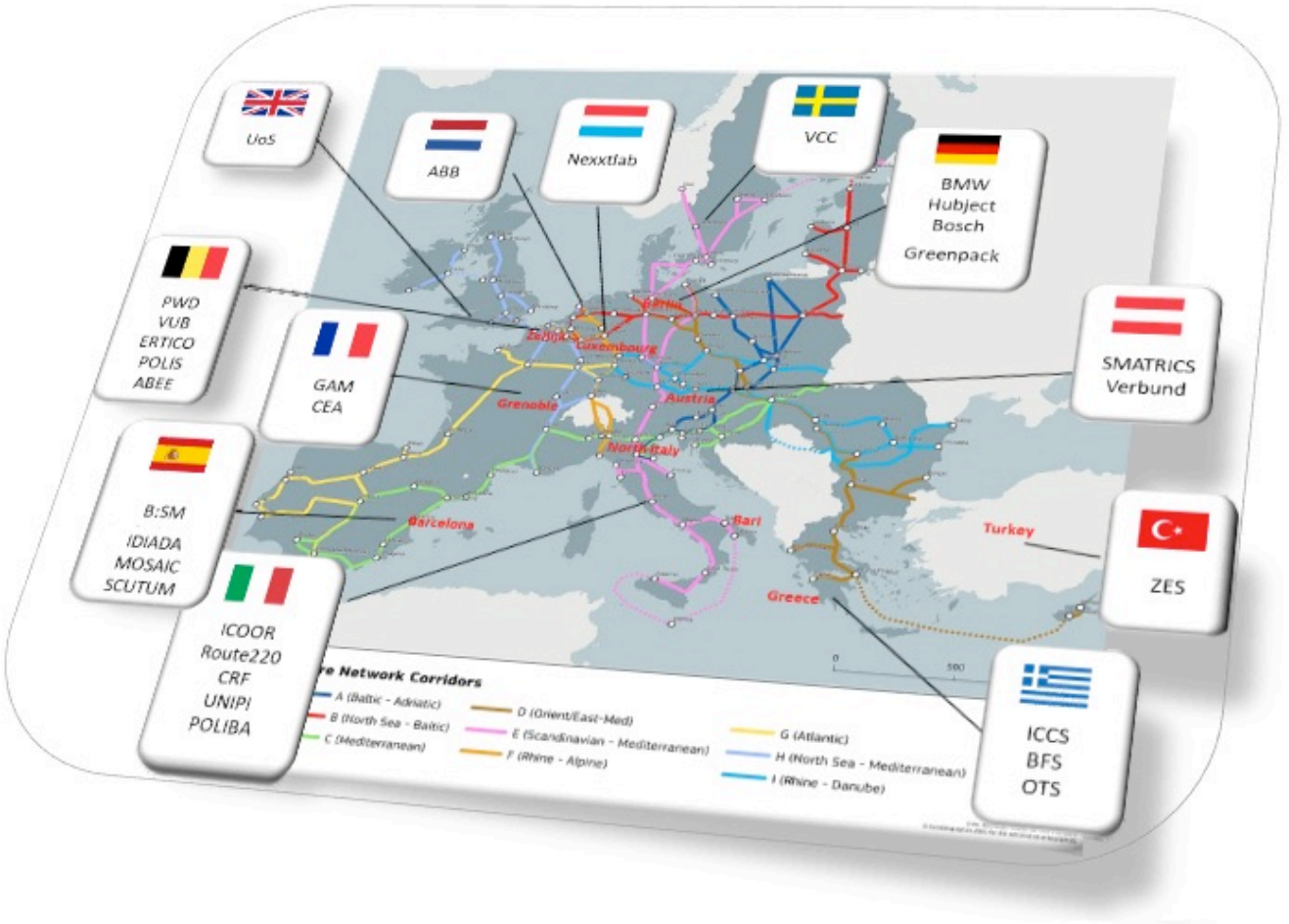
Duration: June 2020 – May 2024

12 countries – 30 Partners – 10 demonstration areas

SCOPE:

eCharge4Drivers aims to **improve the Electric-Vehicle charging experience in urban areas** and on interurban corridors towards promoting e-mobility concept and making it more convenient for users to go green by **developing and designing user-centric and interoperable charging solutions**.

