Accessibility of electric charging infrastructure: state of the art, best practices and future solutions

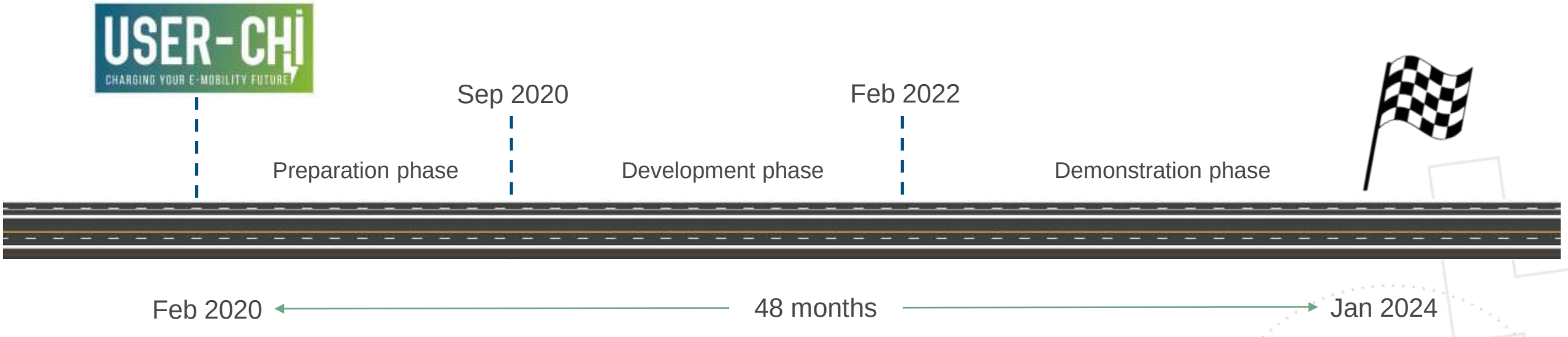
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No [875187]

USER-CHI webinar – 20 JUNE 2023
9:30 – 11:00

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
- 24 partners
- Coordinator: etra I+D



The Objective

CONVENIENT FOR ALL USERS, INCLUDING PEOPLE WITH DISABILITIES

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

AGENDA

Introduction – Setting the scene by Marion Pignel, Eurocities

The Sustainable Transport Forum sub-group on accessibility and results of the recent survey by Aleksandra Klenke, DG MOVE

Presenting the CEAPAT report “Accessibility criteria for electric vehicle charging points or charging stations” by Angel Moya, ETRA

‘Guidelines for barrier-free charging infrastructure’ by Sebastian Lahmann, NOW GmbH

Roundtable discussion and Q&A

The Sustainable Transport Forum/Sub-group on Public Authorities – Task force on accessibility of recharging infrastructure

Aleksandra Klenke
Policy Officer
European Commission - DG MOVE

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Sustainable Transport Forum (STF) established in 2015

Role of STF

The STF was set up to assist the Commission in implementing the Union's activities and programmes aimed at fostering the deployment of alternative fuels infrastructure to contribute to the European Union energy and climate goals. The STF serves as a platform for structural dialogue, exchange of technical knowledge, cooperation and coordination between Union Member States and relevant public and private stakeholders.

Membership re-establishment

Following 2 calls for application, the STF plenary organization-membership (Type C) has been re-established on 7 February 2023.

All but one are EU representations/associations; good representation of all relevant alternative fuels, all transport modes and civil society.

Membership set-up remains unaltered: maximum 60 members (Type C) and all EU Member States authorities (Type D) are automatically members. Additionally, other public entities (Type E).

https://transport.ec.europa.eu/news-events/news/sustainable-transport-forum-new-membership-appointments-2023-03-07_en

Sub-group on Governance & Standards

State of play

Activity 1:

Mapping of the current discussion concerning standards and protocols for communication exchange in the electromobility ecosystem.

- Report approved in 2022 by the STF Sub-group.

- https://op.europa.eu/en/publication-detail/-/publication/a8cd2c4b-54dc-11ed-92ed-01aa75ed71a1/language-en

Activity 2:

Development of a governance structure and implementation strategy for the operation of a PKI in the EU.

- Work to be finalized in June 2023.
- Report with recommendations from members of the STF Sub-group – final draft.
- Commission Support Study to evaluate and support how to address this topic in legislation (i.e., Commission Implementing Act under AFIR).

Sub-group on Data
State of play

Activity 1:

Characterisation of the different data dimensions required to enable the future creation of digital services in the alternative fuels market.

- Work to be finalized in June 2023.

Activity 2: Mapping of the roles and responsibilities of the different types of market actors within the alternative fuels ecosystem.

- Work to be finalized in December 2023.
- Alingment with NAPCORE. Demonstrator on alternative fuels data running until December 2024.

Coordination between different programmes and expert groups:

Sub-group on Public Authorities

State of play

Sub-group functions as platform for exchange between public authorities on all matters to promote and facilitate deployment of high-quality recharging infrastructure, **by means of dedicated Task Forces.**

There are 6 standing Task Forces:

Task Force 1: Development of Recommendations for permitting and grid connection procedures for recharging points – finished: currently being edited prior to publication

Task Force 2: Development of templates, tools, decision trees and standard contracts for public authorities – to be presented during September sub-group meeting for adoption

Task Force 3: Development of Recommendations for recharging infrastructure roll-out for specialized and captive fleets – final review ongoing, for publication before summer

Task Force 4: Update SUMP Electrification topic guide – draft being prepared

Task Force 5: Development of Recommendations for Accessibility of recharging stations – survey finalized

Task Force 6: Developments for fire safe deployment of recharging points in covered parking garages – Task Force launched in February of this year, work ongoing (webinar planned in June; survey in preparation)

STF – PA Task Force 5: work so far

Cities and Regions asked for good examples of barrier-free recharging infrastructure... **where to find them?**

To go beyond AFIR reference to the charging point, by also focusing on surrounding environment and location... **but how?**

We cannot refurbish everything**, but it doesn't mean we disregard this topic**

Official task by the STF-PA:

- Kickoff meeting establishing the TF5 core group on 19 September 2022 – scope and objectives, examples of good practices and recommendations
- Second STF-PA TF5 meeting on 31 May 2023 – present survey preliminary results, presentation of additional guidelines and recommendations from countries outside the EU

STF – PA Task Force 5: work so far

Scope of the guidelines:

- Hardware: pole/charging station: design, new technologies like wireless charging…
- Associated parking spaces and surrounding environment
- Distribution/location of accessible recharging poles/stations & parking spaces (ratio of accessible recharging infrastructure)

Collection of existing legislation and recommendations at different governance levels:

- EU Accessibility Act
- UK PAS 1899:2022 Electric vehicles – Accessible charging – Specification
- Designability's Design Guidance Accessible EV charging
- US Access Board Design Recommendations for Accessible Electric Vehicle Charging Stations)
- (…)

