



bridge

ENLIT – Session 2

15:45 – 17:15

30th November

Moderated by Tomi Medved – Senior researcher
and project manager at LEST

The role of the business models in
provision of flexibility



Agenda

Time	Topic	Speaker
15.45 – 15.50	Introduction – scope of the session	Tomi Medved - Moderator
15:50 – 16:25	Projects Presentation: XFLEX, MERLON, ELAND, COORDINET, TRINITY, FLEXISTRANSTORE (6' each)	Project Representatives
16:25 – 17:10	Round Table + Q&A Session	All Panellists and project representative Q&A from the Audience
17:10 – 17:15	Conclusions	Tomi Medved - Moderator

Project Presented and speakers



X-FLEX
Chloé Fournely



MERLON
Chrysanthopoulos
Nikolaos



ELAND
Heidi Tuiskula



CoordiNet
Carlos Madina



TRINITY
Álvaro
Nofuentes



FLEXISTORE
Thong Vu Van



X-FLEX

Chloé Fournely



Summary of X-FLEX project

OBJECTIVE: Develop complementary products offering flexibility services to all the energy stakeholders



	SERVIFLEX	MARKETFLEX	GRIDFLEX
User	Flexibility managers	Flexibility Service Providers, DSO	DSO and microgrid operators
Added value	<ul style="list-style-type: none"> - Holistic framework - Flexibility extraction, profiling, forecasting, classification, clustering and management - Serve market and grid needs 	<p>Enable small-scale flexible sources to participate on wholesale and local energy markets</p>	<ul style="list-style-type: none"> - Automatic grid observability and control, - Prevent congestion and power quality problems - Enhance resilience for extreme climate event - Use flex. As an alternative to network reinforcement

Summary of X-FLEX project

4 Pilot Locations:

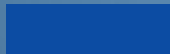
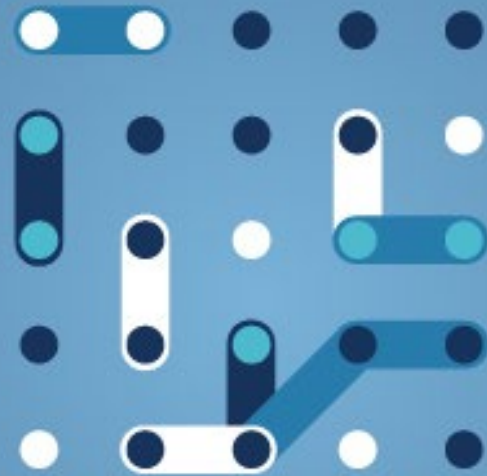
- ❖ *RAVNE NA KOROŠKEM, Slovenia*
Flexibility of the Power to heat on an industrial site
- ❖ *LUČE, Slovenia*
Flexibility of local energy community
- ❖ *ALBENA, Bulgaria*
Flexibility on a commercial site and microgrid/TSO cooperation
- ❖ *XANTHI, Greece*
Green flexibility for network resilience





MERLON

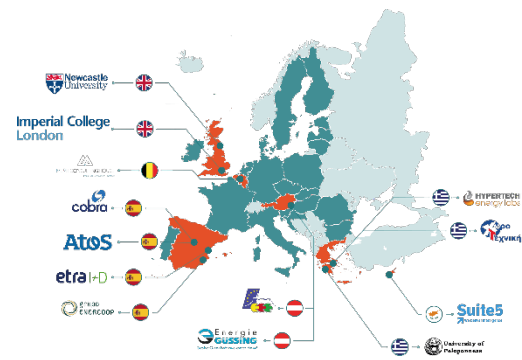
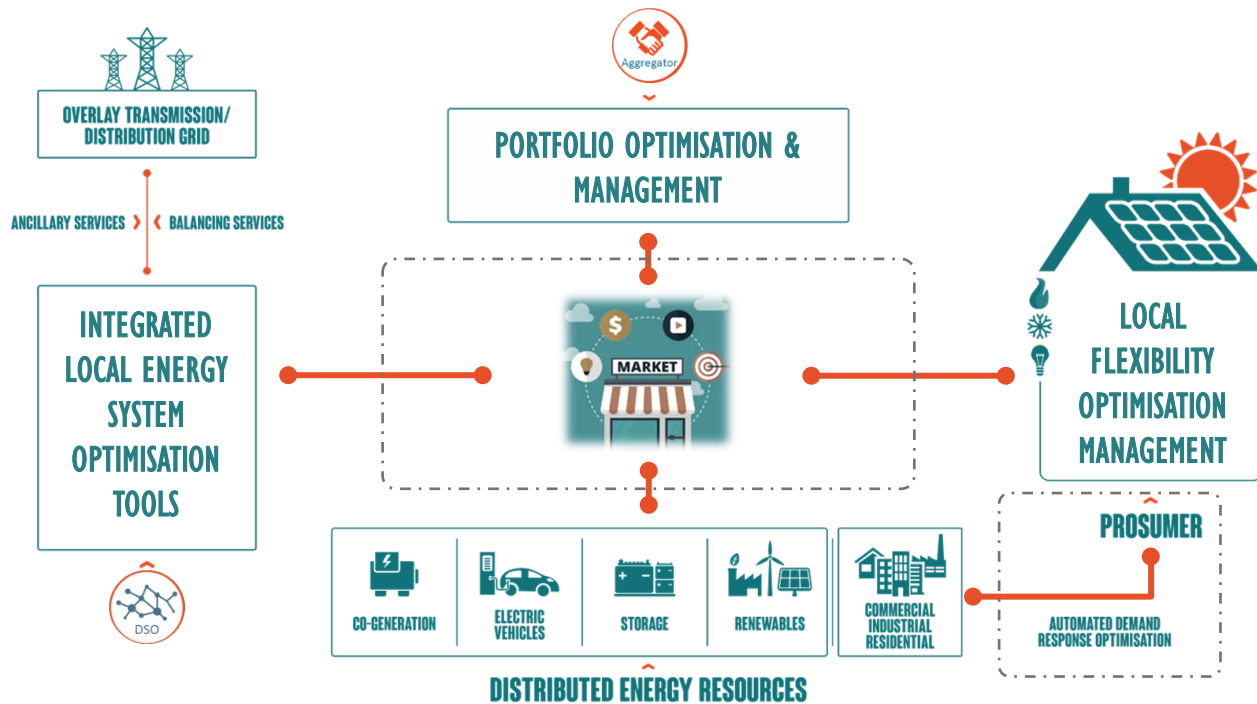
Chrysanthopoulos
Nikolaos



The MERLON project

Introduction of an Integrated Modular Local Energy Management Framework for the Holistic Operational Optimization of Local Energy Systems in presence of high shares of variable distributed RES.

An overview of the concept



Consortium:
13 Project Partners
6 Countries
10 Cities
2 Pilots

Coordinator:
Hypertech
Energy Labs

Duration:
Jan 2019
Apr 2022

Website:
merlon-project.eu

H2020 MERLON



European
Commission

The MERLON Business Models



BM1: Local distribution network management

Scope: Support economic operation and development of local distribution network, by limiting power flows and thus mitigating thermal and voltage constraints



BM2: Provision of security of supply during emergencies

Scope: Minimise required load shedding and inconvenience costs during emergency conditions, by enabling islanded operation



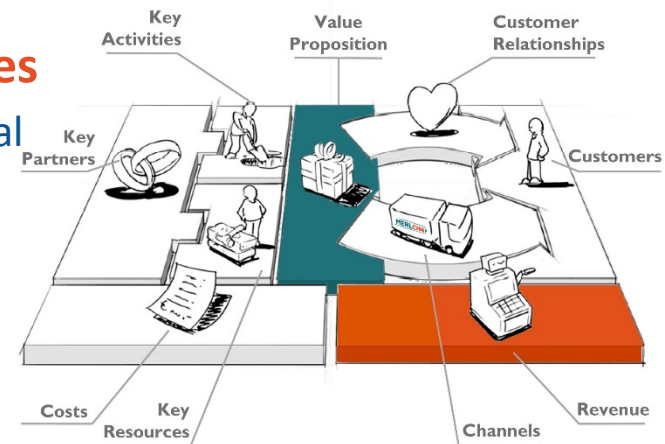
BM3: Provision of system balancing services

Scope: Participation of LES (and access to additional revenues) in balancing markets (FCR, FRR, RR)

