



The eC4D demonstrations – Deployment challenges and lessons learned

Maria Pia FANTI, Polytechnic University of Bari (Italy)

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The eC4D demonstration goals

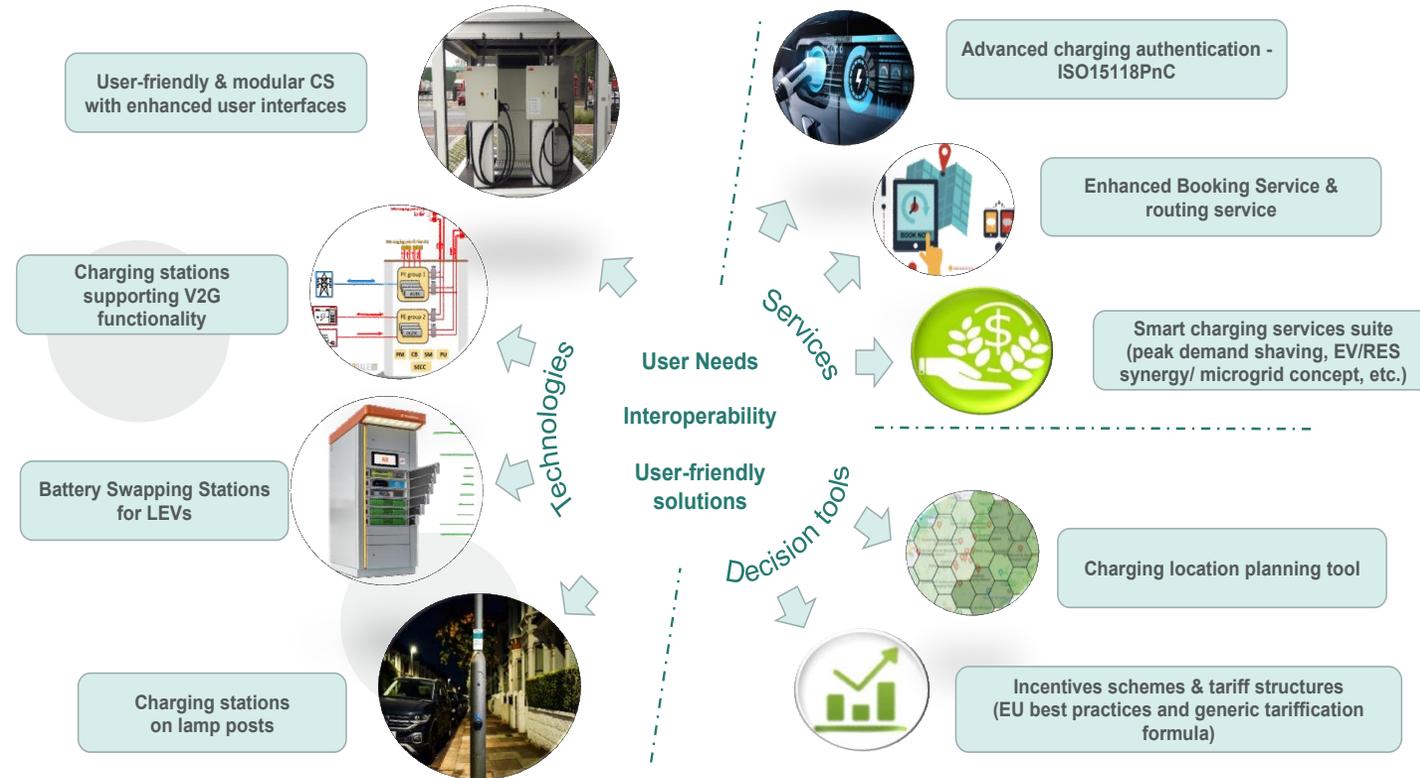


Demo Objectives



- **Demonstrating advanced charging technologies** to serve mobility energy needs of passenger and light EVs
- **Demonstrating user-centric e-mobility charging services** facilitating user's accessibility and exploitability of the charging network
- **Demonstrating tools for planning the charging network** in efficient and sustainable way, **define tariff and incentive policies** towards promoting e-mobility concept.