Different e-mobility maturity level



Strategic objectives

O-1: Understand the user needs and collect user requirements so that the project charging solutions and services substantially **improve the user charging experience and acceptance**

O-2: Design, develop and demonstrate **user-friendly and cost-efficient charging stations** for passenger vehicles and LEVs

O-3 Deploy and demonstrate **innovative charging solutions** for on-street residential charging for passenger vehicles (charging points on lamp posts) and **standardised battery swapping stations** for LEVs

O-4: Design and demonstrate **smart charging strategies** and systems serving diverse objectives and unlocking several business opportunities

O-5: Enable and demonstrate **interoperability of end-to-end communication** and provision of **enhanced information to the EV users**, before, during and after a charging session

O-6: **Accelerate the deployment** of charging infrastructure and other charging services in a sustainable and user-centric way (decision support tools, i.e. CP location planning, new tariff schemes/incentives)

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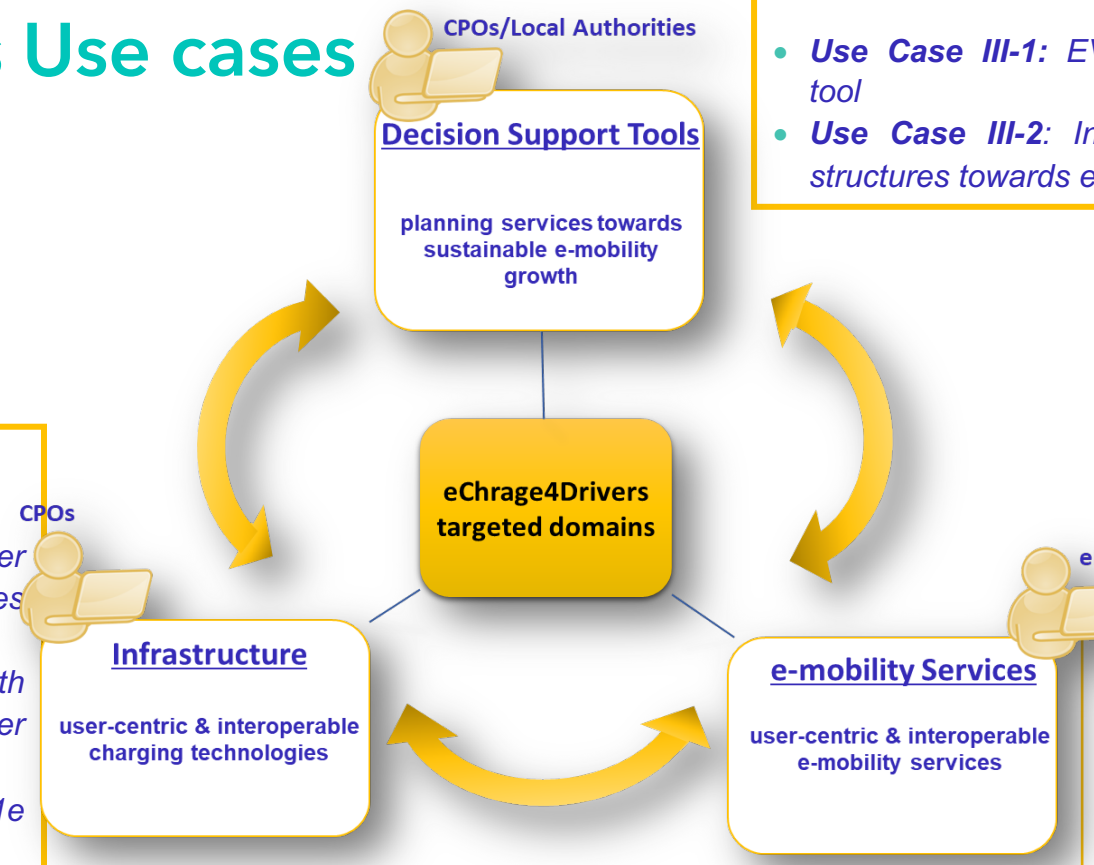
eC4D solutions towards Challenges

