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ENERGY COMMUNITY WEBINAR SERIES

Electricity Transmission Rights

18 April 2020

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In focus for this webinar

- Key features of electricity market design
- Zonal model and cross-zonal exchanges
- Requirements for capacity calculation and allocation
- Coordinated capacity calculation
- Capacity allocation process
- Transmission rights and their value



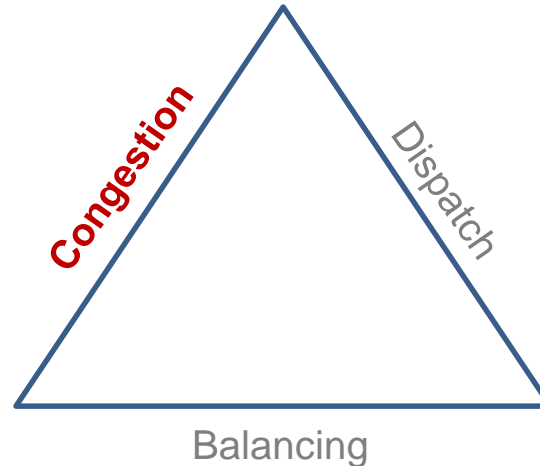
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Electricity market design

Zonal market –
competition within the
zone

Cross-zonal capacity
calculation &
allocation for regional
integration



Self dispatch (de-
centralised operational and
investment decision)

Bilateral trading combined
with centralised DAM/IDM

Market based
procurement of
balancing services

Financial balancing
responsibility

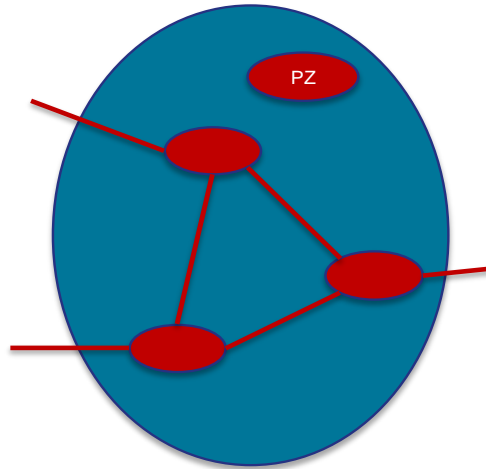


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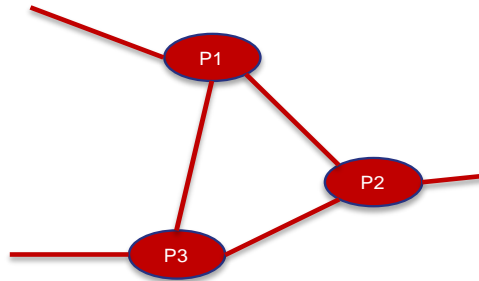
Design addressing congestion

Zonal pricing



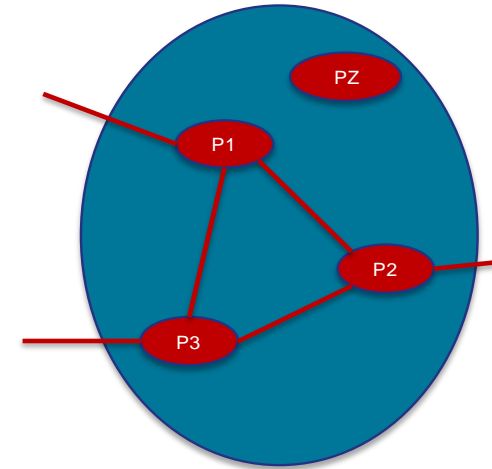
Consideration of cross-zonal capacity with other zones

Nodal pricing



Consideration of constraints between the nodes

Hybrid (nodal zones)



Consideration of cross-zonal capacity with other zones, in addition to nodal pricing



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Design addressing congestion - features

Importance of cross-zonal capacity

High system operation costs (redispatch)

Higher competition

Loop flows

Understanding the system constraints for each node

Low system operation costs

Low competition

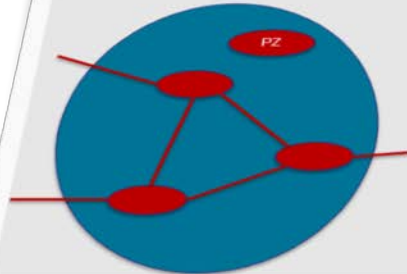
Loop flows addressed

Understanding the system constraints for each node, and how they impact cross-zonal capacity

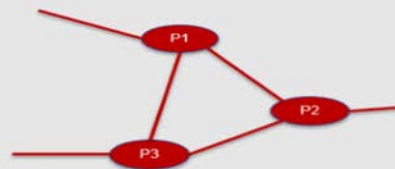
Low system operation costs, but still some countertrading necessary

