#ETIPSNET

ENLIT EUROPE – EU Project ZONE

Smart charging: a win-win solution, not a Trade-Off

15.50 – 17.00
30 November 2022

Moderated by Santiago Gallego Amores

Agenda

15.50 – 15.55	**Opening the session by the Moderator** Santiago Gallego Amores – ETIP SNET WG1 Co-Chair
15.55 – 16.05	***Digitalising the energy system - EU action plan – implication on E-Mobility*** **-** Karsten Krause (Policy Officer DG ENEG Unit B5)
16.05 – 16.15	***Presentation of the ETIP SNET White Paper E-mobility deployment and impact on grids*** - Guillermo Amann – ETIP SNET WG1 Member
16.15 – 16.25	XFlex Project – Lola Alacreu Porject Manager at ETRA I+D
16.25 – 16.35	INTERCONNECT Project - David Emanuel Rua - Inesctec
16.35 – 16.45	REDREAM Project - Prof. Dr. Stéphane GALLAND - Deputy Director of CIAD
16.45 – 17.00	Panel discussion
17.00	End of the session

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Opening

Santiago Gallego Amores
ETIP SNET WG1 Co-Chair

Digitalising the energy system - EU action plan – implication on E-Mobility

Karsten Krause
Policy Officer
DG ENEG Unit B5

EU Action Plan for the Digitalisation of the Energy System

&

Implications on E-mobility

Twin Energy and Digital Transition

European Green Deal

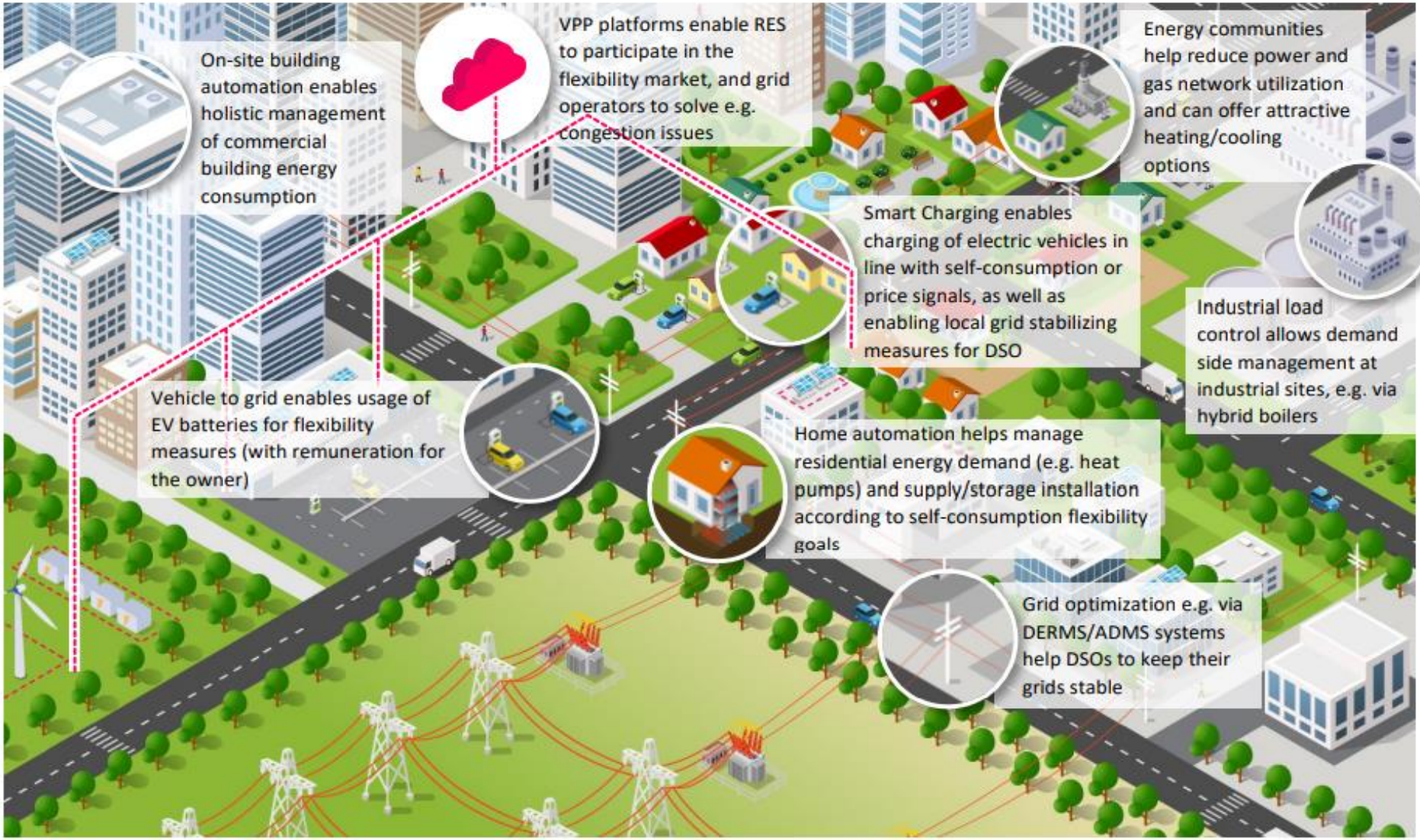
Europe fit for the Digital Age

a better-functioning, smart, integrated and interconnected energy system, where new business models can easily emerge in a fast-changing market.

European Commission

Relevance of Digitalisation

- Enabling factor for more resilience and an accelerated transformation of the energy system
- Market integration of technologies and services (prosumers, smart buildings, flexible loads, renewables, smart charging of electric cars…)
- Transition governance vs. “unguided” digitalisation with risks (market fragmentation, privacy, cybersecurity).
- Acceleration of investments in smart grids, contribution to security of supply



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Main areas of the Digitalisation Action Plan

European Commission

A European framework for sharing data to support innovative energy services

- Priority **high-level use cases**: (a) flexibility services, (b) smart charging of electric vehicles, and (c) buildings
- Developing a **Common European Energy Data Space** (interoperable framework of common standards and practices)
- Building on the energy and digital regulatory framework, including the Implementing Acts under preparation
- Creating an EU **Smart Energy Expert Group** with a ‘Data for Energy’ working group

European Commission

Increasing investments in digital energy infrastructure

- Creating a **digital twin** of the electricity grid with ENTSO-E and EU DSO Entity
- Supporting National Regulatory Authorities and ACER in defining common **smart grid indicators and objectives**
- Urging Member States to accelerate the rollout of **smart meters** and revisit their costs-benefits analysis when necessary

European Commission

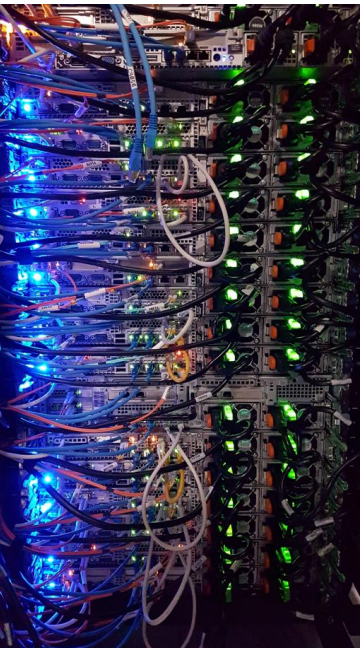
Empowering citizens

- Fitness Check of EU **consumer law on digital fairness**
- **Strategies to engage consumers** in the design and use of digital tools
- A **common reference framework for an app** helping consumers reduce their energy use, especially during peak hours
- Tools, guidance and a first-of-a-kind platform that facilitate the use of digital solutions in **energy communities**
- Large-scale partnership on the digitalisation of the energy value chain as part of the **EU's Pact for Skills**

Ensuring cybersecurity

- Complement **cross-sector legislation**, such as the NIS 2 Directive, the Cyber-resilience Act, and the proposed Council Recommendation on critical infrastructure
- With a **network code for cybersecurity aspects of cross-border electricity flows**
- And later a **delegated act on the cybersecurity of gas and hydrogen networks**

Energy consumption of the ICT sector



- **Eco-design and labelling of products**
  e.g. energy-label for computers
- Measures targeting **communication networks**
  e.g. EU code of conduct for their sustainability
- Measures targeting **Data Centres**
  e.g. environmental labelling scheme
- Measures targeting **crypto-assets**
  e.g. energy-efficiency label for blockchains

An EU-wide coordinated approach

- Increasing investments in digital solutions in **National Energy and Climate Plans, Digital Decade roadmaps, and Recovery and Resilience Plans**
- **EU funding** to accelerate the **development and deployment** of innovative digital energy solutions
- Structured **high-level dialogue** on digitalisation
- **Platform for cooperation** between digital and energy innovators
- Reinforcing **international collaboration**

European Commission

Thank you

Stay informed: DG ENER work on Digitalisation of the energy sector: https://energy.ec.europa.eu/topics/energy-system-integration/digitalisation-energy-sector_en

European Commission

Presentation of the ETIP SNET White Paper “E-mobility deployment and impact on grids”

Guillermo AMANN
Member of the ETIP SNET
Working Group 1
Senior Advisor to the President
at ORMAZABAL

What is ETIP SNET?

