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# Governance and organisation of local flexibility markets: key issues and approaches

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Olivier Rebenaque

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Paris – Dauphine University

# Introduction

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- With the development of distributed energy resources (DERs), there is a concern on the growing level and costs of the congestion at the distribution level (Schermeyer et al., 2018).
- Local flexibility markets (LFMs): a solution to coordinate flexibility sources through a marketplace
- The development of LFMs raises some issues regarding the organizational structure, i.e. the role allocation and the coordination of the distribution network industry
- Assigning the management of the LFMs to the DSO may harm the competition as the vertically integrated undertaking defines the market rules and participates with different affiliated undertakings
- There is a risk of discrimination for the access of the market, information leakage and distortions in network investments (Buchmann 2020; Burger et al, 2019; Lowe 2007)

# Introduction

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- While the Clean Energy Package is clear on the DSO's neutral role regarding the recharging points for electric vehicles and the storage ownership, the roles and responsibilities for the LFMs are not specified (de Almeida et al., 2021)
- This has led to a patchwork of different role allocations in the current European projects
- Several contributions have been made regarding:
  - The definition of the product (Heilmann et al, 2020)
  - The regulation
  - The comparison of the project designs (Schittekatte and Meeus, 2020; Valarezo et al, 2021; Anaya et al, 2020)
- However, the issue of the role allocation within the LFMs is still unsolved

# Objective of the paper

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- Objectives:
  - Identify the key challenges of the LFM
  - Propose solutions to achieve success in LFM implementation
  - Give some insights on the impact of the local jurisdictions on the best design model

How we do this: review of the current LFM projects (real-case and simulation based)

What we do not do:

- quantitative analysis, cost benefit analysis, welfare analysis
  - Analysis DSO's incentives to procure flexibility from a marketplace
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- The aim is to provide insights regarding best practices for LFM implementation
  - Also, we provide recommendations on DSO's roles under the legal unbundling scheme

# Issues with the role allocation

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- Two main platform designs (ENTSO-E 2021):
  - Marketplace: platform managed by a third-party and performs all the roles
  - Market intermediaries: platform provides some services to the DSO but not all
- For the DSO, the choice depends on the transaction costs: he will perform the roles for which he has the expertise and outsource the others
- However, there are critical issues on the role allocation (under the legal unbundling scheme)
  - Asymmetric information: the DSO has access to strategic information he can share to his affiliated undertaking
  - Market power: the DSO will not necessarily report strategic behavior and market power from his affiliated undertakings
  - Discrimination: the DSO favors his affiliated undertaking during the market clearing

# Solution proposed in the current projects

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- Solution: to « unbundle » the tasks
- Certification: in Enera, a platform was created (E-flex) to store the information regarding the flexibility assets. It is available at request by the network operators
  - Advantage: Avoid asymmetric information
- Bid collection and market clearing:
  - Order book: a third party can collect the bids and the platform can make the flexibility sources anonymous (InterFlex project - French Demo)
  - Split market clearing: first, the DSO validates the bids based on a technical analysis and then, the market operator clears the market (IREMEL). Also, the MO can send the bids to the DSO without the price (ReFlex)

## Solution proposed in the current projects

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- Identification of the congestion: it seems relevant to allocate this role to the DSO but there are different options to increase in transparency and to avoid coordination costs
- Altdorfer Flexmarkt: the DSOs need to create a topological assignment matrix to benefit from the services provided by the platform. It allows the market operator to identify if a flexibility offer solves the congestion and so, to accept the bids or not. The DSOs do not provide any information regarding the network model nor the load flows (only congestion).
- Cornwall LEM: the DSO provides a hierarchical mapping of the network assets to the market operator. It allows the market operator to check if a bid solves the congestion at the substation
- Flech-iPower: The DSO identifies the congestion but the methodology for the load forecast is made by the market operator.
  - A step further would be to define the methodology of congestion forecasting in compliance with the regulator or the market operator

# Consideration of local aspects

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- The choice in the role allocation is not either black and white: the market operator cannot only be performed either by the DSO or a third party.
- And, there is no one-size-fits-all solution because the contexts are different: frequency and level of congestions/TSO-DSO organization/market maturity
- Germany:
  - Higher coordination needs due to numerous small DSOs
  - Higher maturity of the market through the development of business models such as P2P, local energy markets...
- France:
  - Lower coordination needs because there is one main DSO
  - Low maturity of the market: high incentives needed.