

# **How to adapt established locational marginal pricing to the needs of EU consumers?**

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## **The need for flexibility to keep the system operable and controllable is huge**

- High and growing redispatch costs in large bidding zones (e.g. 2.6 billion € 2024 in Germany, increased grid fees 5-10 €/MWh)
- Local overload risks if solar/wind not responding to (real time) network situation
- Customers with PV and batteries might pursue self-sufficiency often contrary to system needs

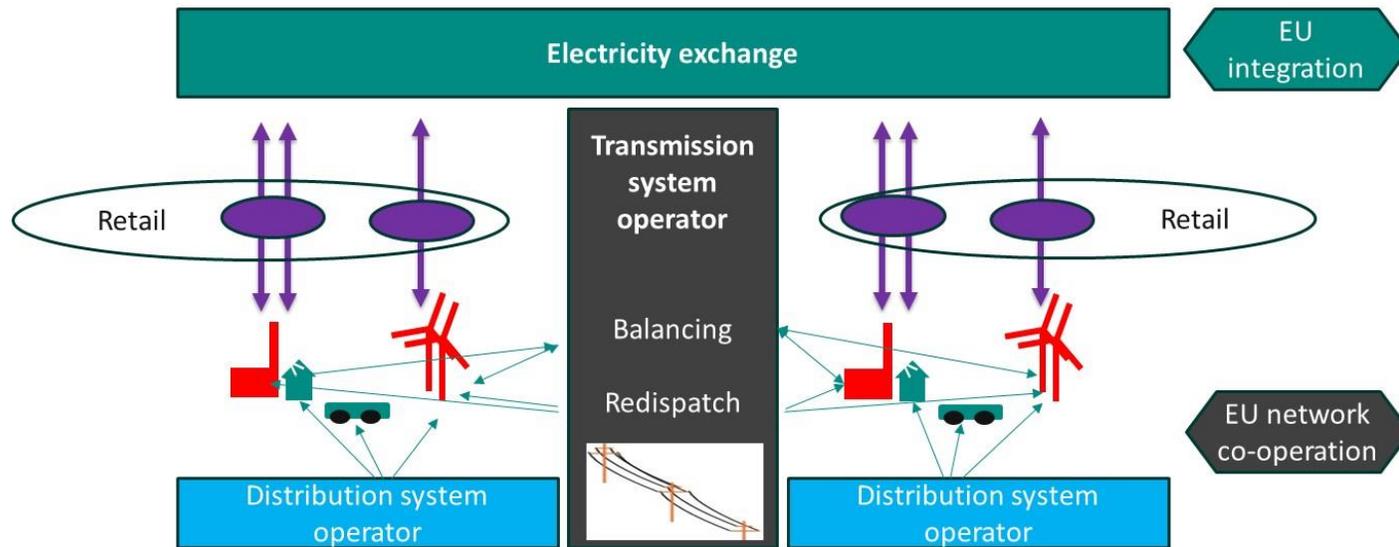
## **Various barriers for demand side participation need to be addressed**

- Too few smart meters and/or lack of tariffs (also) reflecting the real time price
- Counter-productive flex incentives for industrial consumers (structure of grid charges),
- Extensive qualification processes for demand participation in balancing and reserve markets,

## **... but without local price signals, TSOs increasingly discourage demand side participation because:**

- Customers reacting to zonal rather than a local wholesale price can exacerbate congestion. For example battery projects are unlikely to obtain grid access. With local prices they would all help the grid and hence would be granted grid access.
- If TSOs redispatch load it can exacerbate congestion: As opportunity costs for load are impossible to determine, TSOs would pay load above (opportunity) costs. This makes it profitable for load to overstate their demand projection.
- Redispatch of load also creates cyber risks from use of the internet for communication with decentral resources.

# Local marketplaces reduce complexity and save money: Currently many markets and control signals:



Redispatch payments arise because the market issues "bad cheques" - guarantees for transmission capacity that is not available. The cheques then must be bought back at high cost.