European Technology & Innovation Platforms (**ETIP**s) have been created by the European Commission in the framework of the new Integrated Roadmap Strategic Energy Technology Plan by bringing together a multitude of stakeholders and experts from the energy sector

The ETIP Smart Networks for Energy Transition (**SNET**) role is to guide Research, Development & Innovation to support Europe's energy transition, through six different Working Groups

WG 1 addresses business and technology trends contributing to the overall energy system optimization at affordable investment and operation costs. It focuses on system aspects, addressing the main functionalities, quality and efficiency of the electricity system as such and consider the benefits of its integration with the other energy vectors.

European Commission

Why this e-mobility White Paper?

Starting in January 2021, WG1 decided to establish a dedicated working group to draft a White Paper on the impact of electromobility on networks.	
Name of the paper	**E-mobility deployment and impact on grids. Impact of EV and charging infrastructure on European T&D grids – Innovation actions needs**
Meetings	Monthly during 2021
Milestones	November 21: Report draft February 22: Final contributions March-April 22: Review **June 22: Approved by EC**
Main Goal	ETIP SNET intends to **contribute to the debate on EV solutions and regulations to be adopted** through the constructive cooperation with transport, urban planning and vehicle industry stakeholders, and also decision makers.
Drafting team	Guillermo Amann, Víctor Bermúdez, Elena Boscov Kovacs, Santiago Gallego, Spyros Giannelos, Antonio Iliceto, Albana Ilo, Lorena Jiménez, Julián Romero Chavarro, Natalie Samovich, Laurent Schmitt, Nuno Souza e Silva, Goran Strbac, Zelijko Tomsic, Emre Zengin
Lead	Santiago Gallego

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Overview

- Chapter **1**. “Scope and target”.
- Chapter **2**. “Challenges and opportunities”. *A wide ecosystem*.
- Chapters **3** (TSO) & **4** (DSO). *Impact on grids.*
- Chapter **5**. “User perspective”. *Typologies, behaviours, roles.*
- Chapter **6**. “Enablers”. *Interoperability, standards, regulation.*
- Chapter **7**. “R&D and innovation needs”. *Efforts, incentives.*
- Chapter **8**. “Key findings and messages”.

Main concepts (I)

- **"E-mobility deployment and impact on grids.**

  Impact of EV and charging infrastructure onEuropean T&D grids – Innovation needs."

- **Scope:** relevant characteristics of E-mobility with a specific focus on its impact on the power system.

  - **IN**: road transport (passenger vehicles, buses, lorries, trucks); battery-propelled vehicles; conductive, stationary charging infrastructure.

  - **OUT**: railway, micro mobility, dynamic charging (vehicle on the move), maritime transport and aviation, fuel cells and green fuels propelled vehicles.

- **Challenges:**

  - EV charging process represents the **concrete interface between transport and energy sectors,** and it is the crucial element for guaranteeing the successful development of both.

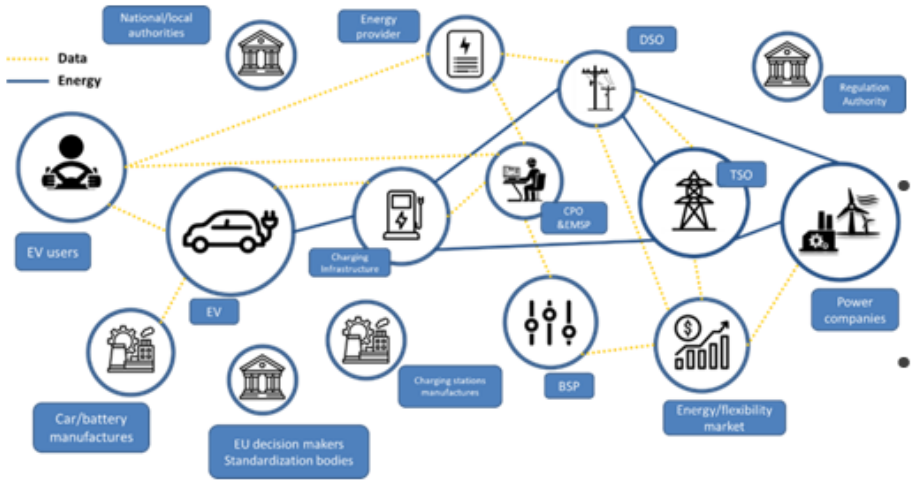
  - **Several stakeholders** are active players in this **new ecosystem**: users, system operators (DSOs/TSOs), manufacturers, IT industry, policy makers.

  - **Users at the center.** They decide how/where/when to charge EVs and have specific needs and expectations from the charging process.

  - **Enablers**. New technologies (i.e., V2G), interoperability and standards, market design and regulation.

Main concepts (II)

- Most **relevant characteristics** of e-mobility with a particular focus on its impact on the power system.
- **Data and energy interactions** among electromobility ecosystem actors



- LINK **holistic, technical, and market-related** smart grid model with large EV penetration.
- Role of **enablers**:
  - Interoperability and standards.
  - Regulatory framework and cross-sector cooperation.
- Reflect and consider the possibilities to **optimize the charging process**: new processes and structures
- Where to concentrate R&I efforts: **ETIP-SNET Research Areas**.

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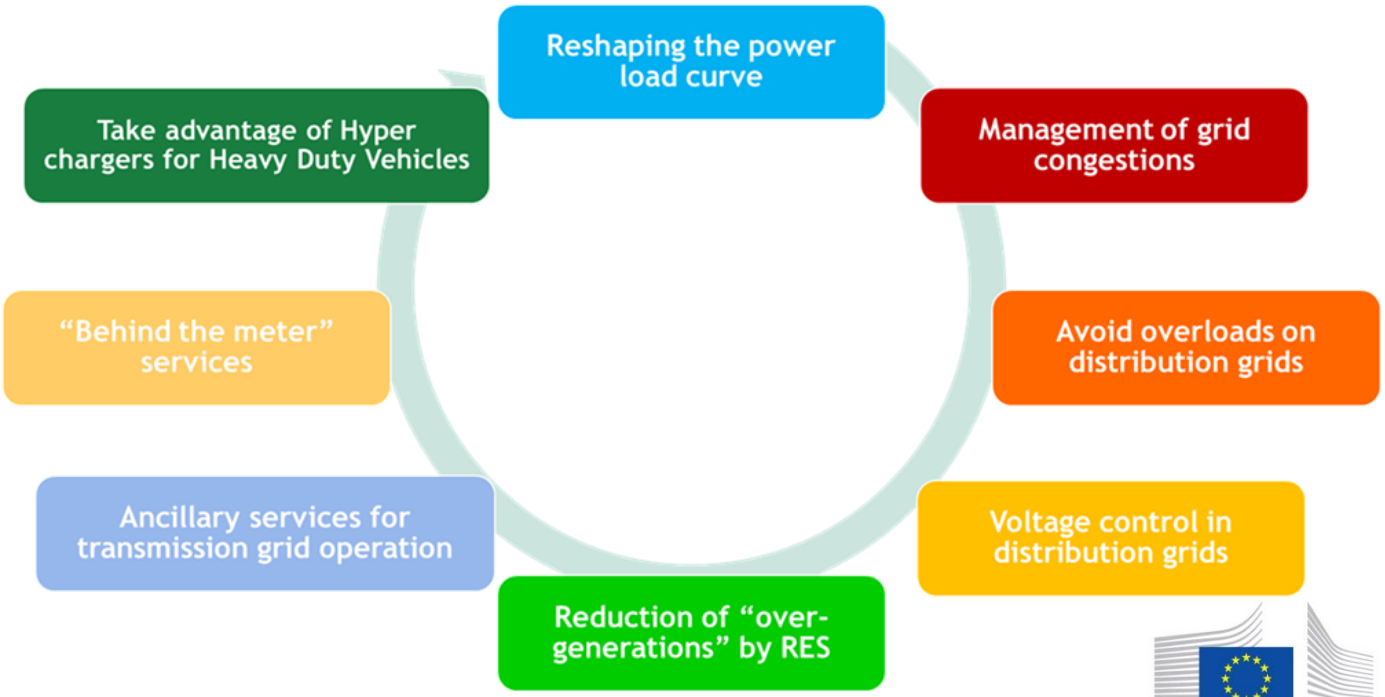
TSO perspective – EV as an opportunity to the system

- EVs will represent an additional load, a big scale energy storage system, and a distributed flexible resource for grid services.
- Only through **an optimal management of the bi-directional charging process** will it be possible to solve the potential system challenges and take advantage of all the potential opportunities.



