

NBM Stakeholder Reference Group Meeting

Nordic aFRR Capacity Market

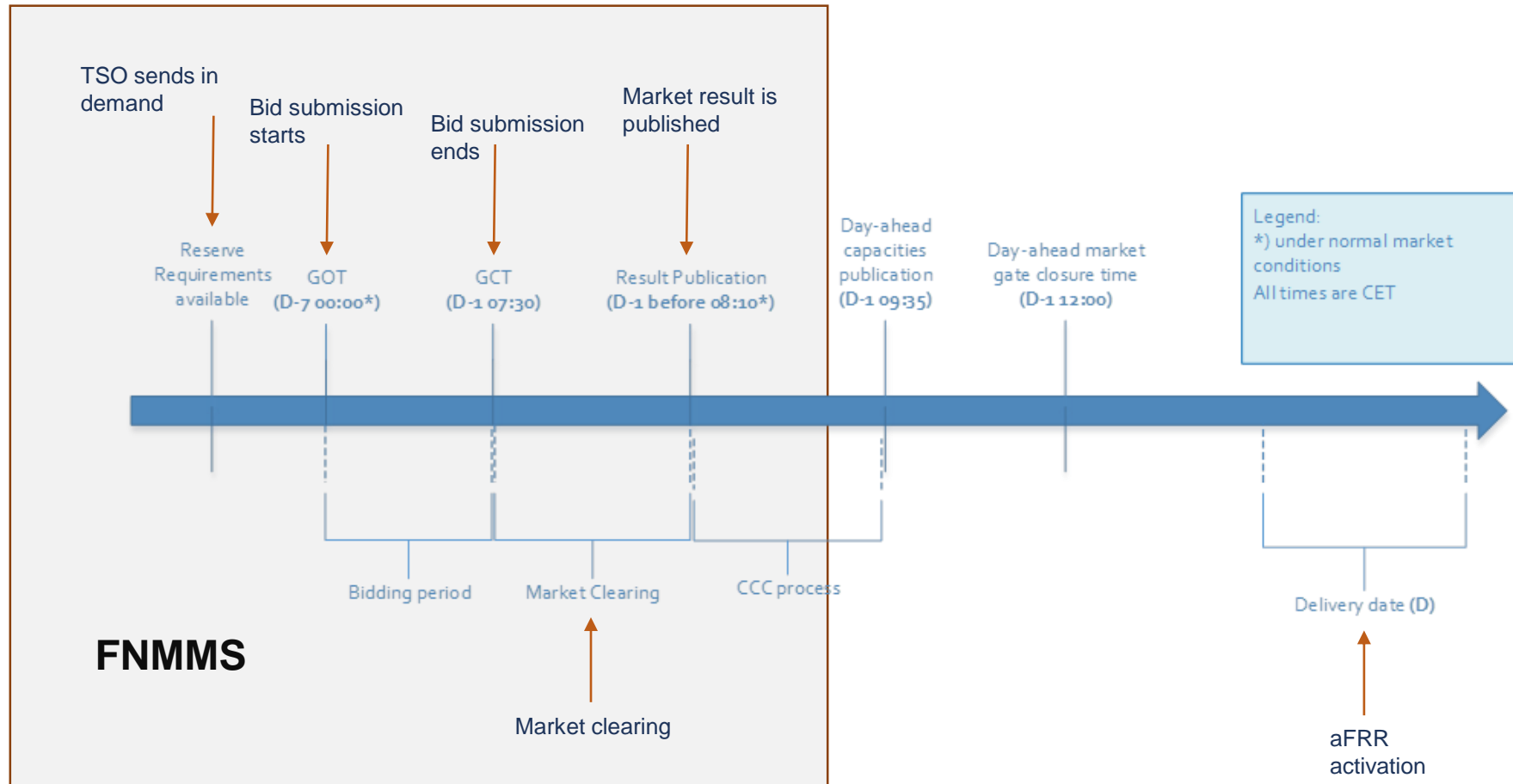
-Status update & initial market results

14.12.2022

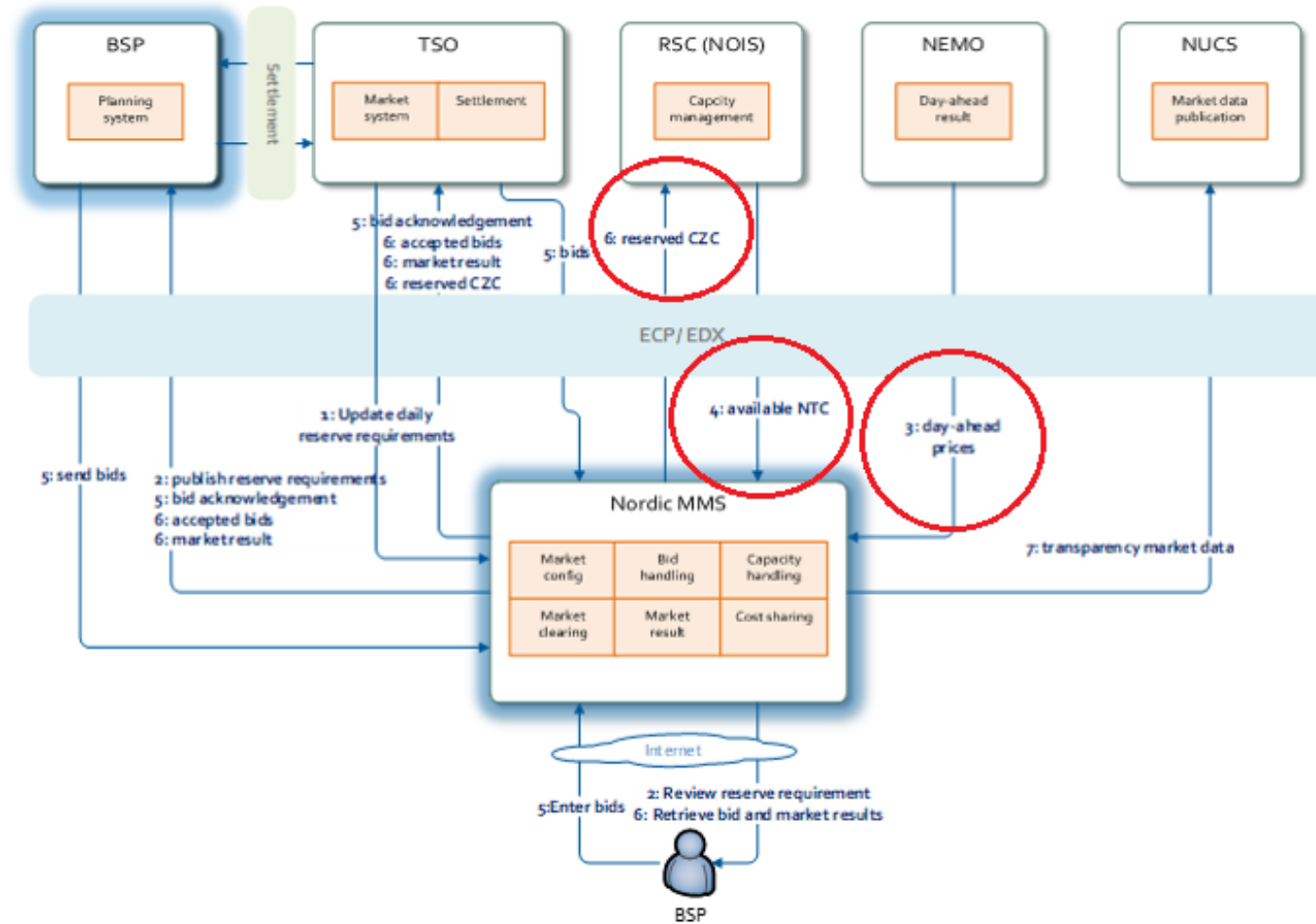
Nordic aFRR CM

- Successful go-live for the Nordic aFRR Capacity Market Dec 7th 2022, with the first delivery date Dec 8th 2022
 - Three of the Nordic countries already had national aFRR markets using the same IT platform
 - Statnett, Norway, December 2021
 - Fingrid, Finland, January 2022
 - Svenska Kraftnät, Sweden, May 2022
 - Energinet, Denmark, did not have a national market before the Nordic Go Live, but has now joined
- According to plan, Fingrid will partially join the market Dec 24th
 - According to the terms and conditions for the Finnish market, this will allow the procurement of Nordic aFRR capacity without reservation of cross-zonal transmission capacity against the dominating direction
 - SE1-> FI is the dominant flow. That means that reservation FI->SE1 is allowed.
 - FI can buy downward capacity outside FI, and other TSOs can buy upward capacity from FI

