eCHARGE 4DRIVERS

Electric Vehicle Charging Infrastructure for improved User Experience

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

Call identifier: H2020-LC-GV-2018-2019-2020

Topic: GV-10-2017 “Demonstration (pilots) for integration of electrified L-category vehicles in the urban transport system”

EC funding: 14,424,526.39 €

Duration: June 2020 – May 2024

12 countries – 30 Partners – 10 demonstration areas

eCHARGE 4DRIVERS

PARTNERS:

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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eCharge4Drivers – Demonstration Activities

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 enabling V2G functionality*

Use Case I-3*: Battery sharing concept for L1e vehicles*

e-Mobility Services

Use case II-1: *Advanced charging authentication - ISO15118PnC*

Use case II-2: *Enhanced booking service*

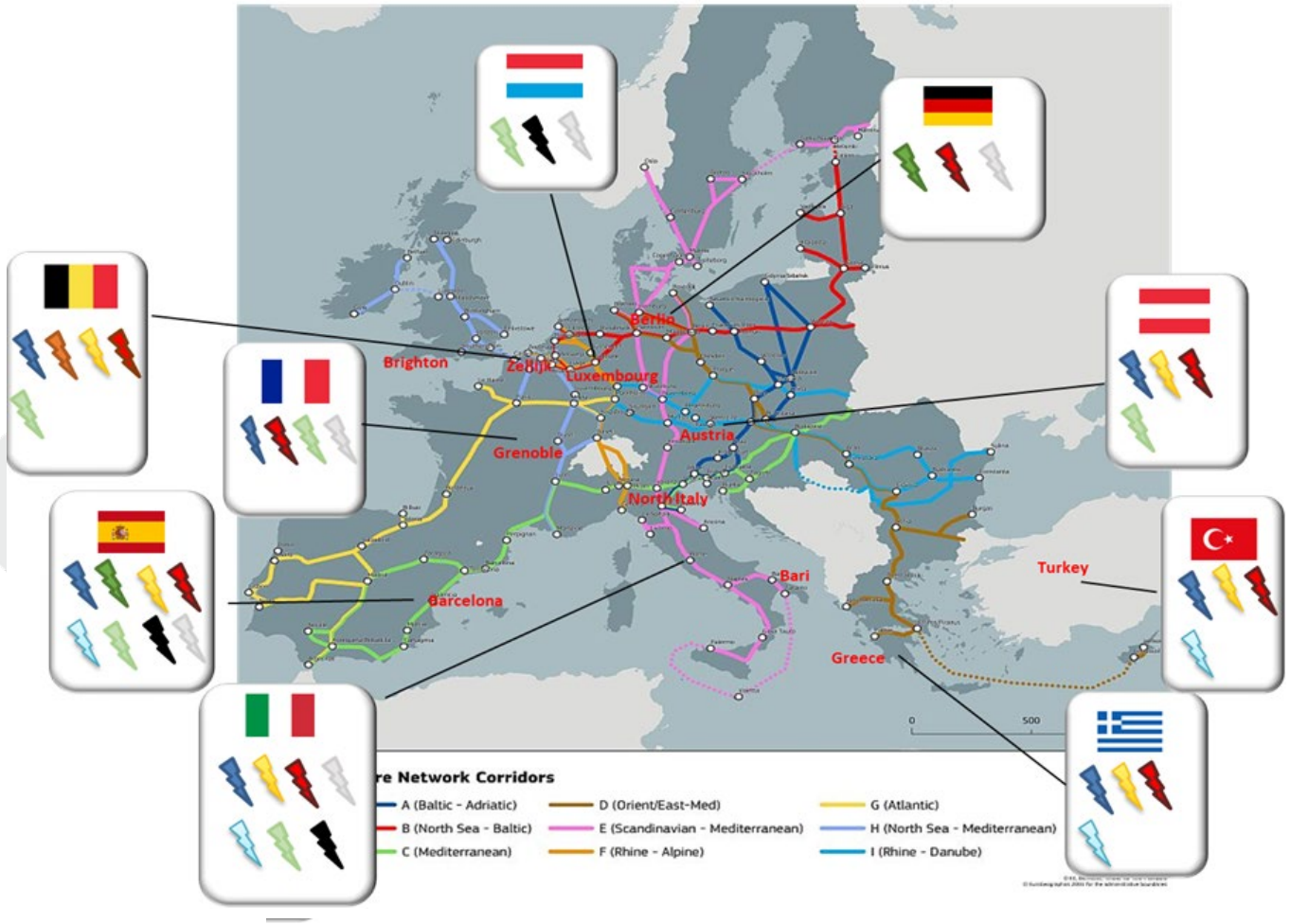
Use Case II-3: *Advanced routing service*