Demo Solutions



The eC4D demonstration use cases overview



10 use cases

10 demonstration areas/cities

USE CASE ID	USE CASE TO BE DEMONSTRATED	Barcelona	Grenoble	Berlin	Luxembourg	Zellik	Bari	Austria	Northern Italy	Greece	Turkey
UC I-1	User-friendly, low and high-power charging stations for passenger & L3e vehicles with enhanced user interfaces	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
UC I-3	Battery sharing concept for L1e vehicles	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
UC I-4	Charging points on lamp posts	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
UC II-1	Advanced charging authentication - ISO15118PnC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
UC II-2	Enhanced booking service enabling better exploitation of the public charging network	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
UC II-3	Advanced routing service facilitating EV user's accessibility to the public charging network	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
UC II-4	Smart charging suite unlocking new business opportunities	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
UC II-5	Preventive Diagnostic and Charging optimization service	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
UC III-1	EV charging location planning tool	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
UC III-2	Incentives schemes and tariff structures towards e-mobility sustainability	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

UCI-1: User-friendly, low and high-power charging stations for passenger & L3e vehicles with enhanced user interfaces (Austria, Bari, North Italy, Zellik, Turkey)



Use case objectives

- Demonstrate user-friendly charging stations for passenger cars and motorcycles, modular and scalable

Lesson learned

- new charging points installed not able to read the RFID card charging points network
- a new software able to read those cards was installed.



Mobile container with

- 2 AC WB (22 kW)
- 2 DC WB (24 kW)



UCI-3: Battery sharing concept for L1e vehicles (Barcelona, Berlin)



Use case objectives

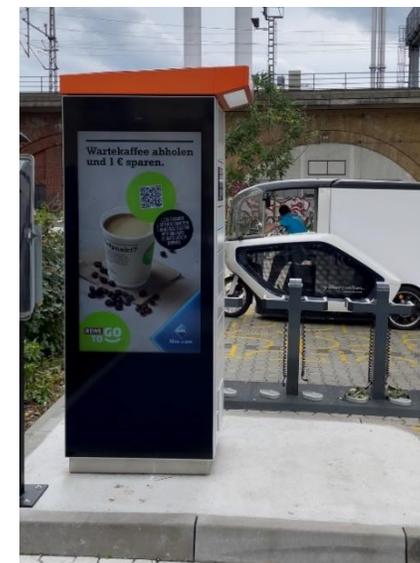
- **Battery swapping stations** for LEVs (L1e)
- Enable Users to take out a full battery and insert the almost empty battery in **less than 2 minutes**

Deployment and operational challenges

- **Location Scouting:** Identifying viable locations to meet accessibility, internet connectivity, and power sources.
- **Location Contract:** Negotiating and finalizing contracts with property owners or local authorities.
- **New ticketing:** Arranging a new ticket for the clients to enter the car park without cost (Barcelona)

Lessons learned

- Restrictive requirements for the installation of battery swapping systems
- Permits to operate



Swapping hubs @ Berlin



UCI-4: Charging points on lamp posts (Grenoble)



