

AFRY

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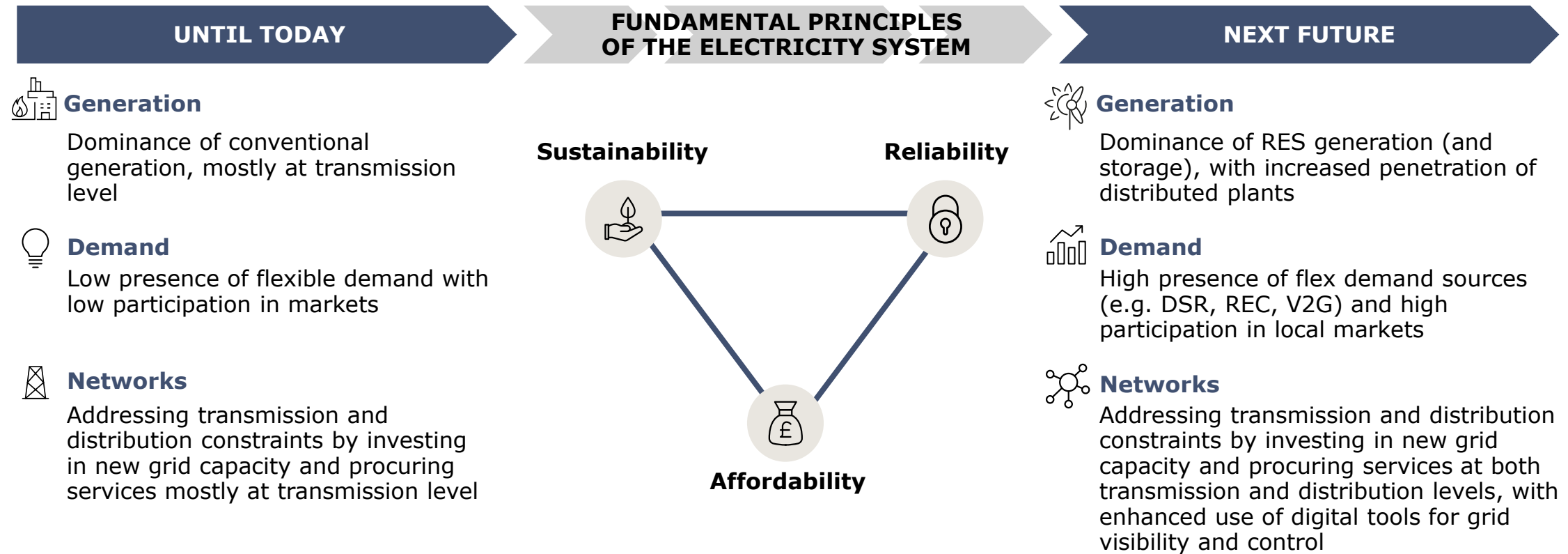
# Innovation in local optimisation

