



eCharge4Drivers is co-funded by the EU under the H2020 Research and Innovation Programme (grant agreement No 875131).



Electric Vehicle Charging Infrastructure for improved User Experience - A priori User Survey

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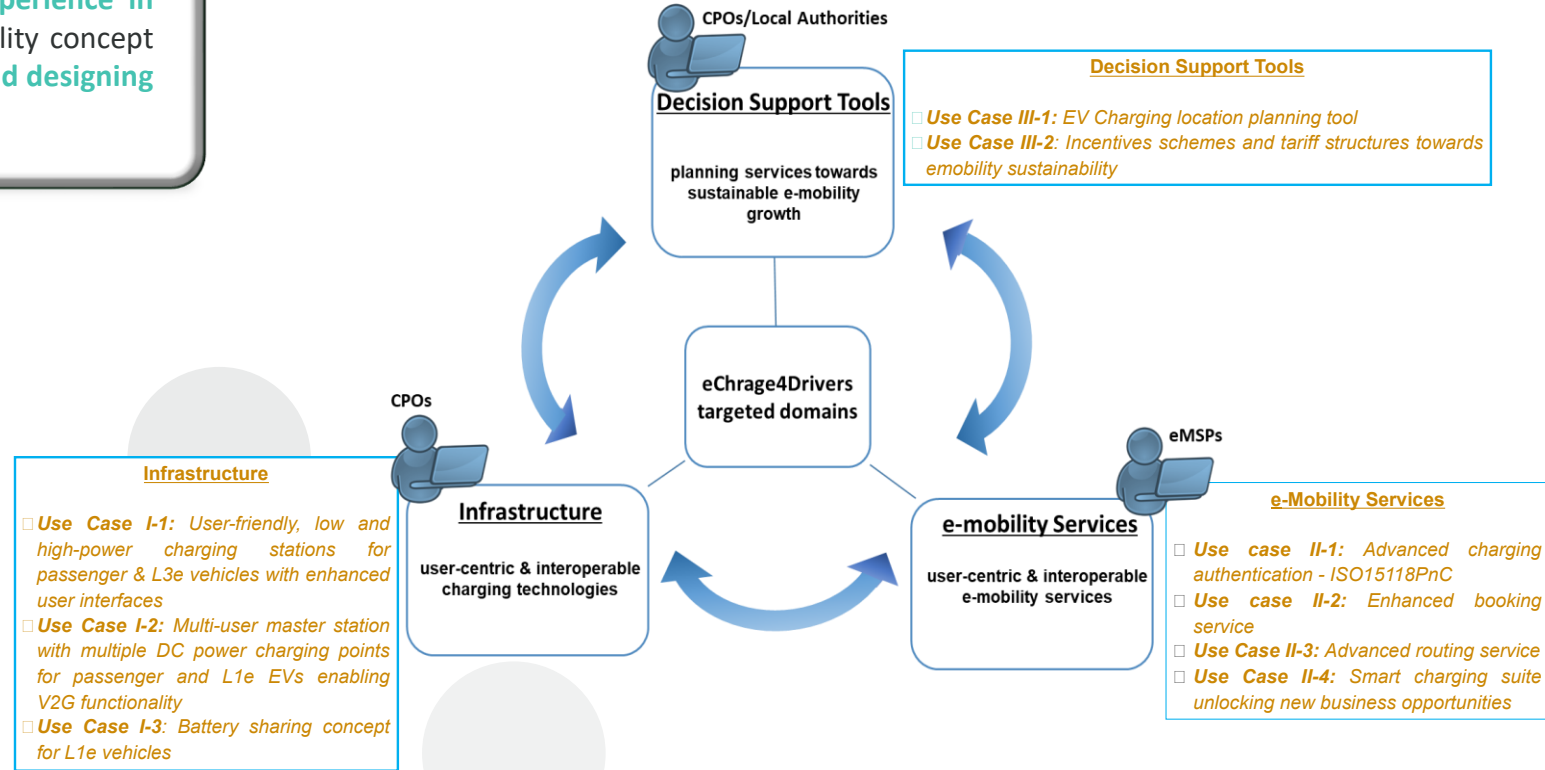


eC4D in a nutshell



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**.