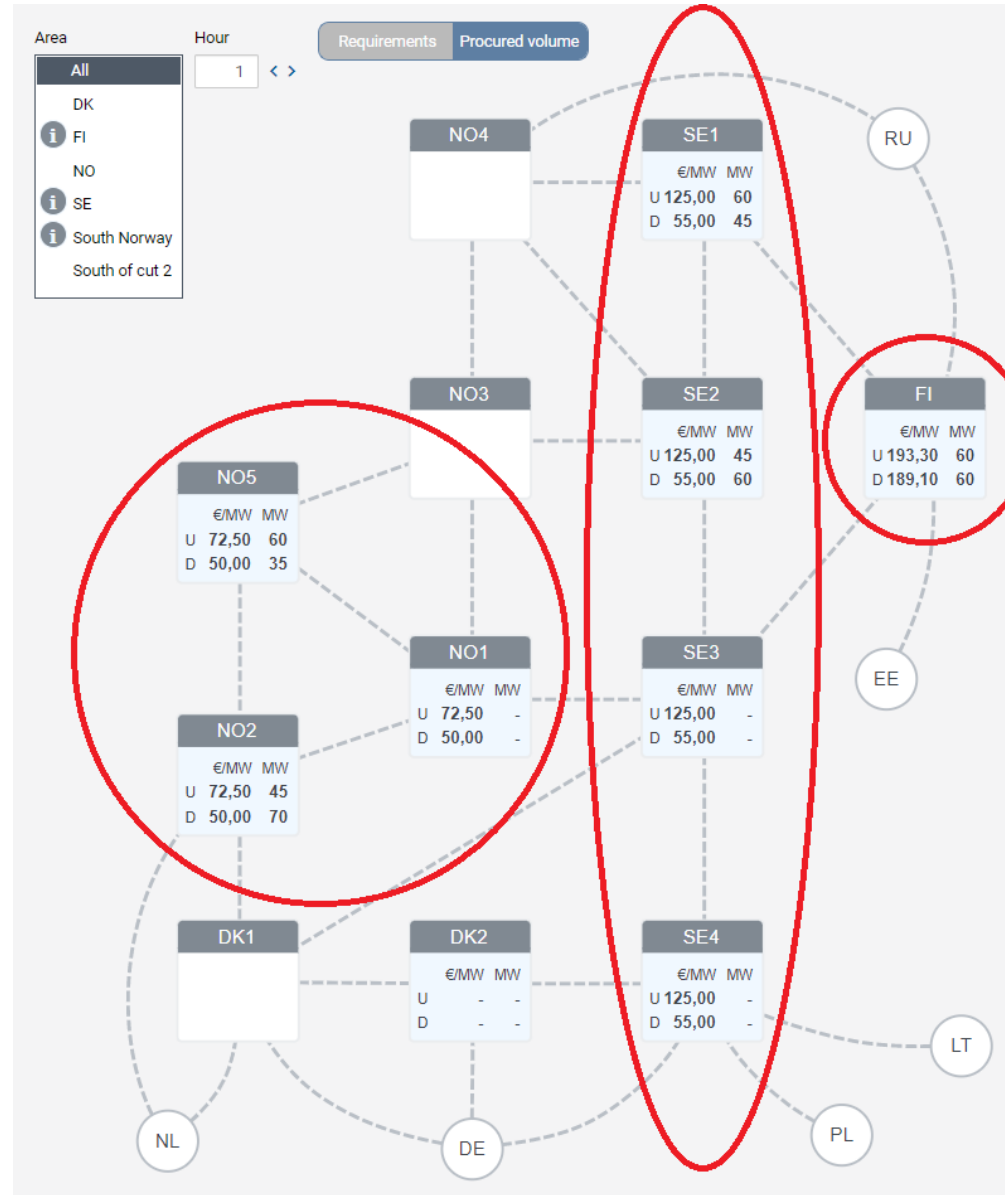
Auction timeline is still the same



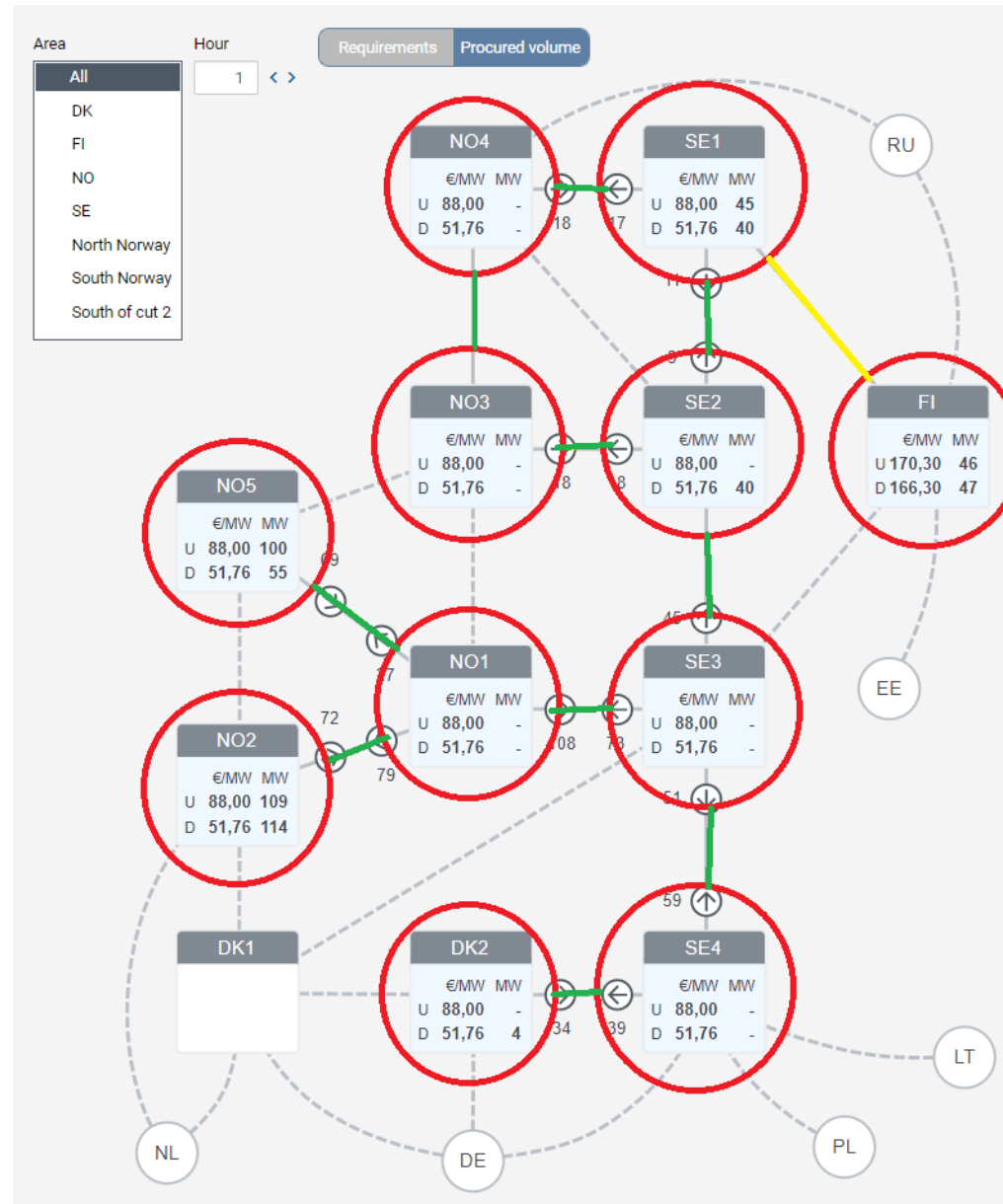
System context in a nordic market



National market - Bidding zone topology



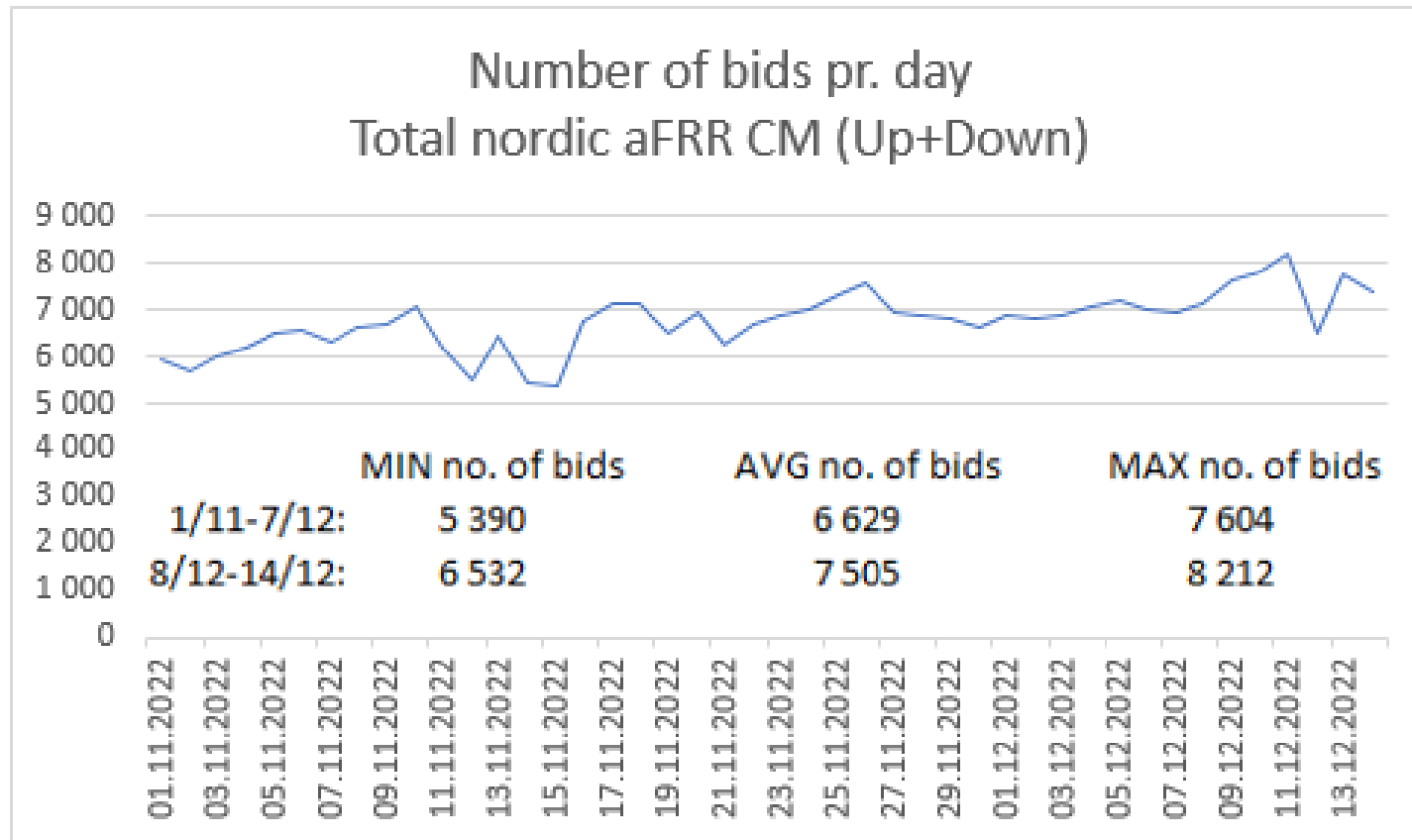
