

“Real progress along the road to Flexibility”

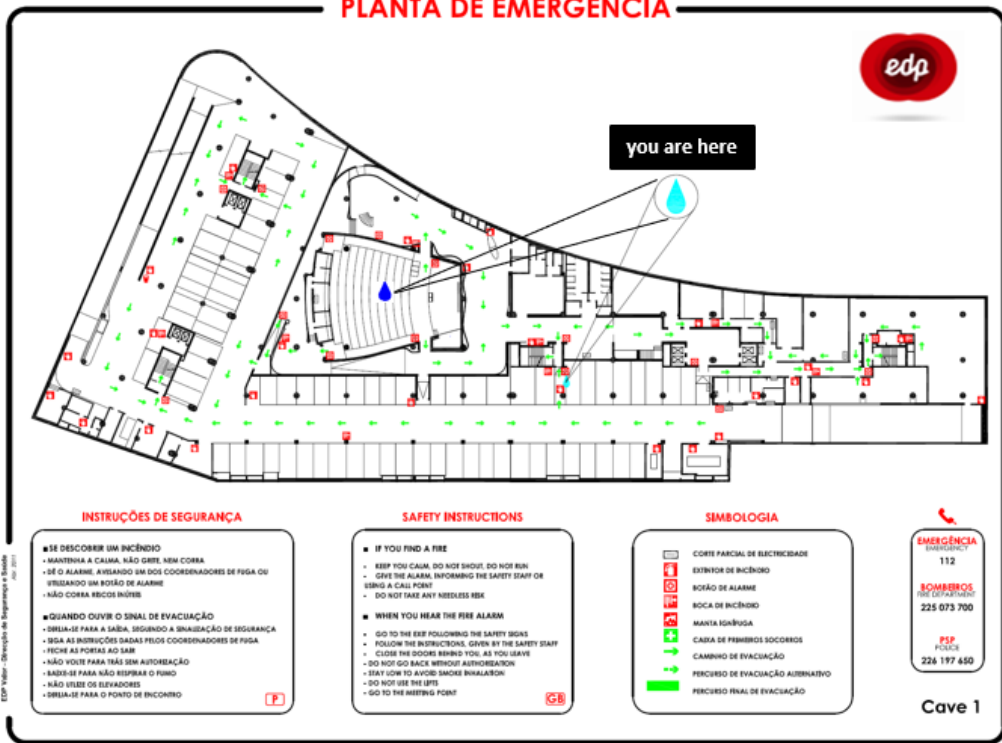
May 10th | Porto, Portugal

welcome

emergency procedures – Rua Ofélia Diogo Costa

Emergency plant - Porto Headquarters - Floor -1 (Auditorium)

PLANTA DE EMERGÊNCIA



Meeting Point



If the alarm sounds:

- do not panic
- do not run
- leave the place immediately, following the emergency signs and the instructions on the monitor
- don't go back to look for something forgotten
- go to the meeting point outside
- wait for authorization to re-enter the building

“Real progress along the road to Flexibility”

May 10th | Porto, Portugal

agenda

“Real progress along the road to Flexibility”

May 10th | Porto, Portugal

09h30 Session Opening – José Ferrari Careto (CEO of E-REDES)

09h40 Mugurel-George PAUNESCU (European Commission Policy Officer)

10h00 Panel 1 “Foundations that underpin flexibility”

Moderated by Rita Lopes Mourão (E-REDES) with the participation of Coordinet; X-FLEX; FlexPlan;

EUniversal and Interconnect

11h10 Coffee Break

11h30 Panel 2 “Flexibility in action”

Moderated by Madalena Lacerda (E-REDES) with the participation of OneNet; Platone; Interrface;

Fever and Parity

12h40 Key conclusions and closure – Luís Vale da Cunha (E-REDES)

13h00 Lunch

“Real progress along the road to Flexibility”

May 10th | Porto, Portugal

Session Opening

Ferrari Careto

E-REDES CEO

Energy policies – an update

George PAUNESCU

European Commission Policy Officer

DG Energy Unit -Innovation, Research, Digitalisation, Competitiveness



Energy policies – an update

E-REDES meeting on European projects

“Real progress along the road to flexibility”

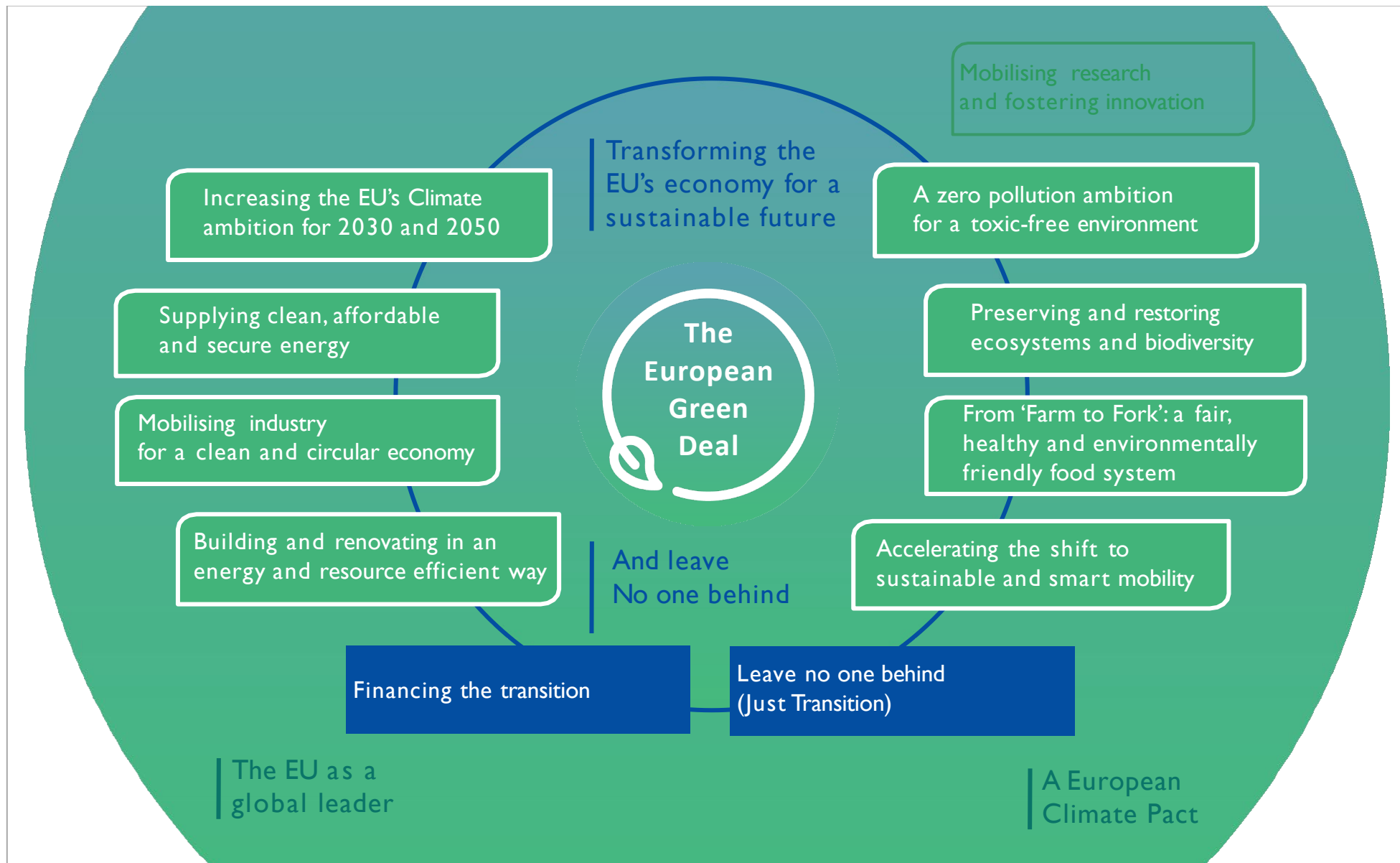
10 May 2022

George Paunescu

Policy Officer, DG Energy

Unit - Innovation, Research, Digitalisation, Competitiveness

The European Green Deal (1/3)



European Green Deal (2/3)

Key principles for the clean energy transition, which will help reduce greenhouse gas emissions and enhance the quality of life of our citizens:

- 1.ensuring a **secure** and **affordable EU energy supply**
- 2.developing a **fully integrated, interconnected** and **digitalised EU energy market**
- 3.prioritising **energy efficiency**, improving the **energy performance of our buildings** and developing an energy sector based largely on **renewable sources**

The European Green Deal (3/3)

Supplying clean, affordable
and secure energy

Building and renovating in an
energy and resource efficient way

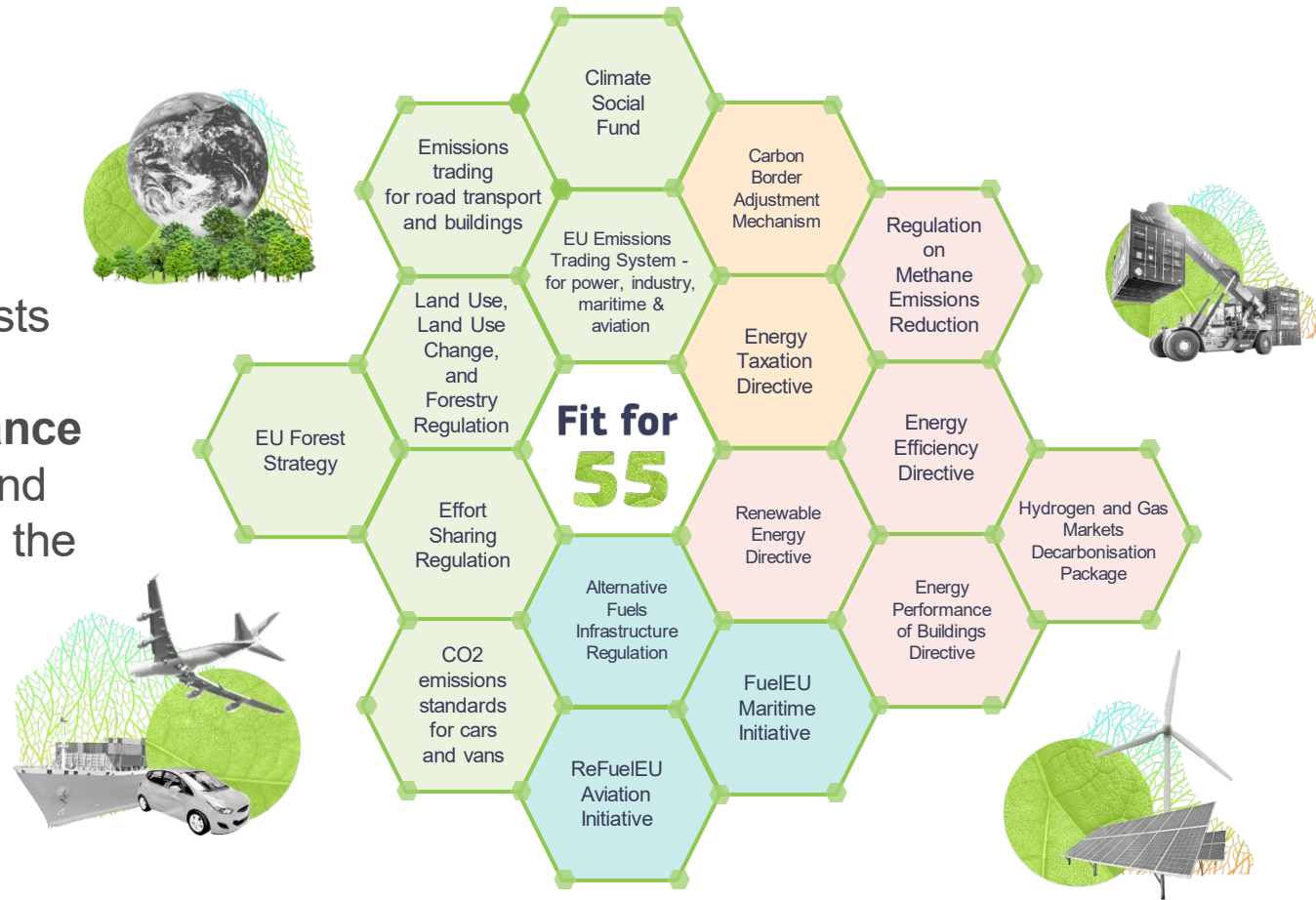
- Assess the ambition of the final **National Energy and Climate Plans** - by June 2020
- **EU Strategy for energy sector integration** - July 2020
- **EU Hydrogen strategy** – July 2020
- **Renovation wave strategy** - October 2020
- **EU strategy on offshore renewable energy** - November 2020
- **TEN-E Regulation** – revision proposal December 2020
- + 'Fit for 55' package

The EU as a
global leader

A European
Climate Pact

Fit for 55 Package (1/6)

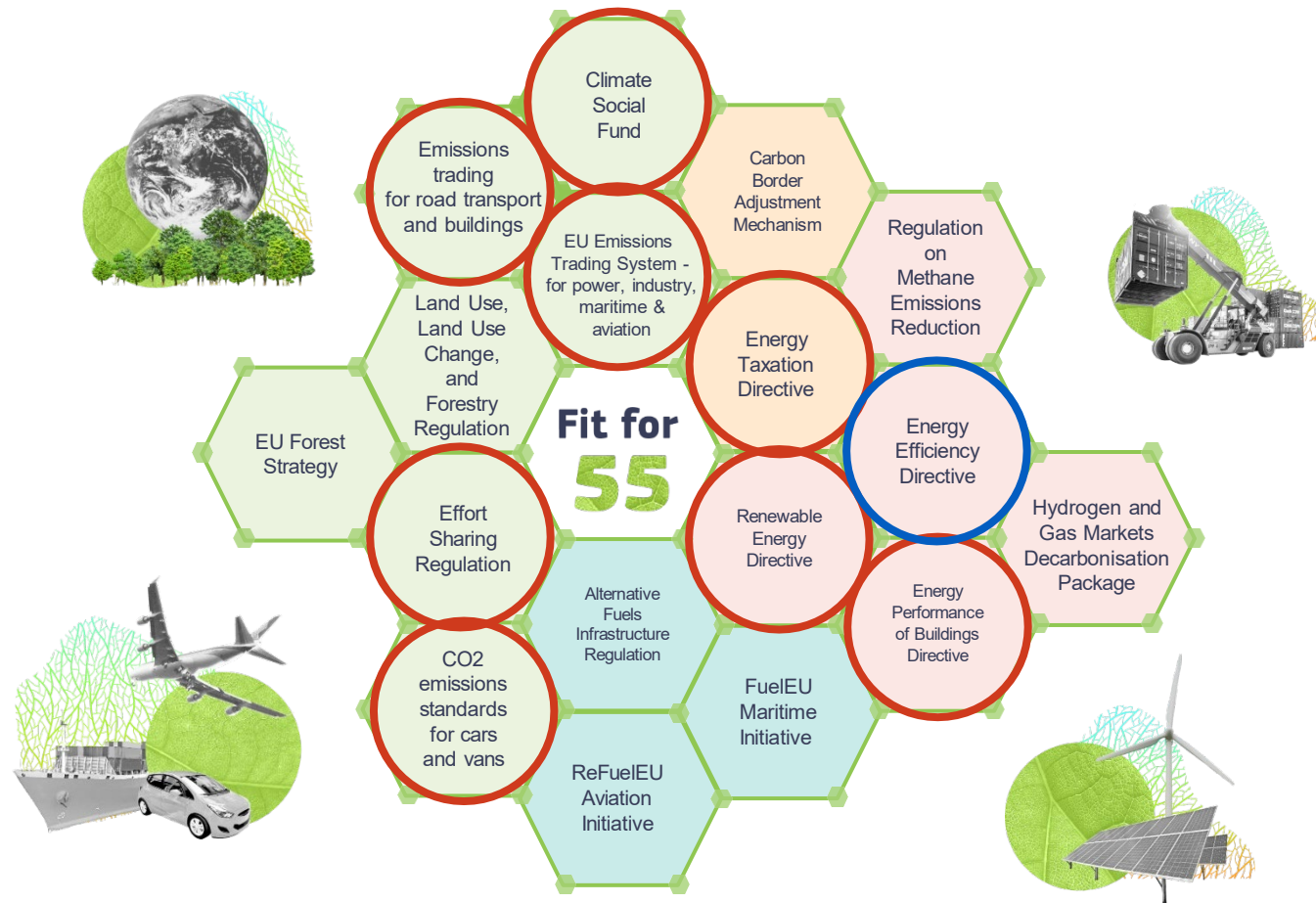
The Fit for 55 Package consists of a set of **interconnected proposals that strike a balance** between pricing, standards and support measures to achieve the energy and climate targets.



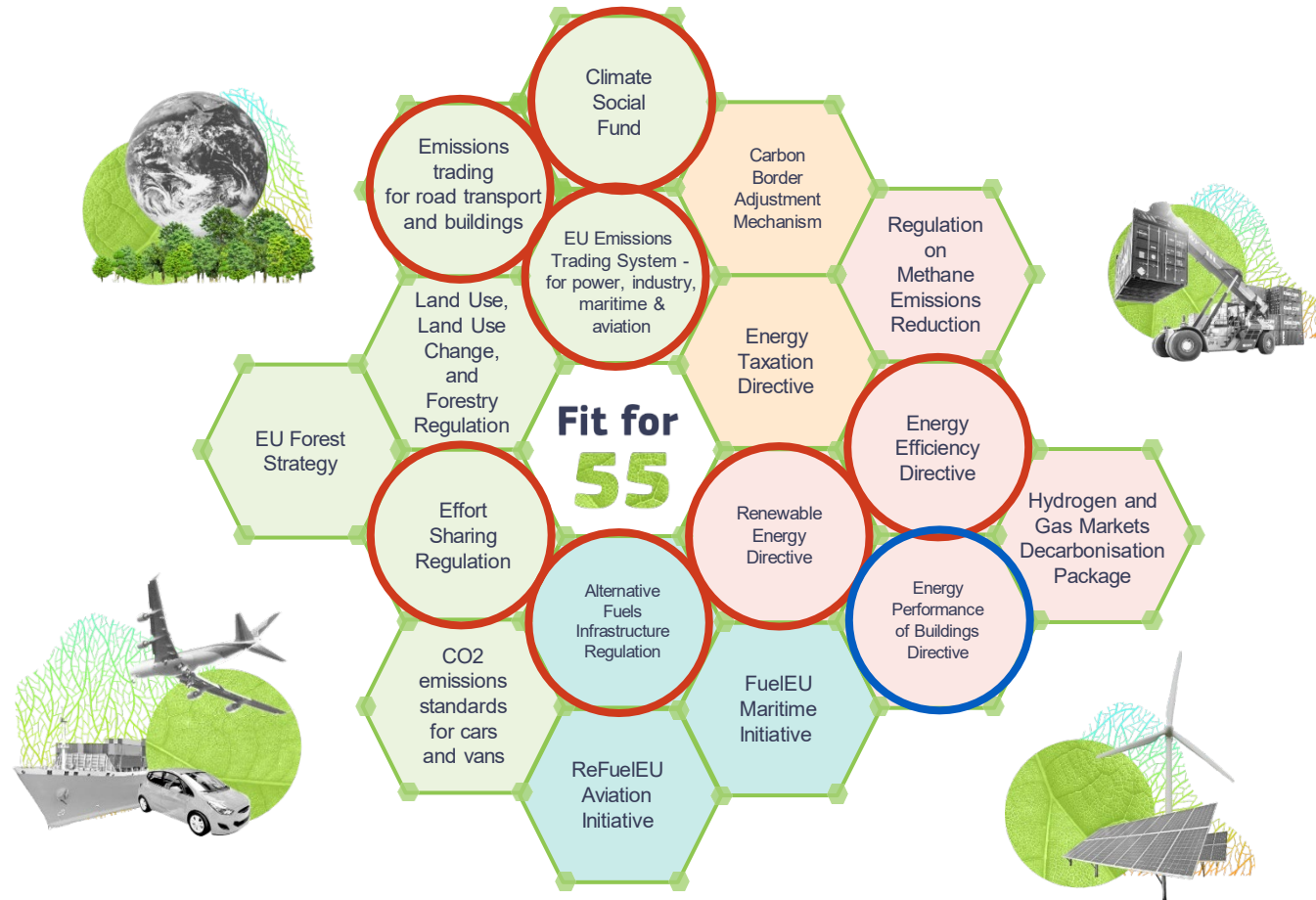
REDII: key interlinkages (2/6)



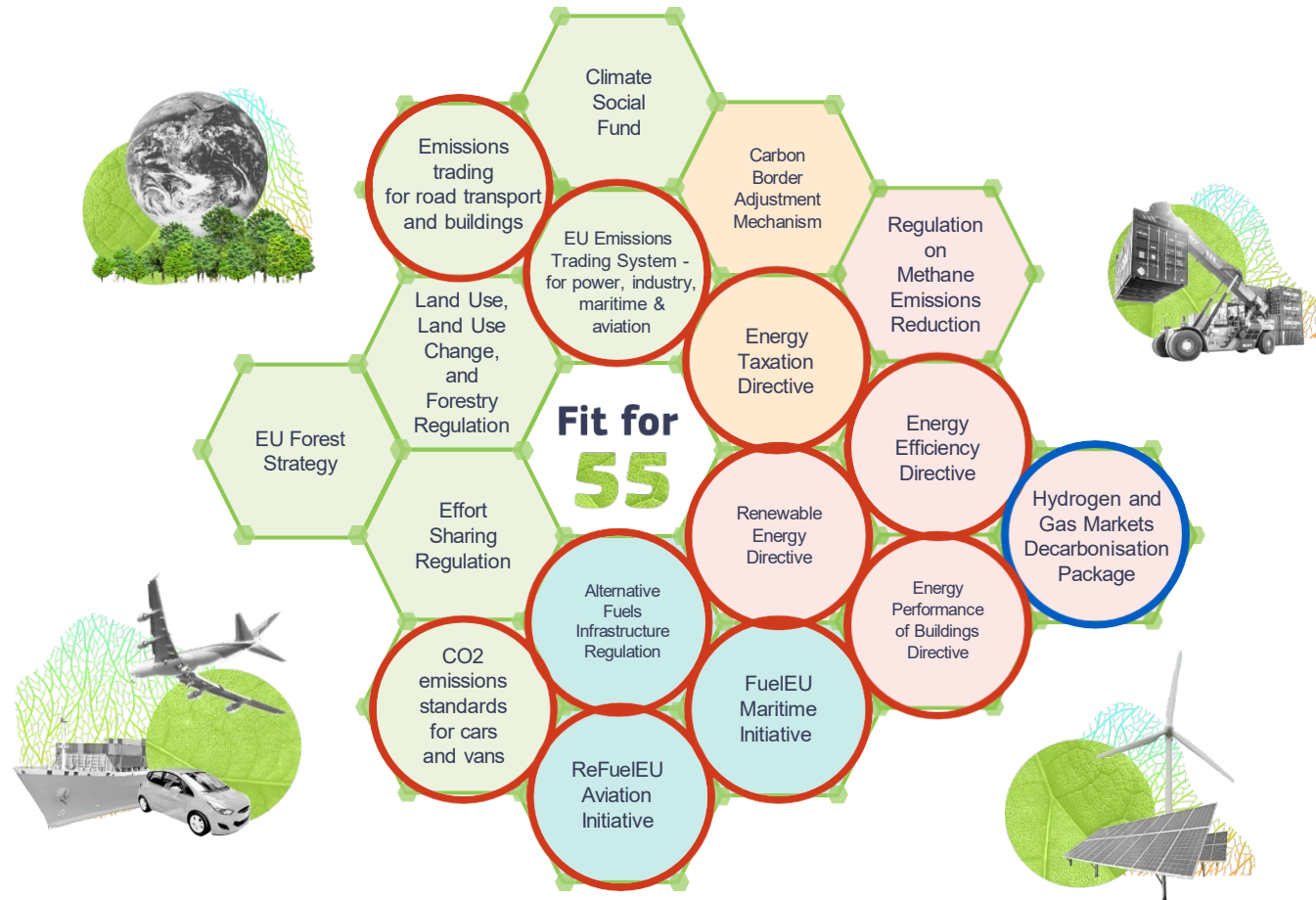
EED: key interlinkages (3/6)



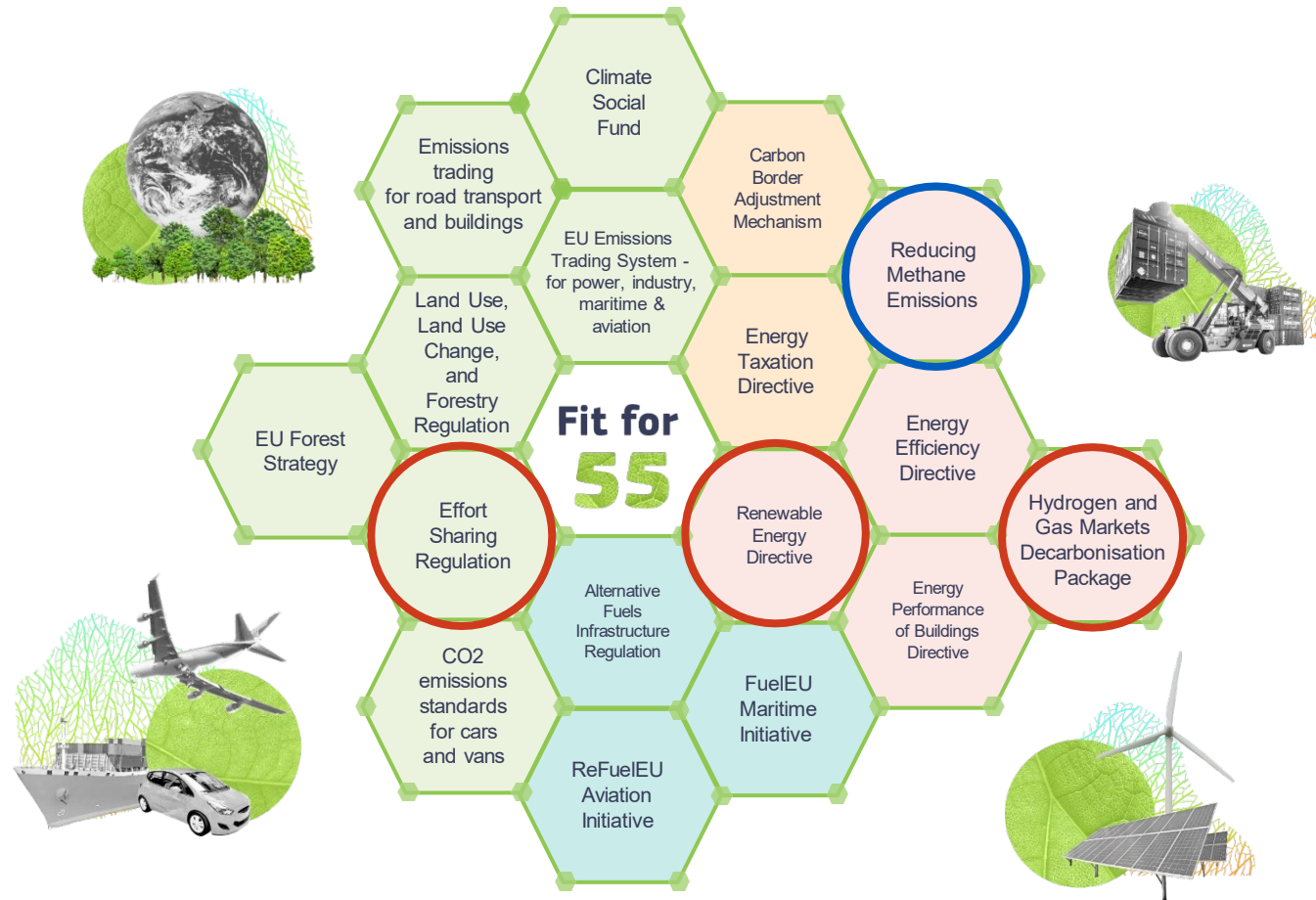
EPBD: key interlinkages (4/6)



Hydrogen and Decarbonised Gas Package: key interlinkages (5/6)



Reducing Methane Emissions: key interlinkages (6/6)



REPowerEU (1/4)



**REPowerEU: Joint European
action for more affordable,
secure and sustainable energy**



REPowerEU (2/4)

URGENT ACTION ON PRICES

Keeping retail energy prices in check by confirming the possibility of price regulation to help protect consumers and our economy.

