FLEXI GRID

INTEROPERABLE SOLUTIONS FOR IMPLEMENTING HOLISTIC FLEXIBILITY SERVICES IN THE DISTRIBUTION GRID

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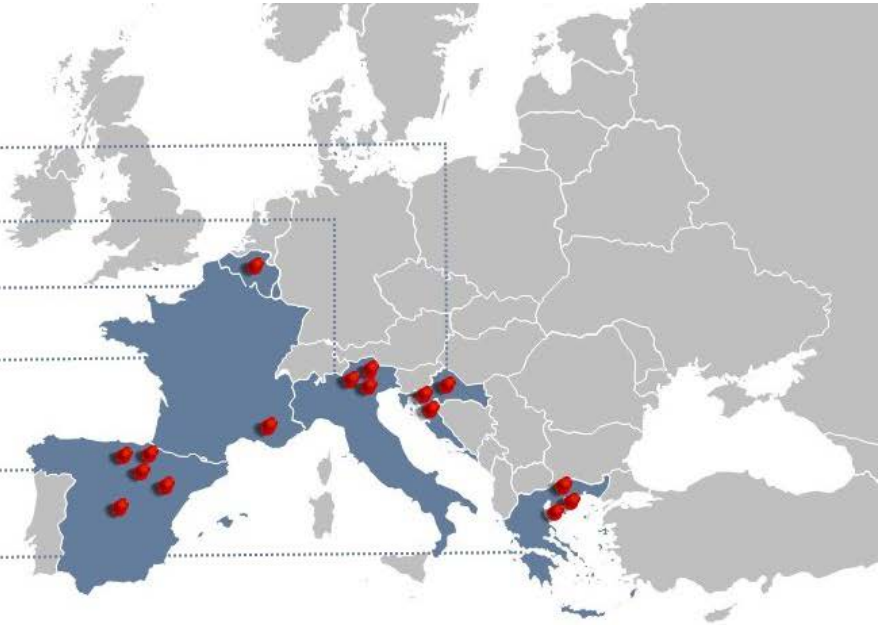
Info. about FLEXIGRID project

- Budget: 8.541.073,00€
- Type of Action: IA -Innovation action
- Duration: 48 months (1/10/2019 – 30/09/2023)
- Coordinator: CIRCE
- Number of partners: 15

CROATIA	HEP-ODS, UNZIG-FER
ITALY	LINKS, EDYNA
BELGIUM	CEDEC
FRANCE	CAP
SPAIN	VIESGO, CIRCE, ZIV, ORMAZABAL, ATOS, UNICAM
GREECE	VERD, IOSA, HYPERTECH



FLEXIGRID - Project Objectives

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01/04/2020

FLEXIGRID – Project Objectives

The **main goal** of FLEXIGRID is to allow the distribution grid to operate in a **secure and stable** manner when a **large share of variable generation electricity sources** is connected to low and medium voltage grids.

To do so, FLEXIGRID proposes a three-level approach aiming at **(1) Flexibility**, **(2) Reliability**, and **(3) Economic Efficiency** through the development of innovative hardware and software solutions.

These solutions will be demonstrated in **four Demo-Sites** across Europe ensuring their interoperability through its integration into an open source platform able to harmonize the data flow between FLEXIGRID solutions and the real grid.

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FLEXIGRID – Project Objectives

FLEXIGRID Specific Goals

- ✓ **Goal 1**: To improve the **power system flexibility** by enhancing the grid **hosting capacity** of RES through DR, P2X, storage of electricity and variable generation towards the energy network **decarbonization**
- ✓ **Goal 2**: To increase the **observability**, **controllability** and **automation** of the network systems for the improvement of both the **security** and **resilience** of the grid
- ✓ **Goal 3**: To **mitigate** short-term and long-term **congestions** in the distributed grid from an economic efficient point of view thus reducing the cost of the European energy transition
- ✓ **Goal 4**: To ensure the **interoperability** and **compatibility** of the developed **solutions** with the different platforms used by the European DSOs guaranteeing a proper and secure **data management**

