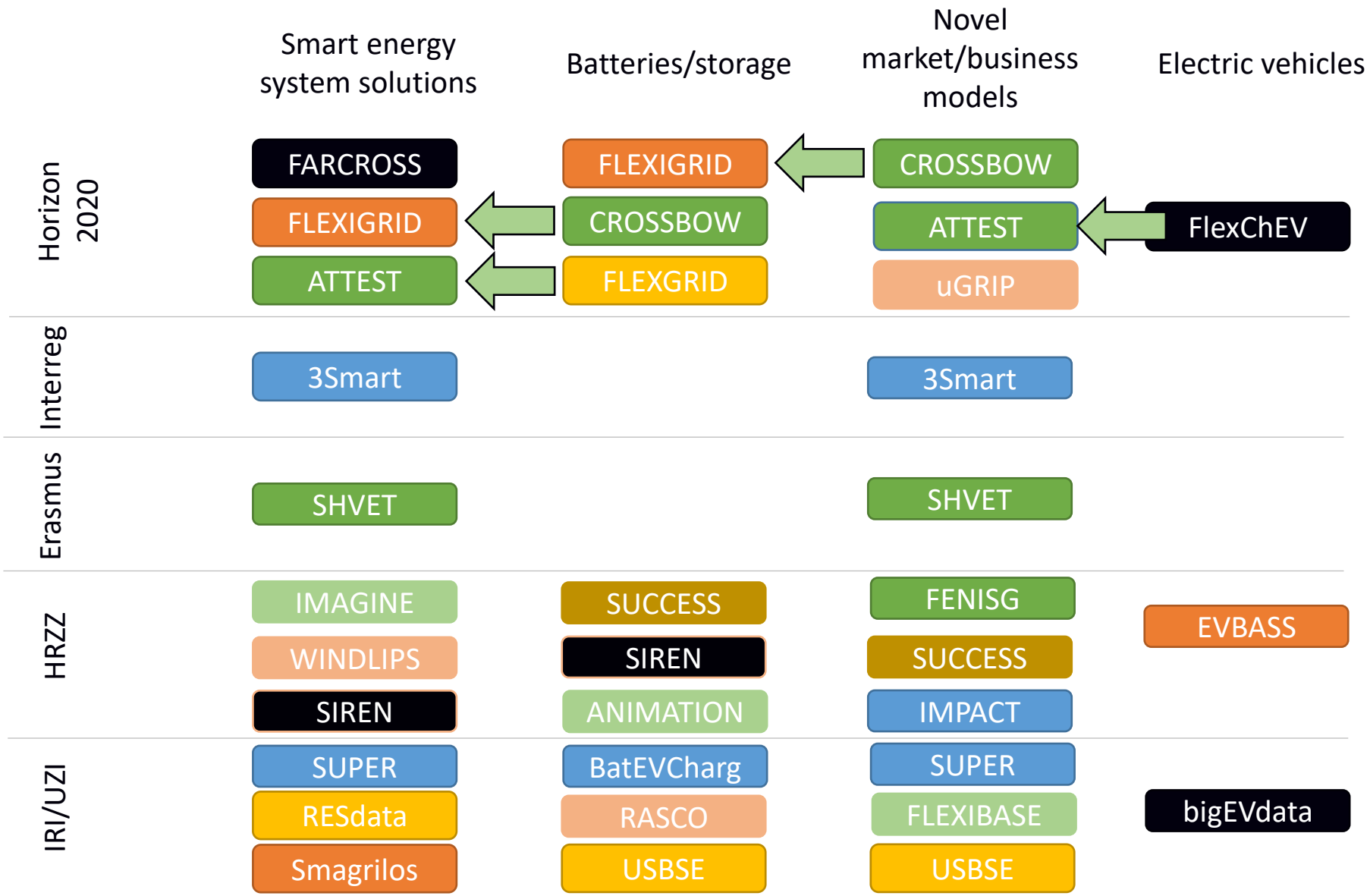
H2020 projects: FLEXIGRID and ATTEST

PROSPECT 2030 Development of energy infrastructure: transmission and distribution grids and energy storage