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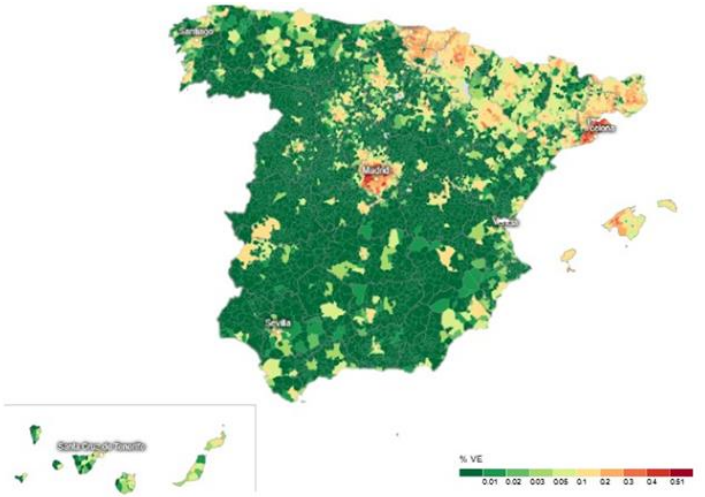
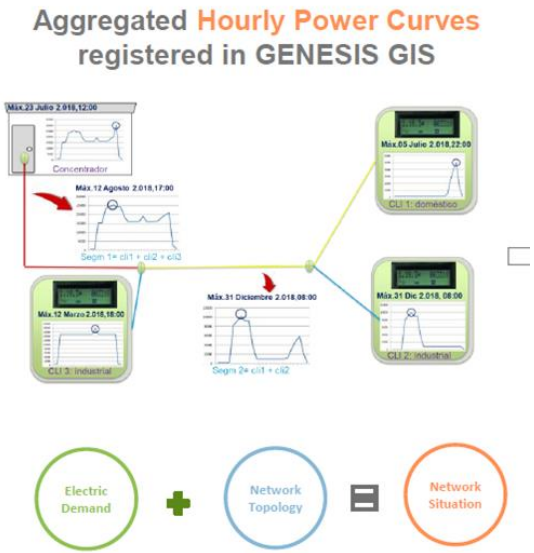
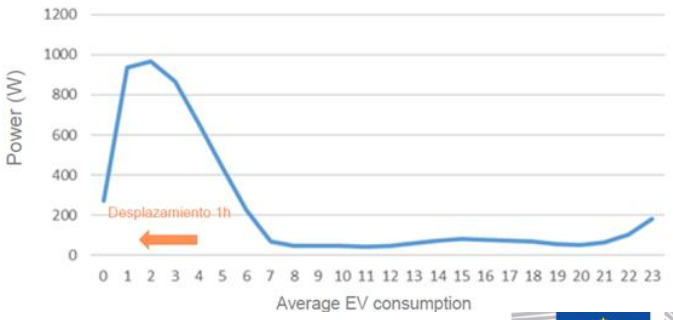
DSO perspective – Use case

- Study (i-DE, Spain) to assess how the incorporation of the EVs and heat pumps will **mainly impact (in a moderate way) the LV network** in the short term.
- For the long term, **grid reinforcements can be planned and developed ahead of need**.







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Key findings and conclusions

- **Integrated planning with the participation of all players:** Improved models should be adopted to perform robust simulations of the impact of the charging infrastructure.

- **System operators play a key role in the deployment and integration of EV charging infrastructure** in the electricity network. **DSO-TSO cooperation is essential** to favourably manage the charging of electric vehicles.

- **The adoption of EVs is not a problem in the short and medium term:** the distribution network is ready. System operators can plan and develop grid reinforcements ahead of need if they are allowed to invest in infrastructures at the right time.

- **Smart management of the charging process should be pursued**. It represents a crucial solution to limit the need for additional peak capacity when renewable production is scarce, and prevent grid overloads, especially at the local level. Initiatives like ‘time of use’ distribution tariffs can be a good starting point.

European Commission

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THANK you for your attentions

XFlex Project

Lola Alacreu
ETRA I+D

INTEGRATED ENERGY SOLUTIONS AND NEW MARKET MECHANISMS FOR AN EXTENDED FLEXIBILITY OF THE EUROPEAN GRID

ETRA INVESTIGACIÓN Y DESARROLLO, S.A.

UNIVERSITY OF LJUBLJANA (UL)

PETROL (PETROL)

ELEKTRO CELJE (EL CELJE)

ALBENA AD (ALBENA)

ELEKTROENERGIEN SISTEMEN OPERATOR EAD (ESO)

INSTITUTE OF COMMUNICATION & COMPUTER SYSTEMS (ICCS)

HEDNO (HEDNO)

SUITE5 (S5)

BLUEPRINT ENERGY SOLUTIONS (BPE)

SUNLIGHT SOLUTIONS (SLS)

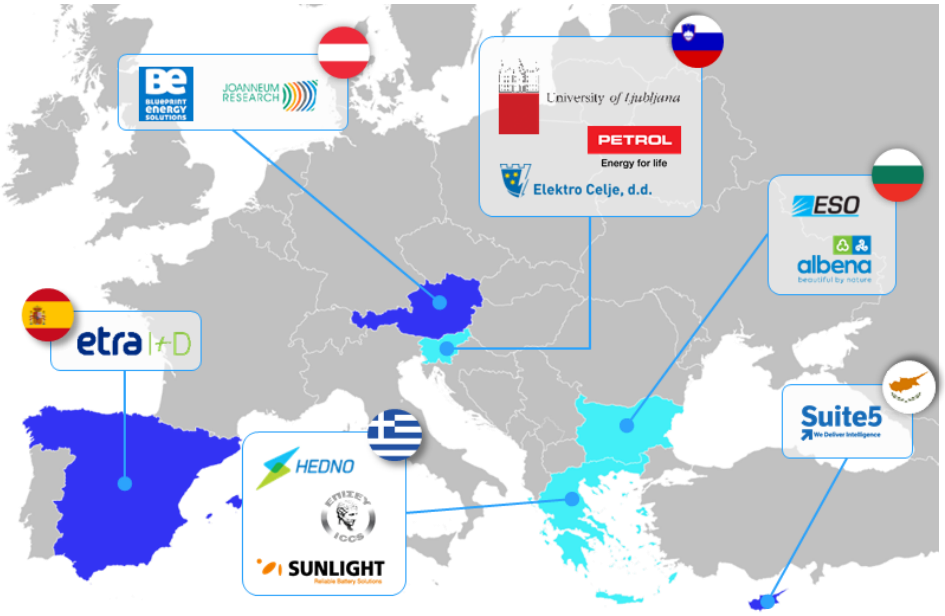
JOANNEUM RESEARCH (JR)

Lola Alacreu, ETRA I+D

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement n° 863927

X-FLEX at a glance

- Coordinator: ETRA I+D
- Consortium: 12 partners from 6 EU countries (3 DSO, 1 microgrid manager, 1 TSO, 1 battery provider, 3 IT provider, 3 academy)
- Demonstration: 4 pilot sites in 3 EU Member states
- Total budget: 9,5 M€
- Total funding: 7,3 M€
- Start date: 01/10/2019
- End date: 30/09/2023



X-FLEX Project objectives

1. Design and development of the tools that would **facilitate the use of flexibility in the power system to create more stable, resilient and sustainable smart grids**, with special attention to extreme weather conditions.

2. Demonstrate the **technological, economic and social benefits of these tools in real conditions,** involving the participation of all the systems and actors of the grid.

How to reach X-FLEX objectives

X-FLEX will develop 4 complementary products that will offer services to all the energy stakeholders:

1. **SERVIFLEX tool:** Flexibility management tool for aggregators and flexibility providers.
2. **GRIDFLEX tool:** Advanced tool for automatic control and observability of the grid for the operators.
3. **MARKETFLEX tool:** The tool to facilitate the participation in the energy market for market operators.
4. **X-FLEX platform** that serves as the service bus for all the sub-systems, services, and actors of the X-FLEX project.

Electric Vehicles Modelling in X-FLEX

- Different **EV-charging strategies models**, with different optimization objectives, depending on the **actor** on which it is focused (Grid Operator or end-user) have been analysed.

- Optimization models for the interest of the **Grid Operator include Power Supply Quality** parameters, while those models developed in the interest of the **end-user focus on energy cost optimization** and other EV driver requirements (i.e. Emission saving, Vehicle availability, etc.).

- In **X-FLEX the EV modelling is focused on the end-user** (i.e. CPO, EV drivers or Fleet Managers, EMSP (e-Mobility Service Provider)), **but offering at the same time flexibility to the DSOs**. (WIN-WIN)

