

ENLIT EUROPE 2023

BEFLEXIBLE- ENFLATE- STREAM



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Cluster projects

HORIZON-CL5-2021-D3-02-06 - Increasing energy system flexibility based on sector-integration services to consumers (that benefits system management by DSOs and TSOs)

STREAM

Streaming flexibility to the power system. Coordinated by Univerza v Ljubljani and Etra as technical coordinator.

ENFLATE

ENabling FLeXibility provision by all Actors and sectors through markets and digital Technologies. Coordinated by NOVA (EL) and UBITECH ENERGY (BE).

BEFLEXIBLE

Boosting engagement to increase flexibility. Coordinated by I-DE (Iberdrola group).

ENLIT 2023- Agenda

TIME	TOPIC	SPEAKERS
5 min	Welcome	Moderator
10 min	Keynote Speech <i>The challenges to unlocking flexibility markets</i>	Ricardo Bessa, INESC TEC
25 min	Pannel session: <ul style="list-style-type: none">- Platforms- Consumer Engagement- Regulation- Services	David Martín, i-DE, BEFLEXIBLE project coordinator Jan Jeriha, University of Ljubljana, STREAM Project Coordinator. Katerina Drivakou, UBITECH ENERGY, ENFLATE project coordinator
10 min	Q&A	Moderator
5 min	Wrap up and conclusions	Moderator

The challenges to unlocking flexibility markets

Keynote Speech

Ricardo Bessa, INESC TEC, Portugal

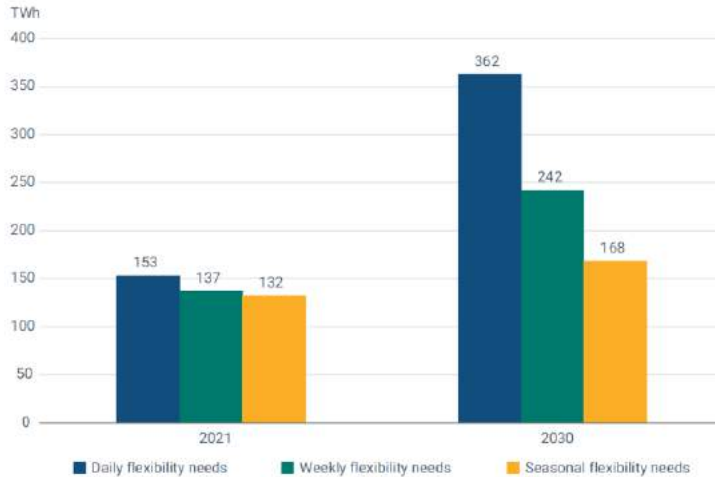


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EEA/ACER report and the EC market reform