Guidance on temporary tax measures on windfall profits and use of emissions trading revenues, so governments can ease the pressure on household consumers.



State Aid measures: consultation with Member States on a potential Temporary Framework to grant aid to companies facing high energy costs.

Market actions assessing options to improve the electricity market design.

REPowerEU (3/4)

REFILLING GAS STORAGE FOR NEXT WINTER

A legislative proposal by April on minimum gas storage

so Europe better controls its supply, establishing a 90% filling target by 1 October, designating gas storage as critical infrastructure, and allowing incentives for refilling.

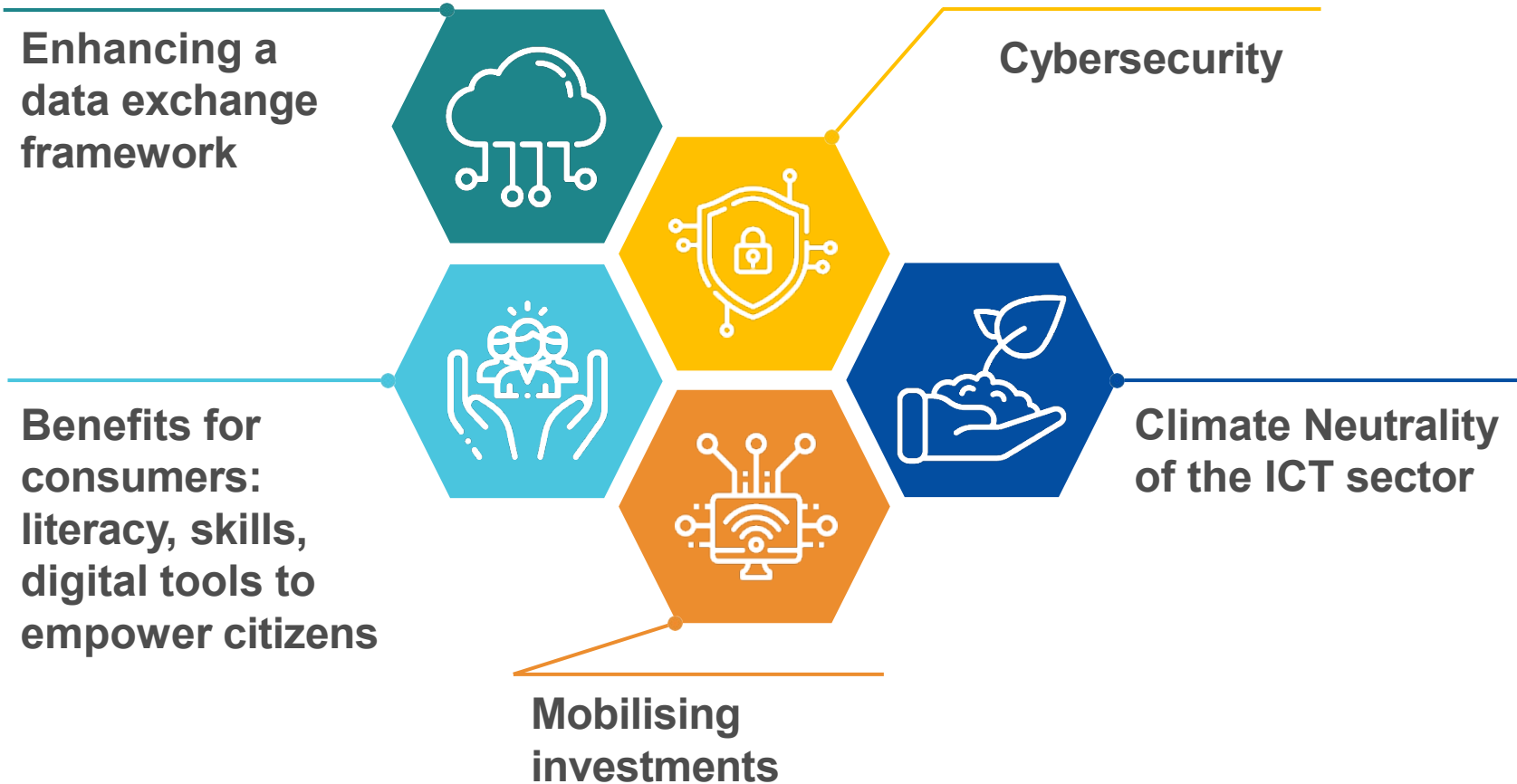


Support to **coordinated gas refilling operations**, for example through joint procurement, collecting orders and matching supplies.



Continued **investigation into behaviour by operators**, notably by Gazprom.

Digitalisation of Energy Action Plan (1/7)



REPower EU (4/4)

REPOWEREU TO CUT OUR DEPENDENCE ON RUSSIAN GAS



More rooftop solar panels, heat pumps and energy savings to reduce our dependence on fossil fuels, making our homes and buildings more energy efficient.



Decarbonising Industry by accelerating the switch to electrification and renewable hydrogen and enhancing our low-carbon manufacturing capabilities.



Speeding up renewables permitting to minimise the time for roll-out of renewable projects and grid infrastructure improvements.



Doubling the EU ambition for biomethane to produce 35 bcm per year by 2030, in particular from agricultural waste and residues.



Diversifying gas supplies and working with international partners to move away from Russian gas, and investing in the necessary infrastructure.



A Hydrogen Accelerator to develop infrastructure, storage facilities and ports, and replace demand for Russian gas with additional 10 mt of imported renewable hydrogen from diverse sources and additional 5 mt of domestic renewable hydrogen.





Enhancing a data exchange framework (2/7)

To develop the **competitive market** for energy services that:

- helps further **integration of renewables** in the grid
- values **demand-side flexibility**
- Supports the integration of **EV smart (and bidirectional) charging**
- Facilitates **consumer/prosumer engagement**

And **supporting the:**

- Development of a **Common European Energy Data Space** (upon request from EUCO on 25/3/2021 to establish sectoral data spaces)
- Development of an **interoperability framework**
- Considering a **governance system** for the digitalisation of the energy sector and enhancing data exchanges



Benefits for consumers: literacy, skills, digital tools to empower citizens (3/7)

To make it easier for citizens to **engage in the energy transition** as e.g. active consumers or investors in renewable energy.

Four dimensions:

- ❑ Social dimension: tools to support citizens' engagement in energy markets
- ❑ Rights dimension: data-driven energy services market has consumers' benefits and rights at its core
- ❑ Energy communities: how upcoming energy community models can engage in new business models
- ❑ Skills dimension: by developing and implementing reskilling and upskilling pathways and “digital energy literacy”

While paying attention to the digital divide and energy poverty issues.



Cybersecurity (5/7)

To contribute to maintaining a **high level of cybersecurity of the energy system**, while guaranteeing our citizens' privacy.

➤ Considering also the energy specificities: real-time requirements, cascading effects and the mix of legacy technologies with smart/state of the art technology

- ❑ By establishing and consolidating energy-specific measures:
 - ❑ E.g the planned **Network Code on cybersecurity of cross-border electricity flows** (foreseen to be adopted by the end of 2022);
 - ❑ Considering additional measures, such as specific rules for the gas sector;
- ❑ While aligning with the general framework for cybersecurity, in particular the proposed **Directive on Security of Network and Information Systems (NIS-2 Directive)**



Climate Neutrality of the ICT sector (6/7)

To ensure synergies between digital transformation and climate action.

- Requires to **manage the growing energy demand of the IT sector** (related to data processing, communication, use of devices and software) and to make it climate neutral.

- By complementing the **European Digital Strategy** and the **Circular Economy Action Plan** focusing on measures that promote cooperation between the energy sector and digital sector
- By prioritising **energy efficient solutions and the use of renewables** in all stages of the digitalised energy value chain
- By supporting the deployment of **sustainable products and data centres**

Stay informed (7/7)

- [Six stakeholder workshops: https://ec.europa.eu/info/events/workshops-digitalisation-energy-system-2022-feb-16_en](https://ec.europa.eu/info/events/workshops-digitalisation-energy-system-2022-feb-16_en)
- DG ENER work on digitalisation of the energy sector: https://energy.ec.europa.eu/topics/energy-system-integration/digitalisation-energy-sector_en
- Social media: #digitalisation (follow [@Energy4europe](#))



Promoting investments (4/7)

To accelerate the **development**, **implementation** and **upscaling** of digital solutions in energy supply, demand, and transmission and distribution

➤ to support the energy transition as well as the competitiveness and leadership of the EU's industry.

- ❑ By mobilising **research**, fostering **innovation** and **market uptake**
- ❑ By making use of complementarities among programmes (such as Horizon Europe and its partnerships, the Connecting Europe Facility and the Digital Europe Programme) to support **innovation** and **scale-up** of piloted solutions.

Thank you



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Foundations that underpin flexibility

Panel

Moderated by Rita Lopes Mourão (E-REDES) with the participation of Coordinet; X-FLEX; FlexPlan; EUniversal and Interconnect

“Real progress along the road to Flexibility”

May 10th | Porto, Portugal

Foundations that underpin flexibility

EUniversal



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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 864334



EU Universal UMEI

Linking active system management to flexibility markets



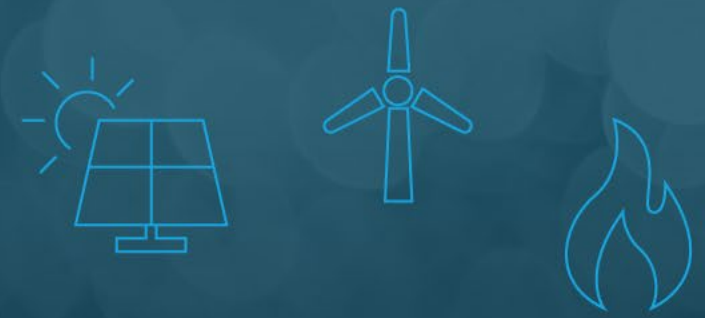
EU Universal UMEI

E-Redes event

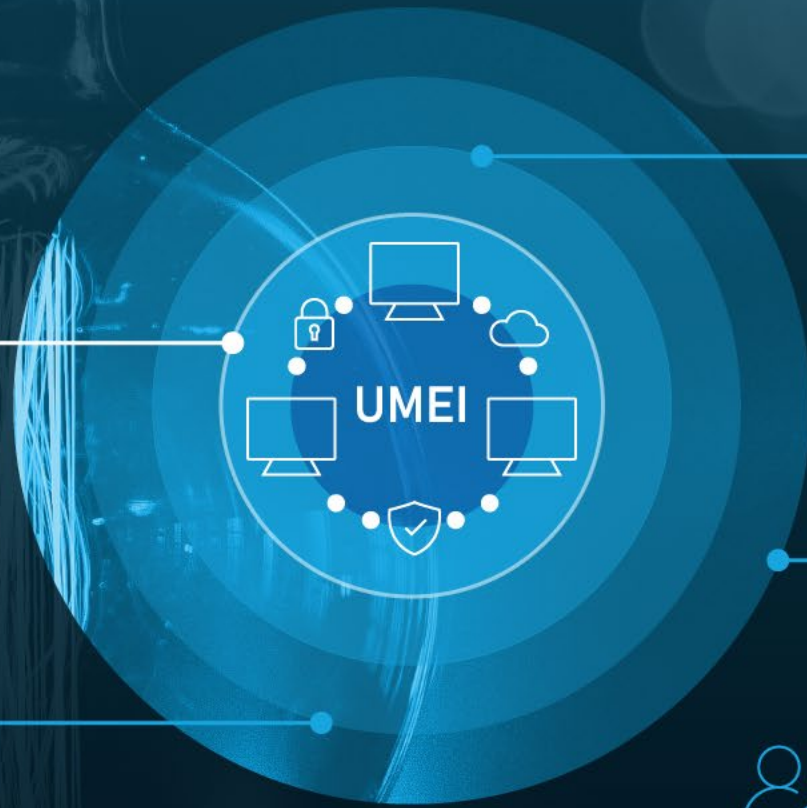
2022, may 10th



ACTIVE SYSTEM MANAGEMENT



MARKET PLATFORMS



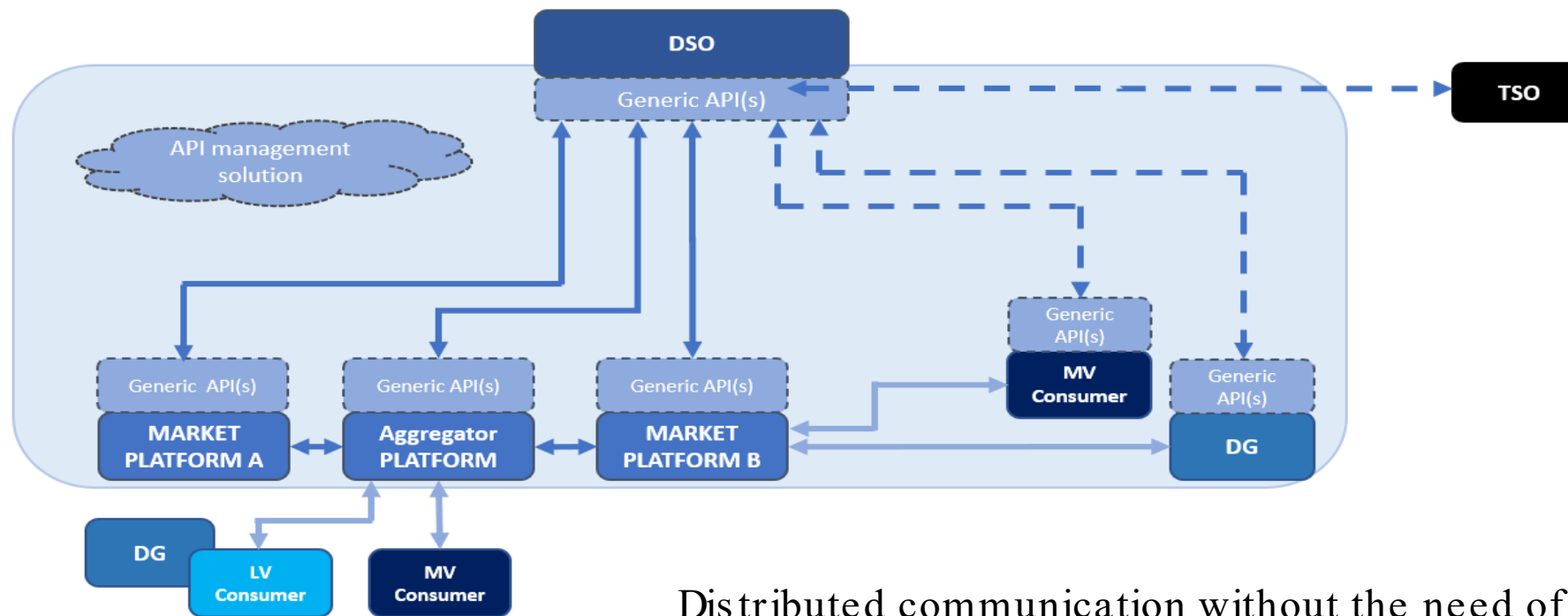
PROSUMERS & CONSUMERS/
ENERGY COMMUNITIES/
SMART CITIES

AGGREGATORS



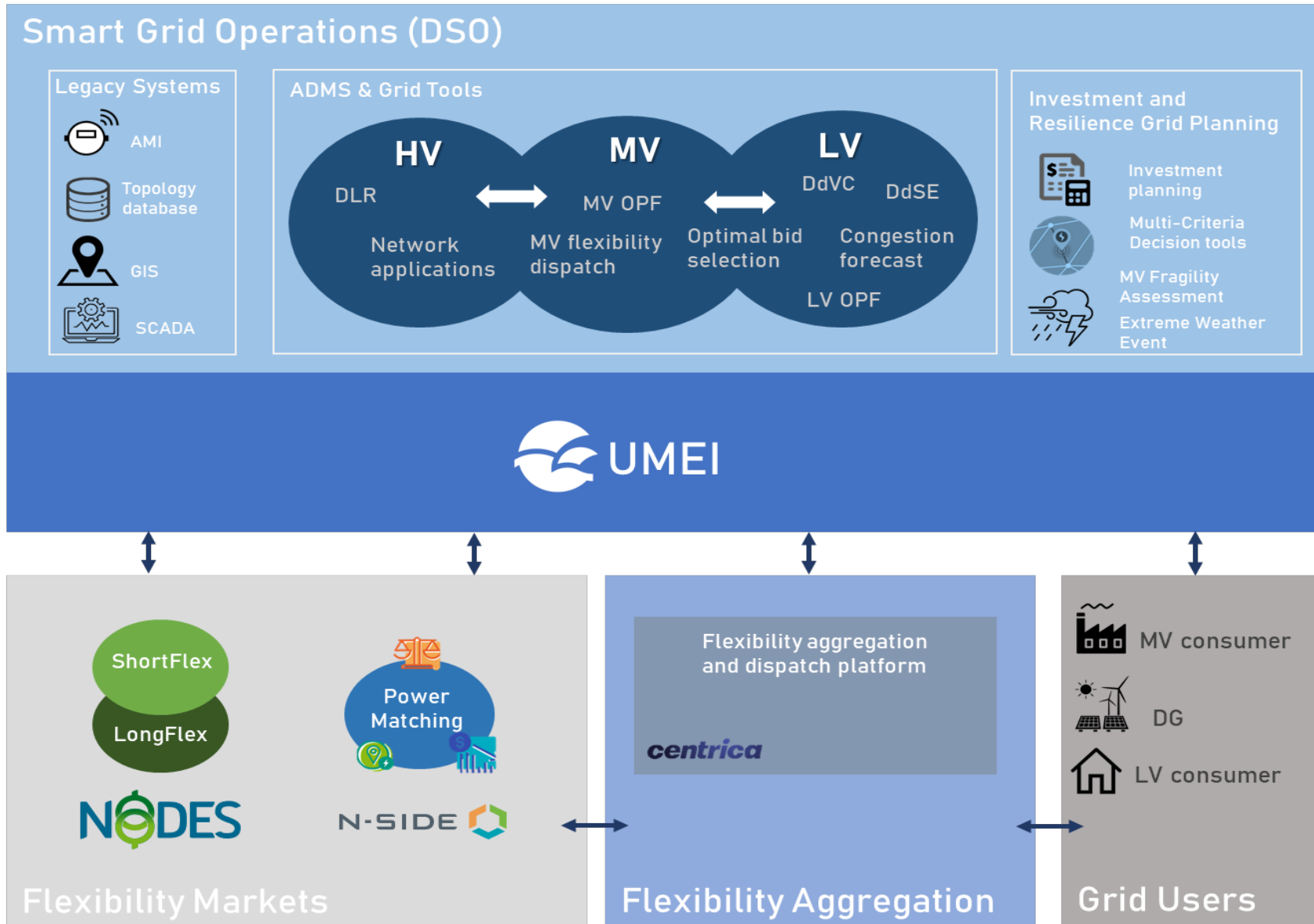
The EUniversal project aims to develop a universal approach on the use of flexibility by DSO and their interaction with the new flexibility markets, enabled through the development of the concept of the Universal Market Enabling Interface (**UMEI**) – a unique approach to foster interoperability across Europe.

The **UMEI** will materialize in the conceptual architecture design and the implementation of a **standard, agnostic, adaptable and modular** REST API to link DSOs and market parties with flexibility market platforms, in coordination with other flexibility users.

