

2106 – Distribution-Level Flexibility Provision Through Simultaneous Ascending Auctions

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Introduction

Local Flexibility Mechanism (LFM) complements efficient distribution network charges. It is designed to efficiently extract and utilize available customers' flexibility in the short-term. Network charges considered here are composed of forward-looking peak coincidence network charges and fixed charges.

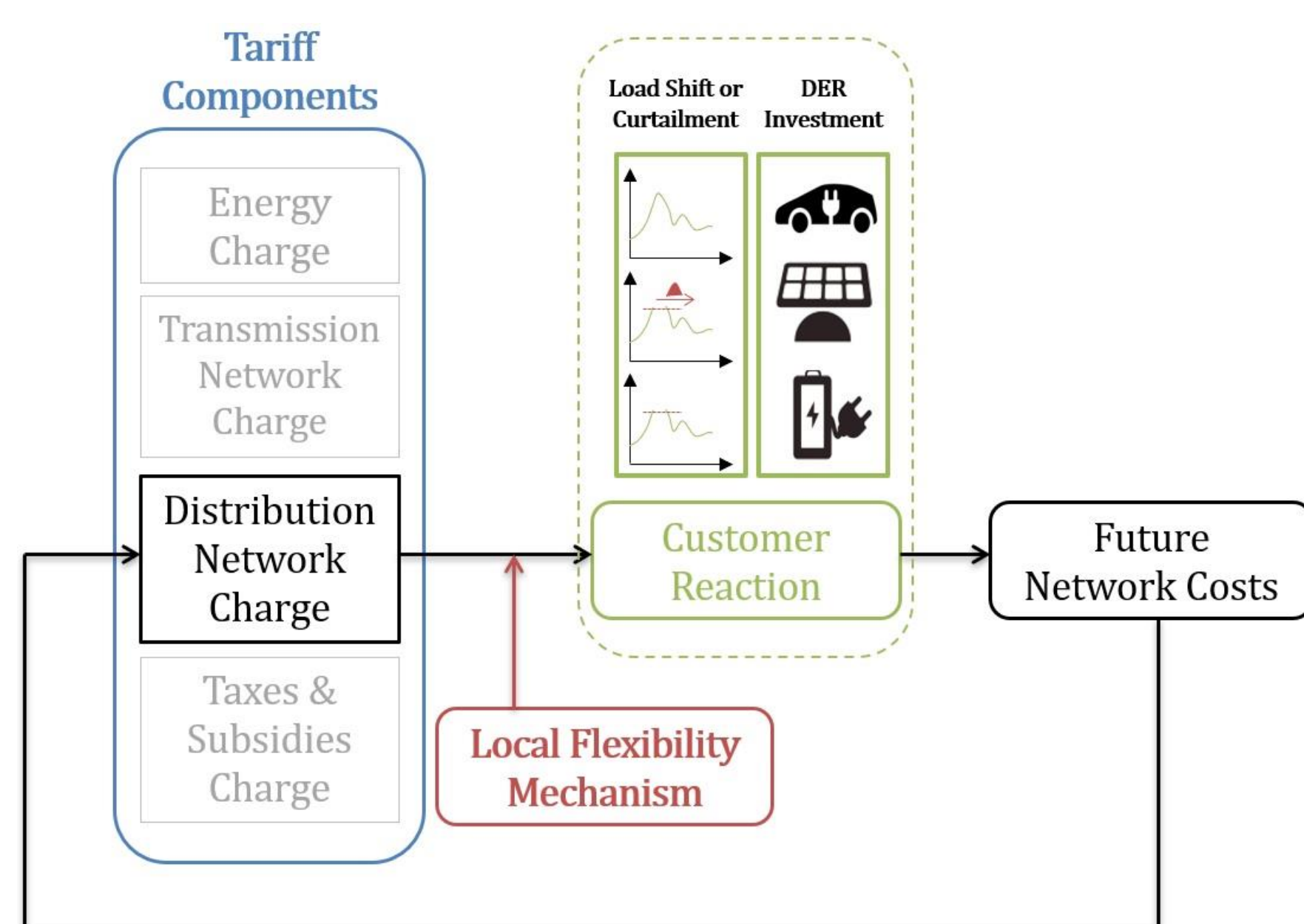


Figure 1 – Local Flexibility Mechanism

Simultaneous Ascending Auction

LFM operates through Simultaneous Ascending Auction (SAA) within the day-ahead time frame. When network peak hours are expected the next day, SAA operates to utilize customers' flexibility by allowing them to book their network capacities in the day-ahead, through a series of paired capacities and prices for each auctioned hour.