Figure 5 Daily, weekly and seasonal flexibility needs in 2021 and 2030 in Europe



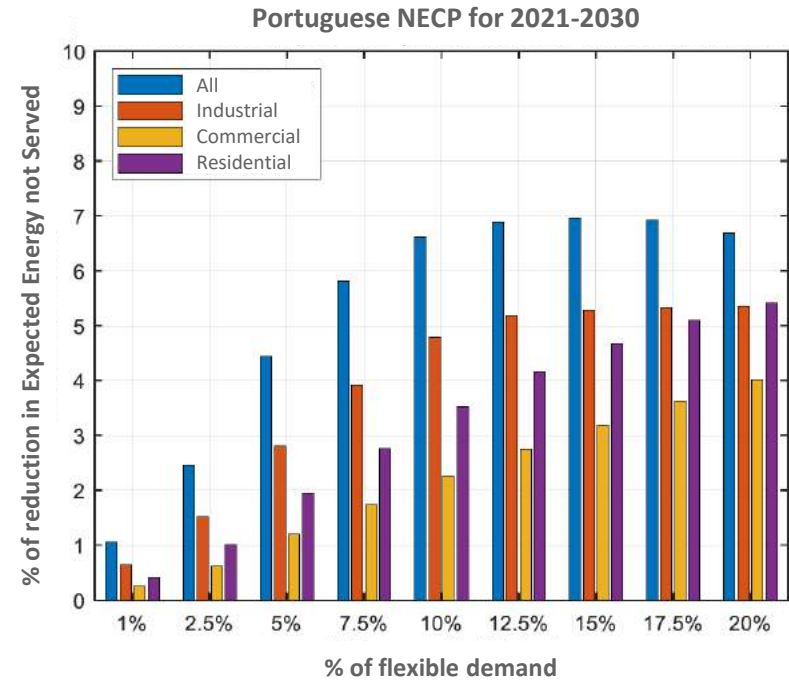
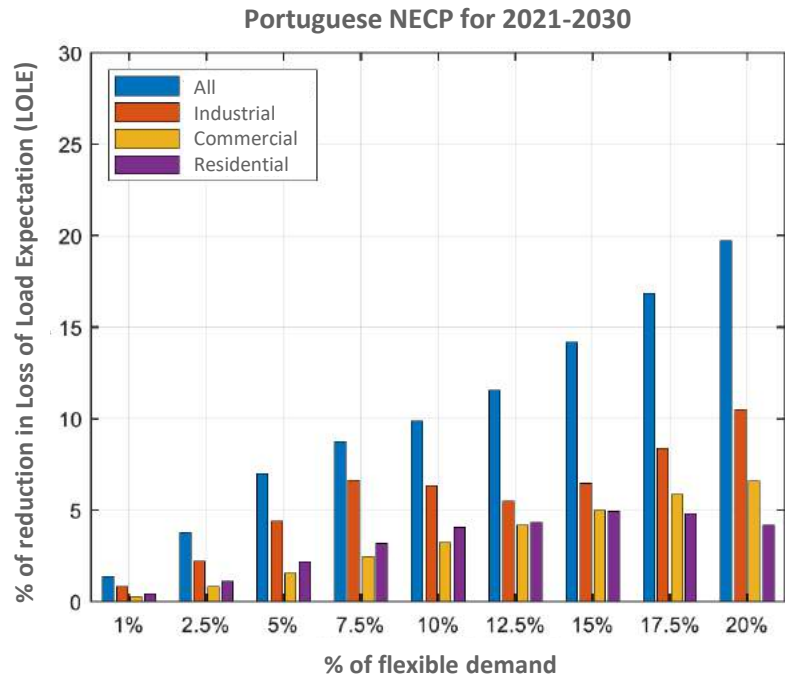
- By 2030, the European system will need **more than twice** the current amount of flexibility resources
- Higher short-term flexibility needs**
- ...and it is just looked at supply-demand balancing**

Source: EEA/ACER Report 09/2023, *Flexibility solutions to support a decarbonised and secure EU electricity system*

EC market design reform and Flexibility






- New peak shaving product:** high prices and security of supply
- Dedicated metering measurement devices** for DR and storage
- New tariff schemes:** the flexibility impact on reducing operational costs is recognized
- Decrease of minimum bid sizes (<100kW):** enable participation of small-scale flexible resources in day-ahead and intraday markets

Demand-side flexibility integration on the security of supply – The case of Portugal



Sequential Monte Carlo methodology described in: Alves, I., Carvalho, L., Peças Lopes, P. (2023). Modeling demand flexibility impact on the long-term adequacy of generation systems. International Journal of Electrical Power & Energy Systems, 151, 109169.