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FLEXIGRID – Project Objectives

FLEXIGRID Specific Goals

- ✓ **Goal 5**: To carry out a complete **demonstration** program up to TRL 8 in four different demo-sites, obtaining reliable results on its **replicability** and ensuring its attractiveness for European stakeholders
- ✓ **Goal 6**: To identify and analyze the **needs** and **shortfalls** of the distribution grid as well as the **obstacles** to innovation under the current local and international context and regulation framework
- ✓ **Goal 7**: To raise **awareness** among **citizens** and other relevant **stakeholders** of the transition towards a **low carbon economy** considering them as an **active player** in the energy system
- ✓ **Goal 8**: To ensure the **exploitation** of the project results by developing a corresponding **business plan** as well as their **dissemination** by exchanging knowledge with other projects under the BRIDGE Initiative

FLEXIGRID – Solutions, use cases & Demo sites

FLEXIGRID - Solutions

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INTEROPERABLE SOLUTIONS FOR IMPLEMENTING HOLISTIC FLEXIBILITY SERVICES IN THE DISTRIBUTION GRID

S1

Secondary Substation of the future

S2

Smart meters with feeder-mapping capabilities

S3

Protections for high RES penetration

S4

Energy Box

S5

Software module for fault location and self-healing

S6

Software module for forecasting and grid operation

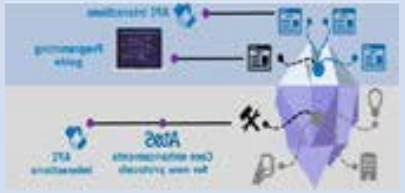
S7

Software module for congestion management

S8