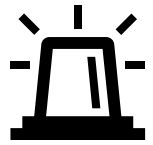


Distributed communication without the need of managed platforms

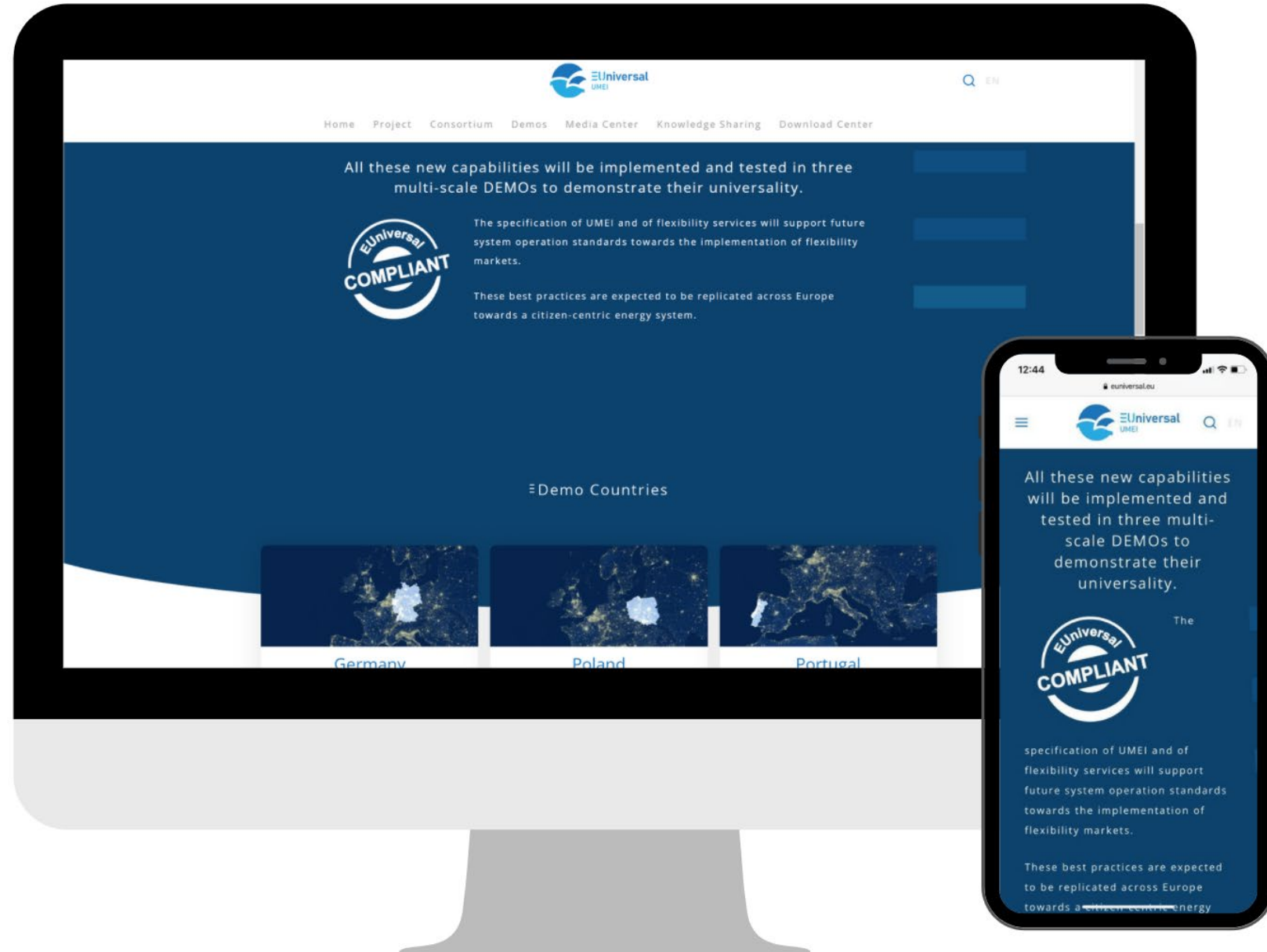
The project will demonstrate the UMEI concept in the operation of flexibility tools by the DSO, with prosumer participation through the Market Platforms



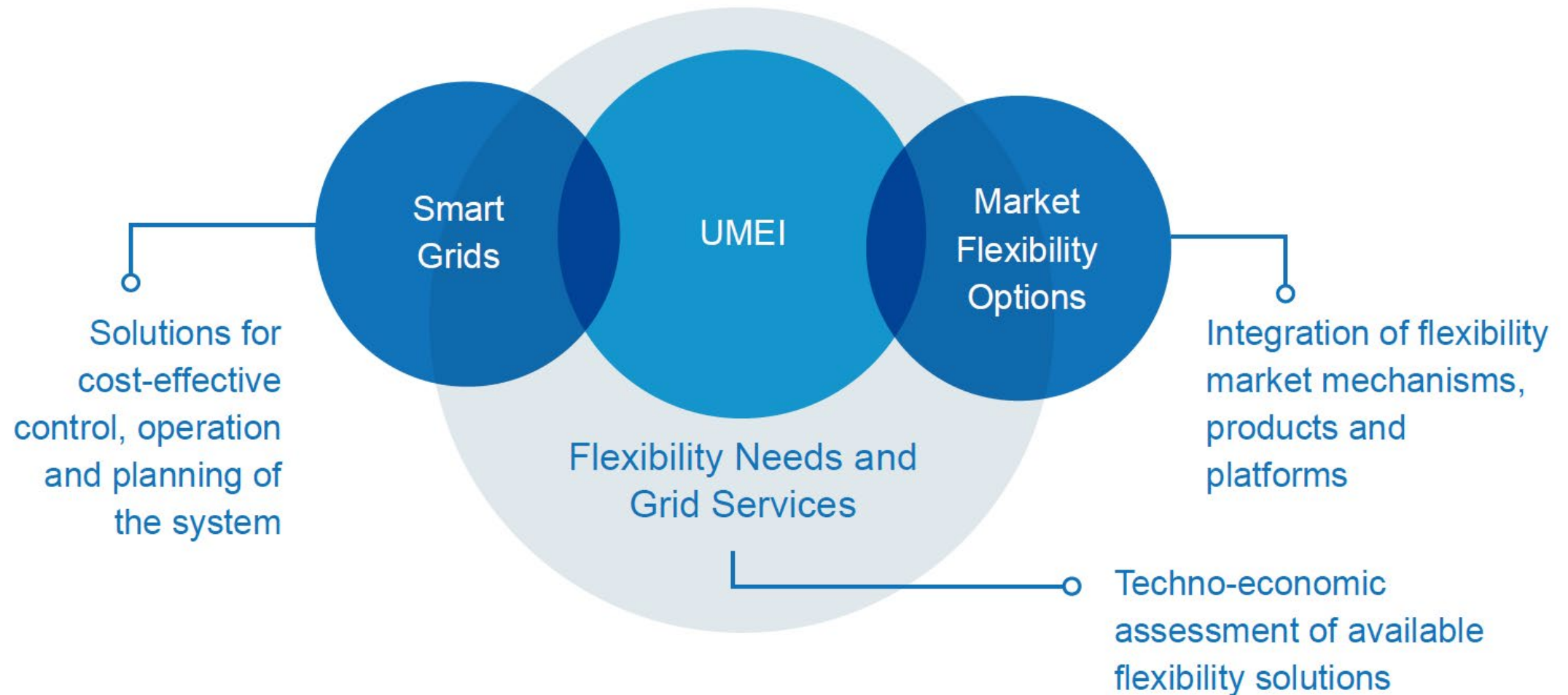
The UMEI public specification will be public in 2022













Coming
soon



A three-fold approach lays down the foundation for this implementation



The Business Use Cases will test those different services in three demos

Mechanism	Service	Buyer	Auction type	Product	Timeline	Aggregation	Demo		Platform					
									NODES	N-SIDE				
Flexibility market	Corrective Congestion management and voltage control	DSO only	Continuous market	AP	Day-ahead intraday	Yes	 DE AP	<input checked="" type="checkbox"/>						
						No	 PL AP	<input checked="" type="checkbox"/>						
					Day-ahead intraday	Yes	 DE RP	<input checked="" type="checkbox"/>						
						No	 PL RP	<input checked="" type="checkbox"/>						
	Corrective and Predictive Congestion management and voltage control	DSO only	Continuous market (NODES) Call market (N-SIDE)	AP	Day(s)-ahead Weeks-ahead	Yes	 PT 3	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>					
							Day(s)-ahead Years-ahead	 PT 4	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				
					Corrective Congestion management			DSO only	Continuous market (NODES) Call market (N-SIDE)	AP	Day(s)-ahead	Yes	 PT 1	<input checked="" type="checkbox"/>
							Corrective Voltage control						AP/RP	 PT 2
Corrective Congestion management via flexibility of the line capacity	Producer		>RES generation than connection agreement limit	Day-ahead	No	 PL DLR		<input checked="" type="checkbox"/>						
Bilateral contract	Corrective Voltage Control			Flexstation solutions			 PL FS							



Everyday grid maintenance is performed to:

- Replace aged assets;
- Add new clients to the grid;
- Install remote control equipment, etc

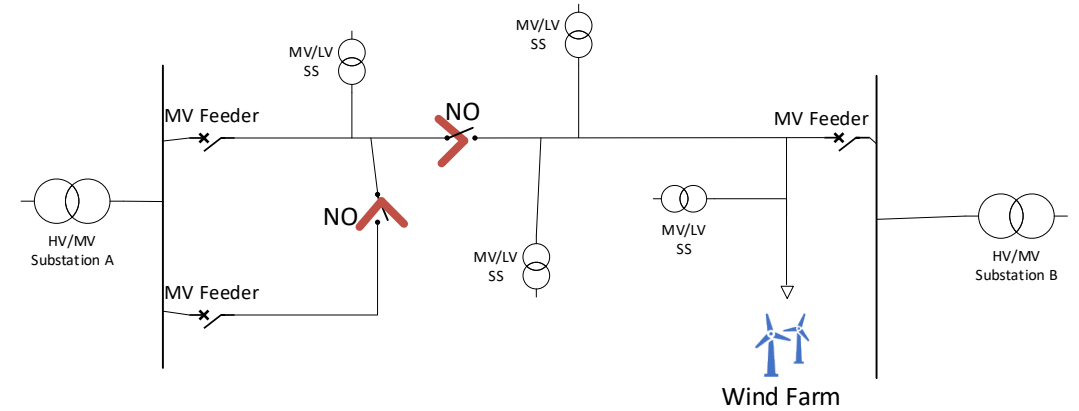
High number of daily maintenance activities!

Type of maintenance	#Month Average
Internal Maintenance	+ - 1500
External requests	+ - 250

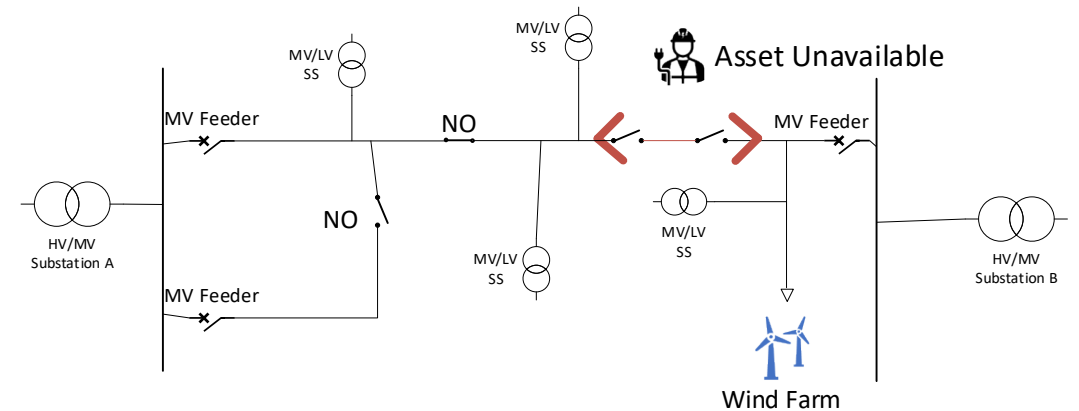
A new method is proposed to:

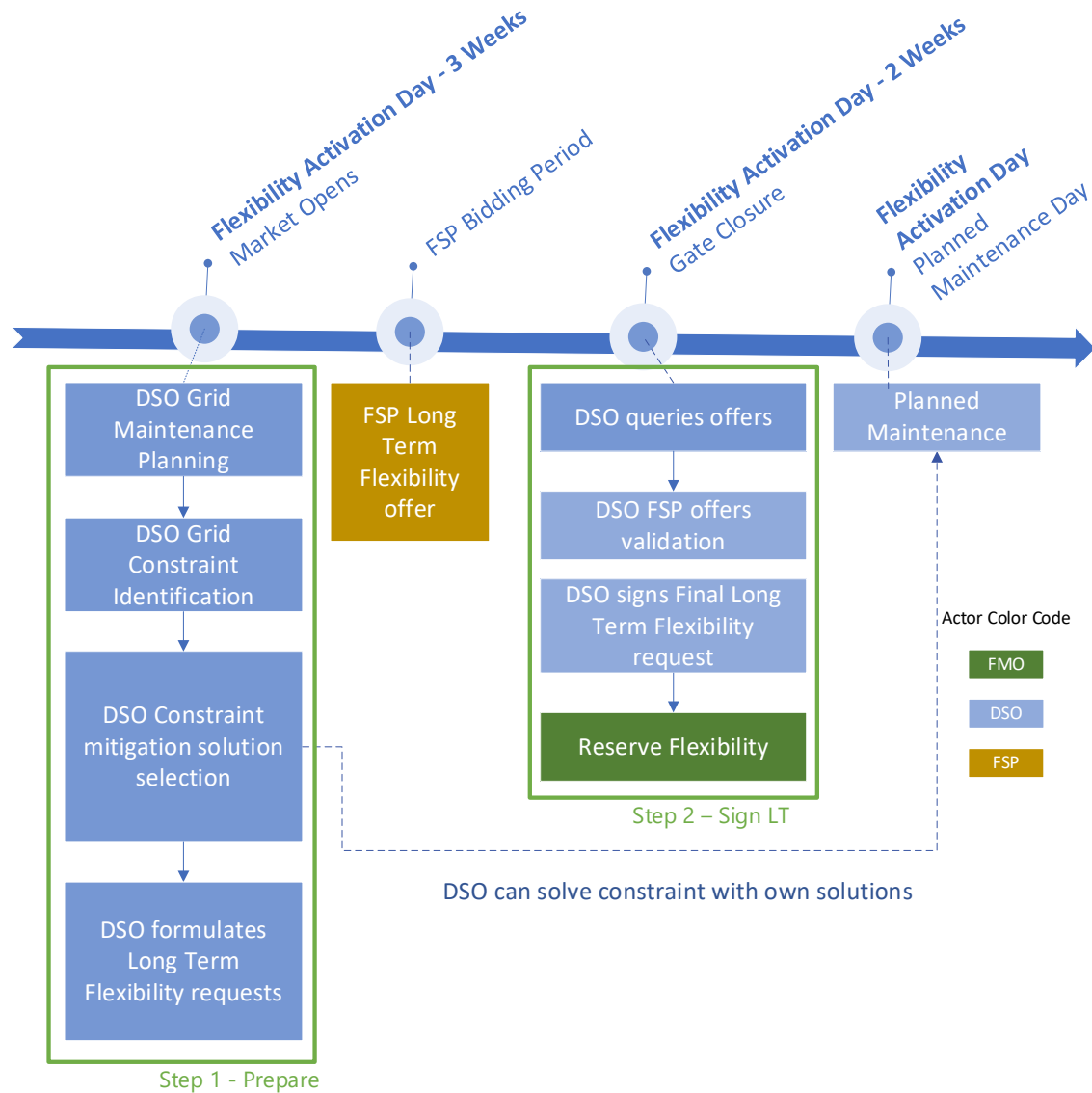
- Explore network reconfiguration options
- Use flexibility

Normal Operation



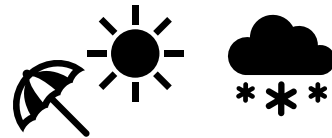
Grid re-configuration for maintenance (example)



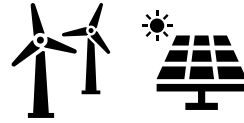


The matched sell bids, from each market, will be considered as **reserved flexibility**. The FSPs with matched sell bids **are obliged to submit sell offers in the short-term** market, with an accorded maximum price cap.

The challenges that traditional grid planning faces



Seasonal grid congestions



Increase DER hosting capacity



Host new types of load



Questions to be answered

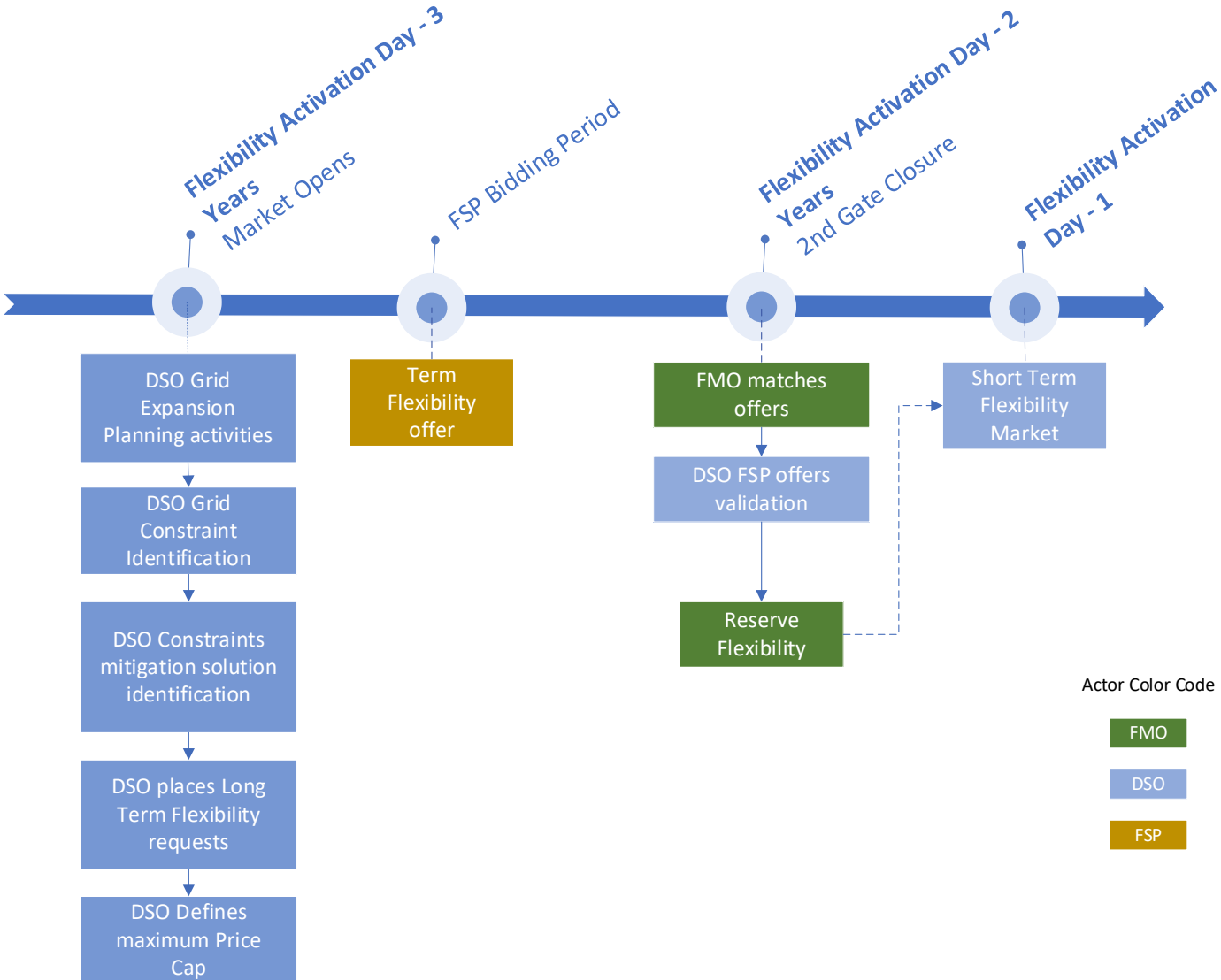
①

Can contract long-term flexibility services be considered as an alternative to the traditional distribution grid investment solutions or to postpone such investments?

②

What is the economic effectiveness of such flexibility services when compared with the traditional grid investments?

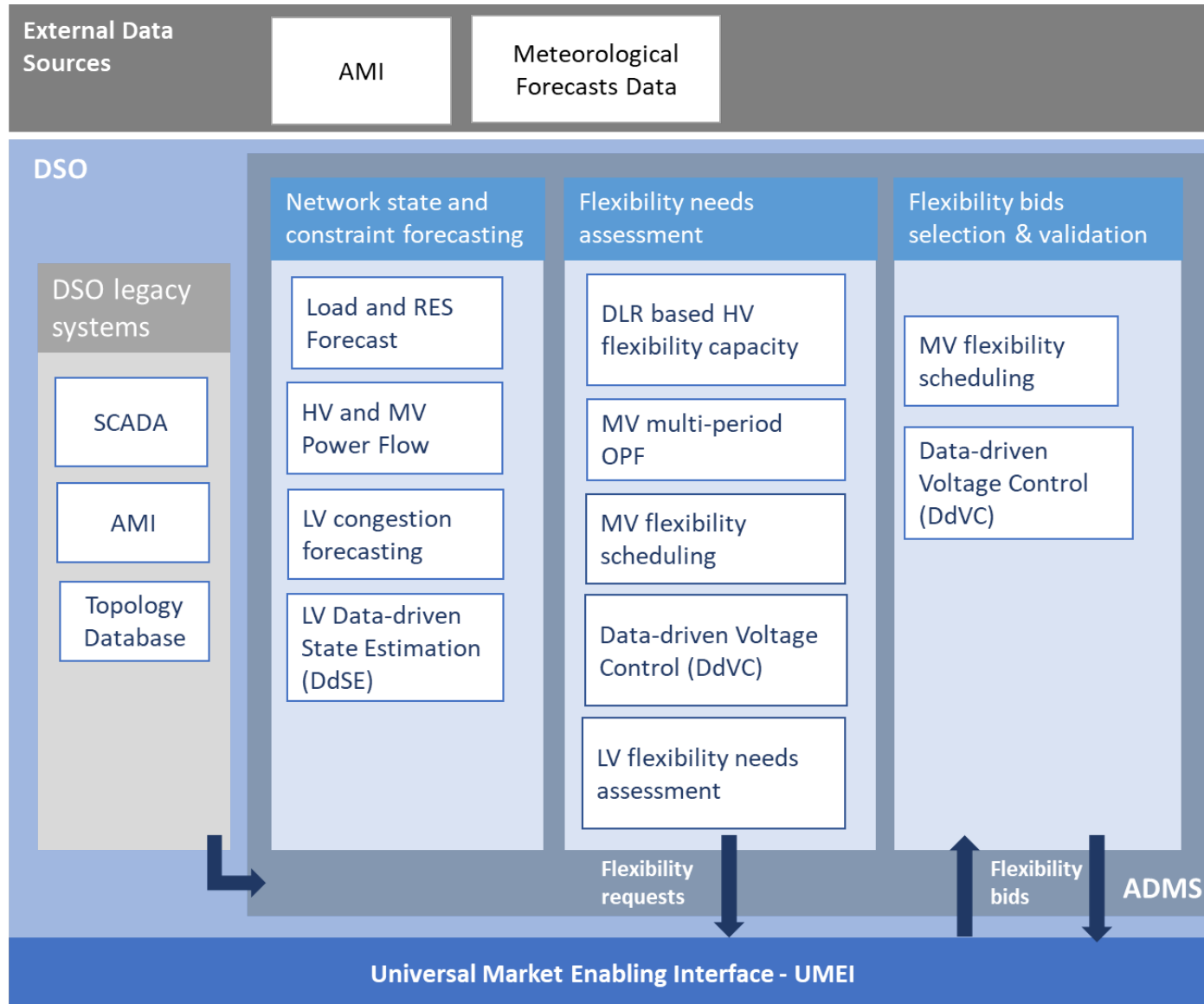
- **Improve network observability**, including the integration of MV load allocation and LV state estimation tools to characterize the LV network status, in terms of voltage.
- **Predictive grid applications**: anticipating potential network restrictions, ensure optimized use of network assets, quantifying flexibility needs and validating flexibility market results both in day-ahead and intraday.
- **Coordinated control framework between grid voltage levels**.
- Improve grid operational resilience, **including flexibility in operation and maintenance planning**, increasing the capacity to deal with unexpected events, considering for example self-healing capabilities.
- **optimize network investment planning** considering available flexibility from market-based services



5 Main processes

1. Identification and quantification of congestions in the distribution grid
2. Identification of the traditional distribution grid planning solution with the least total cost
3. Identification of the flexibility quantities to be contracted in the long-term market and activated in the short-term market
4. Performance assessment & solution ranking (multi-criteria decision process)
5. Flexibility services procurement

If flexibility services are the preferred alternative, the DSO **reserves** in the long-term market.



- Capability to forecast for the next hours the network status and identify *a priori* potential HV, MV and LV network constraints
- Multi-level approach for the assessment of flexibility needs
- Enabling the selection (if applicable) and validation of flexibility bids
- Compatibility with different market designs:
 - N-SIDE - Bids cleared by external market platform
 - NODES – Bids are collected by the platform and selected by the DSO



EU Universal UMEI



euniversal.eu



[euniversal_proj](https://twitter.com/euniversal_proj)



[euniversalproject-h2020](https://www.instagram.com/euniversalproject-h2020)



[euniversal_h2020](https://www.linkedin.com/company/euniversal_h2020)

Let's flatten the energy curve!



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 864334



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“Real progress along the road to Flexibility”

May 10th | Porto, Portugal

Foundations that underpin flexibility

FlexPlan



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This project has received funding from the European Union's Horizon2020 research and innovation programme under grant agreement N° 863819

FlexPlan

E-REDES Annual Event | 10th May 2022

The FlexPlan project

Gianluigi Migliavacca

RSE S.p.A.