Nordic market - Bidding zone topology



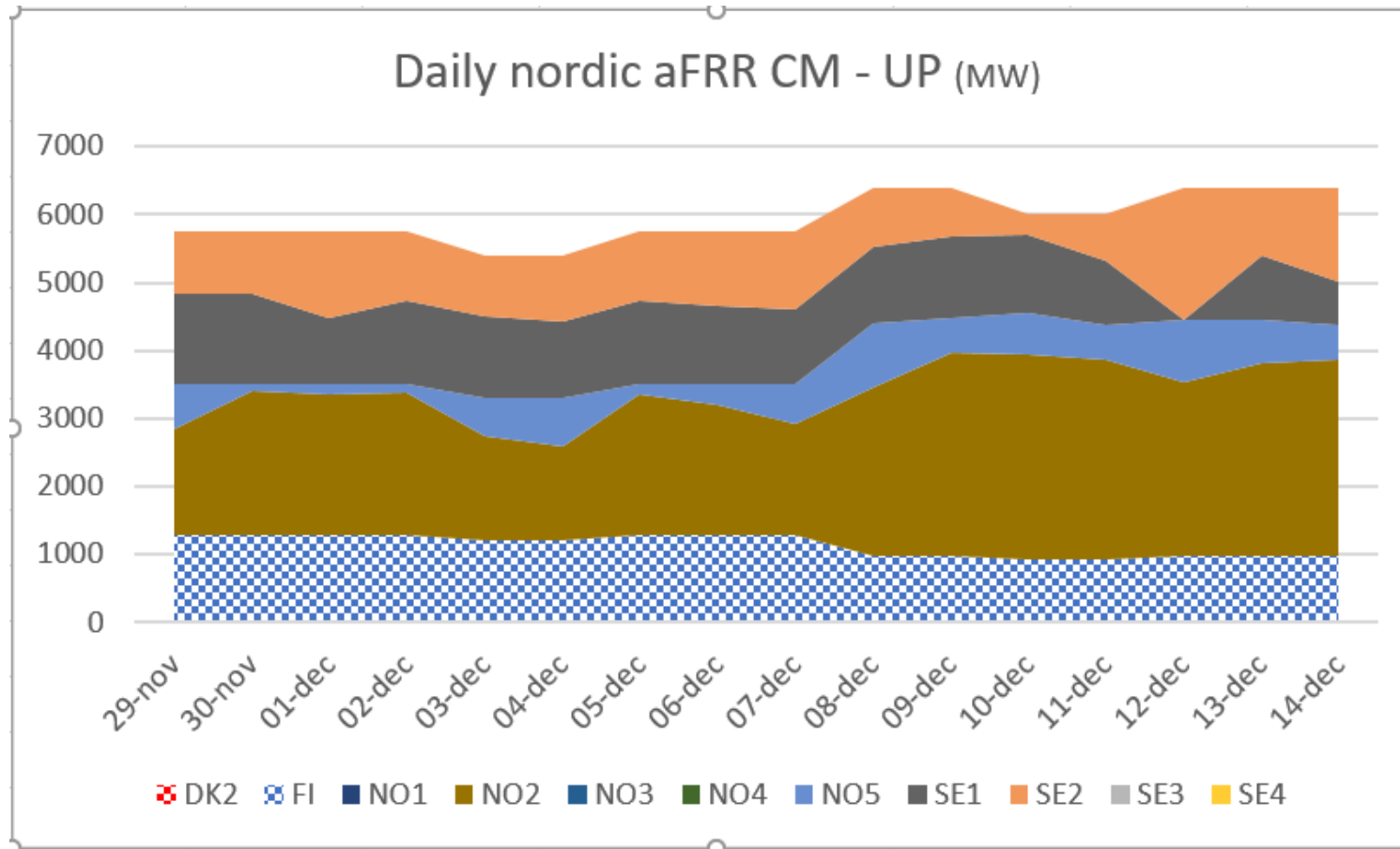
Initial results & thoughts

- Optimal solution found for each auction run
- Surplus of bids on a Nordic level
- SE1, SE2, NO2, NO5 suppling the majority of bidding zones
- NO3, NO4, SE3, SE4 & DK2 are currently importing reserves
- Roughly 23 different BSPs submitting bids
- Daily total number of bids has increased
- NO1->NO5 utilizes max default CZC in some hours for some days

