



Presentation of the Report

# **EFFECTS OF A MORE INTRADAY DRIVEN MARKET**

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## Structure of the presentation



The report considers the future timing of three different types of trading in response to a variety of potential changes / drivers

## TYPES OF TRADE

- 1 Physical**
  - Used to construct a desired physical position as a net generator or consumer
  - May be constructed across multiple timeframes

- 2 Balancing (Portfolio optimisation)**
  - Corrections to physical positions in response to unforeseen changes to generation / consumption volumes
  - Must be intraday by definition

- 3 Speculative**
  - Taking of a temporary position to profit from price fluctuations ahead of gate closure

## CHANGES / DRIVERS

- New technologies that imply greater reliance on intraday information
- Variable generation
  - Demand Side Response

Reservation of cross-zonal capacity for intraday trade

- Greater integration with neighbouring markets
- Construction of additional interconnection capacity
  - Intraday coupling (XBID)

- New commercial actors
- Aggregators
  - Short-term (battery) storage owners

- New trading technologies
- Blockchain ledgers
  - Trading bots

Overall, intraday 'balancing' volumes are expected to increase but there is no significant migration of physical trading from the day-ahead to intraday market

1

### Physical

- Differences in the trading costs associated with different markets might prompt a migration in trade.
- Intraday auctions and bot trading may lower the costs of trading intraday, but are unlikely to make it absolutely cheaper than day-ahead trade.
- Assuming some degree of risk aversion on the part of traders, they are unlikely to exit the day ahead market completely in preference for intraday trade.

2

### Balancing (Portfolio optimisation)

- Increased volumes of variable renewable generation and storage will increase intraday balancing volumes.
- Intraday balancing volumes may also spill into the Norwegian market from more volatile neighbouring intraday markets and this effect may be increased by increased interconnection to such markets.

3

### Speculative

- Technological improvements (blockchain and bot trading) may lower trading costs and thereby support greater speculative trading.
- Increased speculative trading intraday may also be supported by the increased volume of balancing trades.
- There is a risk that speculative trading activity switches to an alternative platform (e.g. blockchain OTC).

A significant move to closer to real time trading (which we are not convinced will happen) would not significantly impact efficiency

### Dispatch outcomes

- Later trading might prevent the use of lower-cost options that have long lead times.
- BUT if traders maintain choice of when to trade, they won't want to wait so long as to force themselves into an inefficient outcome.

### Quality of the reference price

- Changing trading patterns are unlikely to materially worsen the quality of the reference price. Notably:
  - The System Price pools liquidity from across Nord Pool, making it hard to undermine.
  - Hedging using the System Price already incorporates some basis risk that firms manage.
- Even if they did, a new reference price would be developed, preventing a significant increase in hedging costs.

### System operation

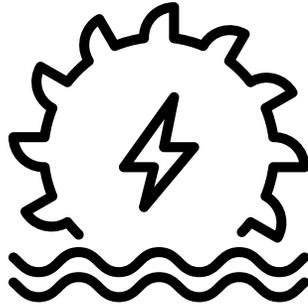
- Less accurate planning data has the potential to harm system planning, but:
  - Advanced production schedules provided to Statnett don't need to match day-ahead positions.
  - Other changes may limit the harm of inaccurate submissions (e.g. move to 15-minute settlement and the incorporation of independent forecasting into Statnett's operational decisions).

Cross-zonal capacity reservation from the day ahead to intraday markets doesn't, by itself, make sense... But reserving capacity for use after gate closure might

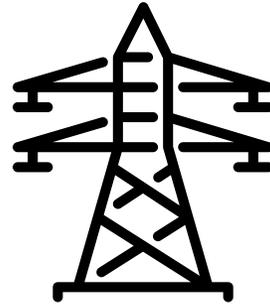
“ there will never be a case when [cross-zonal] capacity reservation from the day-ahead to intraday stages alone makes sense ”

“ Reserving [cross-zonal] capacity for later balancing services use may be justified ”

Reserved cross-zonal capacity can, at most, restore the flows that the day-ahead market would anyway have wanted to provide



Flexible Zone



Inflexible Zone

What would have happened absent capacity reservation?

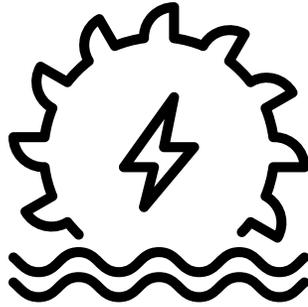
The day-ahead solution could have:

1. Used all capacity to flow power TO the flexible zone.
2. Had the interconnector in float.
3. Used all capacity to flow power FROM the flexible zone.

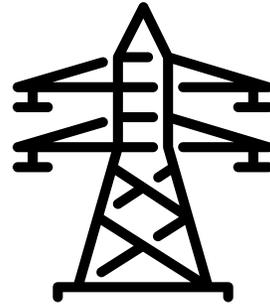
} Capacity reservation makes no difference here as cross-zonal capacity is anyway available.

Reservation is only relevant in cases where the day ahead solution would anyway have been suggesting the efficient pattern of flows

When contrasted to what would have happened absent capacity reservation, it becomes clear that there is no additional efficiency gain



Flexible Zone



Inflexible Zone

Efficient day-ahead solution?



Since nothing changed in the Flexible Zone between the day-ahead and intraday timeframe (planned exports were the same), there is no scope for an improvement to efficiency.

A rationale day-ahead market or planner will have taken the least-cost dispatch decisions day-ahead given this risk and intraday trade will enable any feasible re-optimisation regardless of capacity reservation. This is the hardest bit to intuit.

