



A novel smart grid architecture that facilitates high-RES penetration through innovative markets towards efficient interaction between advanced electricity grid management and intelligent stakeholders

Final e-Demo Event

What is a flexibility market?

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NODES (*Lysaker, Norway*)



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- ▶ *Gesa has a PhD in Marine Geology at the CNRS/University of Bordeaux. She has been working at Vattenfall Energy Trading and Meteologica (Power Production Forecasting).*
- ▶ *Gesa joined NODES in January 2020.*

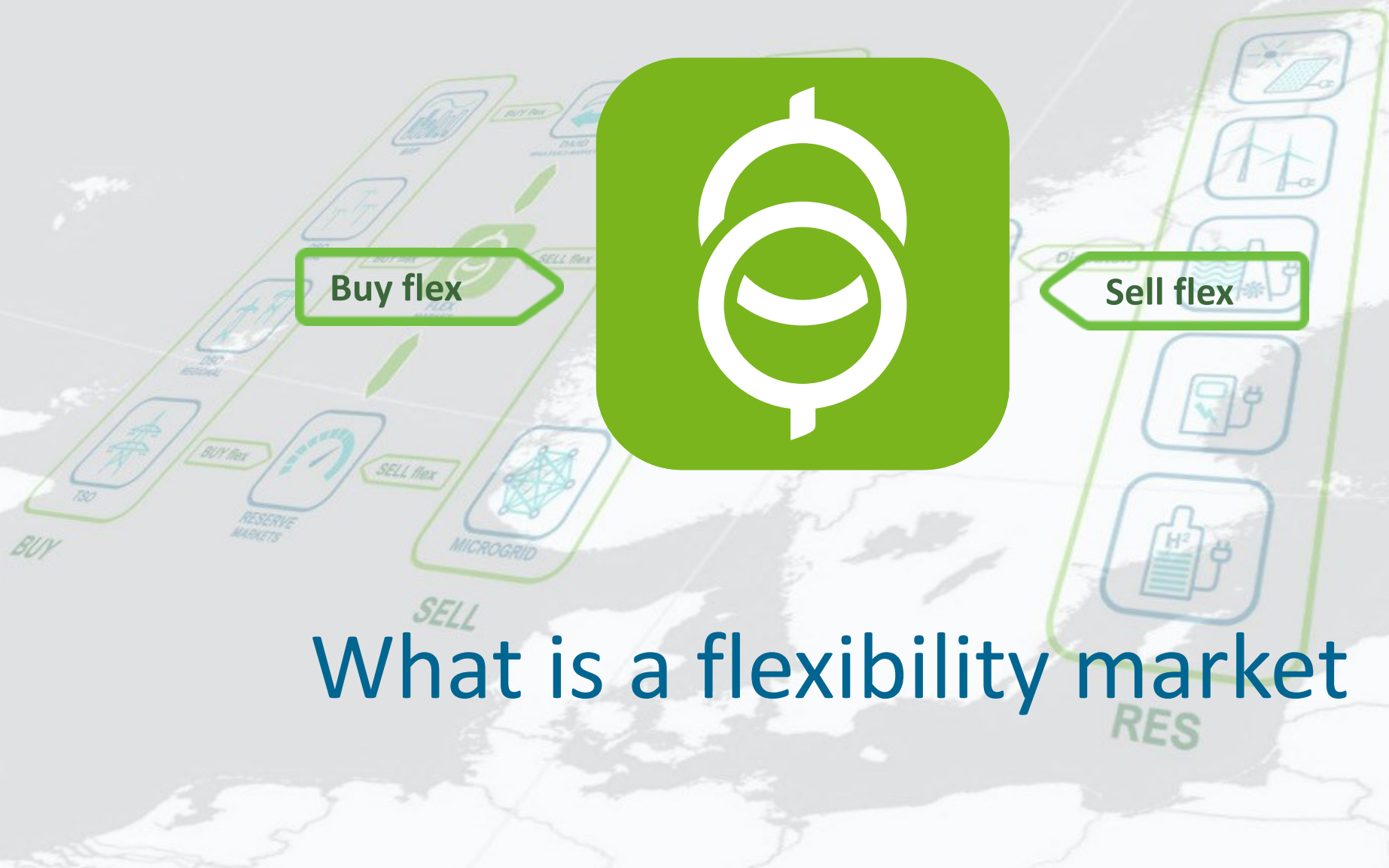




Buy flex

Sell flex

What is a flexibility market



Clean Energy Package

- the framework for change

- ▶ Enhanced role of the DSO, particularly in procurement of ancillary services, **flexibility**.....
- ▶ **Equal treatment** of generation, demand side response and storage
- ▶ Aggregation permitted
- ▶ Market based prices