During real-time, if the network's utilization level exceeds the threshold, unreserved capacities will be charged PCNC.

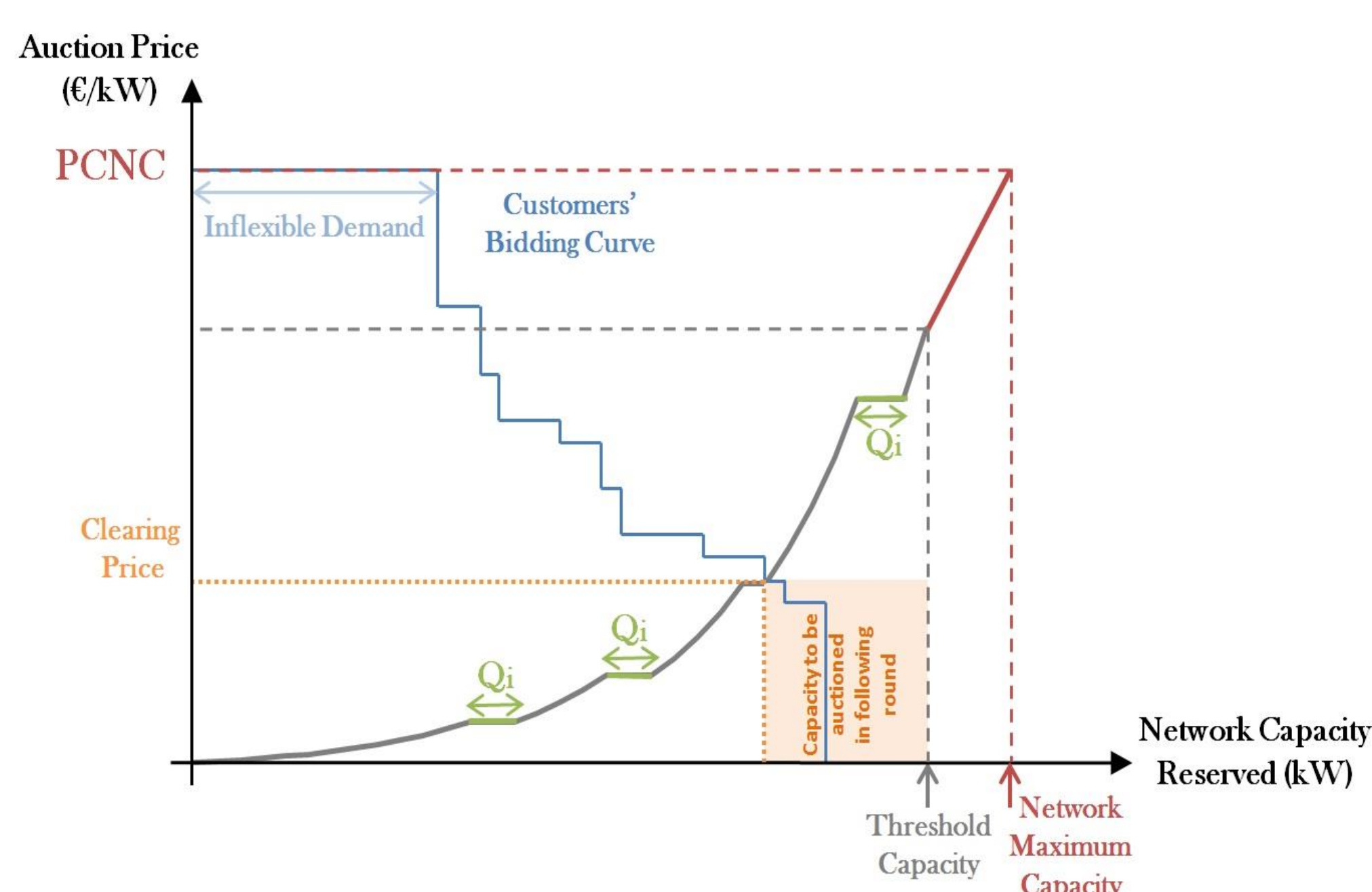


Figure 2 – Simultaneous Ascending Auction (SAA)

Case Study

It is expected a load increase in the following period that requires least network reinforcement equivalent to 20% of the current network annual cost. This is translated into the PCNC part of the network tariff.