From flexibility products to market platforms

Technical challenge	Flexibility Product	Examples of DSO implementation
Short-term congestion	↑↓ PQ control from DRES, load, storage	
Short-term under/over-voltage	↑↓ PQ control from DRES, load, storage	
Long-term congestion	↓ P control from DRES, load and ↑↓ storage	
Phase balancing	↑↓ P control from DRES, load, storage	
Extend assets lifetime	↓ P control from DRES, load, storage	
Planned maintenance	↓ P control from DRES and load	
Increase resilience (e.g., extreme weather)	↑↓ PQ control from DRES, load and (mobile) storage	



- Mainly platforms for **flexibility procurement**
- Integration of the wholesale market** is fundamental
- Effort in **standardizing flexibility products**
- Heterogenous baseline** methodologies
- Flexibility **selection** mainly based on **price value**
- Flexibility perimeters** are **location-based** (e.g., postal code)

The need for a cross-sector viewpoint in flexibility



Electrical mobility integrated with non-energy products



Green high-performance computing
Computing power ↔ RES



Multi-energy industrial parks



Collective self-consumption with possibly low economic benefits

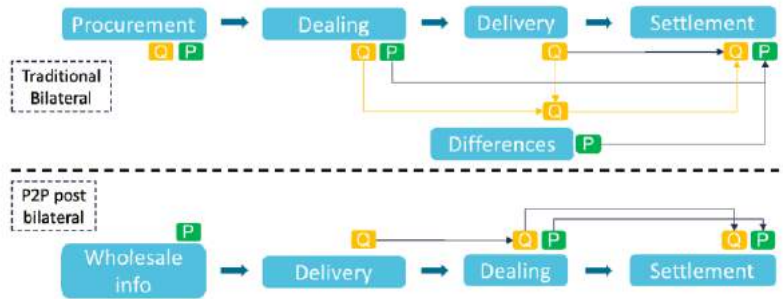
	Cost savings in %		
Settlement Pattern	(i) Building selection - individual approach	(ii) Building selection - EC approach	(iii) Building Pool - EC approach
Multi-apartment building area	8.3%	9.2%	7.4%
Historical area	2.3%	3.3%	3.0%
Rural area	1.9%	6.8%	5.4%
Mixed area	7.7%	8.9%	8.5%

Source: Fina, B., Auer, H., Friedl, W. (2019). Profitability of PV sharing in energy communities: Use cases for different settlement patterns. Energy, 189, 116148

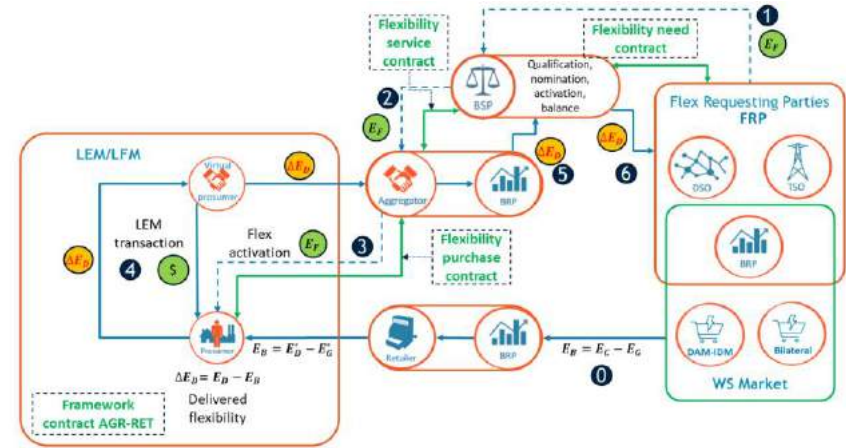


We need additional energy (**flexibility**) and non-energy services to increase incentives for community formation

Is simplicity needed for local flexibility markets?



extension to local flexibility markets



Reference: Mello, J., Villar, J. (2023). Integrating flexibility and energy local markets with wholesale balancing responsibilities in the context of renewable energy communities. Energy, 282, 128853.

- ❑ Integrating local energy markets with wholesale settlement **without requiring peer delivery obligations**
- ❑ **Post-delivery: peers trade an already-known amount of energy**
- ❑ Each prosumer **bids are based on the resources' opportunity costs**, i.e., surplus and supply prices contracted with their retailer

Reference: Mello, J., Villar, J., Bessa, R. J., Lopes, M., Martins, J., Pinto, M. (2020). Power-to-Peer: a blockchain P2P post-delivery bilateral local energy market. EEM 2020. IEEE.