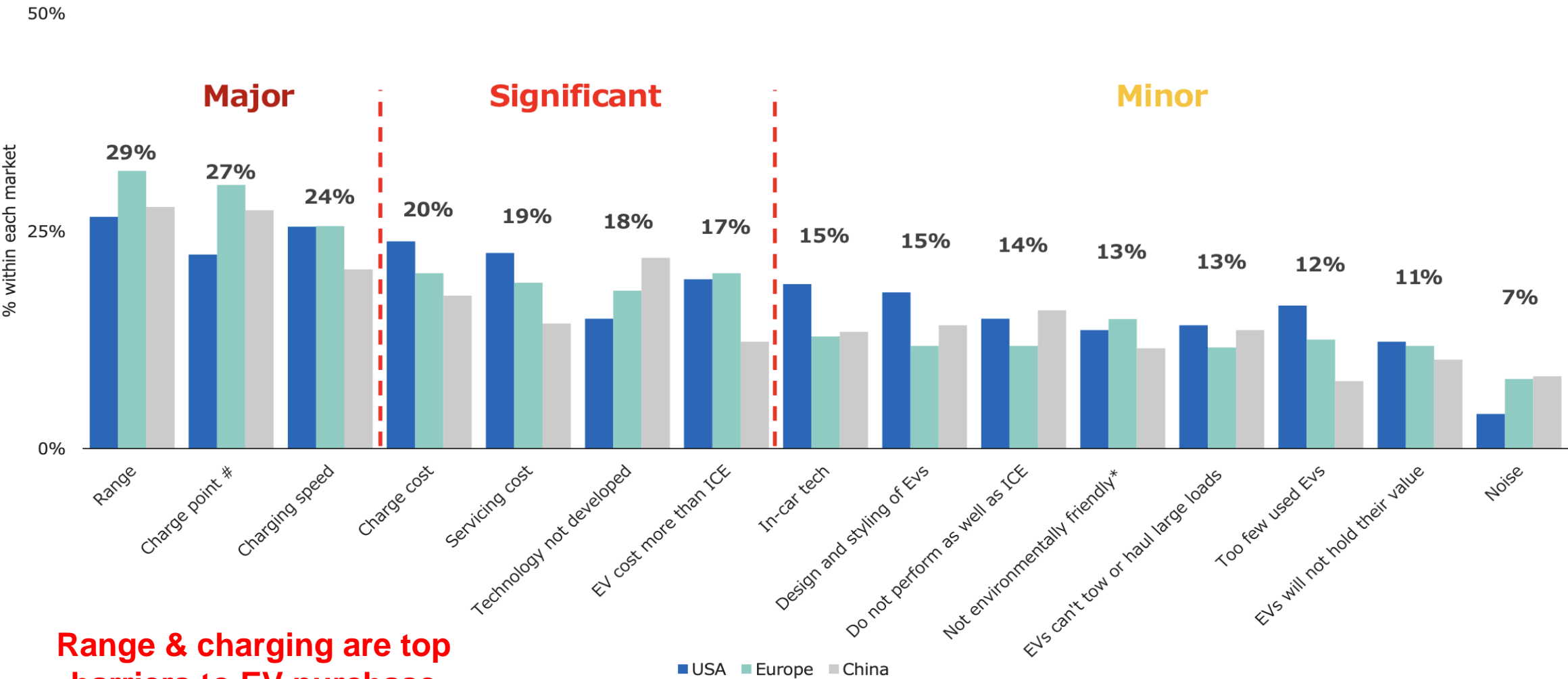


@Charge4E
@eCharge4Drivers
www.echarge4drivers.eu



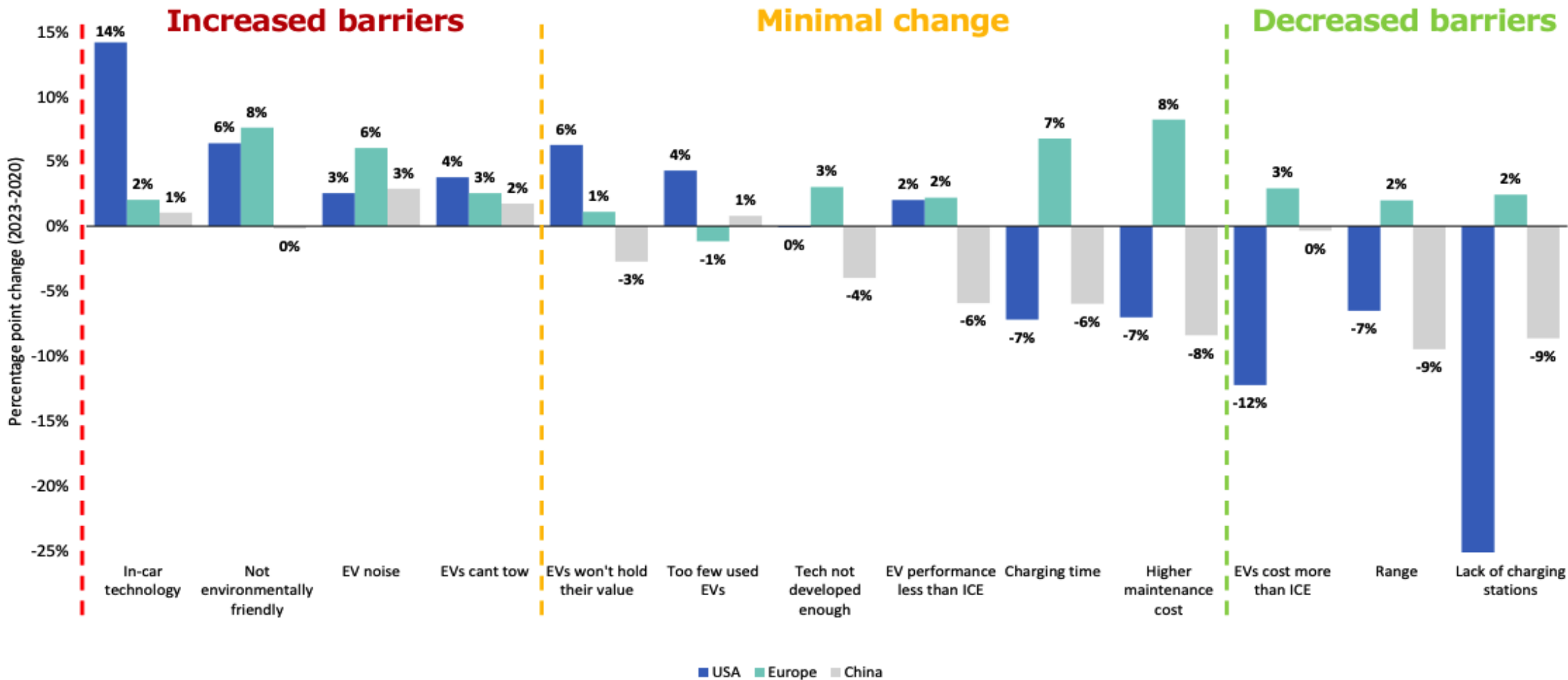
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User's e-mobility concerns



Range & charging are top barriers to EV purchase

User's e-mobility concerns



Comparison of SBD report 222 survey data set (2023) compared to SBD report 208 (2020)
Question: Which of the below reasons might prevent you from buying an electric car as your next car?
2023 n=800 EV considerers only, 2020 n = 3,096 EV considerers only