Use case objectives

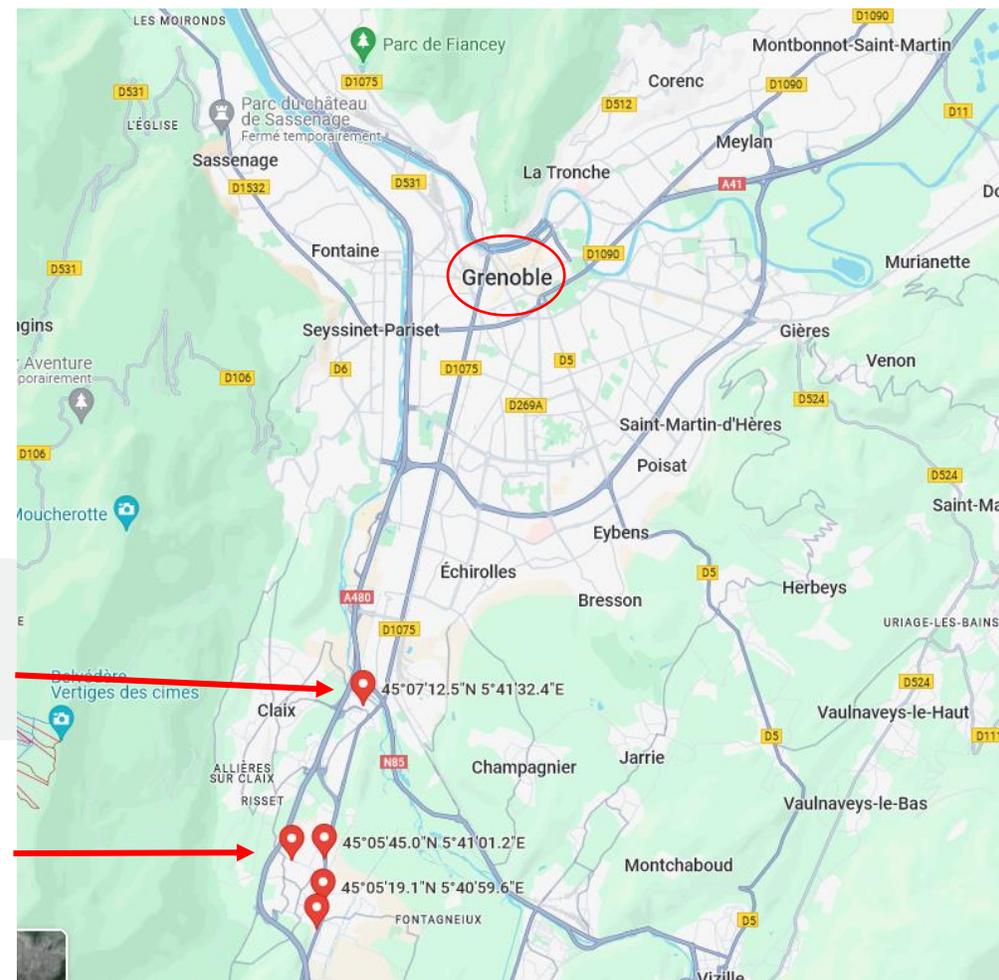
- **System installation and integration** to the supervision of Bouygues Energies & Services (BYES), who acts as the CPO. Grenoble-Alpes Métropole (GAM), provides the lamp posts.
- **6 charging points distributed across five stations** located in the municipalities of Varcès-Allières-et-Risset and Claix

Operational lessons learned

- **Technical difficulty for the charging point** to read the RFID card of GAM charging stations network.

Regulatory lessons learned

- Cities were afraid of paying for electricity consumption
- **Agreement GAM-cities:** GAM ensures the metering of users' consumption



UCII-1: Advanced charging authentication - ISO15118PnC (Austria, Greece, North Italy, Zellik, Turkey)



Use case objectives

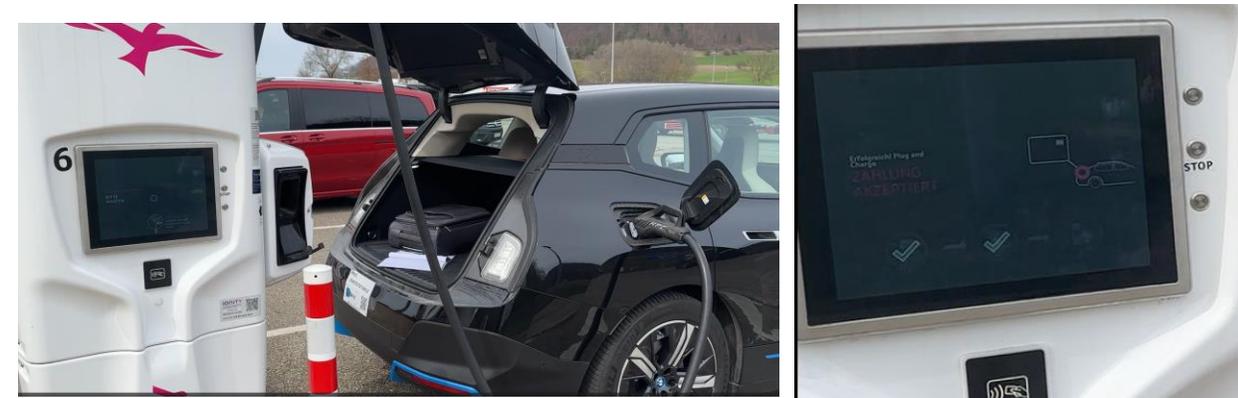
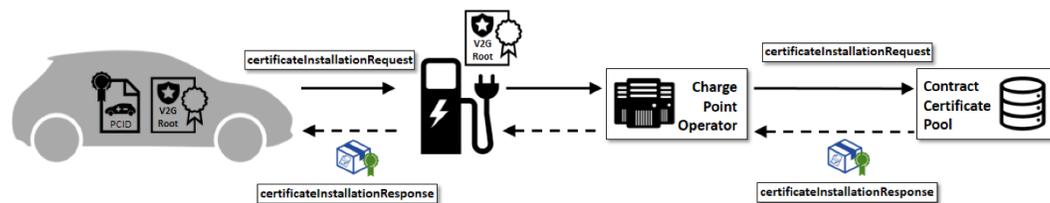
- Demonstrate ISO 15118 Plug & Charge feature as an advanced charging authentication method to provide increased data security and user-convenience