Flexibility markets help energy networks to monitor energy flows and create market signals to motivate changes in energy supply and demand, integrating smart meters, smart appliances, renewable energy resources and energy efficient resources accordingly. The Commission promotes flexibility markets as they can contribute and help the EU becoming a climate-neutral continent by 2050.

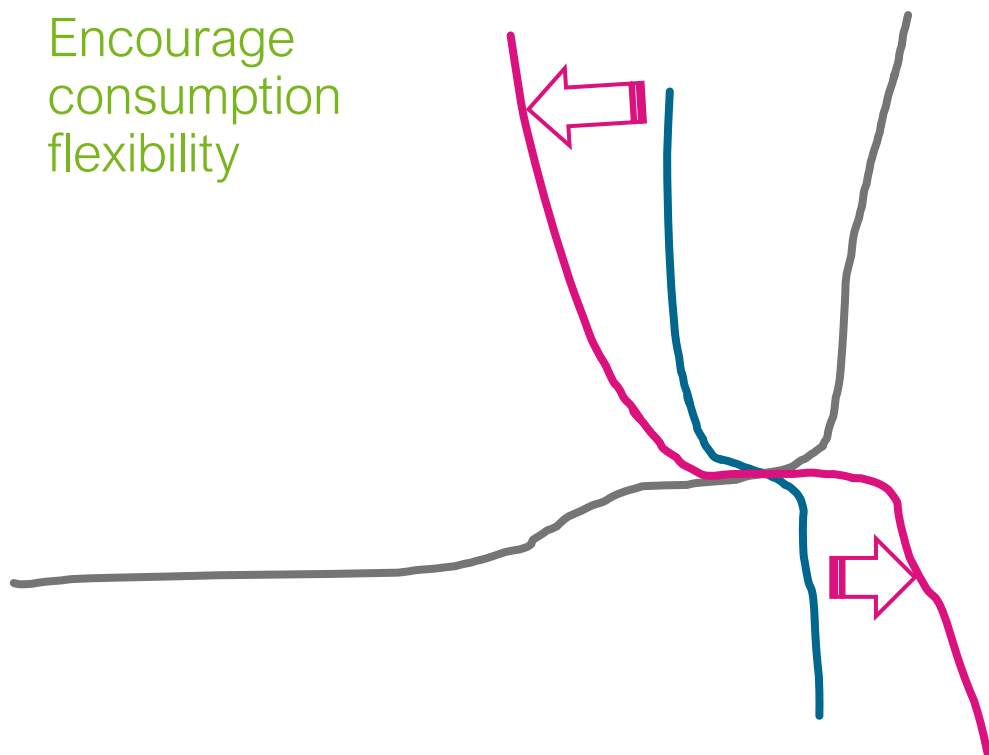
What is flexibility?

Flexibility in the electricity sector means is the ability to purposely deviate from a planned / normal generation or consumption pattern. This could be in response to a price signal, the grid frequency, or an activation signal from the grid operator.

- ▶ Production flexibility: increase or decrease the production of power plants
- ▶ Consumption flexibility = Demand Response: temporary reduction or increase of the consumption of an industrial process, electrolysers, a household, etc
- ▶ Storage flexibility: pumped hydropower plants or storage units

Consumption must follow production.....