Agenda

- Motivation and partnership of the FlexPlan project
- What FlexPlan will achieve
- The new planning tool
- The six regional cases



- Due to high-speed deployment of RES, T&D planning is more and affected by higher uncertainty
- Grid investments span decades: due to rapidly changing scenarios a newly commissioned line could be already partially stranded
- Building new lines meets more and more hostility from the public opinion, which makes planning activities longer and uncertain
- Variable flows from RES generate intermittent congestion, better compensated with system flexibility than by investing in new lines
- There is an on-going debate on the employment of storage technologies and system flexibility to create “virtual power plants”

FlexPlan

01.10.2019 - 31.03.2023

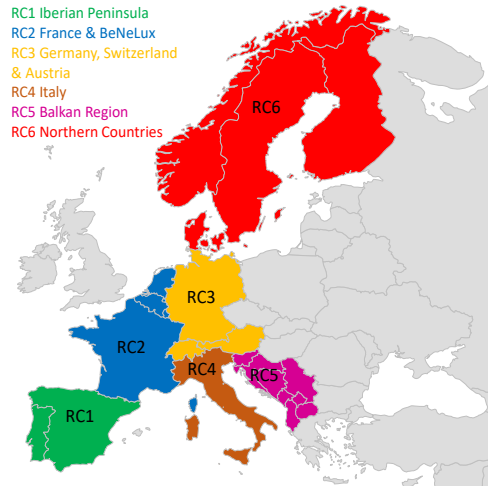
... aims at establishing a **new grid planning methodology** considering the opportunity to introduce new storage and flexibility resources in electricity transmission and distribution grids as an alternative to building new grid elements.

<https://flexplan-project.eu/>



What FlexPlan will achieve

1 – New planning methodology - Creation of a **new tool for optimizing T&D grid planning**, considering the **placement of flexibility elements** located both in transmission and distribution networks **as an alternative to traditional grid planning**: in particular, storage, PEV, demand response)



2 – Scenario analysis 2030-40-50 - New methodology applied to analyse **six regional grid planning scenarios at 2030-2040-2050**. A **pan-European scenario** will deliver border conditions to initialize in a coherent way the 6 regional cases.

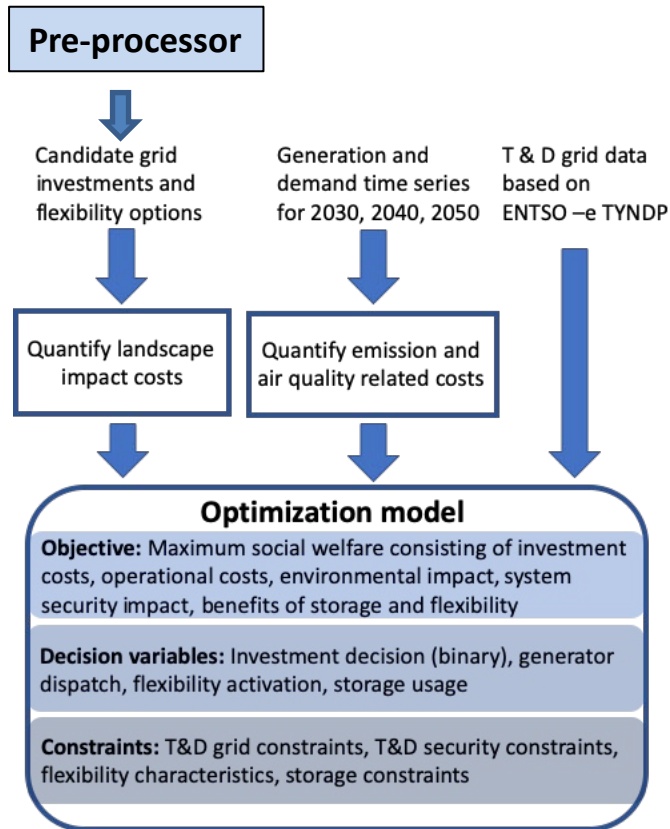
3 – Regulatory guidelines – FlexPlan goal is to provide:

- an optimized planning methodology for the future usage of TSOs and DSOs
- indications on the potential role of flexibility and storage as a support of T&D planning
- guidelines for NRA for the adoption of opportune regulation.



The new planning tool

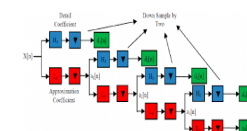
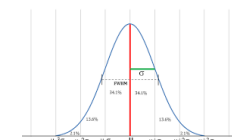
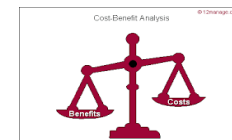
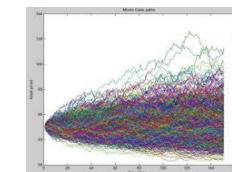
FlexPlan



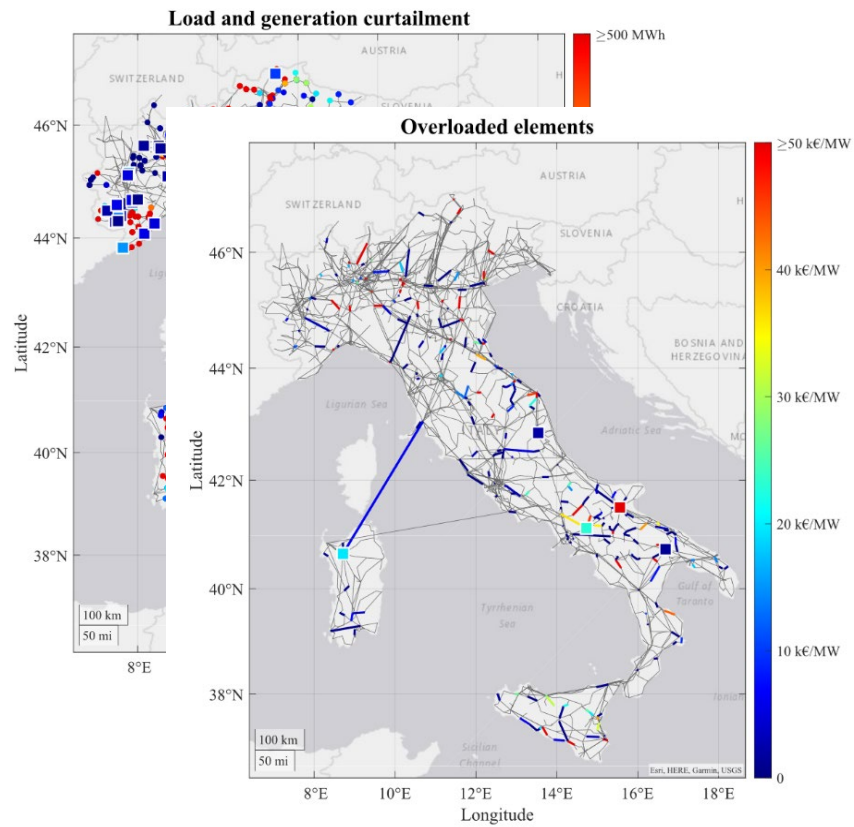
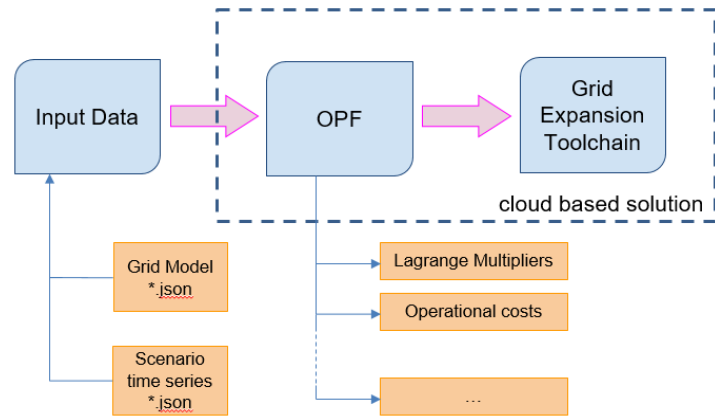
- Best planning strategy with a limited number of expansion options (mixed-integer, sequential OPF)
- T&D integrated planning
- Embedded environmental analysis (air quality, carbon footprint, landscape constraints)
- Simultaneous mid- and long-term planning calculation over three grid years: 2030-2040-2050
- Probabilistic OPF using 35 climate year variants (RES and load time series) reduced to 2 variants of 12 representative weeks by using clustering-based scenario reduction techniques
- Full incorporation of CBA criteria into the target function
- Probabilistic elements (instead of N-1 security criterion)
- Numerical *ad hoc* decomposition techniques to reduce calculation efforts (Benders, T&D)



2030
2040
2050



The six regional cases



Scenario data

- based on Ten Year Network Development Plan (TYNDP) 2020, developed by ENTSO-E: 3 storylines are described for 2030 and 2040:
 - National trends
 - Distributed Energy
 - Global Ambition
- for 2050, a “smart” extrapolation of the TYNDP 2020 data was carried out; the document “A Clean Planet for all” by the EC was considered too for validation.

In total, FlexPlan adopts 9 scenarios : 3 TYNDP storylines times 3 grid years (2030, 2040, 2050).

Grid data

- based on ENTSO-E’s TYNDP 2018 pan-European **transmission grid model** (extra-high voltage)
- sub-transmission reconstructed with public data (Open Street Map + consortium information)
- **synthetic distribution networks** were created on the basis of network statistics to get a reduced-scale model of the real networks.

Thank you...

Gianluigi Migliavacca

Contact Information

Affiliation: RSE S.p.A.
Phone: +39 02 3992 5489
Email: gianluigi.migliavacca@rse-web.it



FlexPlan



FlexPlan-Project.eu

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“Real progress along the road to Flexibility”

May 10th | Porto, Portugal

Foundations that underpin flexibility

Interconnect



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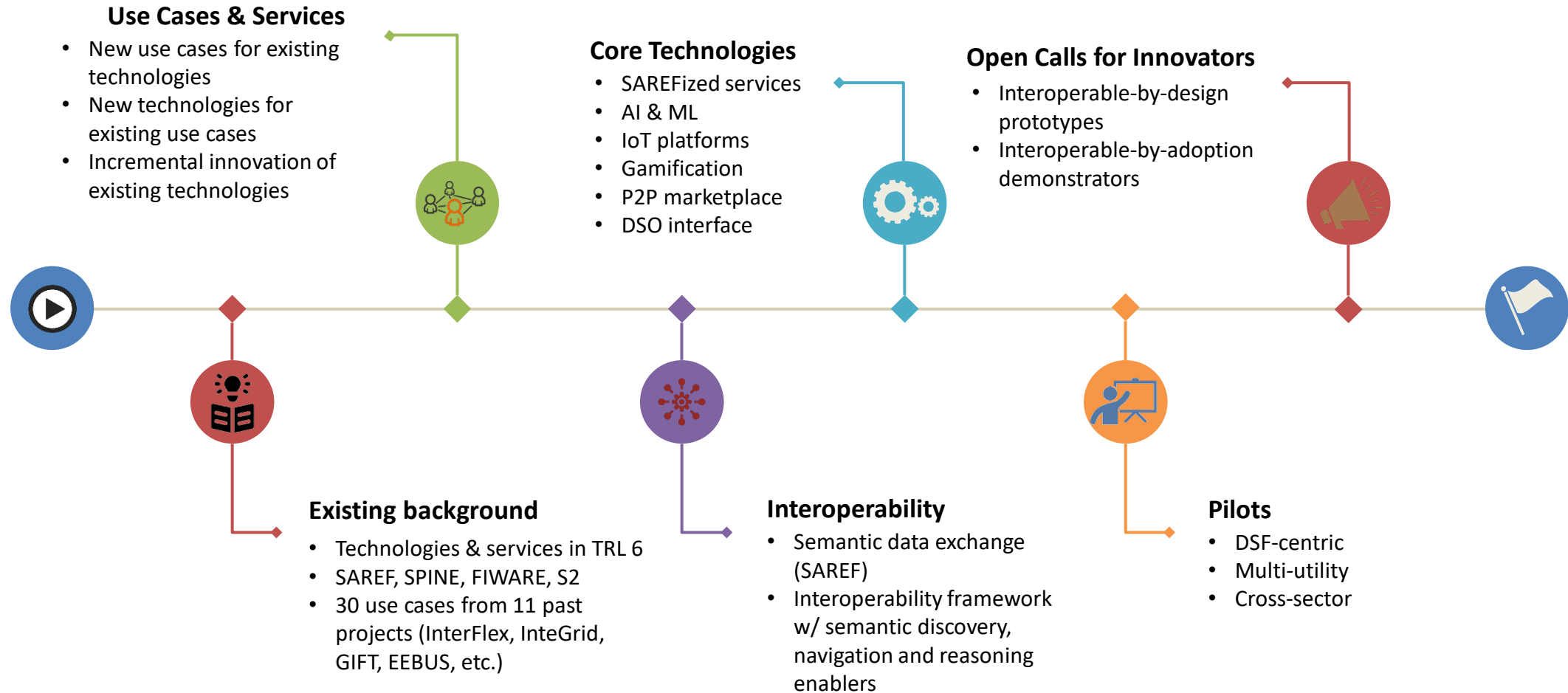
InterConnect – Interoperability for Flexibility

David Rua (INESC TEC)

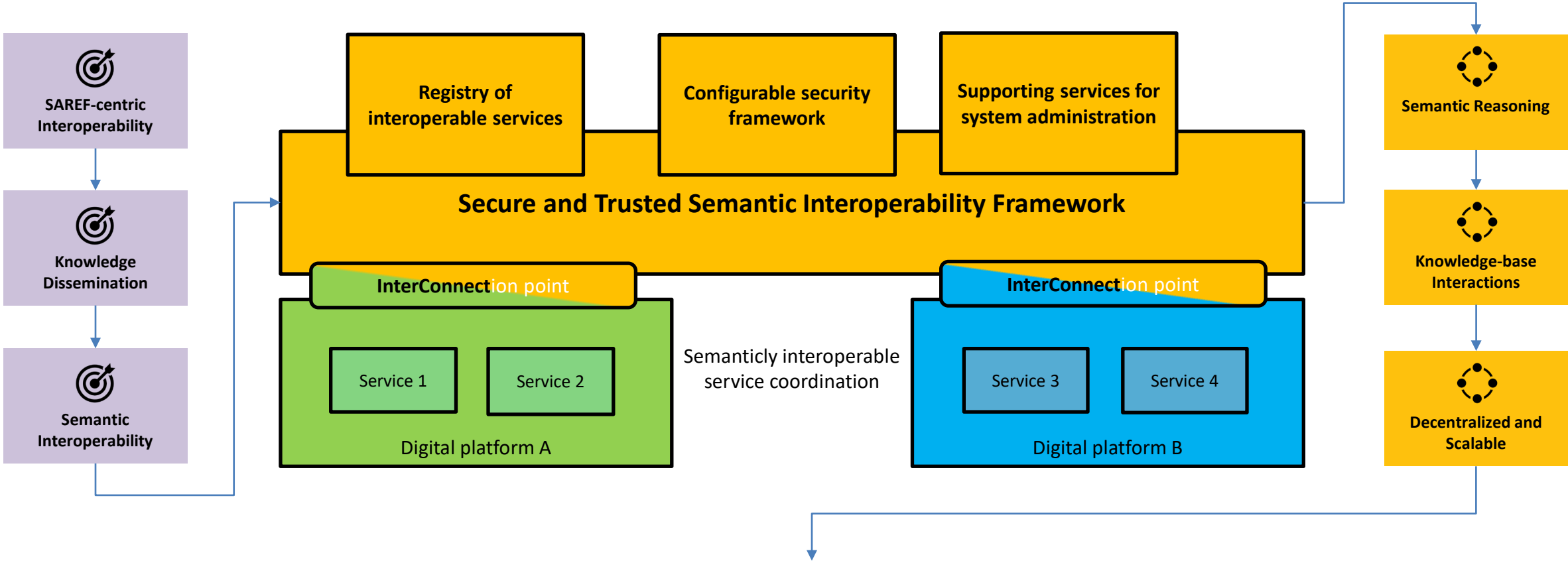
Real progress along the road to Flexibility

10th May 2022

InterConnect Pathway to DSF



Semantic Interoperability Framework



Digital Platforms and Services Become Semantically Interoperable

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

Green Supermarkets: flexibility in tertiary buildings



Tertiary buildings represent a significant role in the end energy use and have been suffering several evolutions in the integration of renewable generation



Supermarkets have the potential to make use of the underlying flexibility of cold thermal loads, the integration of renewables and foster smart charging to increase efficiency, reduce costs and help the grid.



These buildings have a crucial role in supporting electric mobility as a complement to public charging and as an alternative to private charging (when there is no owned infrastructure)



New services and opportunities are being created to valorise the role of these buildings as well as the engagement and participation of different end-users: services for citizens.

Green supermarkets: the motivation



 Exploit demand side flexibility from supermarkets

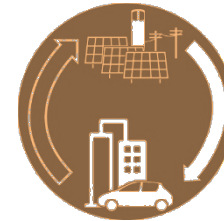
 Meet energy sustainability goals: 100% on-site renewable energy

 Supply flexibility in the framework of Directive (EU) 2019/944

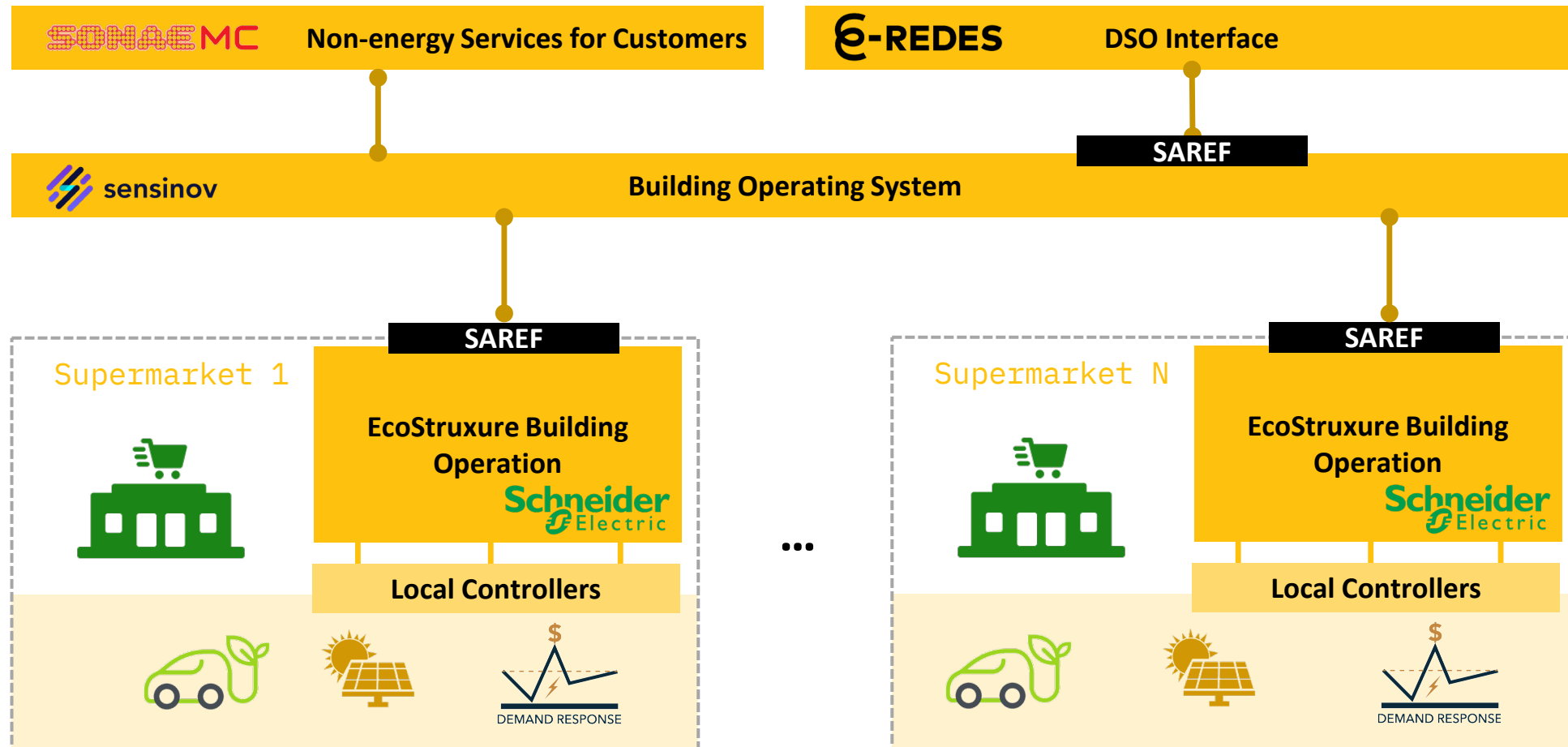
 Boost interoperability and data-driven energy optimization

 Monitoring and control of consumption remains limited

 Design a cost-effective IoT platform for food retail



Green supermarkets: architecture for interoperability

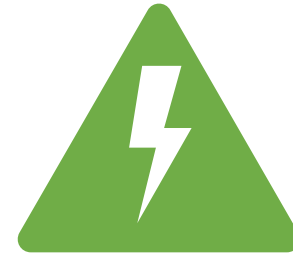


Green Supermarkets: Scope



“Self” objectives

Maximize self-consumption from on-site PV
Energy optimization with data-driven process modelling



Flexible grid node

Active power modulation: DSO demand response signal
Integrate with electricity retail business

interconnect

interoperable solutions
connecting smart homes,
buildings and grids

interconnectproject.eu

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

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“Real progress along the road to Flexibility”

May 10th | Porto, Portugal

Foundations that underpin flexibility

X-Flex



Network: guestON
Password: xp4510#21



Integrated energy solutions
and new market mechanisms for an
eXtended **FLEX**ibility
of the European grid

X-FLEX project

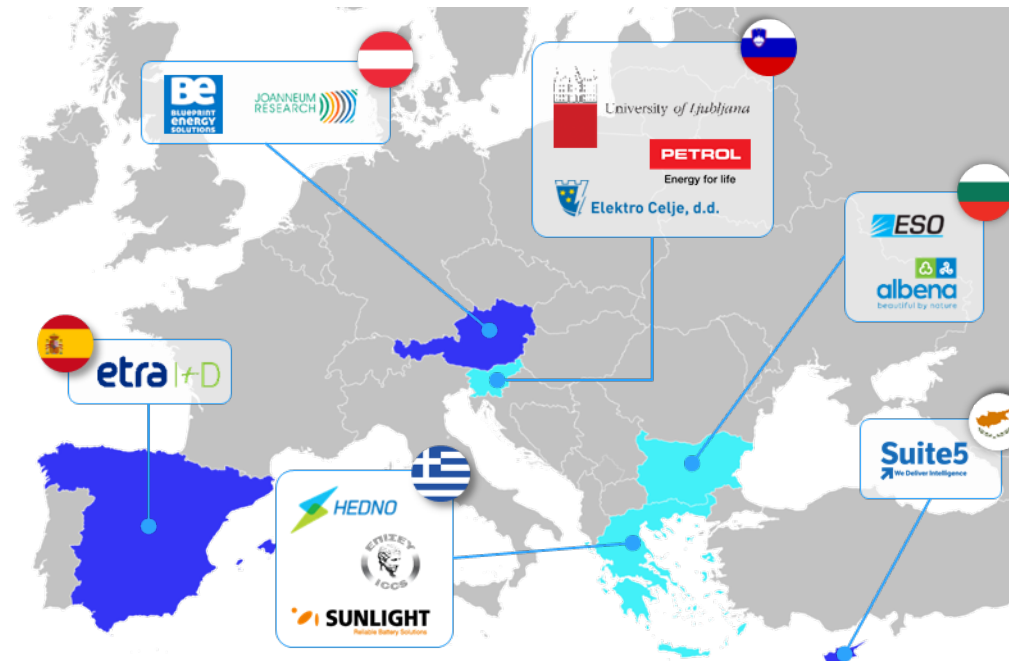
Flexibility services promoting
cooperation among all the
energy stakeholders

Lola Alacreu
Project manager ETRA I+D

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 providers, 3 research institutes)
- 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





1. Development of tools that would enable and facilitate the **use of flexibility in the power system** with the aim of **increasing the stability and security of supply** in normal working conditions and **extreme weather conditions**.
2. Demonstrate **technological, economic and social benefits** that are created with the participation of various stakeholders in the electricity system of existing energy connections.

