USER-CHI

INNOVATIVE SOLUTIONS FOR USER CENTRIC CHARGING INFRASTRUCTURE

Marion Pignel, Project Coordinator, Eurocities

15/04/2024 – Transport Research Arena 2024

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

THE CONTEXT

Currently most EV owners have their own garage and live in peri-urban areas...

The market share of full electric vehicles is still low in many European member states…

Current business models and revenues from charging infrastructure are not enough to ensure a sustained market growth…

Innovative solutions are required to allow EV drivers having a similar mobility experience than with conventional vehicles…

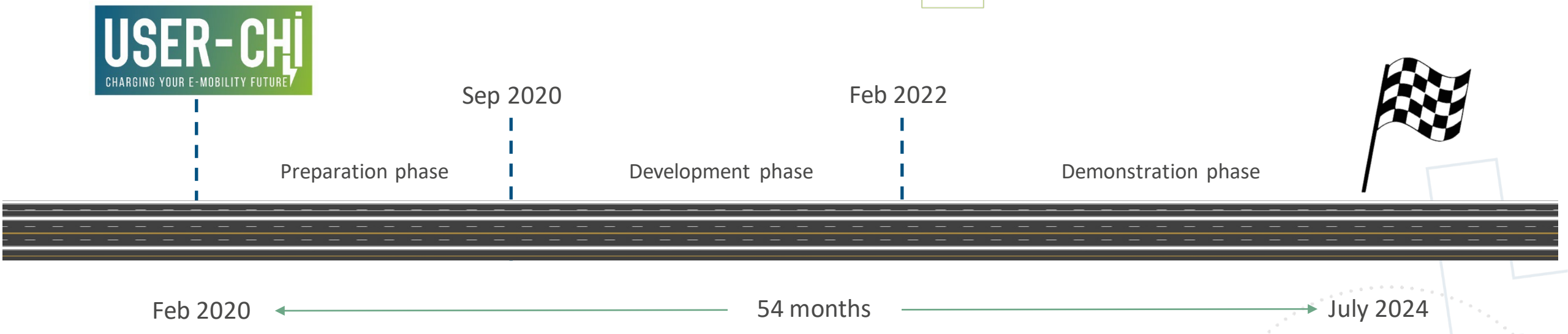
THE CHALLENGE

Support the accelerated deployment of EV charging infrastructure in Europe by ensuring user's acceptance

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
- ✔ Budget: 17M€
- ✔ 24 partners
- ✔ Coordinator: etra I+D