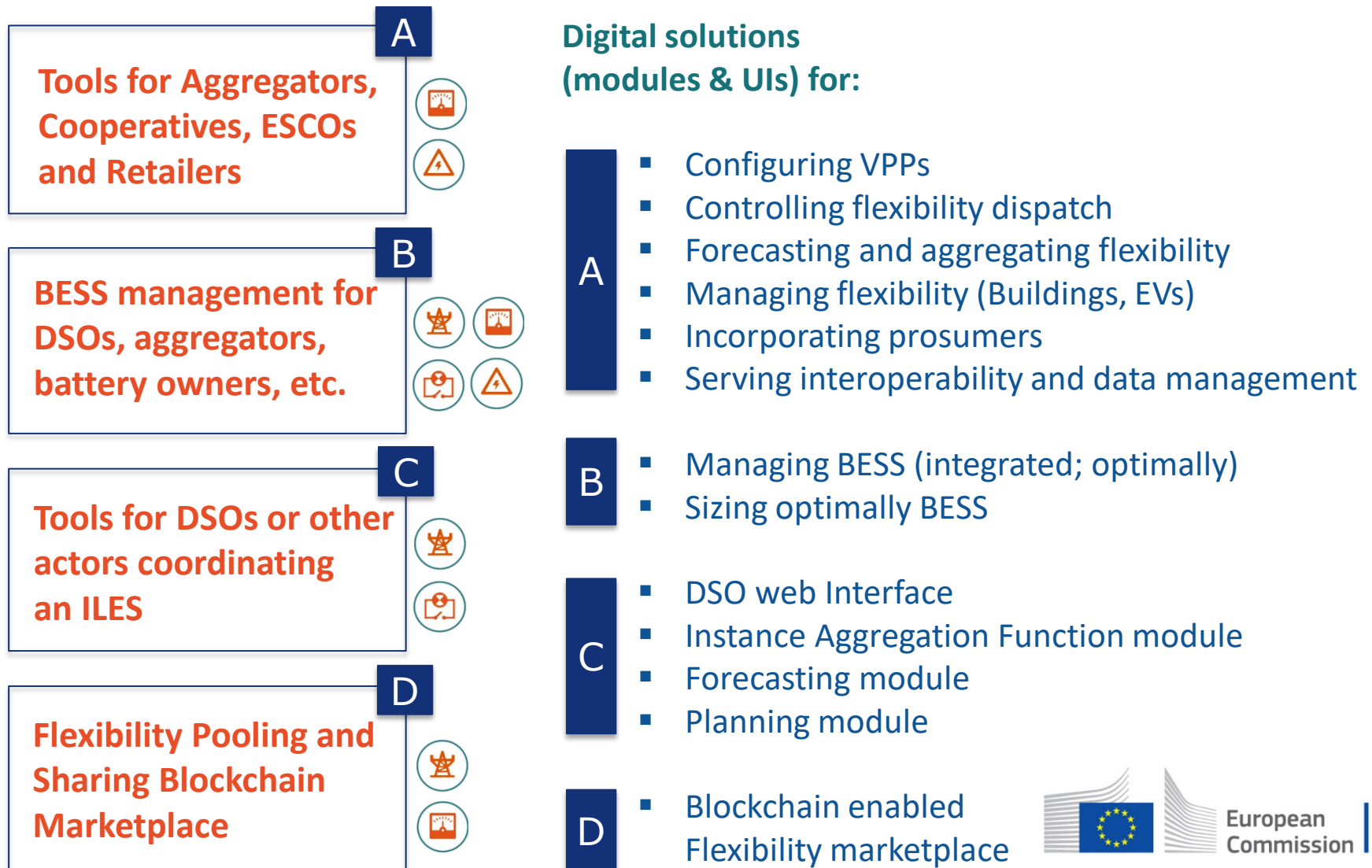


BM4: Participation in energy trading

Scope: Reduce energy costs of LES consumers by a) responding to time-varying energy prices, and b) establishing local energy trading



The MERLON Results



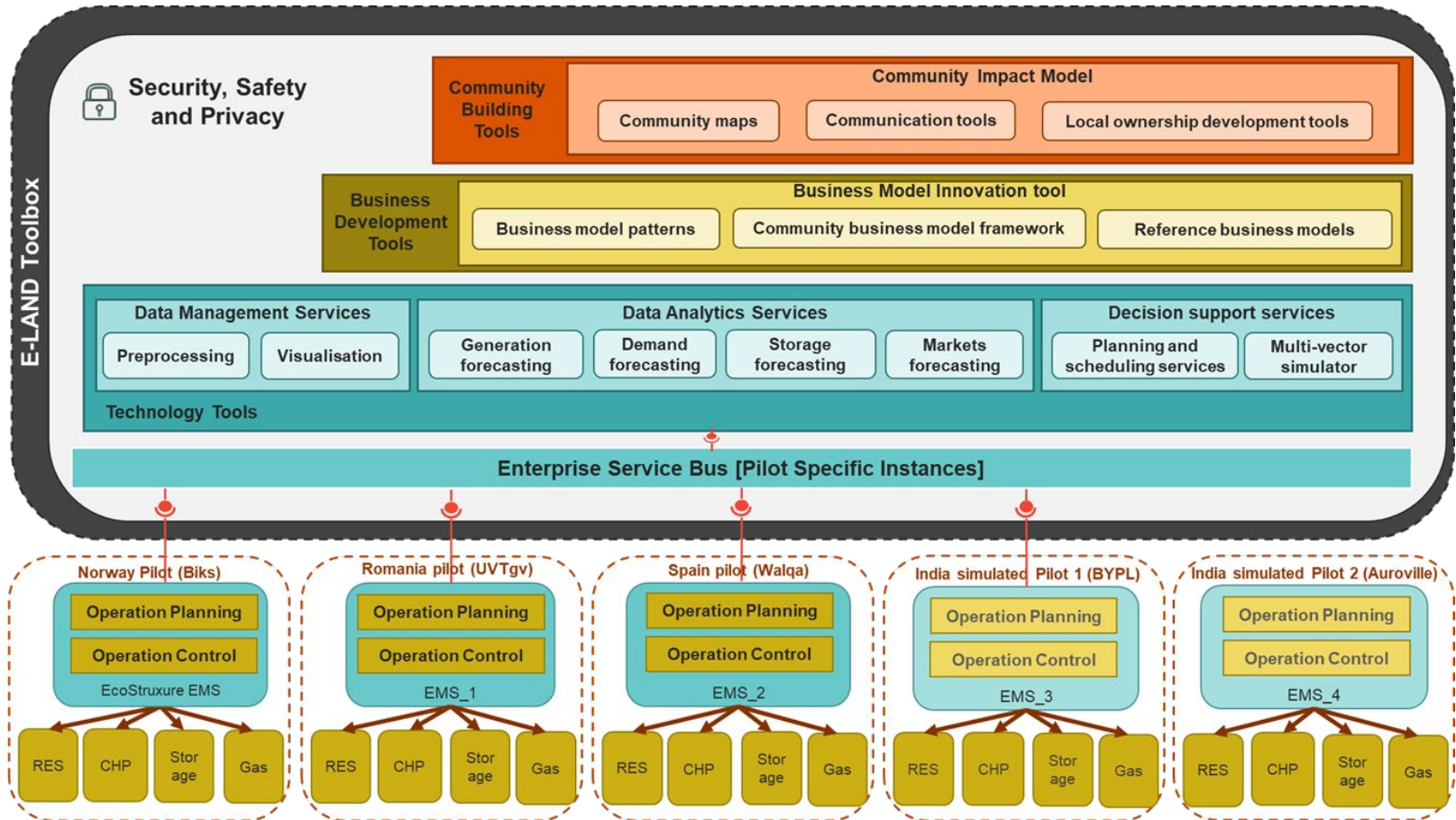


E-LAND

Heidi Tuiskula



E-LAND 2018-2022



E-LAND findings

- *With digitalization we can capture new values from the same systems. However, technology integration with legacy systems is still a challenge.*
- *Communities are not aware of what business models are and how to develop those.*
- *Communities are not driven by profits, thus benefits of business models and being part of the energy community are not clear to them.*
- *With complex systems, communities need support in their decision making.*

E-LAND input for panel questions

- *1. Do you know tools or models for developing business models for energy communities?*
- *2. Is there quantified evidence of benefits for energy communities?*
- *3. How can we support policymakers in creating more energy community friendly solutions?*