How to reach X-FLEX objectives

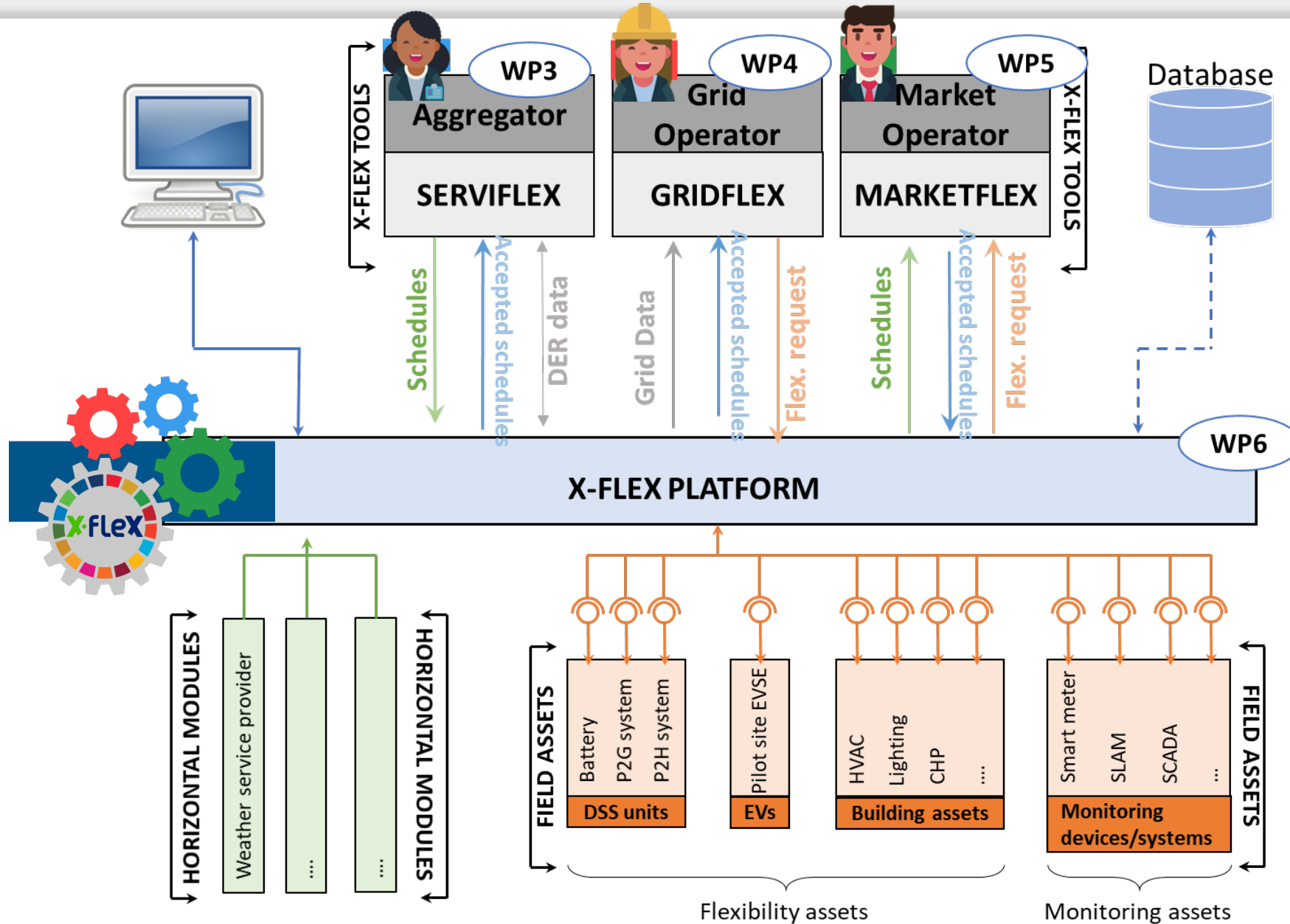


X-FLEX will develop 3 complementary products that will offer services to all the energy stakeholders:

1. **SERVIFLEX tool:** Integrated flexibility management tool
2. **GRIDFLEX tool:** Advanced tools for automatic control and observability
3. **MARKETFLEX tool:** Market platform and new market mechanisms



How to reach X-FLEX objectives



4 PILOT LOCATIONS

- RAVNE NA KOROŠKEM, Slovenia
- LUČE, Slovenia
- ALBENA, Bulgaria
- XHANTI, Greece



X-FLEX Project pilot sites

Demo site: Ravne na Koroškem (Slovenia)

Flexibility of the Power to heat on an industrial site

- Ravne na Koroškem is a **small remote town** (population 7,268) with a district heating system (residential & industry).
- XFLEX project will **create synergies with the heat production (RES Power2Heat) and heat network operation** to:
 - Provide flexibility on the electricity grid.
 - To lower the imbalances in the network.
 - To improve the reliability of electricity and heat supply.
 - To demonstrate cooperation among key actors (DSO-DSO)



X-FLEX Project pilot sites



Demo site: Luče (Slovenia)

Flexibility of local energy community

- Luče is a remote alpine village with 400 inhabitants in Slovenia. It has a **low local network capacity** with weak middle voltage overhead line connection that results in two major problems:
 - Limited local RES production.
 - Frequent power outages usually due to weather events.
- X-FLEX project will provide **flexibility to the local energy community through the use of DER (EV-charging unit, community and home batteries, and PV, wind systems), to improve the network operation costs and operational reliability.**

X-FLEX Project pilot sites



Demo site: Xanthi (Greece)

Green flexibility for network resilience

- The city of Xanthi, that has a population of more than 60,000, experiences **harsh winters and extreme weather events**, mainly including snowfall and strong rain storms.
- The resilience of the network to extreme weather events is enhanced through X-FLEX advanced control algorithms and the optimal management of the flexible sources.
- Coordination of the available infrastructure will result in significant improvements in terms of power losses reduction and voltage stabilization.

X-FLEX Project pilot sites

Demo site: Albena (Bulgaria)

Flexibility on a commercial site and micro grid/TSO cooperation

- Area on the Black Sea coast, which consists entirely of **hotel resorts**. Its most **active season is during the summer** when it can accommodate up to 20,000 people.
- Albena is subject to a **fluctuating energy demand throughout the year, specially for the domestic hot water**. X-FLEX solutions will provide solutions for advanced flexibility management of non-electric boiler and storage systems in order to reduce energy consumption.





Thank you!

QUESTIONS?



Antonio Marqués.
Director of Technology ETRA I+D
amarques.etraid@grupoetra.com

For more information visit:

<http://xflexproject.eu/>

Foundations that underpin flexibility

Coordinet



Network: guestON
Password: xp4510#21



**Real progress along the road
to flexibility**

CoordiNet

Kris Kessels – VITO/EnergyVille

10/05/2022



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824414

The CoordiNet project



Large-scale TSO-DSO-Consumer demonstrations of innovative network services through demand response, storage and small-scale distributed generation

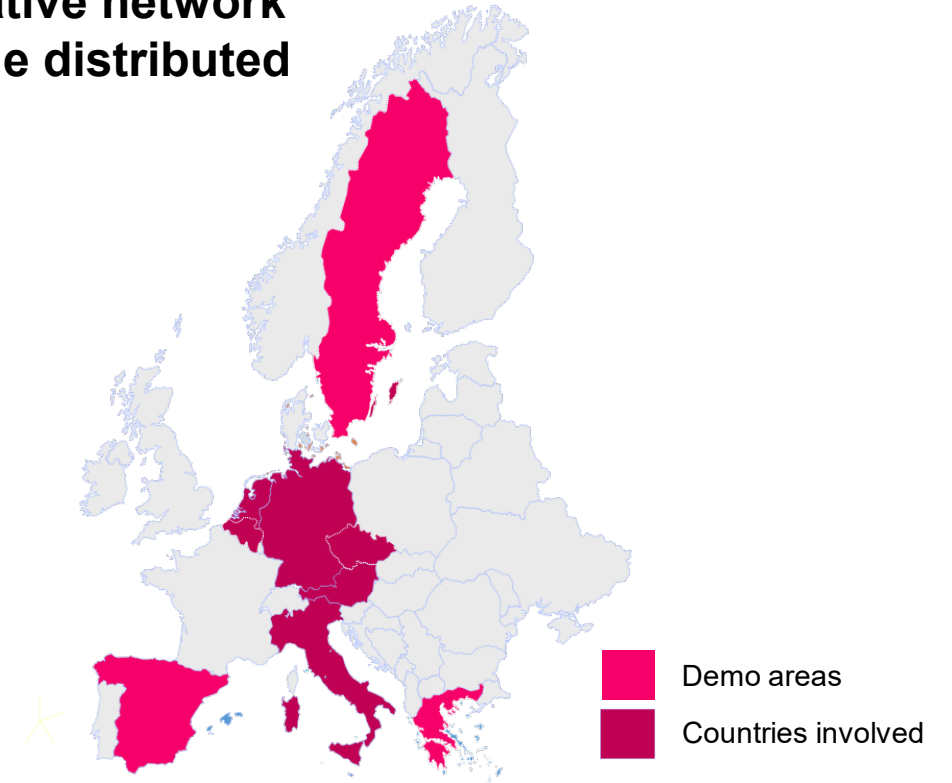
Project Timeline: 1° of January 2019 – 30° of June 2022

Project Budget and funding : 19.2M€ - 15.1M€

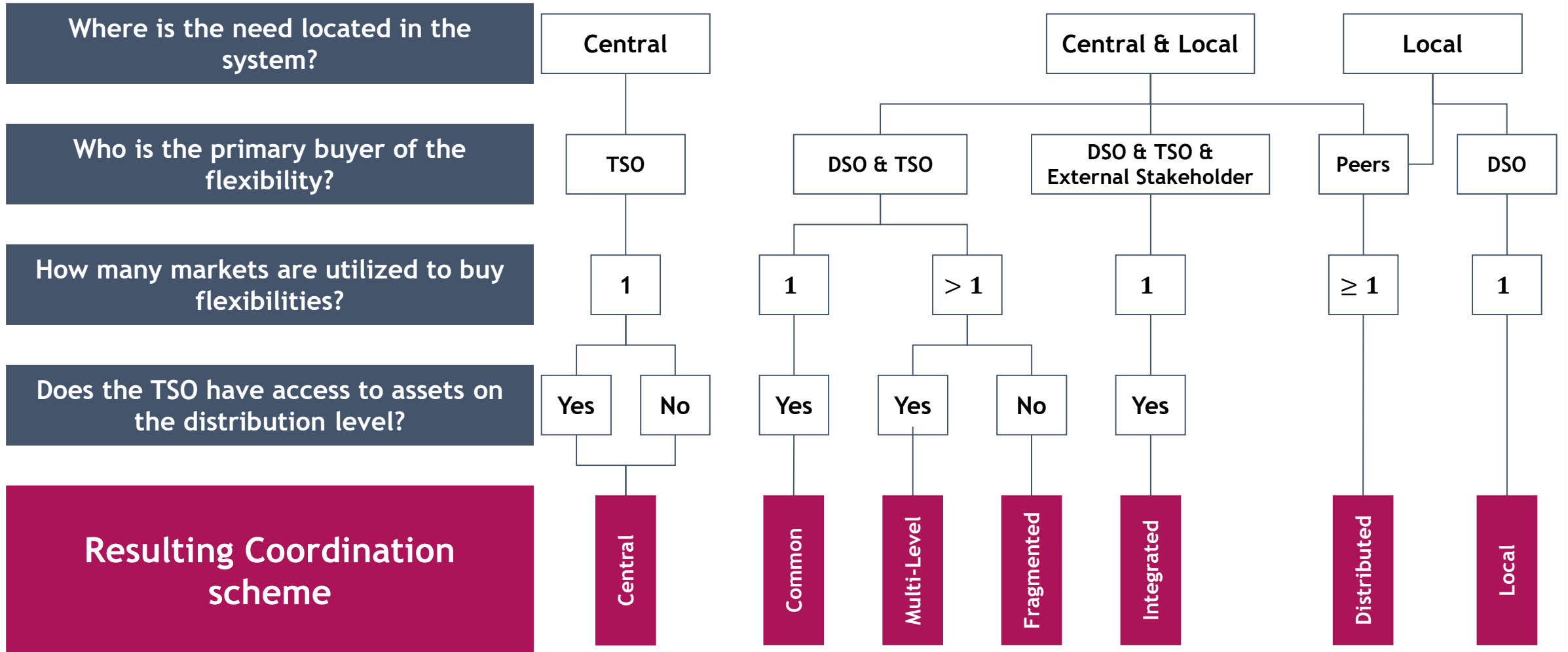
Total number of partners: 23 + 10 Linked Third Parties

Objectives:

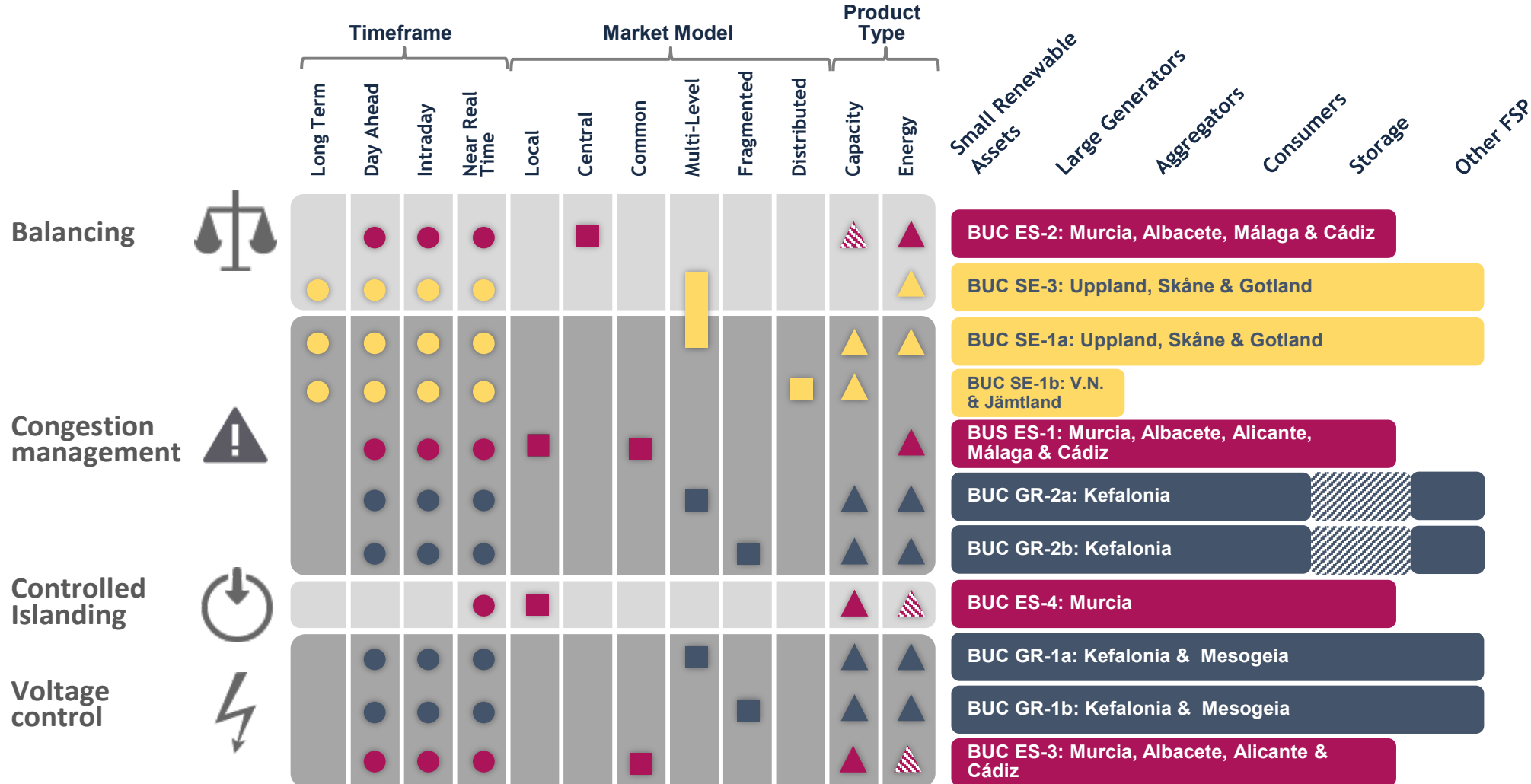
- Demonstrate the activation and provision of services through TSO-DSO coordination
- Define and test standard products that provide services to the network operators
- Develop a TSO-DSO-consumer collaboration platform in demonstration areas to pave the way for the interoperable development of a pan-European market



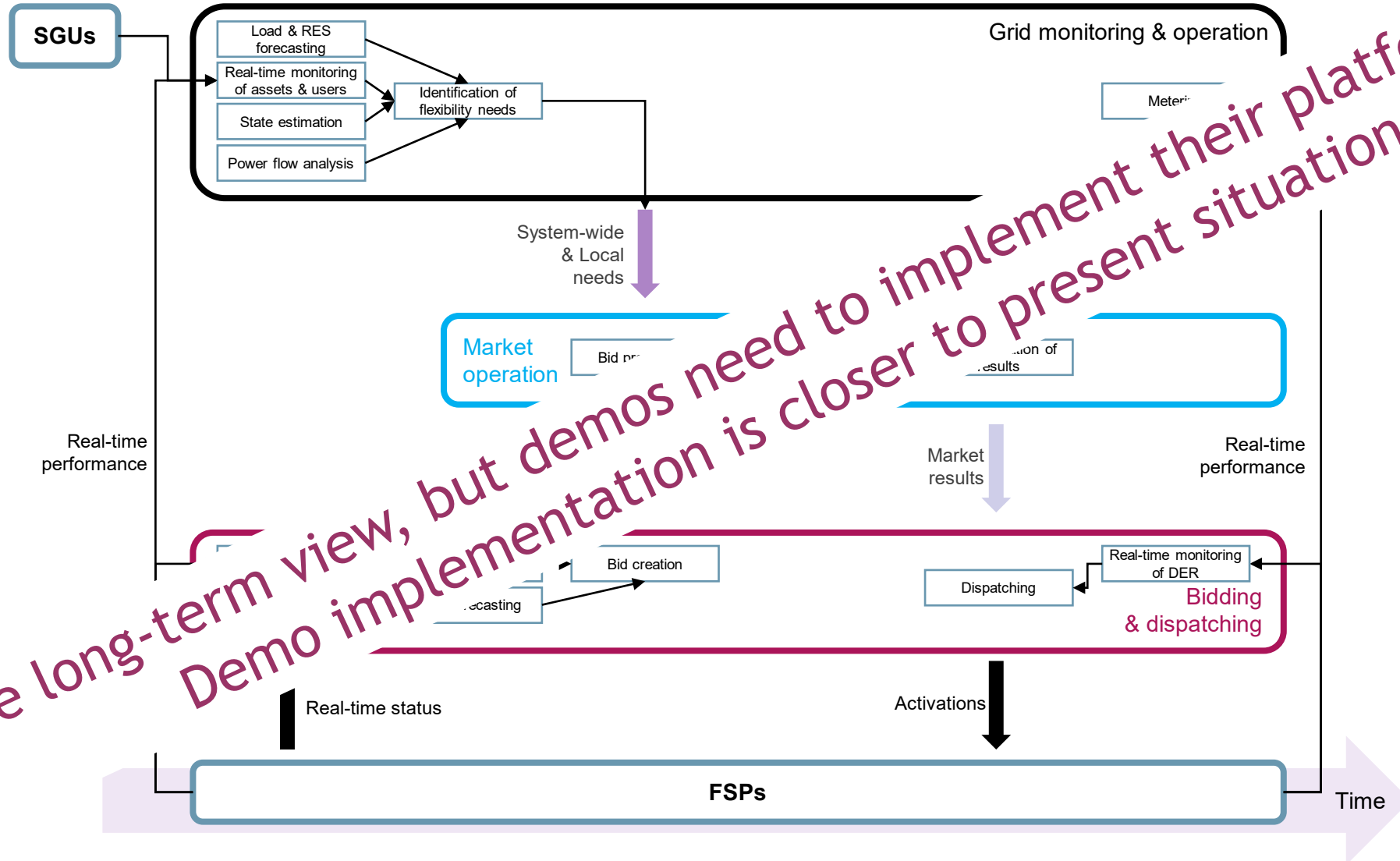
TSO/DSO coordination schemes



Project scope

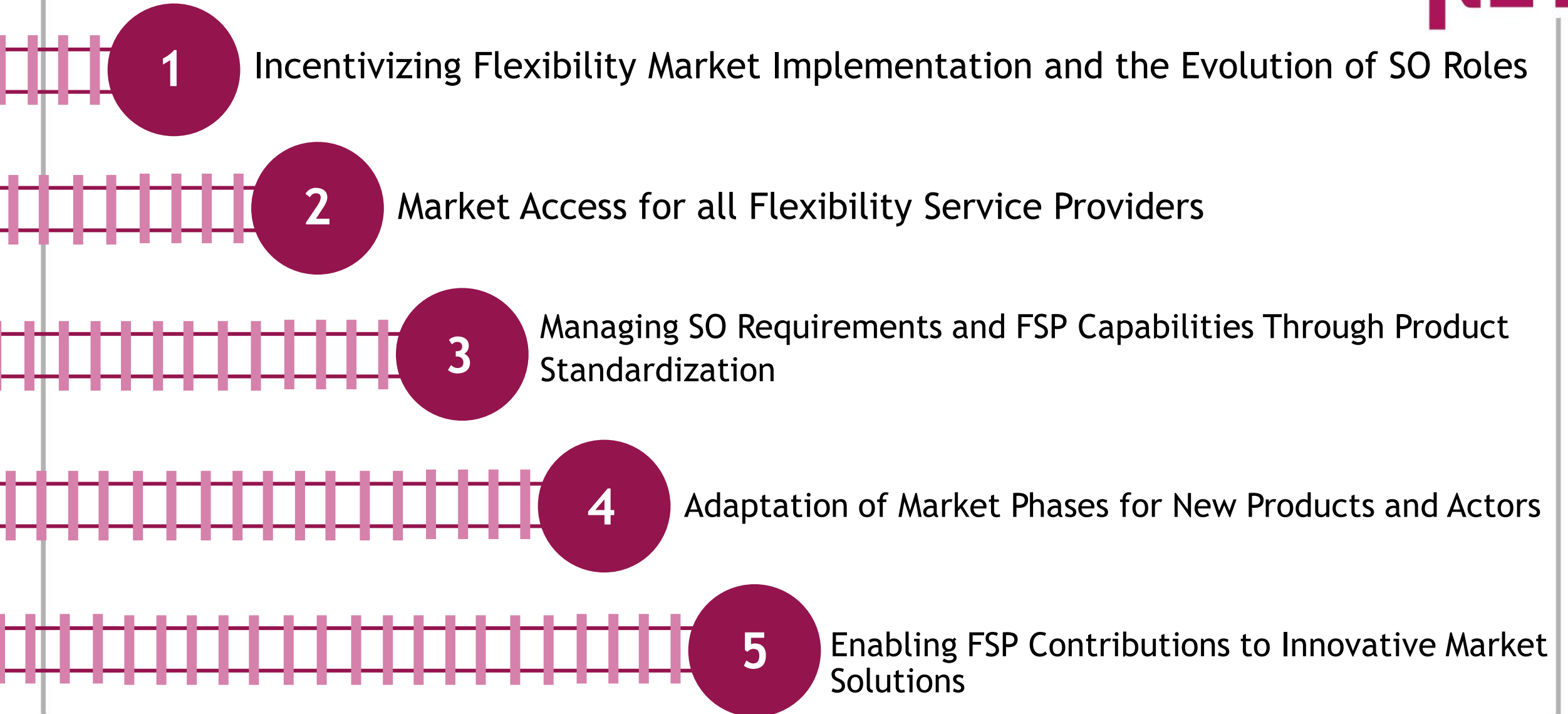


CoordiNet architecture





Roadmap towards new market design





THE COORDINET FINAL EVENT

16TH AND 17TH OF JUNE


BluePoint Brussels



Join us!

Registrations now open!

#CoordiNet

 This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824414

<https://coordinet-project.eu/news/coordinet-final-event-in-brussels>

coordinet
NET

Thank
you!