The example in the report showed that the market should never be willing to pay to reserve capacity for use intraday (since there are no efficiency gains to be had)

Value of reserved capacity to buyer  $=$  Expected intraday price spread between zones

If the market is efficient, the day-ahead price in each market must equal the expected intraday price

Day-ahead price spread between zones  $=$  Expected intraday price spread between zones

Note: This doesn't entail the need to physically withhold capacity day-ahead, only the ability to set an offer price reflective of the expected intraday price

Minimum cost to reserve capacity  $=$  Day-ahead price spread between zones

A lower price would allow reservation below the willingness to pay for capacity in the day ahead market

Value of reserved capacity to buyer  $=$  Minimum cost to reserve capacity



**Conclusion:** Even if offered the chance to reserve capacity, the market should always be indifferent to doing so. If there were a real efficiency gain to be had, this wouldn't be the case.

# Intraday auctions are likely required to allow for the pricing of cross-zonal capacity

## The need for auctions

- The pricing of cross-zonal capacity is required by the Guideline on Capacity Allocation and Congestion Management (CACM).
- Continuous trade doesn't allow for useful capacity pricing. Initial trades undertaken before the capacity is fully utilised are given free capacity. If the capacity later becomes scarce (with a positive price), owners cannot extract this value since the capacity has already been allocated for free.

There are 8 mechanisms through which auction design choices are likely to influence efficiency:



Simultaneous clearing of multiple bids



Revenues for cross-zonal capacity



Providing focal points for trade



Pay-as-clear pricing



Timing of trade



Bid structures



Transaction and staffing costs



Hedging quality

Based on an assessment of these effects, we conclude that the introduction of a small number of auctions is probably ideal



### Simultaneous clearing of multiple bids

- May allow for more efficient clearing solution, as bids with lowest costs and highest willingness-to-pay are picked (rather than first to click).
- May make it easier to implement flow-based coupling (and thereby increase effective capacity available to market).
- Limits the value of automated trading, potentially improving system resilience.



### Revenues for cross-zonal capacity

- Creates efficient incentives to expand / release trade capacity.



### Providing focal points for trade

- May support liquidity and thereby reduce the costs of trading.
- May facilitate a late burst of portfolio optimisation / balancing that might support lower balancing errors.



### Pay-as-clear pricing

- Encourages participants to bid true costs / willingness-to-pay and reveal full volumes of possible production / consumption. This increases transparency and resilience and avoids the risk of missed trades.

Based on an assessment of these effects, we conclude that the introduction of a small number of auctions is probably ideal (continued)



### Timing of trade

- Delaying trade to await an auction may foreclose lower cost options, or increase the costs of altering production / consumption plans.

Ideally any auctions that are created should be scheduled to minimise any potential efficiency loss due to the deferral of trade.



### Bid structures

- Auctions potentially allow for more complex bidding structures, and may thereby support more efficient solutions.



### Transaction and staffing costs

- Auctions tend not to reward continual monitoring, quick trading or an ability to estimate other's positions, thereby significantly reducing the effective costs of participation.



### Hedging quality

- Unlike continuous trade, auctions provide a clear reference price that market participants can realise in the market, thereby enabling hedging products that are free from basis risk.

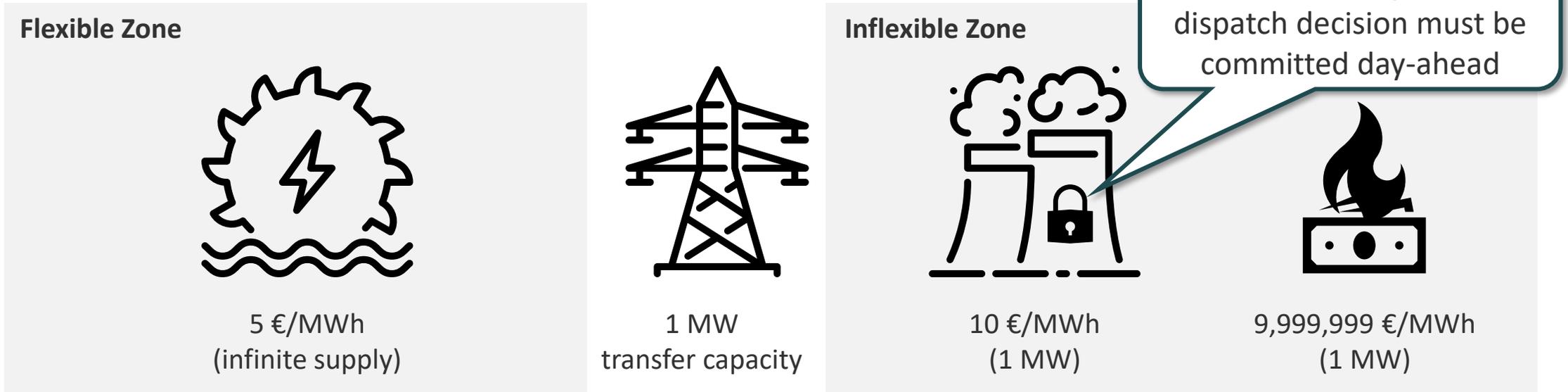
**Implied design:** A small number of auctions scheduled to minimise inefficiencies resulting from the deferral of trade.

# Questions



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# A simple numerical example to help discussions on the value of reserving cross-zonal capacity for intraday trade



**Possible outcomes:** Total demand in the inflexible zone will be either 1 MW (50%) or 2 MW (50%)



**Efficient solution:** 10 €/MWh plant must run and transfer capacity used to meet possible second MW of demand