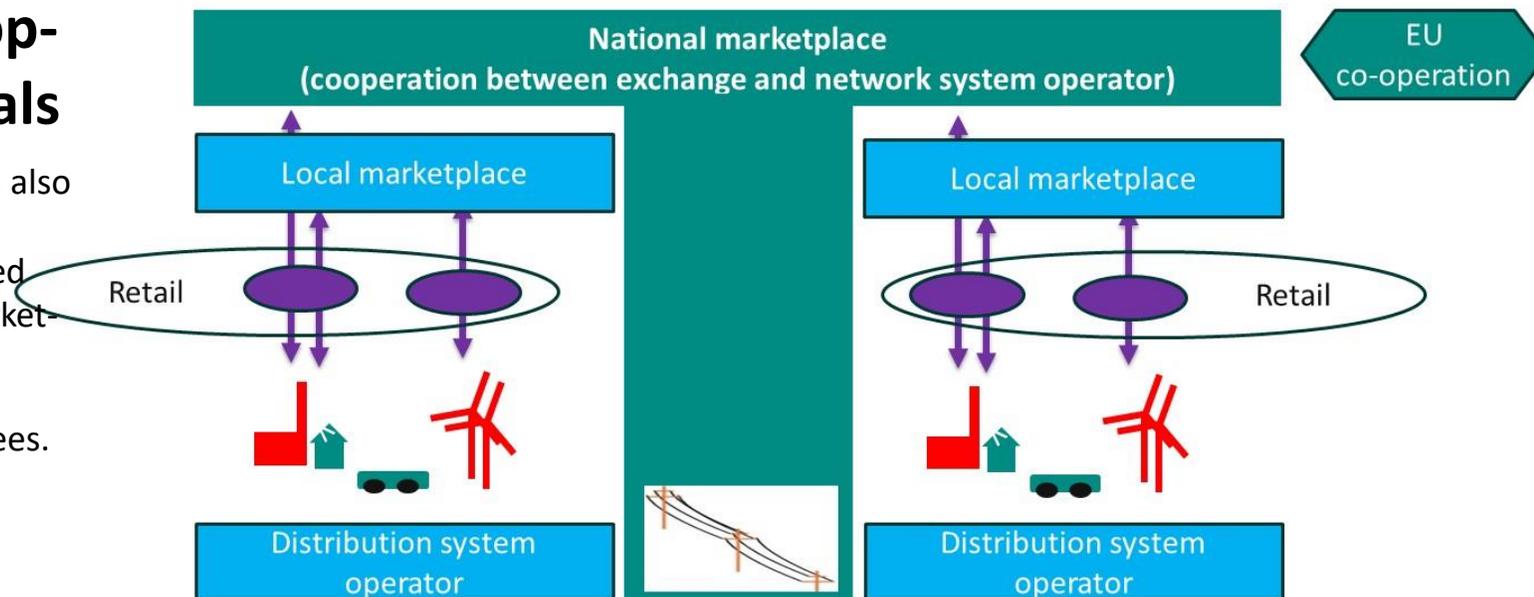
Some producers profit twice, from unrealistic BZ prices and from redispatch revenues.

# Local marketplaces provide one-stop-interfaces based on local price signals

The local marketplaces are linked by a joint clearing algorithm also allocating transmission capacity (as in US LMP). PX/TSO coop. Those local prices combine spot (DA+ID), the no-longer-needed redispatch and Replacement Reserves centrally. The local marketplaces can further differentiate according to local congestion.

The avoided redispatch costs reduce all customers' network fees.

Financial Transmission Rights or Renewable Energy Pools can provide hedges against locational price differences



## Local marketplaces from the customers' view

- Different from flexibility platforms as not just the flexibility relative to a difficult to define business as usual demand prior to flexibility provision is traded, but the entire demand and supply are traded.
- Customers can respond flexibly to real-time signal for operational decisions on small-scale generation, storage and demand (avoids need to bid prior to gate closure and then comply with schedule to give TSO time for redispatch)
- Customers use their own chosen algorithms (probably programmed by service providers) to „dispatch“ their own flexibilities in response to the local price signals. This allows easier consideration of customers' individual preferences and constraints, e.g. on timing and levels of EV charging or building heating and cooling requirements.
- This simplifies communication requirements: only a price signal needs to be communicated to customer using radio or wire based signal (linked to local data hub). Avoids cyber security risks from internet based control systems.
- Customers with flexibilities (heat pump, PV, battery, EV charger) include control software in their home energy management. No need to relinquish control (already sensitive for households' comfort, more so for industries).
- Local market price signal (e.g. at city level) incentivises flexibility to respond to common developments (e.g. store power during PV peak). This reduces congestion in distribution system.
- DSOs can choose to implement additional price or other signals for local congestion management.
- Average costs for all customers are reduced, as generation, storage and flexibility are used efficiently and redispatch costs are eliminated.
- Incentives for developing flexibilities increase as it is rewarded both for system balancing and for congestion management. This reduces the need for grid expansion at both transmission and distribution level.