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**
- Smart charging flexibility - 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 - 8/03/2021
4.703 participants, 2.966 eligible respondents

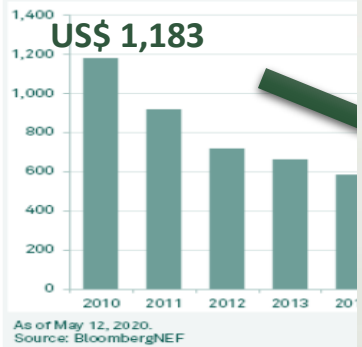


eC4D response to user's concerns



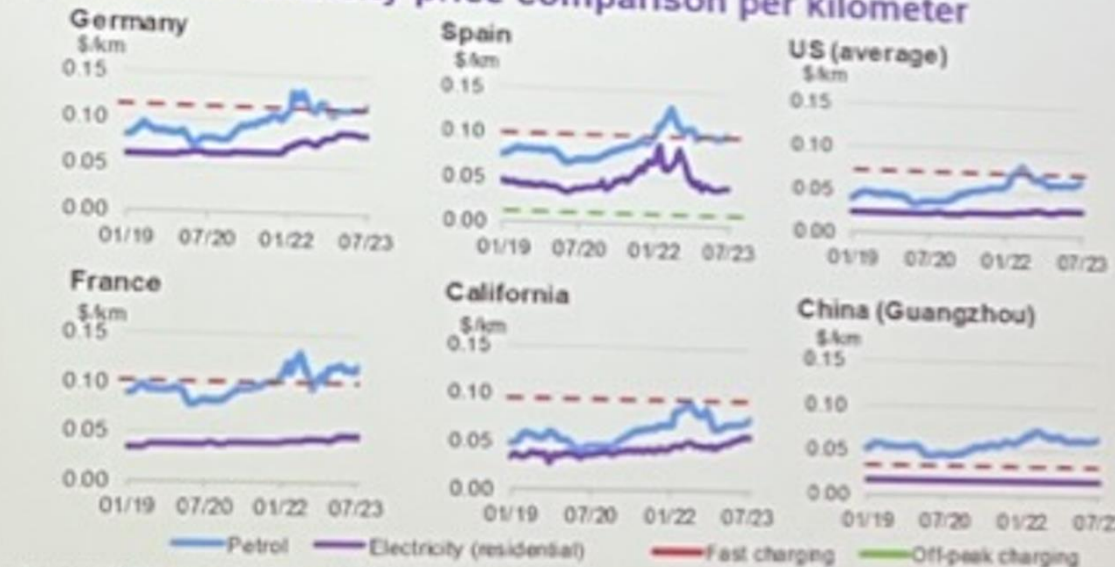
Battery cost reduction $\approx -90\%$

Battery pack price (US\$/kWh)



Electricity prices are still cheaper than petrol in most countries

Petrol and electricity price comparison per kilometer



Source: BloombergNEF, Eurostat, US Energy Information Administration, European Commission, Fastned, EVgo, CAMS. Note: Assumed efficiency of 0.18 kWh/km for electric vehicles and 5.7 litres per 100km for petrol vehicles. Exchange rate assumed: \$1 = 7.27 yuan, \$1 = €0.93 euro.

19 September 14, 2023

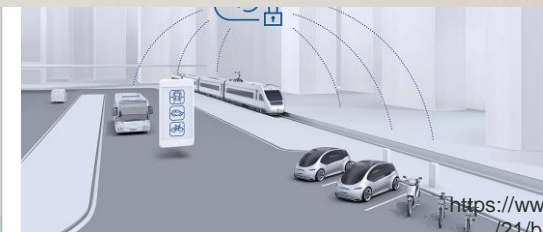
Fast charging prices

FASTNED	\$0.75/kWh Germany
	\$0.64/kWh France
EVgo	\$0.53/kWh Sacramento
CAMS	\$0.2/kWh China