Smart Energy Summit 2023 – Brussels, 19<sup>th</sup> April 2023

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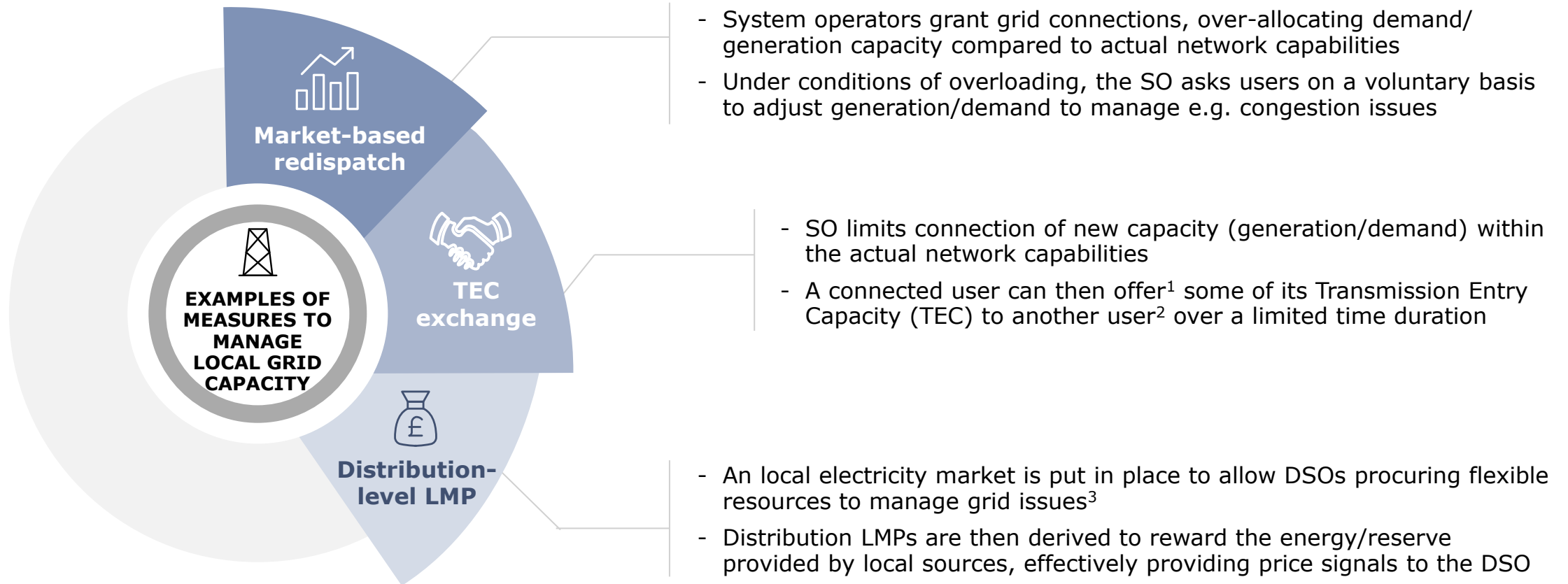
In future, together with new investments in grid capacity, the use of local flexible resources will be necessary to efficiently manage networks

**EVOLUTION OF ELECTRICITY SYSTEM**



RES: Renewable Energy Sources; DSR: Demand Side Response; REC: Renewable Energy Communities; V2G: Vehicle to Grid

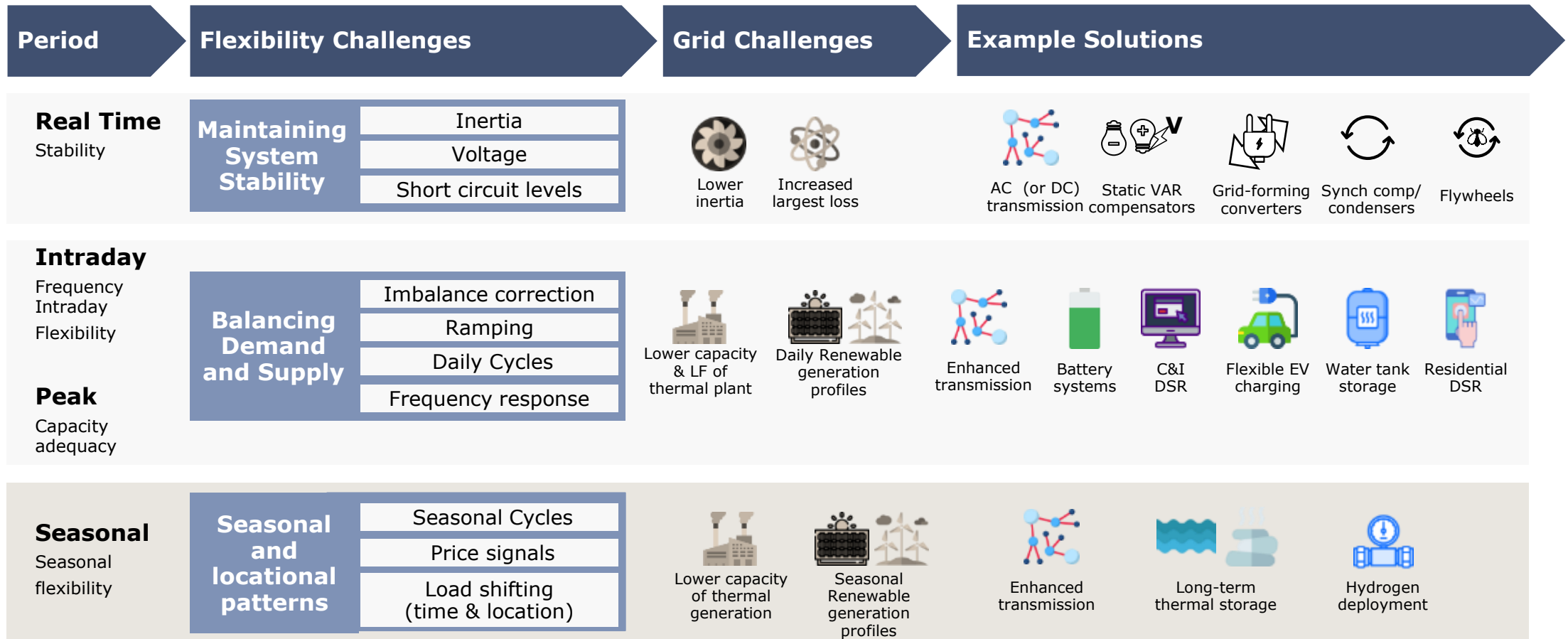
# Although there are different ways to manage local grid capacity, ...