Should we also rethink control rooms because of flexibility?

Growing (fragmented?) data & controllable resources



Increase in supervision needs



New tools for flexibility procurement & activation



No more tools please!

Procure and activate flexibility in the short-term horizon



How to rank different flexibility options?

Panel Session

David Martín, i-DE, BEFLEXIBLE project coordinator

Jan Jeriha, University of Ljubljana, STREAM Project Coordinator.

Katerina Drivakou, UBITECH ENERGY, ENFLATE project coordinator



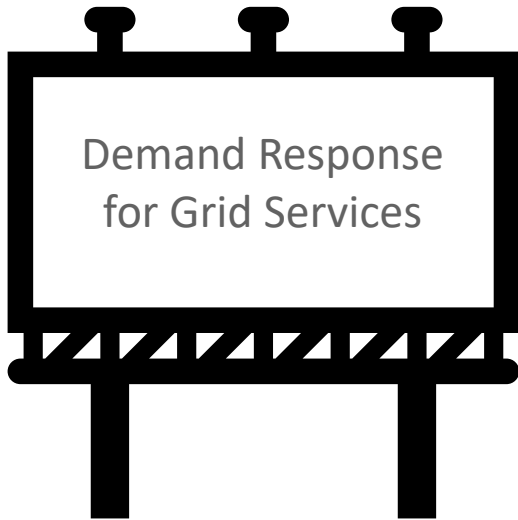
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CUSTOMER ENGAGEMENT



Why would I provide services to the network when it is the network that has to provide the service to me?

They still haven't understood...