- eCharge4Drivers Use cases



Decision Support Tools

- ***Use Case III-1:*** *EV Charging location planning tool*
- ***Use Case III-2****: Incentives schemes and tariff structures towards emobility sustainability*

Infrastructure

- ***Use Case I-1:*** *User-friendly, low and high-power charging stations for passenger & L3e vehicles with enhanced user interfaces*
- ***Use Case I-2:*** *Multi-user master station with multiple DC power charging points for passenger and L1e EVs enabling V2G functionality*
- ***Use Case I-3****: Battery sharing concept for L1e vehicles*

e-Mobility Services

- ***Use case II-1:*** *Advanced charging authentication - ISO15118PnC*
- ***Use case II-2:*** *Enhanced booking service*
- ***Use Case II-3:*** *Advanced routing service*
- ***Use Case II-4:*** *Smart charging suite unlocking new business opportunities*

eCharge4Drivers – Demonstration Activities

Metropolitan areas:
Zellik, Grenoble, Barcelona, Bari, Berlin, Luxembourg

TEN-T corridors
Austria, Greece, Turkey, N. Italy

Infrastructure

Use Case I-1: *User-friendly, low and high-power charging stations for passenger & L3e vehicles with enhanced user interfaces*

Use Case I-2: *Multi-user master station with multiple DC power charging points for passenger and L1e EVs enabling V2G functionality*

Use Case I-3*: Battery sharing concept for L1e vehicles*

e-Mobility Services

Use case II-1: *Advanced charging authentication - ISO15118PnC*

Use case II-2: *Enhanced booking service*

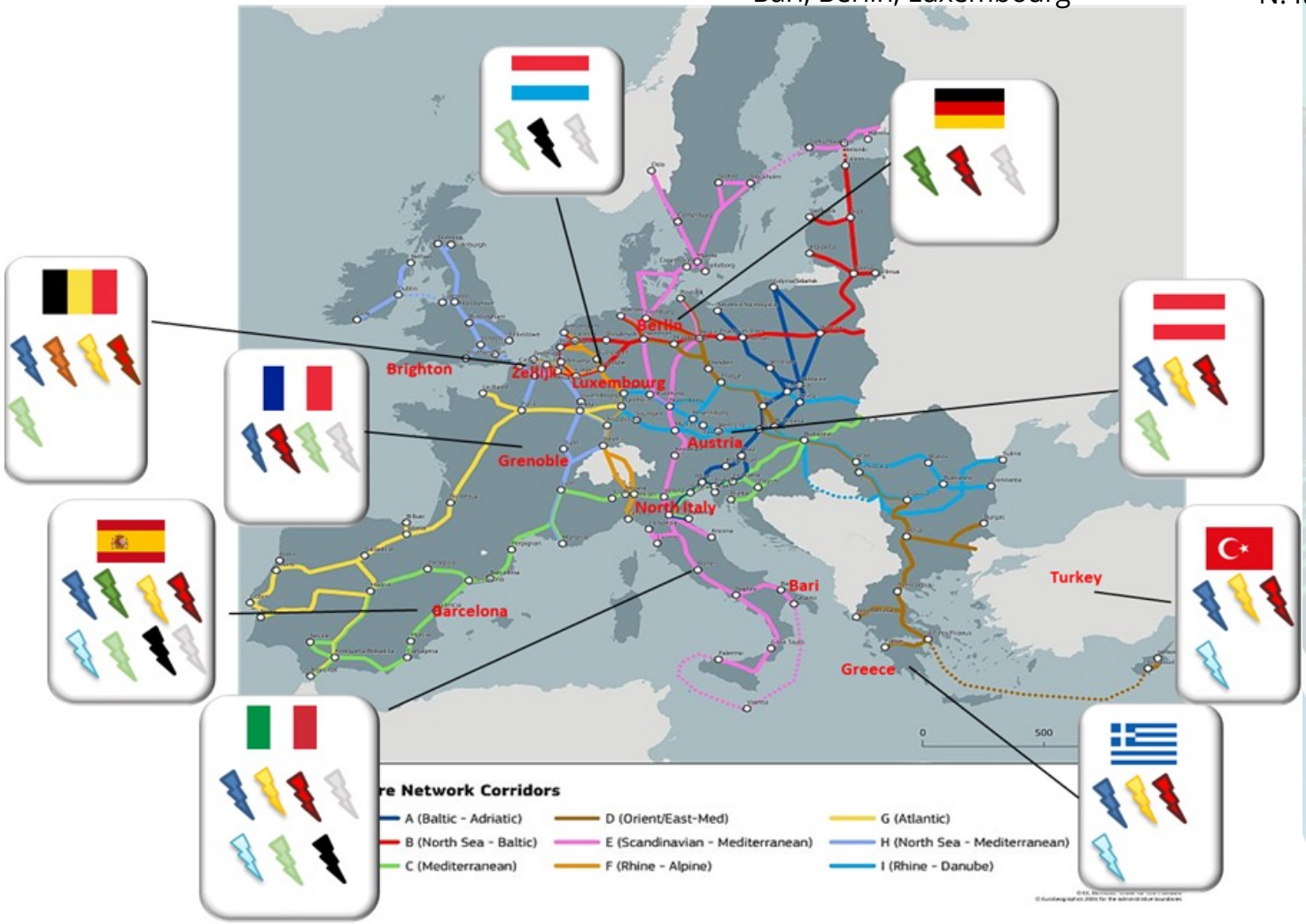
Use Case II-3: *Advanced routing service*

