EU-SysFlex

FLEXIBILITY MARKETS OF THE FUTURE AND TSO-DSO COOPERATION

SESSION 1: WHAT ARE THE PRODUCTS IN YOUR MARKET

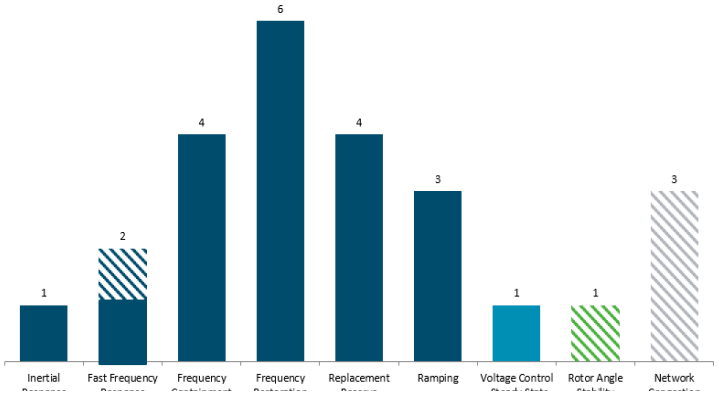
Helena Gerard
Senior Researcher
helena.gerard@energyville.be

How do you define the flexibility you procure? (e.g. do you define a set of product requirements, or a set of key parameters, or asset-specific products)?

EU-Sysflex developed **2 approaches**:

1. A generic suite of innovative system services for the future, including detailed product specifications -> supporting **the process of harmonisation**

Based on the 'general' system needs



OVERVIEW OF GENERIC SUITE OF PRODUCTS FOR FUTURE SYSTEM SERVICES

Parameter	Description	Options/Examples
Type of product	This refers to the high level need for each product	Frequency control, voltage control, congestion management.
Type of event	This relates to the type of event which initiates or requires use of the product to mitigate an issue and the associated scarcity or issue which is resolved due to this product. This will be useful and important information when working with WP2.	Under-frequency following loss of a generator, congestion, system fault, voltage deviation etc.
Scarcity or scarcities that are mitigated	This refers to a specific scarcity or scarcities, that a product can be used to mitigate.	Falling inertia levels, rotor angle instability, congestion etc.
The activation principle	This refers to the manner in which the product is activated.	Inherent response, automatic response or manual activation
Full activation time of the product:	This refers to the period between the event/disturbance and the time the product is fully available/deployed.	2 seconds, 30 second, 90 seconds, 5 minutes, 15 minutes etc.
Required duration of the response	This refers to the time over which the product response must be sustained.	300ms, 10 seconds, 15 minutes, 2 hours, 8 hours etc.
Recovery Period	This refers to the time between the end of the response and the time when the resource can once again provide a response, during which the product is not available. This is usually not applicable for RES and conventional units, may be applied to DR, batteries and other energy limited resources.	10 minutes, 90 minutes, 12 hours etc.
Status of the Product:	This refers to whether the product currently exists, if it is planned for the coming years or whether it is a hypothetical product currently being researched and explored.	No, yes, under trial, an EU-SysFlex demonstration.
Potential procurement options	This refers to the ways in which a product could be procured.	Grid code mandate, market mechanisms, regulated arrangements.
Remuneration Mechanism	How the product is remunerated, if it is an existing product.	Pay-as-bid, pay-as-clear, fixed rate, not remunerated

Disclaimer: This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 773505.

EU-SysFlex

How do you define the flexibility you procure? (e.g. do you define a set of product requirements, or a set of key parameters, or asset-specific products)? (2)

EU-Sysflex developed **2 approaches**:

2. **The 'supermarket concept':**

- Flexibility service providers provide the specifications of a pool of flexibility
- System operators 'shop' on a daily basis to match the actual system needs with the provided offers

Based on the 'characteristics of the flexibility source'

Based on the 'daily system needs'

- (+) Facilitates the process for flexibility providers
- (+) Increases options and liquidity of flexibility offers for system operators
- (-) Increases complexity of decision making by system operators
- (-) Lowers transparency in market functioning for flexibility providers

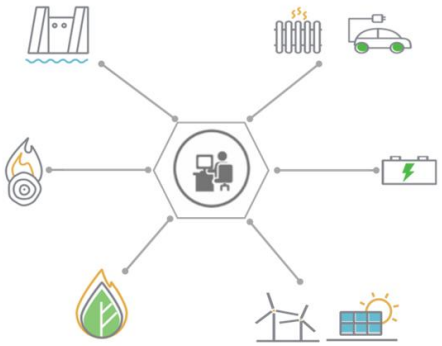
Disclaimer: This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 773505.