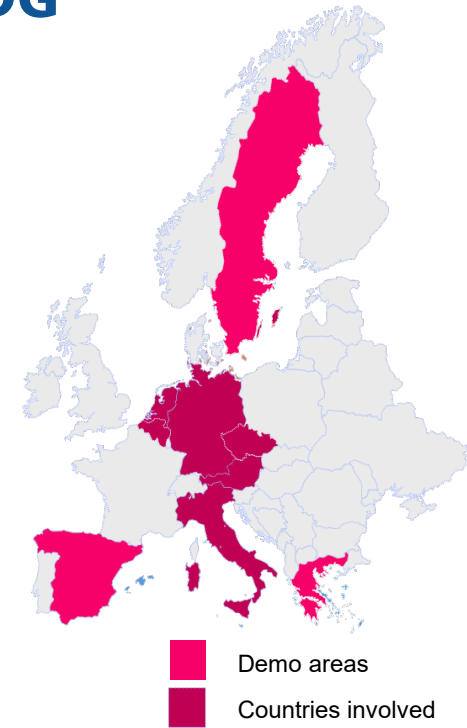
CoordiNet

Carlos Madina

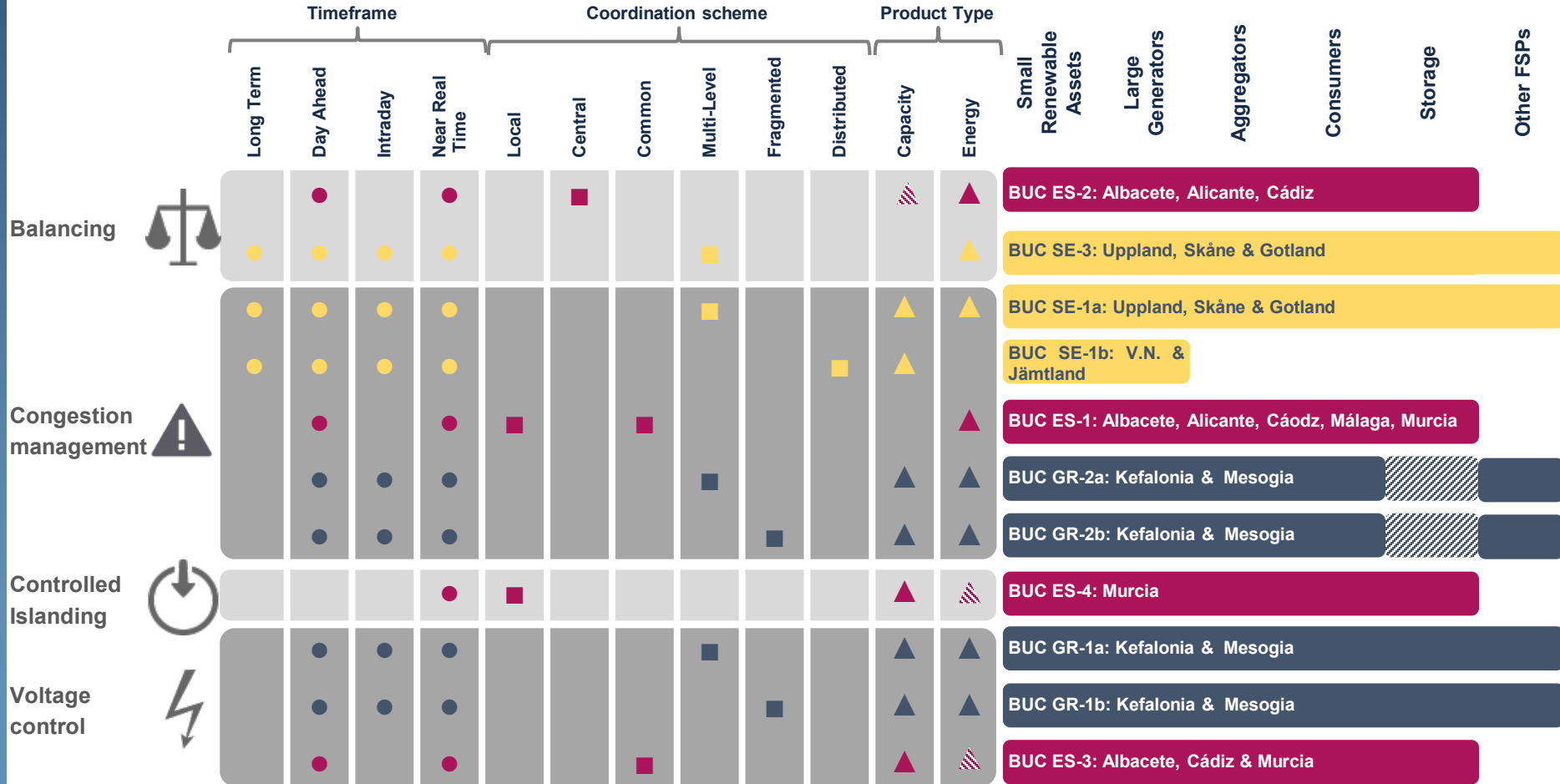


COORDINET: Large-scale TSO-DSO-Consumer demonstrations of innovative system services through demand response, storage and small-scale DG

- *Objectives:*
 - **Demonstrate** the activation and provision of services through a TSO-DSO-customer 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.
- *Timeline: 01/01/2019 – 30/06/2022*
- *Project Budget (funding): 19.2M€ (15.1M€)*
- *23 partners + 10 Linked Third Parties*

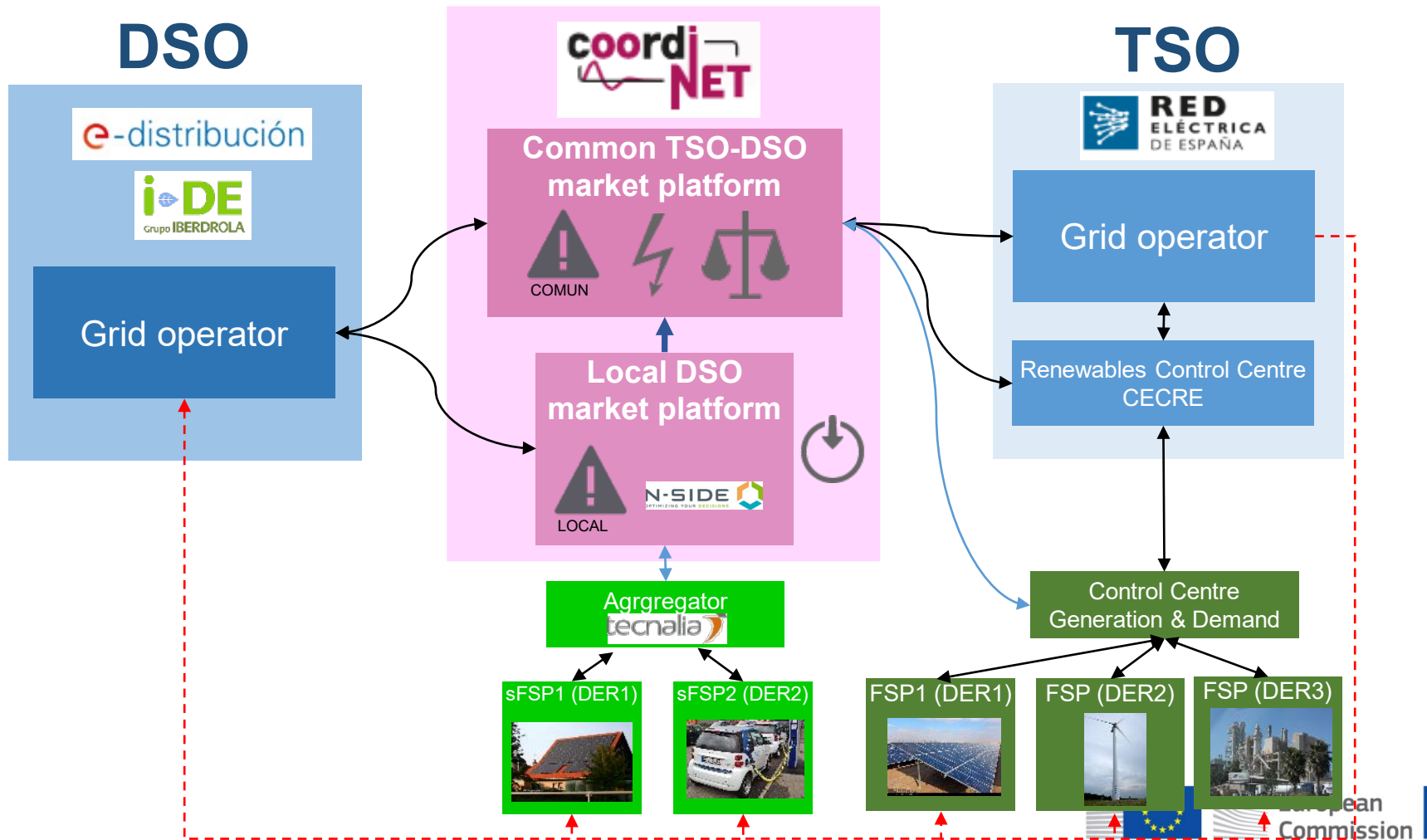


Products & Services demonstrated



Digitalization in the Spanish demonstrator

Market platforms



Digitalization in the Swedish demonstrator (I)

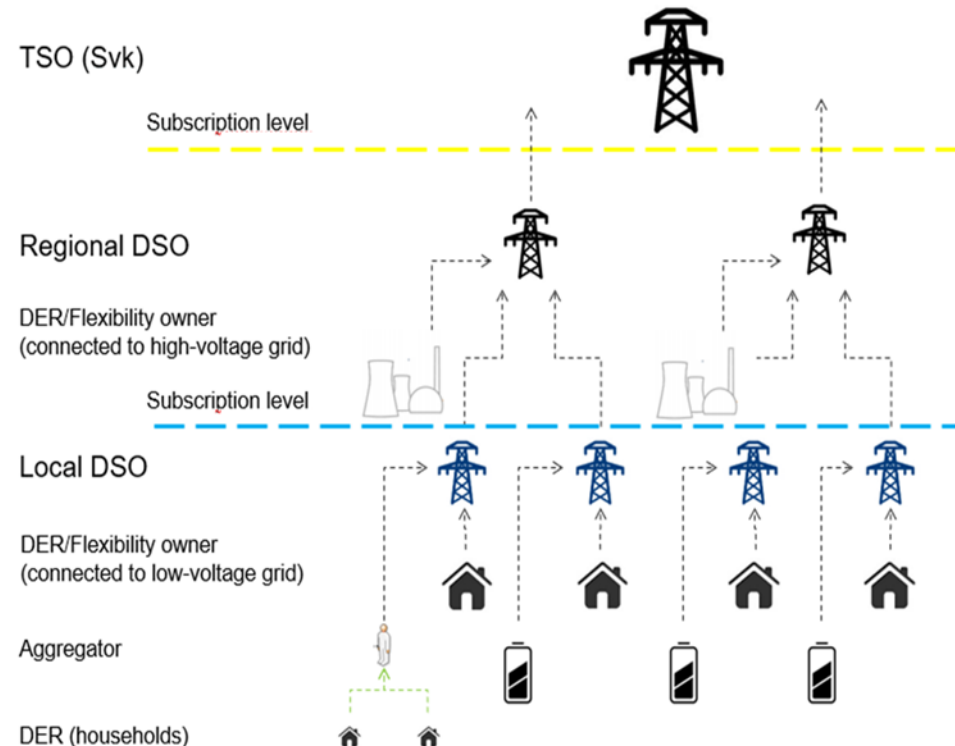
Swedish demo: business case congestion management

