

POLIS

CITIES AND REGIONS FOR TRANSPORT INNOVATION

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leuven



eCharge4Drivers

EV Charging Infrastructure for improved User Experience

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BARCELONA CITY COUNCIL

Background and Context

Barcelona is a city of 1.6 Mhab on 100 km²,
within a metropolitan area of 3.2Mhab on 636 km²

Successive SUMP 2006-2012 & 2013-2018 & 2018-2024:
(now preparing SUMP 2025-2030)
BCN needs EV to achieve goals

Regional EV-Plans PIRVEC

National EV-Plans MOVELE, MOVEA, MOVALT, MOVES





2009 – the tale begins years ago



FIRST STEPS: MOBECPOINT & eMotorBIKES

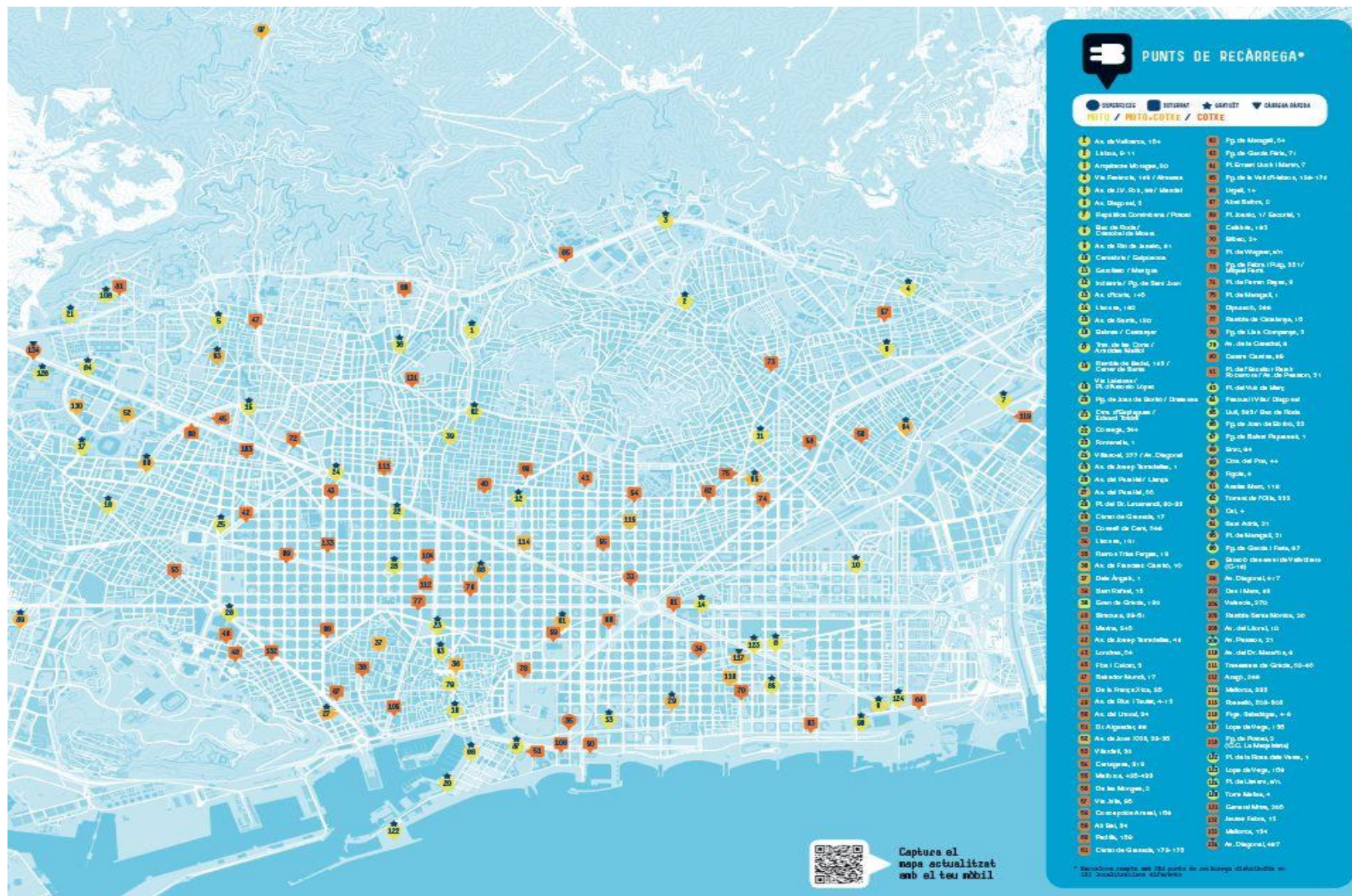


FIRST STEPS: MUNICIPAL PUBLIC PARKING LOTS





MAP OF THE CHARGING NETWORK (2012)