Battery leasing – Battery swapping



- Pricing policies should be implemented for mobile applications as well
- Dynamic prices are being implemented not only at home level. According to research (2023), almost all countries have dynamic rates at public charging stations
- Ad-hoc payment with cash or credit cards

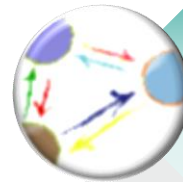


Source:
<https://www.electrive.com/2018/02/21/bosch-bundles-e-mobility-parts-services-systeme/>

eC4D response to user's concerns



User friendly charging stations with enhanced information to users



Interoperability (standards, roaming, PnC) – lack of standardisation for battery swapping



Advanced e-mobility services facilitating user's accessibility and charging experience (routing, booking, smart charging)



Communicate e-mobility concept and its benefits especially in urban environments

eC4D response to user's concerns



Diverse charging technologies in respect to user's needs (public/private, AC/DC)



Planning the adequacy of the (public) charging network considering grid constraints



Roaming maximising usability of existing charging network



Incentives to support the wide deployment of charging infrastructure (i.e incentives)

Enhanced Smart Charging Services



Successful deployment and operational at demonstration sites

Underground parking Porta de Sarrià in Barcelona: Public

- Charge infrastructure operated by BSM
- Charge points OCPP 1.6: 12 × 3.7kW



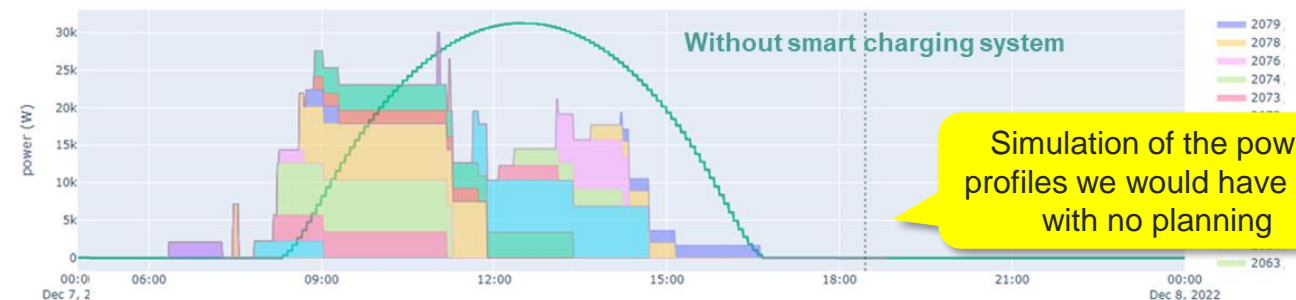
INES – CEA Charge infrastructure : R&D Center

- EV parking PV: 50 kWc
- Charge points OCPP 1.6 : 6 × 7kW and 6 × 22kW



Daily report

19	151.3 kWh	170.1 kWh	140.5 kWh	93 %	10.9 kWh	100.4 kWh	66 %	50.9 kWh	100 %
Charging sessions	EV energy transferred to the vehicles (~1008.88 km)	PV energy	Self-consumption	Self-production ratio	Grid energy taken from the grid	Uncontrolled self-consumption	Uncontrolled self-production ratio	Uncontrolled grid energy taken from the grid	Theoretical maximum self-production ratio PV energy / EV energy