Tomislav Capuder

University of Zagreb Faculty of electrical engineering and computing

Smart energy infrastructure projects

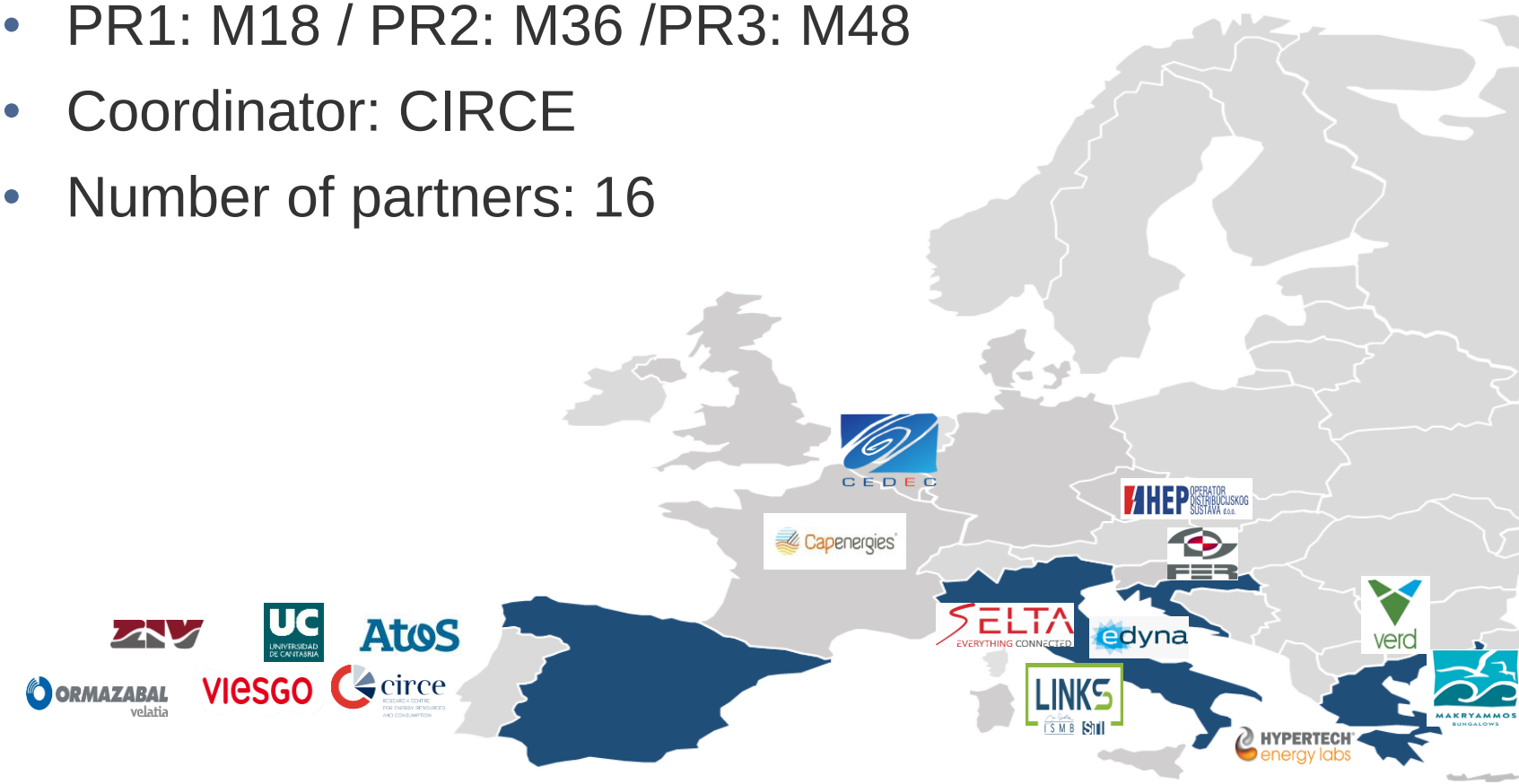


FLEXIGRID

INTEROPERABLE SOLUTIONS FOR IMPLEMENTING HOLISTIC FLEXIBILITY SERVICES IN THE DISTRIBUTION GRID

Info. about FLEXIGRID project

- Budget: 6.868.458,23€