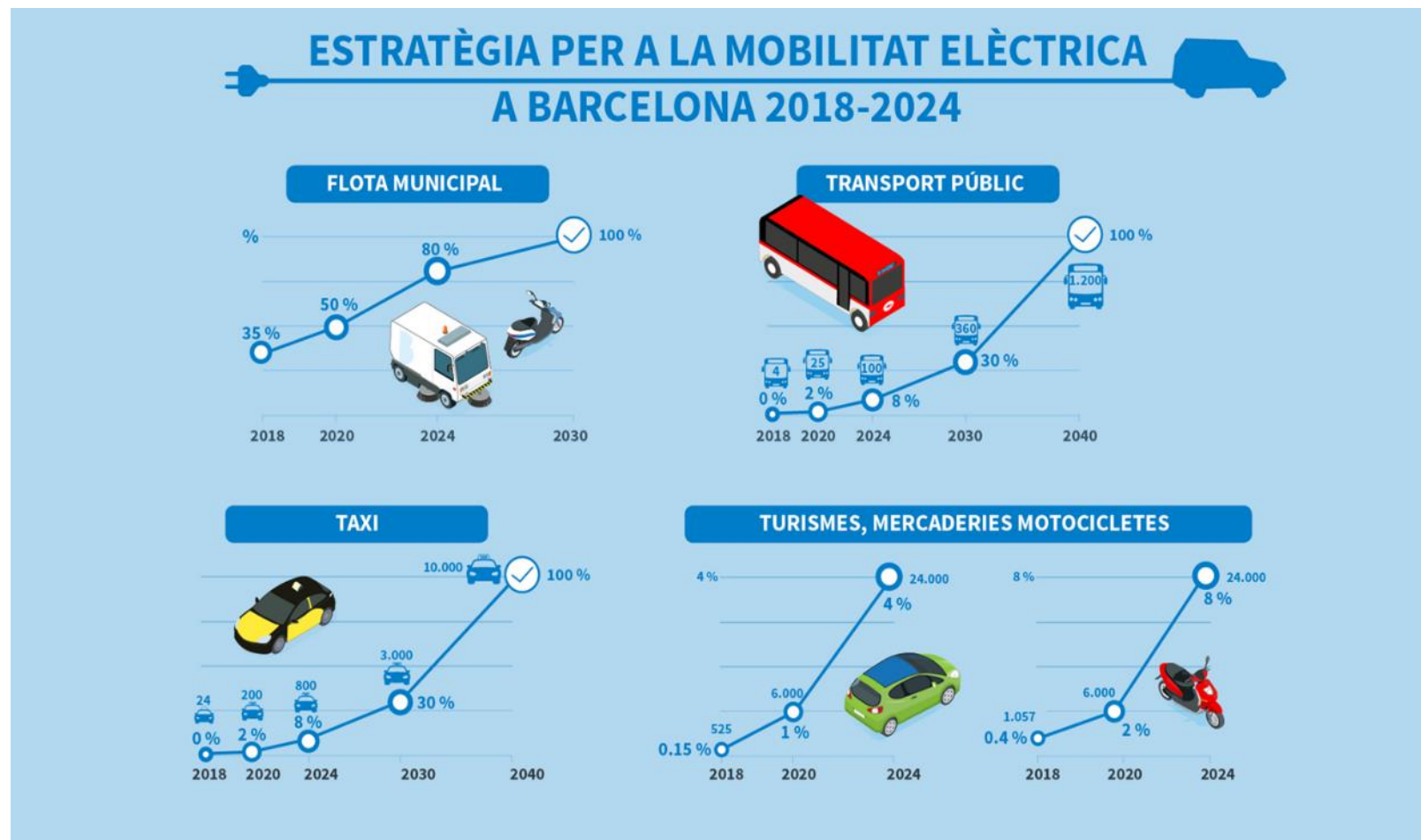




2013 - The first QUICK CHARGER Tristandard 50kW

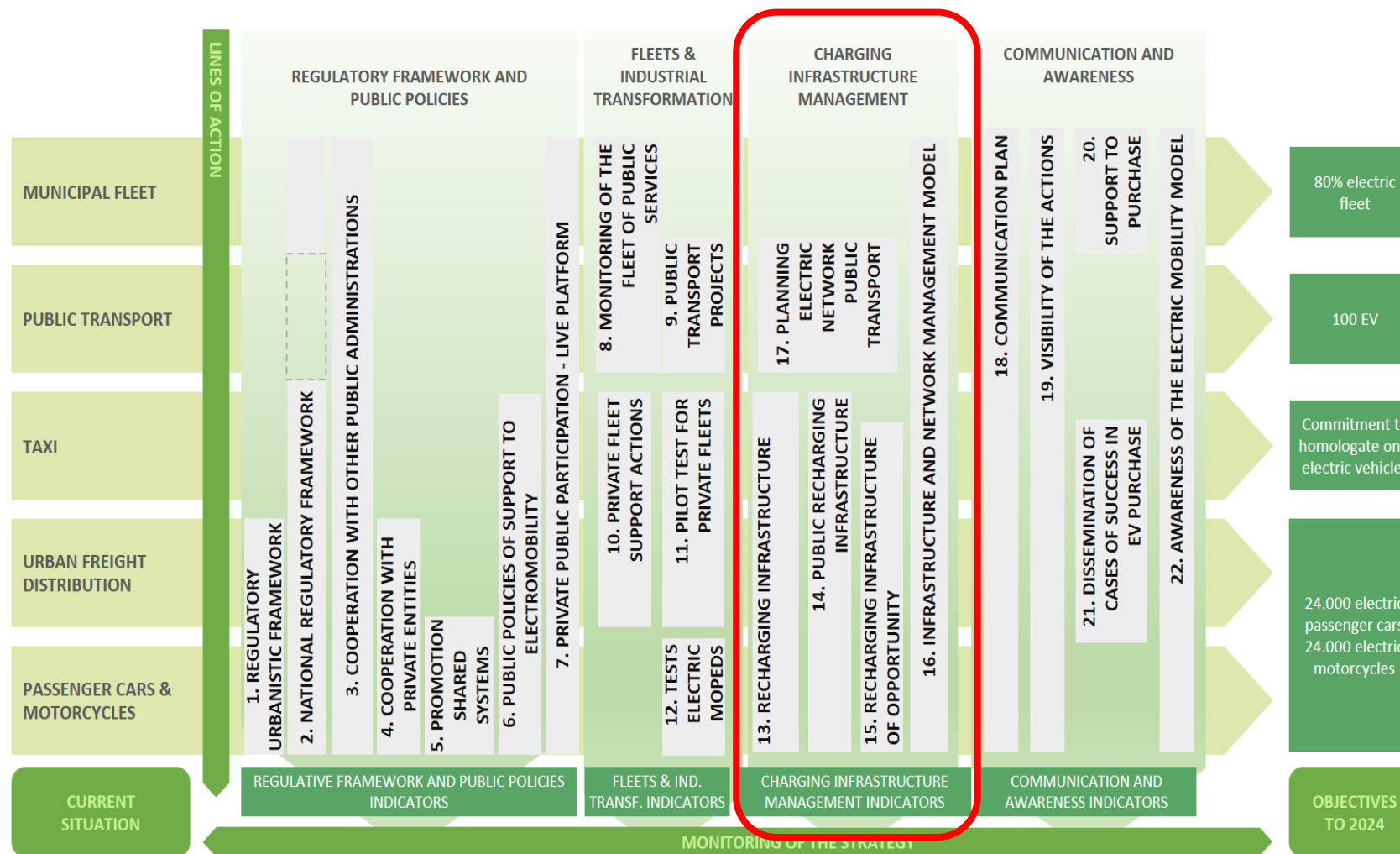


2018 - a strategy to boost e-mobility





Strategy for the development of electromobility





EV Charging Infrastructure – Where & How fast?

EV should charge as long as it needs to be parked. (Operational criteria)

Residential Charge (≈10h, full battery):

Charging at home, overnight, private sphere

Opportunity Charge (≈2h, add some km):

“Meanwhile” charging, associated to another main activity, at work, leisure, shopping, restaurant, hospital, Park&Ride...
private/public activity

Emergency Charge (≈30', in the case of empty):

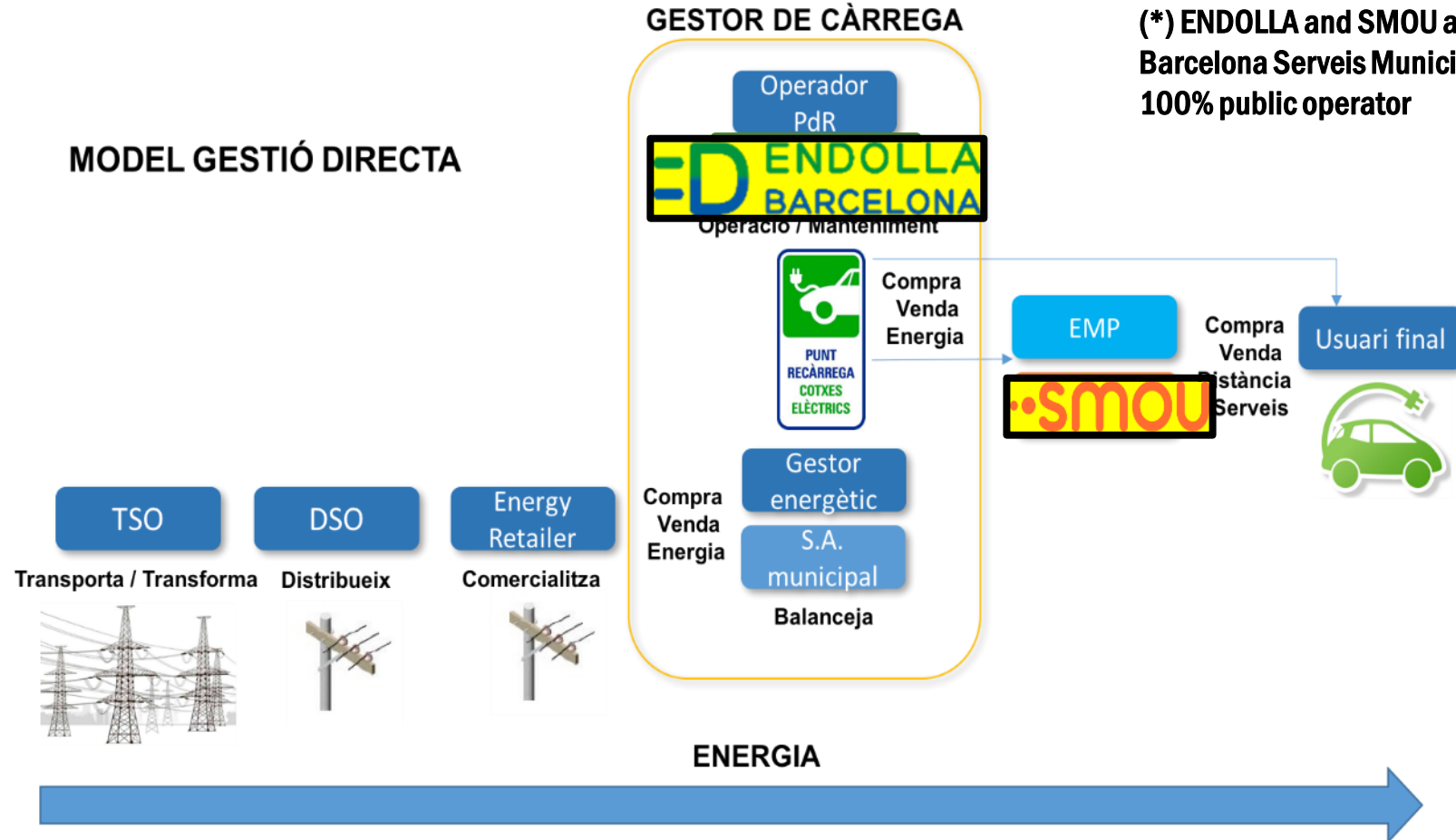
Battery exceptionally exhausted, needed to get back home or just to enlarge autonomy once (one of the main fears of a novice EVdriver). Public Service. Similar to RoadSide Assistance.