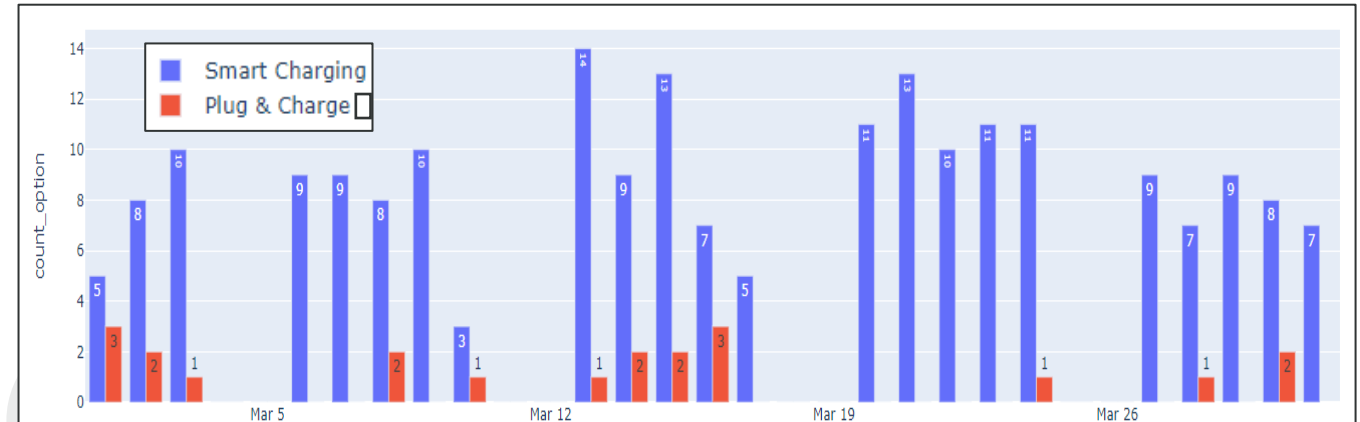
Enhanced Smart Charging Services



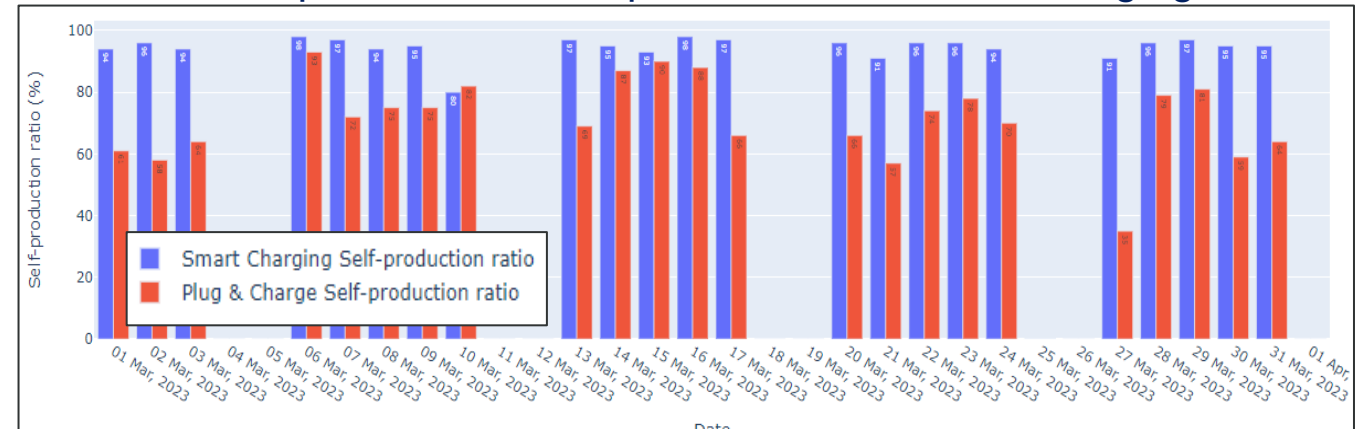
Follow-up / KPI analysis for INES-CEA site