- Type of Action: IA -Innovation action
- Duration: 48 months (1/10/2019 – 30/09/2023)
- PR1: M18 / PR2: M36 /PR3: M48
- Coordinator: CIRCE
- Number of partners: 16



Objectives, concept and expected outcome

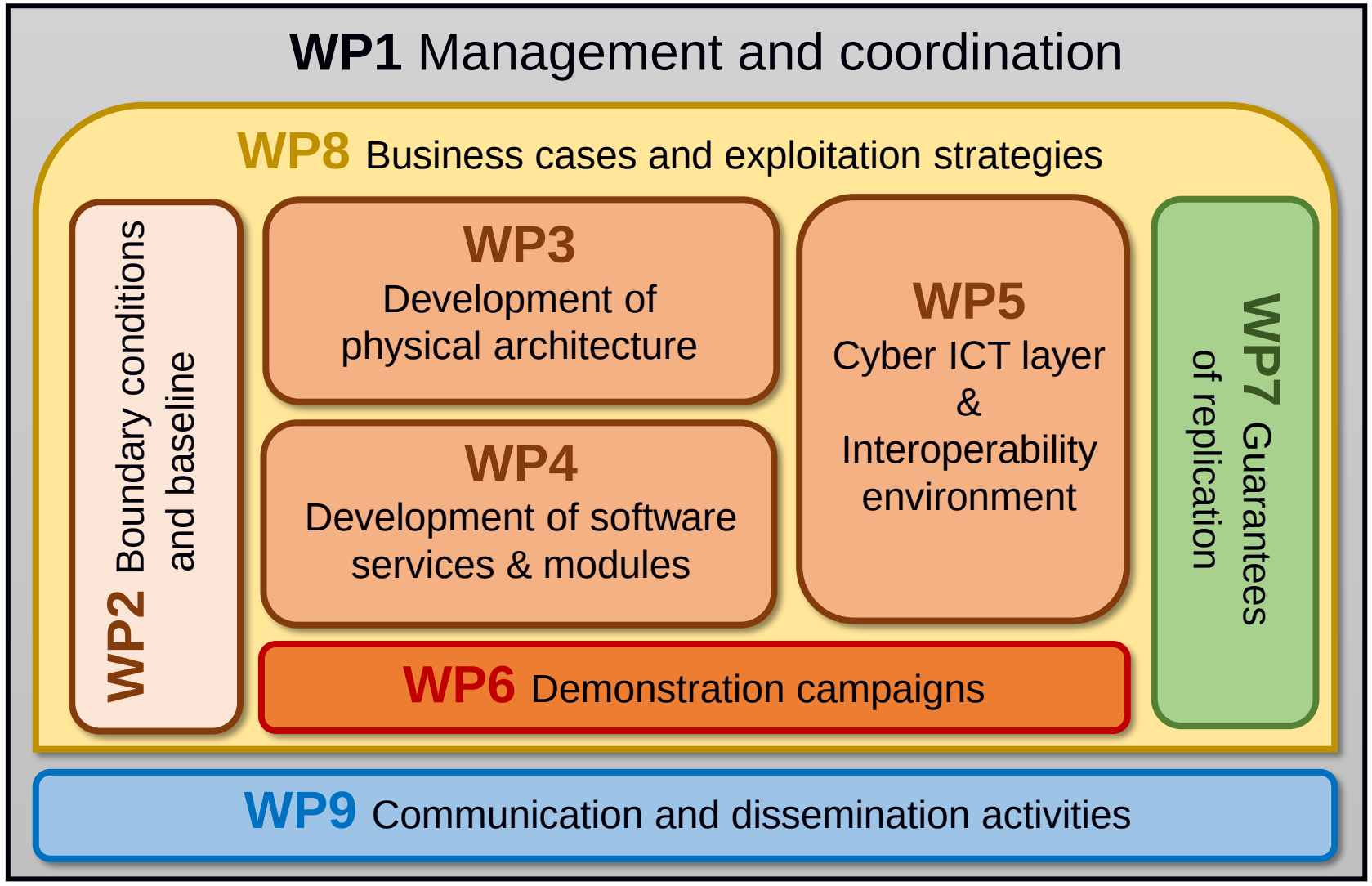
FLEXI GRID
INTEROPERABLE SOLUTIONS FOR IMPLEMENTING HOLISTIC FLEXIBILITY SERVICES IN THE DISTRIBUTION GRID