Encourage consumption flexibility



Consumers need price signals & tools

In order to optimise:

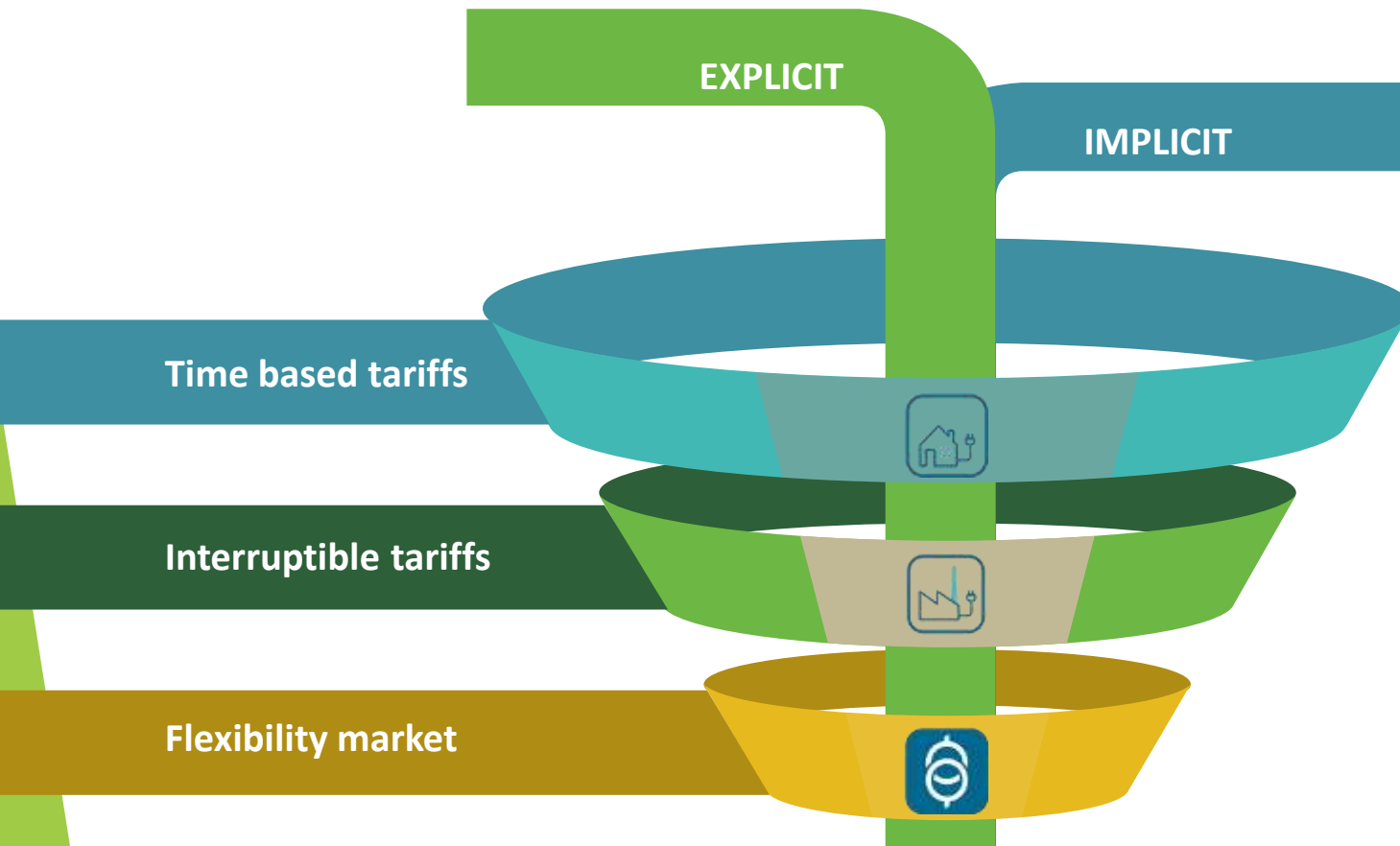
Behind the meter:

- ⌚ Energy efficiency
- ⌚ Move consumption to cheaper time slots
- ⌚ Reduce grid fees

Market based:

- ⌚ Generate revenue of explicit flexibility

Why market-based flexibility?



Implicit flexibility can be released by imposing a time based or dynamic tariff scheme on the customer. This will “hurt” all, as the consumer cannot avoid the higher tariff.