Use Case II-4: *Smart charging suite unlocking new business opportunities*

Decision Support Tools

Use Case III-1: *EV Charging location planning tool*

Use Case III-2*: Incentives schemes and tariff structures towards emobility sustainability*



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Results towards project's objectives

eCharge4Drivers a-priori user survey

- Main reasons for choosing an EV: **environmental friendliness, energy efficiency and low operating and maintenance costs**
- When to charge: **anticipation on the next trip, SOC low threshold & when there is a possibility to charge**
- **Home parking/home charging**: between 73% and 88% of the respondents and parking duration is **approximately 12 hours**
- Duration of charging sessions **45min. – 3h at slow chargers** and **30min. – 1h for fast chargers**.
- Sustainability of investment**: occupancy variation 9% and 32%**
- **User preference** towards **fast charging and smart charging -** willing to pay more for fast charging solutions.
- **Most EV drivers were male**. It is recommended to actively work on strategies to involve women in the e-mobility evolution.

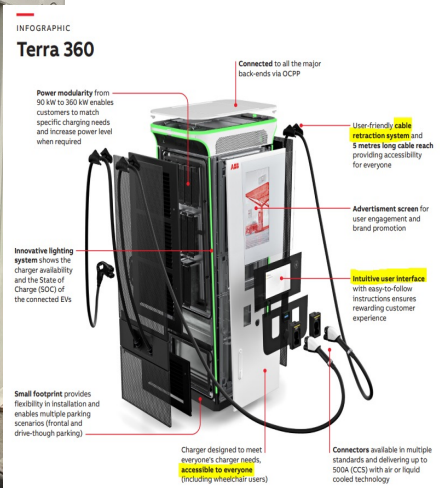
Survey period: 23/11/2020 - 8/032021
4.703 participants, 2.966 eligible respondents

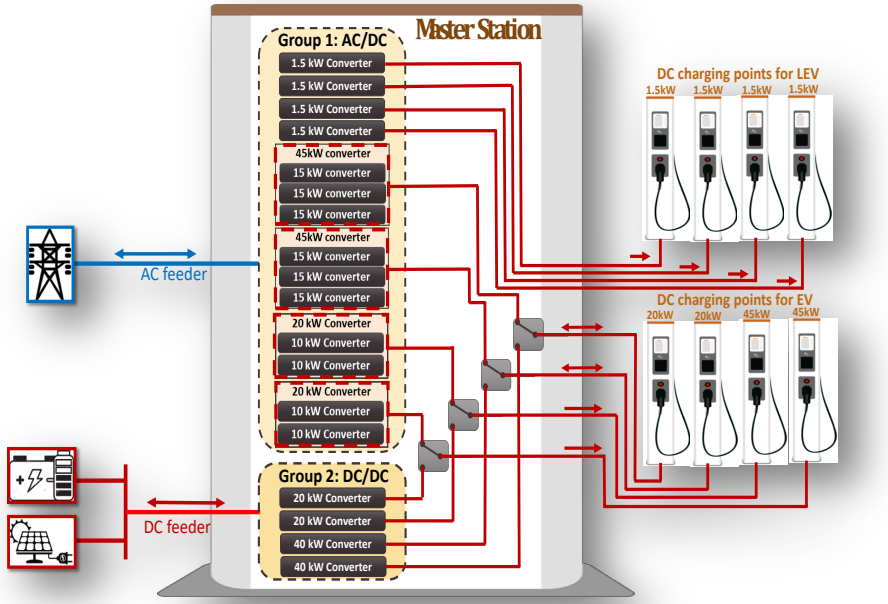
Results towards project's objectives
Infrastructure