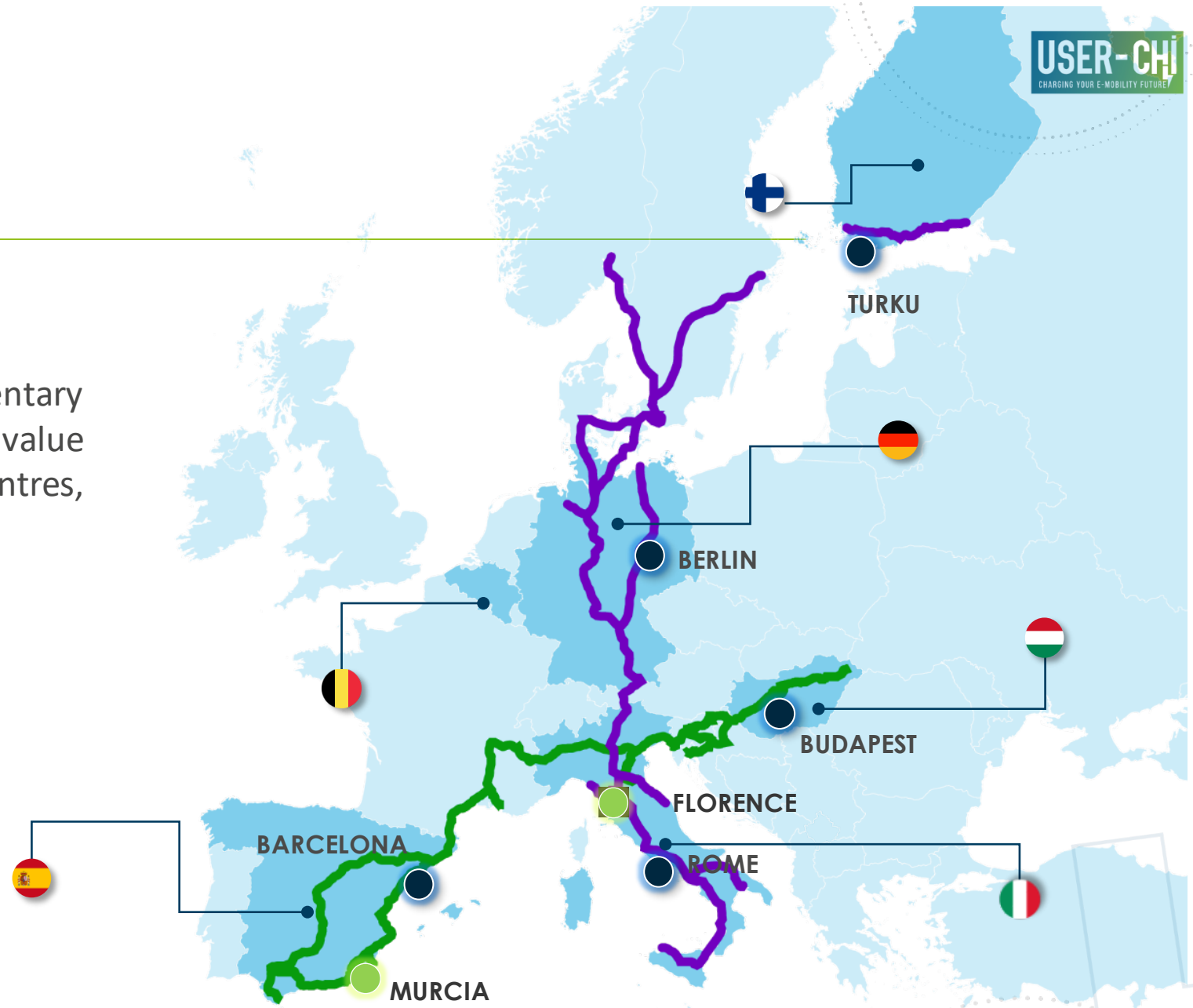
OUR PARTNERS

24 partners from 6 countries

A balanced team of complementary organisations covering the overall value chain of the project: research centres, technology providers and end-users.

5 demo sites + 2 replication cities

- Barcelona
- Berlin
- Budapest
- Rome
- Turku
- Florence
- Murcia



THE USER-CHI PRODUCTS

CLICK- Charging location and holistic planning kit

INCAR – Interoperability, charging and parking platform

SMAC – Smart Charging tool

Software

Stations of the future handbook

eMoBest – e-Mobility replication and best practice cluster

INFRA – Interoperability framework

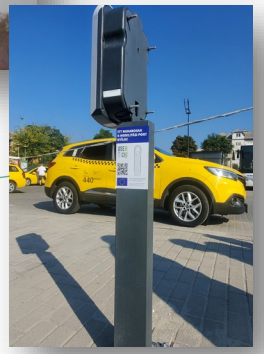
Handbook + transferability cluster + framework…

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

INDUCAR – Inductive charging for e-cars

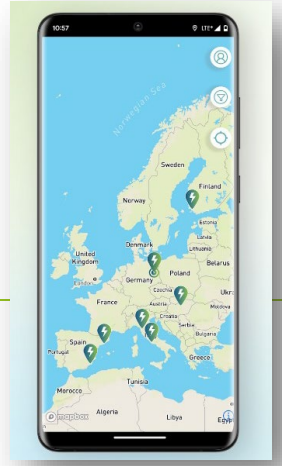
Hardware + soft

DEMONSTRATION SITES



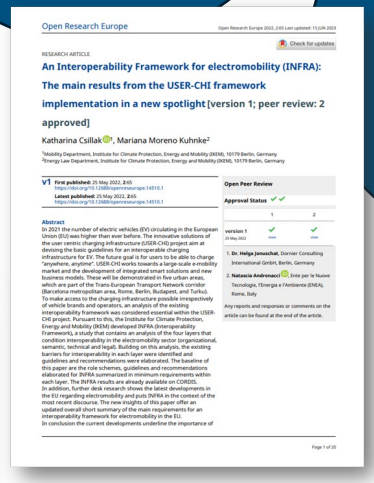
USER-CHI RESULTS

- ✓ Better **interoperability** of the charging infrastructure and charging services across the TEN-T network
- ✓ Increased **user-friendliness** and **user-acceptance** of EVs across Europe
- ✓ Guidelines for designing **user-friendly, optimised and future-proof** charging stations
- ✓ **Sustainable business models**
- ✓ Contribution to **standardisation** (2 documents to be published)