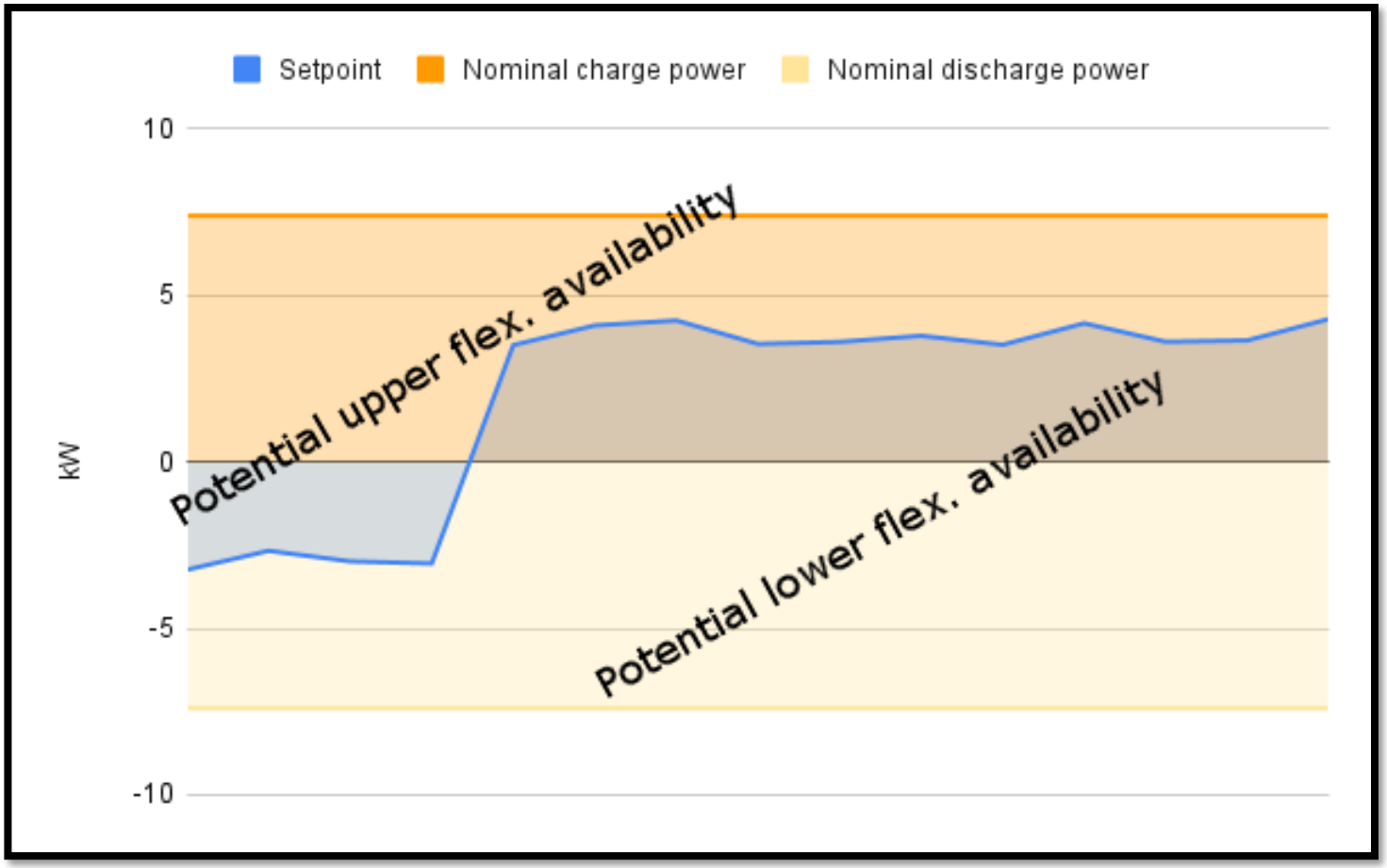
Electric Vehicles Modelling in X-FLEX

- This model considers different constrains and requirements:
  - Optimization context (static info): supply point contracted capacity (kW) / supply point injection limit (kW) / local storage capacity (kWh) / opportunity Cost (€/slot).
  - Dynamic inputs (demand, generation forecasts, energy prices...)
  - EV characteristics and driver preferences (SoC %, capacity EV (kWh), máx. Battery level %, time)

- **V2G principles** is incorporated in the model in order to support bidirectional energy exchange.

- The **maximization of self-consumption** (since on-site generation costs are assumed to be 0) is also part of the X-FLEX model.

Electric Vehicles Modelling in X-FLEX



Thank you!
QUESTIONS?

Lola Alacreu (ETRA I+D)
lalacreu.etraid@grupoetra.com

For more information visit:

http://xflexproject.eu/

@XFlex_H2020 @xflex-h2020

INTERCONNECT Project

David Emanuel Rua
Inesctec

InterConnect Project

Flexibility of Electric Mobility in Supermarkets

INESC TEC – David Rua, Luis Seca, Bárbara Maia

Frankfurt, Germany

30th November 2022

InterConnect project

- H2020 Large Scale Pilot (2019-2024)
- InterConnect gathers 50 European entities to develop and demonstrate advanced solutions for connecting and converging digital homes and buildings with the electricity sector.
- The project pioneers cross-domain semantic interoperability without a centrally hosted facilitator leveraging SAREF ontology.
- Validation in seven connected large-scale test-sites in Portugal, Belgium, Germany, the Netherlands, Italy, Greece and France.
- https://interconnectproject.eu/

Ecosystem Interoperable Services

- ENERGY
- NON-ENERGY
- CROSS-DOMAIN
- CROSS-PILOT

Interconnect Interoperability Framework

STANDARDS

ETSI CEN CENELEC W3C

IN LINE WITH

- FIWARE
- GAIA-X
- IDSA

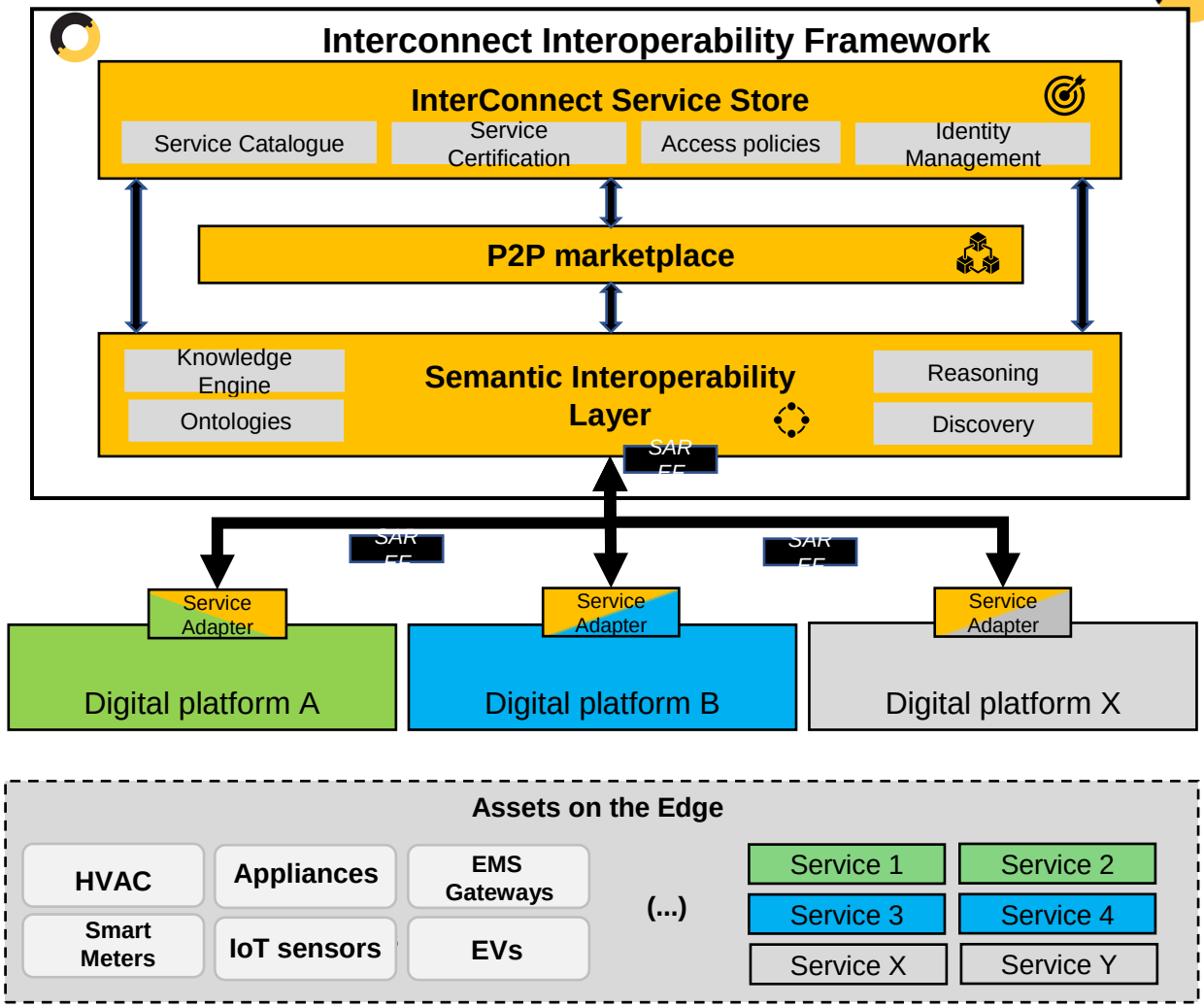
SEMANTIC INTEROPERABILITY BASED ON

- ONTOLOGIES
- GRAPH PATTERNS
- KNOWLEDGE FEDERATION

Interconnect Stakeholders

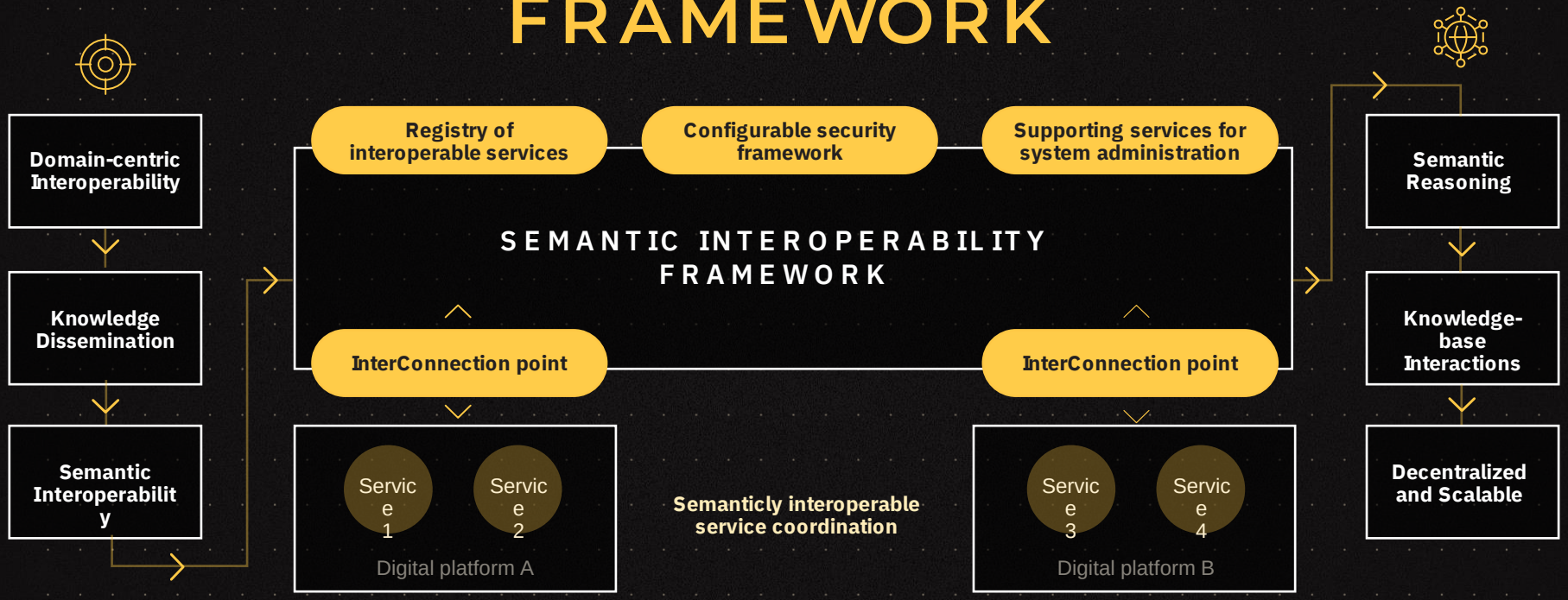
- R&D
- CONSULTANCY
- MANUFACTURERS
- ASSOCIATIONS
- DSOs
- RETAILERS
- END USER