“Real progress along the road to Flexibility”

May 10th | Porto, Portugal

Foundations that underpin flexibility

Panel

Moderated by Rita Lopes Mourão (E-REDES) with the participation of Coordinet; X-FLEX; FlexPlan; EUniversal and Interconnect



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“Real progress along the road to Flexibility”

May 10th | Porto, Portugal

Coffee-break

“Real progress along the road to Flexibility”

May 10th | Porto, Portugal

Flexibility in action

Panel

Moderated by Madalena Lacerda (E-REDES) with the participation of OneNet; Platone; Interrface; Fever and Parity

“Real progress along the road to Flexibility”

May 10th | Porto, Portugal

Flexibility in action

Interface



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INTERFACE

E-REDES Annual Event – European Projects

May 10th 2022, Porto

About INTERRRFACE

LC-SC3-ES-5-2018-2020: TSO-DSO-Consumer: Large-scale demonstrations of innovative grid services through demand response, storage and small-scale (RES) generation

Title: TSO-DSO-Consumer **INTERRRFACE** architecture to provide innovative grid services for an efficient power system

- Project Grant Agreement No. 824330
- Budget: 20.9 M Euro
- Grant: 16.8 M Euro
- Duration: 4 Years



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824330

Demonstrators



INTERFACE

Demo Area 1:

Congestion Management and Balancing Issues

- **DSO and Consumer Alliance** (Centralized Energy Management system for microgrids)
- **Intelligent Distribution Nodes** (Grid Services Management system for flexible LV/MV Networks)
- **Single Flexibility Platform** (Exchange Platform for distributed flexibilities in end-to-end electricity networks)

Demo Area 2:

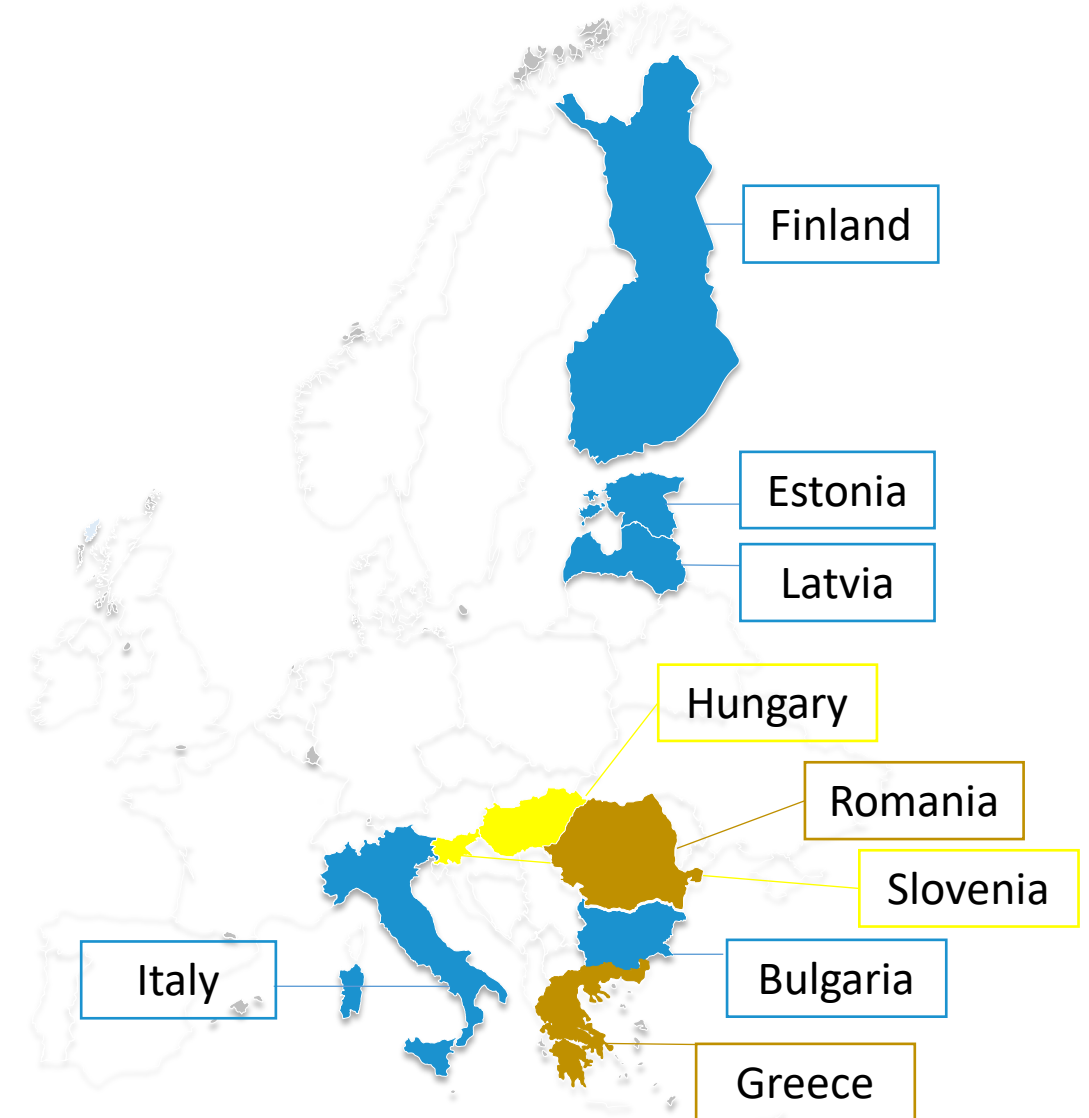
Peer-to-peer Trading

- **Asset-enabled Local Markets** (Microgrid Local Electricity Markets using the assets capabilities)
- **Blockchain-based TSO-DSO flexibility** (Market Platform with Smart Contract and smart billing)

Demo Area 3:

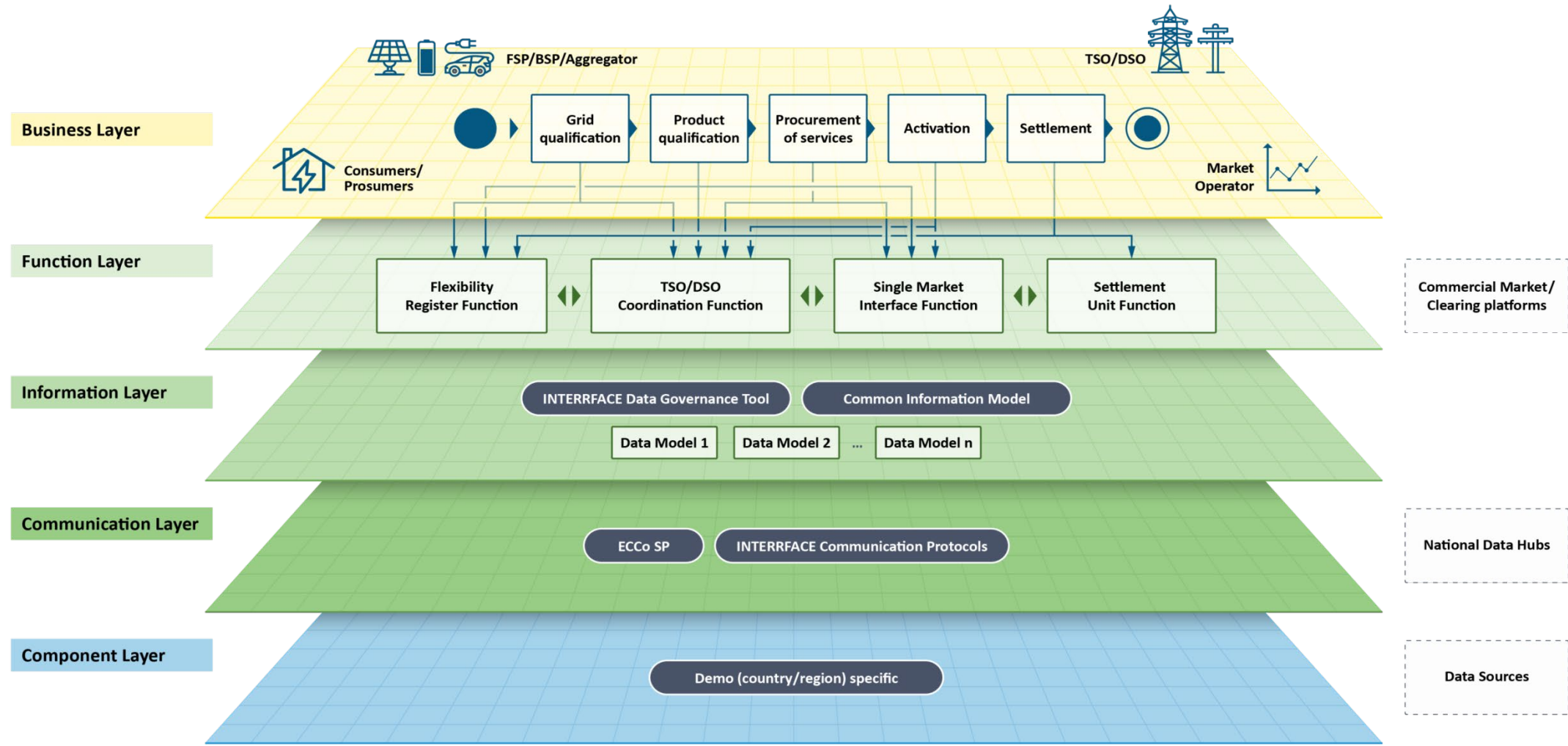
Pan-EU clearing Market

- **DERs into Wholesale** (A retail-to-wholesale Market approach for DERs' integration)
- **Spatial Aggregation of local flexibility** (A EUPHEMIA-based Market Platform to engage local flexibility resources)



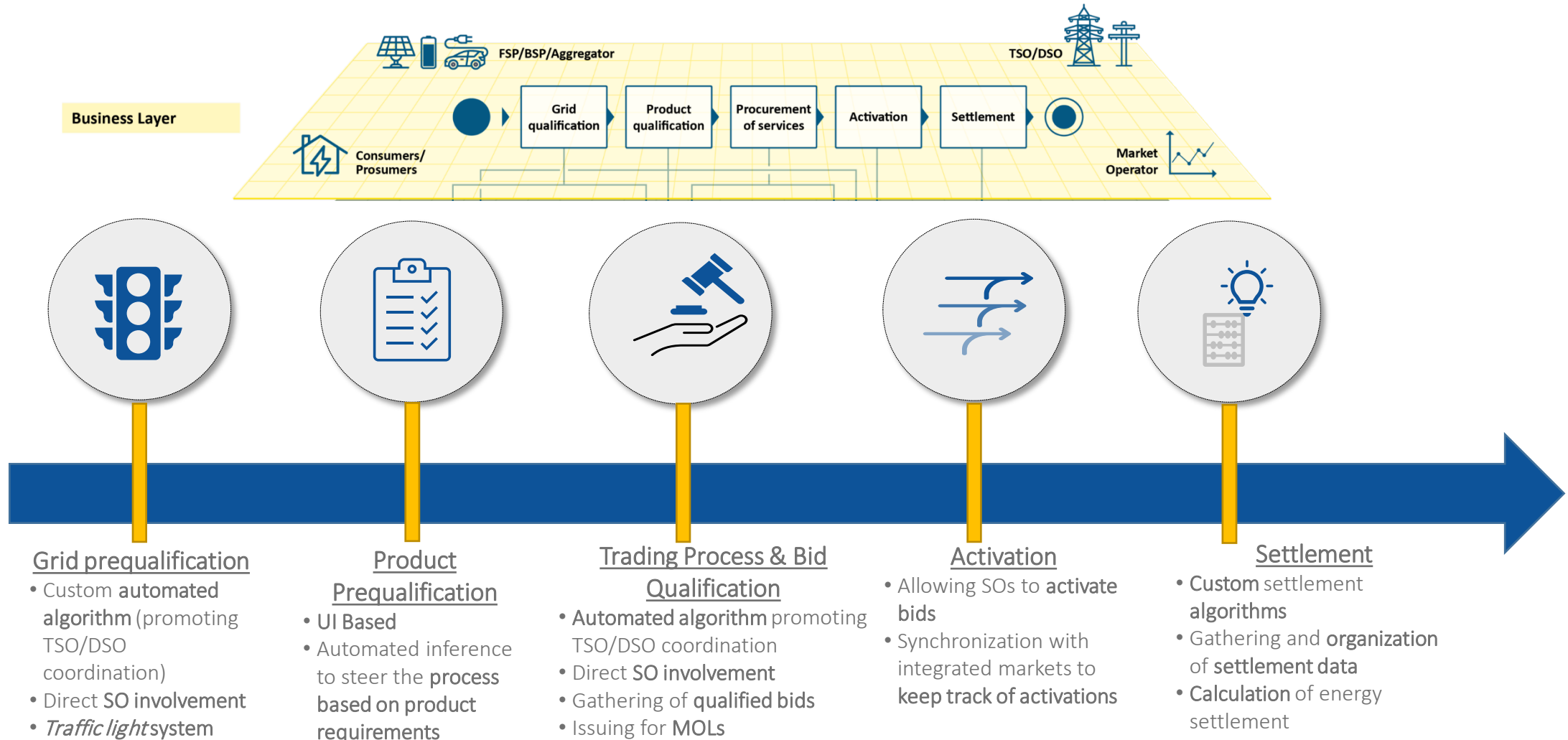
INTERFACE Product

Interoperable pan-European Grid Services Architecture



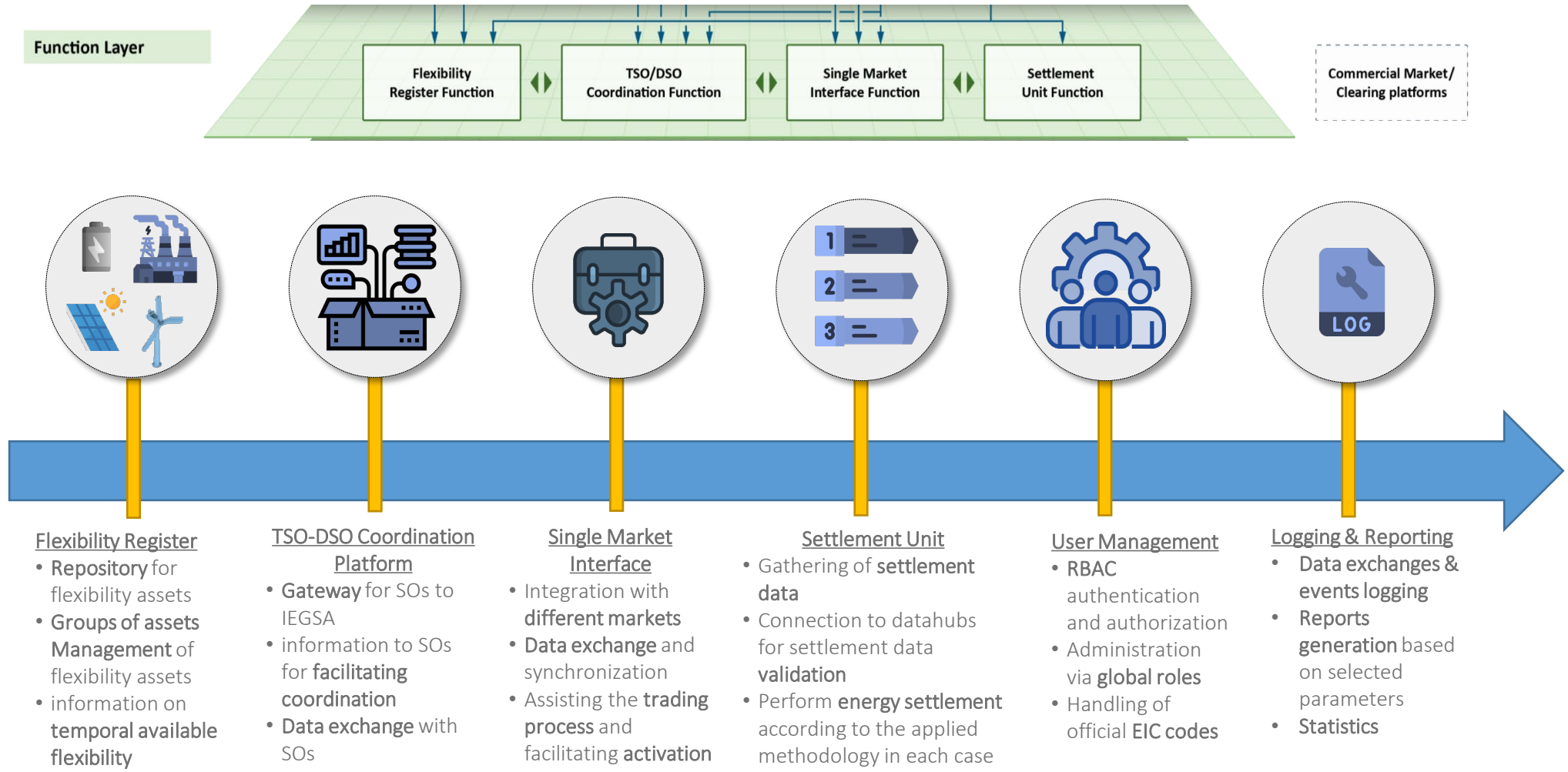
INTERFACE Product

Interoperable pan-European Grid Services Architecture



INTERFACE Product

Interoperable pan-European Grid Services Architecture



Thank you!



/ InterrfaceH



/ interface-h2020



/ www.interrface.eu

Nikos Bilidis – European Dynamics SA

Nikolaos.bilidis@eurodyn.com



“Real progress along the road to Flexibility”

May 10th | Porto, Portugal

Flexibility in action

Parity



P A R I T Y

Pro-sumer AwaRe, Transactive Markets for Valorization of Distributed flexibility enabled by Smart Energy Contracts

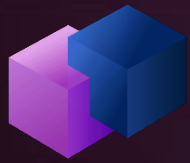
E-REDES Annual Event - Real progress along the road to flexibility

Stylios Zikos

Information Technologies Institute of the Centre for Research & Technology Hellas (CERTH)



This project has received funding from the European Union's Horizon 2020 Framework Programme for Research and Innovation under grant agreement no 864319.



P A R I T Y

The PARITY project

PARITY project addresses the “structural inertia” of Distribution Grids by providing a transactive flexibility framework through integration of IoT and Blockchain technologies

Price-driven implicit LFM approach for activating flexibility for the DSO’s needs: LFM is implicitly integrated in the LEM. The DSO imposes varying grid prices to the prosumers who can react to these price signals by adapting their trades on the LEM

Pilot sites



SPAIN



GREECE



SWEDEN



SWITZERLAND

- Residential and office buildings, municipality building, fuel stations



IoT Enabled
DER Flexibility
Management tools (e.g.
Aggregator Toolset)



Blockchain-based Local
Energy/Flexibility Market
platform (*Blockchain Agents,*
Oracle, Off-chain tools)



Smart grid monitoring
and management
(*DSO Toolset*)

The PARITY solutions

17 PARTNERS
from **7** countries

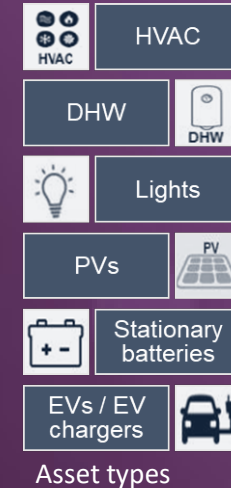


PROJECT DURATION:

42 months (10/2019 – 03/2023)



- ❖ **Baseline load & flexibility forecasts (upwards and downwards flexibility) per controllable asset and aggregated per prosumer, in 15-minute intervals**
- ❖ **Aggregator Toolset decides on how and when flexibility per each prosumer in its portfolio will be activated**
 - Based on Service Level Agreements, grid network state according to the traffic light approach (estimated by the DSO), and grid constraints (set by the DSO)
 - Dynamic flexibility bundles are formed for trading to Ancillary services / Wholesale markets




Flexibility forecasting JSON

Traffic light concept

```

    "dtEnd": "2021-11-23T19:45:00.000+0000",
    "mean": 3500,
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    ]
  }
}

```



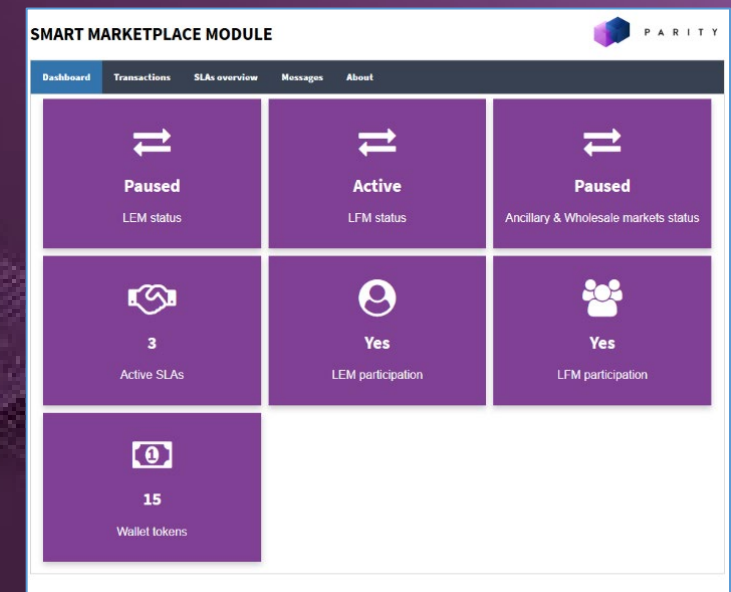
- No constraint violations detected in the distribution grid: DSO performs active grid monitoring**
- Constraint violations have been forecasted by the DSO**
- Distribution grid stability is in danger due to constraint violations such as congestions and voltage violations**
- Grid outage**

❖ Asset control schedules are generated and are applied automatically for the different types of controllable assets

- Respecting user comfort (thermal, visual) and considering estimations about spaces' occupancy

❖ Informed user

- Notifications on activations are sent to affected prosumers
- Web-based user interfaces



- ❖ **After-activation monitoring and rules validation are performed by the Oracle component, which acts as a bridge between the assets and the Blockchain platform (which is based on Tendermint and Cosmos)**
 - One instance running per prosumer
 - The rules are in the form of KPIs that are defined within Service Level Agreements (SLAs) in JSON format
- ❖ **Settlement is performed by the Blockchain Agent**
 - Addition of tokens to prosumers' wallets
 - Application of any penalties according to the rules

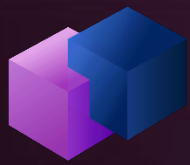
```
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      }
    ]
  }
}
```

❖ Deployment and evaluation of the PARITY solutions at the 4 pilot sites

- Engagement of users through workshops

❖ Definition of the Key Performance Indicators, such as

- Number of flexibility activation events in LEM
- Average self-consumption rate
- Peak load reduction (%)
- Reduction on cost of electricity from flexibility provision



P A R I T Y

The PARITY consortium



Website:
<https://parity-h2020.eu/>



“Real progress along the road to Flexibility”

May 10th | Porto, Portugal

Flexibility in action

Fever



Network: guestON
Password: xp4510#21

FEVER

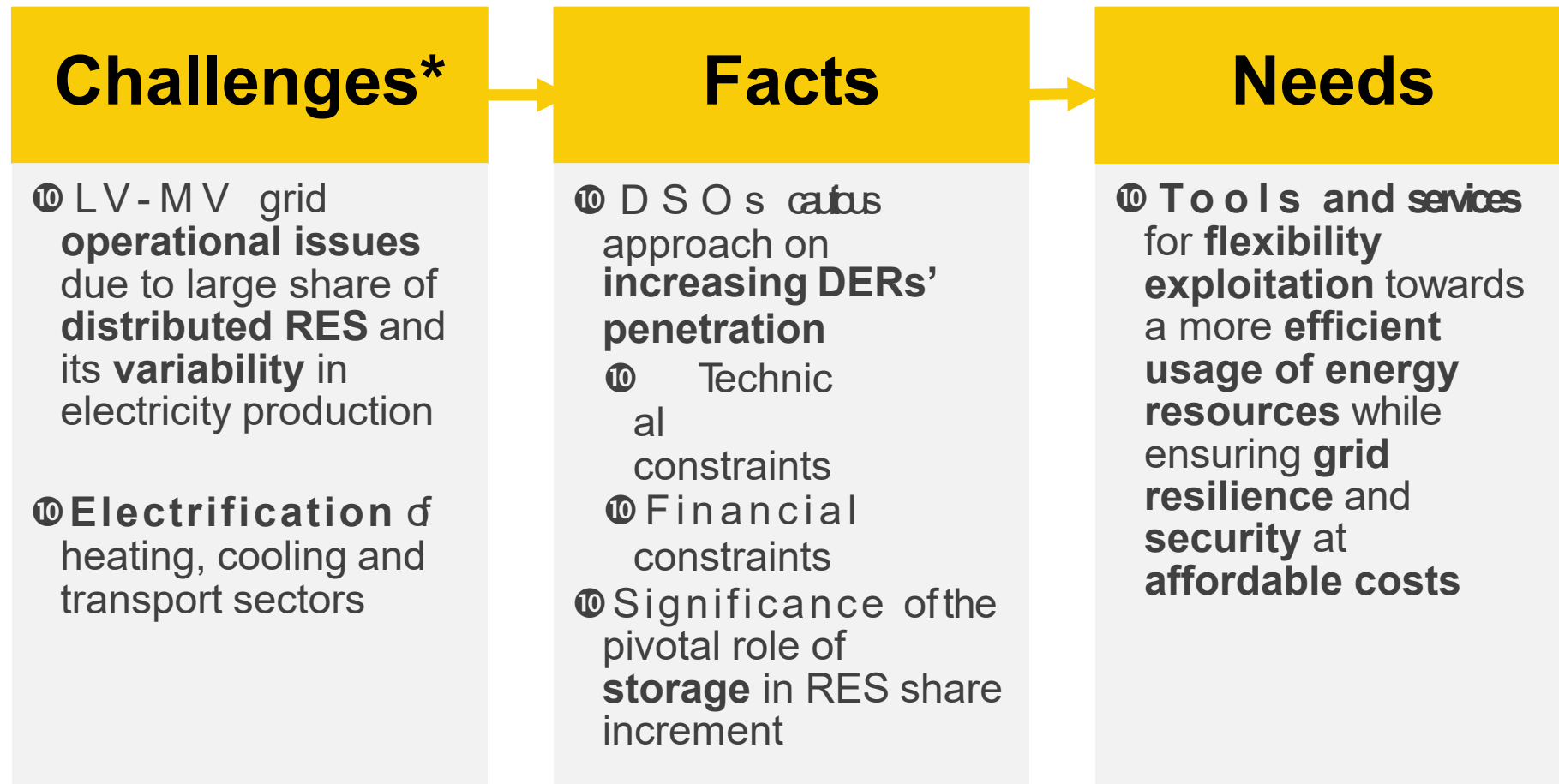
Flexible Energy Production, Demand and Storage-based
Virtual Power Plants for Electricity Markets and Resilient DSO
Operation