600 users for INCAR app across Europe

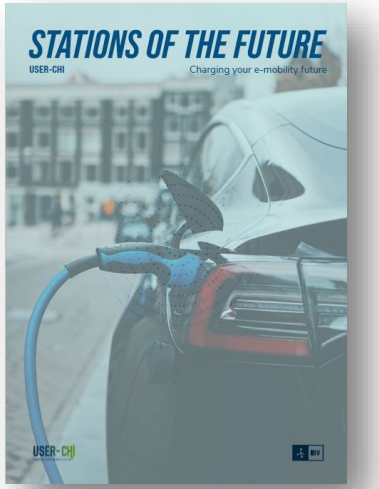
XXX chargers available on INCAR app


Open Research Europe

RESEARCH ARTICLE

An Interoperability Framework for electromobility (INFRA): The main results from the USER-CHI framework implementation in a new spotlight [version 1; peer review: 2 approved]

Katharina Csillak, Mariana Moreno Kuhnke




CEN-CENELEC Workshop on 'Innovative solutions for user centric charging infrastructure for electric vehicles'

USER-CHI RESULTS (2)

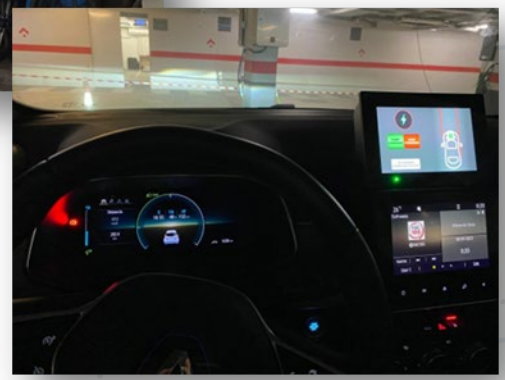
INSOC demonstrated in Barcelona, Murcia, Turku, Florence & Rome

XXX users

- ✓ Innovative **charging and parking solutions** for **Light Electric Vehicles**
- ✓ **RES integration** into EV charging system

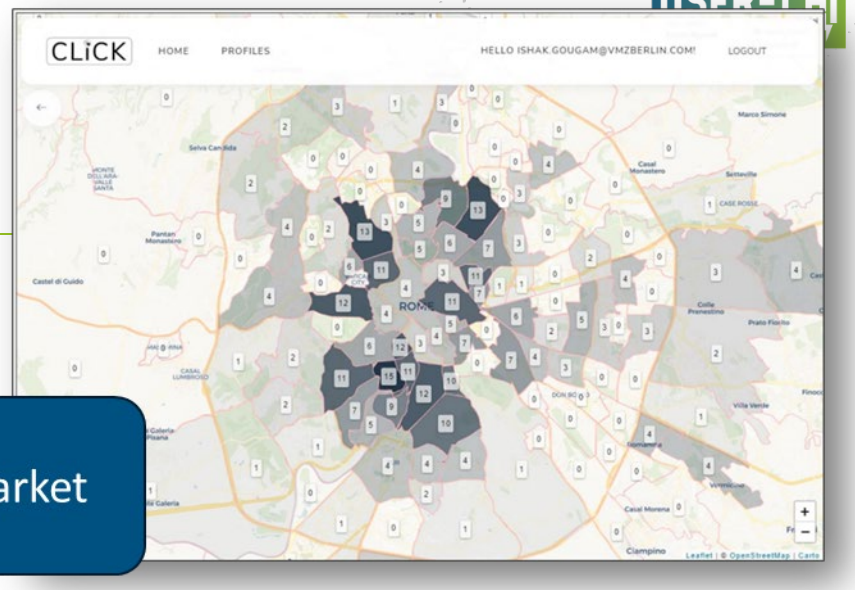
Uses cases in Turku harbor and new residential buildings

- ✓ Demonstration of **inductive charging** and **retrofitting** as a solution for corporate fleet (reduce the use of space, easy parking, no cable manipulation)



USER-CHI RESULTS (3)