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 emobility sustainability*



Metropolitan areas:
Zellik, Grenoble, Barcelona, Bari, Berlin, Luxembourg

TEN-T corridors
Austria, Greece, Turkey, N. Italy

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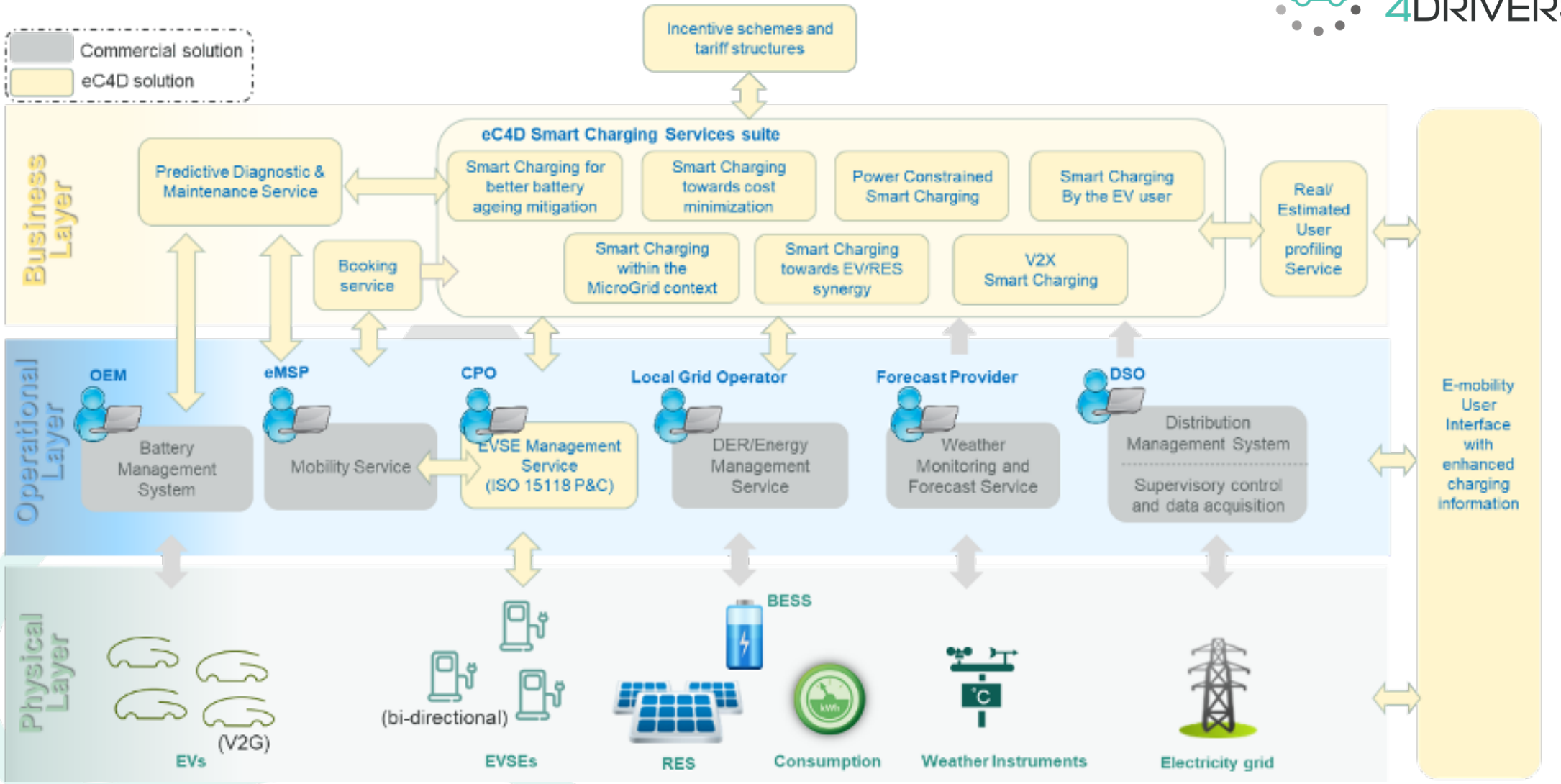
eCharge4Drivers – Smart Charging Solutions



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SCAN ME FOR
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Barcelona & INES-CEA demonstration

Smart charging EMS technology provider: CEA
Barcelona CPO: BSM
INES-CEA CPO: CEA

Sothun HING - CEA

Enhanced Smart Charging Services

CEA's EV Smart Charging solution overview

Controls **each charge point** energy consumption:

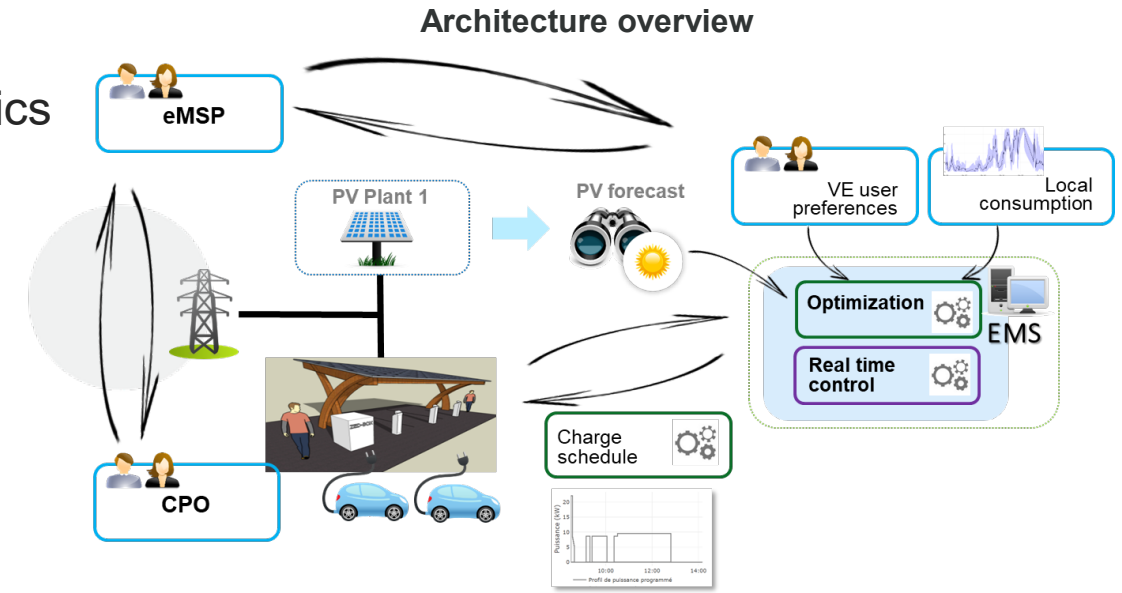
- To satisfy **users needs** (expected energy before departure)
- To satisfy every **electrical constraints** of the charging infrastructure
- To achieve specific **objectives** : minimising **CPO cost**, maximising the use of **local renewable energy**

Builds **optimized charging profiles** for the hours to come taking into account:

- The quantity of energy to transfer
- The charge point and EV charger technical characteristics

Deals with different types/brands of chargeBoxes:

- OCPP >= 1.6 is required
  (with support for charging profiles!)