Operational lessons learned

- Necessity to create additional touchpoint with the EV Drivers.
- Lack of public infrastructure PnC enabled and enabled EVs to perform test and demo



Technical test of PnC @ Zellik demo



Cross-country PnC test – Successful session

UCII-2: Enhanced booking service enabling better exploitation of the public charging network (Austria, Barcelona, Bari, Berlin, Greece, Zellik, Turkey)

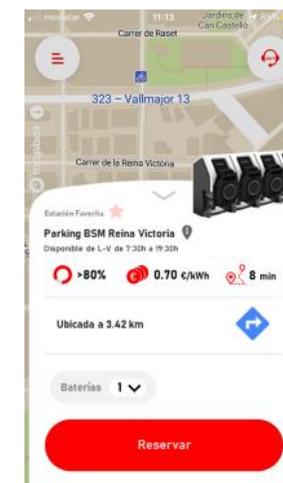
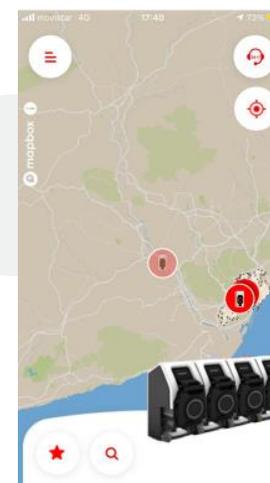
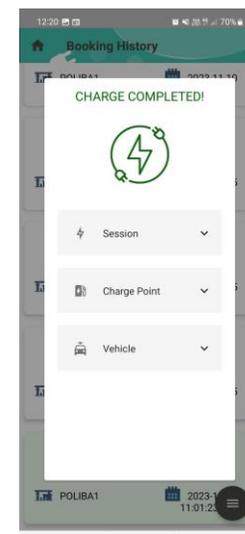
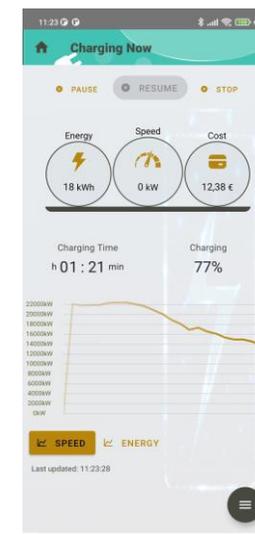
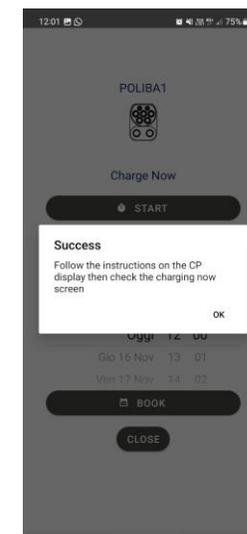
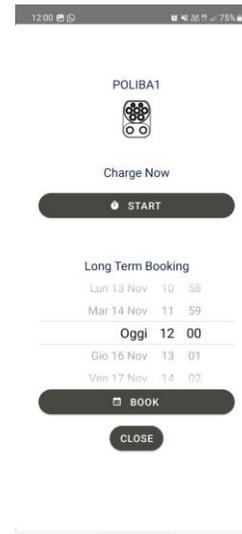


Use case objectives

- Enhanced booking services for conductive charging stations (short / long term reservation)
- Enhanced booking services for battery swapping stations

Deployment and operational lessons learned

- Updating the app service and the backend system to address the blocking of a charging point at the moment of the reservation.
- Ensuring that a reserved CP stays available for the booking user,
- Providing long term booking option: the CPO has to manage a reservation calendar based on the request coming from different users



POLIBA app
For CPs

SCUTUM app
For swapping

UCII-3: Advanced routing service facilitating EV user's accessibility to the public charging network (Barcelona, Bari, Greece, North Italy, Turkey)