Smart Customers are connected to the Smart Grids

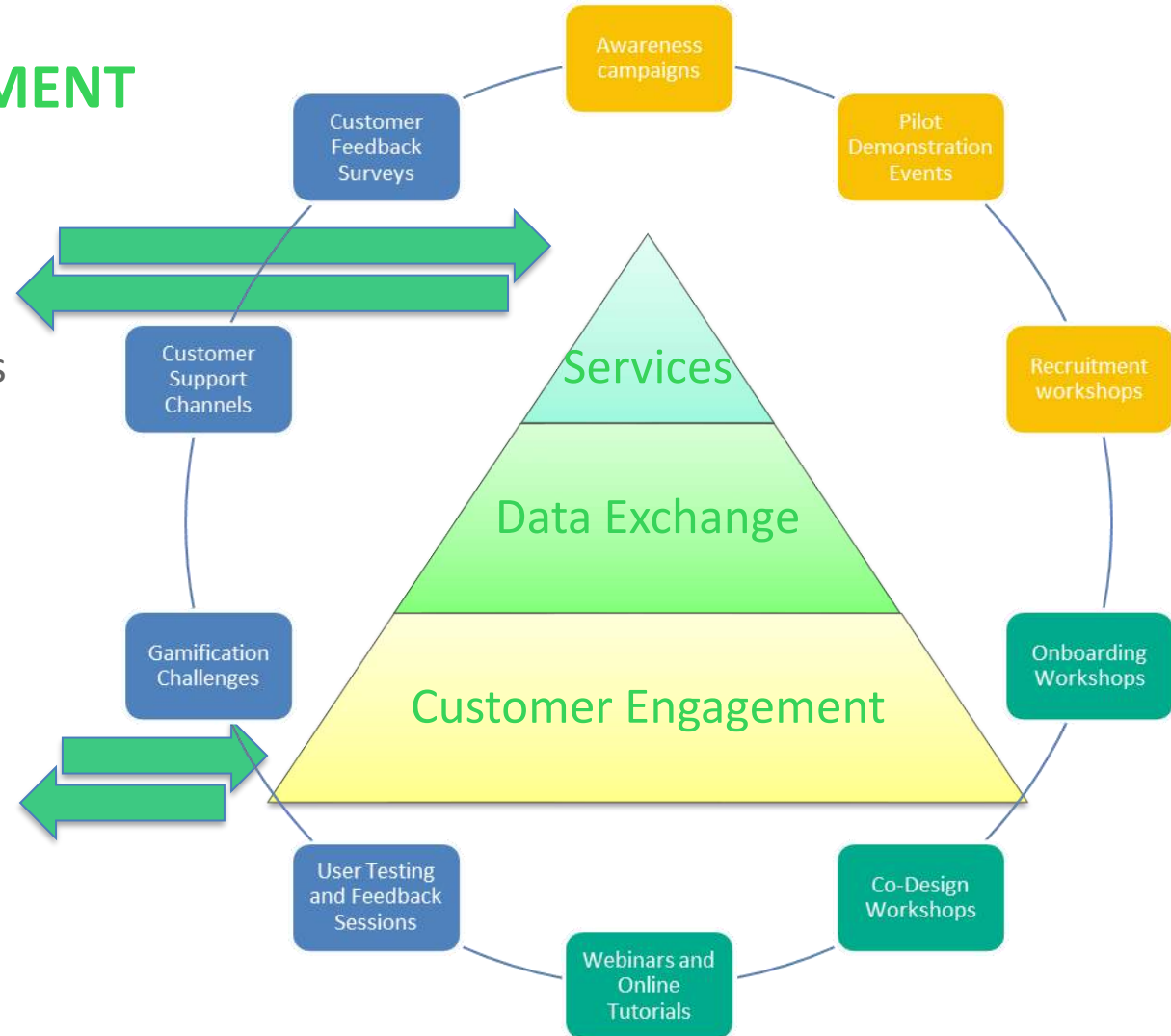
CUSTOMER ENGAGEMENT

System operators