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.

FLEXIGRID – Implementation



FLEXIGRID

INTEROPERABLE SOLUTIONS FOR IMPLEMENTING HOLISTIC FLEXIBILITY SERVICES IN THE DISTRIBUTION GRID

Objectives, concept and expected outcome

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**

FLEXIGRID

INTEROPERABLE SOLUTIONS FOR IMPLEMENTING HOLISTIC FLEXIBILITY SERVICES IN THE DISTRIBUTION GRID

Objectives, concept and expected outcome

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

Solutions, use cases & Demo sites

FLEXIGRID
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

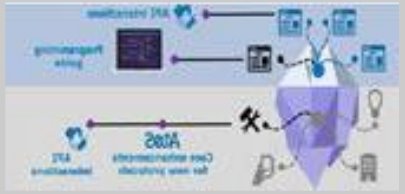
S7

Software module for congestion management

S8

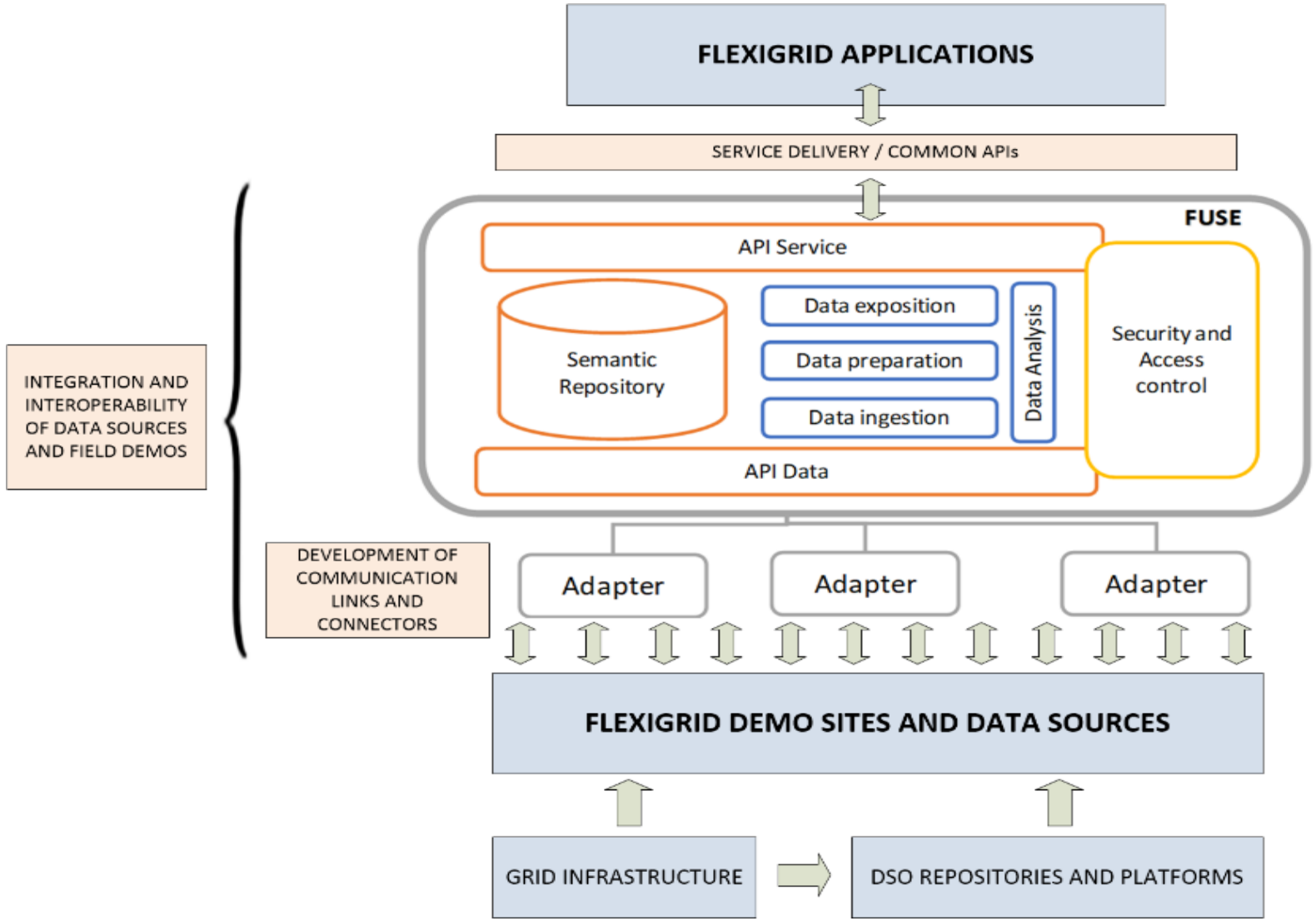
Virtual thermal energy storage model

S9

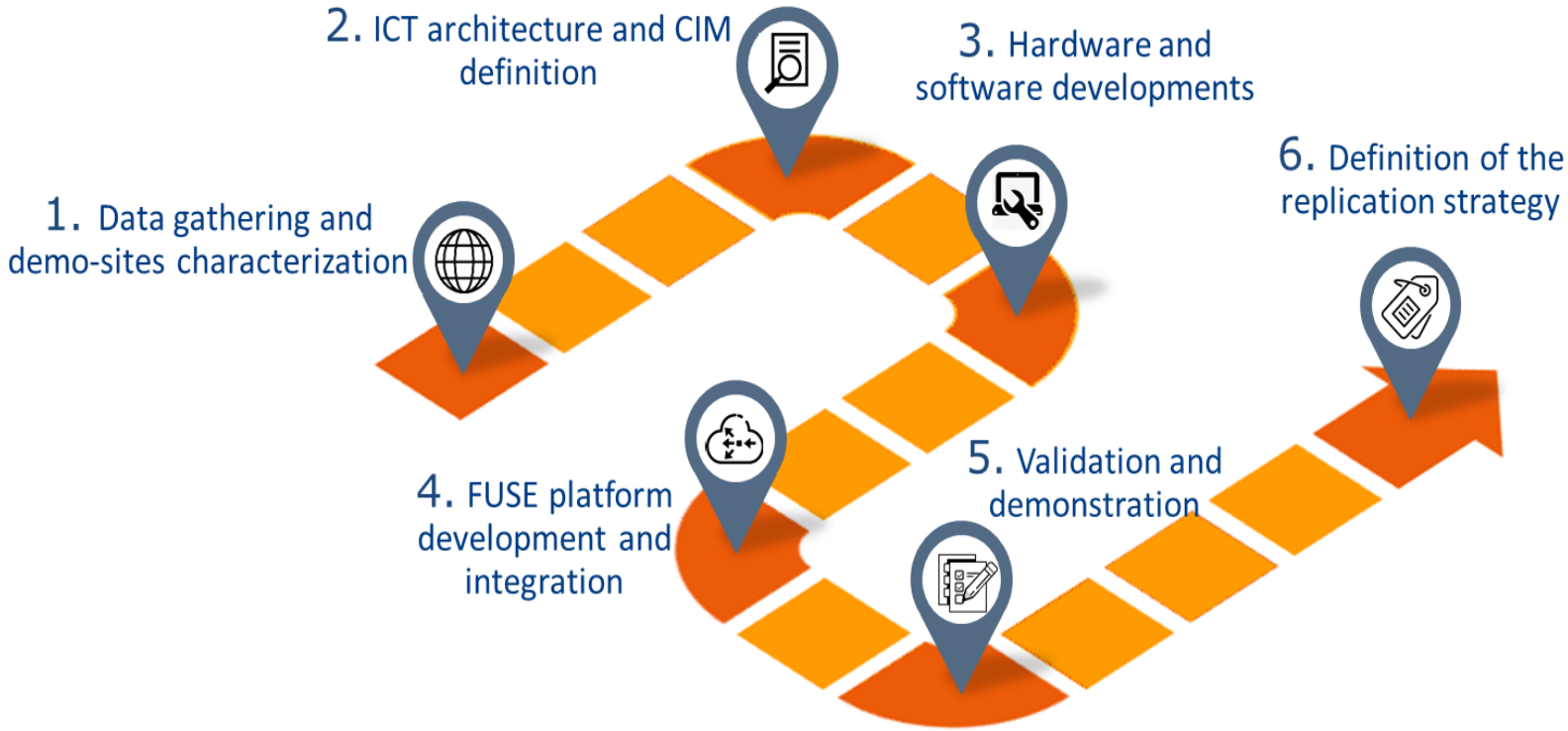


Fuse Platform

Solutions, use cases & Demo sites



FLEXIGRID – Overall Methodology



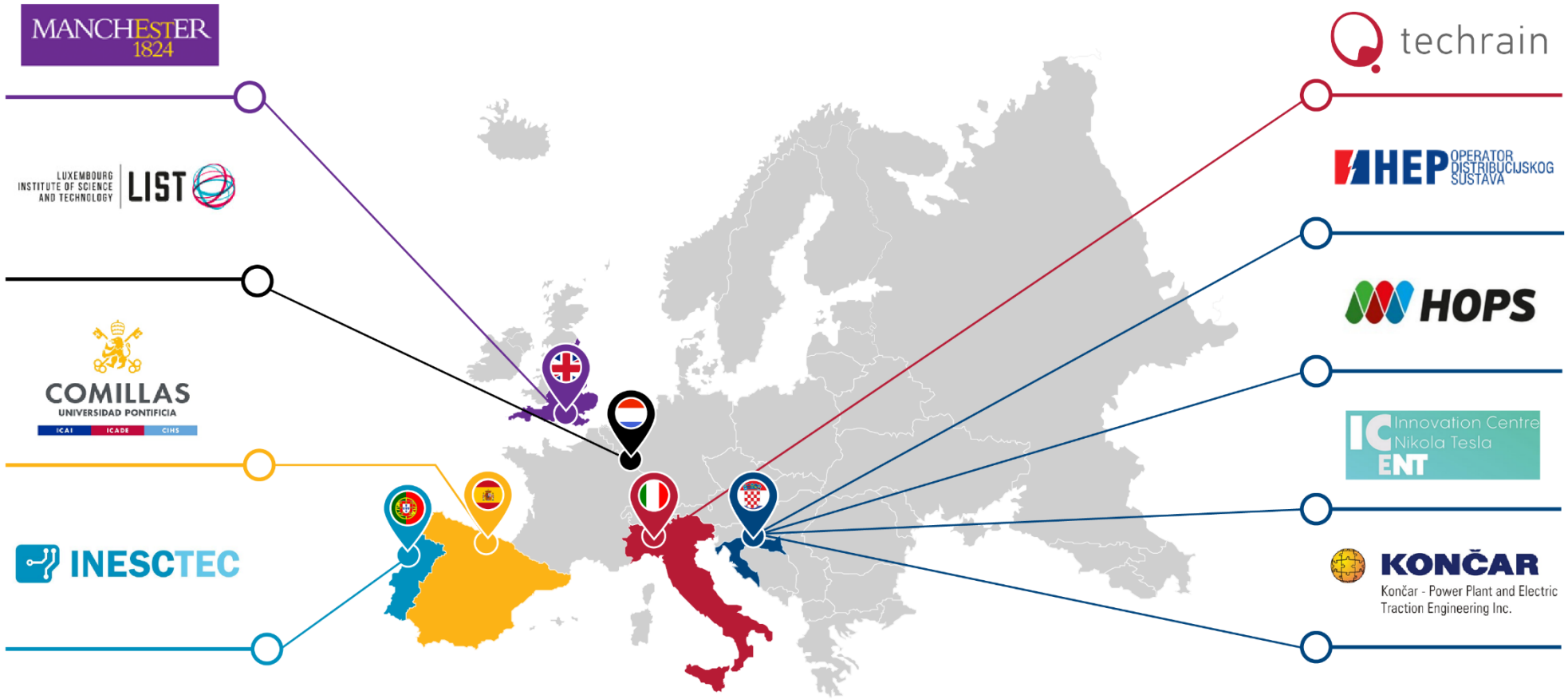
ATTEST

Advanced **T**ools **T**owards cost-efficient decarbonisation of future reliable **E**nergy **S**ys**T**ems