Competition only on zonal level

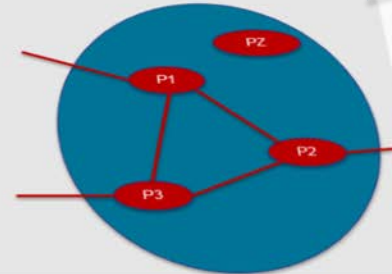
Zonal pricing



Nodal pricing



Hybrid (nodal zones)





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European markets

- *The zonal model is a legacy of how systems (countries' electrification) developed*
 - National systems then interconnected to other systems
 - National systems then split into more national systems 😊
- Market zones in Europe usually correspond to political borders of the countries, with some exception*
 - Nordic markets operate under several zones not related to political borders
 - Italian market is split in several zones that define system (Italian) price
 - Polish market has some sort of hybrid model (nodal with zonal pricing)
 - Ukrainian market is split in two zones (physically!)



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Cross-zonal capacity

- *Reg 714/Annex 1 (third energy package) – applicable for the CPs (for EU it's CEP + CACM Regulation)*
- *TSOs shall endeavour to accept all commercial transactions, including those involving cross-border-trade*
- *No congestion = no restriction (the default rule)*
- *In case of structural congestion = cross-border(zonal) capacity should be allocated (an exemption which applies more than the default rule)*
 - *Congestion should be managed*
 - *Non-discriminatory and market based method that gives efficient economic signals to market participants*



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Allocation starts with calculation

- *Allocation is market activity with the objective to ensure efficient and optimal use of resources*
- *To allocate capacity, TSOs need to calculate capacity*
 - *Coordination of TSOs in capacity calculation is required – requirement for meshed network – beyond bilateral arrangements for each interconnection*
 - *The available capacity should be set at the maximum levels consistent with the safety standards of secure network operation*
 - *Method for the calculation of the capacity for the market and the reliability margin should be subject to NRA approval and published*
 - *Transparency in the process – as important as the process itself!*



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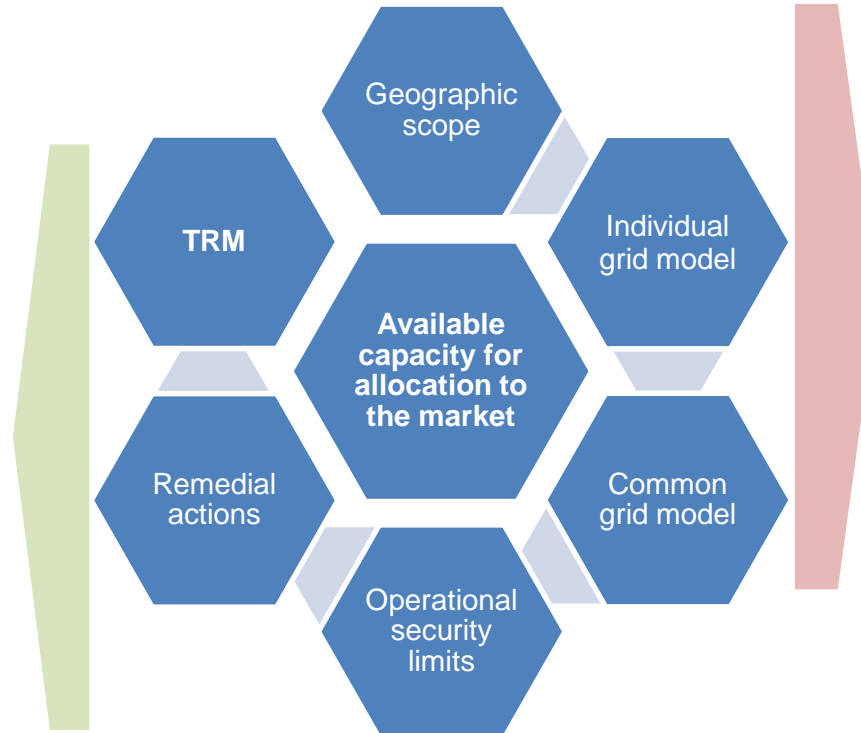


Coordinated capacity calculation

Defining the margin required to cover uncertainties & unintended deviations

Measure applied by TSOs to relieve certain critical element, to keep security of operation or maximise available capacity (preventive and/or curative)

Defining critical elements, defining contingencies N-1, N-2, N-x, tripping of one or more elements (security analyses)