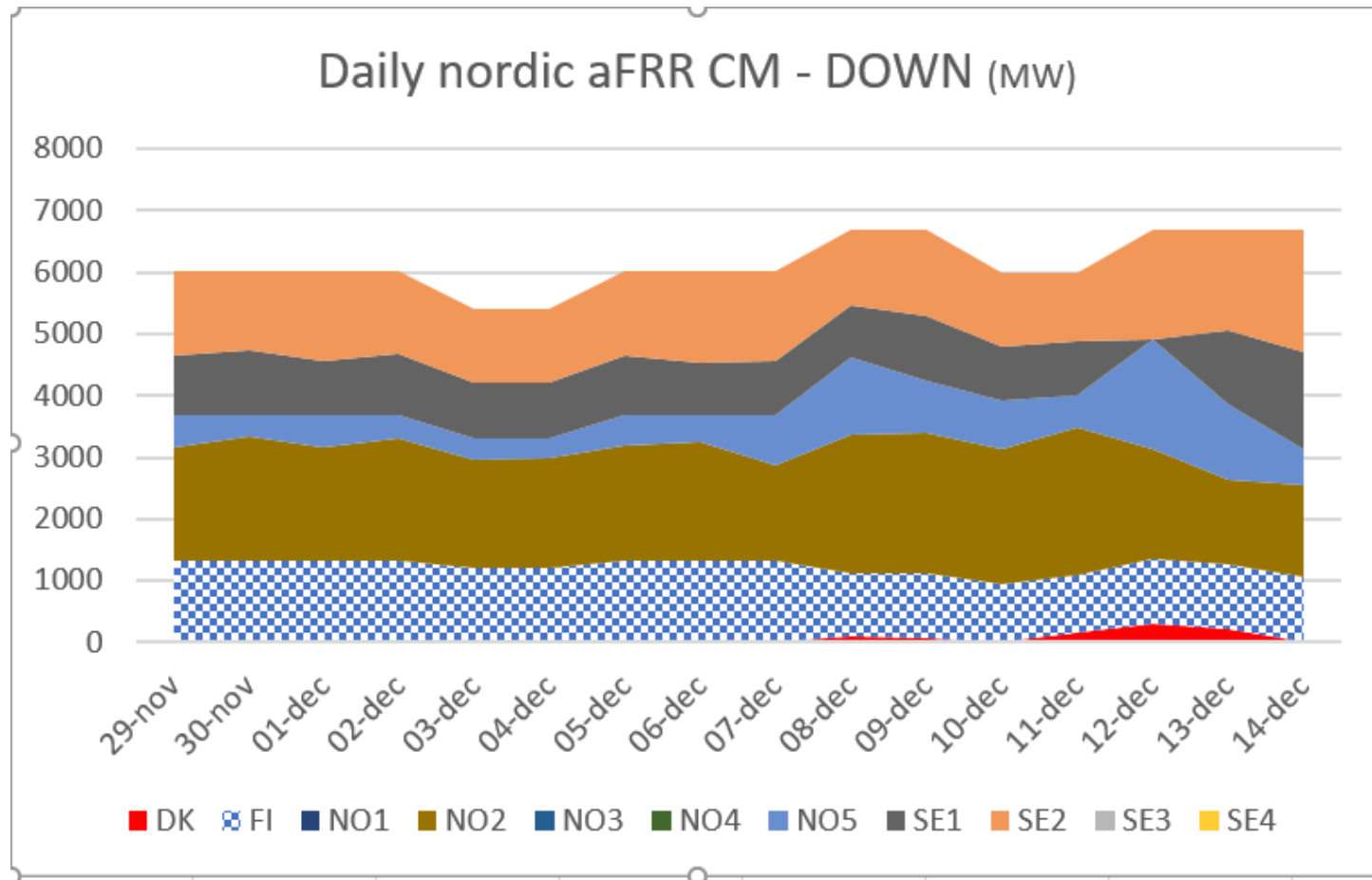
Number of submitted bids per day