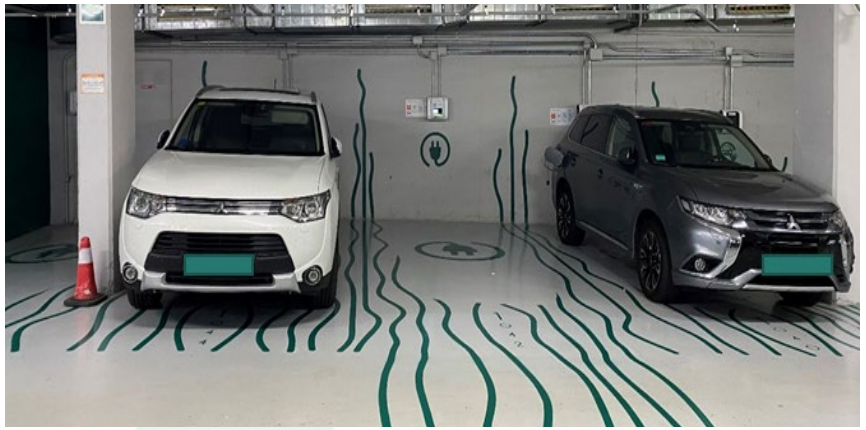


Enhanced Smart Charging Services

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

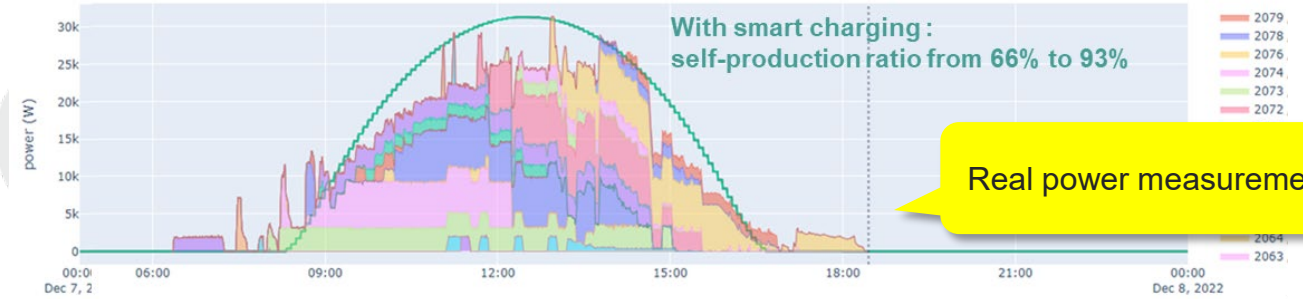


INES – CEA Charge infrastructure : R&D Center

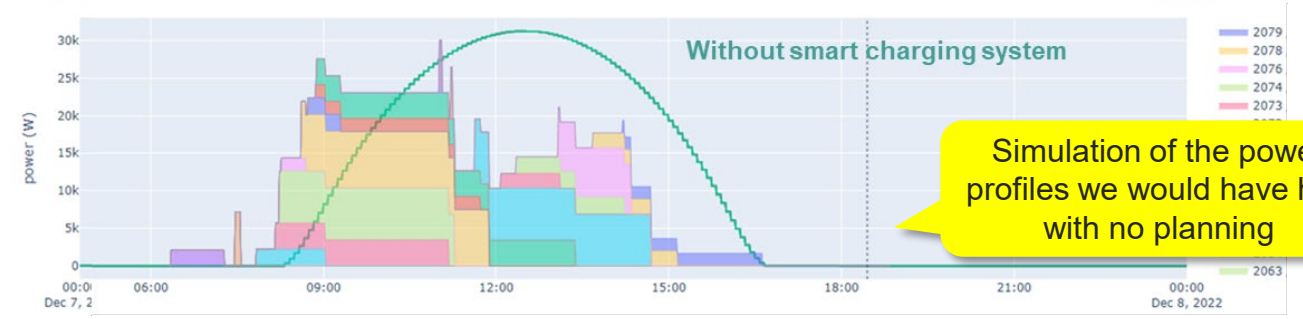
- EV parking PV: 50 kWc
- Charge points OCPP 1.6 : 6 × 7kW and 6 × 22kW

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 Energy transferred to the vehicles (~1008.88 km)	PV energy	Self-consumption	Self-production ratio	Grid energy Energy taken from the grid	Uncontrolled self-consumption	Uncontrolled self-production ratio	Uncontrolled grid energy Energy taken from the grid	Theoritical maximun self-production ratio PV energy / EV energy



Real power measurements



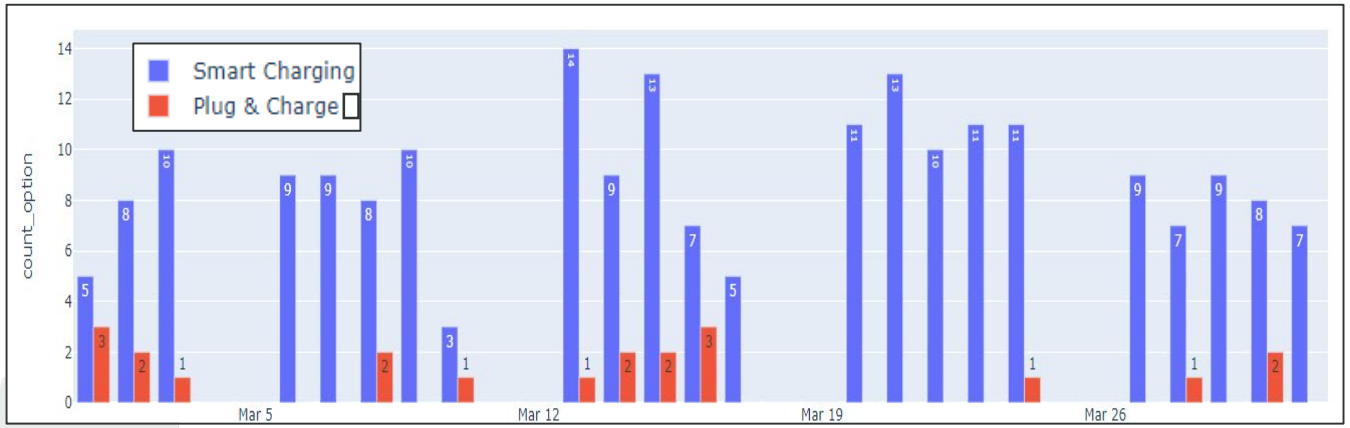
Simulation of the power profiles we would have had with no planning