1. In agreement with the system operator; 2. Up to their Connection Entry Capacity (CEC); 3. e.g. voltage, congestion management | TEC: Transmission Entry Capacity; SO: System Operator; LMP: Local Marginal Price; CEC: Connection Entry Capacity

CHALLENGES FACED BY GRIDS

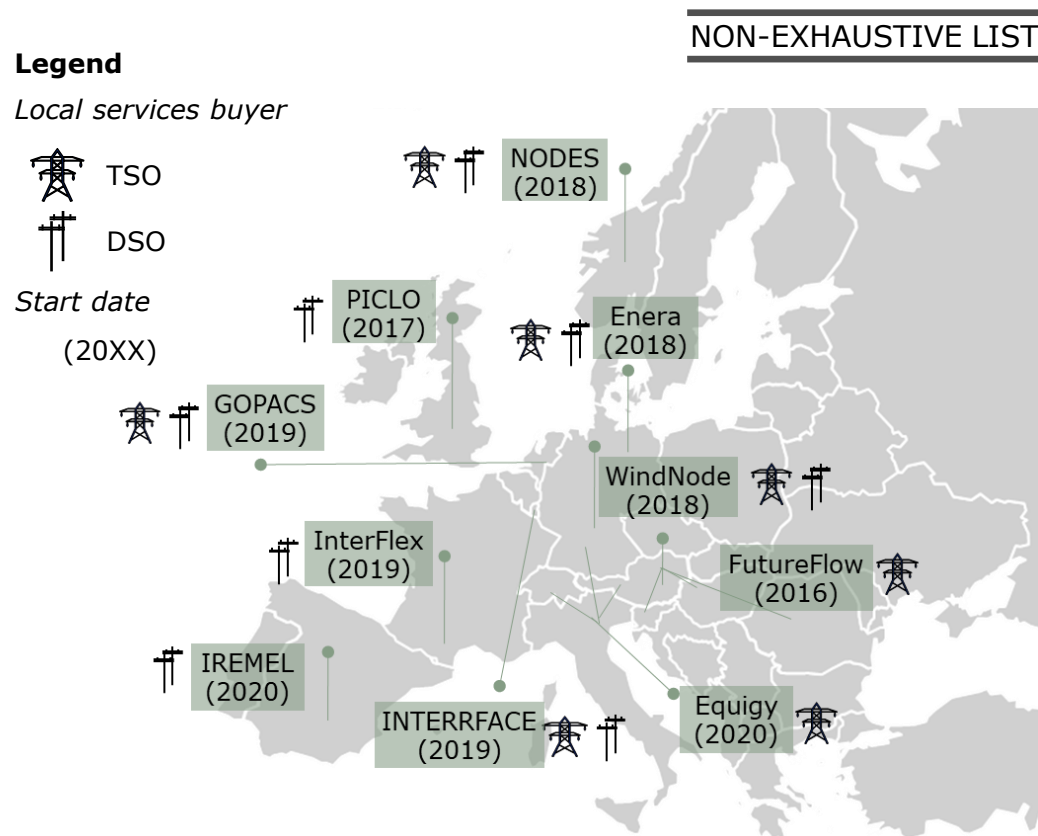
... challenges occur in coordinating the needs of different users of flexibility at different locations over different timeframes