Security and privacy framework , Admin and Governance



Use cases, Interoperable Services, Standardization

SEMANTIC INTEROPERABILITY FRAMEWORK

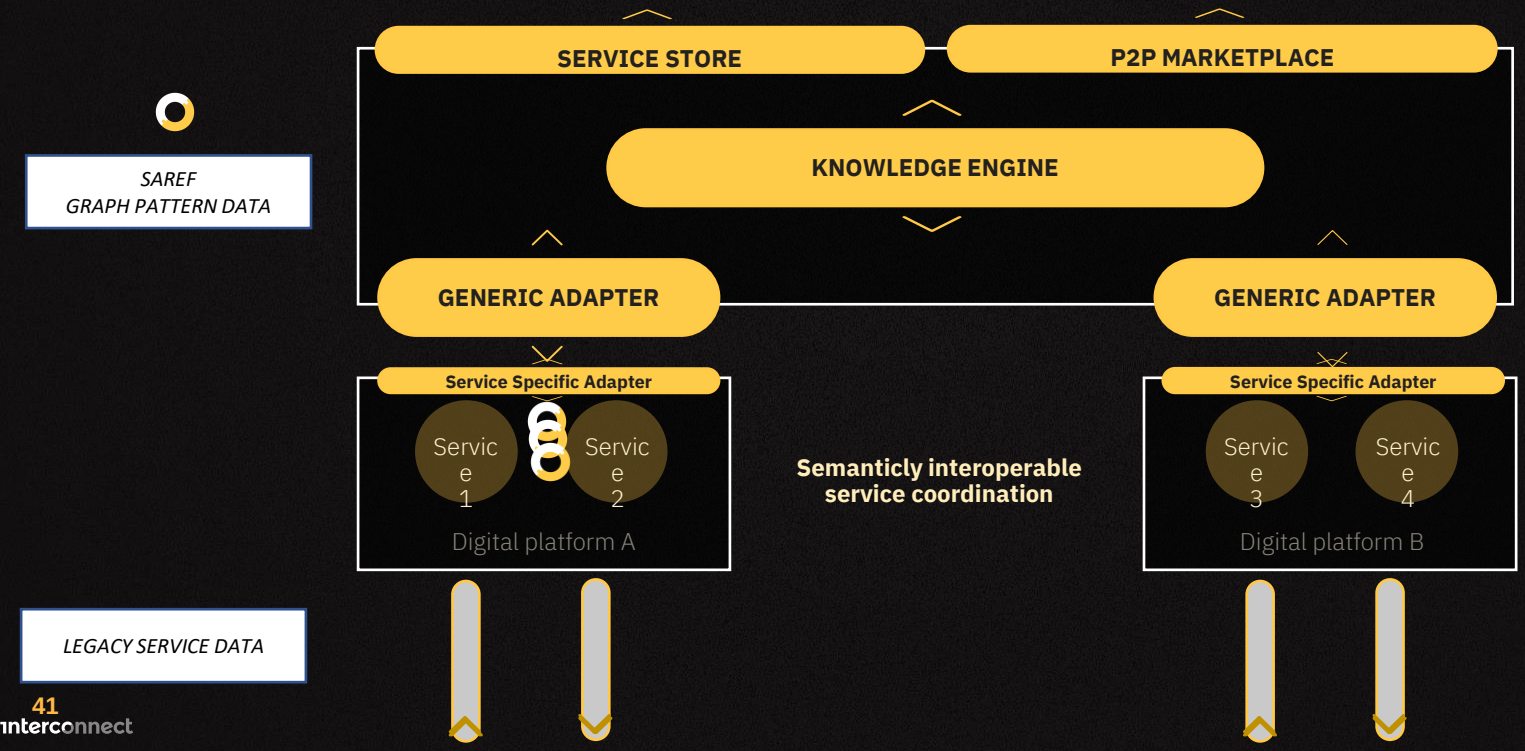


DIGITAL PLATFORMS AND SERVICES BECOME SEMANTICLY INTEROPERABLE

Services use the interoperable tools to publish & discover capabilities and are joint together to enable use case demonstration

INTERCONNECT

SEMANTIC INTEROPERABILITY FRAMEWORK

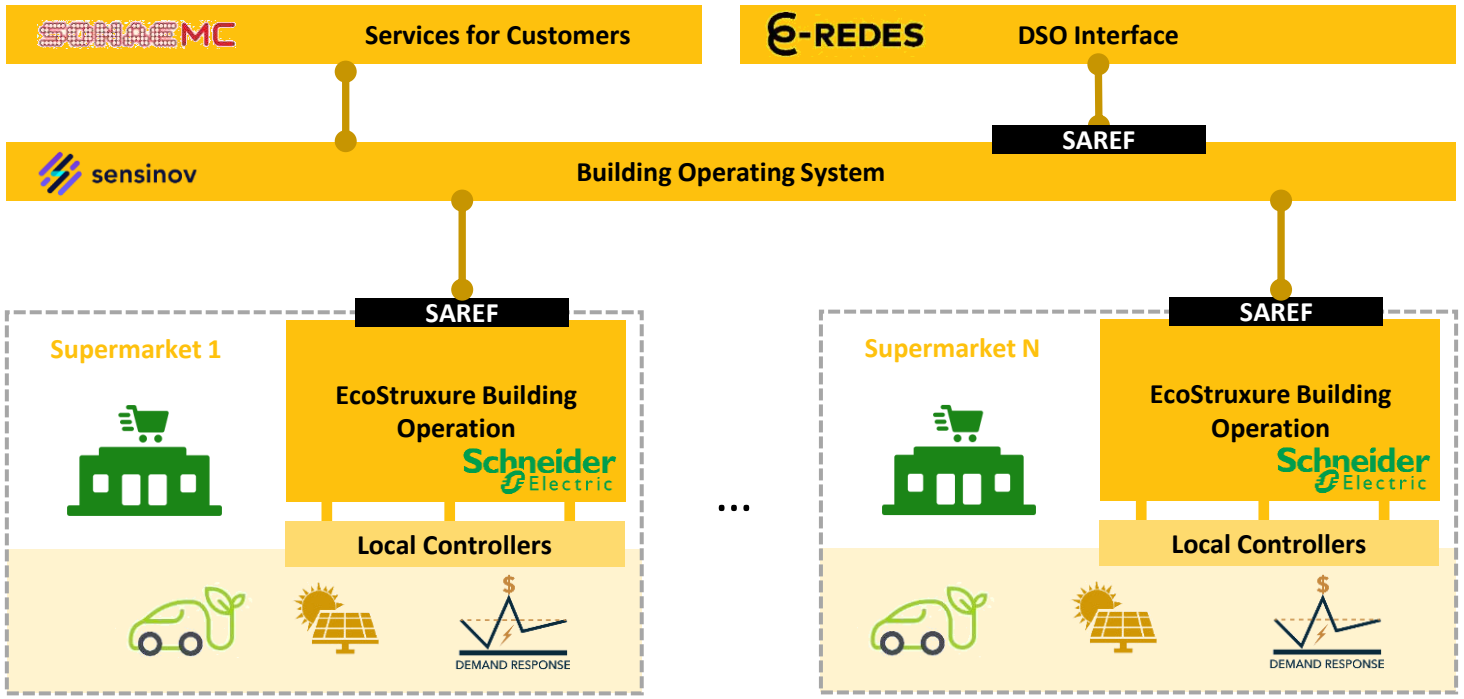


Commercial buildings use case
Green supermarkets (PT): motivation

- Exploit demand side flexibility from supermarkets
- Meet energy sustainability goals: 100% on-site renewable energy
- Supply flexibility in the framework of Directive (EU) 2019/944
- Boost interoperability and data-driven energy optimization
- Monitoring and control of consumption remains limited
- Design a cost-effective IoT platform for food retail

42

Commercial buildings use case
Green supermarkets (PT): architecture for semantic practice