- ***Modular DC ultra fast chargers***
  - ✓ *Plug & Charge*
  - ✓ *Transferability, containerisation for urban environment*
  - ✓ *Large touch-displays to display charging related information*
  - ✓ *Reservation of a charge point*

- ***Multi-user DC V2G enabled CS***
  - ✓ *Multi-source - Multi-outlet*
  - ✓ *Plug-n-Charge*
  - ✓ *V2G enabled charging interfaces*

- ***B2C and B2B Battery Swapping Station enabling BaaS business models***

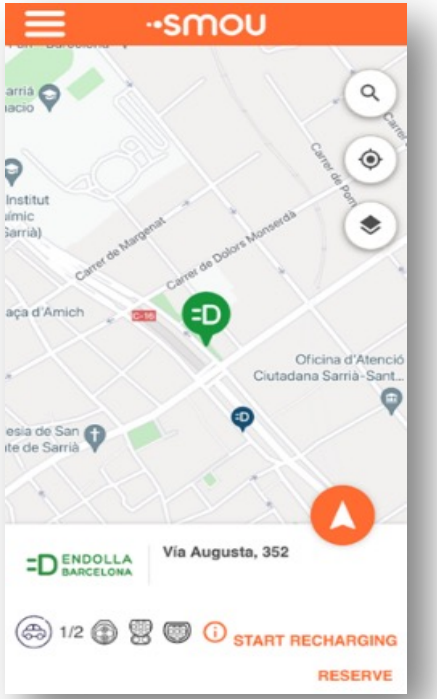




Results towards project's objectives
User-centric & Interoperable Services

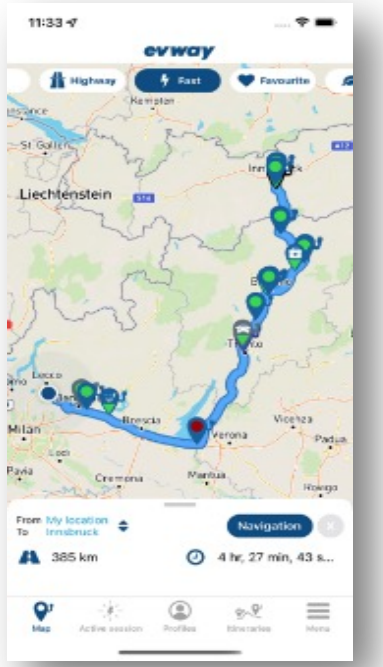
❑ ***Enhanced booking service***

- *Short-term or long-term reservation of a charging station*
- *EVSE occupancy in real-time and prediction*
- *Rewards and Penalties*