EU-SysFlex

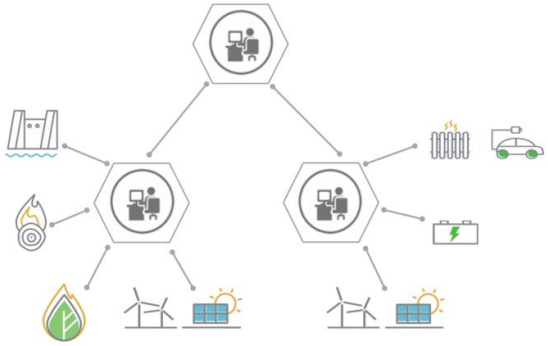
Are the defined services/products/parameters used in your project adapted to the specific characteristics of your network or can they be universally used?

- The two approaches (see previous slides) are both **independent from the characteristics of the network**

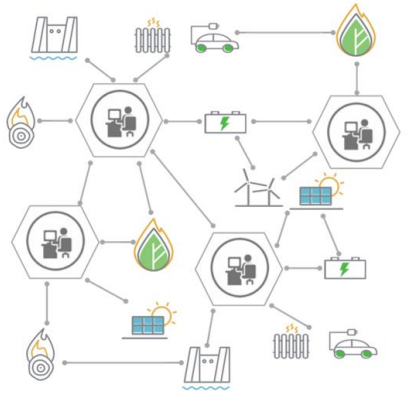
- Dependent on the characteristics of the network,
  - Some services become more/less relevant (e.g. congestion)
  - Some market concepts become more/less relevant
  - The process of integration of grid constraints will be different



Centralized



Decentralized



Distributed

Disclaimer: This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 773505.

EU-SysFlex

Do you use a contract for consumers/assets/appliances to participate in the flexibility market? (Is it a standardized contract? Do you pay for the capacity and/or the actual use of the flexibility? Do you allow free bids (without availability contract)?)

- EU-Sysflex focuses on future system needs + necessary characteristics of flexibility to cover these future system needs
- **Key principle** for the design of system services: **technology neutrality**
- Dependent on the service, it is a **'capacity' product,** an **'energy-only' product or both**
- For energy-only products, we allow free bids

Example: product for congestion management

	Long-term product	Slow Product	Fast Product
Brief Description	Congestion product with long lead time for dealing with regular or permanent congestion	Congestion product for dealing with predictable/forecastable congestion	Emergency congestion management product
Product type	Capacity product and energy product	Capacity product and/or energy product	Capacity product and/or energy product
Event/Situation resulting in need for product/ Origin of congestion	Used to mitigate structural congestion, relied upon as part of the planning process, used as an alternative to network upgrades - changes in demand levels, increased RES penetration.	Used to deal with congestions caused by high-levels of variable renewable generation output. Used to minimise curtailment.	Used to mitigate congestions that are caused by faults and associated remedial actions
System situation type	Normal operation (remedial actions)	Normal operation with high levels of variable renewable generation (remedial actions)	Post-fault/post-contingency
Activation Time	Within long-term thermal limits	Not of utmost importance as activation is part of a planned process where congestion is forecasted.	On the order of a few minutes as the time is related to thermal line limits (duration of Temporary Admissible Transmission Loading).
Procurement Timeframe	In line with grid investment horizon	Operational planning timeframe	Close to real-time
Related Balancing Product	RR or perhaps something similar to capacity adequacy procurement	mFRR	aFRR or perhaps faster frequency response products

Disclaimer: This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 773505.