STF – PA Task Force 5: work so far

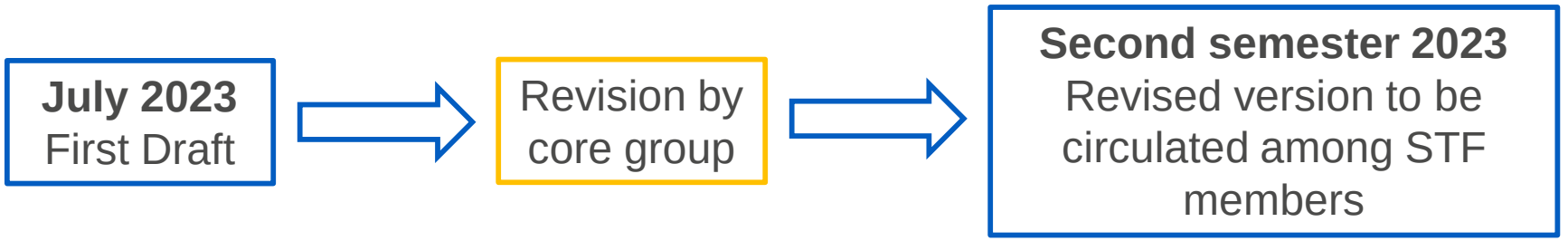
Meetings and further exchange:

1. December 1, 2022: Session at POLIS Conference 2022: **“5E. Clean vehicles: creating the right framework conditions”**
2. March 23, 2023: POLIS Just Transition webinar **“Making EV charging a reality for people with disabilities”**

STF – PA Task Force 5: next steps

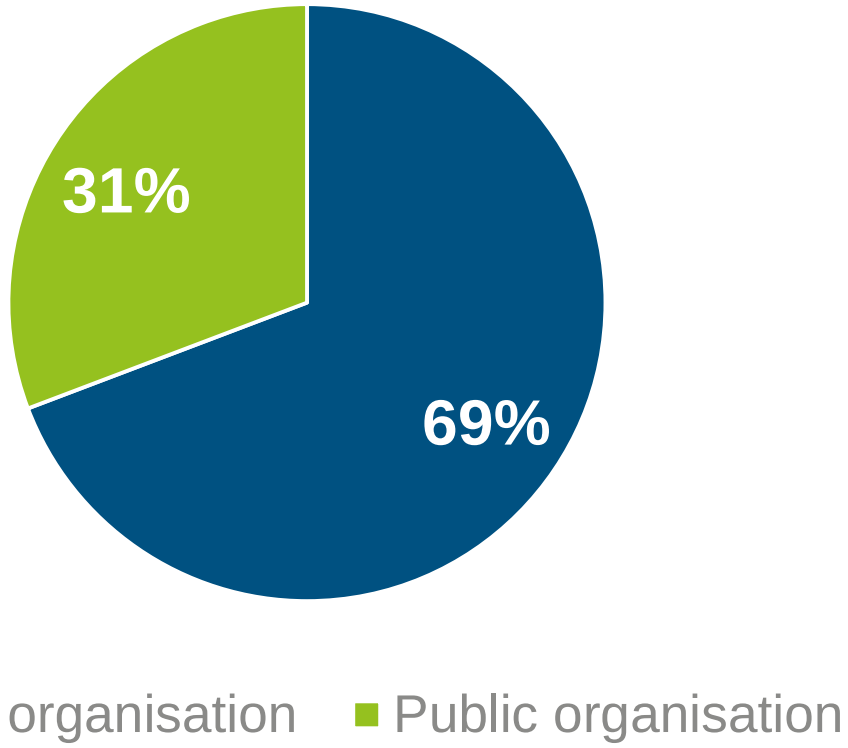
Next steps:

1. Report with the results of survey for **benchmarking**: besides issues and bottlenecks, examples of regulations/guidelines, strategies, projects, best practices, governance
2. **Final deliverable** to include recommendations based on survey results and analysis of reference documents/develop further Guidelines at EU level
3. Indicative timeline:

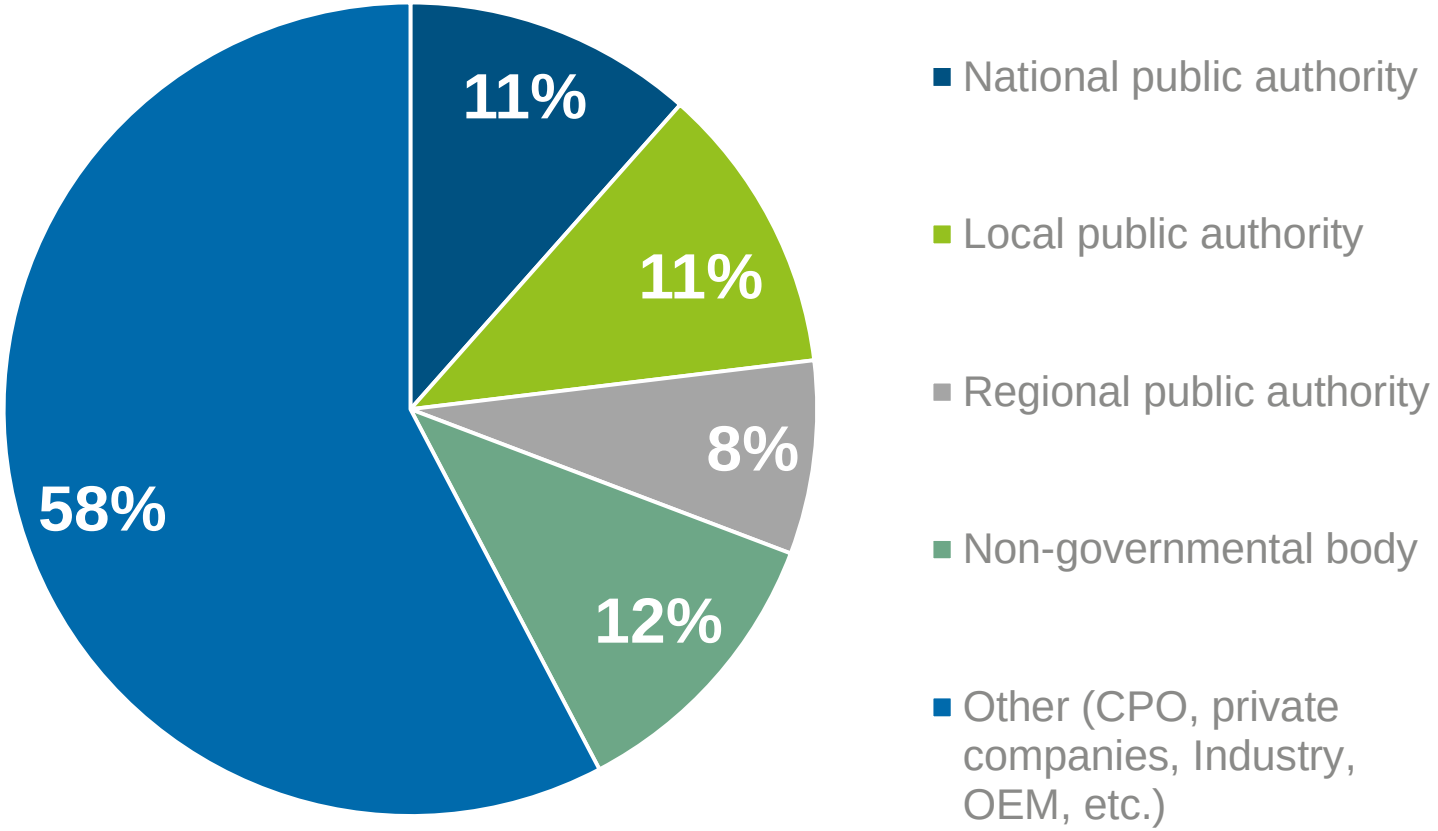


Preliminary results of the survey - Profile of respondents

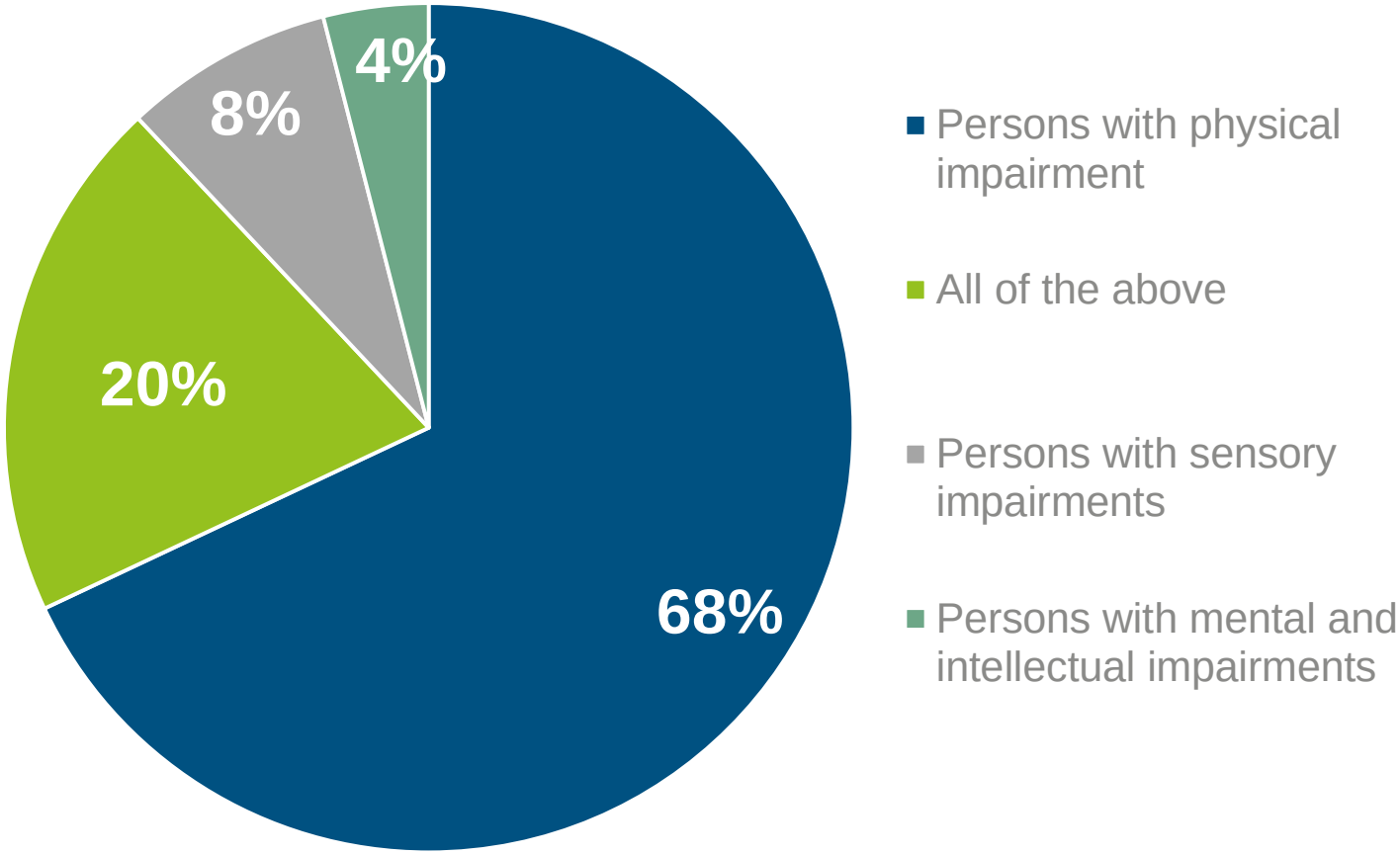
26 responses



Preliminary results of the survey - Type of organisation



Preliminary results of the survey - Main target groups



Bottlenecks and limitations

Issue	Priority #1	Priority #2	Priority #3	SCORE
Lack of common standards for accessible EV recharging	11	4	4	**45**
Absence of a clear regulatory framework	3	9	4	**31**
Lack of available public space	4	3	3	**21**
Lack of knowledge about technical developments/requirements	2	3	0	**12**
Lack of know-how from PA and CPO	2	1	3	**11**
Concern over public prioritisation of this issue	0	2	4	**8**
Technical feasibility of retrofitting	0	3	2	**8**
Retrofitting costs too cumbersome and not cost-efficient	2	0	1	**7**
Uncertainty about the legal ‘interface’ between national legislation and any future European regulatory framework	1	0	3	**6**
Lack of knowledge about installation and maintenance costs	0	0	1	**1**

Level of responsibility

	EU institutions	National authorities	Local and Regional authorities	Private operators	Public-private partnerships
Policy framework	4,3	3,7	2,2	2,1	2,5
Legislation and regulations	4,4	4,0	2,7	2,0	2,4
Physical implementation	2,0	2,8	3,4	4,5	4,0
Monitoring and evaluation	3,1	3,9	3,5	3,1	2,9
Capacity building	2,6	3,5	3,4	3,6	3,4
Communication & dissemination	3,5	4,0	3,4	2,8	2,9

Criteria for accessible recharging infra

- Percentage of existing charging stations in urban areas (ratio) – 15%, 25%
- Area-based indicator in urban zones – 1 per 4 km2, 1 per 9 km2
- For TEN-T core and comprehensive networks – based on distance, % based, but also all accessible

- **Some other takeaways:**
  - Define standards and preliminary analysis before defining %
  - Places should be reserved, or just adapted?
  - Wireless charging as a proposed solution
  - Match accessible EV recharging places with the number of spaces attributed to disabled people

CEAPAT report "Accessibility criteria for electric vehicle charging points or charging stations"

Ángel Moya
Project coordinator
ETRA I+D

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

Who is CEAPAT?

GOBIERNO DE ESPAÑA
MINISTERIO DE DERECHOS SOCIALES Y AGENDA 2030
SECRETARÍA DE ESTADO DE DERECHOS SOCIALES
IMSERSO

Ceapat
Centro de Referencia Estatal de **Autonomía Personal** y **Ayudas Técnicas**

Spain: 4.3 million people with any kind of disability (INE)

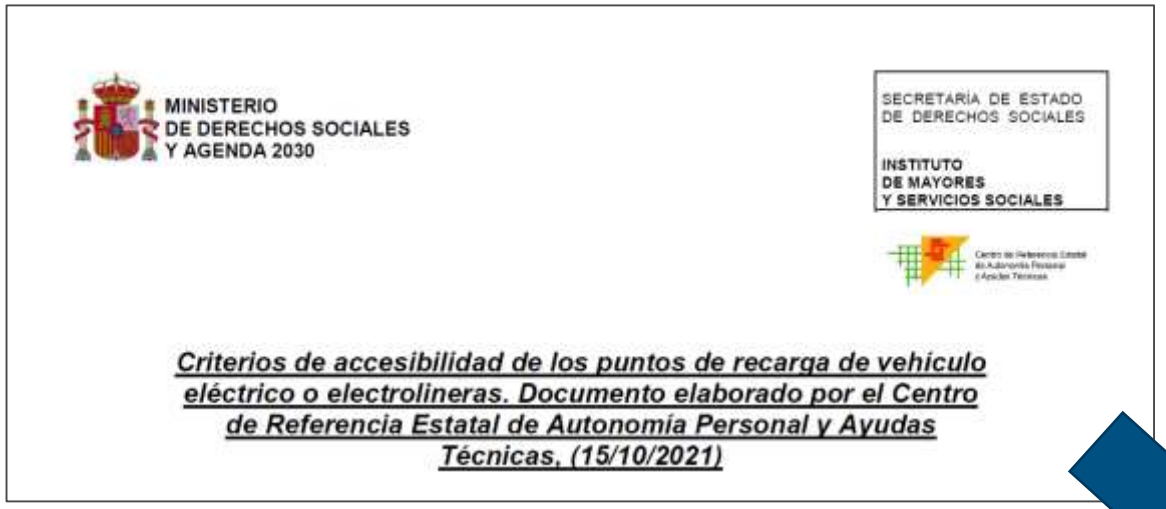
9% total population

OBJECTIVE: offering **quality social services to care for people in a situation of dependency** and their families.