OnRoute Charge (≈5', enlarge autonomy):

Long planned trip, charging in route to enlarge autonomy. Similar to gas station.

EV Charging Infrastructure – Who?

2019 - Governance. CPO&eMsP management assignment to B:SM (*)

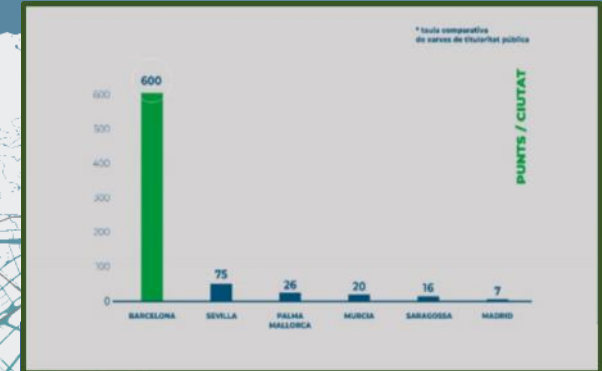


860 EVCS
(8,6 EVCS/km2)

809 off street
+ 51 QC on street

1,26kW/eCar

+ 12.000 uses/month
+ 18.000 registered users



2013-2020 Inversió acumulada 5 M€
2021-2024 Inversió prevista 12M€



Aparcaments B:SM



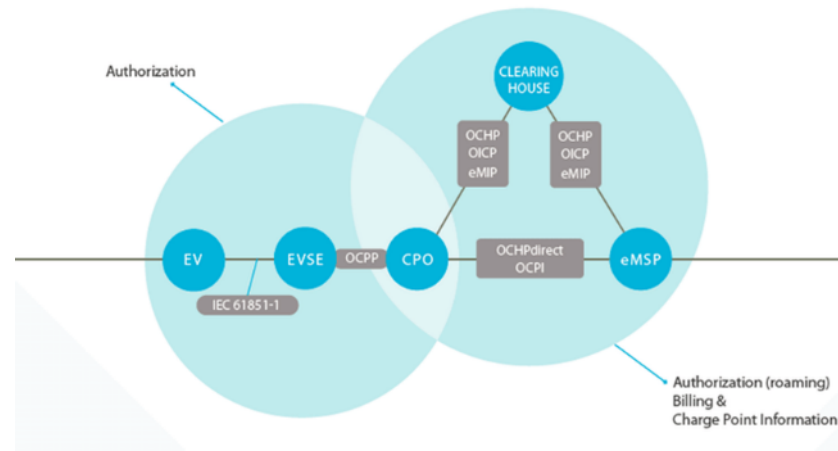
Al carrer



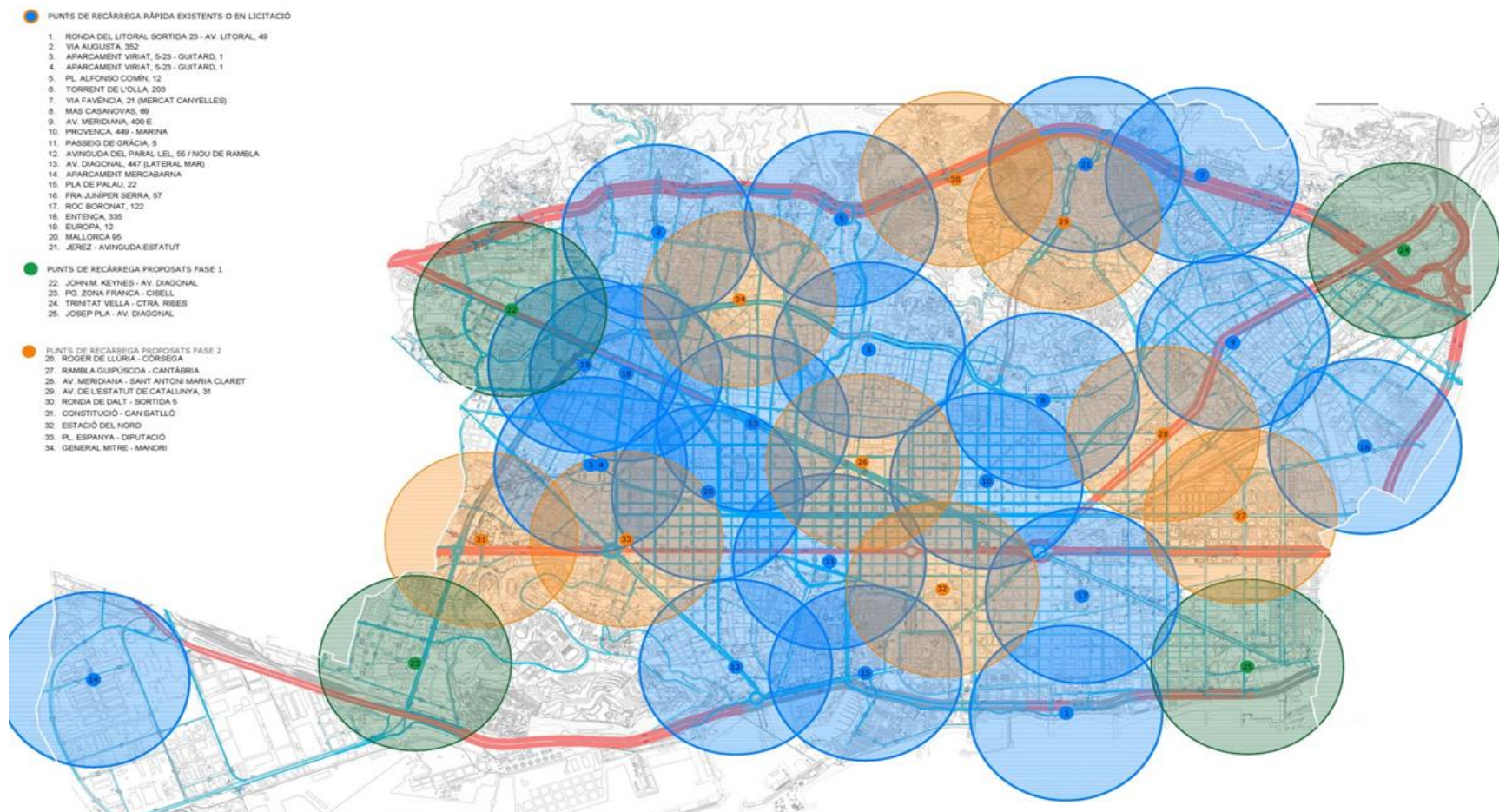
Aggregated interoperable SERVICES – SMOU



Solving the lack of interoperability with Open Source Standards



Strategy 2018/24: a public fast charging network with more than 60QC (AFIR 1.3kW/eCar compliance)



95% of the population has at least one PdRR within 1 km / 5 min



BUT!!! Increasing Demand needs x2 infrastructure every 2 years aprox.



2018 – modification of parking regulations



Art. 300

14. Los estacionamientos o aparcamientos contemplados en esta norma deberán incluir la instalación eléctrica específica para la recarga de vehículos eléctricos, ejecutada de acuerdo con lo establecido en la normativa vigente (ITC BT-52), con las siguientes dotaciones mínimas:

- en los estacionamientos o aparcamientos colectivos, de uso público o privado, se deberá ejecutar una conducción principal (mediante tubos, canales, bandejas, etc.) de manera que se facilite la realización de derivaciones (de máximo 20 metros) hasta cualquiera de sus plazas. Asimismo, se reservará el espacio necesario para la instalación de contadores y protecciones de las instalaciones de recarga para vehículos eléctricos.
- En los estacionamientos o aparcamientos de uso público (usos previstos en el Art. 250.2, epígrafes B, C, D, E, F, G, H, I, J) deberán ejecutarse las instalaciones necesarias para un punto de recarga normal por cada 10 plazas de aparcamiento para vehículos de 2 y 4 ruedas.

a) backbone pre-installed

**b) minimum 1/10 electrified places
Cars & Motorbikes**

Estas instalaciones mínimas se aplicarán al conjunto del estacionamiento o aparcamiento considerado, especialmente en los casos de ampliación de plazas por incremento del volumen edificado o por cambio de uso de la edificación o por sustitución en espacios contiguos de aparcamiento.