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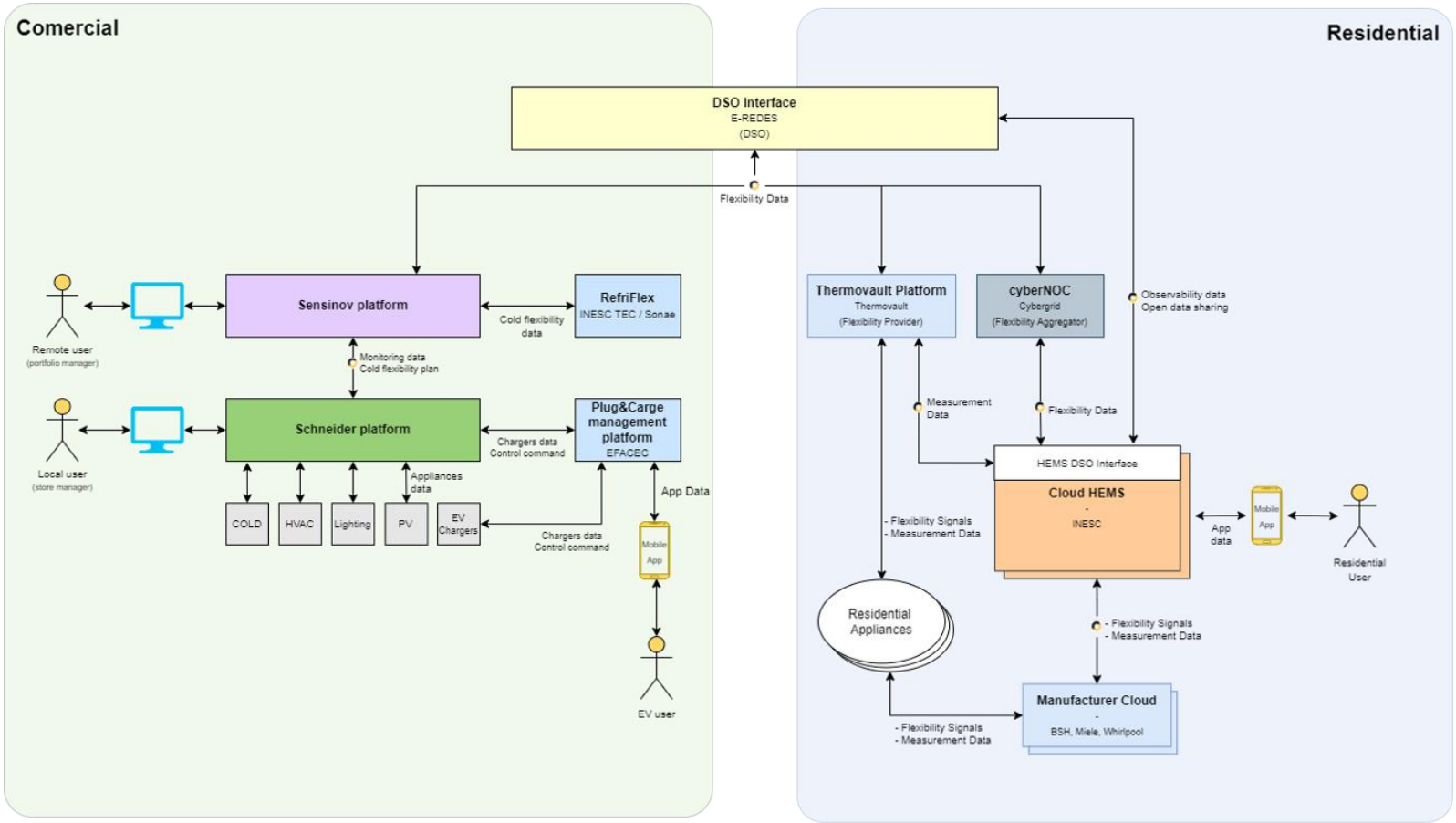
interconnect

Commercial buildings use case
Green supermarkets (PT): the bigger picture



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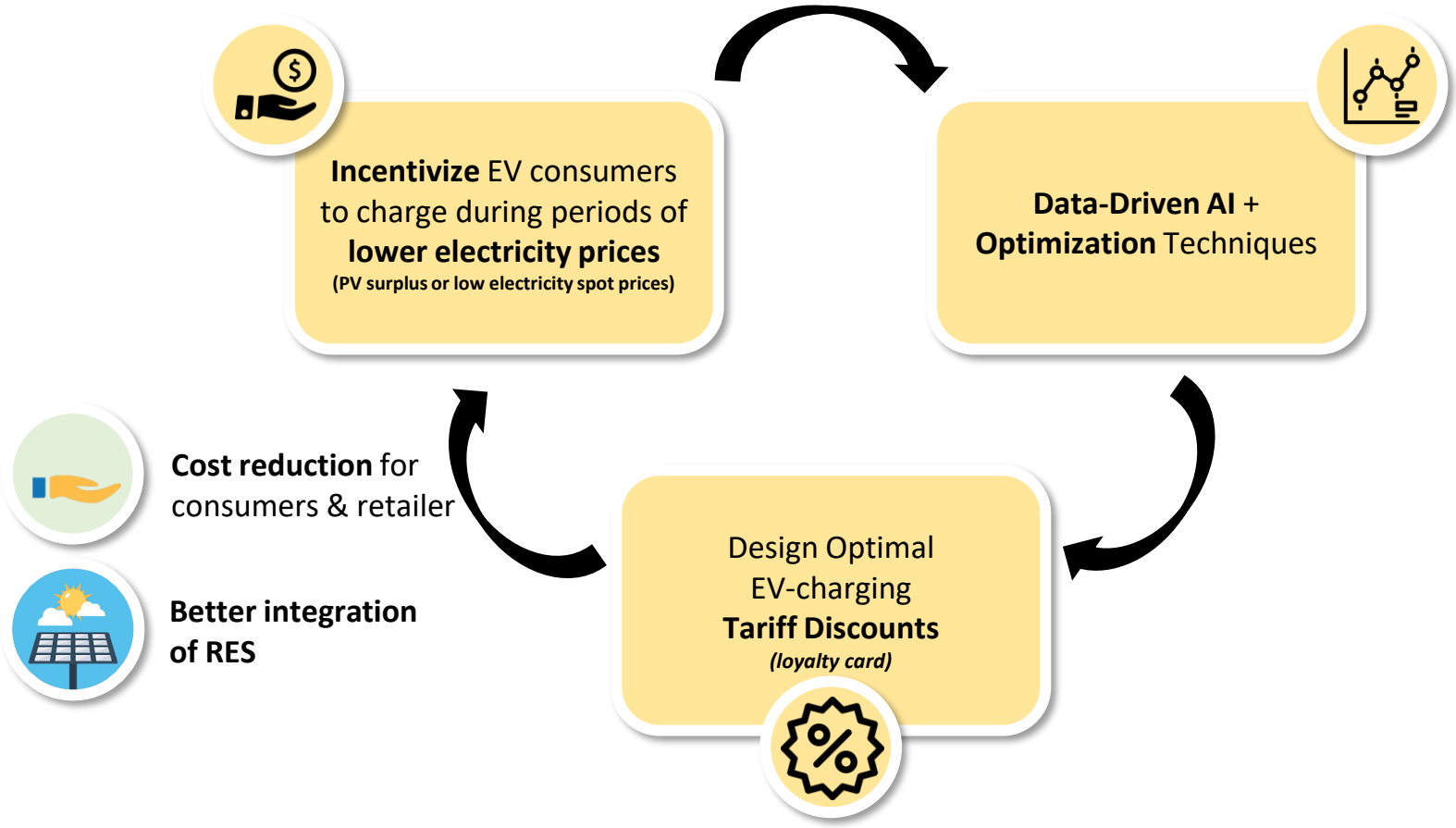
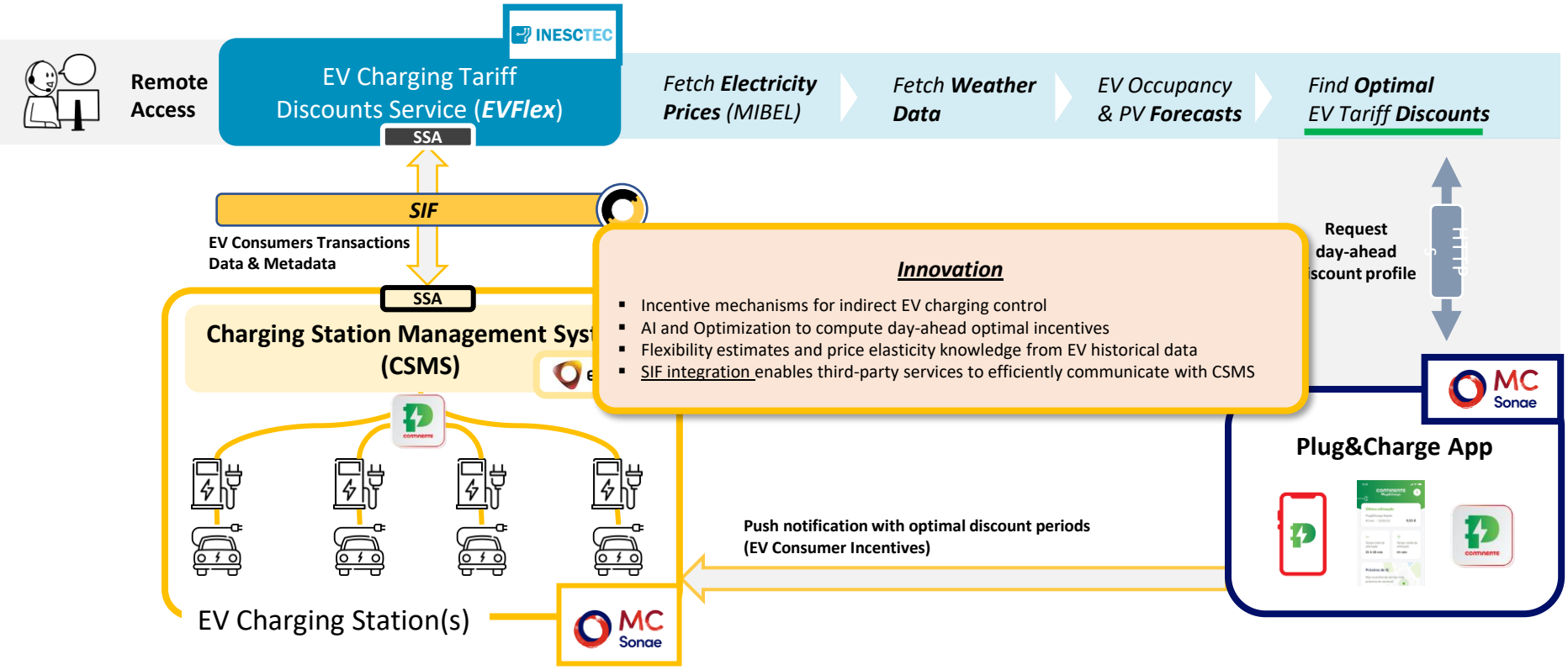
Electric Vehicles Flexibility Use Case