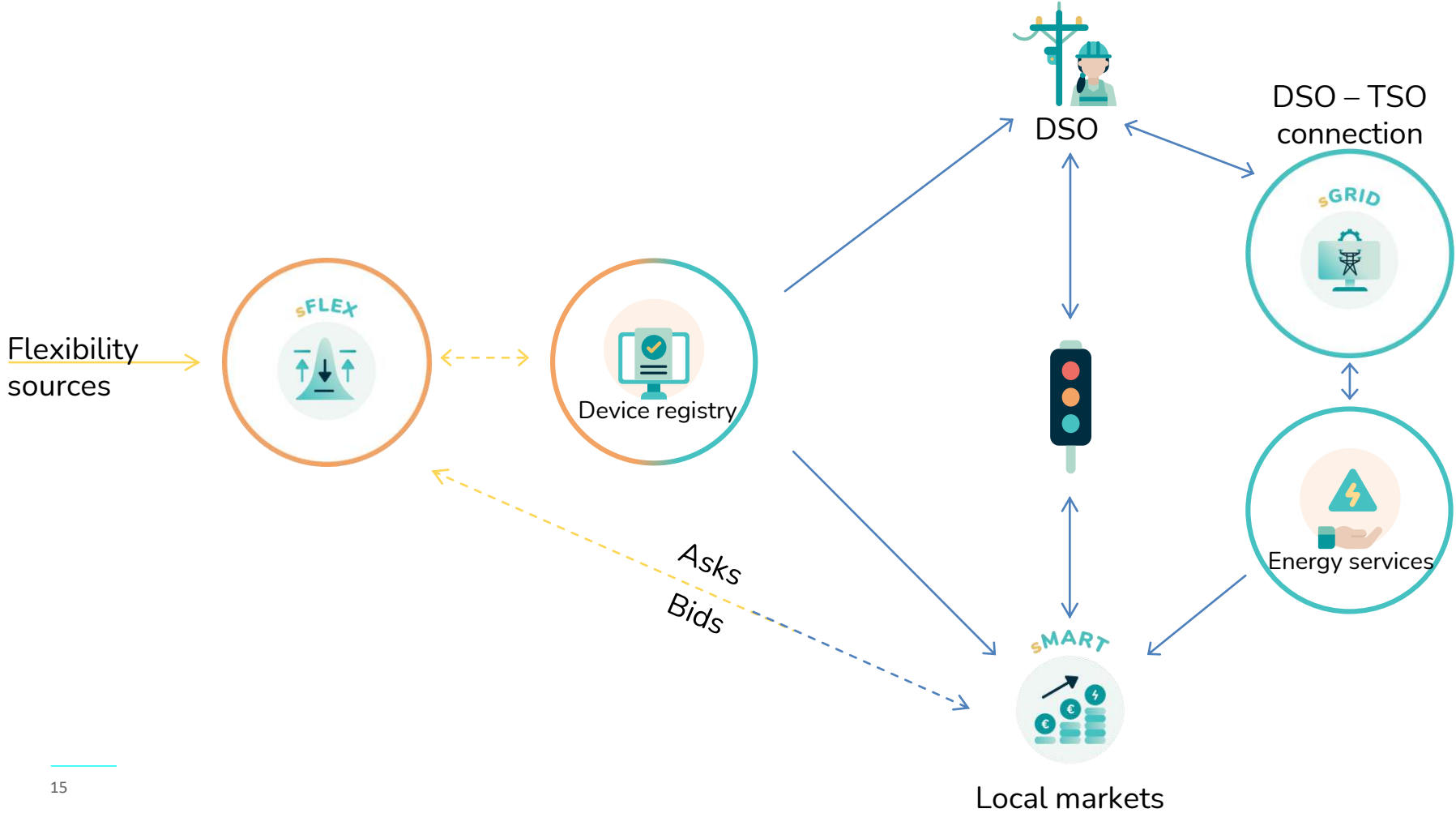
- Incentives and Benefits
- Grid Efficiency
- Operation and planning tools