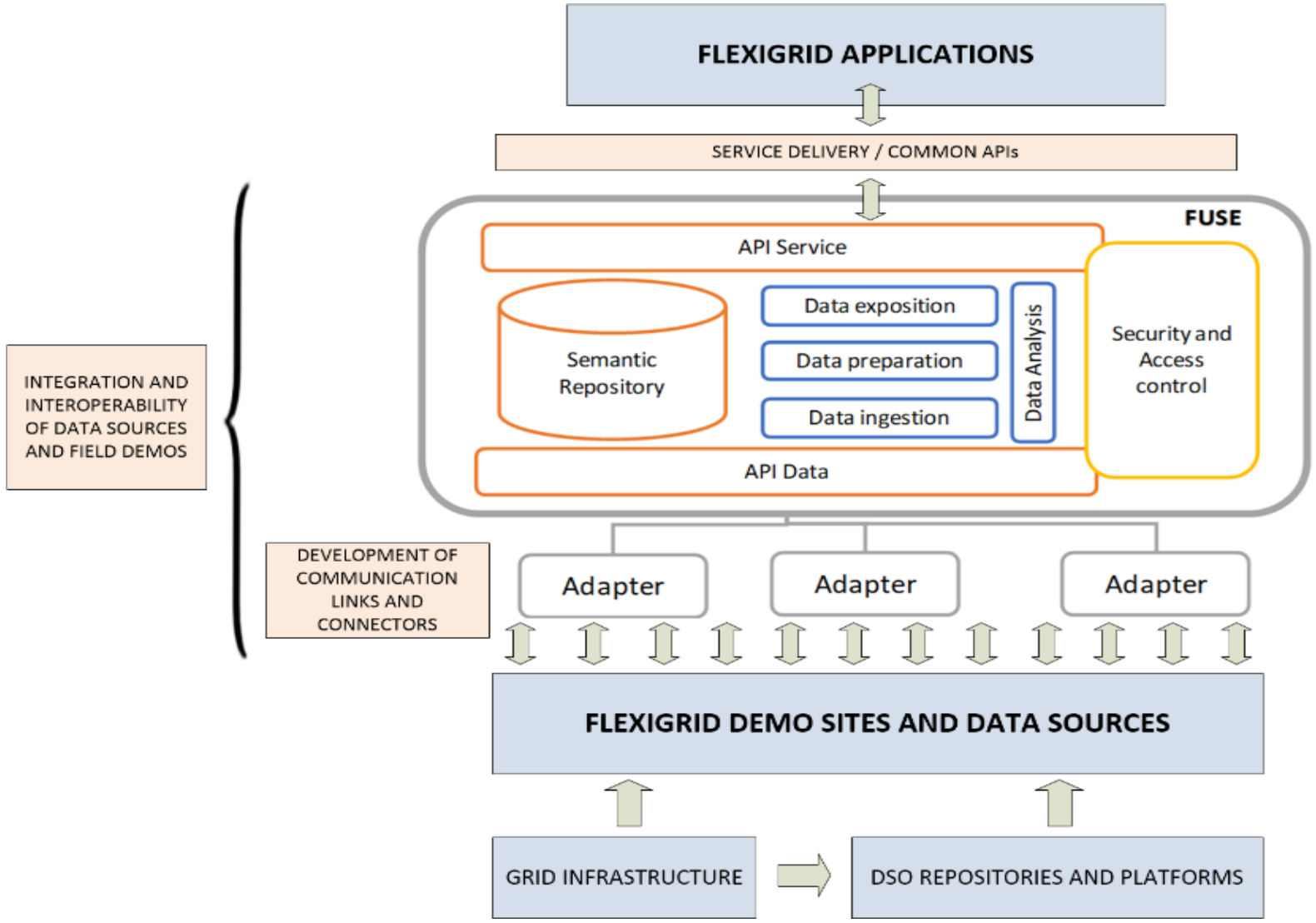
Virtual thermal energy storage model

S9



Fuse Platform

FLEXIGRID - Solutions



FLEXIGRID – Use Cases & Demo Sites

Demo No. 1 - SPAIN

UC 1: Secondary Substation upgrading for higher grid automation and control

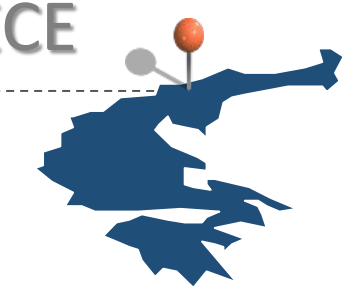
- **S1:** Secondary Substation of the future
- **S2:** Smart meters with feeder-mapping capabilities
- **S4:** Energy Box
- **S6:** Software module for forecasting and grid operation
- **S5:** Software module for fault location and self-healing

UC 2: Protections functions operating with large RES share penetration in the distribution grid

- **S3:** Protections for high RES penetration

FLEXIGRID – Use Cases & Demo Sites

Demo No. 2 - GREECE



UC 3: Holistic energy system optimization & emulation for commercial and residential customers

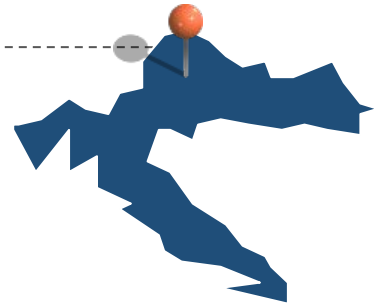
- **S6:** Software module for forecasting and grid operation
- **S4:** Energy Box

UC 4: Microgrid congestion management and peak shaving

- **S7:** Software module for congestion management

FLEXIGRID – Use Cases & Demo Sites

Demo No. 3 - CROATIA



UC 5: Coordinating distribution network flexibility assets & protections schemes in urban districts

- **S3:** Protections for high RES penetration
- **S5:** Software module for fault location and self-healing
- **S7:** Software module for congestion management

UC 6: Virtual Energy Storage for urban building

- **S6:** Software module for forecasting and grid operation
- **S8:** Virtual thermal energy storage model