Explicit flexibility can be released by;

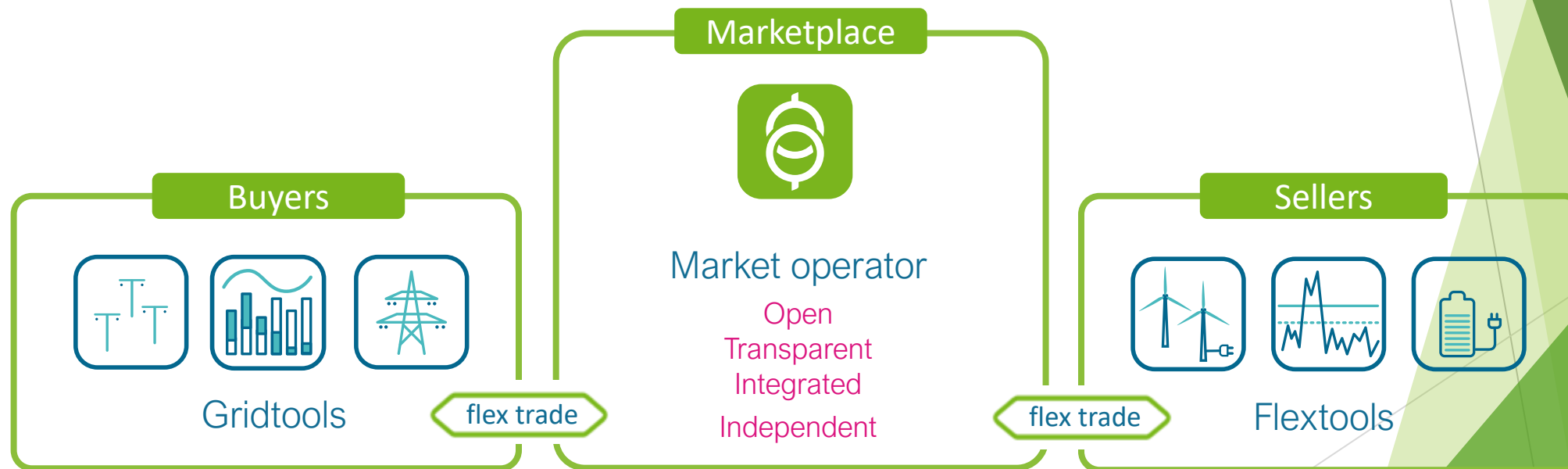
- discount schemes (**interruptible tariffs**) towards customers which are willing to be interrupted.
- Market-based solution will allow the grid operator to secure flexibility for future activation, or in the intraday time frame.

Market-based solution unlocks the true value of flexibility!