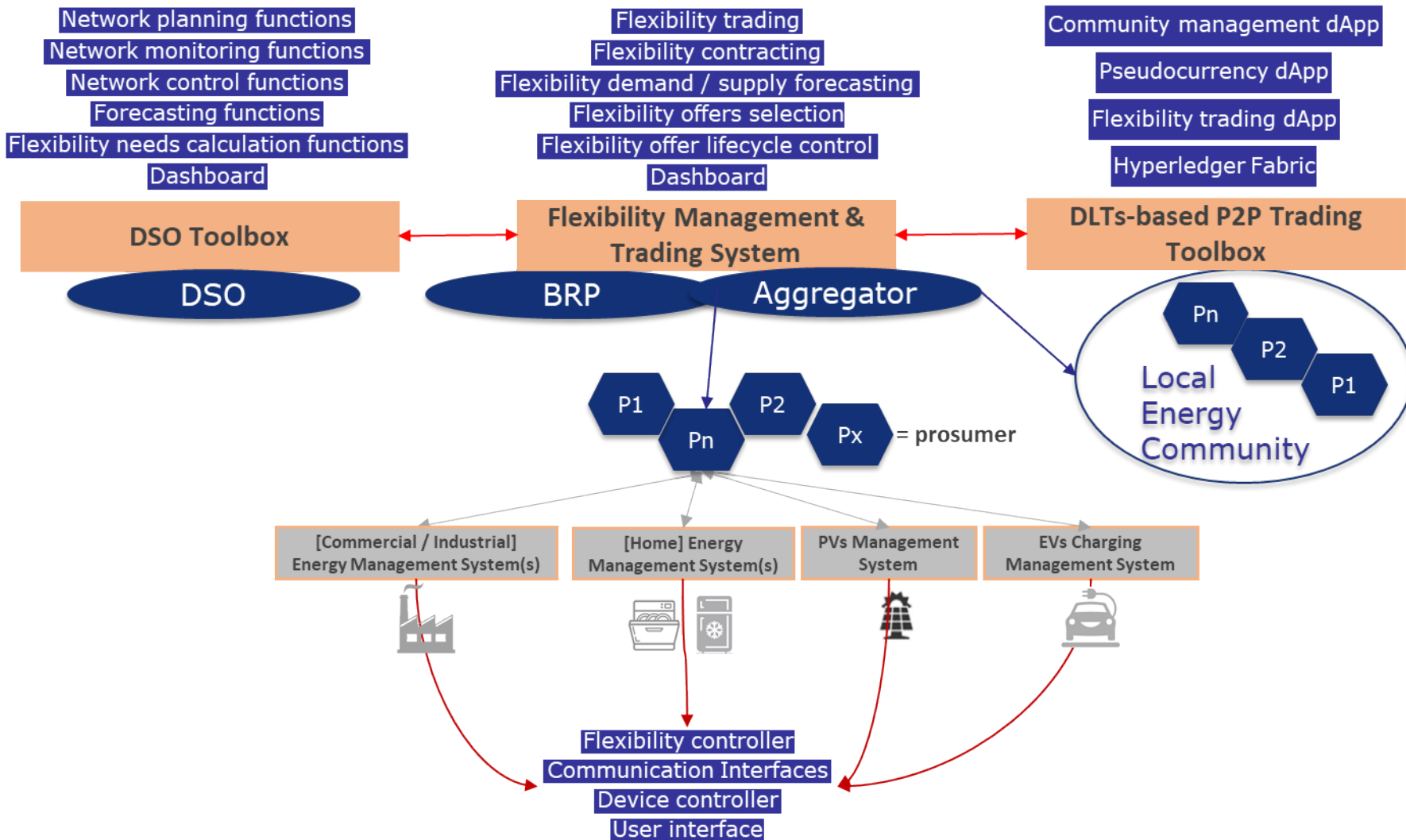
FEVER in a nutshell

- **A Horizon 2020 Innovation Action**
- **17 partners from 8 European countries**
- **~ 9,84 M€ total budget / EU contribution ~ 7,79 M€**
- **3,5 years from February 2020 to July 2023**
- **3 pilots and 1 laboratory simulation**

Project motivation



Solutions implemented in FEVER and relevance to the „Flexibility in Action“ framework



- Preparation**
 - DSO – FSPs: Flexibility products definition (location-based active / reactive power adaptation)
- Planning / Forecasting**
 - DSO – FSPs: Generation / Production forecasting
 - DSO: Dynamic network conditions
- Market**
 - DSO – FSPs: Information exchange
- Monitoring & Activation**
 - DSO: Real time monitoring of the grid
 - DSO-> FSP: Activation of flexibility offers
- Measurement validation & settlement**
 - DSO: Metering data

Project demonstrators

Germany

Regional flexibility exchange and the role of Local Energy Communities
 How regional flexibility between two towns in a rural region with high renewable energy generation can be exchanged

Greece

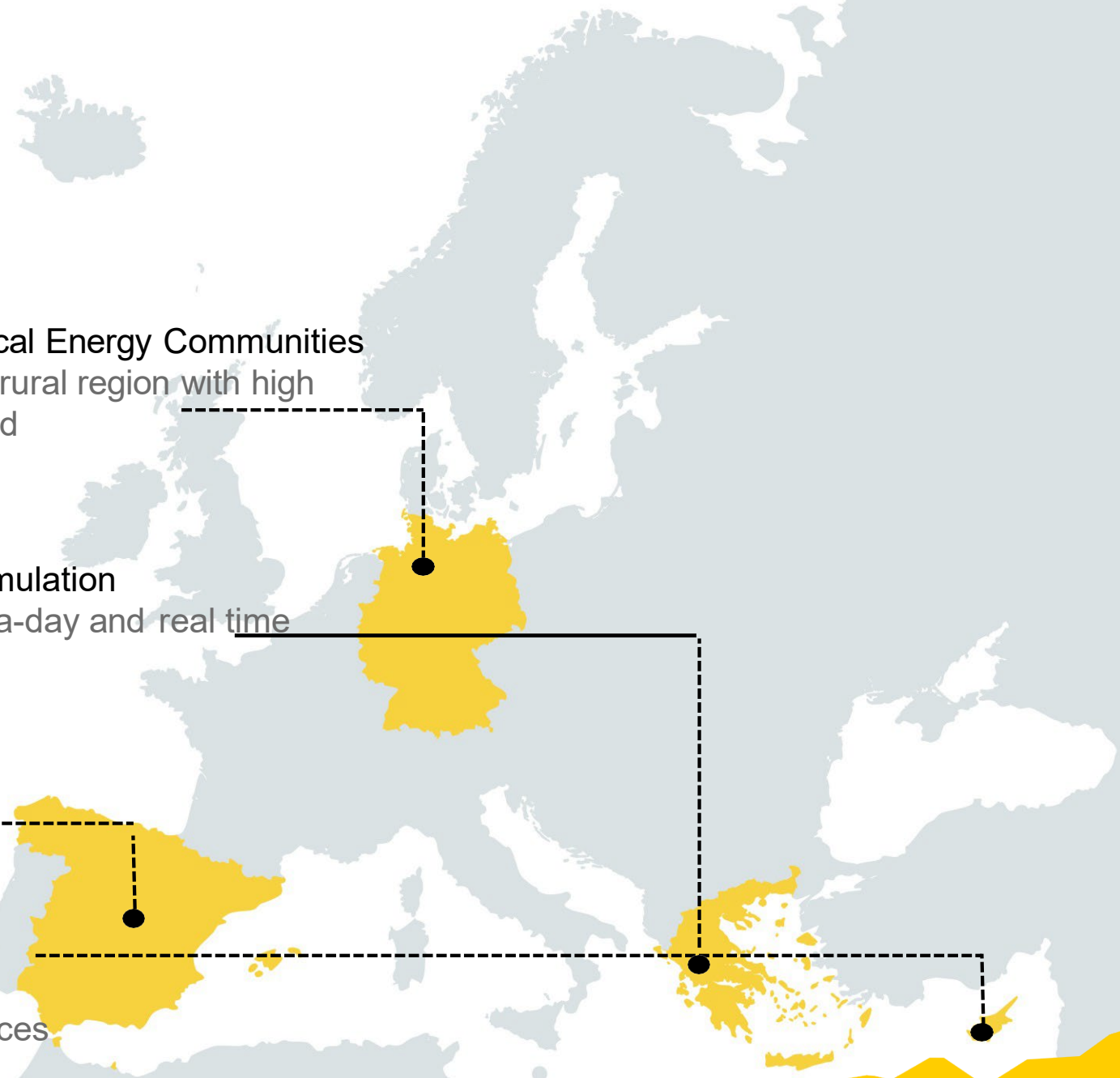
Flexibility-related markets' simulation
 Simulation of day-ahead, intra-day and real time balancing markets

Spain

Flexibility from industrial prosumers
 How activating aggregated local flexibility can be used in ancillary services to the DSO

Cyprus

Flexibility at the level of a Microgrid
 The role of flexibility in island-mode operation and for grid-support services



Thank you!

Contact Ilias LAMPRINOS, FEVER
Project Coordinator

labil@intracom-telecom.com





The project Flexible Energy Production, Demand and Storage-based Virtual Power Plants for Electricity Markets and Resilient DSO Operation (FEVER) receives funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no. 864537.

All information provided reflects the status of the FEVER project at the time of writing and may be subject to change. All information reflects only the author's view and the Innovation and Networks Executive Agency (INEA) is not responsible for any use that may be made of the information contained in this publication.

“Real progress along the road to Flexibility”

May 10th | Porto, Portugal

Flexibility in action

Platone



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Password: xp4510#21

Platone Project



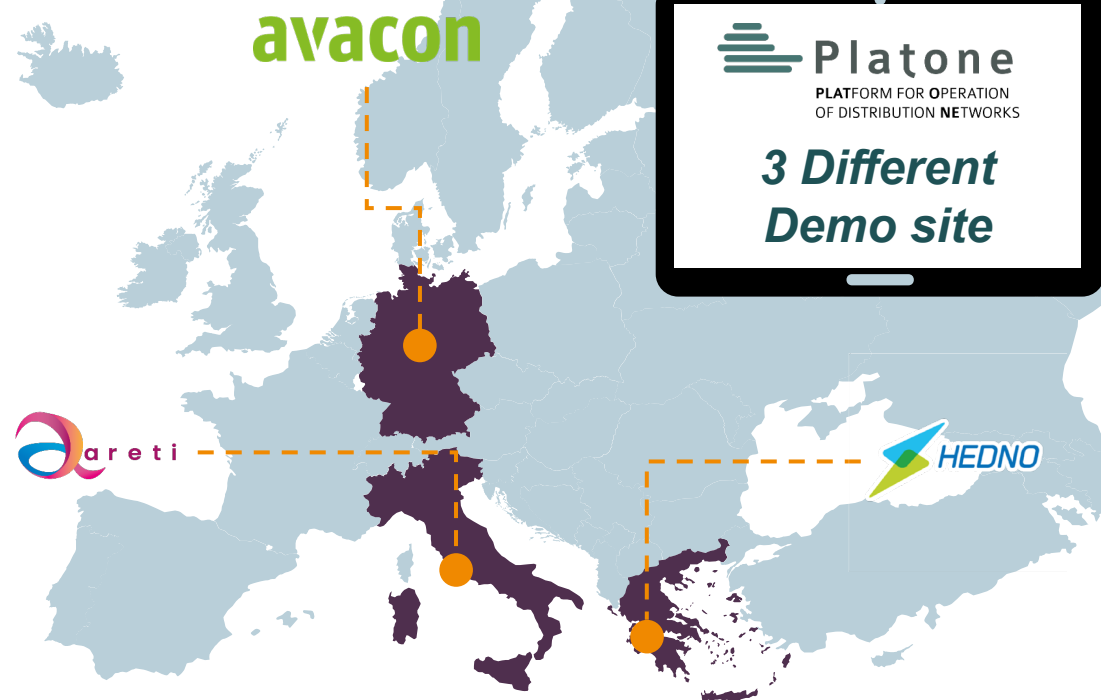
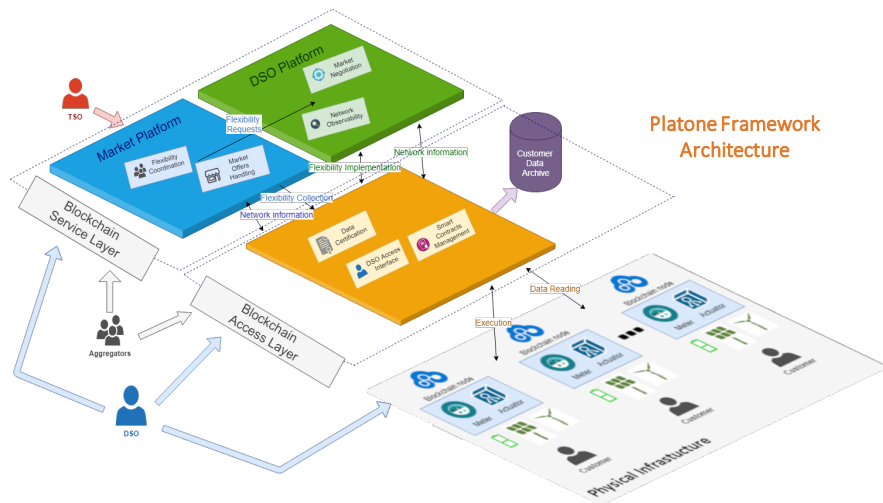
Developing and testing a high technological solution capable to enable energy flexibility mechanisms within an open and inclusive market.

Platone Partnership



Call
LC-SC3-ES-1-2019

Funding
9,5 Mln



Conclusion and Next Steps



In October 2022 the second release of the Italian System Architecture will be released and implemented with further functionalities



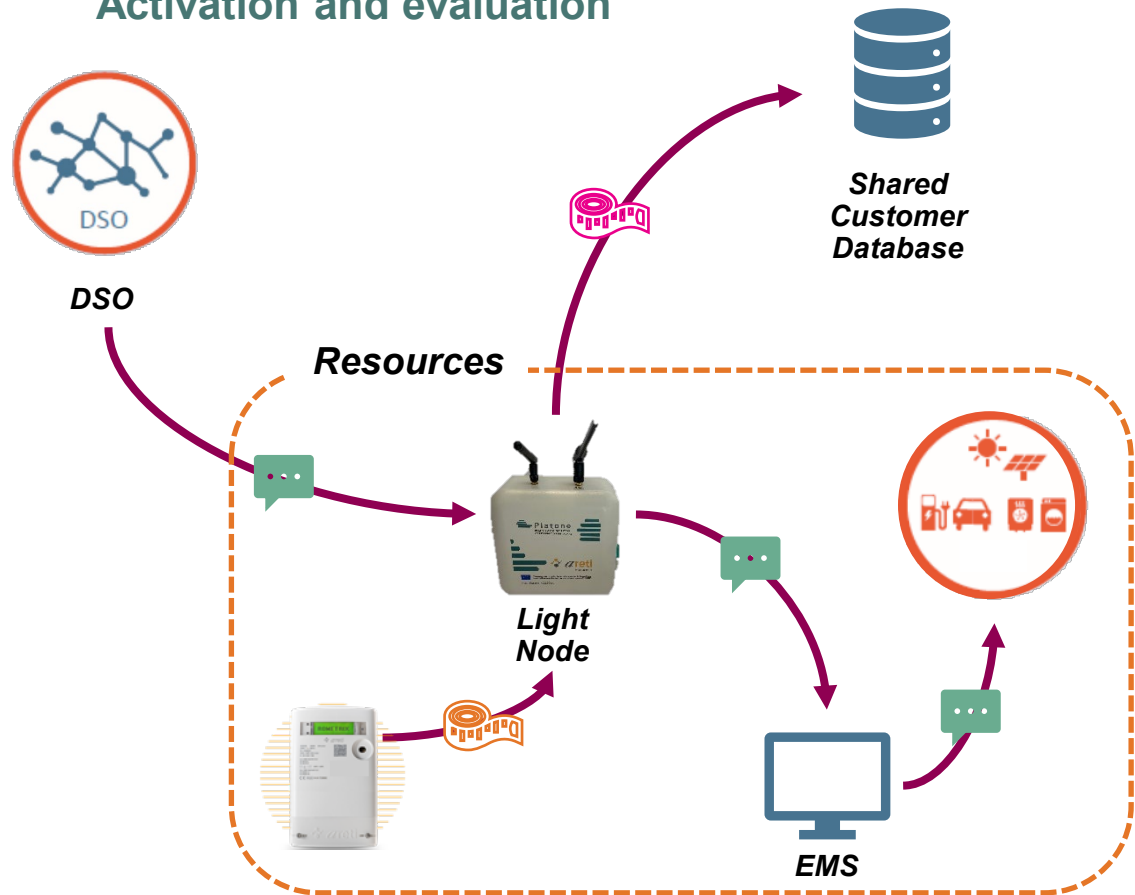
Areti is proposing the Italian Demo System Architecture and solution as a national pilot for the Local Flexibility Market



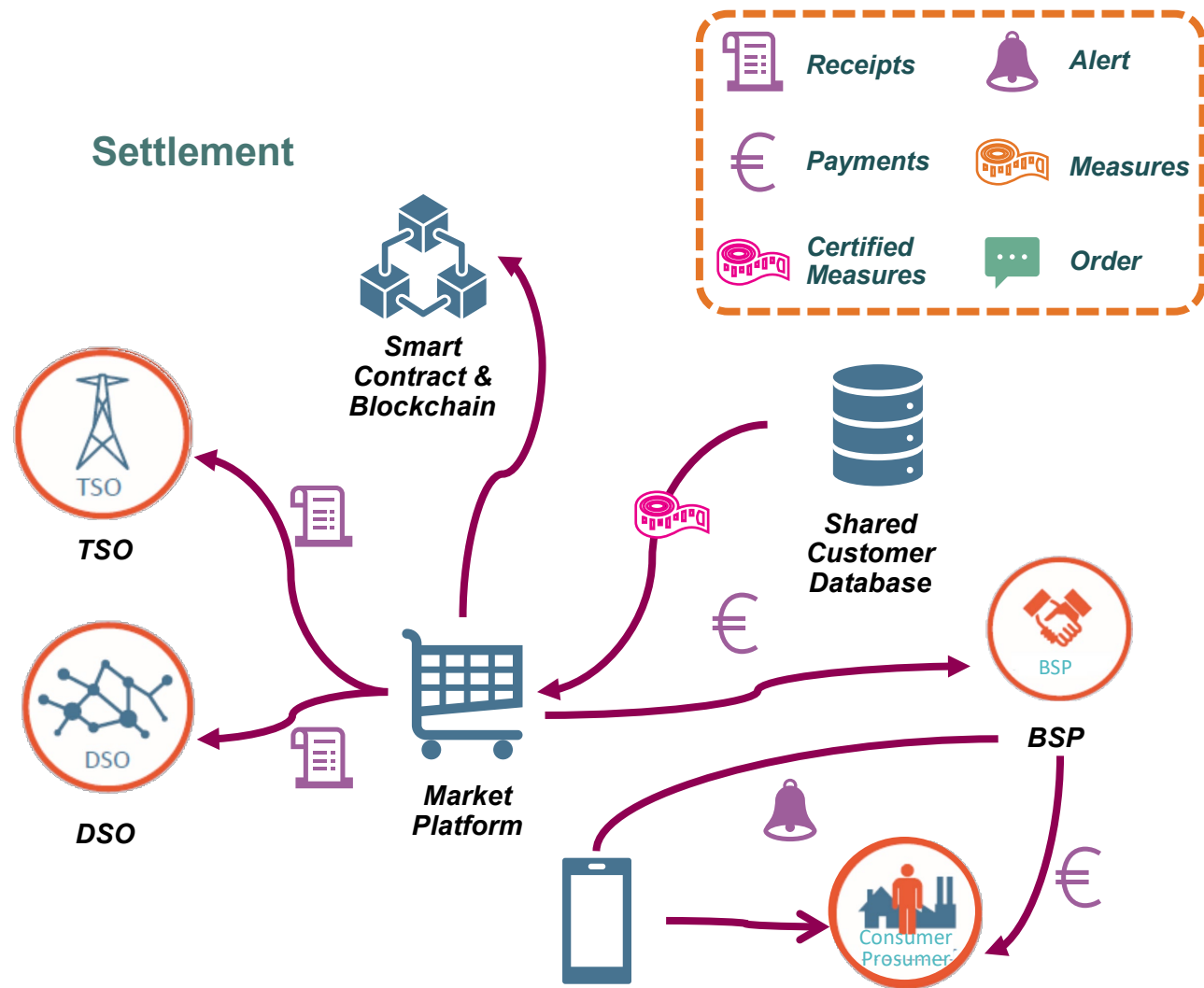
The solution proposed into the Italian Demo will be used as a basis for further development of other European Projects

Measurement and Settlement

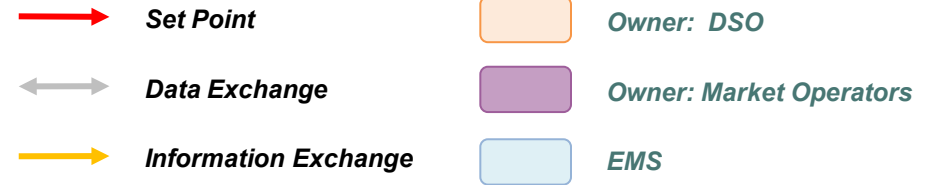
Activation and evaluation



Settlement



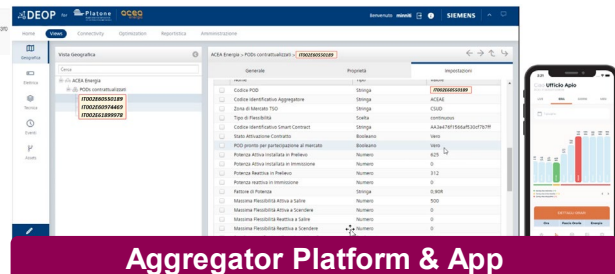
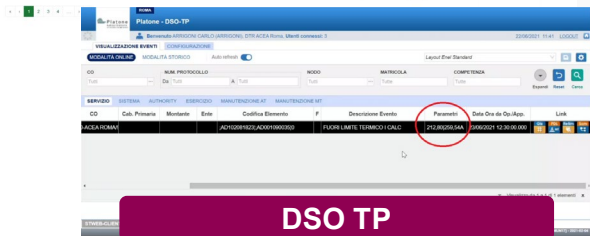
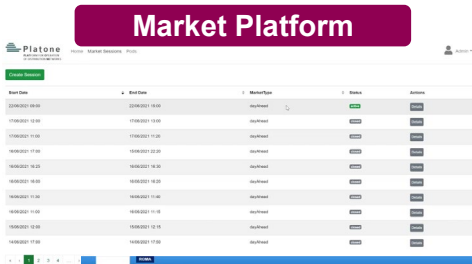
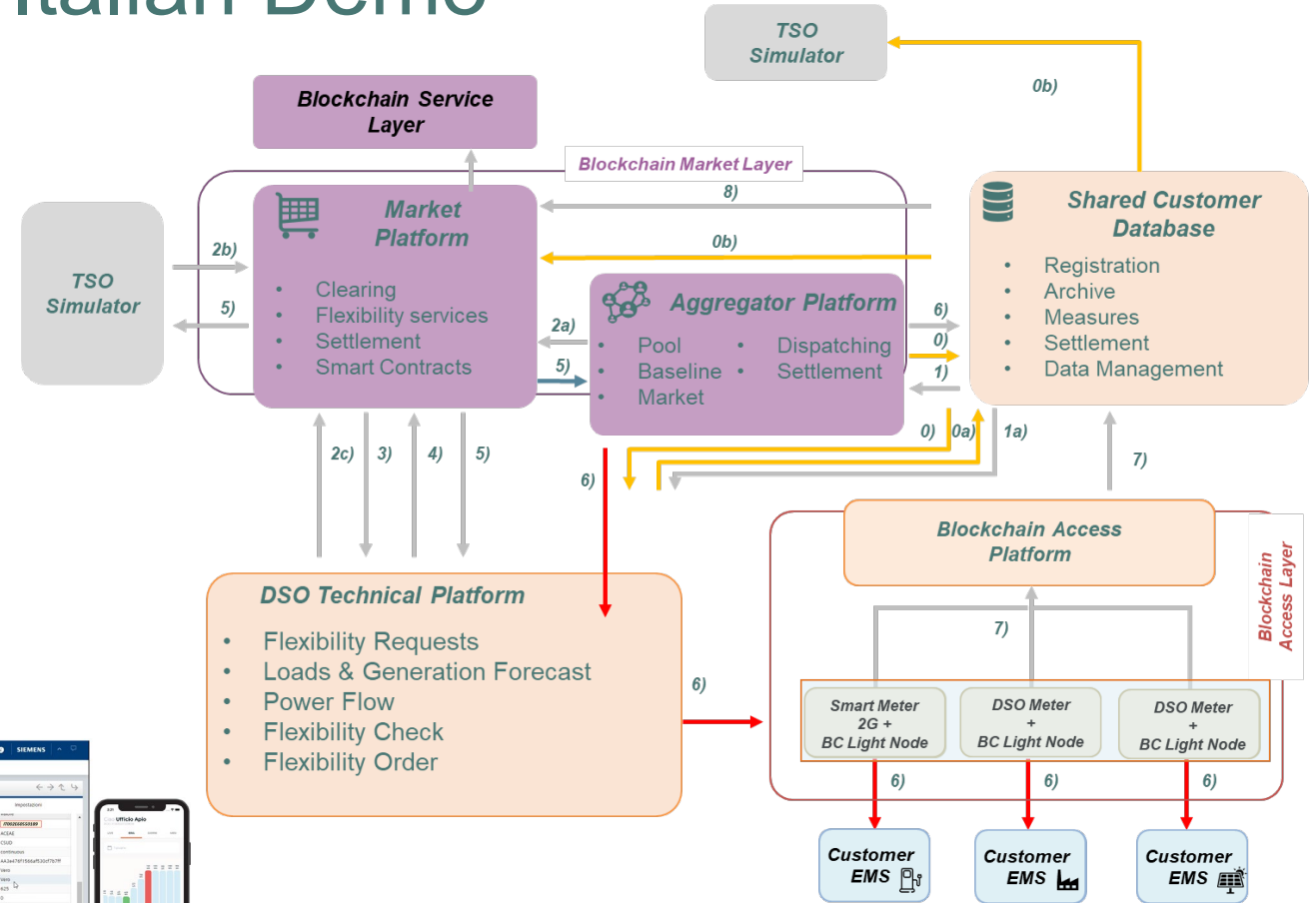
The Flexibility Market in the Italian Demo