LC-SC3-ES-6-2019 – Research on advanced tools and technological development

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 864298

Consortium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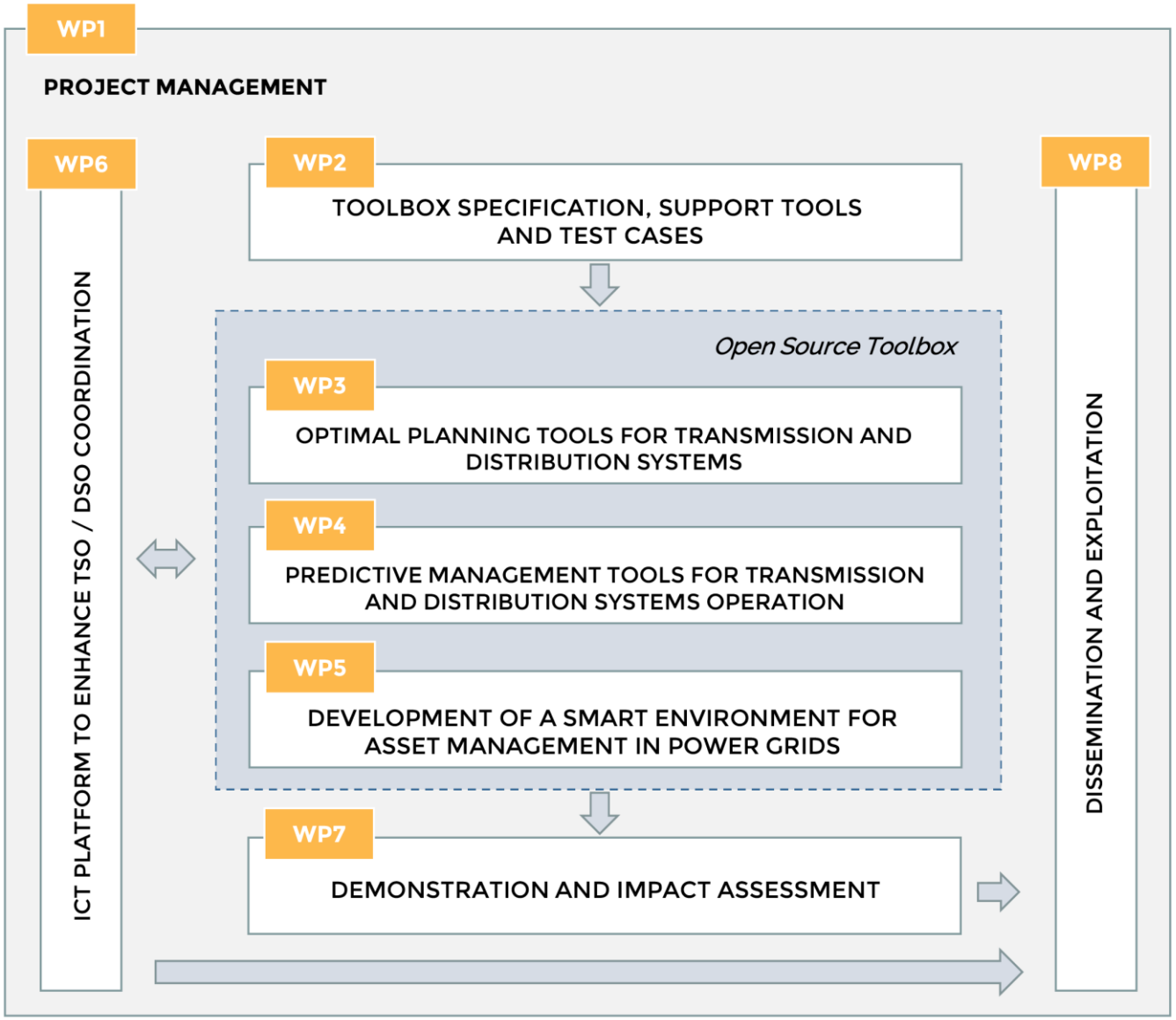
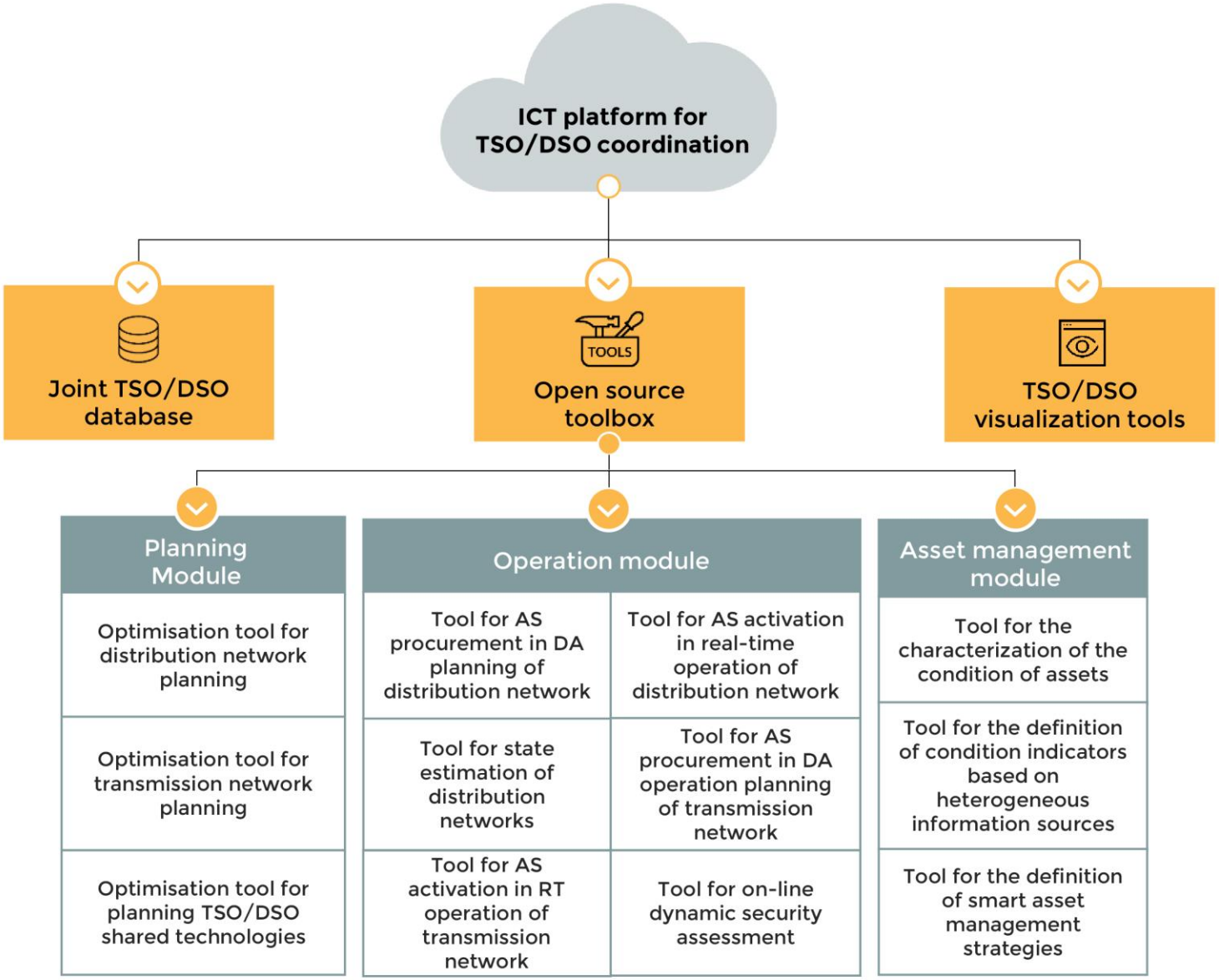
HOPS
IC Innovation Centre Nikola Tesla ENT
KONČAR
Končar - Power Plant and Electric Traction Engineering Inc.