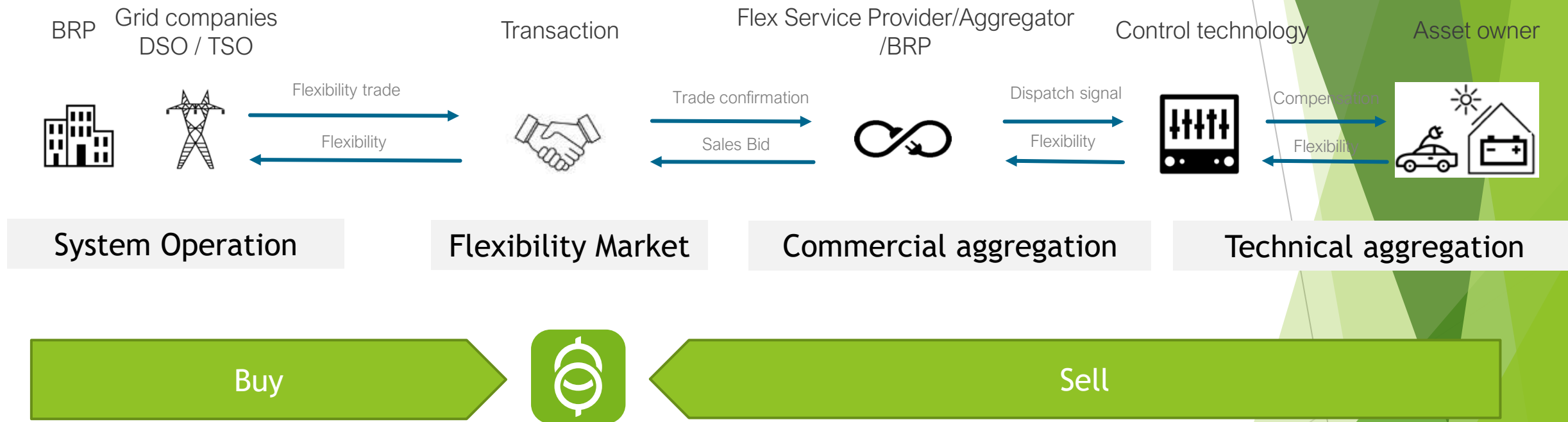
Role of a market

- ▶ A market is a place where **buyers and sellers can meet** to facilitate the exchange or transaction of goods and services.
- ▶ Markets **establish the prices** of goods and services that are determined by **supply and demand**.