Enhanced Smart Charging Services

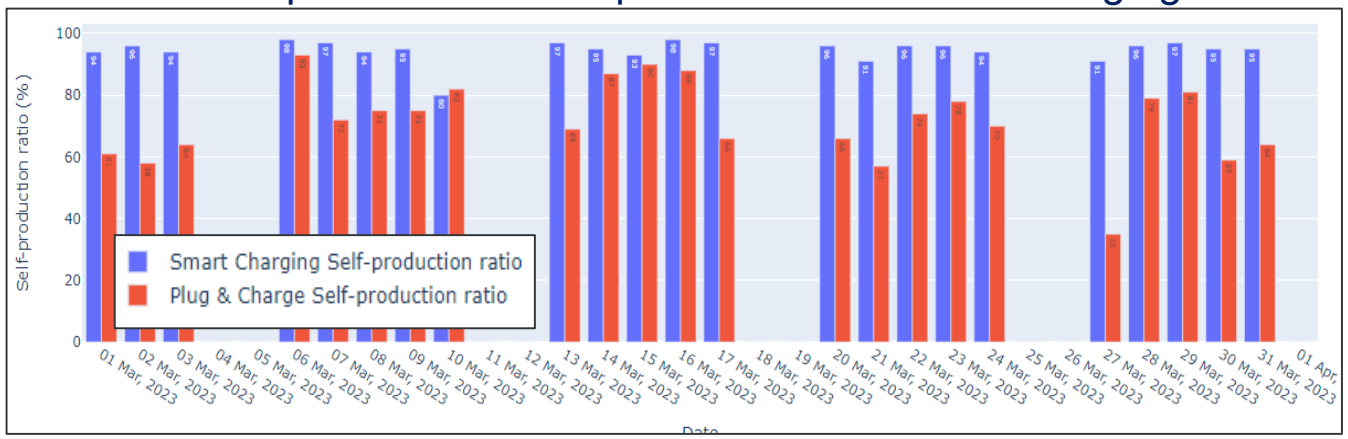
Follow-up / KPI analysis for INES-CEA site from January to March 2023

- **+20 EV users** participate to the demonstration
- EV types: **12 models**
- **+1023 charging sessions** carried out
- Energy transferred to vehicles: **~7500 kWh (~48 666 km)**
- 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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Luxembourg demonstration

Smart charging with locally produced renewables

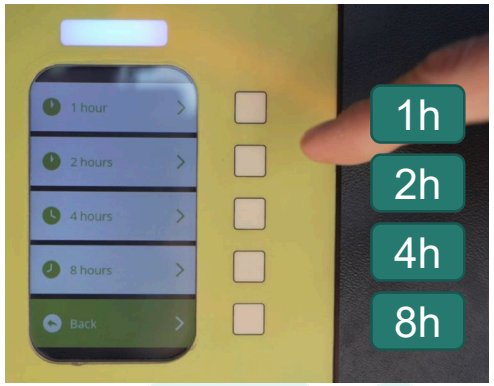
CPO: Luxembourg S.A.

Partner: Nexxtlab S.A.

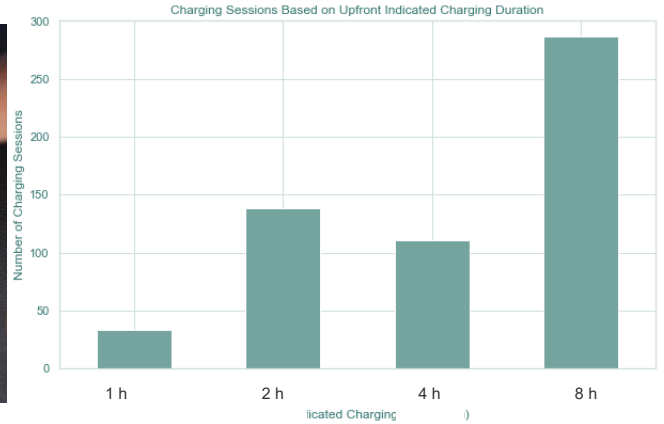
Christoph Emde - Nexxtlab

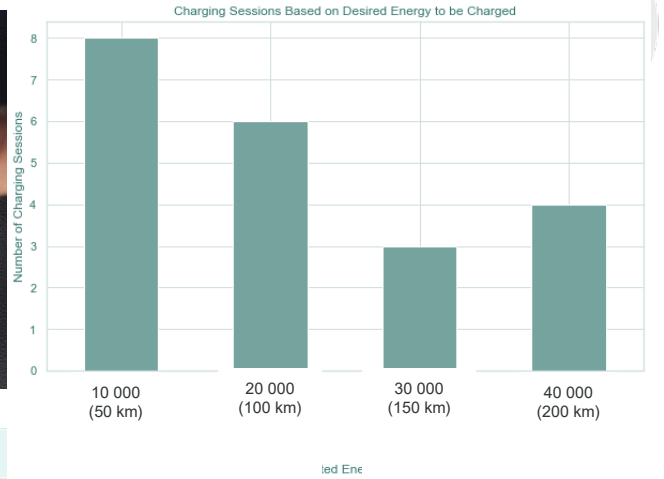
[Watch the video here!]