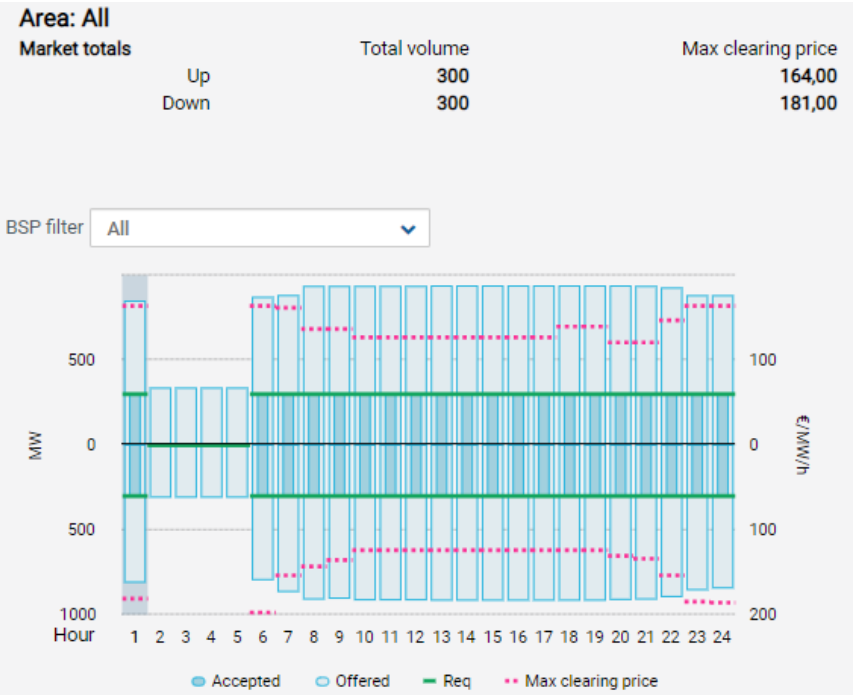
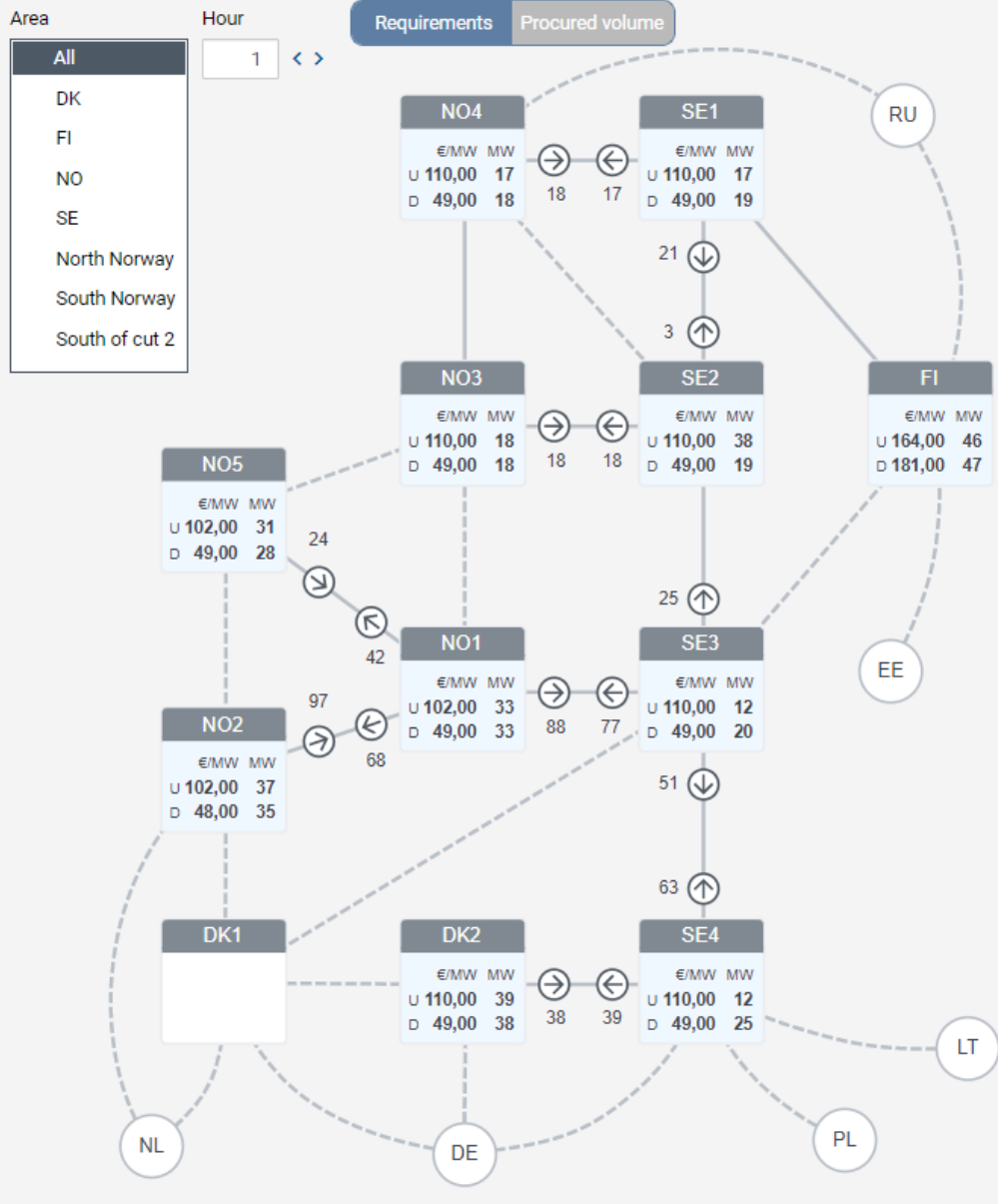