Based on the threshold (2MW) and relaxed threshold (1.8MW), SAA is held for hours 18 and 19. Customers' bids are simulated based on each customer's flexibility percentage.

PCNC along with SAA incentivizes customers to participate in the auction. Analyzing the benefits of SAA; the total cost of the first round is 230€ and 340€ for hours 18 and 19 respectively. If instead customers did not participate, hour 19 would be recognized as a peak hour and PCNC would be allocated causing a total cost of 620€.

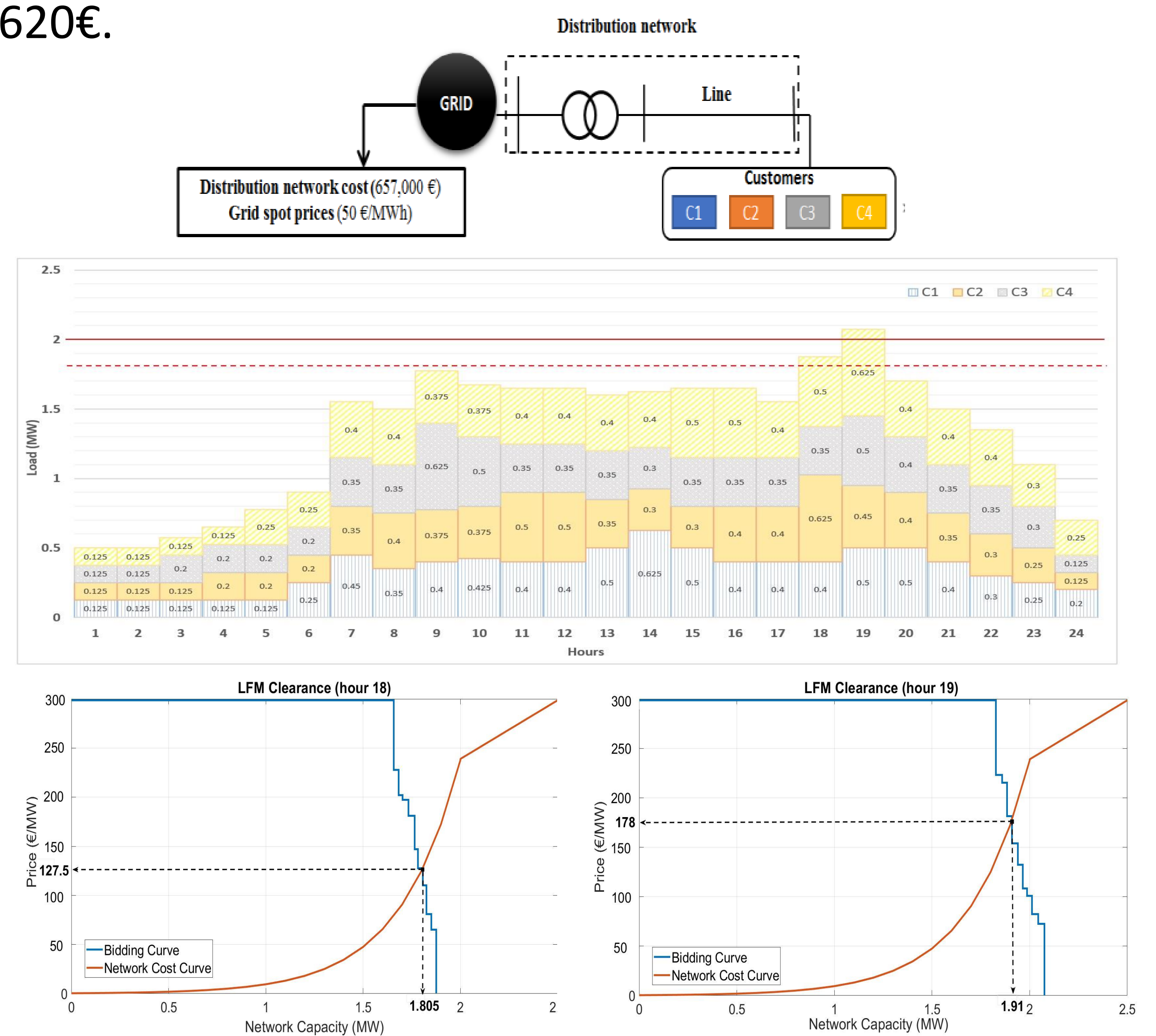


Figure 3 – Case Study & Results

How is LFM different from flexibility markets proposed in literature?