Data Flow Chart

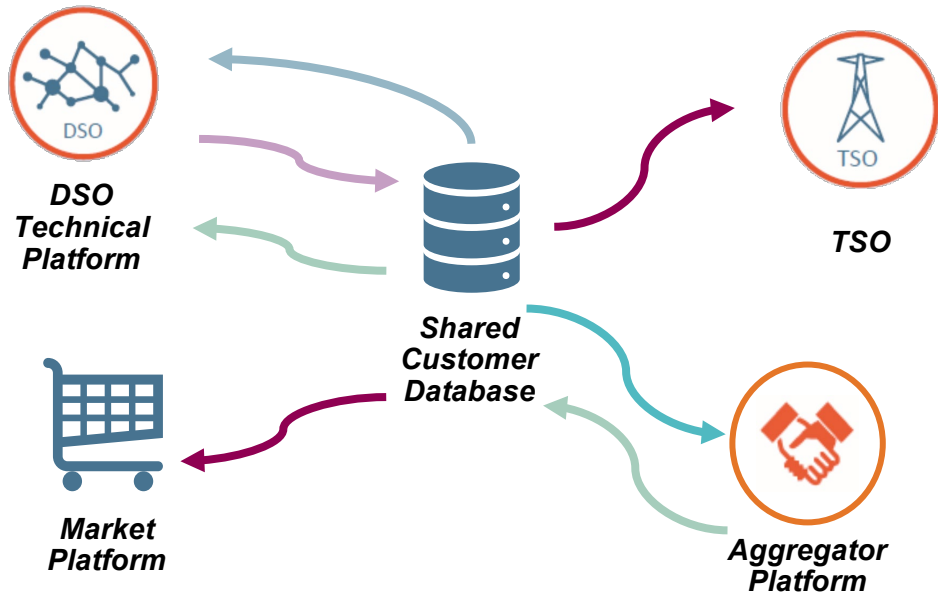
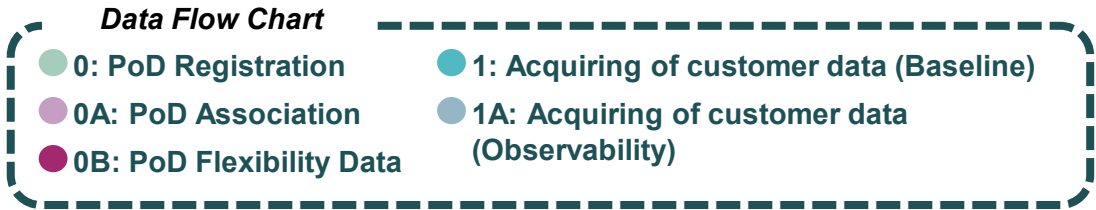
- 0) POD registration
 0a) PDM – POD association
 0b) PDM – POD Flexibility data
 1) Acquiring of Customer data to calculate the baseline;
 1a) Acquiring of Customer data (observability etc);
 2a) Sending of scheduled resources per POD to market;
 2b) Sending of TSO Flexibility Requests per PoM to market;
 2c) Sending of DSO Flexibility Requests per PoD List to market

3) Sending of Economic Market Outcomes to DSO;
 4) Sending of DSO technical acceptances to MO;
 5) Sending of market outcomes to stakeholders
 6) Sending of Set Point to DSO Market Platform, to Light Node and to EMS
 7) Sending of certified data through BC Platform to Shared Customer Database
 8) Sending of data outcomes to Market Platform.

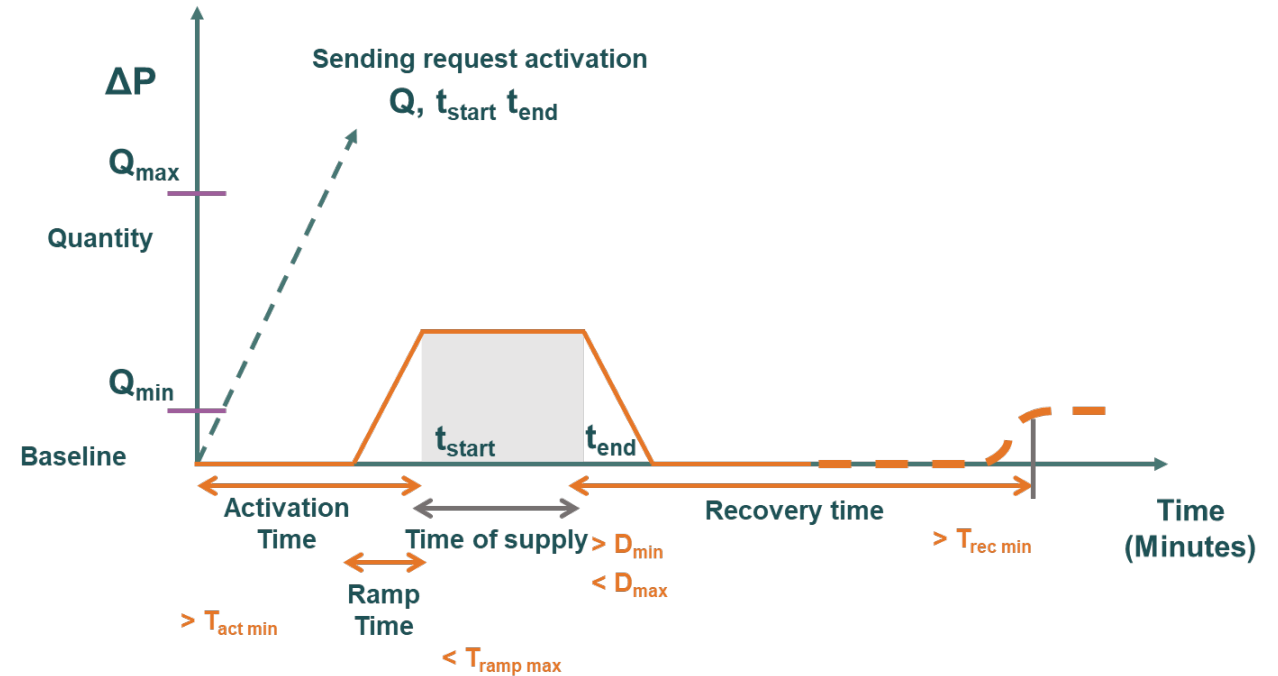


Preparation and Flexibility Products

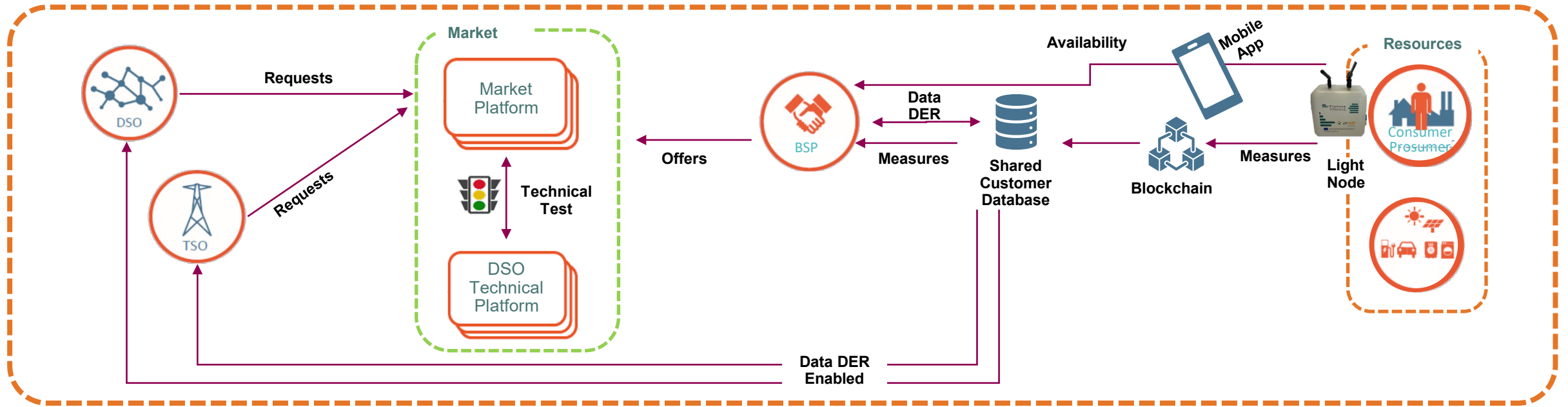
Preparatory activities



Flexibility products



Activation and Use



Market Platform



Day ahead: The only session relative to the services to be supplied in the 24h of the day following the negotiation day



InfraDay: 6 sessions each covering the services to be provided during the 4 hours of the day following the session day

Flexibility Market in Platone Project: an overview on the Italian Demo

E-REDES Annual Event - 10th of May
“ Real progress along the road to Flexibility”
Panel 2 “Flexibility in action”

Gabriele Fedele | areti

“Real progress along the road to Flexibility”

May 10th | Porto, Portugal

Flexibility in action

OneNet



Network: guestON
Password: xp4510#21

OneNet – One Network for Europe: The Northern Flexibility Market

E-Redes Annual European Project Day
“Real progress along the road to Flexibility”
Panel 2: Flexibility in Action

Luciana Marques (VITO)

May 10th, 2022



This project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 957739



OneNet Vision

- Create a fully replicable and scalable architecture
- Enable the whole European electrical system to operate as a single system
- Design a variety of markets
- Allow the universal participation of stakeholders (regardless of their physical location – at every level from small consumers to large producers)

Three Pillars



Definition of a **common market design for Europe**



Definition of a **common IT Architecture** and **common IT Interfaces**



Verification of the proposed solutions in large field tests

European consortium

OneNet brings together more than 70 partners

- Including E.DSO and ENTSO-E
- Together with a large set of TSOs and DSOs
- Leading IT companies and
- Renowned research institutions

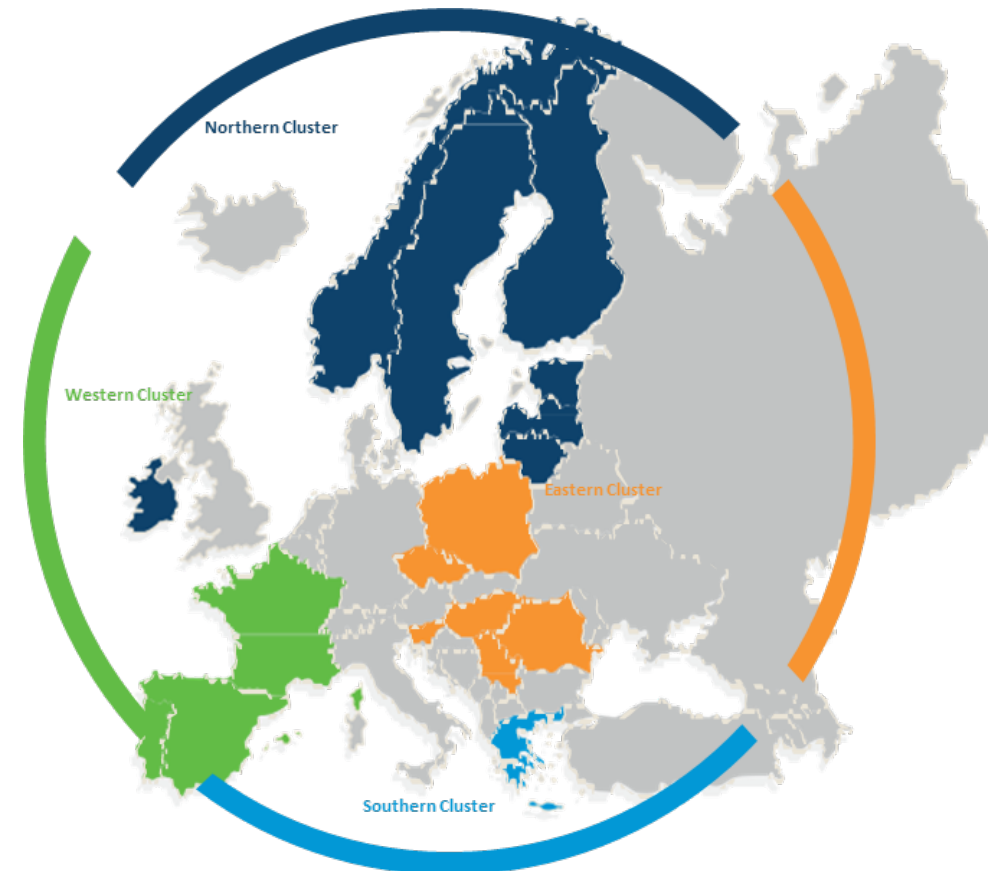
Knowledge base

- Project funded in the last call for **TDO-DSO-Customer** cooperation
- OneNet brings together the **large base of knowledge and technology** developed so far in **H2020** projects like **CoordiNet** and **INTERFACE**.
- OneNet aims to create a **standardized pan-European system of systems approach** combining existing and new solutions

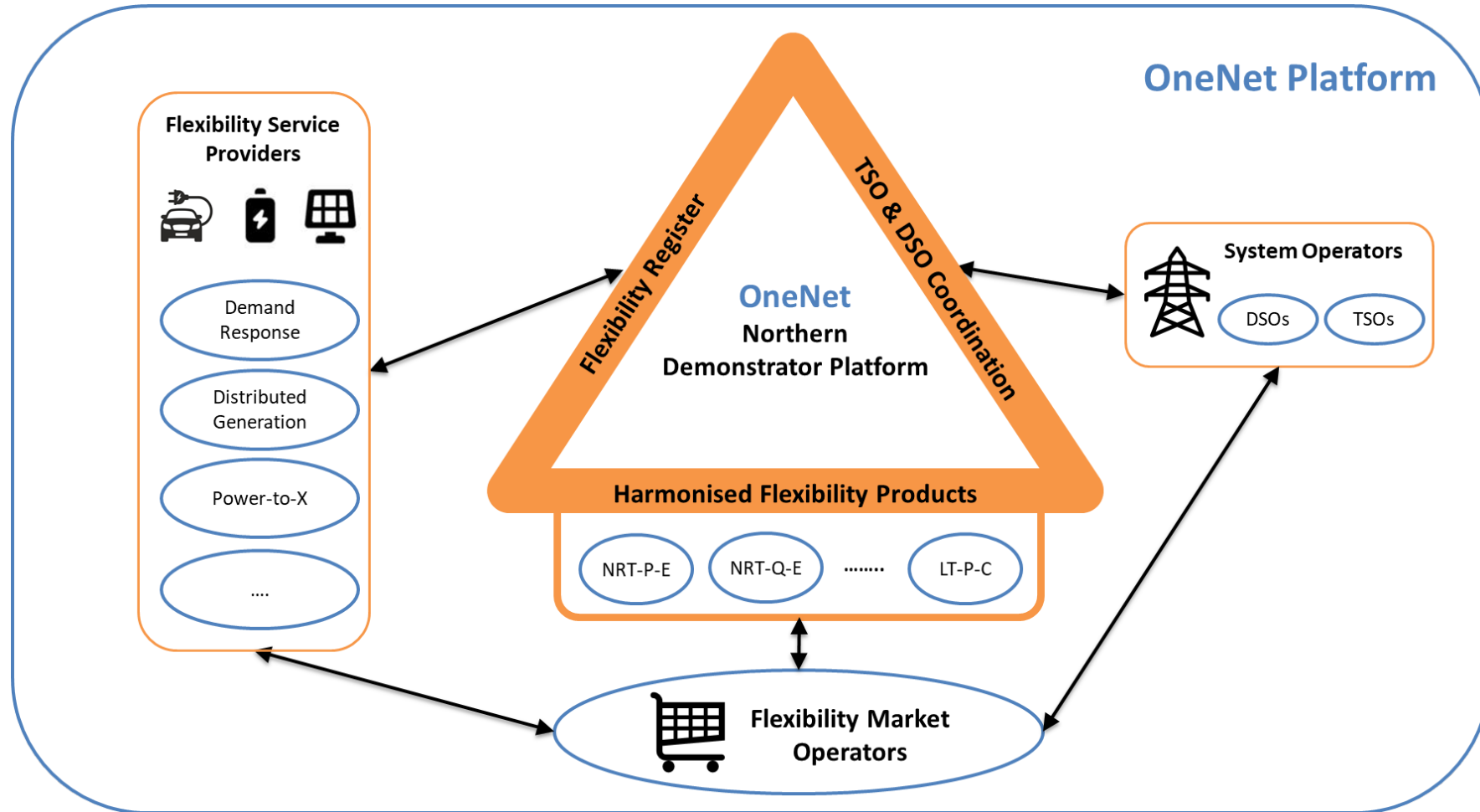


A pan-European system of systems approach:

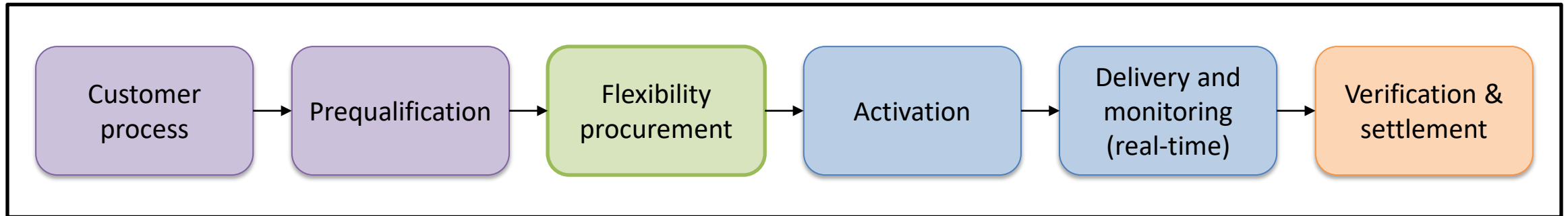
- Bringing together previous knowledge from other H2020 projects;
- Proposing **harmonized products**;
- Developing a **market framework** for the procurement of flexibility;
- Creating **different use cases** according to SOs needs for flexibility and approach to acquire service;
- Developing **OneNet architecture platform** in order to connect all stakeholders.



The Northern Cluster Platform



The Northern Cluster Business Use Case



Preparatory phase:

- Flexibility registration
- Product and grid qualification process
- Grid information

Market phase:

- Market-based procurement
- Joint TSO-DSO market clearing
- Best value stack solution (optimization)
- Constraint selection according to product

Activation phase:

- Request for activation
- Activation confirmation
- Baseline methodology

Settlement phase:

- Metering, trading and activation data
- Remuneration definition
- Invoicing



Thank You

Luciana Marques

Contact Information

Affiliation: VITO

Phone: +32 14 33 55 35

Email: luciana.marques@vito.be



“Real progress along the road to Flexibility”

May 10th | Porto, Portugal

Flexibility in action

Panel

Moderated by Madalena Lacerda (E-REDES) with the participation of OneNet; Platone; Interrface; Fever and Parity



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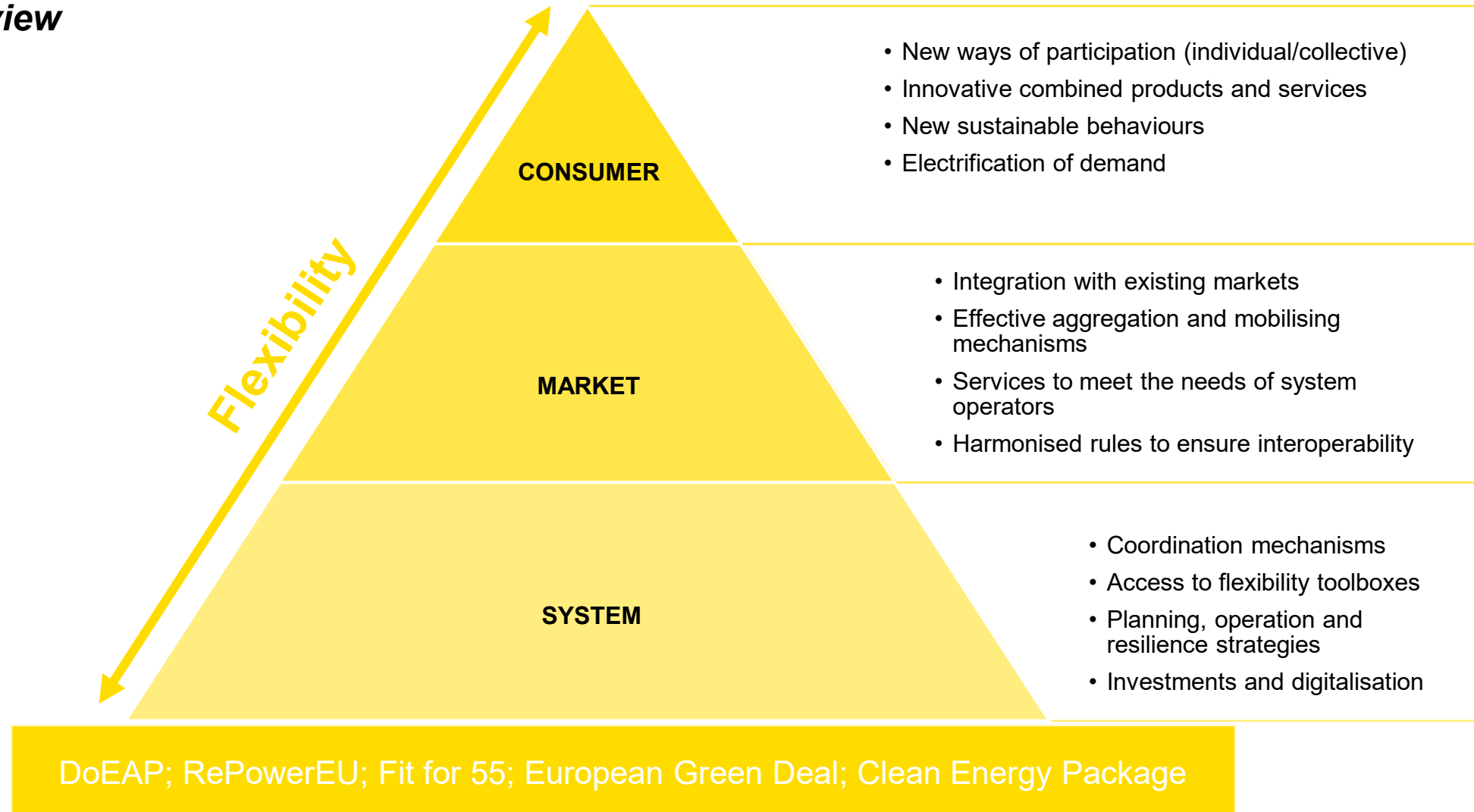
Key conclusions and closure

Luís Vale da Cunha

E-REDES European Projects and Policies

Implementation levels and the way forward

Overview



“Real progress along the road to Flexibility”

May 10th | Porto, Portugal

Thank you!