Procurement localisation Up direction



Procurement localisation Down direction





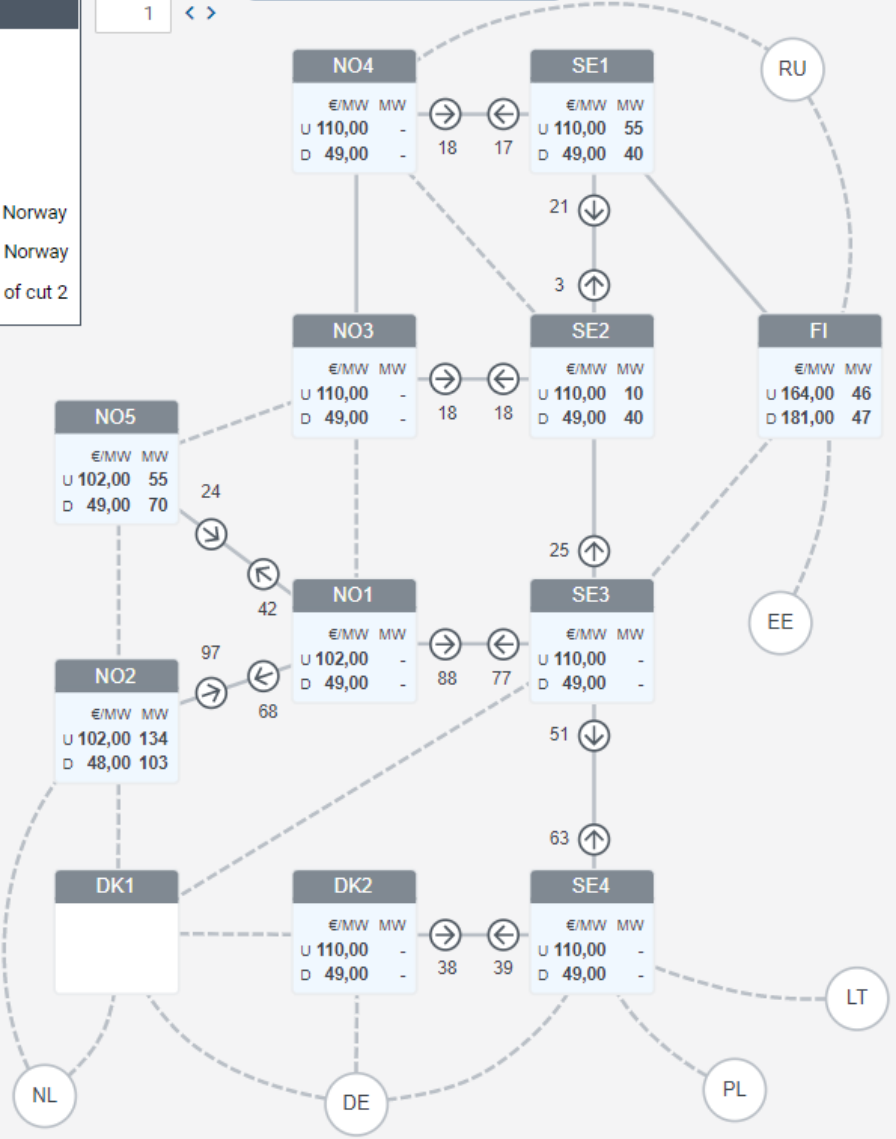
Reserved CZC

All areas are selected

- Area
- All
 - DK
 - FI
 - NO
 - SE
 - North Norway
 - South Norway
 - South of cut 2

Hour 1 <>

Requirements Procured volume



Area: All

Market totals

Up	Total volume	300	Max clearing price	164,00
Down		300		181,00

BSP filter All



Reserved CZC

All areas are selected

Questions?

Cross zonal capacity, CZC

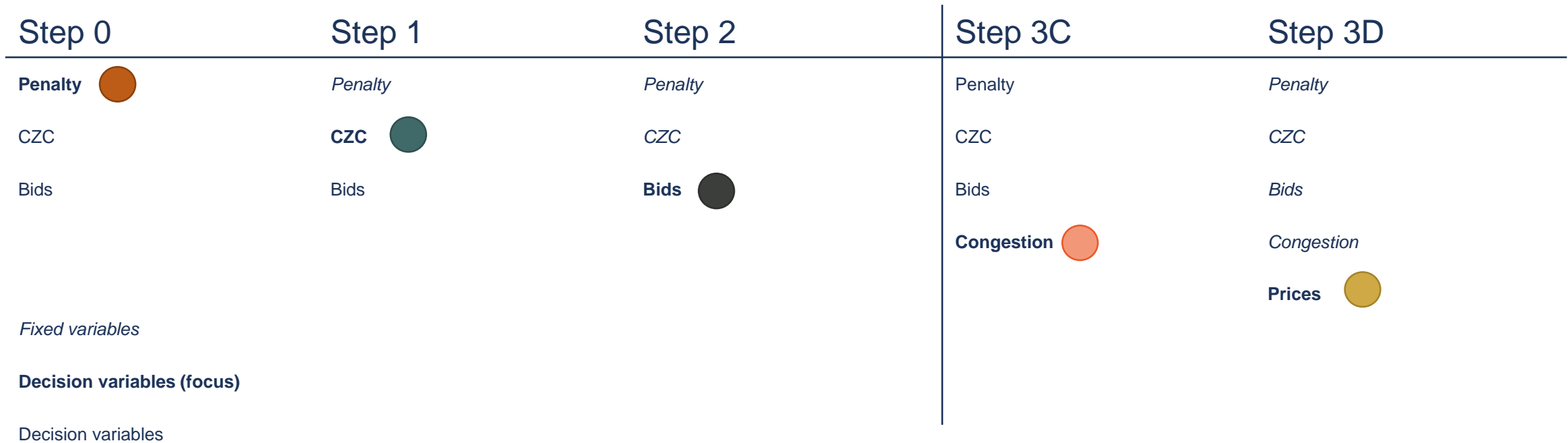
- Transmission capacity, NTC
 - We use a small part of the NTC as CZC in order to utilize bids in different bidding zones.
 - We can use up to 10% of the NTC in order to find cheaper bids
 - We can use up to 20% of the NTC in order to find bids in deficit situations.