MISSION: making the rights of people with disabilities and the elderly effective, through comprehensive accessibility, support products and technologies, and design designed for all people.

ORGANIZATION: interprofessional team, made up of technicians from the fields of architecture, engineering, psychology, speech therapy, occupational therapy, documentation, information technology, workshop personnel, and administration.

Why this accessibility criteria report for charging infrastructure?



MINISTERIO
DE DERECHOS SOCIALES
Y AGENDA 2030

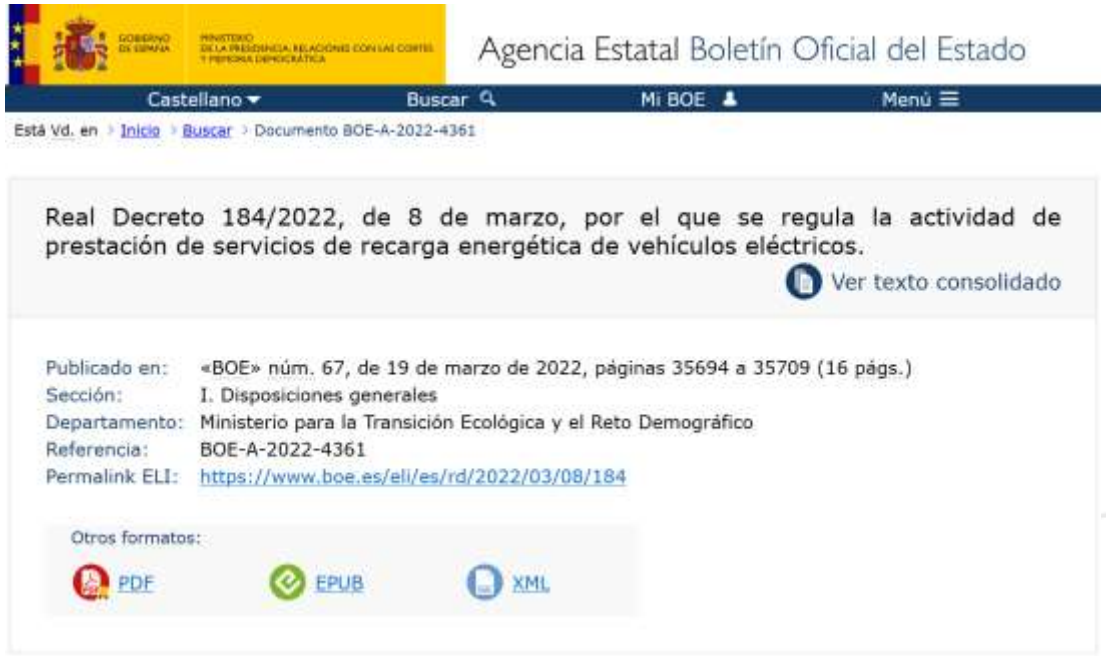
SECRETARÍA DE ESTADO
DE DERECHOS SOCIALES

INSTITUTO
DE MAYORES
Y SERVICIOS SOCIALES

Criterios de accesibilidad de los puntos de recarga de vehiculo eléctrico o electrolineras. Documento elaborado por el Centro de Referencia Estatal de Autonomía Personal y Ayudas Técnicas, (15/10/2021)

July
2021

March 2022



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Está Vd. en › Inicio › Buscar › Documento BOE-A-2022-4361

Real Decreto 184/2022, de 8 de marzo, por el que se regula la actividad de prestación de servicios de recarga energética de vehículos eléctricos.

Ver texto consolidado

Publicado en: «BOE» núm. 67, de 19 de marzo de 2022, páginas 35694 a 35709 (16 págs.)
Sección: I. Disposiciones generales
Departamento: Ministerio para la Transición Ecológica y el Reto Demográfico
Referencia: BOE-A-2022-4361
Permalink ELI: https://www.boe.es/eli/es/rd/2022/03/08/184

Otros formatos:
PDF EPUB XML

CEAPAT: Need to regulate the conditions of universal accessibility in the design, implementation and execution of the charging stations.

The report: «Accessibility criteria for electric vehicle charging points or charging stations» by CEAPAT

Regardless of the place where the charging points are installed, they must meet the conditions of accessibility and universal design, so that anyone can use them independently, comfortably and safely, without exclusion due to disability or advanced age.

Parking surface

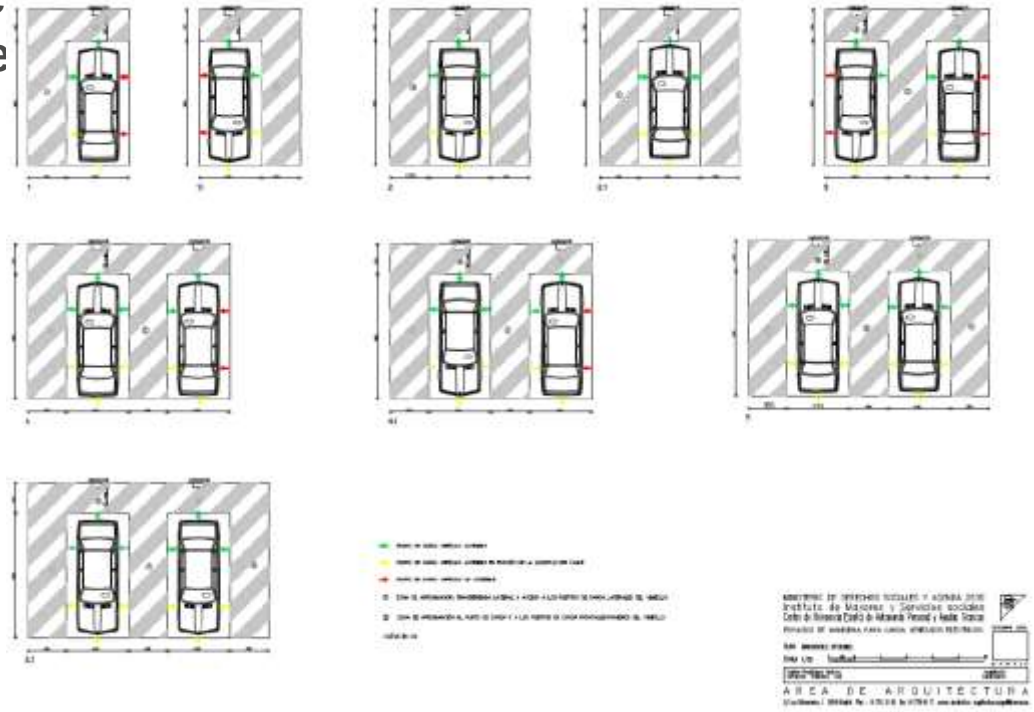
Hardware

Software

Parking surface: recommendation

General recommendations:

1. Include in the mandatory accessibility regulations, the **accessibility criteria for electric vehicle charging points**.
2. In service (“petrol”) stations, parkings, or in any place where there is more than one charging point, **a number of accessible charging points proportional to the total available charging points will be reserved**. In the case of infrastructures with a single charging point, this will be accessible.
3. The parking spaces where an accessible charging point is installed will have the **necessary space to be used by people with reduce**



Parking surface: recommendation

Specific recommendations:

1. The accessible CP will **guarantee access** from the transfer area **to the accessible pedestrian itinerary**, autonomously, free of obstacles and safely.
2. Locate the CP preferably on **horizontal or gently sloping surfaces.**
3. The charging space associated with an accessible charging point will have an **approach area, lateral transfer and access to the side charging ports of the vehicle**, it will also have an approach area to the charging point and the charging ports located in the front and rear of the vehicles.
4. The **approach and transfer areas will be marked on the ground** plane by means of road markings that comply with the established slipperiness requirements.
5. The **lateral approach and transfer area** and access to the vehicle's lateral recharging ports will have a l**ength equal to that of the space (5.00 m) and a minimum width of 1.50 m.**
6. The **approach area to the charging point and the charging ports located in the front and rear of the vehicles** will have a length equal to the width of the square (**2.20 m) and a minimum width of 1.20 m**.
7. **Mark them horizontally and vertically with the symbol of accessibility for mobility**, complying with the specifications of the **UNE 41501 Standard. Symbol of accessibility for mobility**.

Hardware: recommendation

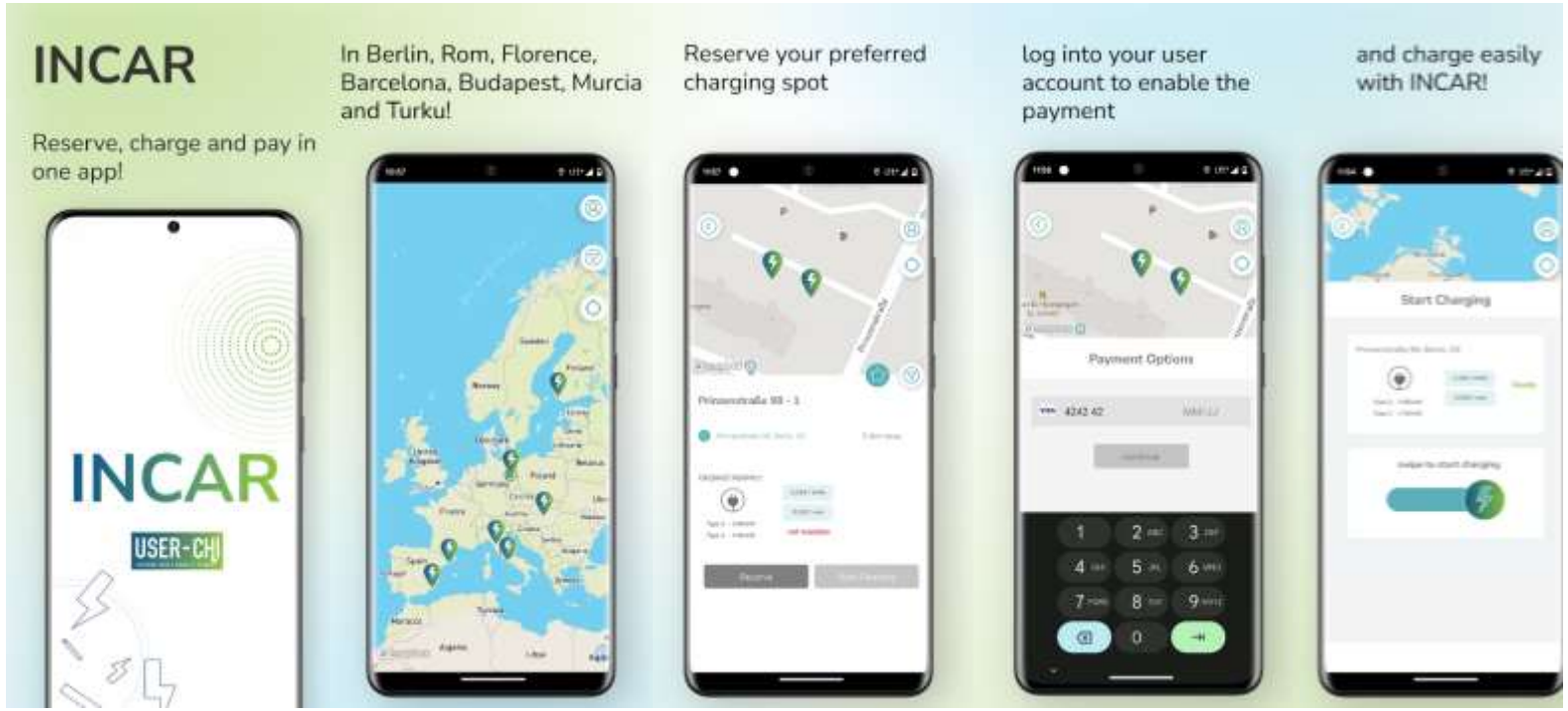
1. Allow recharging a vehicle regardless of where the vehicle's **recharging port** is located.
2. Take into account the **seven principles of universal design**: Equitable Use, Flexible Use, Simple and Intuitive Use, Understandable Information, Error Tolerance, Low Physical Effort, Space and Size for Approach and Use.
3. **Establish common accessibility criteria** that can serve the different existing designs and the different models of vehicles available on the market.
4. The **connection cable** from the charging point to the vehicle's charging port must be **as light and ergonomic as possible**.
5. **Facilitate access** to all interface elements for people who move with support products. Frontal and lateral approach space **with the wheelchair**.
6. **Locate the screen at a suitable height and viewing angle** to facilitate reading by people standing, in wheelchairs and of short

Hardware: recommendation

7. The **elements of interaction with the interface must be easily located and easy to understand** and usable (instructions for use, payment of the service by credit card, top-up, via mobile, instructions in language and with clear pictograms, etc.).
8. If there is some type of **acoustic signal, it must also be accompanied by a visual signal** in order to facilitate its use by people with hearing disabilities.
9. All interface elements must be **able to be manipulated with one hand or used and activated by voice**.
10. Ensure that the **contrast** between the font and the background of the screen is adequate to **optimize readability**.
11. Sunlight can degrade screen visibility for all users. The **screen should be protected from direct or reflected sunlight** or other bright light sources.
12. In addition, take into account the criteria of the **UNE 139801:2**ons for people with disabilities. Computer accessibility requirements.

Software: recommendations

In order for anyone to charge the vehicle properly, both the **mobile application and the access to the charging point digital service should meet accessibility criteria**, in accordance with current legislation and regulations.

