Forward capacity rights as hedging instrument

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In focus

1. Key features of cross-zonal market design
2. Regulatory framework
3. European market & target model
4. Capacity calculation in the meshed networks
5. Importance of forward transmission rights and their value
6. Hedging examples
7. Types transmission rights
Key features

Market design defines how electricity is traded nationally and regionally

Key features:

1. how it deals with network constraints
2. dispatch policy
3. balancing responsibility
4. contractual relationship of market participants
Market designs

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
Trading & hedging under different designs

- 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
- No loop flows

- 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

Diagram showing different pricing models:
- Zonal pricing
- Nodal pricing
- Hybrid (nodal zones)
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!)
Zones = countries!?

Reg 714/Annex 1 (third energy package) – applicable for the CPs (for EU complemented with CACM regulation)

• TSOs shall endeavor 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
Cross-zonal market

Forward cross-border capacity products

Spot cross-border capacity + energy products

Cross-border Balancing (TSO-TSO)

- Monthly (M+1)
- Yearly (Y+n)
- Forward Market (Long term Physical/Financial rights)
- Day Ahead Market
- Intraday implicit
- Long-term and Day ahead allocated rights
- Balancing market
- Delivery of Long term and Day ahead allocated rights
- Delivery of intraday
- Delivery of real-time reserve activation, re-dispatch, countertrading...

- Daily rights implicitly allocated (daily rights + FTR or unused PTRs)
- LT PTRs used
- Intrady market
- Continuous mechanisms with complementary auctions (PXs+capacity)
- Flow-based or NTC-based
- Exchnage of balancing products offered by MPs

- 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.

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

- Exchnage of balancing products offered by MPs
- Real-time reserve activation, re-dispatch, countertrading...
Capacity calculation as TSO activity

- Ensuring third party access – a guiding principle & regulatory requirement
- Capacity calculation is very much linked with capacity allocation
- Allocation is market activity with objective to ensure efficient and optimal use of resources
- The available capacity should be set at the maximum levels consistent with the safety standards of secure network operation

Market: cross-border trading

Capacity calculation

Network security

Security of Supply

Network security

Market: cross-border trading
Zonal market
Why forward transmission rights

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 2 EUR/MWh for Cal transmission rights

+100 MW
Costs 30 EUR/MWh

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

Auction: Obtained Cal 100 MW @ 2 EUR/MWh

Nomination deadline
Opt1: Nominate – commercial flow
Opt2: do not nominate – USOSI applies

Opt1: Nominated rights – capacity blocked as per schedule
Opt2: nominated rights – are allocated on DA say @ 3 EUR/MWh / previous holder is paid this price

Free and un-allocated capacity is allocated on ID and Balancing

For balancing capacity may be reserved

Commercial schedules are firm
TSOs engage in redispatch & countertrading in case of physical congestion
Quality of the forward 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
Example 1:

• G sells 100 MW to D @ 35 EUR/MWh (Cal base), delivery point PZ3
• G obtains 100MW capacity @ 5 EUR/MWh
• **G and D: hedged their positions** on forward basis

Business as usual:
- Month ahead: G and D can dynamically hedge and extract some value on monthly basis / or offset
- G & D go on DAM:

1. G nominates the rights and matches its contract?
2. G looks at the DAM expected prices and then acts?

If price in PZ1 is 30 and PZ3 is 20?

If price in PZ1 is 30 and PZ3 is 35?

If price in PZ1 is 30 and PZ3 is 40?

What is the value of transmission rights in these cases on?
Example 2:

- G sells 100 MW to D @ 35 EUR/MWh (Cal base), delivery point PZ3
- G obtains 100MW capacity @ 5 EUR/MWh
- **G and D: hedged their positions** on forward basis

Curtailment:

- Month ahead: G and D can dynamically hedge and extract some value on monthly basis / or offset
- G & D go on DAM and 100MW is curtailed before DAM

Prices on PZ1 likely to get lower (say 25 EUR/MWh)
Prices on PZ3 spike (say 50 EUR/MWh)

Value of the rights?

- If the curtailed rights are not compensated, G will have to buy at high price in PZ3 to fulfill its contract
- If the curtailed rights are compensated, G will have to buy at high price in PZ3 to fulfill its contract, but he is financially hedged
Example: hedging strategies

Example:
Power plant with 50% efficiency: input of 2 units of gas to produce 1 unit of power (no CO2)

(1) Strategy “hedge and sleep”

T1: forward gas 22 €/MWh; power 50 €/MWh
  ⇒ Forecast: Plant margin: 6 €/MWh => plant will run
  ⇒ Hedging: Sell power, buy gas, margin of 6 €/MWh

T2: forward gas 24 €/MWh; power 45 €/MWh
  ⇒ Forecast: Plant margin: -3 €/MWh, but already hedged at 6 €/MWh

T3: forward gas 23 €/MWh; power 48 €/MWh
  ⇒ Forecast: Plant margin: 2 €/MWh, but already hedged at 6 €/MWh

P&L: 6 €/MWh

(2) Strategy “Option Value”

T1: forward gas 22 €/MWh; power 50 €/MWh
  ⇒ Forecast: Plant margin: 6 €/MWh => plant will run
  ⇒ Hedging: Sell power, buy gas, margin of 6 €/MWh

T2: forward gas 24 €/MWh; power 45 €/MWh
  ⇒ Forecast: Plant margin: -3 €/MWh, but already hedged at 6 €/MWh
  ⇒ Sell gas, buy power, additional margin 3€/MWh

T3: forward gas 23 €/MWh; power 48 €/MWh
  ⇒ Forecast: Plant margin: 2 €/MWh, but already hedged at 6 €/MWh
  ⇒ Sell power, buy gas, additional margin 2€/MWh

P&L: 11 €/MWh
# Financial vs physical 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

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Thank You!

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