Customers

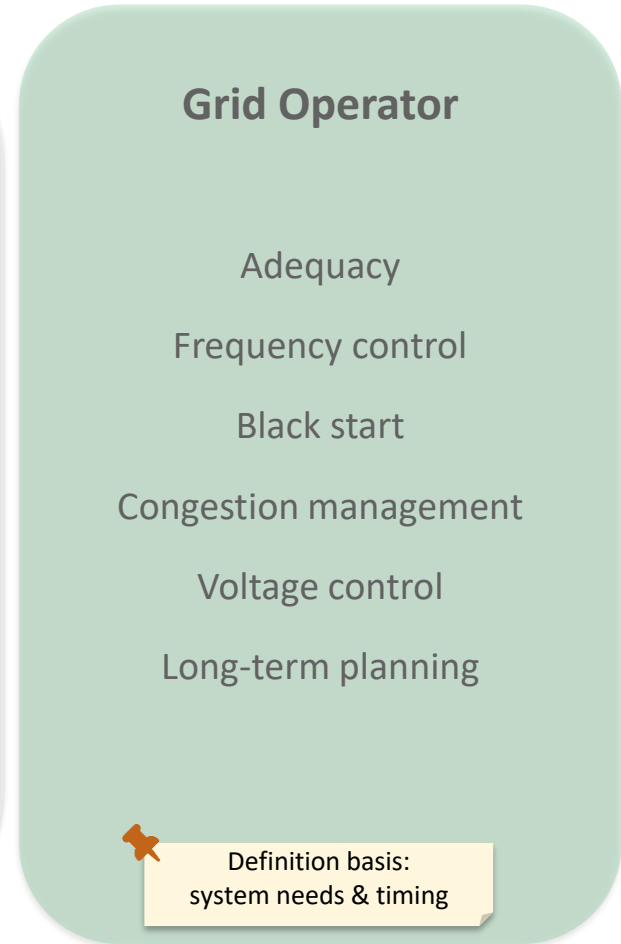
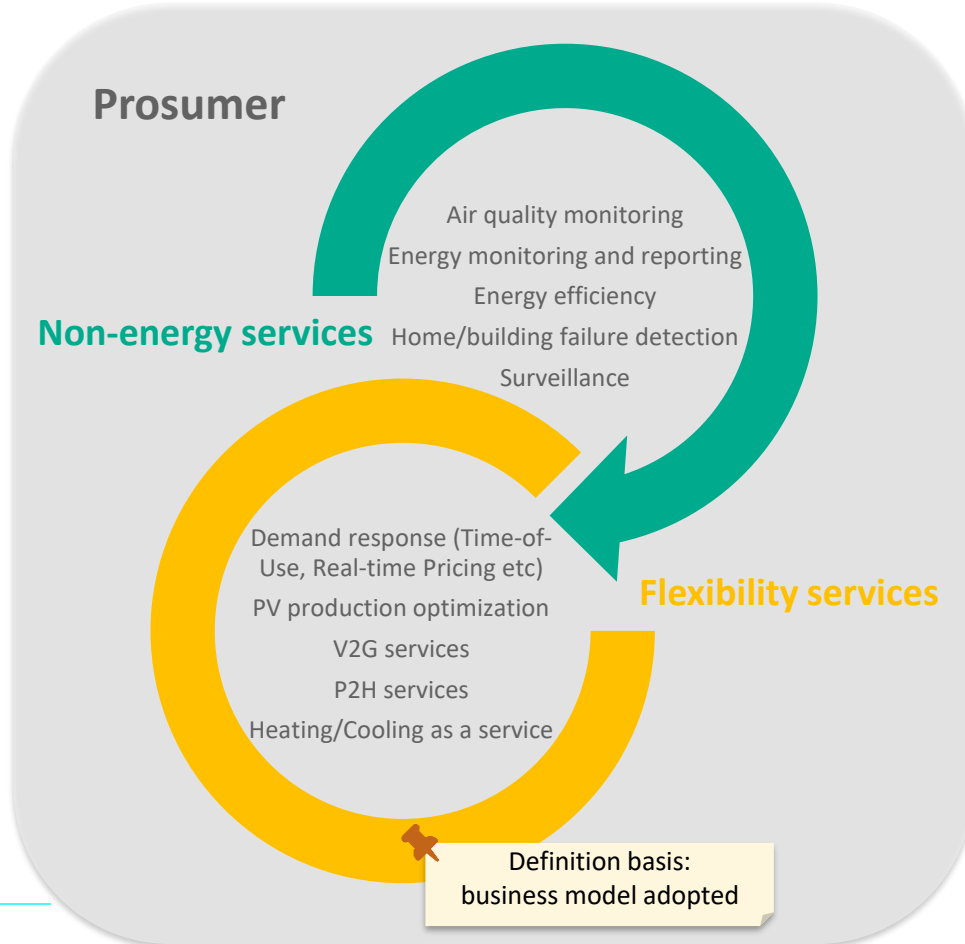
- Incentives and Benefits
- Education and Awareness
- Continuous Feedback and Support
- Evaluation and Refinement