www.investopedia.com



New flexibility value chain

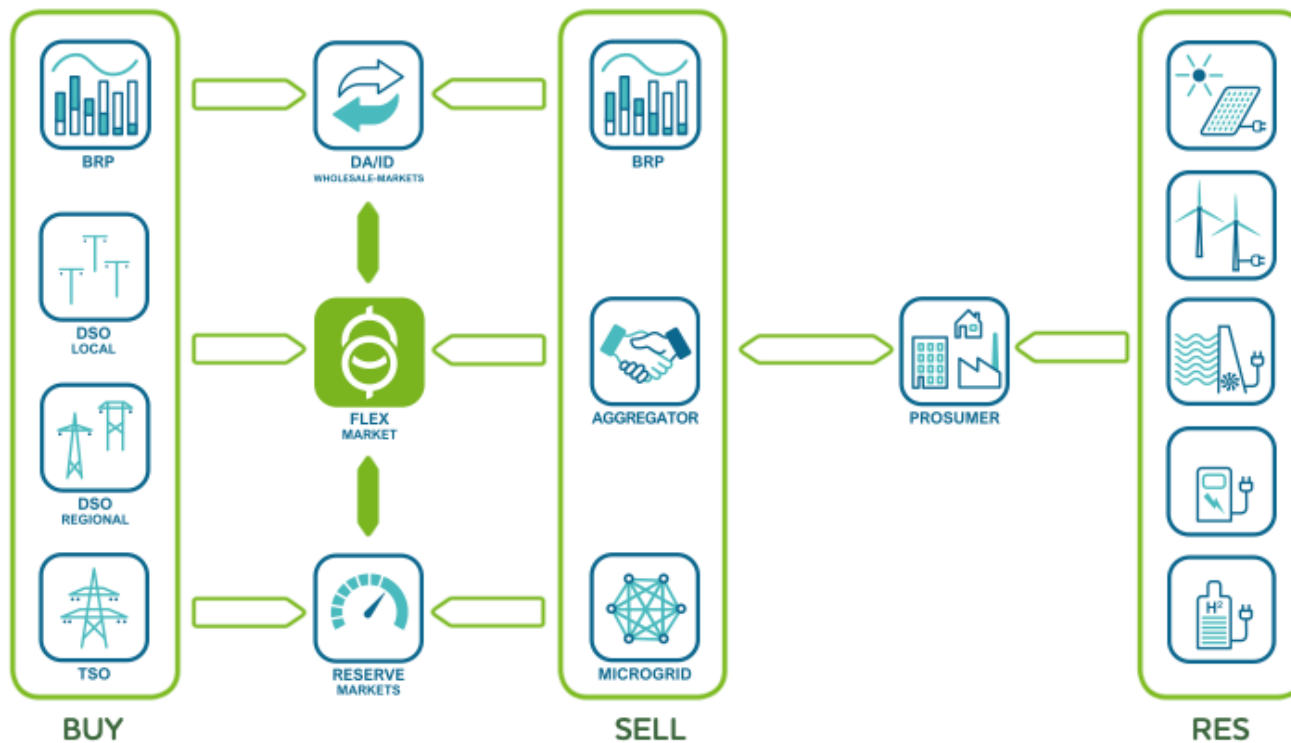


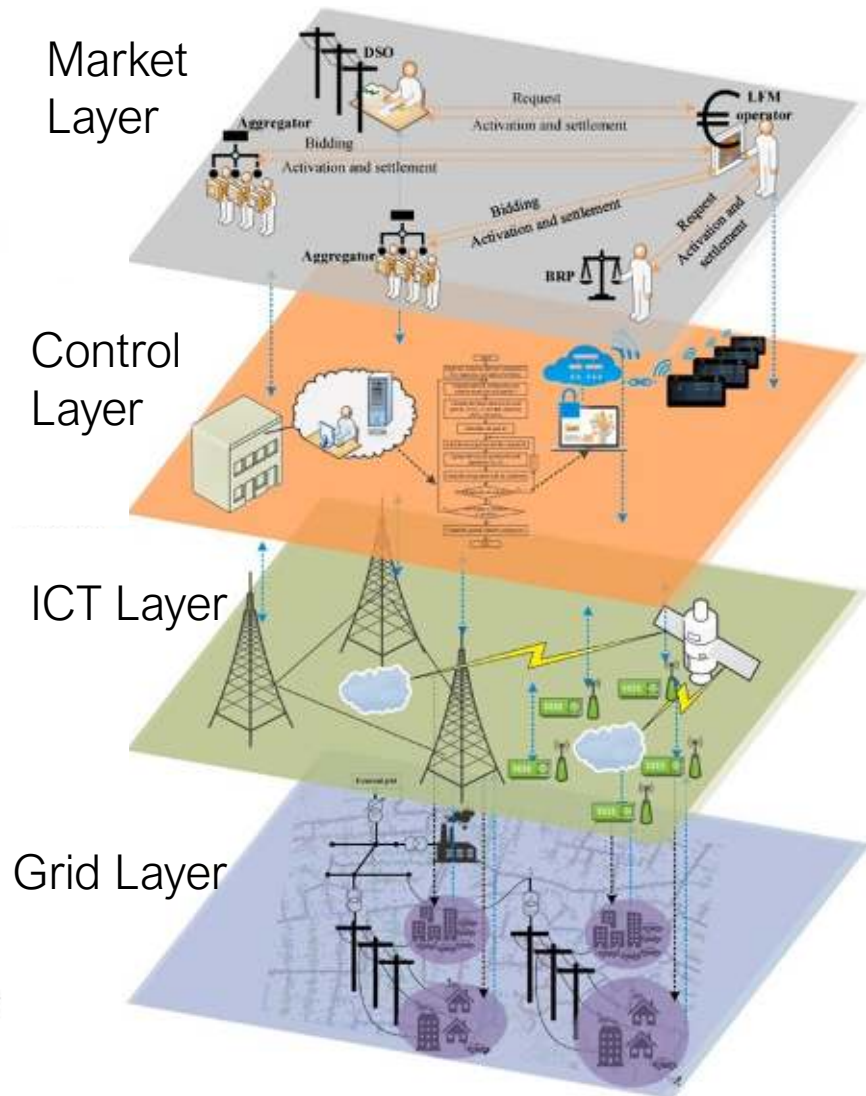
- A flexibility market platform is an IT platform where the trading, dispatch and / or settlement of flexibility is facilitated or coordinated

Flexibility market design



Integrated market design





Need for role & responsibility definition
& coordination principles

- ▶ Local Flexibility Market
- ▶ DSO/TSO
- ▶ FSP/Aggregator
- ▶ BRP
- ▶ TSO – DSO coordination for grid management

Flexibility markets can...

- ▶ Facilitate access to DRES and may help to increase the share of renewable energies
- ▶ Reduce grid investments or bridge the time period of grid amplification
- ▶ Create financial revenue and reduce costs (CAPEX/OPEX, Social Welfare)
- ▶ Enable a transparent price formation
- ▶ Non-discriminatory towards technologies or asset size

Need for

- ▶ Clear role & responsibilities
- ▶ Determination of coordination principles between market participants (DSO/TSO)
- ▶ Market Rules
- ▶ Monitoring and Validation & Settlement



THANK YOU !!

Questions?

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Visit our website!

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

YouTube channel:

<https://www.youtube.com/channel/UCepdrFhiltkGTi7dmNL--yg>

GitHub area:

<https://github.com/FlexGrid>



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