Limits exist for the **power subscription levels** between the **local DSO** and **regional DSO** and between the **regional DSO** and **TSO**

Subscription limits violation are subject to **cost**, and may be denied

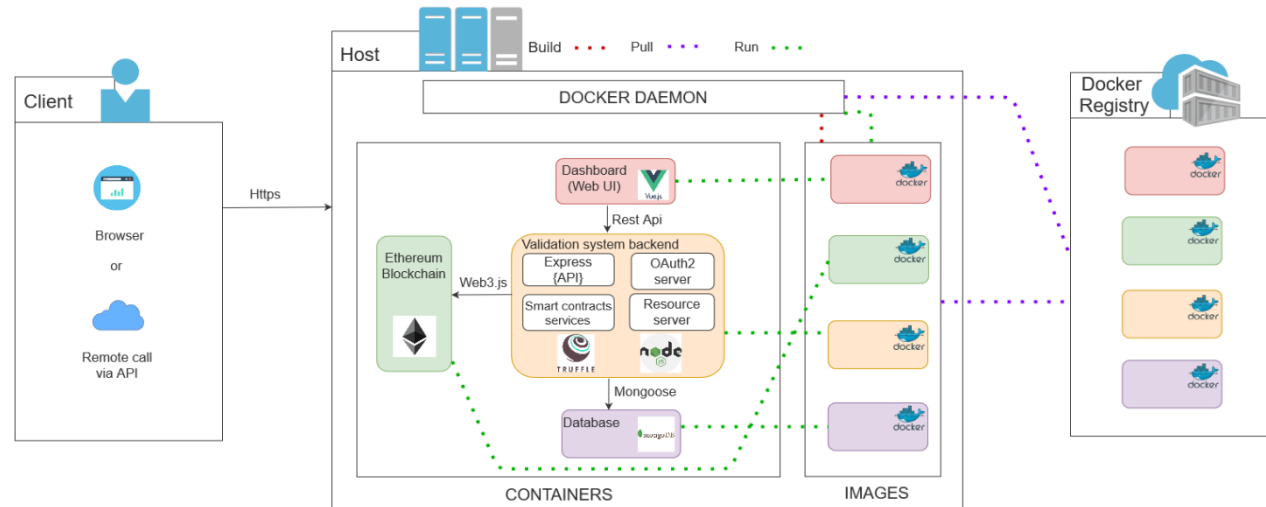
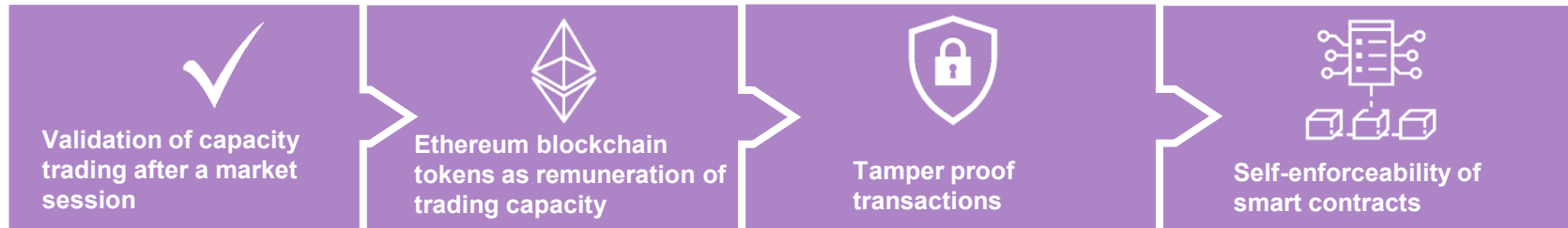
The DSO **utilizes flexibility services to lower peak demand** of its grid during the winter season November to March

A **grid state forecast** makes it possible to call for **flexibility day-ahead** working proactively to **alleviate grid congestion** that has strong correlation with temperature



Digitalization in the Swedish demonstrator (II)

Development of a blockchain environment for validation of a P2P capacity market



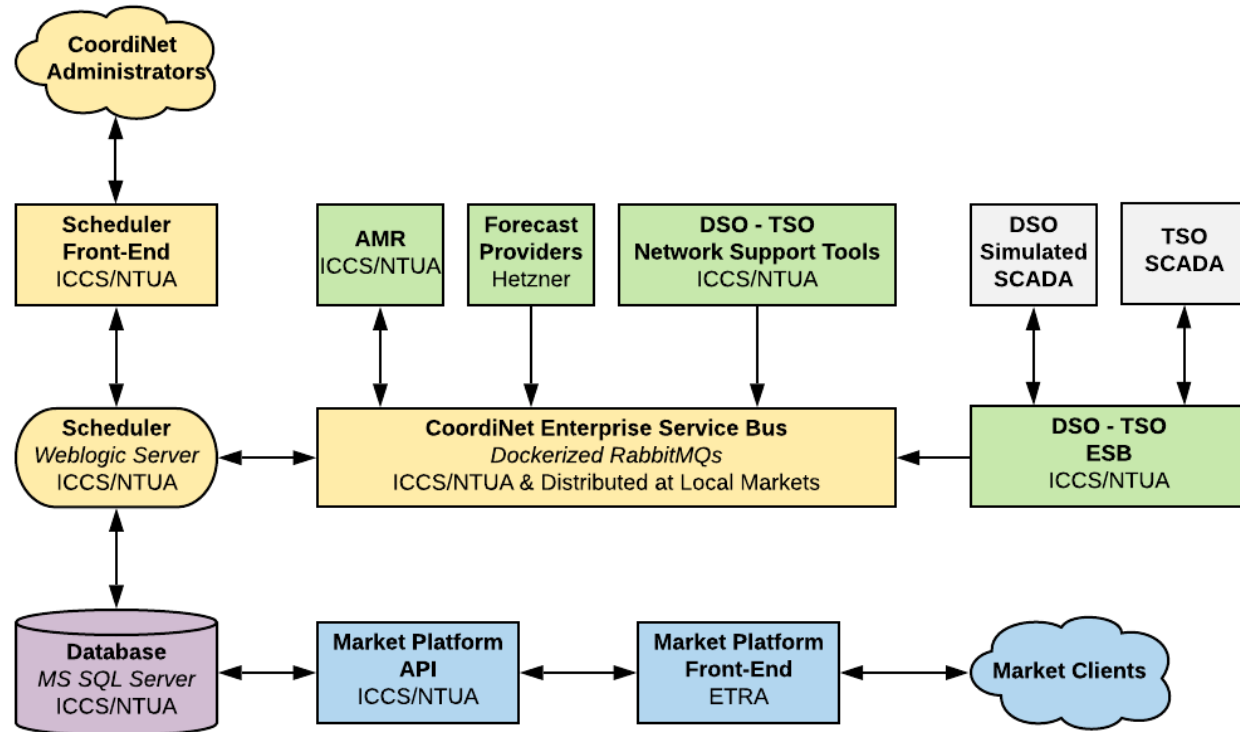
Test	Dates	Trading	Actual Delivery
Simulated test run	14-18 September	Yes	No
Actual live demo	12-16 October	Yes	Yes

Digitalization in the Greek demonstrator

The communication is achieved via an ESB, to support mutual connection of decoupled applications

Five groups of entities separated by color:

- **Magenta:** The shared DB between Market Platform & ESB's Scheduler.
- **Blue:** Market's Platform back & front end.
- **Yellow:** Scheduler's back & front end, including the Enterprise Service Bus.
- **Green:** Modules integrated to the system & 3rd party services.
- **Gray:** Other pre-existing integrated systems over an external ESB as a 3rd party service.