FLEXIGRID – Use Cases & Demo Sites

Demo No. 4 - ITALY

UC 7: Dispatching platform for MV generation

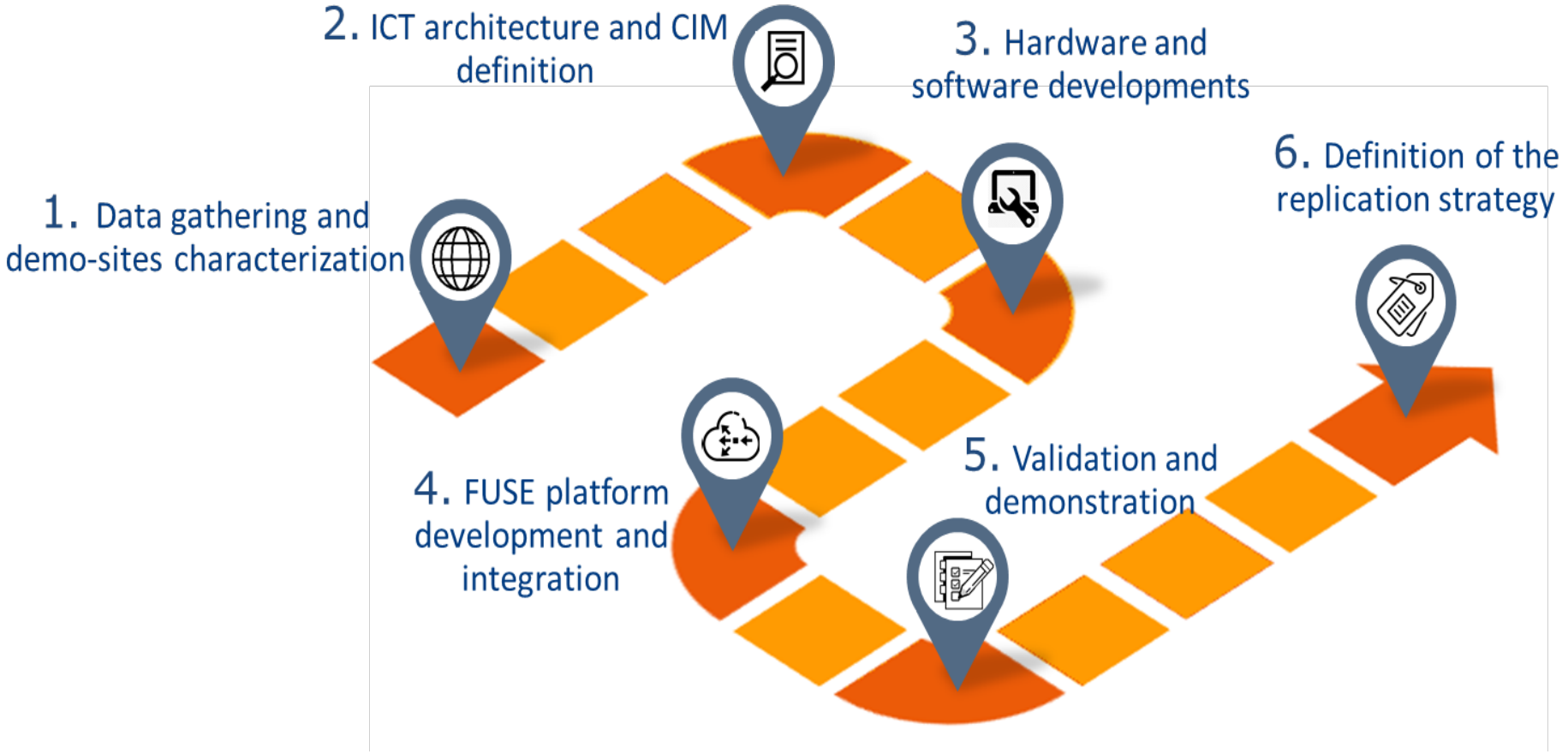
- **S1:** Secondary Substation of the future
- **S2:** Smart meters with feeder-mapping capabilities
- **S4:** Energy Box
- **S6:** Software module for forecasting and grid operation