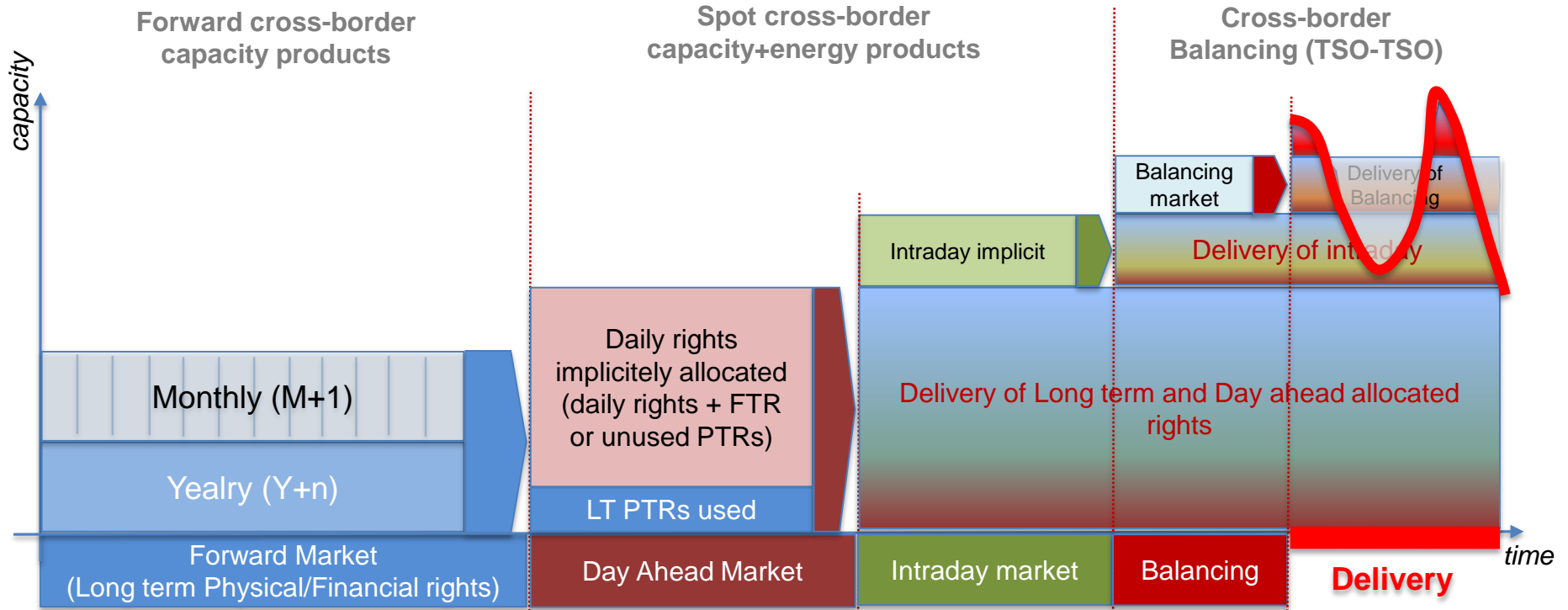
Defining the region, i.e. flows from one zones impacting other zones - CCR

Develop IGM, G & L forecast, Intermittent generation, dispatchable generation, grid topology, operational limit for each network element

Validation of IGM, solving tie-lines inconsistencies, merging into CGM, establishing balances net position via CGM alignment



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Allocation of forward rights on long-term basis through auctions as PTRs or FTR (tradable rights with UIOSI).
Single allocation office for capacity allocation.

Price coupling - auction mechanism managed by PXs with capacity module.
Flow-based or NTC-based.

Continuous mechanisms with complementary auctions (PXs+capacity)
Flow-based or NTC-based

Exchange of balancing products offered by MPs

Real-time reserve activation, re-dispatch, countertrading...



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Value of the forward transmission rights

- *The value of the right is the spread between the DAMs – this is considered the index
 - *implicit day-ahead allocation is based on an algorithm which brings the supply and demand together at the same time, including cross-zonal capacity as supply/demand in those markets – therefore much more efficient**
- *Explicit day ahead allocation is based on market participants' prediction of the DAM prices which settle on different time schedule – could imply flow in on the opposite direction, so not so efficient*
- *Any price paid on forward market would be the best guess of where the DAM price is expected to be (on average).
 - *Forward market prices are the reflection of this => Cal spreads = Cal rights; Month spread = monthly rights**



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Quality of transmission rights