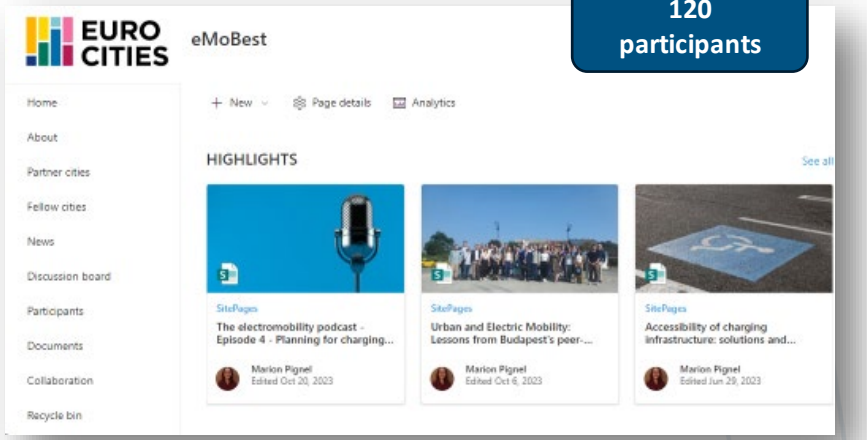
- ✓ Better **planning** and **location** of public charging infrastructure



Ready-to-market

- ✓ Multistakeholders cooperation framework & public-private partnerships schemes (local public authorities, CPOs, EMSP)

120 participants



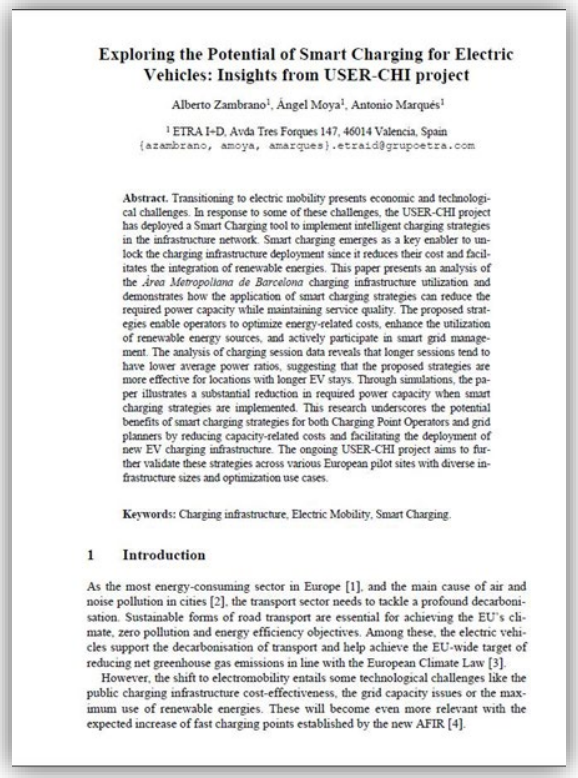
- ✓ Knowledge-exchange and best practices including on **procurements of charging infrastructure** and **electromobility strategies**

5 peer learning visits
11 follower cities

COLLABORATION WITH SIMILAR PROJECTS

- ✓ USER-CHI project is part of the **Synergy Club**, regrouping 6 similar EU-funded projects
- ✓ Regular exchanges (twice a year)
- ✓ Knowledge exchange, common recommendations, technical collaboration and joint dissemination

USER-CHI AT TRA 2024



Exploring the Potential of Smart Charging for Electric Vehicles: Insights from USER-CHI project

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Abstract. Transitioning to electric mobility presents economic and technological challenges. In response to some of these challenges, the USER-CHI project has deployed a Smart Charging tool to implement intelligent charging strategies in the infrastructure network. Smart charging emerges as a key enabler to unlock the charging infrastructure deployment since it reduces their cost and facilitates the integration of renewable energies. This paper presents an analysis of the *Àrea Metropolitana de Barcelona* charging infrastructure utilization and demonstrates how the application of smart charging strategies can reduce the required power capacity while maintaining service quality. The proposed strategies enable operators to optimize energy-related costs, enhance the utilization of renewable energy sources, and actively participate in smart grid management. The analysis of charging session data reveals that longer sessions tend to have lower average power ratios, suggesting that the proposed strategies are more effective for locations with longer EV stays. Through simulations, the paper illustrates a substantial reduction in required power capacity when smart charging strategies are implemented. This research underscores the potential benefits of smart charging strategies for both Charging Point Operators and grid planners by reducing capacity-related costs and facilitating the deployment of new EV charging infrastructure. The ongoing USER-CHI project aims to further validate these strategies across various European pilot sites with diverse infrastructure sizes and optimization use cases.