Overall structure of the work plan

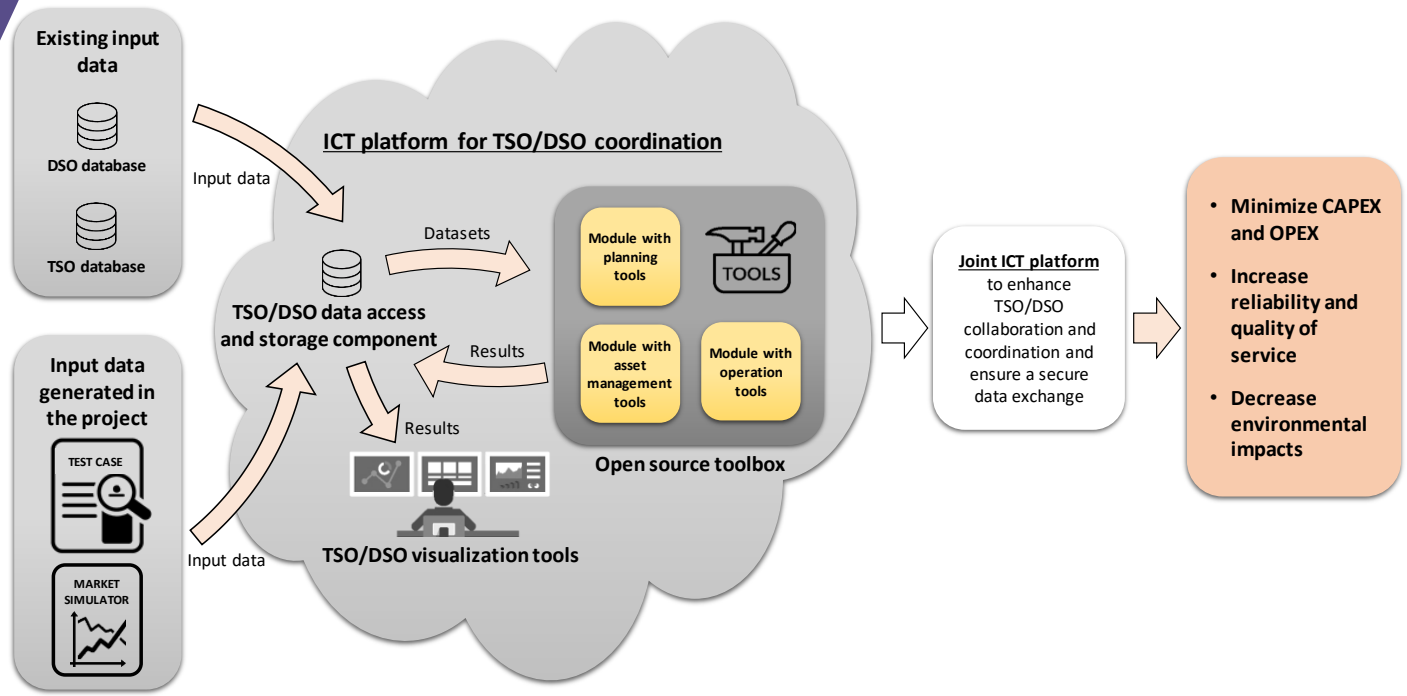
- WP structure



Hierarchy of the ICT Platform components



Conceptualizing the energy systems of the future



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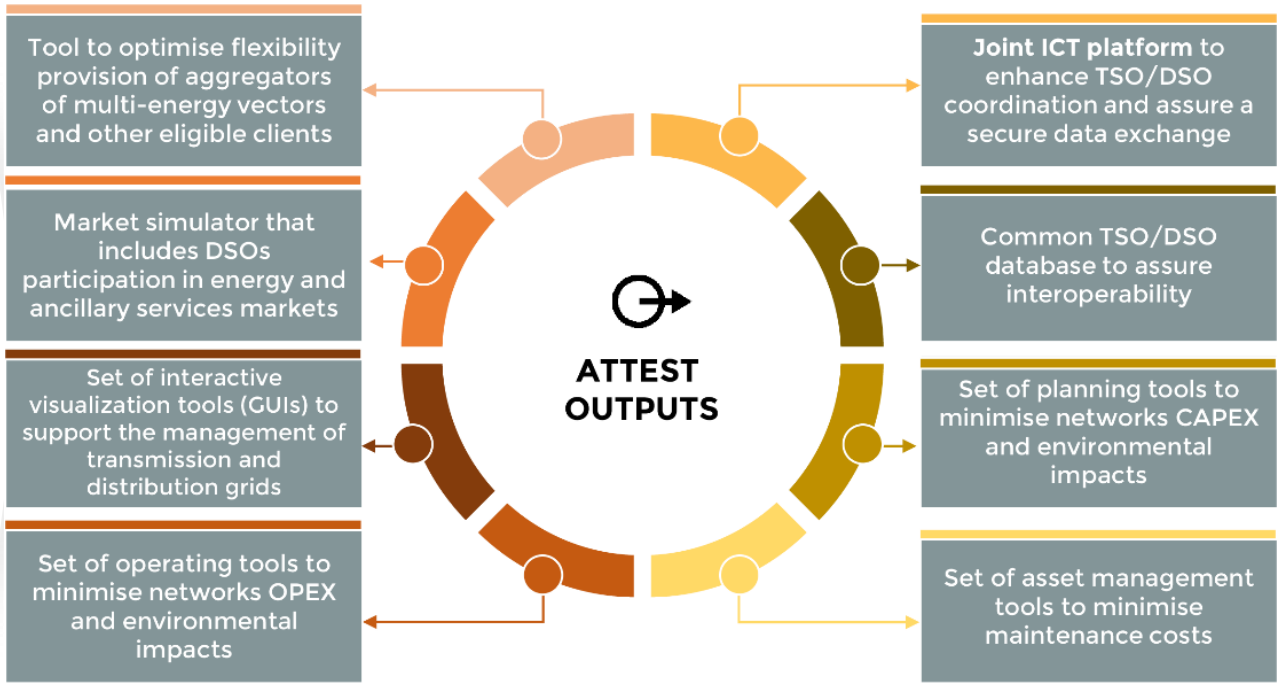
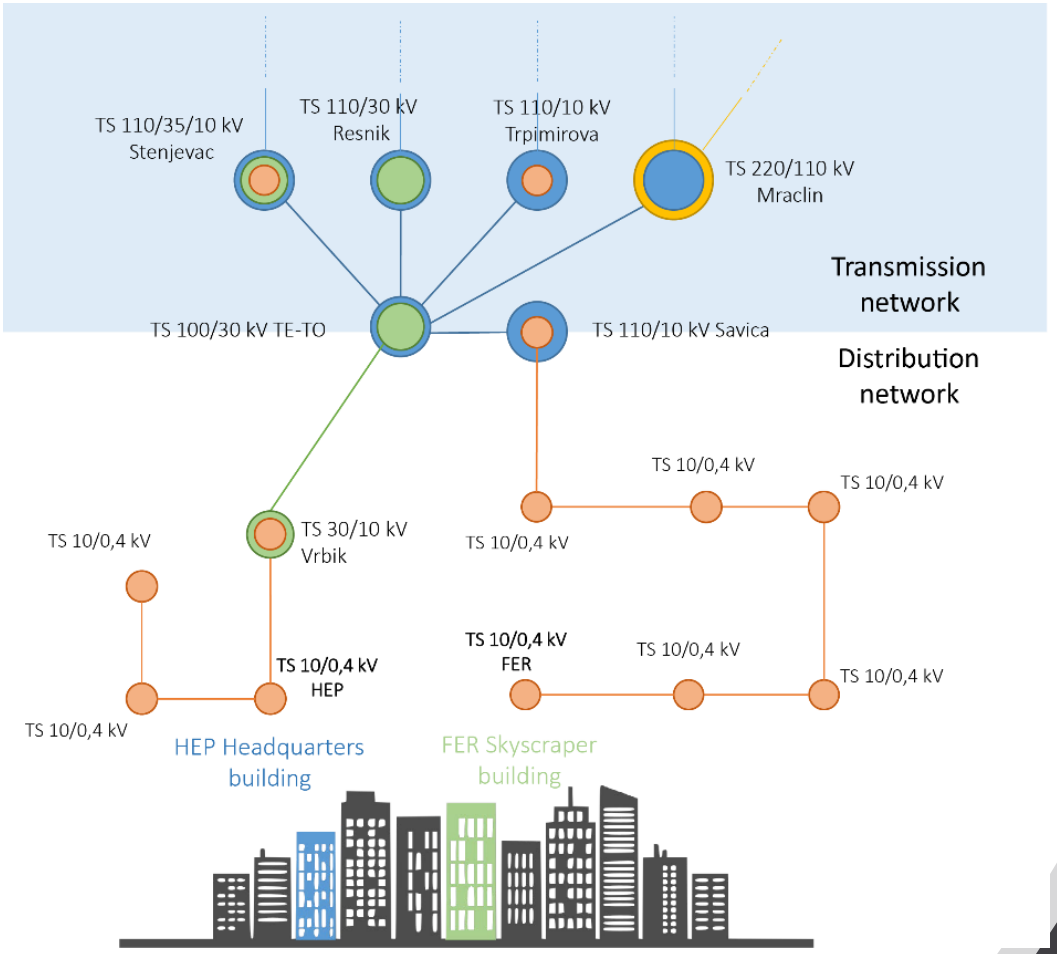
- ***Developing and operationalizing a modular open source toolbox*** comprising a suite of innovative tools to support TSOs / DSOs operating, maintaining and planning the energy systems of 2030 and beyond in an optimized and coordinated manner.





The ICT platform and a selection of tools from the open source toolbox will be validated in 3 different zones of the electrical system of Croatia:

- **ZAGREB**
  - Demand response
  - Flexibility from buildings
- **KOPRIVNICA**
  - Network operation
  - Flexibility from DSO assets
- **NORTHWESTERN CROATIA**
  - Network planning / expansion

Thank you for your attention!

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