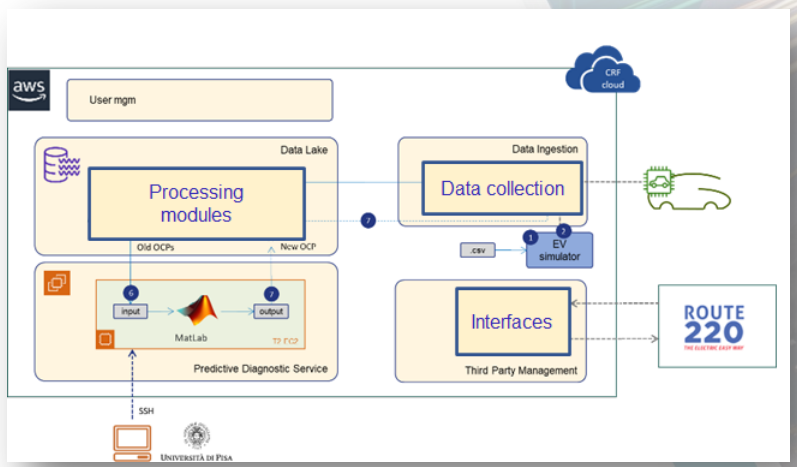
❑ ***Advanced routing service***

- *Multiple routing profiles and capability to be integrated to a navigator*
- *Real-time information on the EVSE occupancy and routing rescheduling*



❑ ***Smart charging suite***

- *Smart charging within Microgrid context*
- *Smart charging towards EV/RES synergy*
- *Smart charging towards cost minimization*
- *Power constrained smart charging*
- *Predictive Diagnostic Service*



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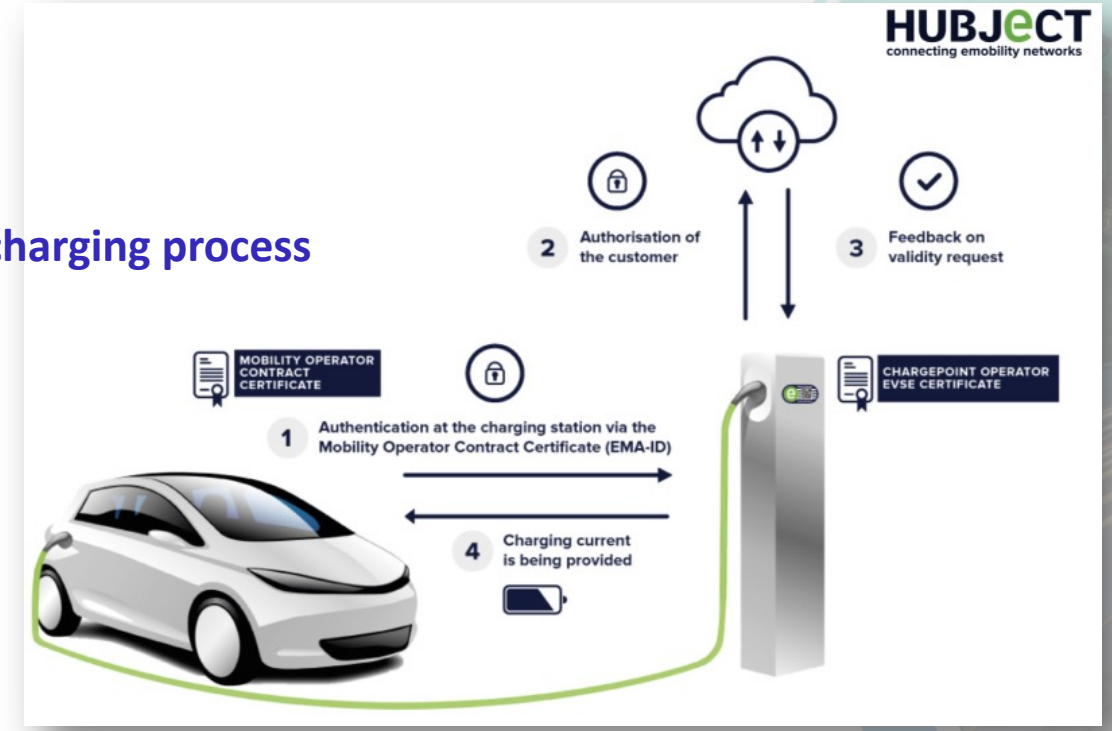
Results towards project's objectives
User-centric & Interoperable Services

- No cards/no mobile apps for authorisation
- Charging your EV with different CPOs seamlessly
- Secure and reliable information exchange throughout the whole charging process
- Enhanced information about the charging session from the EV
- Conformance and interoperability testing emulators
  - ✓ *EV/EVSE PnC ready emulators by IDIADA*
  - ✓ *Online testing facilitates for remote testing of CPO backoffices*
- Deployment
  - ✓ *EV prototypes: BMW & Volvo*
  - ✓ *EVSE prototypes: ABB and Powerdale*
  - ✓ *Open source ISO15118 EV/EVSE interfaces to overcome struggling deployment issues*