Combining EV data and AI to develop new data-driven services



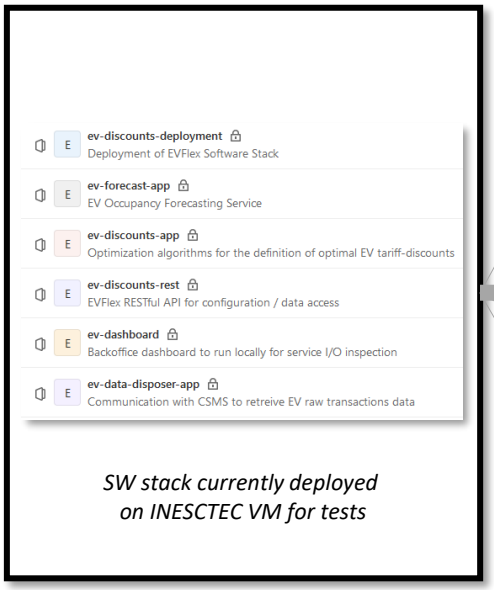
Electric Vehicles Flexibility Use Case

Combining EV data and AI to develop new data-driven services

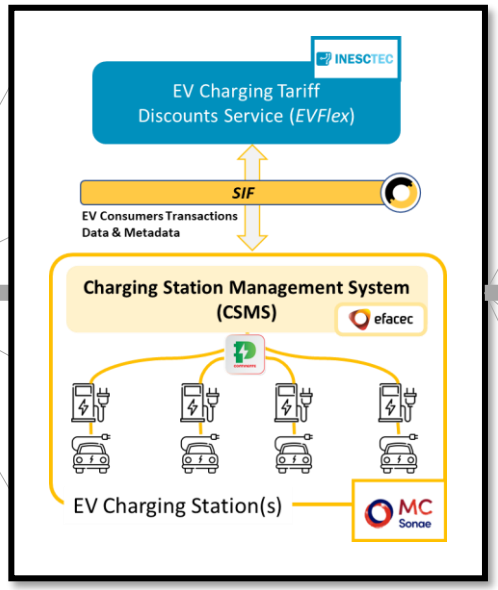


Electric Vehicles Flexibility Use Case

Part 1
EVFlex - Components



Part 2
Data-sharing via SIF



Part 3
User Interfaces

interconnect

interconnect

interoperable solutions connecting smart homes, buildings and grids

FINANCING

This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant agreement No 857237

PROJECT CONTACT

interconnect_project@inesctec.pt

DURATION

01.10.2019 / 30.09.2023

European Commission

REDREAM Project

Prof. Dr. Stéphane GALLAND
Deputy Director of CIAD

ReDREAM

ReDREAM

change your energy

ENLIT Conference 2022

Session “Transport and e-mobility”

Prof. dr. Stéphane GALLAND

Université de Technologie de Belfort-Montbéliard / UBFC, France

ReDREAM

REDREAM Overview

ReDREAM will establish a connected user-centred energy ecosystem by:

- enabling the effective participation of consumers and prosumers in the energy market;
- developing a strategy for the creation of a value generation chain based on a revolutionary service-dominant logic (SDL) in which services services are exchanged;
- fostering the demand response tools and energy/non-energy services that enable consumers to participate in the energy market.