Keywords: Charging infrastructure, Electric Mobility, Smart Charging.

1 Introduction

As the most energy-consuming sector in Europe [1], and the main cause of air and noise pollution in cities [2], the transport sector needs to tackle a profound decarbonisation. Sustainable forms of road transport are essential for achieving the EU's climate, zero pollution and energy efficiency objectives. Among these, the electric vehicles support the decarbonisation of transport and help achieve the EU-wide target of reducing net greenhouse gas emissions in line with the European Climate Law [3].

However, the shift to electromobility entails some technological challenges like the public charging infrastructure cost-effectiveness, the grid capacity issues or the maximum use of renewable energies. These will become even more relevant with the expected increase of fast charging points established by the new AFIR [4].

Stations of the Future: a study on EV charging stations considering users' requirements and expectations

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Abstract. One of the products included in *USER-CHI* project is the definition of the charging stations that not only EVs and LEVs require, but also fulfil the needs and expectations of the end users. A qualitative and quantitative user research following the user experience principles have been performed, achieving a deep knowledge of EV drivers' charging preferences and patterns in order to increase their acceptance. As a result of this research, we have identified basic requirements, increasing value and desirable features that are related to the charging process of an EV, that should be included in a charging station aimed to achieve end users' expectations. Taking these features, we have defined four different concepts of stations of the future, namely: *Intermodal Station*, *Highway Station*, *LEV Charger* and *Urban Station*. Concepts are presented in a handbook, following a composition that includes: a colored realistic sketch of the concept, a presentation of its main features organized in three topics (*Technologies-Services-Location*), and business models related to the concept. These business models were generated with the five demo-cities that are part of the *USER-CHI* consortium. The business model related to each concept, is a combination of the seven business models defined with the cities -*Logistics Hubs*, *Citizen e-mobility Station*, *City Centre (Park&Charge)*, *e-Trucks*, *e-Taxi Stops*, *Special Events*, *Mobile Charging Stations*. The most relevant features of the resultant business model related to each conceptual station are presented in a new reduced format, including four topics: *The Value*, *The Business*, *The Market* and *The Flow*.

Keywords: user research; EV; LEV; charging station; business model; USER-CHI project.

1 Introduction

As the most energy-consuming sector in Europe [1], and the largest cause of air pollution in cities [2], the transport sector needs to tackle a profound decarbonisation revolution. Disruptive technologies and business models are also deeply transforming the way European citizens understand mobility [3]. Citizens' rising environmental awareness and new mobility habits present a unique opportunity for the large-scale implementation of electric vehicles (EVs). European Union (EU) has made a commitment to

Poster 6.4 Zero Emissions Transport - 18/04/2024 – 9:45 – 11:00

Poster 4.4 Urban, Regional & Rural Transport

Tracks **Technical & Poster Sessions**

Wednesday, April 17, 2024
9:45 AM - 11:00 AM

Speaker

Ms Thais Rangel Associate Professor Universidad Politécnica De Madrid	Exploring the Dynamics of Ride-Hailing Fares in Madrid: A Machine Learning Approach
Mr Toni Lusikka Senior Scientist VTT Technical Research Centre Of Finland Ltd.	Decarbonizing Urban Mobility Through Data-driven Services: How to Achieve Modal Shift?
Mrs Stella Aaltonen Project Manager City Of Turku	Soft Measures Speeding up the Change – Showcases from the City of Turku, Finland

Poster 1.2 People-centred & Inclusive Mobility

Tracks **Technical & Poster Sessions**

Monday, April 15, 2024
2:00 PM - 3:15 PM

Speaker

Dr Andreas Nikiforiadis Research Associate Centre For Research And Technology Hellas - Hellenic Institute Of Transport	Incorporating Individual Preferences in Multimodal Trip Planning
Miss Oona Uusitalo Project Coordinator City of Turku	Art Competition as a Creative and Participatory Tool for Promotion of Sustainable Mobility
Mr Divy Ravikiran Gupte Research Associate Institute For Climate Protection, Energy And Mobility	"Please hang in there!": User Acceptance as a Key Element for a Successful Charging Infrastructure

THANK YOU!

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