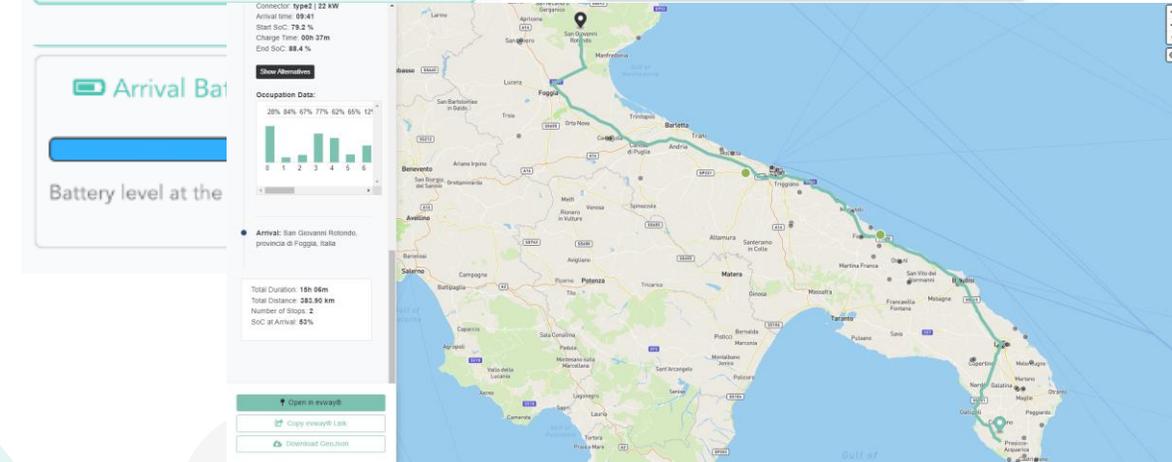


Use case objectives

- Enhanced route planner for long distance trips (web tool)
- Real time route planning via mobile application (app)

Operational lessons learned

- **Operational issues:** the planner failed to find a route under different conditions
- **Necessary connection with the local CPOs** for real time data

This screenshot shows the top portion of the routing application interface. It includes a search bar for the "Start Point", a button to "+ Add Waypoints", a search bar for the "Destination", a dropdown menu for the vehicle type set to "Fiat - 500e", and a "Battery at Start" section with a slider set to 90%. A button for "+ Show Advanced Options" is located at the bottom of this section.This screenshot shows the "Start Time" and "User Trip Preferences" sections of the application. The "Start Time" is set to 11:05. The "User Trip Preferences" section contains three sliders: "Food" (set to a high level), "Nature" (set to a low level), and "Shop" (set to a low level).

UCII-4: Smart charging suite unlocking new business opportunities (Austria, Barcelona, Grenoble, Luxembourg, Zellik)



Use case objectives

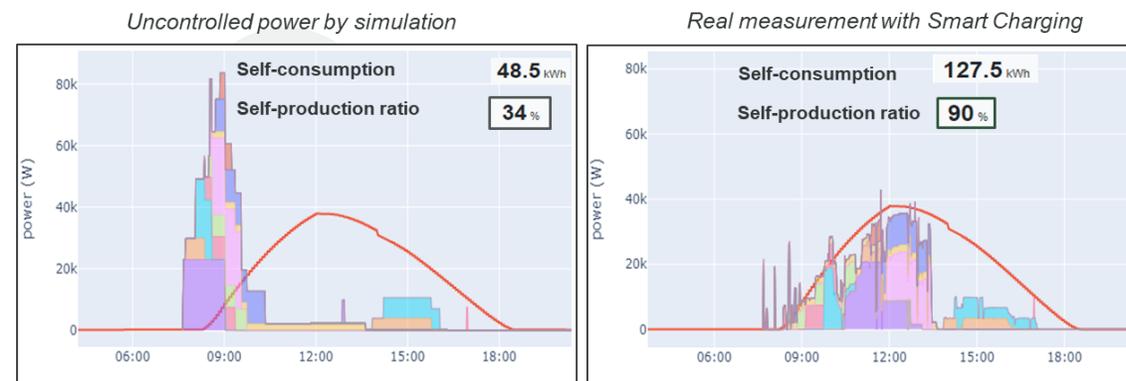
- Smart charging services for exploiting renewable energy, minimizing costs and power balancing.
- Smart charging system schedules and executes an optimized charge session, cars are energy storage tools