User preferences allowing for charging flexibility

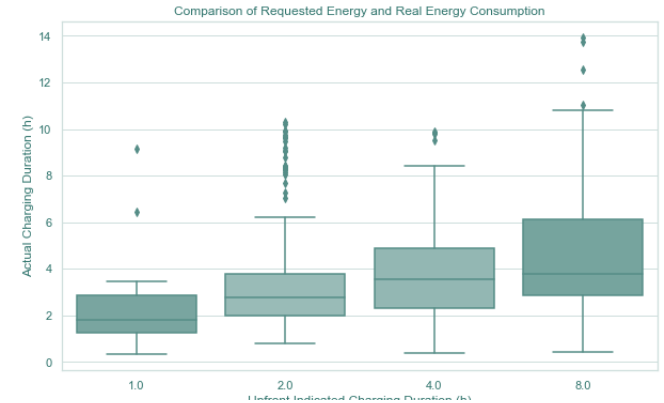


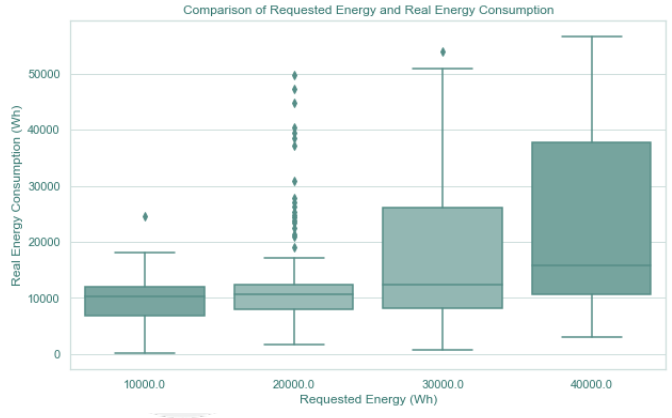
User interface





What users indicate upfront





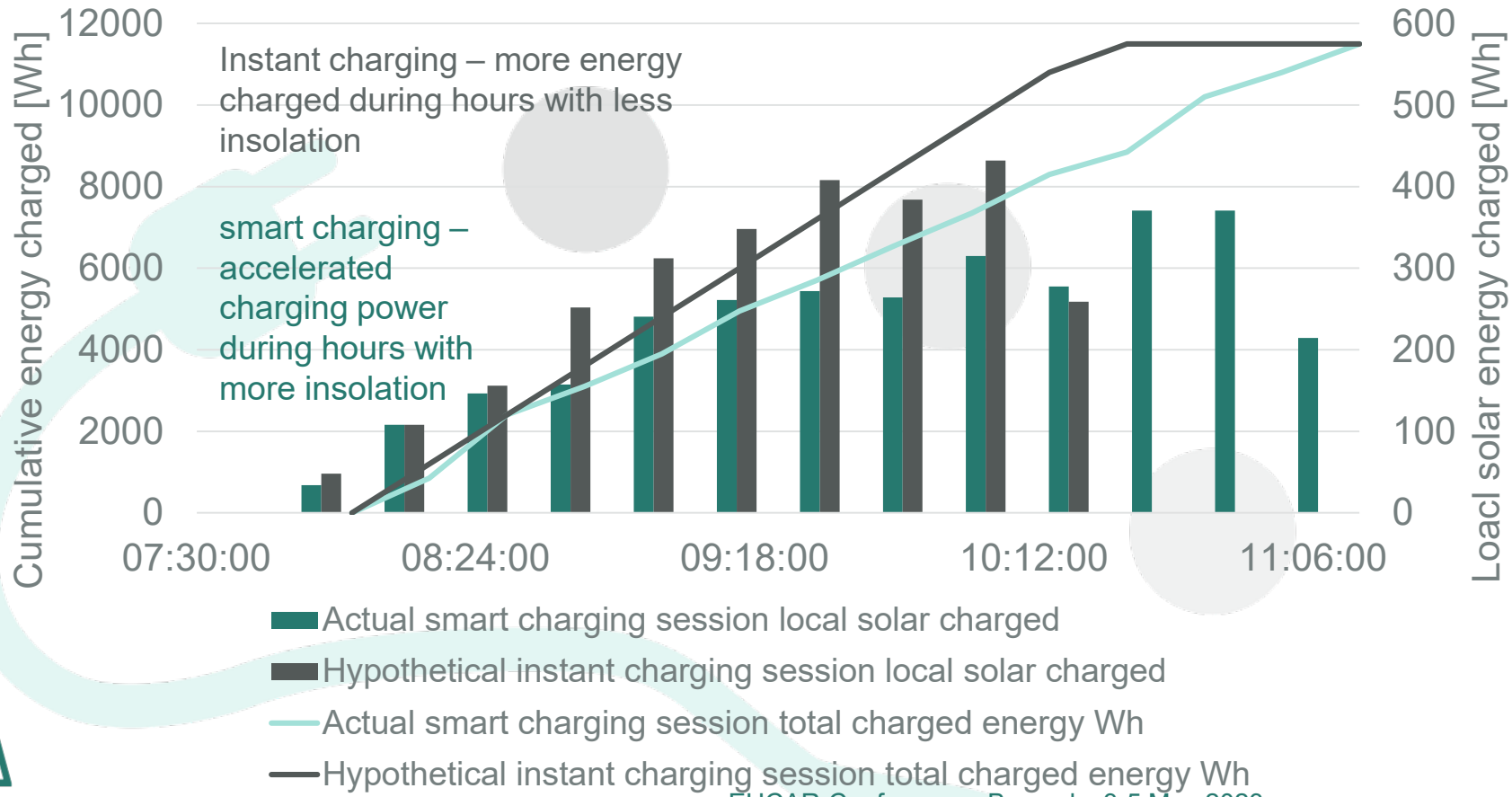
Actual with indicated

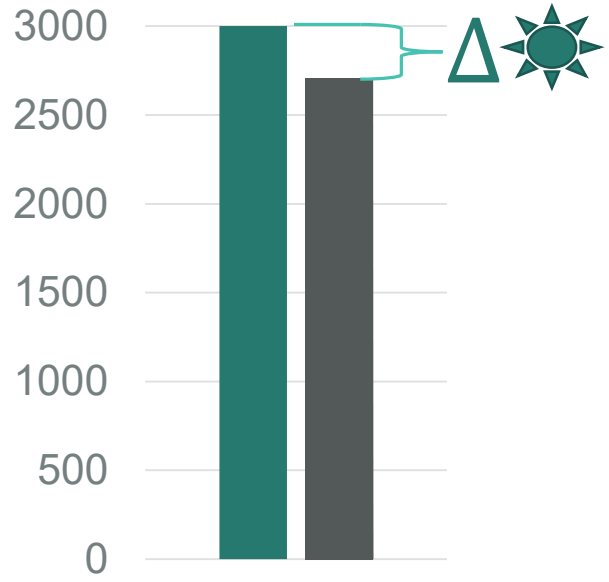
- Users typically indicate they stay for 8 hours
- Their charging terminates after less than 4 hours

- Many users indicate they need 50 or 100 km of range.
- Most charging sessions end with around 10 kWh charged, the equivalent of 50 km range

Smart charging allows to use 25.6% more locally produced solar energy on average

Below example of a (random) charging session from 21/11/2022:
For each true ***smart charging session***, a ***hypthetical session*** is derived that would have started with the maximum measured current instantaneously and terminated with the same session consumption.





More locally produced solar energy is charged ***with smart charging*** as compared to a ***hypothetical instant charging***.

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Zellik demonstration

Smart charging EMS technology provider: VUB & Powerdale
CPO: Powerdale

Cedric DE CAUWER – VUB

Enhanced Smart Charging Services

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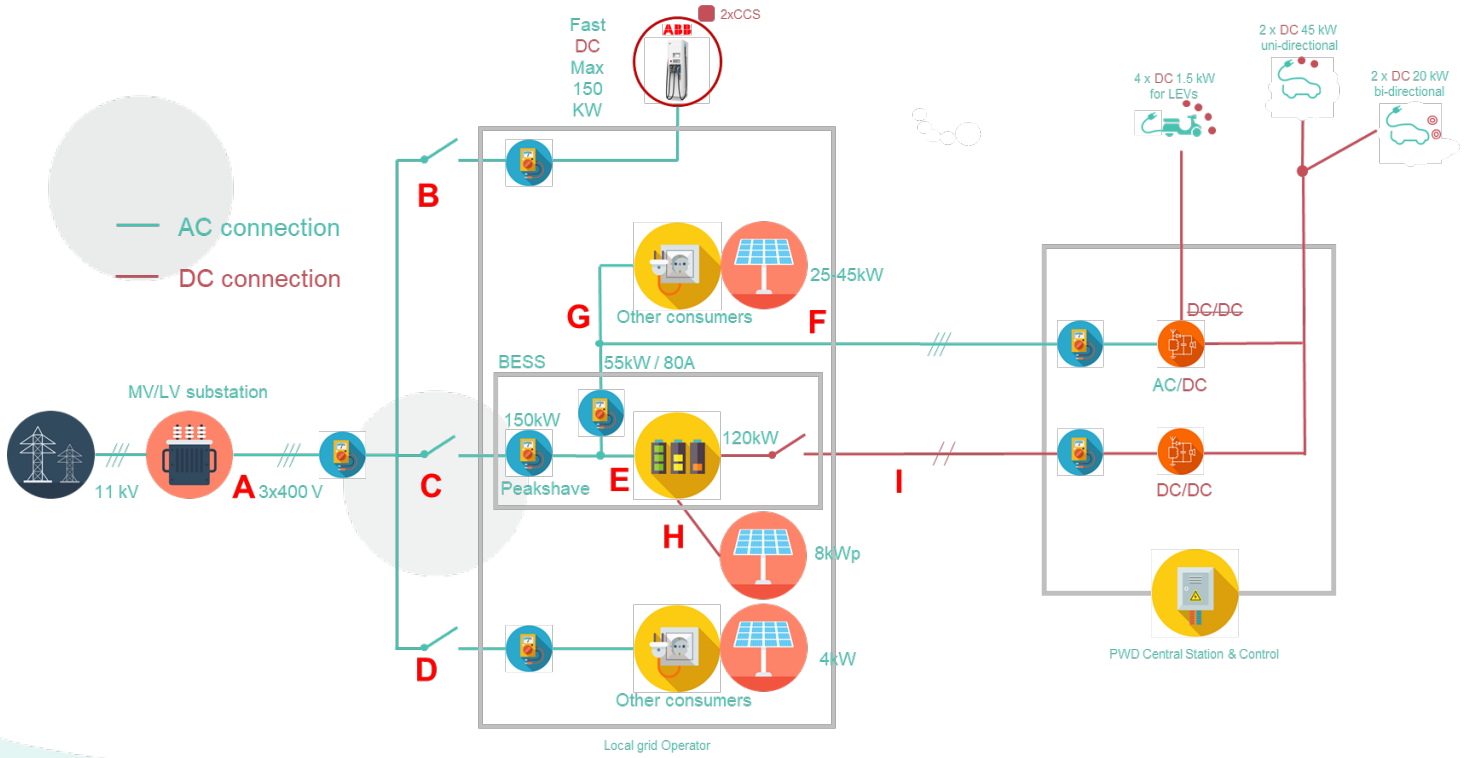
Objective :