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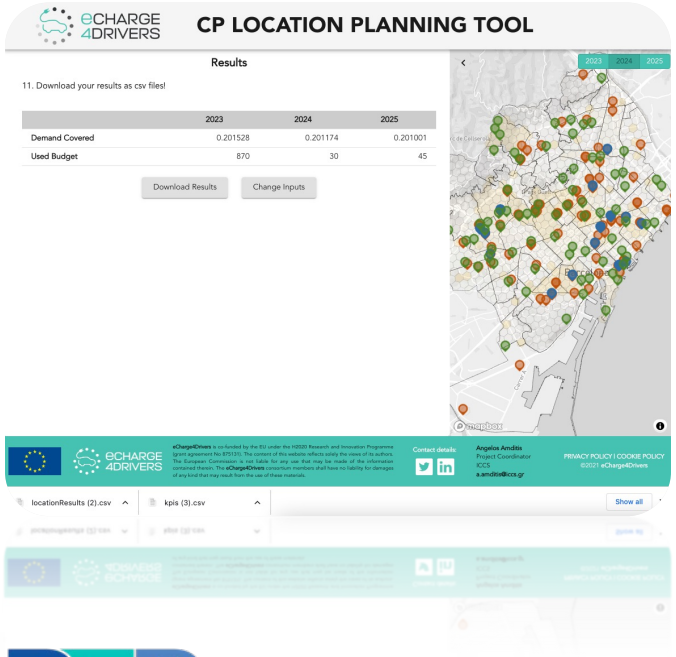
Towards sustainable e-mobility growth

EV Charging location planning tool

- ✓ *EV demand estimation tool*
- ✓ *Location planning algorithm*
- ✓ *Graphical User-interface*



Incentives schemes and tariff structures towards emobility sustainability

\ tariffs depend on…	In… Barcelona	Grenoble	Berlin	Luxembourg	Belgium (Flanders)	Bari	Greece	Turkey
Subscription	√	√			√	√	√	
Type of charger		√	√	√	√	√	√	√
Average power								√
Initial fee							√	
Location of the CP	√						√	
Type of vehicle	√							
Time of the day	√	√						
Cost (€/kWh or €/min)	√	√	√	√	√	√	√	√
Minimum charge	√							
Energy threshold						√		
Time threshold		√						
Connection fee (when EV is fully charged)					√			
Discounts	√							√

https://echarge4drivers.eu/wp-content/uploads/2022/05/eCharge4Drivers_D2.2_Accessibility-requirements-tariff-schemes-and-incentives_final.pdf

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eC4D Expected Impact

Im-1: Wide user acceptance beyond early adopters, urban users and garage parkers

Im-2: Foster investors to invest in charging infrastructure

Im-3: Determine legal gaps which slow down infrastructure expansion and propose solutions

Im-4: Improve interoperability of vehicle-to charger and charger-to infrastructure communication

Im-5: Better grid integration of high-power chargers

im-6: Standardized charging solutions and payment systems for LEVs for price reduction and higher market acceptance in urban environment