Operational lessons learned

- Obtain user's preferences.
- **Software AI based** (machine learning) to estimate the preferences based on history of their charging sessions.
- **Regulation of the battery energy storage system**



EVSE @ CEA for smart charging demonstration

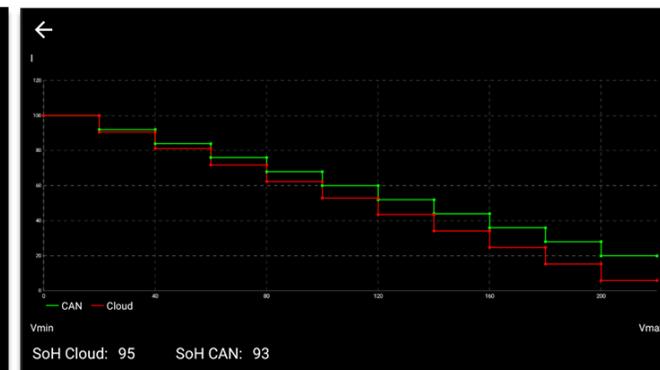
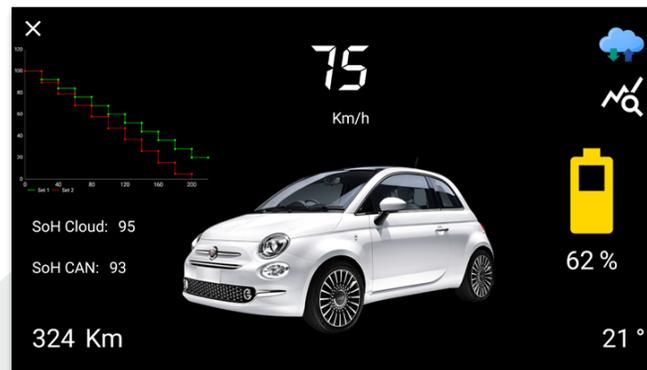


UCII-5: Preventive Diagnostic and Charging optimization service (North Italy)



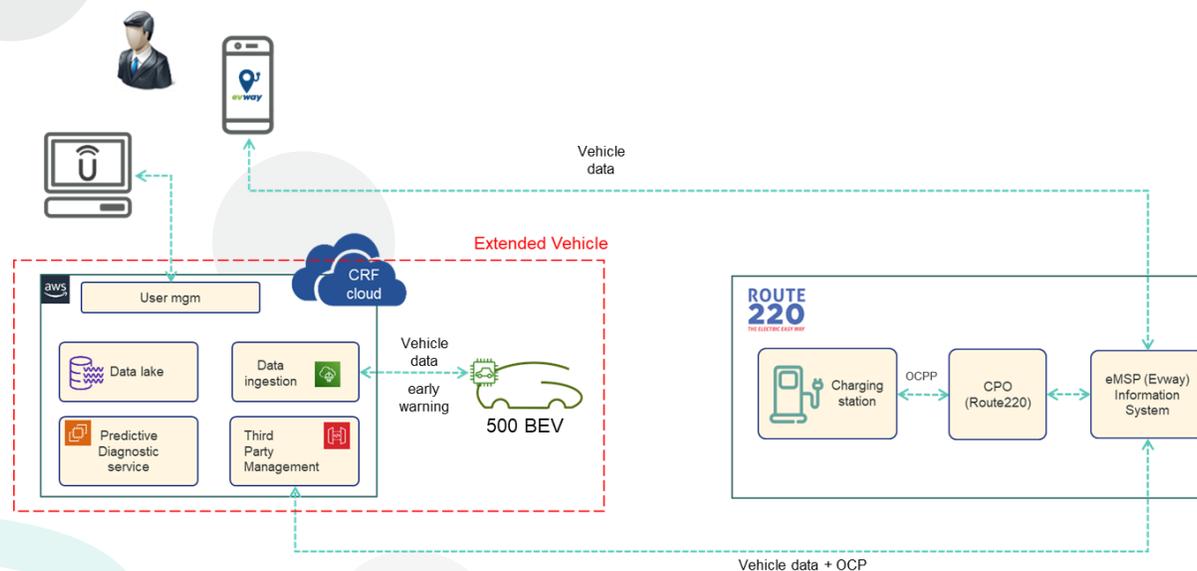
Use case objectives

- Analyse the daily behaviour of the HV batteries of Evs and adapt the charging profile to **extend the lifetime** of the vehicle.
- Provide an **early warning** to the vehicle owner about the **non-recoverable degradation** of the HV batteries.