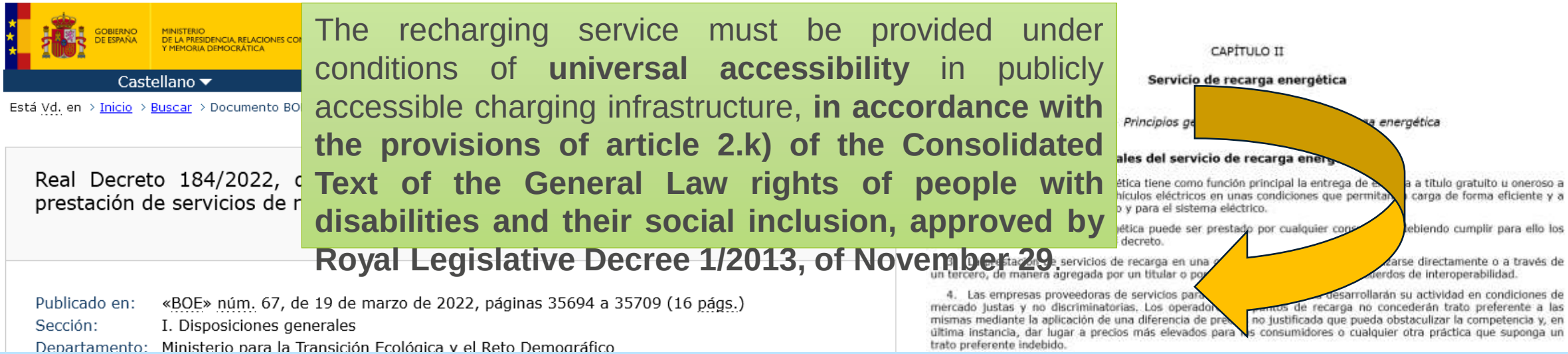


RD 1112/2018, de 7 de septiembre, sobre accesibilidad de los sitios web y aplicaciones para dispositivos móviles del sector público.

This RD transposes **European Directive 2016/2102**, and requires native apps, at least in the public sector, to be accessible as of June 23, 2021 in accordance with:

- **UNE-EN 301 549** Accessibility requirements for ICT products and services.
- **UNE 139801:2003** Standard Computer applications for people with disabilities. Computer accessibility requirements. Hardware.

Spanish RD 184/2022: provision of charging services for electric vehicles



The recharging service must be provided under conditions of **universal accessibility** in publicly accessible charging infrastructure, **in accordance with the provisions of article 2.k) of the Consolidated Text of the General Law rights of people with disabilities and their social inclusion, approved by Royal Legislative Decree 1/2013, of November 29.**

- Universal accessibility: (…) to be **understandable, usable and practicable by all people in conditions of safety and comfort and of the autonomous and natural way possible**. Universal accessibility includes **cognitive accessibility** to allow easy understanding, communication and interaction for all people. (…) → E.g., easy reading, alternative and augmentative communication systems, pictograms and other human and technological means available for this purpose.

- It presupposes the strategy of "**universal design** or design for all people".

- Understood without prejudice to the **reasonable adjustments** that **must be adopted**.

Orden TED/445/2023, de 28 de abril, por la que se regula la información a remitir por los prestadores de servicio de recarga energética al Ministerio para la Transición Ecológica y el Reto Demográfico, a las Comunidades Autónomas y a las Ciudades de Ceuta y Melilla.

Disposición final segunda. *Entrada en vigor.*

La presente orden entrará en vigor el día 16 de mayo de 2023.

Madrid, 28 de abril de 2023.–La Vicepresidenta Tercera del Gobierno y Ministra para la Transición Ecológica y el Reto Demográfico, Teresa Ribera Rodríguez.

ANEXO I

Definiciones técnicas

1. «Emplazamiento del punto de recarga»: Conjunto de uno o varios puntos de recarga que comparten localización física.
2. «Conector»: Interfaz físico entre el punto de recarga y el vehículo con objeto del suministro de energía eléctrica.
3. «Horario de apertura»: Horario en el que es posible el acceso con vehículo al emplazamiento del punto de recarga y la operación de recarga de vehículo.
4. «Código identificativo del punto de recarga a efectos de interoperabilidad a nivel europeo»: Código asignado por el operador de punto de recarga al punto de recarga de acuerdo a la norma ISO15118-2:2014 o aquella que la sustituya.
5. «Modo de carga»: Modo de carga de acuerdo a la norma IEC-61851 o aquella que la sustituya.
6. «Métodos de identificación y pago»: Medios de identificación y de pago que se ponen a disposición del cliente a efectos de la prestación del servicio de recarga.
7. «Tipo de conector»: Standard correspondiente al conector.
8. «Formato de conector»: Socket (base que se encuentra embutida en una superficie para su conexión, puede estar en el vehículo, en el equipo de recarga o en ambos en el momento de la carga) o Plug (conector que se inserta en la base o formato Socket y puede estar en el vehículo o en el equipo de recarga).
9. «Tipo de carga»: Corriente alterna (AC) o corriente continua (DC).
10. «Potencia máxima»: Potencia nominal máxima a la que puede operar el punto de recarga en condiciones normales con un determinado conector.
11. «Precio de venta al público de la electricidad o del servicio de recarga»: Precio ad-hoc que se factura al consumidor final por el servicio de recarga en un determinado punto de recarga sin que sea necesaria la existencia de un contrato entre el usuario del servicio y el proveedor del mismo. Se proporcionará, al menos, en unidades de euros por unidad energética o euros por unidad de tiempo.
12. «Titular del punto de suministro asociado al punto de recarga»: Empresa titular del punto de suministro eléctrico, que puede ser distinta del CPO que lo opera.
13. «Accesibilidad para personas con movilidad reducida»: El punto de recarga es accesible para personas con movilidad reducida (si/no/no disponible).

OCPI 2.1 protocol used in INCAR and SMAC USER-CHI products. Working to include the “accessibility” field.

OCPI protocol to send the data

"Accessibility for people with reduced mobility": The charging point is accessible for people with reduced mobility (yes/no/not available)

‘Guidelines for barrier-free charging infrastructure’

Sebastian Lahmann
NOW GmbH (National Centre for Charging Infrastructure)

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

Who we are

Who we are

NOW-GMBH.DE

Nationale LEITSTELLE Ladeinfrastruktur
National Centre for Charging Infrastructure

Commissioned by:

Federal Ministry for Digital and Transport

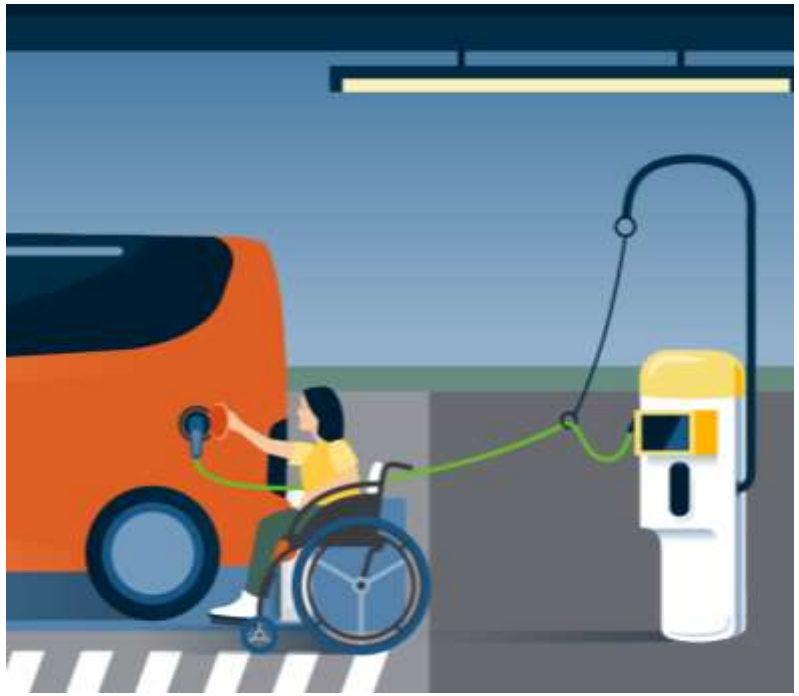
Why guideline and what's inside

- Focused on **physically handicapped** people
- **Technical requirements** regarding hardware and charging site
- 2 types of requirements:
- **Level A**: basic requirements
- **Level AA**: advanced requirements