PLATFORMS

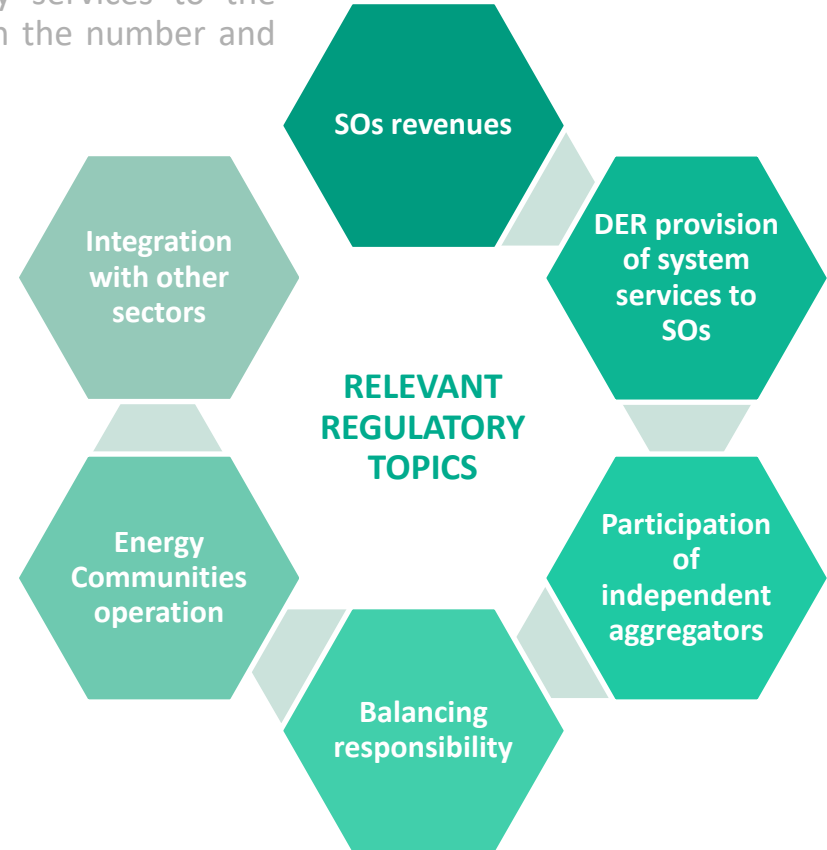
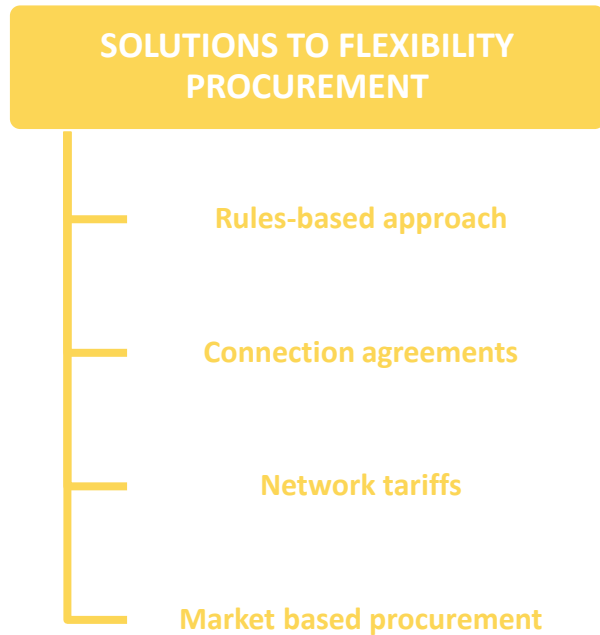


SERVICES



REGULATION

From a regulatory perspective, integrating the flexibility services to the current energy system is a quite challenging process given the number and complexity of the topics needed to be addressed.



Q&A

David Martín, i-DE, BEFLEXIBLE project coordinator

Jan Jeriha, University of Ljubljana, STREAM Project Coordinator.

Katerina Drivakou, UBITECH ENERGY, ENFLATE project coordinator



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Wrap up and conclusions

Ricardo Bessa, INESC TEC



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Main takeaways

- **Long-term customer engagement in flexibility markets remains a challenge**
 - Combination of monetary and non-monetary incentives can unlock flexibility
 - Need for more information to consumers (energy and non-energy services) and increased energy literacy
- **Low voltage grids remain a bottleneck for decarbonization.** New planning and operational paradigms are needed
- **Interoperability between platforms, systems, and services is fundamental** for fast and cost-effective flexibility exploitation
- **Regulation is becoming complex to accommodate new DER, roles, and business models**
 - Cross-border harmonization
 - Explicit integration of flexibility in security of supply assessment
 - Cost-reflective network charges