TRINITY

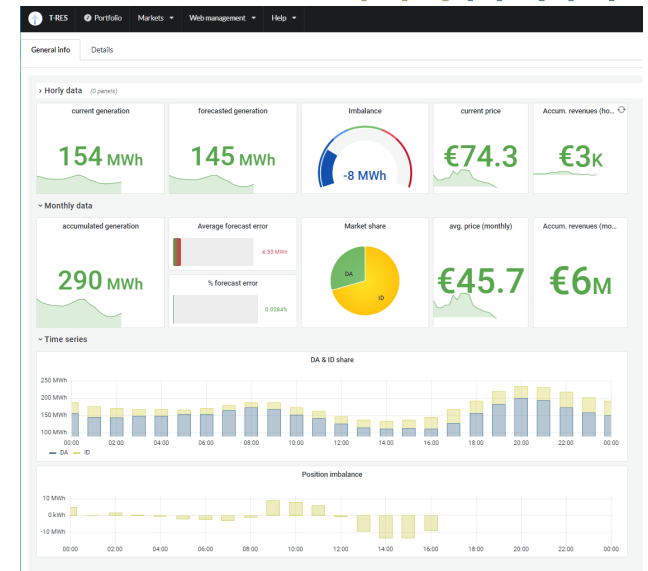
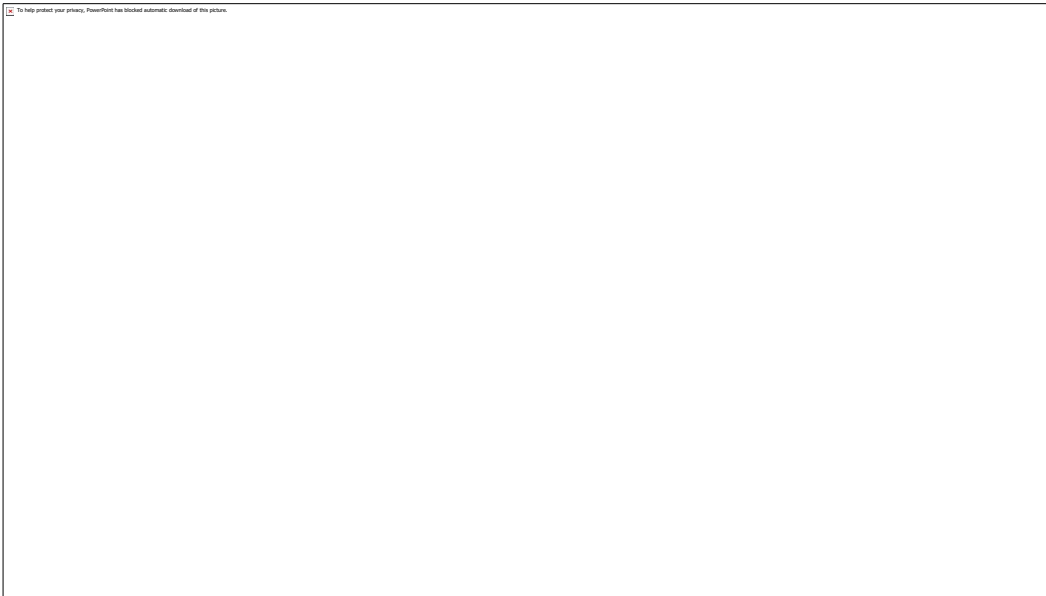
Álvaro Nofuentes



Summary of TRINITY



Summary of T-RES



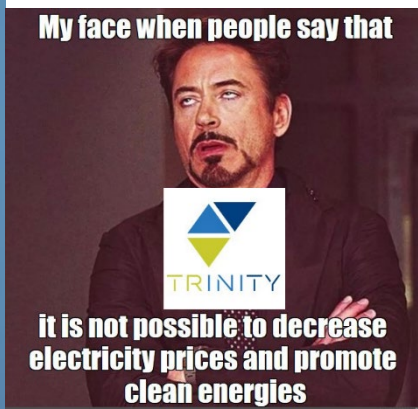
Barriers and recommendations for RES Business Models

Main challenges / Barriers

- When receiving FiT, it is reduced due to fees for balancing purposes.
- In some countries, RES producers aren't allowed to get incomes from GoO if receiving other incentives such as FiT.
- Technical barrier: Lack of transmission system capacity may rise cost for constructing new wind power plant.

Conclusions and recommendations

- RES operators prefer FiT financial schemes instead of Spot Markets since FiT provides a stable income for a large portion of the life of the RES plant. It also removes any income uncertainty that might come from the other market routes. Spot Markets should be adapted to make them more interesting for RES investors and reduce uncertainties.
- Facilitate Cross-Border transactions.
- Increase transparency and reliability of GoOs.
- To keep that RES producers will be the last ones to perform emergency curtailments.
- To improve accuracy of RES production, demand and market prices.





FLEXISTORE

Thong Vu Van



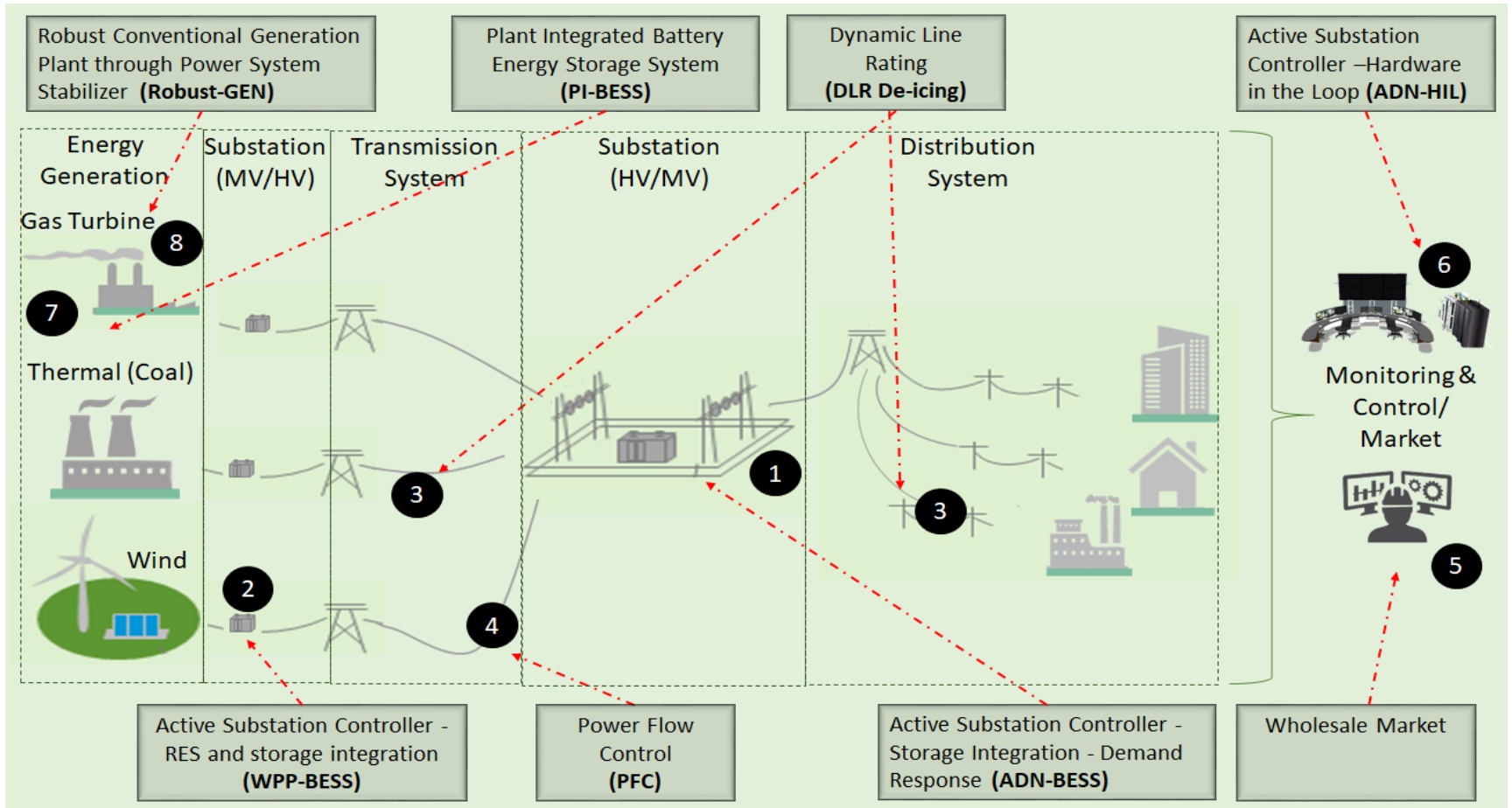


- *FLEXITRANSTORE consists of 8 demonstrations in 6 countries.*
- *The demonstrators are divided into three layers, according to their application point across the energy value chain:*
 - **Layer 1:** Flexibility at transmission connection points: Production and demand
 - **Layer 2:** Increasing cross border capacity and clean energy flows
 - **Layer 3:** Flexibility entering the market