2021 - Special urban plan for the (no new) installation of fuel supply facilities (and boosting recharge service stations)



PLA ESPECIAL URBANÍSTIC PER A LA IMPLANTACIÓ
D'INSTAL·LACIONS DE SUBMINISTRAMENT PER A VEHICLES
A MOTOR A LA CIUTAT DE BARCELONA

INSTAL·LACIONS DE SUBMINISTRAMENT ELÈCTRIC PER A VEHICLES

Juny 2021

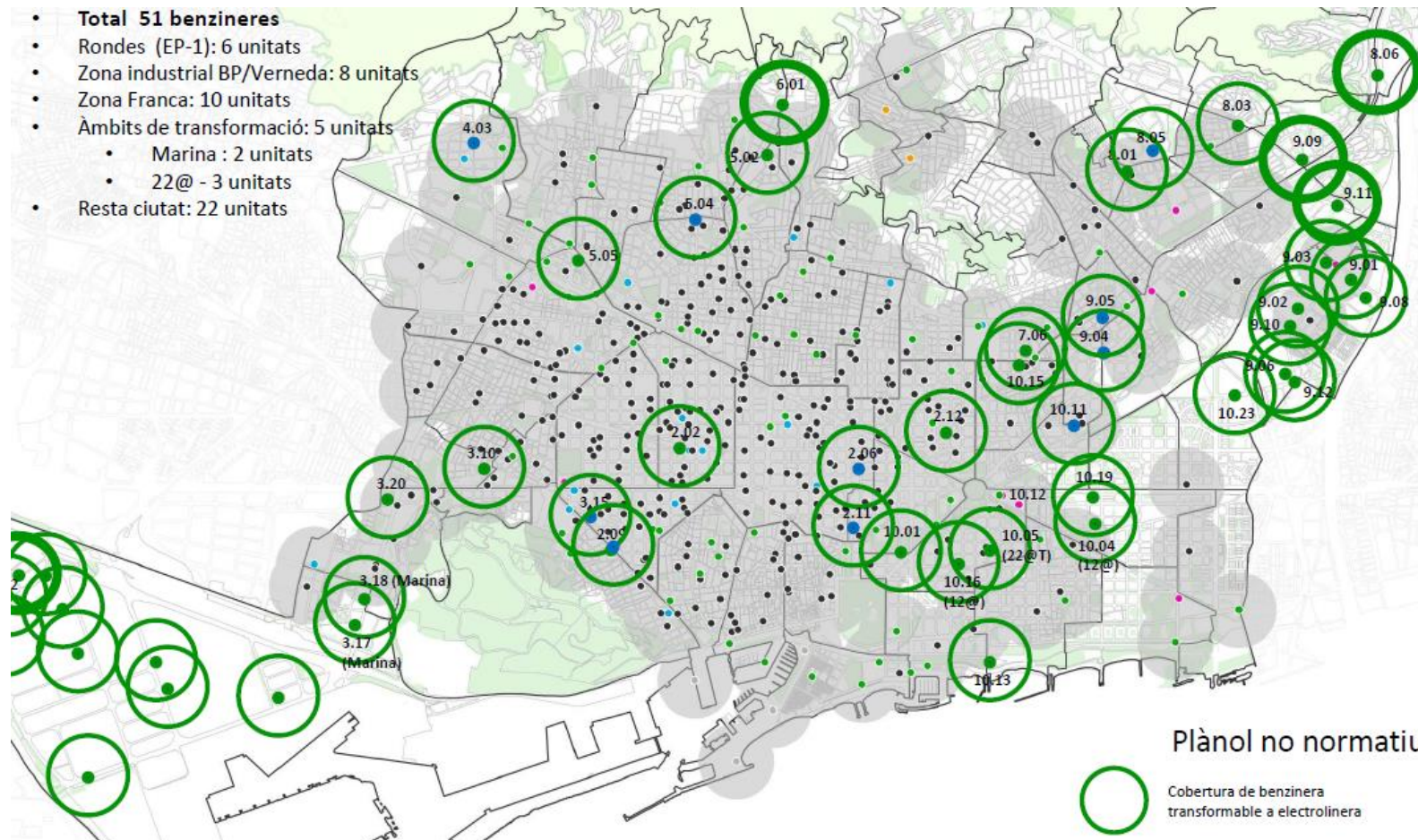


Ajuntament
de Barcelona

DIRECCIÓ DE SERVEIS DE PLANEJAMENT
GERÈNCIA D'URBANISME

Reorienting private investments from re(fuel) to re(charge) service stations

- Total 51 benzineres
- Rondes (EP-1): 6 unitats
- Zona industrial BP/Verneda: 8 unitats
- Zona Franca: 10 unitats
- Àmbits de transformació: 5 unitats
 - Marina: 2 unitats
 - 22@: 3 unitats
- Resta ciutat: 22 unitats





Incorporating USER-centric perspective



Improving the EV charging experience within cities and for longer trips: the eCharge4Drivers project



This project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No. 875131 (Innovation Action)

Challenges



Improve comfortability of charging



Enable services interoperability and provide appropriate information to users



Promote smart charging solutions



Propose standardised charging options for LEVs



Support the wide deployment of charging infrastructure

In a nutshell....

12 countries - 30 Partners – 10 demonstration areas

Infrastructure

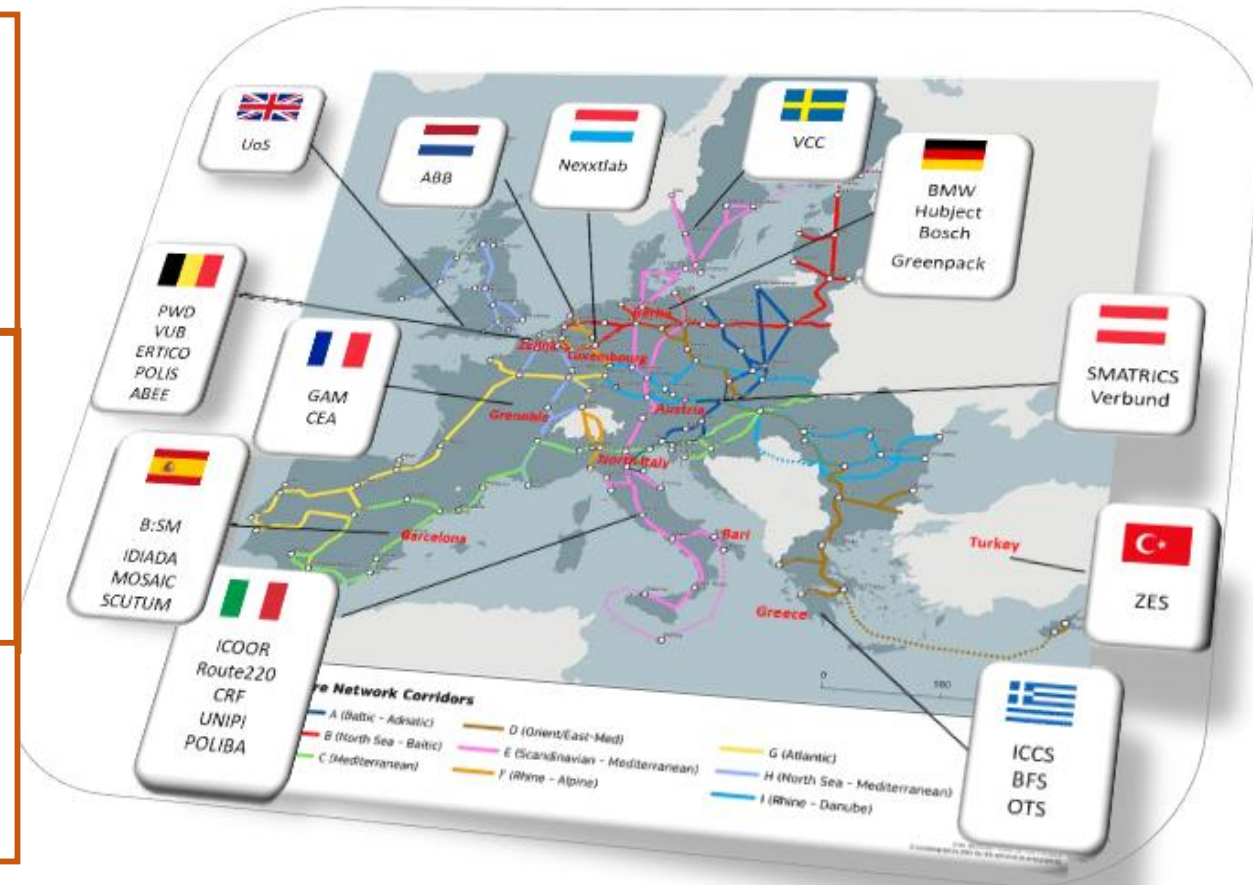
- **Use Case I-1:** User-friendly, low and high-power charging stations for passenger & L3e vehicles with enhanced user interfaces
- **Use Case I-2:** Multi-user master station with multiple DC power charging points for passenger and L1e EVs
- **Use Case I-3:** Battery swapping concept for Lxe vehicles