Operational lessons learned

- The signals and frequency required too high and not usually managed by a commercial vehicle.



UCIII-1: EV charging location planning tool (Barcelona, Luxembourg, North Italy)

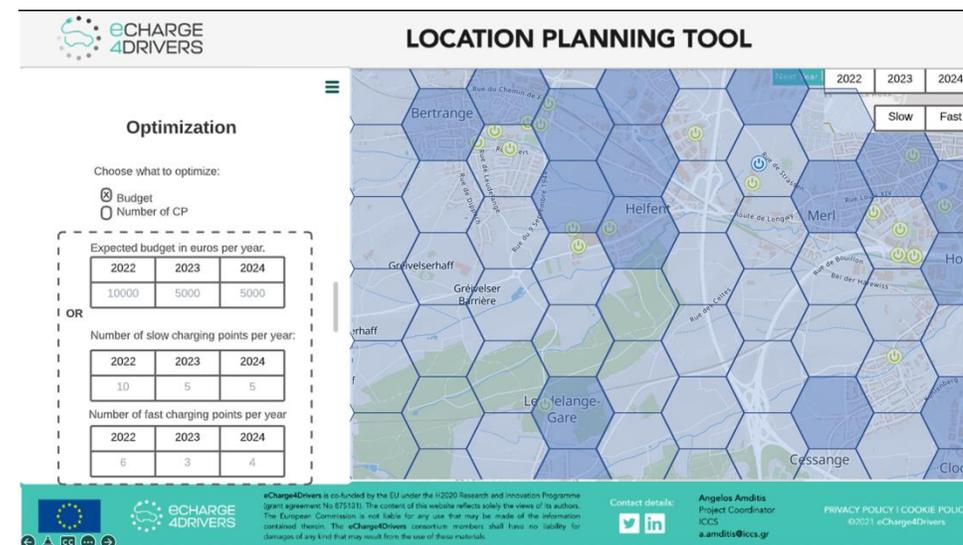


Use case objectives

Location planning algorithm to identify locations that maximize the service coverage of the charging infrastructure or minimize the budget while maintaining a target service coverage.

Lessons learned

Demonstration with the stakeholders: some concerns from the user perspective as regards the adaptability of the tool to different conditions or business needs.



UCIII-2: Incentives schemes and tariff structures towards e-mobility sustainability (Barcelona, Bari, Berlin, Grenoble, Zellik)



Use case objectives

- **New tariff schemes and incentives** to shape the demand and support the use of charging options, services and smart strategies.

Regulatory challenges

- Since BSM is a public company that acts as both CPO and eMSP, it requires a **political approval in any tariff change**.
- Having a political view in the approval of tariffs could lead to a change in the **tariff structure that could differ to the technically approved ones**.

The screenshot shows the website interface for eCHARGE 4DRIVERS. The top navigation bar includes links for HOME, ABOUT US, REGULATION, REWARDS, and CONTACT US. The main banner features a glowing blue electric car and the text "Electric charge 4 Earn" with the tagline "Recharge, collect, redeem!". Below the banner, the "Notifications" section is visible, containing a table of rewards and a search filter on the left.

Description	Points	Date
Gift card Feltrinelli	200	2022-01-08
Gift card Amazon	100	2022-01-08
Booking made	10	2022-01-10

Incentive platform @ Bari - POLIBA

Outcomes and lessons learned



- **New and advanced charging technologies**
- **New tools, approaches and strategies** to facilitate accessibility and exploitability
- **Deployment:** necessity to implement **regulations, selection of locations** of the charging points, necessity of **establishing agreements and contracts with the public authorities and private companies, innovation of the infrastructures, lack of public infrastructure PnC enabled and enabled EVs** to perform test and demo
- **Regulatory:** **citizens objections and requirements, public authority requirements,** necessity of **establishing agreements** between the stakeholders, **restrictive requirements** for the installation of battery swapping systems, **permits to operate**
- **Operational:** evaluation of the preference based on **AI approaches, development of web-based services and APP,** connection between the vehicle battery and the charge infrastructure, provide right and accurate information to users.



@fantimp



<https://www.linkedin.com/in/maria-pia-fanti-5385388/>



mariapia.fanti@poliba.it



www.echarge4drivers.eu



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