UC 8: Mountainous valley grid operating in island mode

- **S5:** Software module for fault location and self-healing

FLEXIGRID – Methodology & Implementation

FLEXIGRID – Overall Methodology



FLEXIGRID – Implementation

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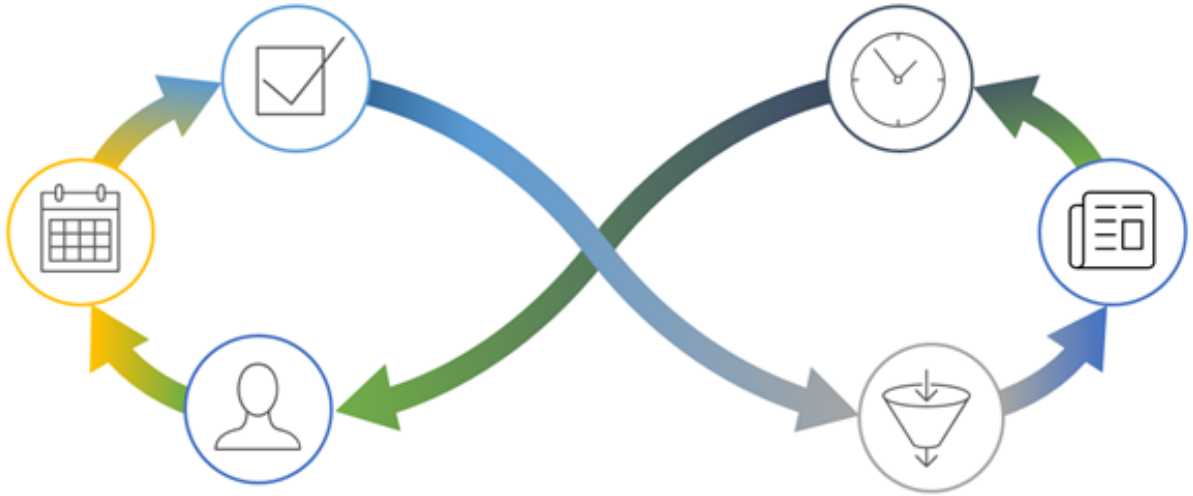
INTEROPERABLE SOLUTIONS FOR IMPLEMENTING HOLISTIC FLEXIBILITY SERVICES IN THE DISTRIBUTION GRID

8 solutions
to improve the distribution grid operation

4 demo-sites
in different scenarios to ensure replicability

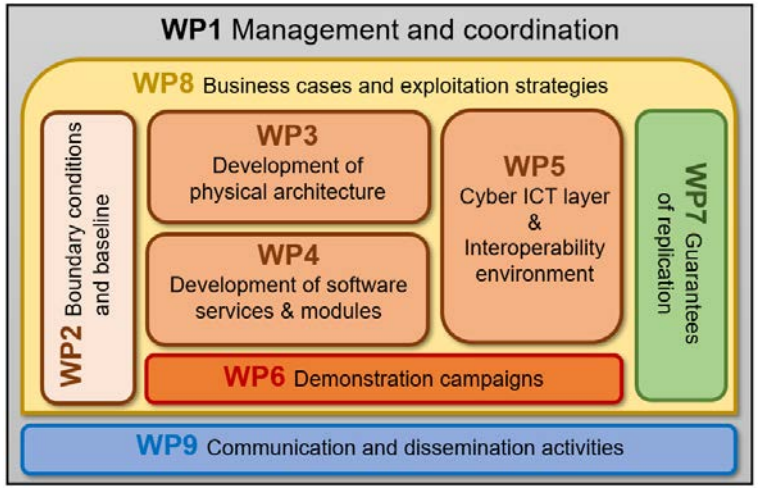
9 work packages
to develop and demonstrate innovations going beyond current state of the art

8 use cases
addressing the most common EU distribution grid problems



16 partners at 6 countries
2 RTOs, 2 Universities, 5 tech providers, 2 SMEs, 3 DSOs, 2 large companies and 2 associations

1 platform
an open source platform to ensure interoperability



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www.flexigrid-h2020.eu

flexigrid-h2020@fcirce.es

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