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 mobility sustainability



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Silence's 5,6 kWh Battery Pack

It aims to become the
standard Battery Pack

Targetting the 125-
300 cc equivalent
LEVs category



Use Case I-3: Battery Swapping



S02



S01+



Battery Pack
Standard

S01
The Ride
Decision



S04

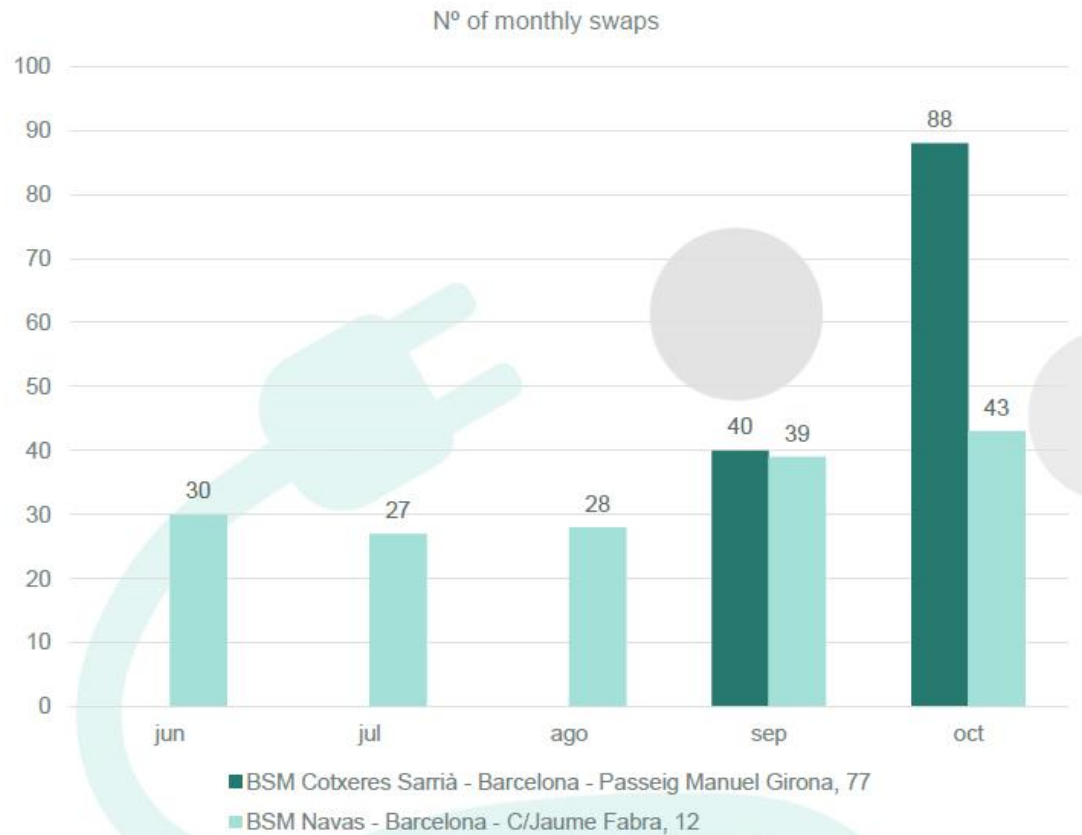


Use Case I-3: Battery Swapping

Battery Swapping in Fuel Station



UCI-3: Battery Swapping Stations



Nº of monthly swaps per car park

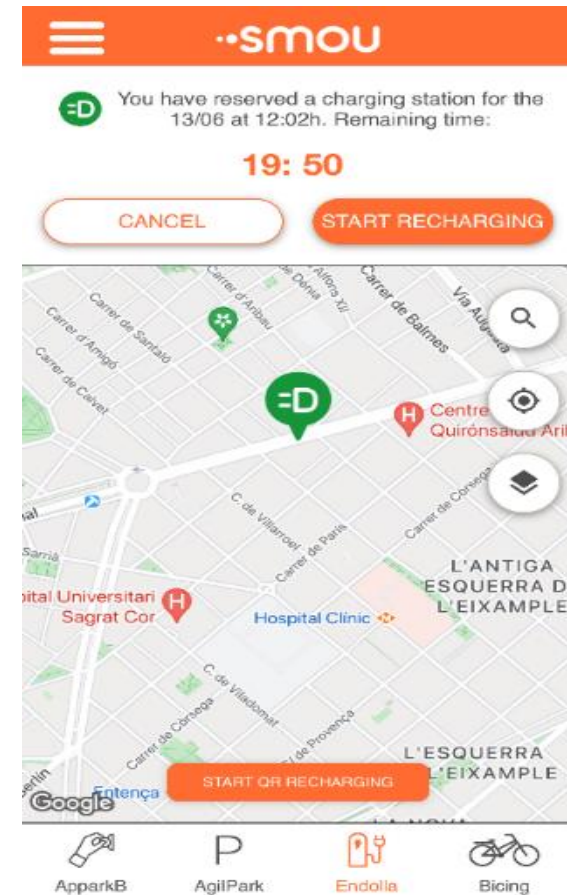
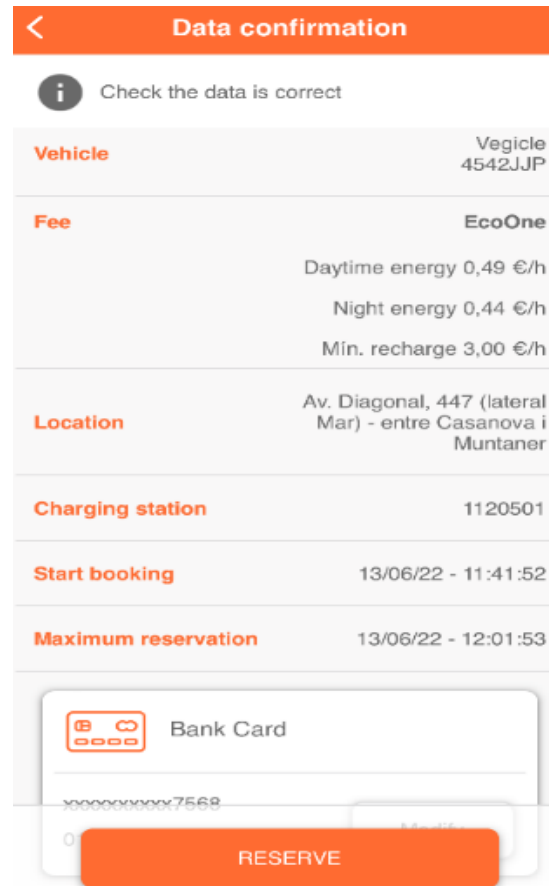
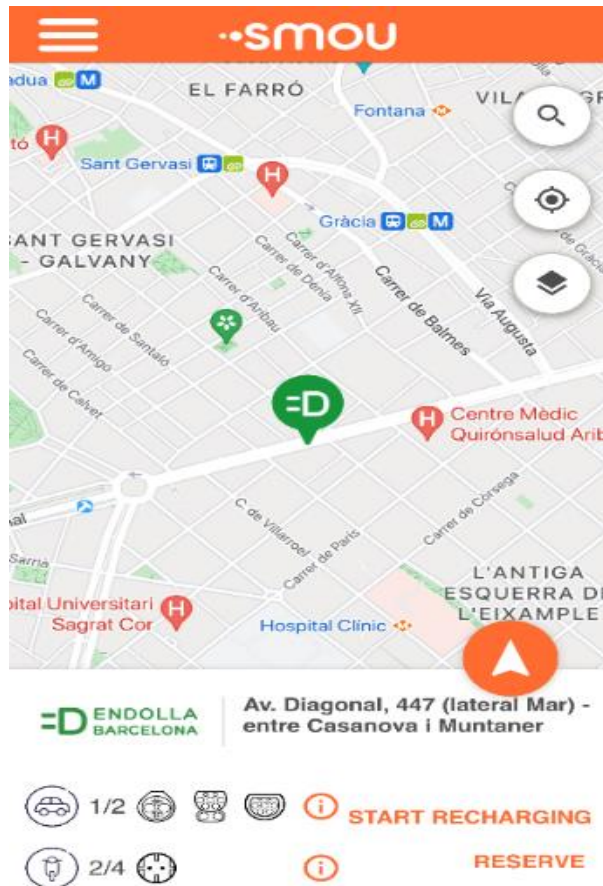