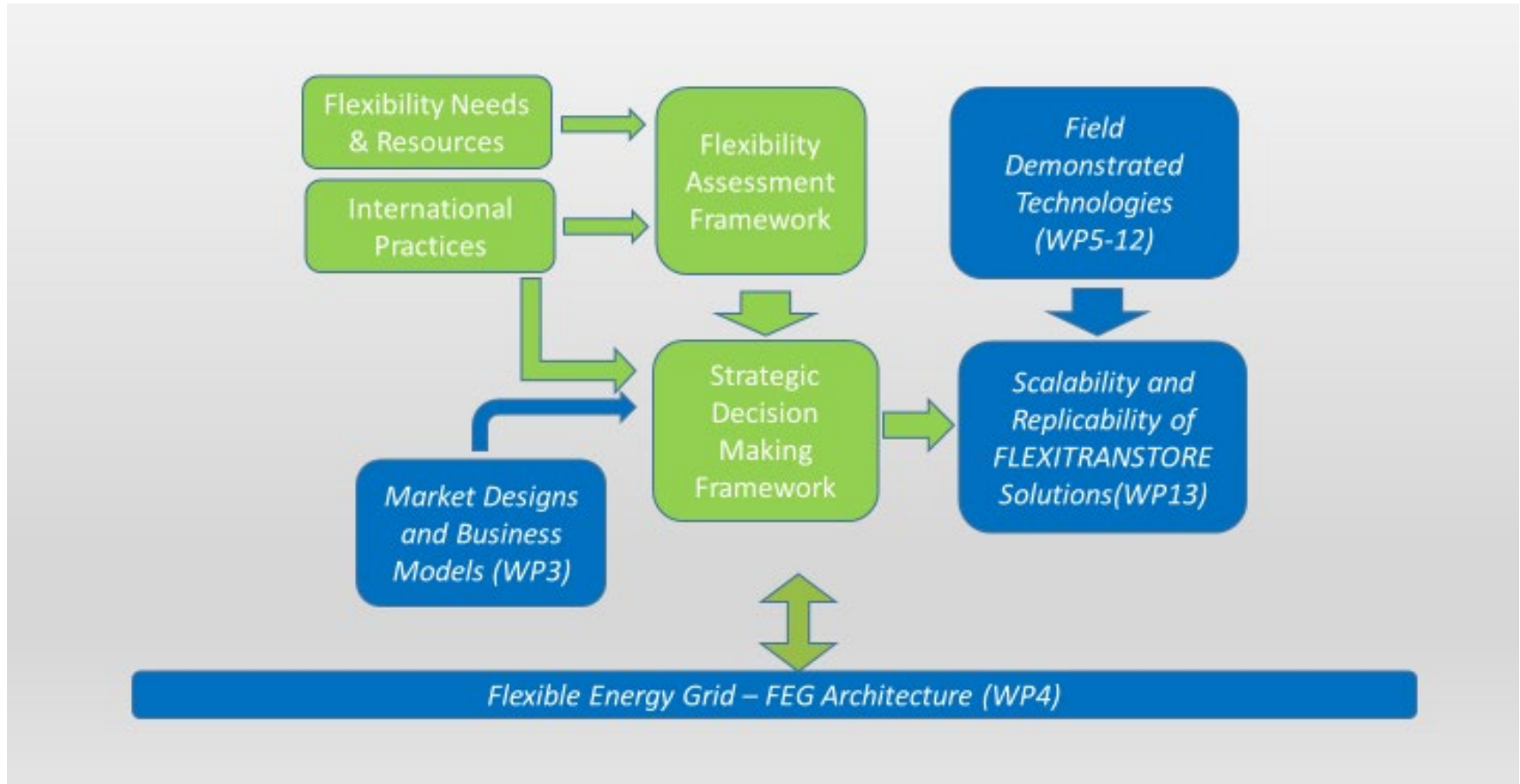


Budget: 21.7 M Euro, Grant: 17 M Euro , Nov 2017 – Apr 2022

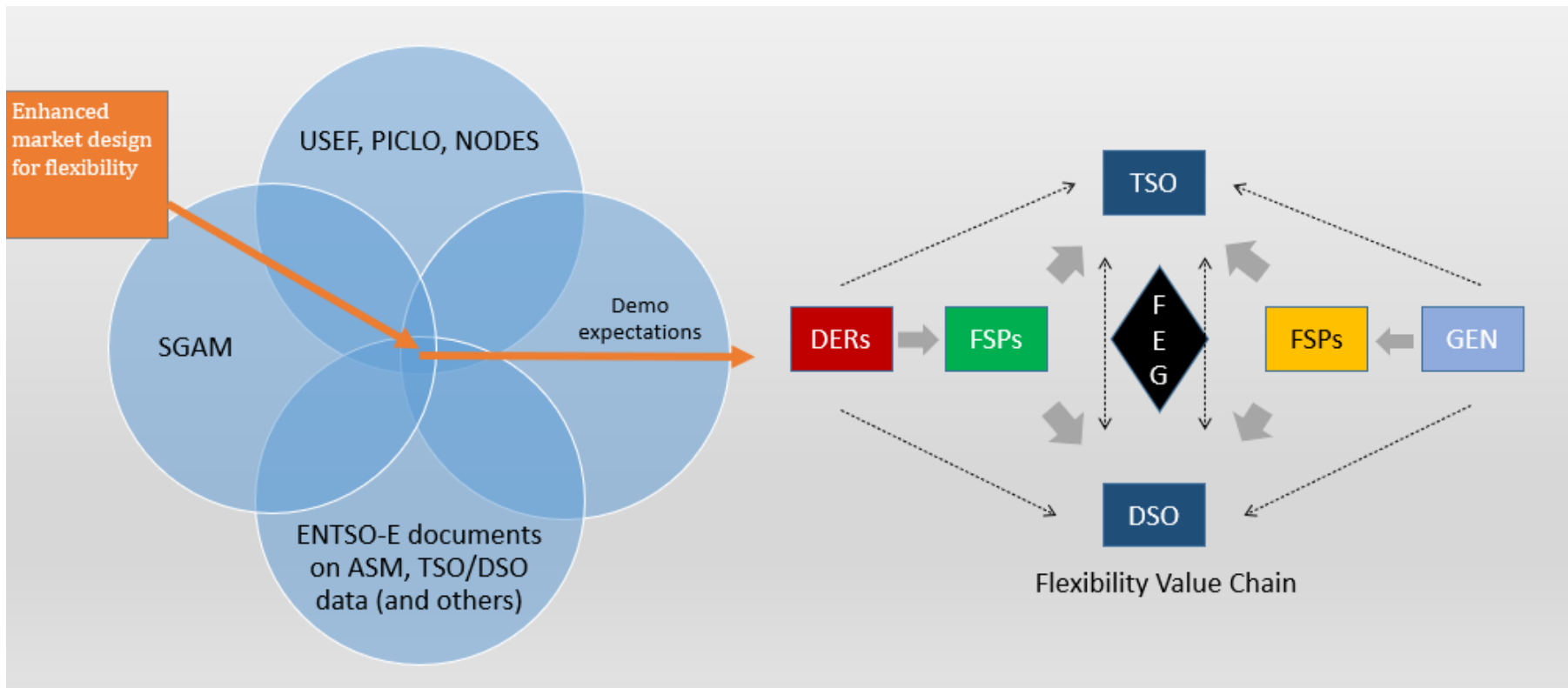
Enabling large-scale grid flexibility

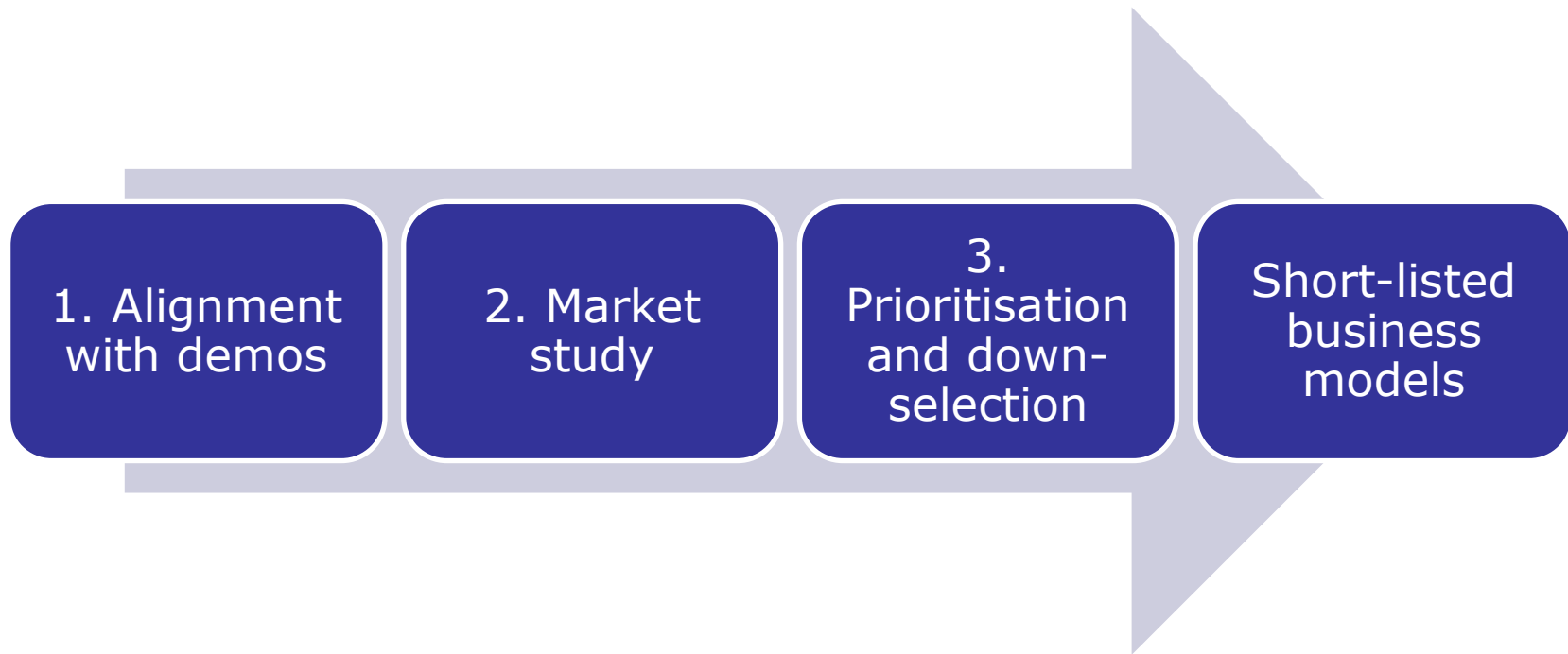


Concept flow

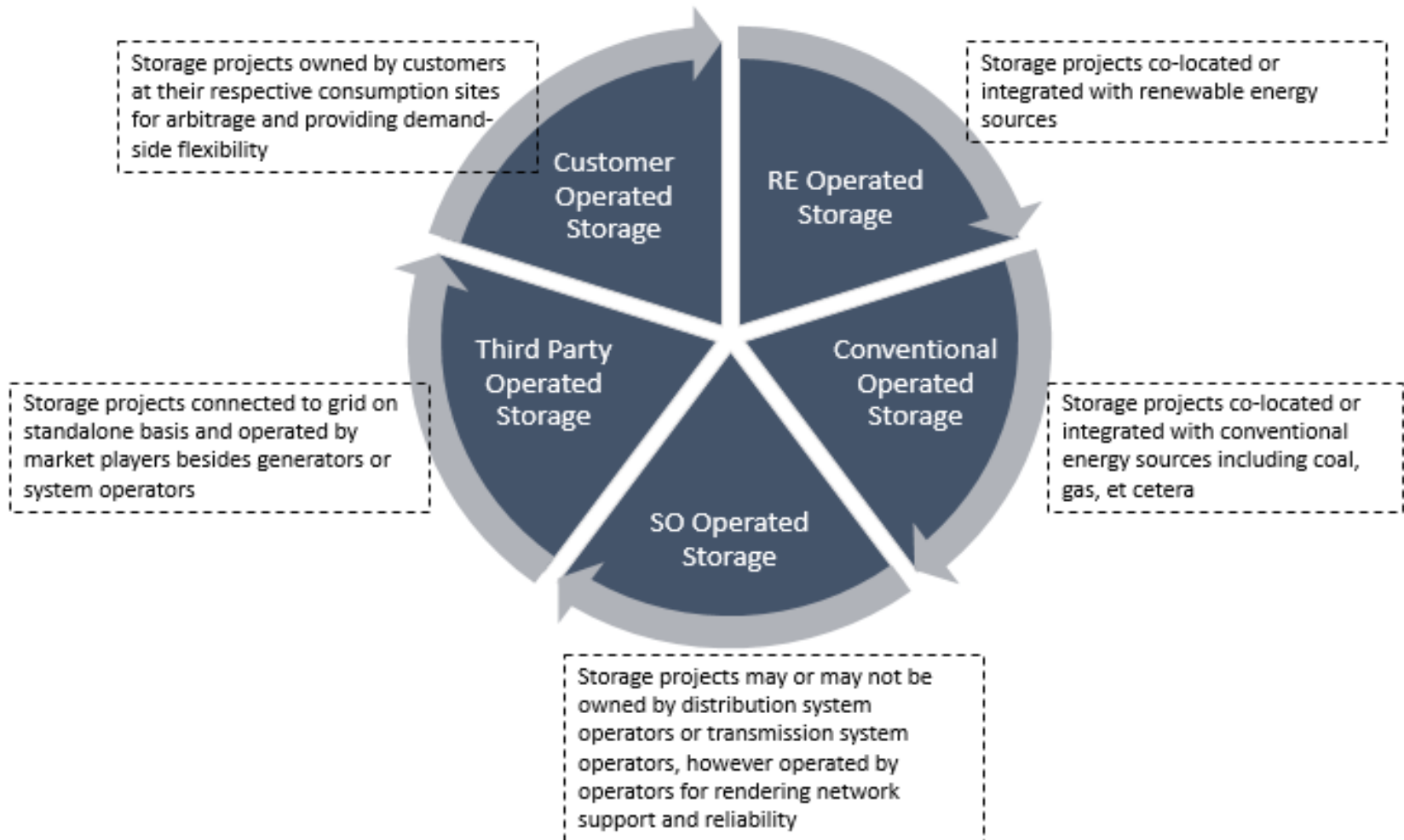


Flexibility Value Chain

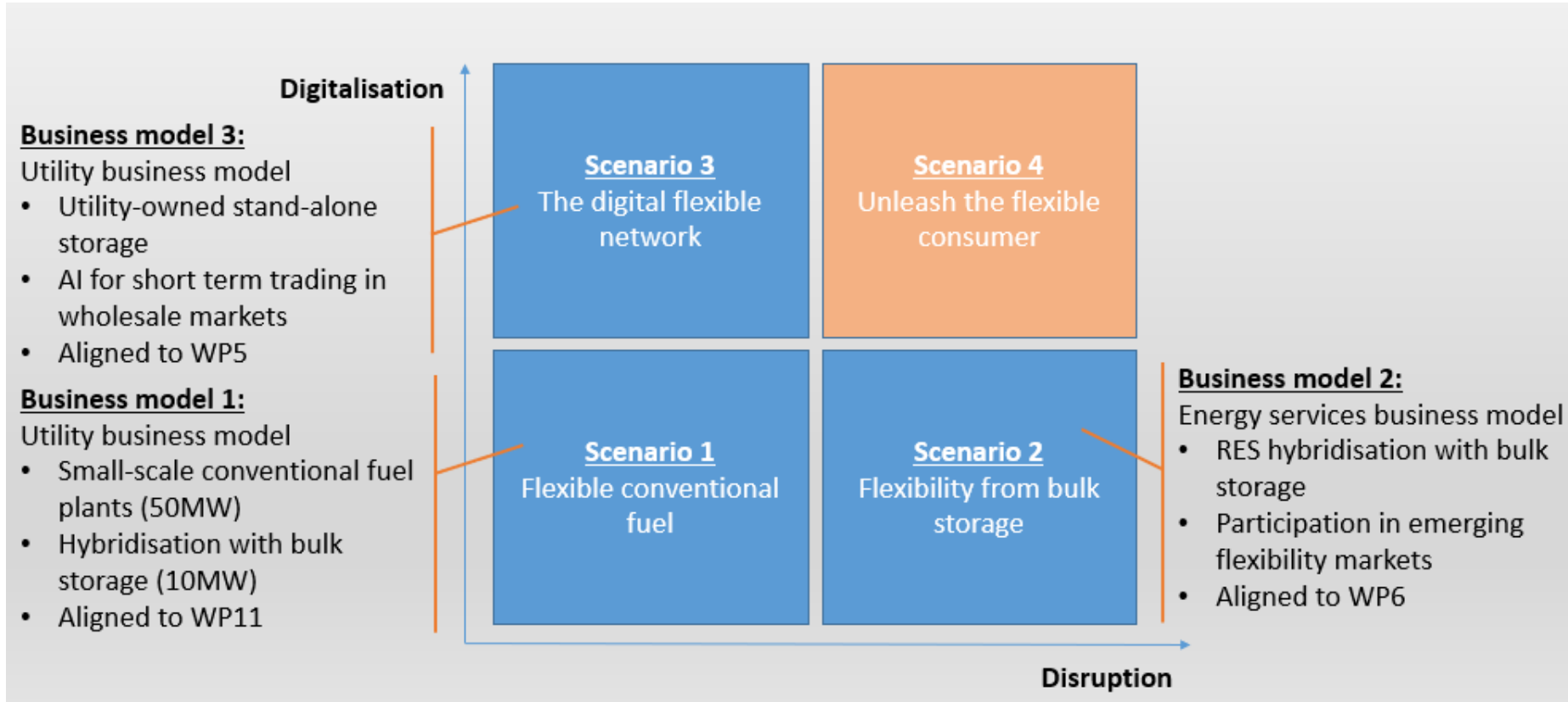




Business Model Classification



Business Models for FLEXITRANSTORE



PANEL DISCUSSION

Panellists

Natalie Samovich
ETIP SNET WG1 Chair



X-FLEX
Chloé Fournely



MERLON
Chrysanthopoulos
Nikolaos



ELAND
Heidi Tuiskula



TRINITY
Álvaro Nofuentes



FLEXISTORE
Thong Vu Van



CoordiNet
Carlos Madina



Scope of the Session

- *Focus presentations and discussion on the results of the projects, in line of the following panel topics:*

1. *What did you learn from your project, how digitalization could help in implementation?*
2. *What barriers did you face?*
3. *Which solution involving digitalization would you need to overcome them?*
4. *How can /could your **project business models or activities** benefit from digitalization to make the positive business case?*