Cross zonal capacity, CZC

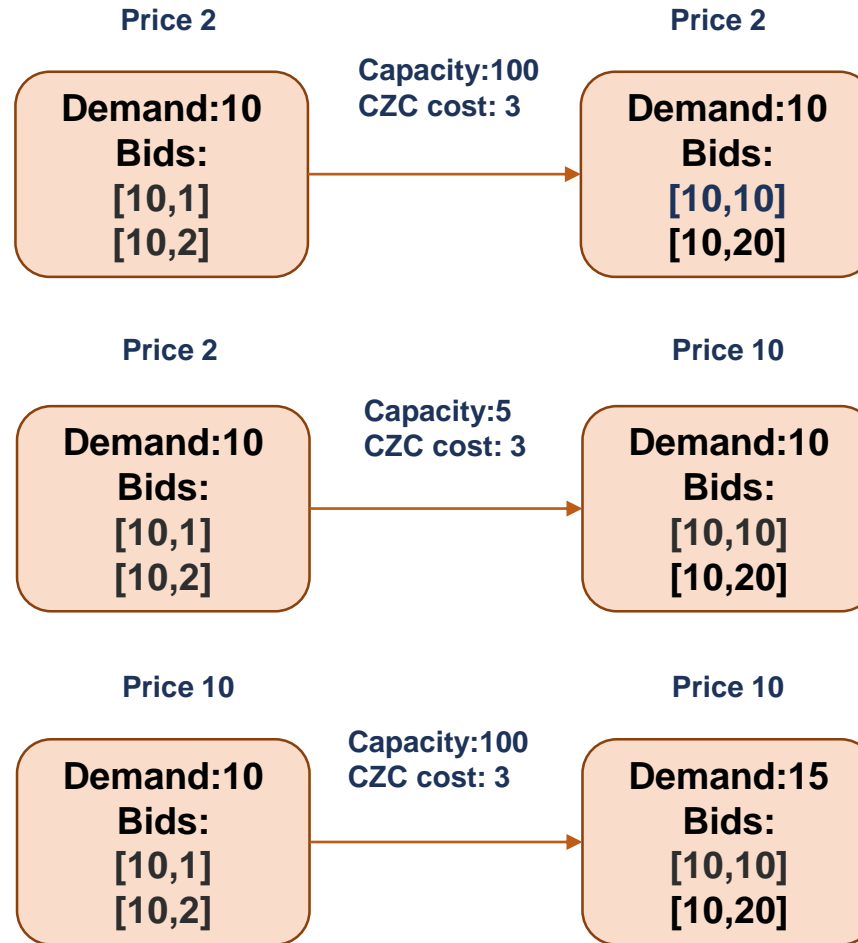
- Day-ahead price forecast
 - Actual DAM prices are not available in time so we use forecasted DAM prices
- Mark up calculation
 - Dependent on the error between forecasted and realised DAM prices
- CZC cost
 - The CZC reservation cost is the DAM price difference between bidding zones + the mark up

Variables in market algorithm

MAIN VARIABLES ARE FIXED SEPARATELY IN STEPS 0 TO 3D



General clearing principles

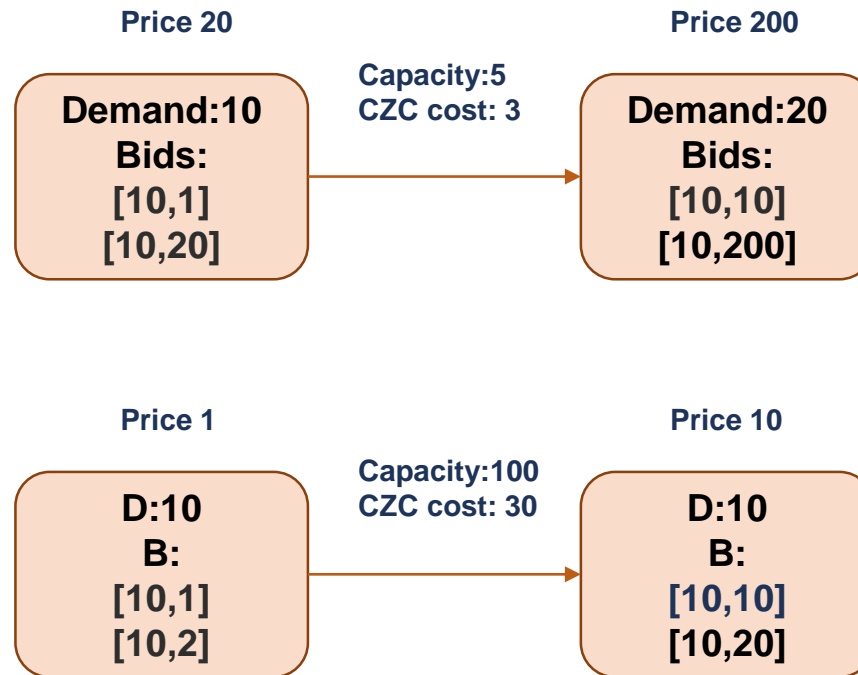


UNCONGESTED
Reservation: [10MW, 3Euro]

CONGESTED
Reservation: [5MW, 3Euro]

UNCONGESTED
Reservation: [10MW, 3Euro]

General clearing principles



CONGESTED

Reservation: [5MW, 3Euro]

CONGESTED

Reservation: [0MW, 30 Euro]