Navas Car park battery station

Use Case II-2: Enhanced booking service

Short term booking → already existing and functioning via de SMOU app (20' reservation)

Enhanced information → most of the new items are already in service and are offered to users

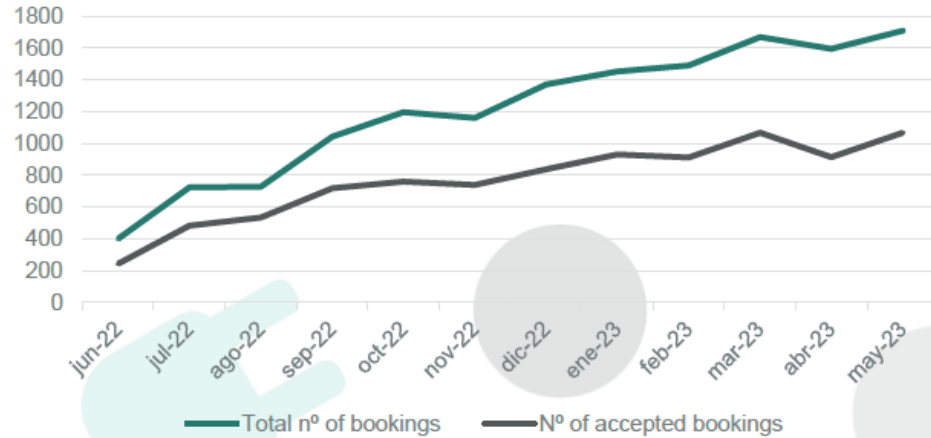




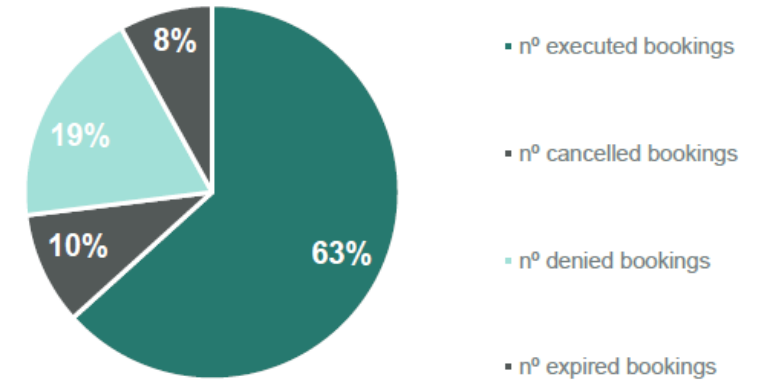
UCII-2: Enhanced booking service



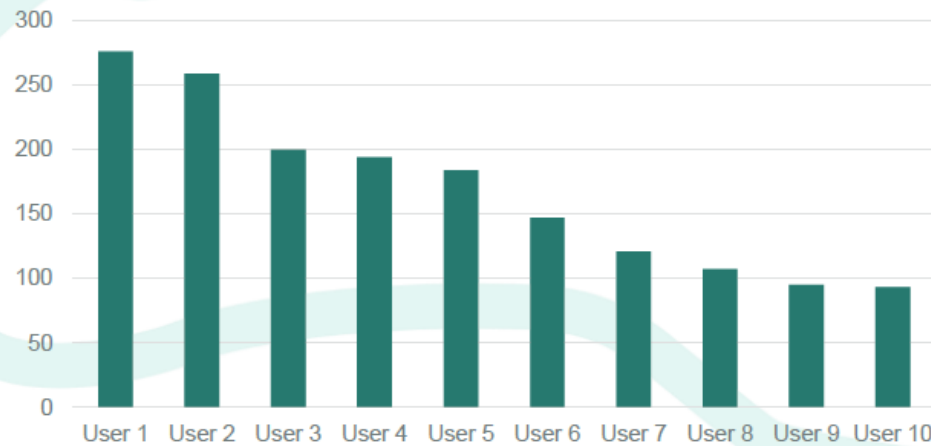
N° of bookings



Percentage of bookings



10 most frequent users



- The number of accepted bookings since June 2022 has increased four times.
- Only 63% of the bookings end up as executed charging sessions
- There are several users that use the service with a high frequency

UCII-3: Route planner

The beta version of the route planner is available at <https://planner.evway.net>

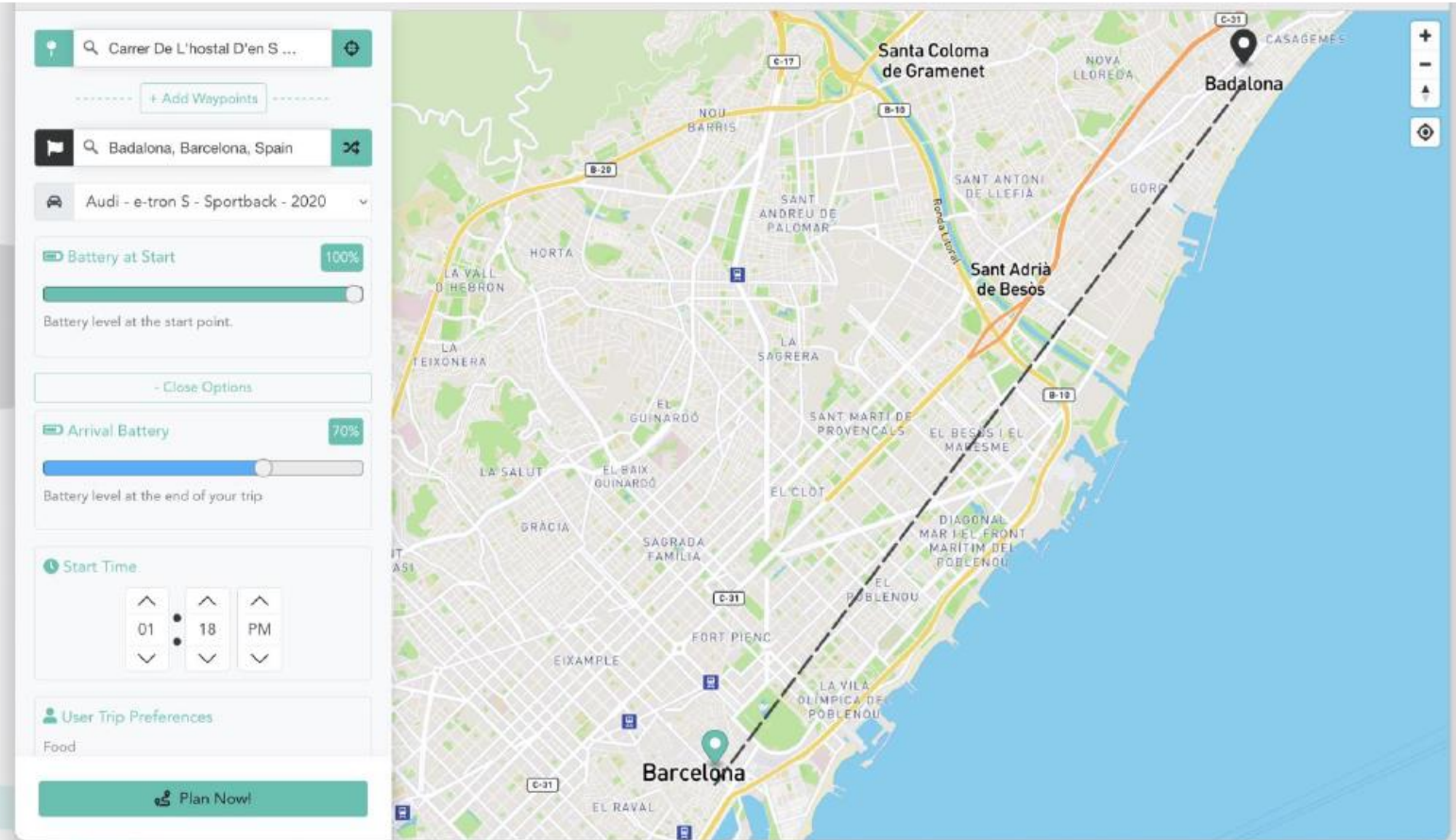
- In May 2023, BSM has given access via OCPI to BSM charging network

Input required:

- Starting point of the trip
- Destination
- Car model
- Battery at Start
- Arrival Battery
- Start Time
- User preferences
- Other advanced parameters