EU-SysFlex

Is grid and/or product prequalification organized? If so, how? (Do you require a type of certification of a consumer appliance or asset before participation in the flexibility market is possible? If yes, what and why?)

- Three levels of prequalification identified:
  1. **Market prequalification:** compliance with the financial and IT requirements necessary to participate in a flexibility market (at the level of the Flexibility Service Provider)
  2. **Technical prequalification:** compliance with the technical requirements for the product procured (at the level of the Flexibility Unit)
  3. **System prequalification (optional):** verification if the provision of flexibility from a specific location is not violating grid constraints (= STATIC)

  ➢ Alternatively, grid constraints can be included in the procurement phase (clearing)

  - **Option 1**: Clearing where all **grid information is included in the market optimization/bid selection** algorithm -> risk of complexity
  - **Option 2**: Clearing where **partial grid data** (representative grid model for one topology) **is included in the market optimization/clearing** algorithm -> possible need for a ex post check
  - **Option 3**: Clearing happens without grid information -> outcome is sent to different system operators who define for each bid the relevant **bid limitations (alternatively – this happens upfront)** -> information sent back market operator

Disclaimer: This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 773505.

EU-SysFlex

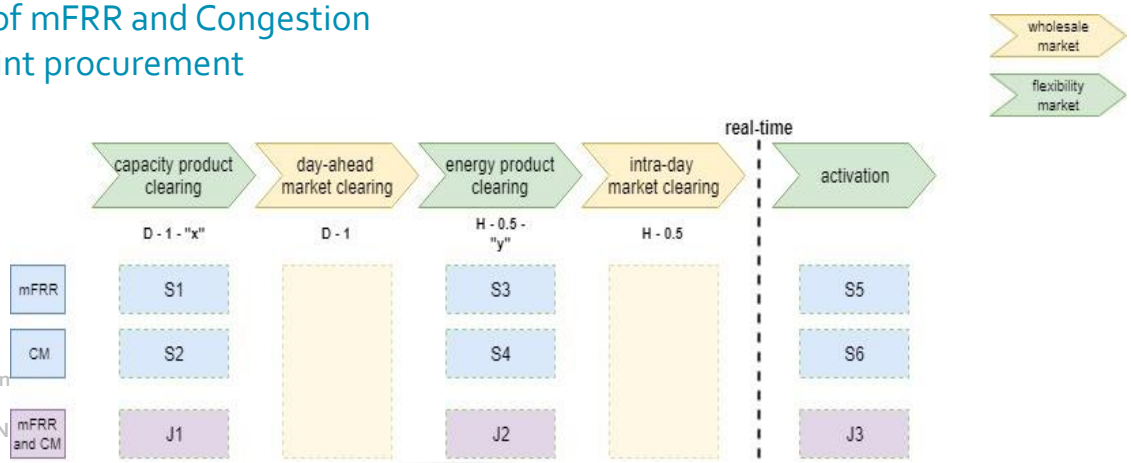
Do you combine several products/services in one common flexibility market (joint procurement)? If so, which services/products can be combined and what are the benefits and potential pitfalls?

- General **framework** of options for **joint procurement**

- EU-Sysflex focuses **on one common market place, for all frequency-related products and congestion management products, jointly procured by TSO and DSO**

  First step is the combination of **mFRR** with **congestion management within the distribution grid**

- **Challenges:**
  - ✓ Joint procurement – does it mean 'joint market place' - 'joint bidding' – 'joint clearing'?
  - ✓ Joint procurement only for 'energy' of also for 'capacity'
  - ✓ Joint 'procurement' or also 'joint activation'?
  - ✓ How to integrate 'pricing' for pre-procured products
  - ✓ How to overcome different duration of mFRR and Congestion
  - ✓ What is the detailed time-frame of joint procurement



Disclaimer: This project has received funding from European Union's Horizon 2020 research and innovation programme under grant agreement N

Follow us

eusysflex.com

@eusysflex

@eusysflex

@eusysflex

#eusysflex

Disclaimer: This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 773505.

EU-SysFlex