PANEL Discussion – 1st Question

- What did you learn from your project, how digitalization could help in implementation?

PANEL Discussion – 1st Question

Demonstration scenarios: Digitalisation in implementation

Scenario 1: Network Constraints Management

- check network constraints, - perform day-ahead forecasts, - create flexibility schedule

Scenario 2: Network Constraints Management on Imbalance Detection

- set new operation setpoints, - revise flexibility schedule

Scenario 3: Emergency Islanding

- minimise expected imbalances, -operate BESS/DR accordingly, - update scheduling

Scenario 4: ILES Participation in Ancillary Services

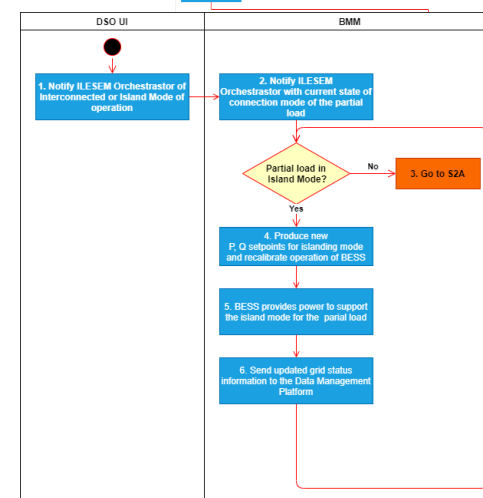
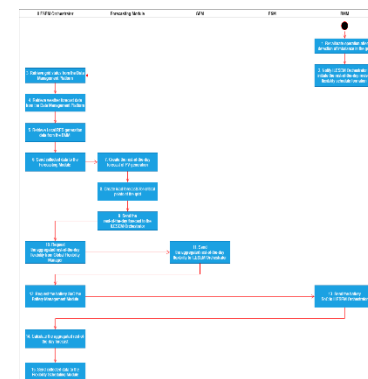
- monitor SoC, - identify balancing commitments, - revise flexibility schedule

Scenario 5: ILES Participation in Wholesale Market

- schedule flexibility according to prices, - maximise surplus energy

Scenario 6: Flexibility Marketplace

- register asset, - pool flexibility, - remunerate



Lessons learned around...