AC: Alternate Current; DC: Direct Current; LF: Load Factor; C&I: Commercial & Industrial; DSR: Demand Side Response; EV: Electric Vehicle

# Local flex initiatives have already been started at pilot level. However, further actions are required to optimise the use of local flexibility

## EXAMPLES OF EUROPEAN INITIATIVES FOR LOCAL FLEXIBILITY



## CRITICAL DRIVERS TO FURTHER OPTIMISE LOCAL FLEXIBILITY

- 1 Flexibility strategies**  
 Government entities to set rules guiding SOs and users through use of flexibility (e.g. Ofgem has initiated the process to implement a flex strategy)

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- 2 Flex markets and tariff reform**  
 New flex markets for local sources. Tariff structure (e.g. TOTEX) should incentivise SOs to use flex sources when more efficient than building new grids

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- 3 Digitalisation**  
 Enforce use of digital tools to improve grid's and resources' visibility and control (e.g. TSO-DSO Digital Twin<sup>1</sup>)

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- 4 Smart meters (and sub-meters)**  
 As envisaged by the European Commission, smart meters (sub-meters specifically) should be a key enabler for participation of DR in electricity markets

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- 5 Simplification of permitting processes**  
 Permitting processes for local flex sources to be further simplified to speed up their deployment

Sources: flex initiatives/platforms - AFRY analysis | 1. European Commission has mandated the EU DSO Entity and ENTSO-E to develop a Digital Twin at DSO-TSO level | TSO: Transmission System Operator; DSO: Distribution System Operator; SO: System Operator; DR: Demand Response; RES: Renewable Energy Source

# The BiTraDER project will design and trial options for the creation of a bilateral market for trading contracted curtailment obligations

## AFRY'S CASE STUDY 1: BiTraDER PROJECT (ONGOING)

### Situation and challenge

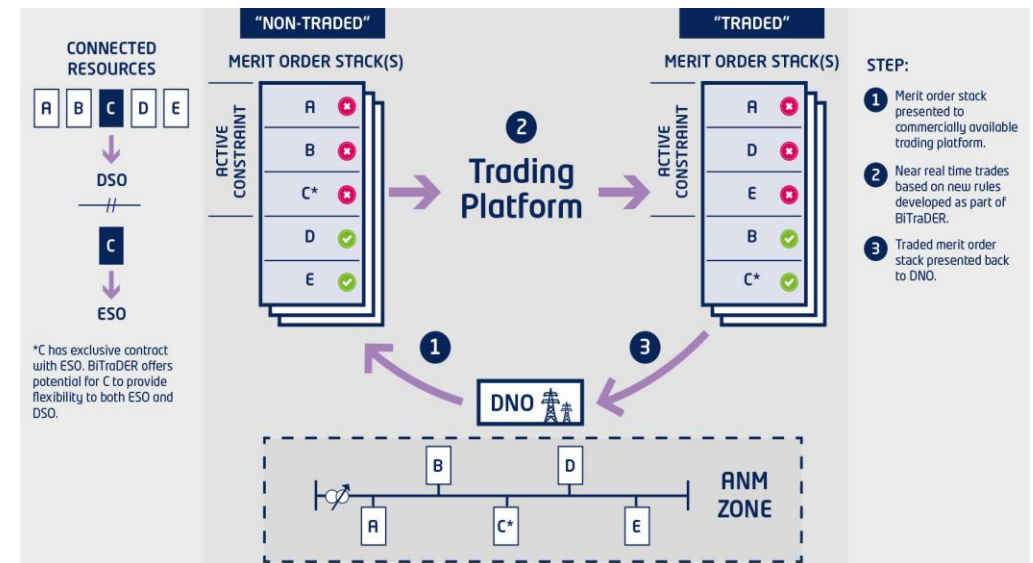
- Electricity North West (ENW) is facing several challenges:
  - Customers are reluctant to accept a non-firm or flexible connection and to offer flexibility services
  - Lack of competition and market liquidity leading to high costs for flexibility services
  - Operational and contractual conflicts between the DNO and ESO