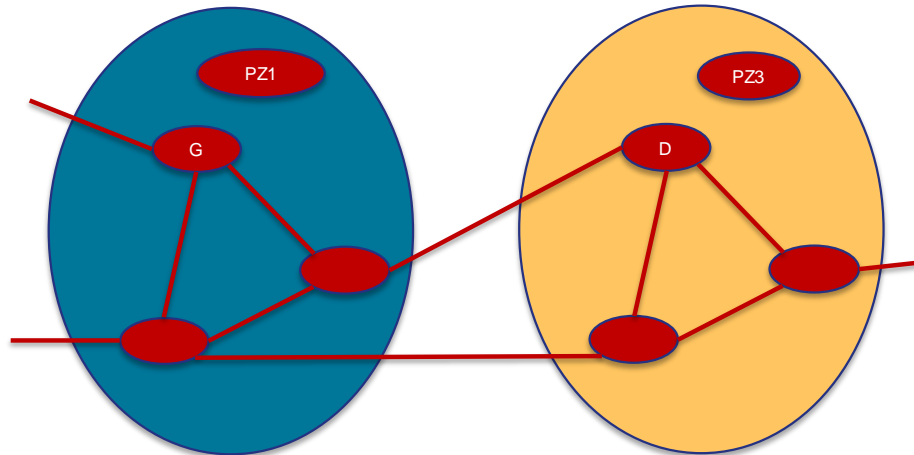
- *Clear and transparent procedures, coordinated process and are important user friendly platform are important*
- *However ... to be considered a hedge:*
 - *Forward rights should have the optionality and be financially firm*
 - *The right holder:*
 - *has the option to use the right (nomination) or get paid the value from the day ahead market (also option to return or transfer)*
 - *is entitled to the payment on the value of the DAM (with certain applicable caps to protect TSOs from risk exposure), in case of curtailment*



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Hedging instrument



+100 MW
Costs 30
EUR/MWh

-100 MW
Buys at any price*
(up to VoLL)

DAM comes with volatility and uncertainty

1. Wait and sell on DAM
 - Makes profit if market price 35 EUR/MWh
 - Makes loss if market price is 25 EUR/MWh
2. Looks at forward market
 - Cal price at PZ3 is 32 EUR/MWh
 - Ready to sell at this price and pay up to 2 EUR/MWh for Cal transmission rights

Simplified real-life example:

*EEX
Yesterday, 17/06*

*DE CAL-21 @ 38.55
FR CAL-21 @ 45.75*

*CAL transmission
right value (if auction
was today) =
spread,
7.2 EUR/MWh*



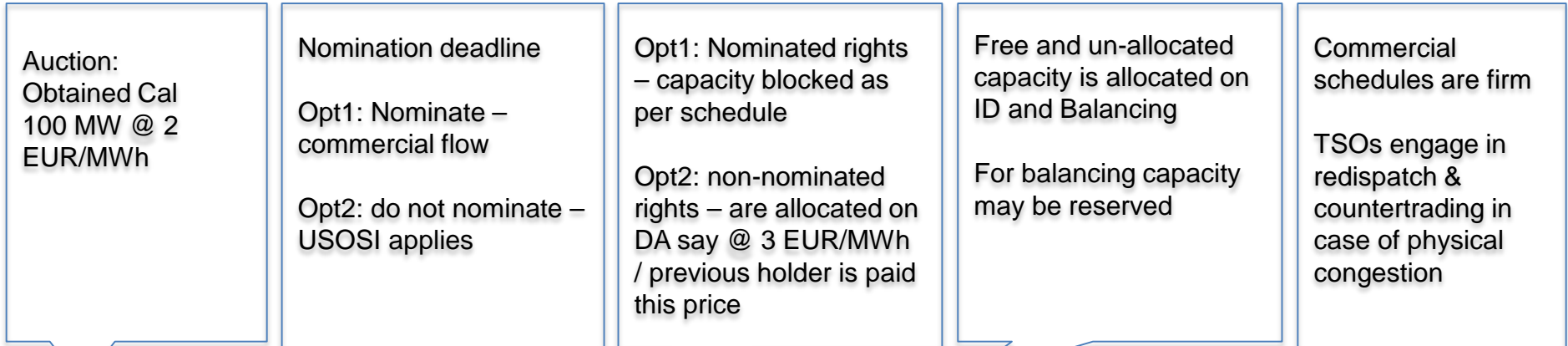
Phys vs fin financial transmission rights

- *PTRs*
 - *Options: right to nominate or get paid (UIOSI)*
 - *Obligations: us is mandatory, effectively UIOLI (history)*
- *FTRs*
 - *Options: right get paid, but not the obligation (important if value is negative)*
 - *Obligation: obligation to get paid/pay any price*
- *CfDs*
 - *Obligation: obligation to get paid/pay any price*

| | | | |
|---------------------------|----------------|----------------|-----------------------|
| Issued by TSOs | PTR Opt | FTR Opt | Similar rights |
| | PTR Obl | FTR Obl | |
| Market instruments | | CfDs | |



From allocation to use





THANK YOU FOR YOUR ATTENTION

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