- ✓ Smartification of buildings (facilitator for DSR, privacy issues)
- ✓ Interoperability should be ensured (open standards, OpenADR)
- ✓ Digital tools throughout the hierarchy (data management, information flow)
- ✓ End-user level requirements (user-centric, friendly UI, prosumer app)

PANEL Discussion – 2nd Question

- What barriers did you face?

PANEL Discussion – 2nd Question

Barriers [1] and challenges faced

Regulatory / Legislative:

- Definition of LES
- Hindering distributed generation / storage
- Inefficient network charges

Economic/Market:

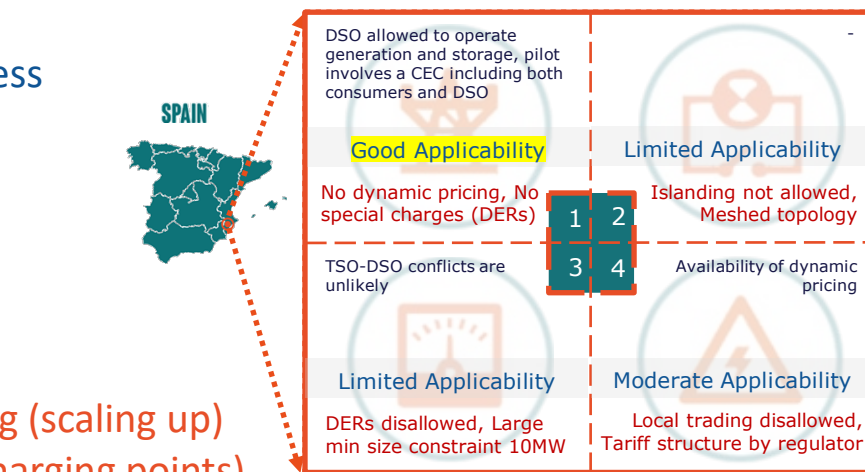
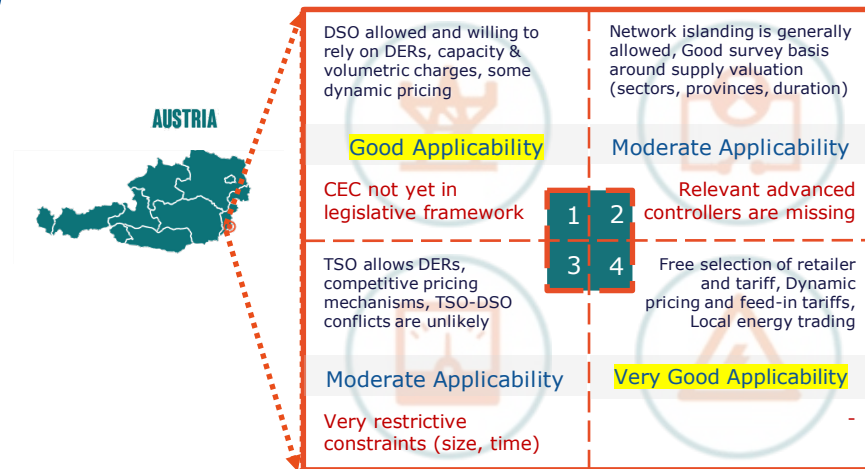
- High capital costs
- Market participation restrictions
- Lacking capacity remuneration schemes

Technical:

- Limited flexibility
- Enabling technologies
- Islanded operation

Social:

- Lack of awareness
- Behavioural barriers



On the practical side...

- Privacy / security measures (GDPR)
- Permissions needed for data gathering (scaling up)
- Missing connectivity (e.g. public EV charging points)
- Observability and controllability for islanded operation

[1] Papadaskalopoulos, D., Woolf, M., Chrysanthopoulos, N., Strbac, G., "Business Models and Barriers towards the Development of LES in Europe: Insights from the H2020 MERLON Project", CIRED2021, Geneva, IET, Sep. 2021

PANEL Discussion – 3rd Question

- *Which solution involving digitalization would you need to overcome them?*

PANEL Discussion – 3rd Question



Examples from the MERLON solution

Restrictive constraints on market participation

Optimisation and Management in the Aggregation level

- Virtual Power Plant configurator
- Advanced forecasting and coordination modules
- Local and global flexibility manager
- Flexibility pooling through the marketplace

Neglecting the actual value of flexibility

Optimising the value-stack of flexibility

- MERLON Business Models and potential synergies
- Blockchain-enabled flexibility marketplace

Challenges around enabling technologies

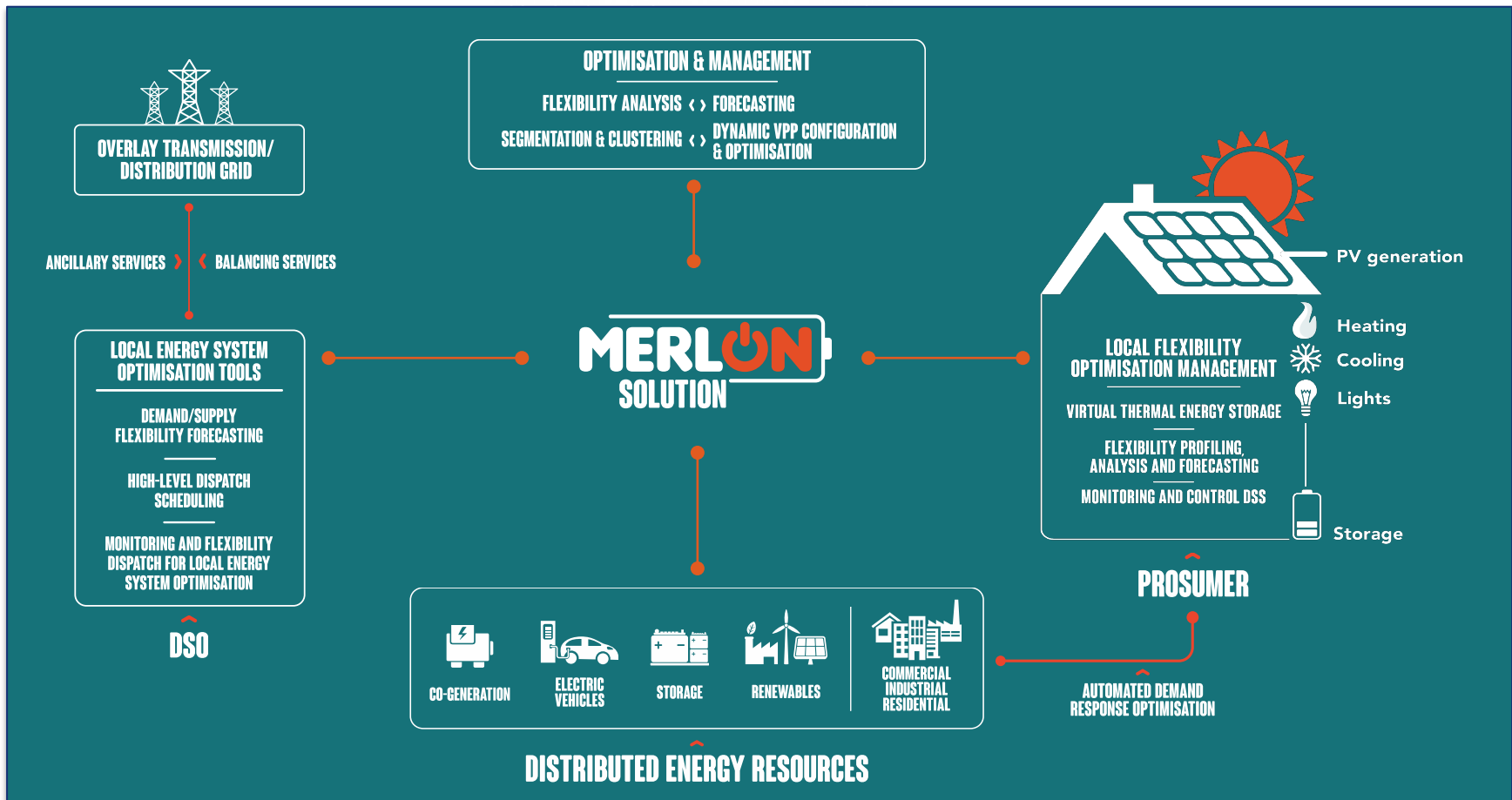
Interoperability and data management

- Common data structures (open standards)
- MERLON architecture
- Common information model

PANEL Discussion – 4th Question

- *How can /could your **project business models or activities** benefit from digitalization to make the positive business case?*

PANEL Discussion – 4th Question



- MERLON Solution is an end-to-end digitalised solution
- Scenarios and use-cases could not be realised without digitalisation
- Smartification and digitalization drives
 - participation, - engagement and - democratization

Conclusions

Tomi Medved - Moderator





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