- 1- LFM is linked to the distribution network charges, therefore avoiding potential market abuse whereas flexibility markets are not.
- 2- In LFM, customers reserve network capacity during peak hours, rather than offering their flexibility services through increase or decrease in their energy injections/withdrawal.
- 3- In LFM, there is no financial compensation, instead customers hedge against high network charges.

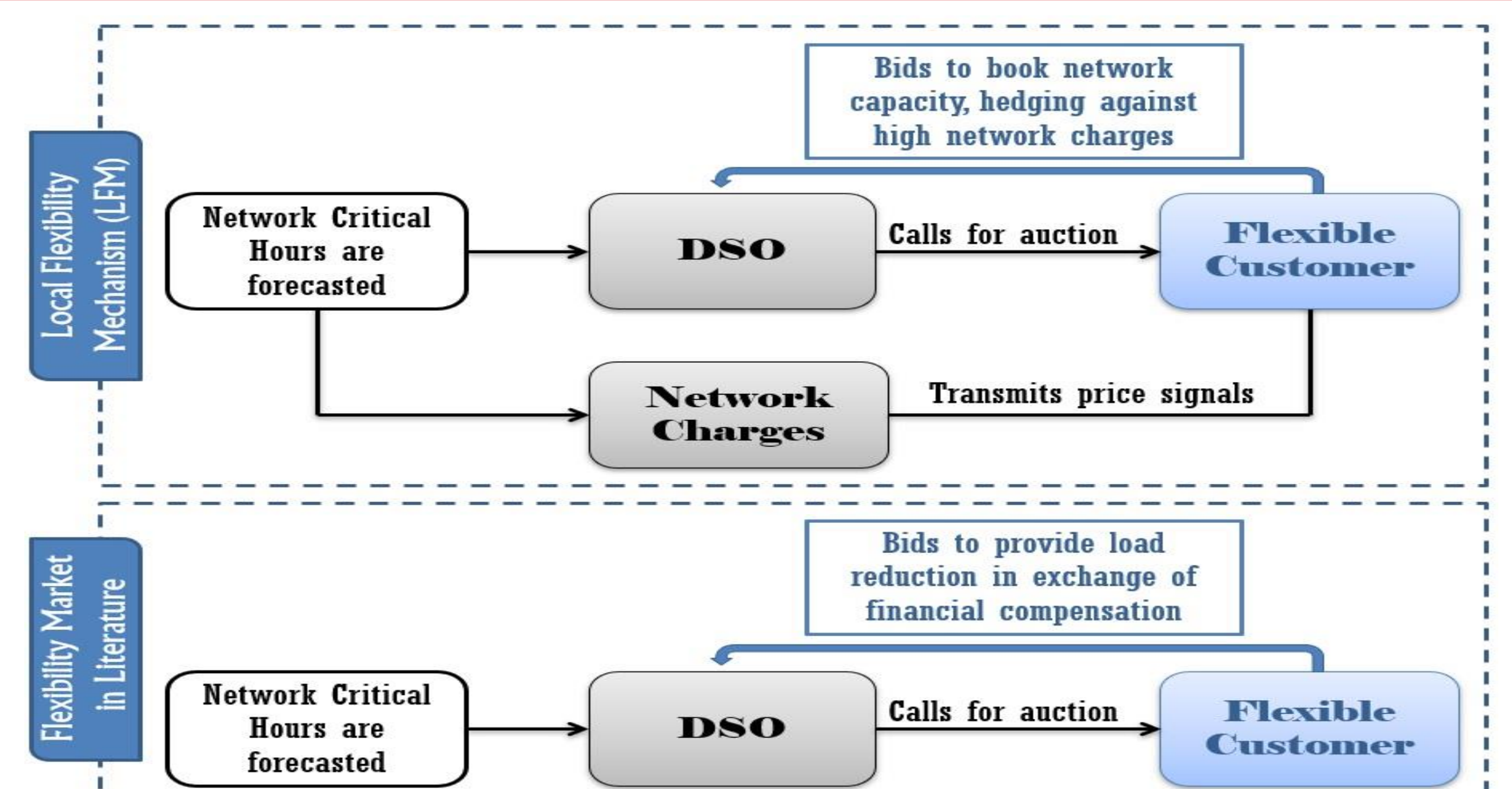


Figure 4 – LFM Vs Flexibility Markets in literature