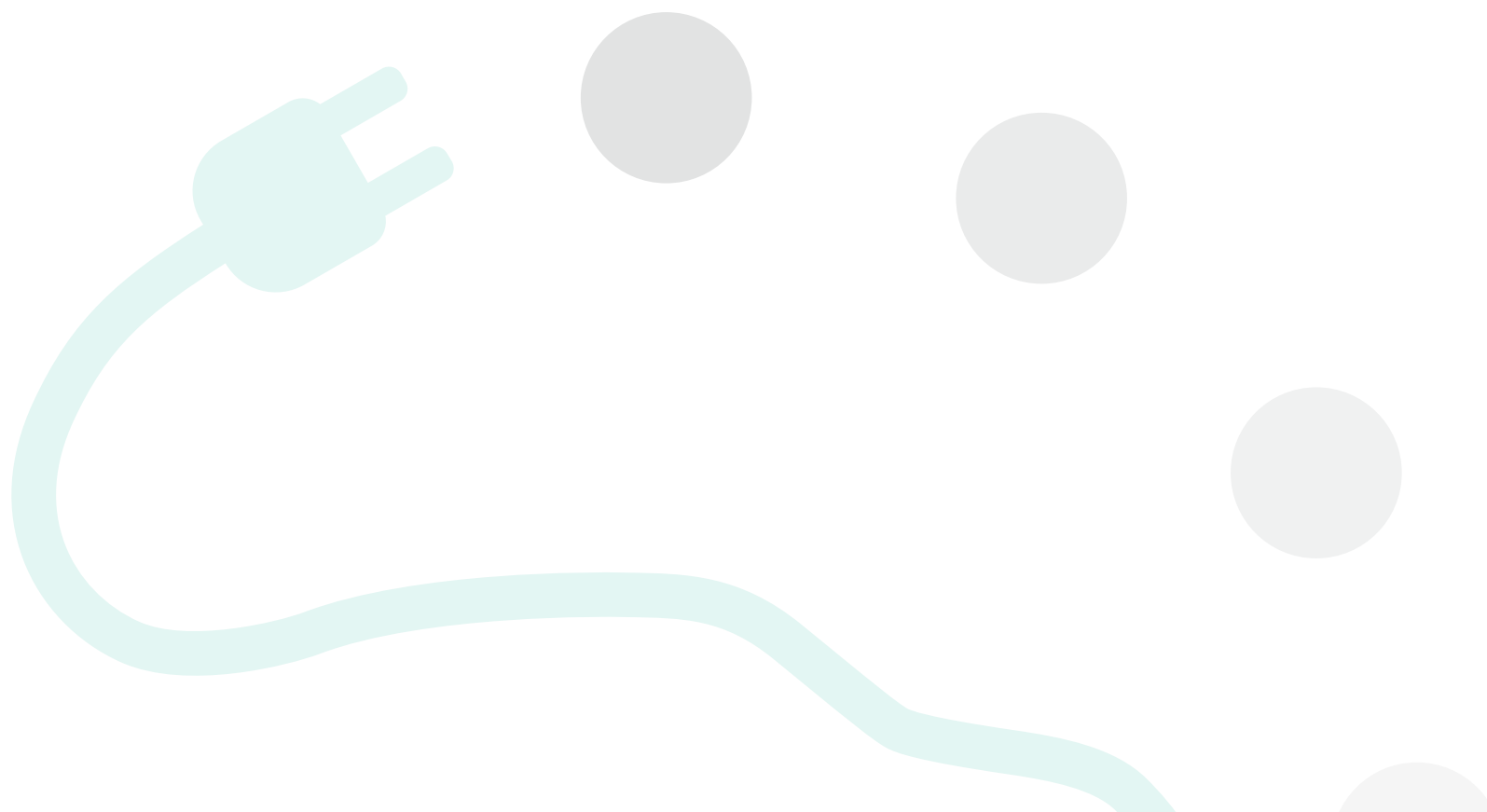
- **+20 EV users** participate to the demonstration
- EV types: **12 models**
- **+1023 charging sessions** carried out
- Energy transferred to vehicles: **~7500 kWh**
- Charging **cost reduction** with smart charging using PV energy **~18.8%**
- Most EV users charge more than **4 times per week**
- Charging time flexibility given by EV users : **4 to 8 hours**

Smart Charging use ratio more than 90%



Self-production ratio up to 95% with Smart Charging







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