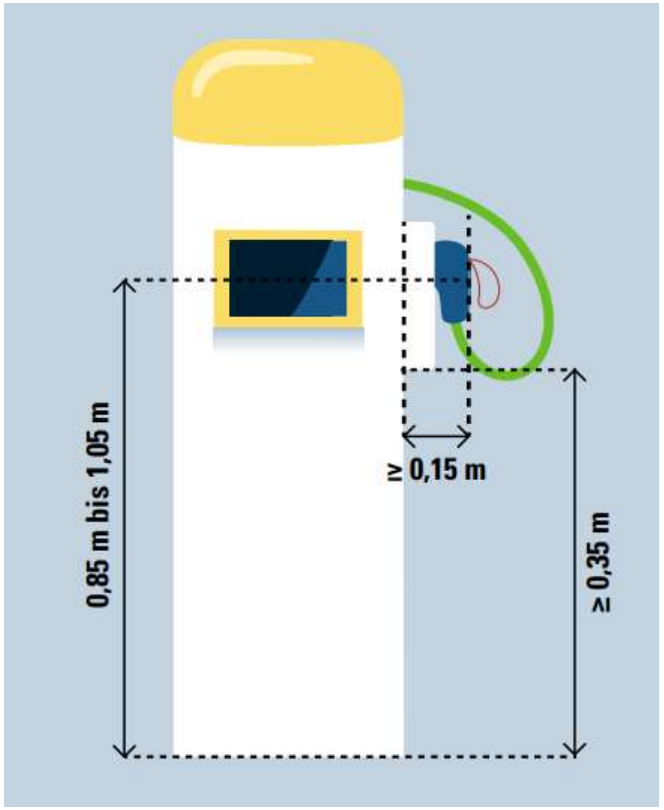
Supported by

SOZIALHELD*INNEN

Hardware accessibility



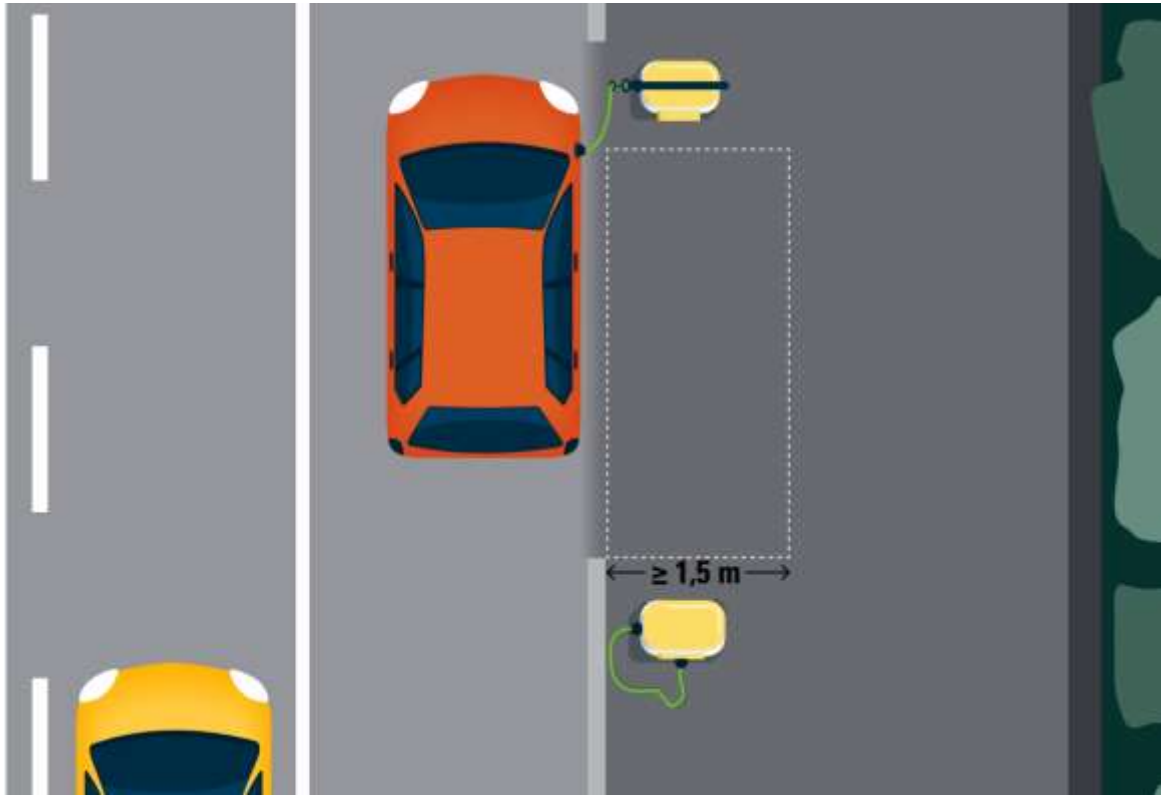
Level A: **cable support**



Level A: **position of operating elements and accessibility**

Level AA: **digital accessibility**

Charging bay requirements

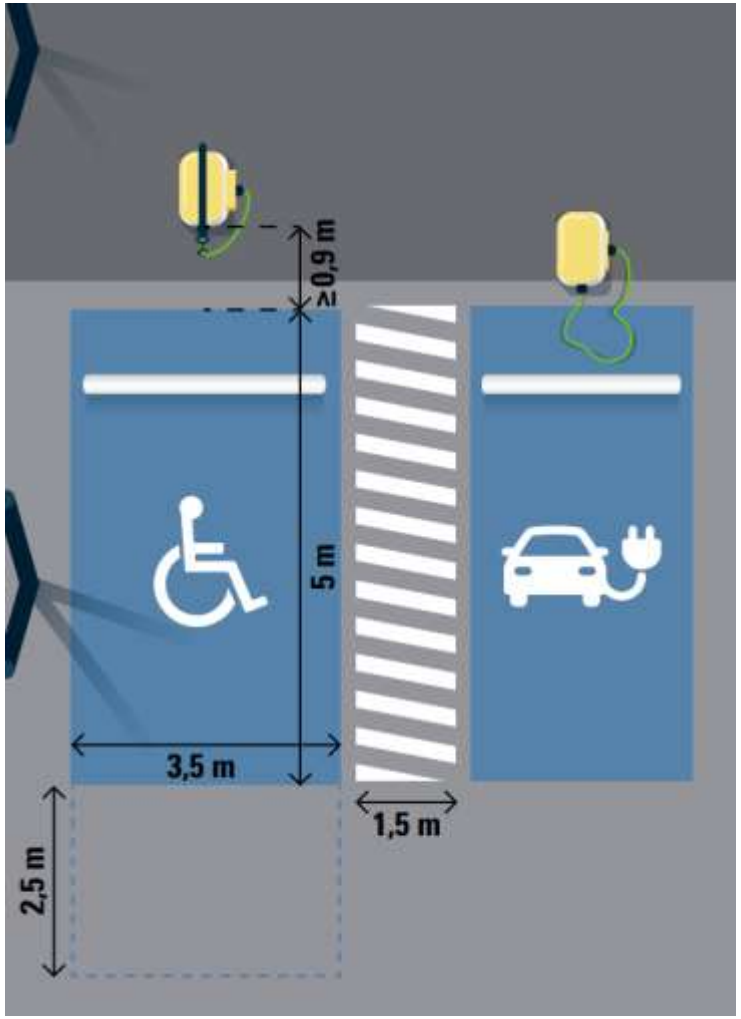


Parallel parking

Level A: free area of with a width of at least 1,5 m at the pavement

Level AA: like Level A and a length of parking bay of at least 5 m plus additional 2,5 m for rear entry into the car