Output:

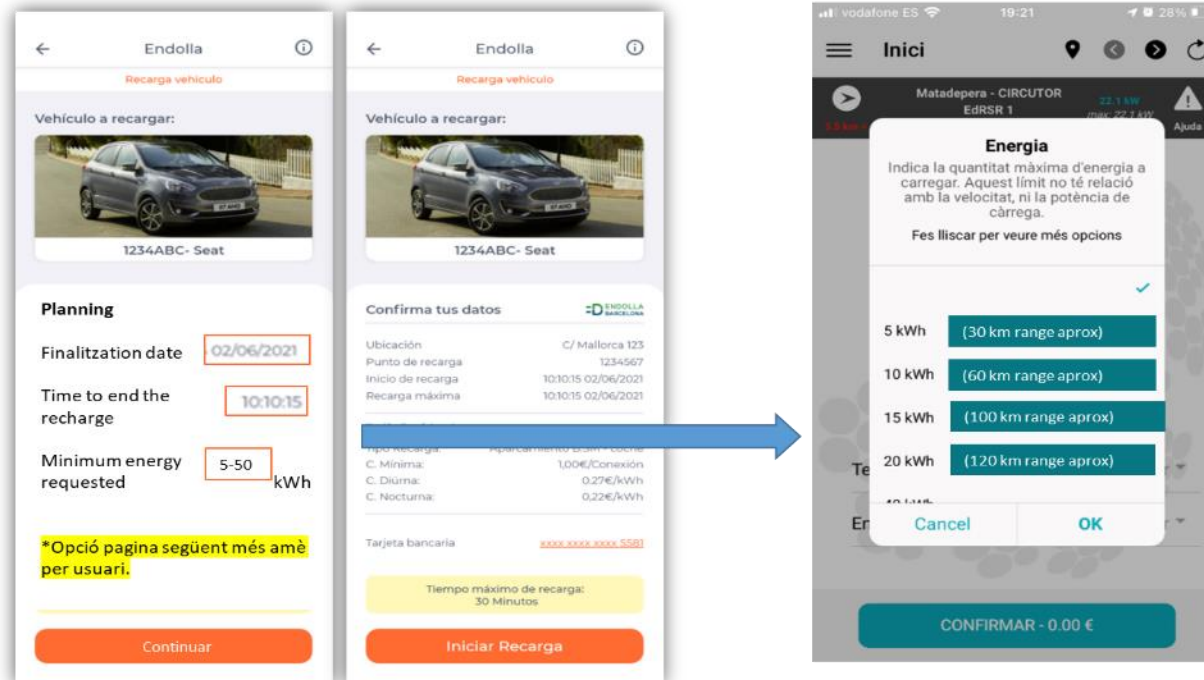
- If the input parameters allow enough degrees of freedom, the tool will offer different routes for the user to choose



Screenshot of the tool

Use Case II-4: Smart Charging

- **4 new charging points** have been renewed in the car park in order to upgrade the existing technology (OCPP 1.6). There are still two CP that have to be renewed. In total, 6 CP will be available for smart charging.



UCII-4: Smart Charging



Main figures

63 planned sessions between march and july 2023

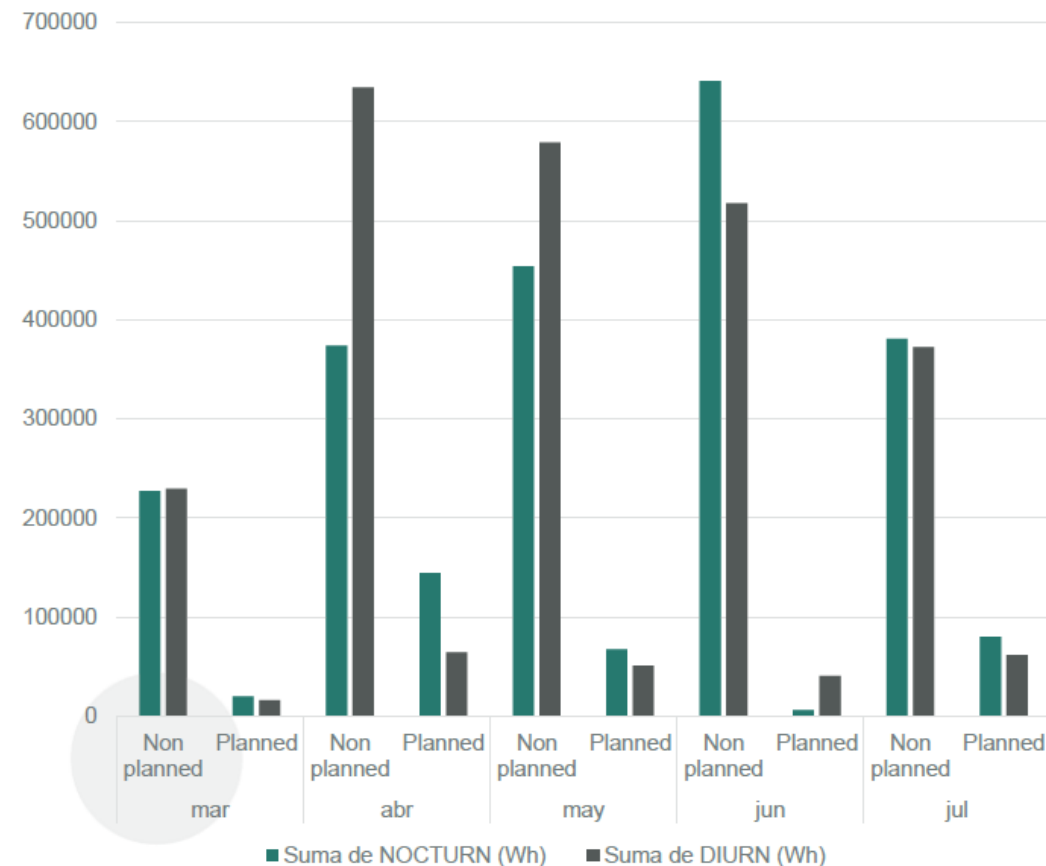
16,5 hours of charging flexibility

9,27kWh of energy charged by flexible users

0,31€ saved per charging session due to flexible charge (night charge)

2,5 planned charging sessions on average done by same user.

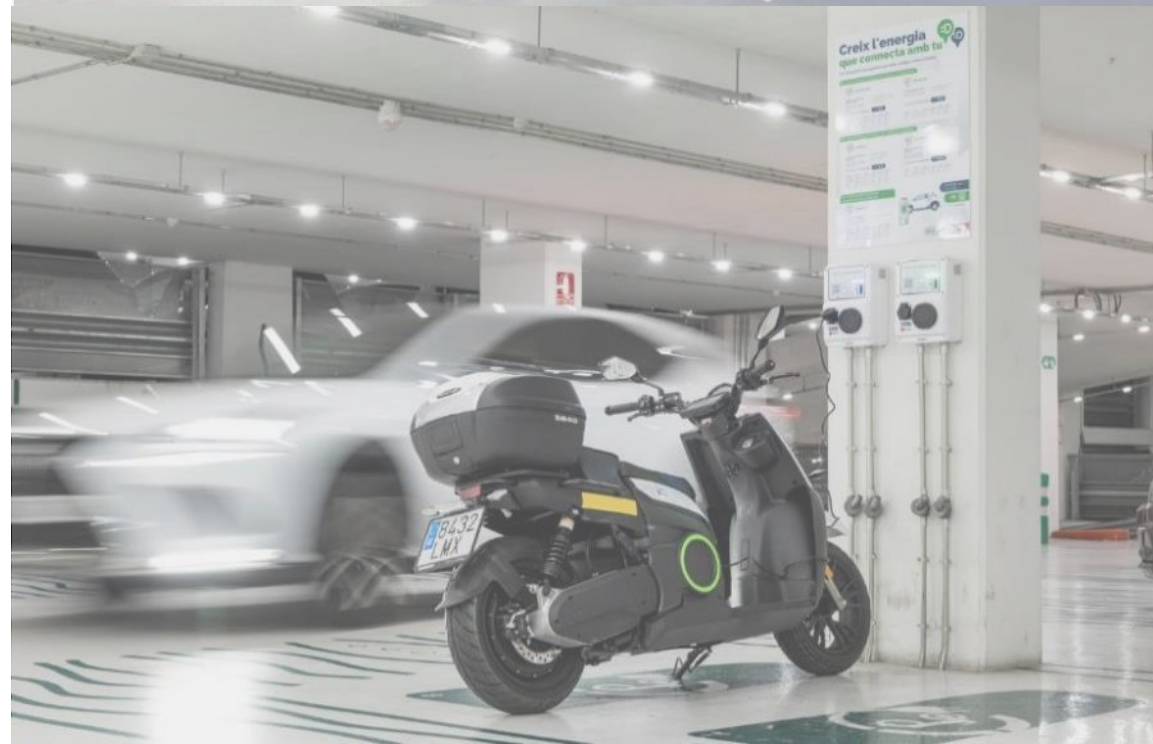
60% of the users have a positive opinion of the service and think that it should be available in all the car park network