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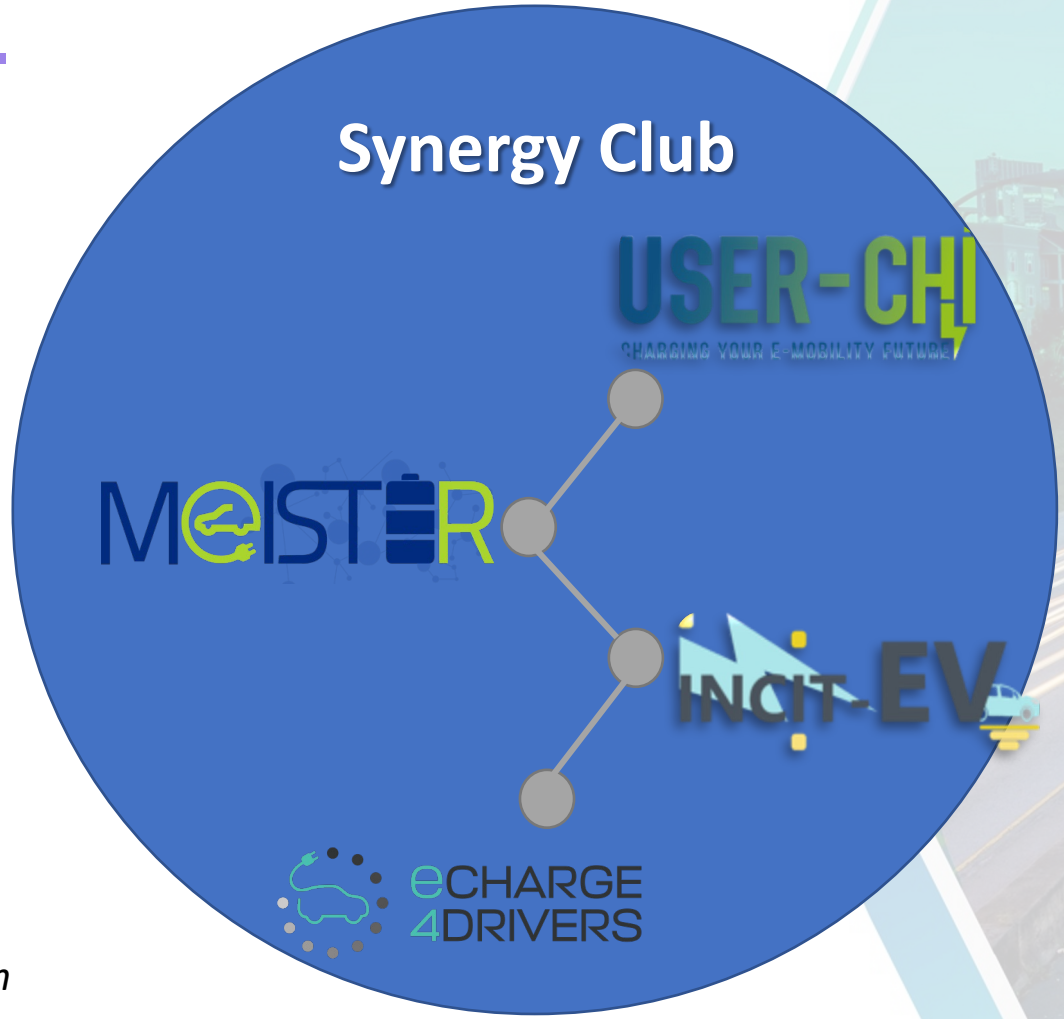
eC4D synergies with EU projects

- ✓ **User charging needs and preferences**
- ✓ **Interoperability**
- ✓ **E-mobility tariff schemes**
- ✓ **E-mobility uptake barriers**
  - **Recommendations/Guidelines to:**
    - *CPOs for technological advances and decision tools for sustainable charging network development*
    - *eMSPs for advanced services and tariff policies to increase their competitiveness by offering advanced quality services*
    - *Local authorities to promote and facilitate the EV uptake with respect to the specificities of their city*



eC4D synergies with EU projects

Joint Dissemination Activities

- Session Presentations
- Webinars
- Exhibition Booths
- Common Publications

past Mobilizing mobility webinar ‘20
ITS World Congress ‘21
CIVITAS Forum 21
PARK4SUMP High level meeting ’22
ITS Europe Congress ‘22,
TRA ‘22
POLIS Conference ’22

future **RTR Conference ‘23**
ITS Europe Congress ‘23
POLIS Conference ‘23

Join Booth (USER-CHI, INCIT-EV & eC4D) at TRA 2022, Lisbon, 14-17 November 2022

Future Activities

- Common publications on user needs and requirements
- Joint Webinar (topic TBD)
- Workshop on validation test

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Thank you for your time!

christina.anagnostopoulou@iccs.gr

@Charge4E

eCharge4Drivers

info@eCharge4Drivers.eu

www.echarge4drivers.eu

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