Charging bay requirements



Side by side parking

Level A: width of at least 3,5 m

Level AA: like Level A and an additional free area at one side with a width of at least 1,5 m

Further requirements

Level A: lowered kerbs on charging site

Level A: sufficient **lighting** of charger

Level AA: decent lighting of charging site

A **tactile guidance system** with floor markings should be present

Thank you

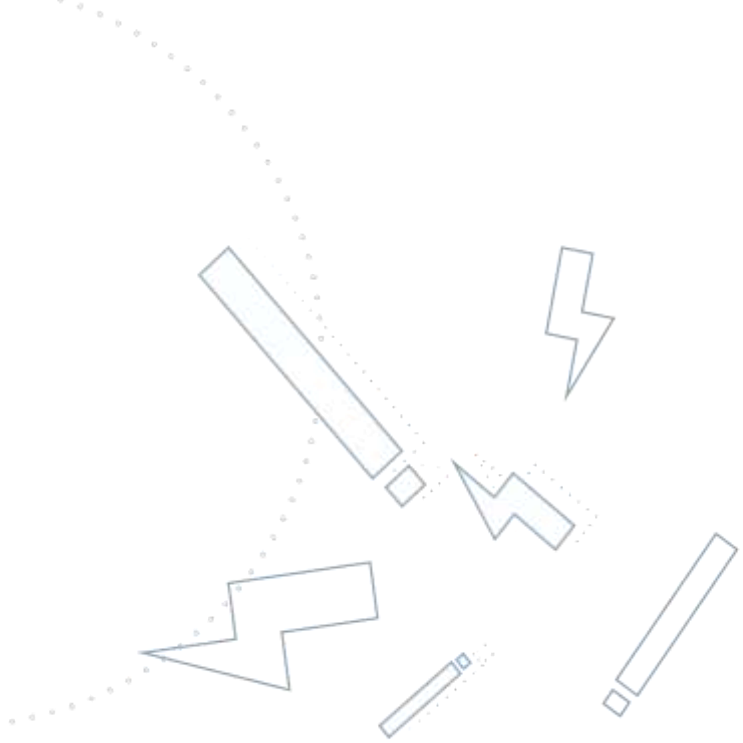
Nationale LEITSTELLE Ladeinfrastruktur

National Centre for Charging Infrastructure

Sebastian Lahmann

Team Lead Implementation

Sebastian.lahmann@now-gmbh.de



USER-CHI products

CLICK- Charging location and holistic planning kit

Stations of the future handbook

eMoBest – e-Mobility replication and best practice cluster

INFRA – Interoperability framework

INCAR – Interoperability, charging and parking platform

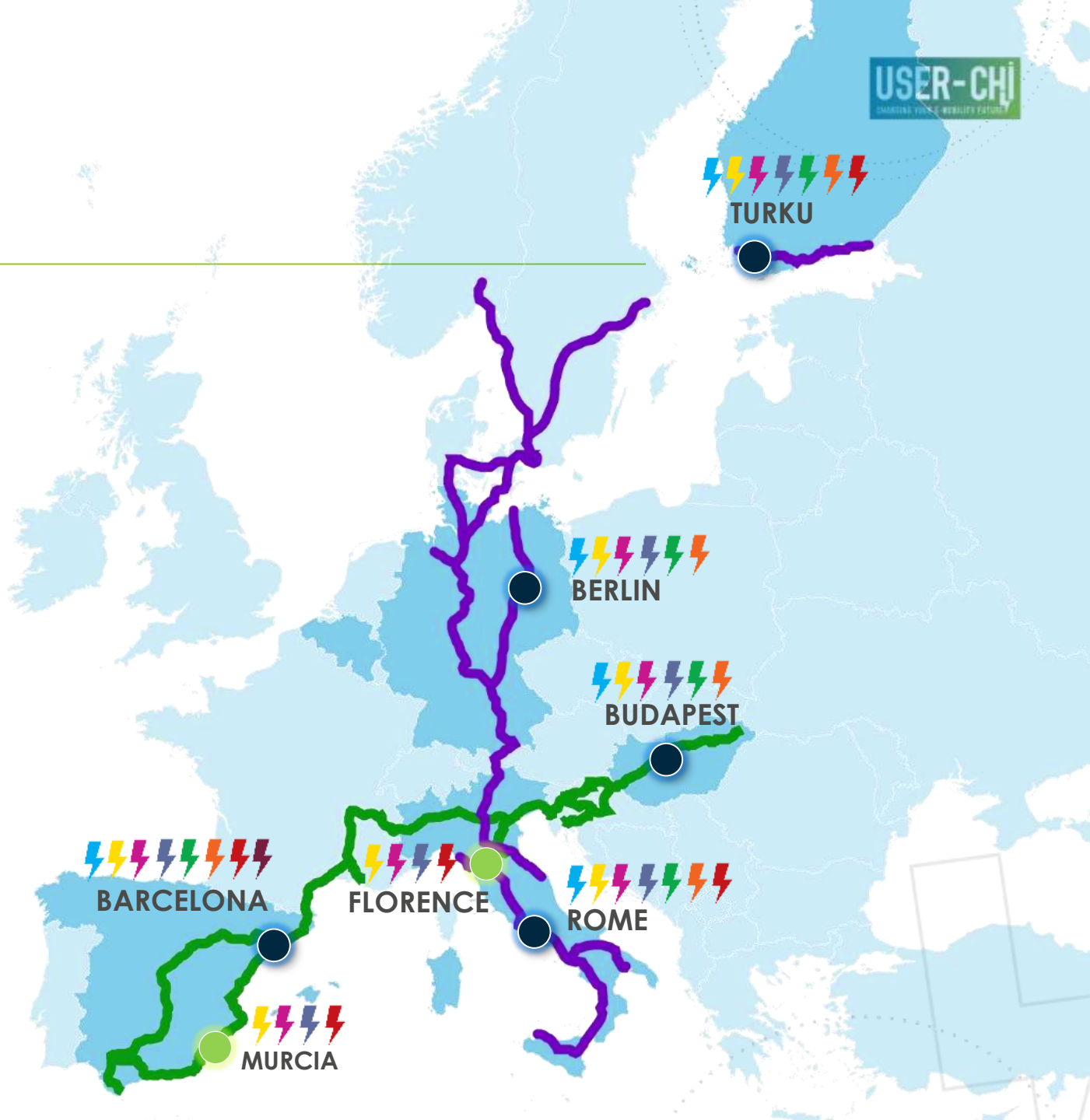
SMAC – Smart Charging tool

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

INDUCAR – Inductive charging for e-cars

Product roll-out

- **CLICK-** Charging location and holistic planning kit
- **Stations of the future** handbook
- **eMoBest** – e-Mobility replication and best practice cluster
- **INFRA** – Interoperability framework
- **INCAR** – Interoperability, charging and parking platform
- **SMAC** – Smart Charging tool
- **INSOC** – Integrated solar DC charging for Light Electric Vehicles (LEVs)
- **INDUCAR** – Inductive charging for e-cars



A LOOK AT SOME INNOVATIVE SOLUTIONS

INDUCTIVE CHARGING

ELECTRIC CHARGING FOR WHEELCHAIRS - TURKU

THANK YOU!

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