15 European Partners from 8 countries

4 Demo sites

REDREAM

36 months

1.10.2020 to

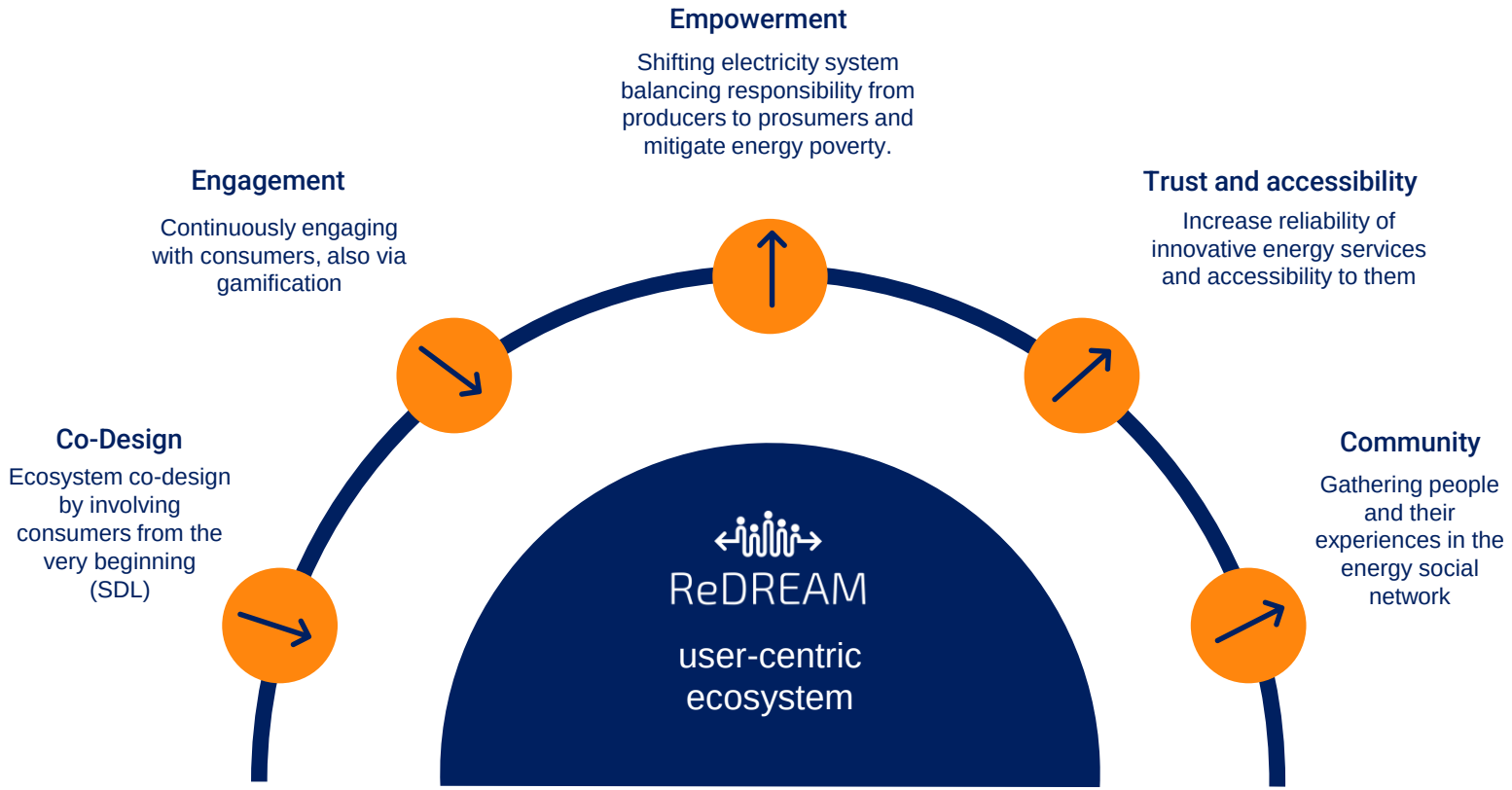
7.2M€

estimated cost

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N°957837

ReDREAM

Consumer and citizen engagement



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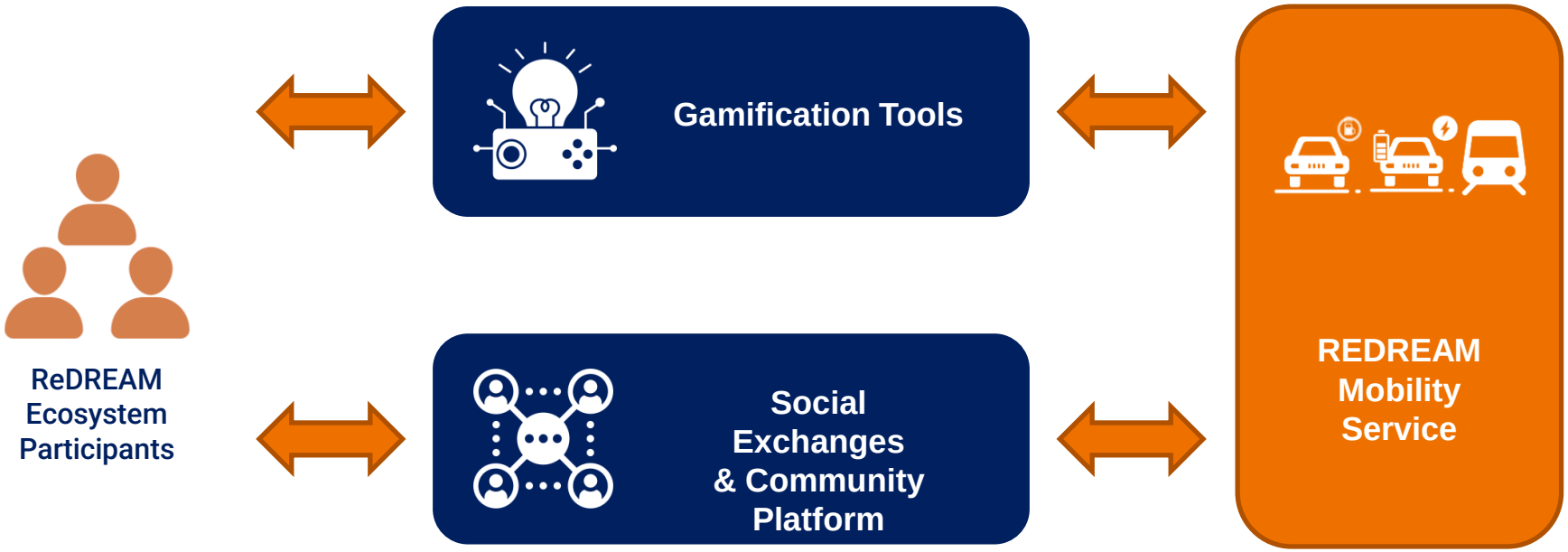
ReDREAM

REDREAM Methodology & Mobility Service



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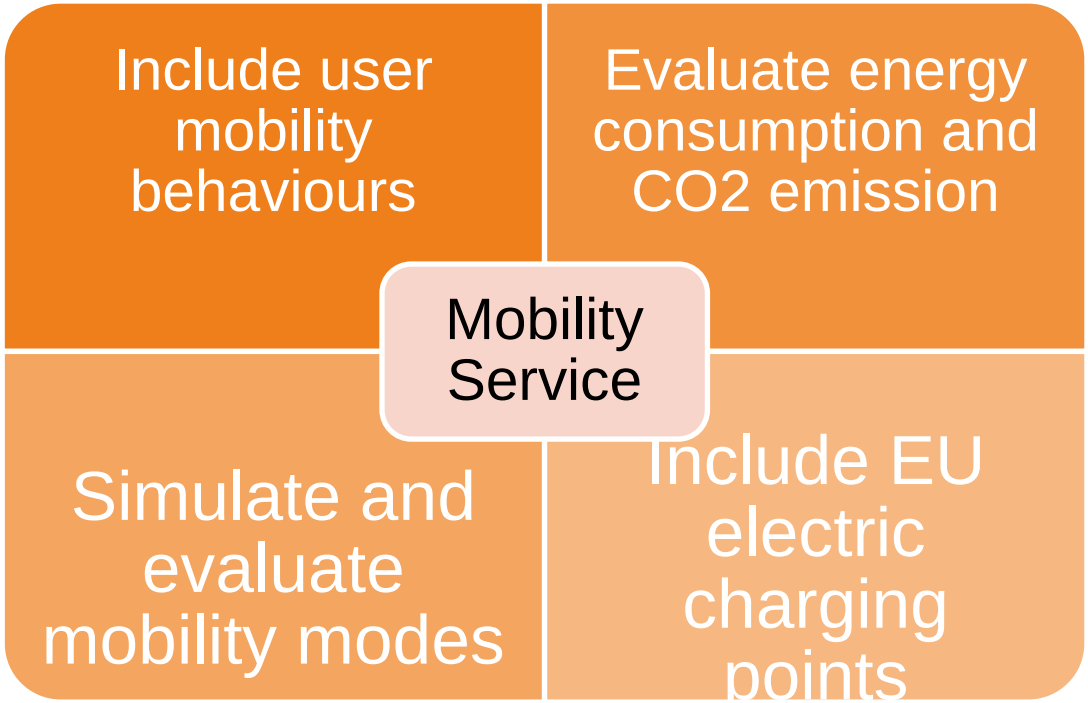
ReDREAM

Mobility Service Features



Queries and Habits from ReDREAM participants

Indicators and recommendations to ReDREAM participants

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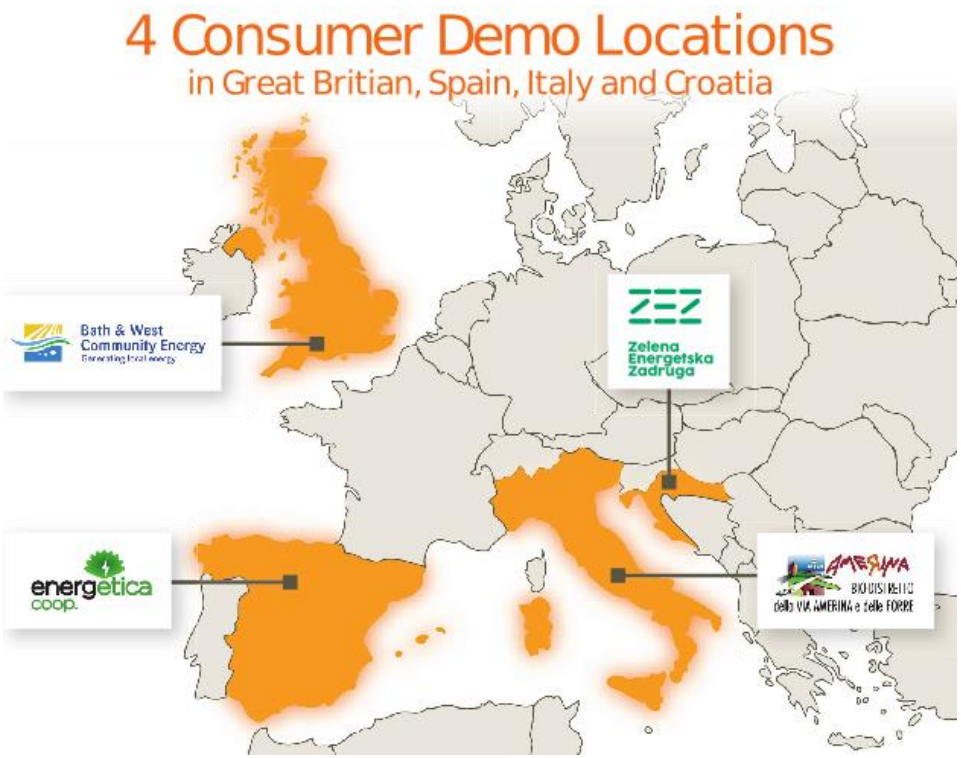
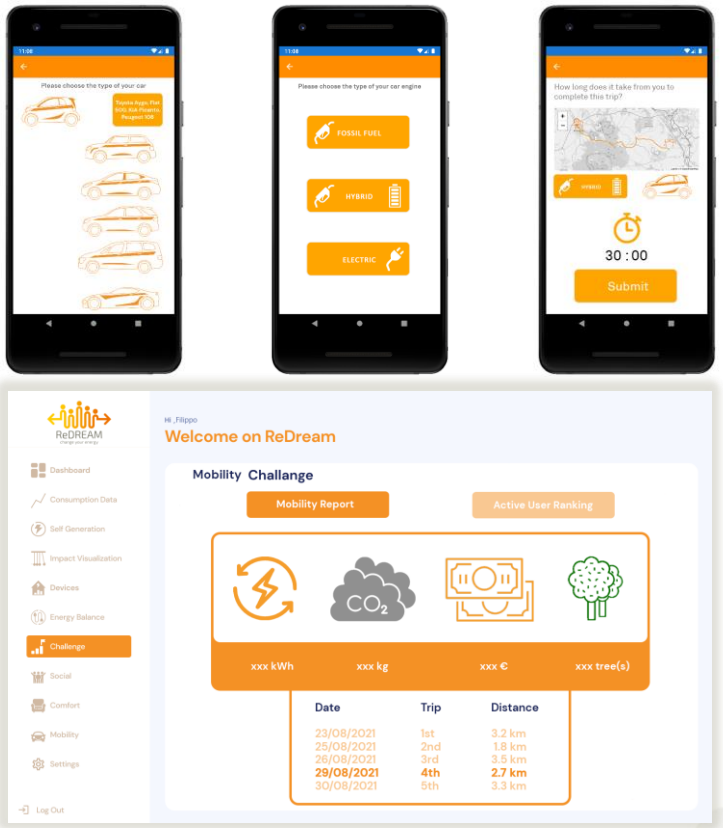
ReDREAM

Ongoing Experiments





Front application by Rimond; Back mobility service by UTBM/UBFC

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N°957837

ReDREAM

change your energy

European Commission

Panel discussion

European Commission

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Thanks for your participation!