The energy charged in the planned sessions, is higher at night time, compared to the non-planned charges

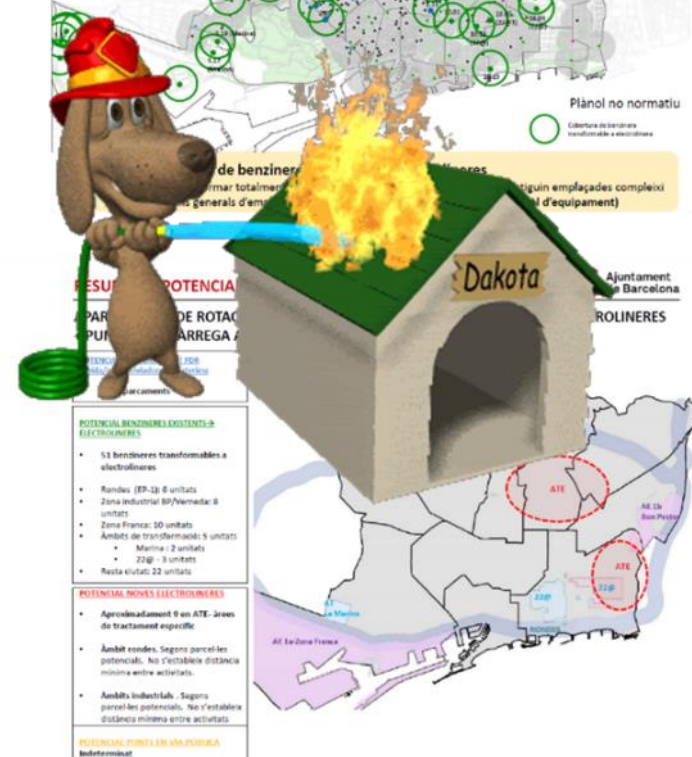
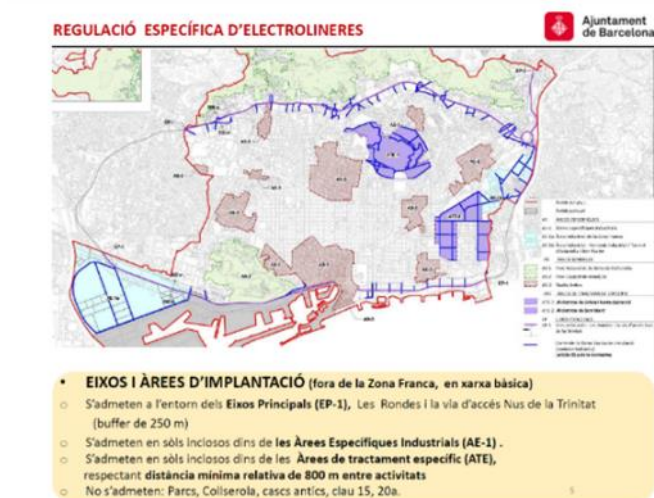
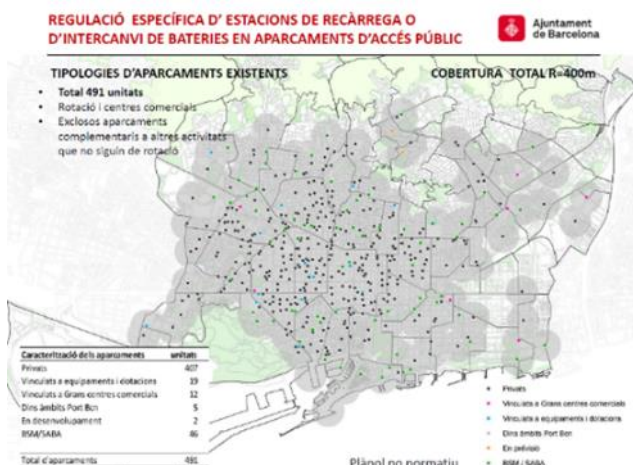
ENDOLLA challenges in the context of InnovAction 2030 program

- Mobile and flexible charging point
- Low power economic charging point



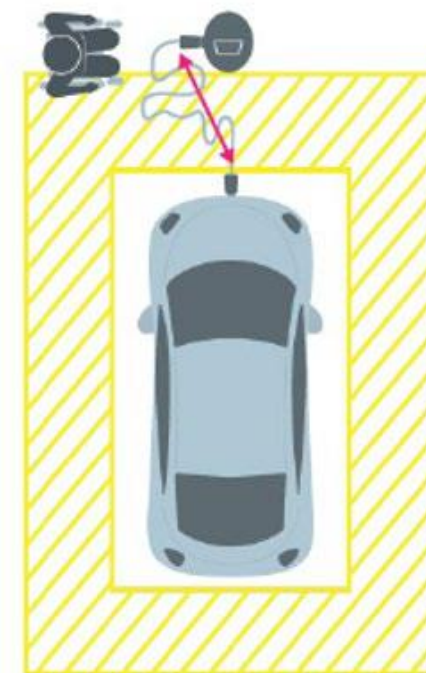
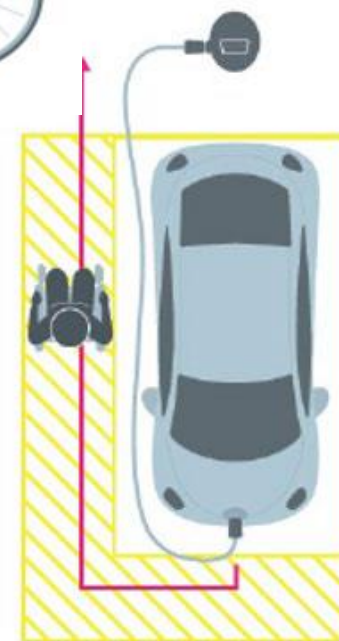
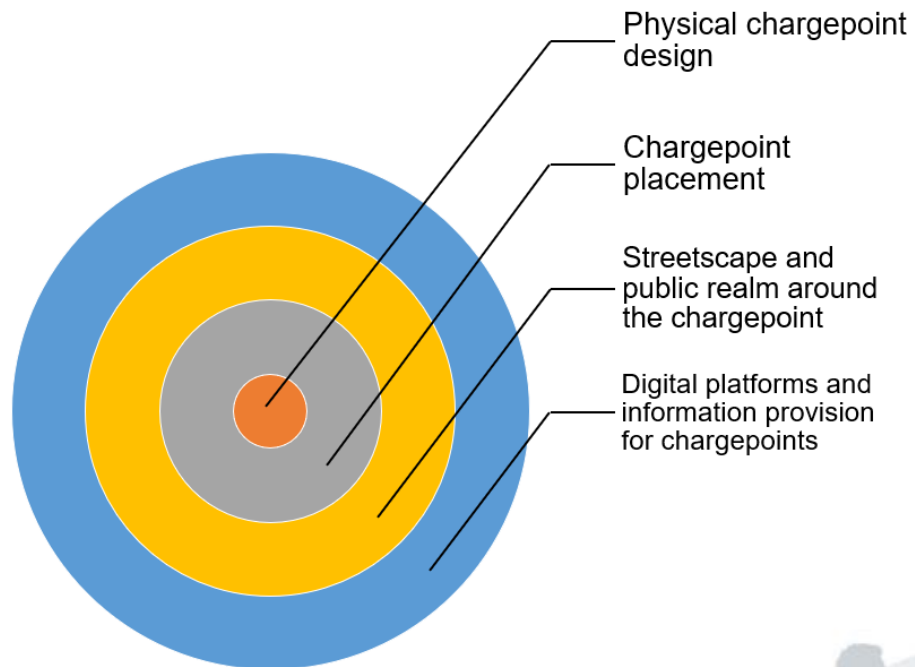


UPPS - Fire safety issues... unknown hazards





Accessibility issues 2024 – New Regional Accessibility Code





**Thank you for
your attention!**



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