- ✓ ***Microgrid optimization to maximize the use of RES and better integration of fast charging***
- ✓ ***Smart charging to offer lower cost to the user, enable V2G operation and meet grid power constraints***

Site characteristics:

- ✓ *Multi-operator site (2xCPO, 1 local grid manager)*
- ✓ *Multiple consumers, multiple PV-installation, BESS*
- ✓ *DC-charging, Fast Charging (150kW), V2G*

Architecture overview



Enhanced Smart Charging Services

Current status :

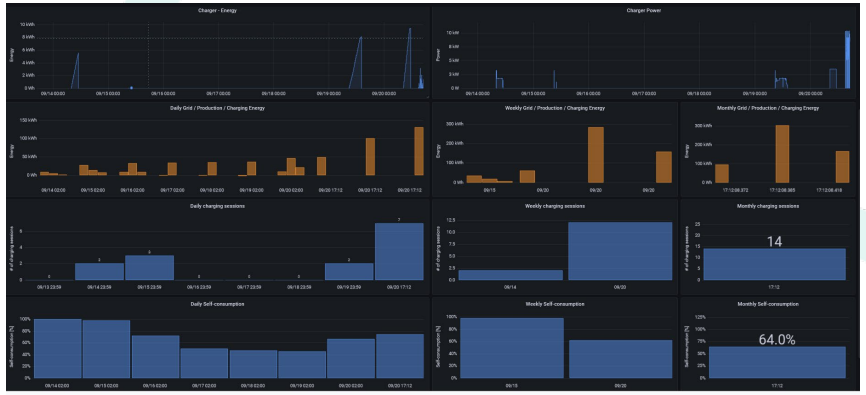
- ✓ *V2G operation with CCS connector by Powerdale tested in lab*
- ✓ *ABB fast charger commissioned and integrated in management system*
- ✓ *Driver input & charging status interface*
- ✓ *Deployment of smart charging with interface for status and KPIs*

EMS – real-time status interface

Power measurements

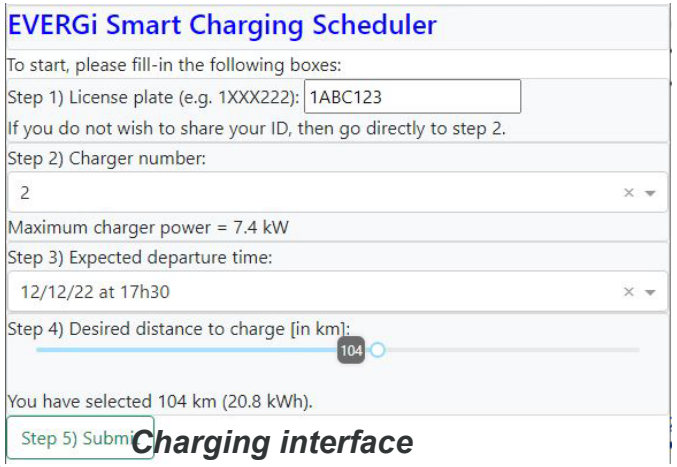
Power Forecasts

EMS – KPI status interface



- **Sessions**
- **Energy**
- **Cost**
- **Self-consumption**
- **Self-sufficiency**

Driver input interface



Charging interface

Enhanced Smart Charging Services

So far:

- 12 individual users participated
- Large portion (up to 80%) of inherent flexibility not indicated by users
- Need for incentivizing participation or linking with pricing

Next steps:

- Commission Powerdale DC V2G chargers
- Integrate Powerdale chargers and smart charging into local grid management system
- Conduct energy management demonstration over multi-month period
- Assess user acceptance
- Assess performance of overall multi-level EMS

Are you interested in learning more about eCharge4Drivers and our solutions? Follow us!

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