### Aims of the project

- BiTraDER aims to:
- Investigate, develop and trial an innovative method enabling peer-to-peer trading of curtailment obligations
  - Reduce barriers for the uptake of RES and choice for connected customers
  - Introduce new sources of flexibility and encourage its use to reduce whole system costs
  - Enable DNOs to meet net zero, avoiding carbon intensive reinforcement associated with traditional firm connections

### Example of outputs

- BiTraDER (project ongoing) will deliver a functional specification detailing the requirements for facilitating bilateral trading. This will encorage the creation of a platform, market model, data requirements and interface





# Within the Furuset microgrid project, an optimisation model has been implemented to reduce total system costs through the use of local flexibility

## AFRY'S CASE STUDY 2: FURUSET PROJECT

### Situation and challenge

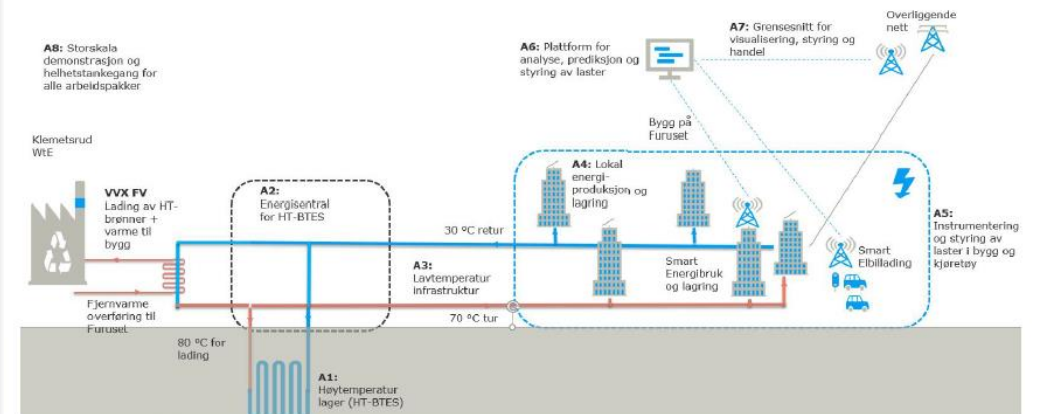
- The broader Furuset initiative set by Oslo municipality aims at creating an urban community based on environmental and economic sustainability
- Within the initiative, one of the challenges was to enable energy self-sufficiency (and export) through the use of local generation, demand and flexible electric/heating resources

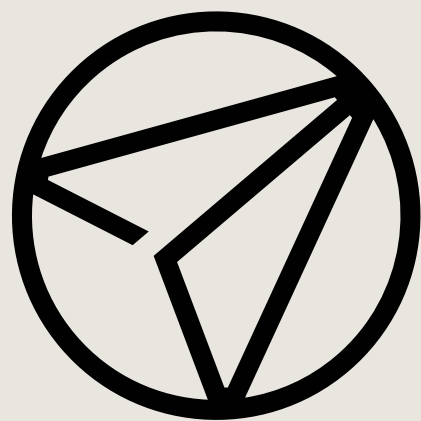
### Aims of the project

- Furuset's project aims mainly at optimising the use of local flexible sources such as RES, heat and storage systems and DSR, in order to minimise peak loads within the Furuset microgrid

### Example of outputs

- An optimisation model has been implemented to minimise peak loads, analysing the effect of different flexible units, under different weather conditions, price scenarios and market policies
- The model allows the optimal use of flexibility through the integration of local RES, heat and storage systems sources, DSR and interaction with the overlying grid





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