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SESSION 3 – CAPACITY REMUNERATION
Coordinating European Capacity Mechanisms: Which Way Forward?

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Agenda

- Capacity mechanisms – the new game in town
- A patchwork of national approaches – drivers of capacity mechanisms
- EC guidelines for capacity mechanisms harmonization
- Cross border participation – mapping potential approaches
- Conclusions

Capacity mechanisms – the new game in town

The historical approach for capacity mechanisms in Europe

- Historical capacity mechanisms dominated by capacity payments/ strategic reserve approaches

- In most countries without explicit capacity payment, direct tendering remains a fall back option:
  - Article 3 Directive 2003/54/EC (Directive on internal market in electricity) [repealed by 2009/72/EC]
  - *'Member states may impose on undertaking operating in the electricity sector, in the general economic interest, public service obligations which may relate to security, including security of supply'*

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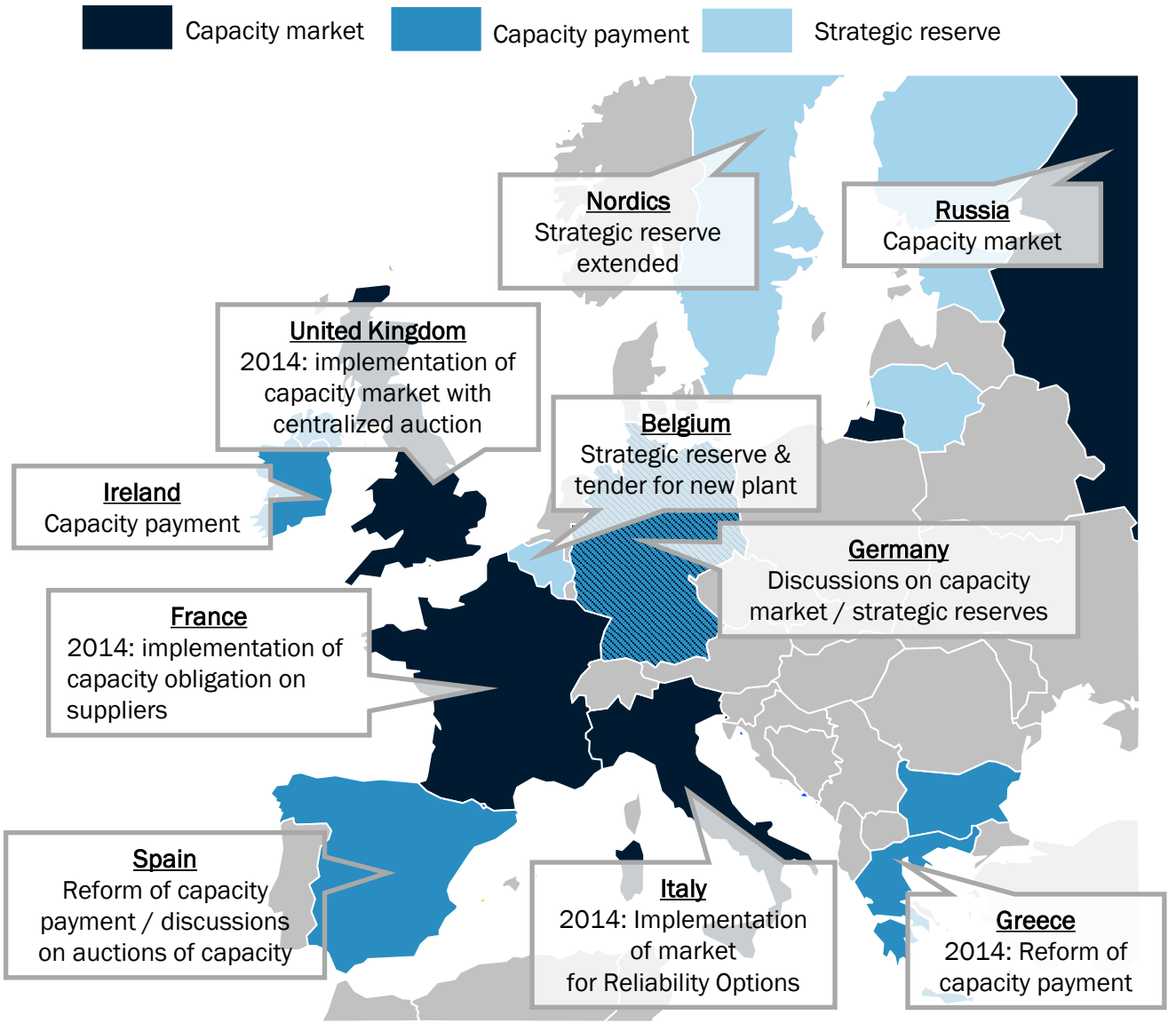
Ongoing reforms for capacity mechanisms in Europe: Toward market based approaches?



- Ongoing reforms / discussions mark a shift toward market based capacity mechanisms
- Reforms in France, Italy, and United Kindom share common structural (and permanent) approach
- Significant differences remain in the design of the different capacity markets

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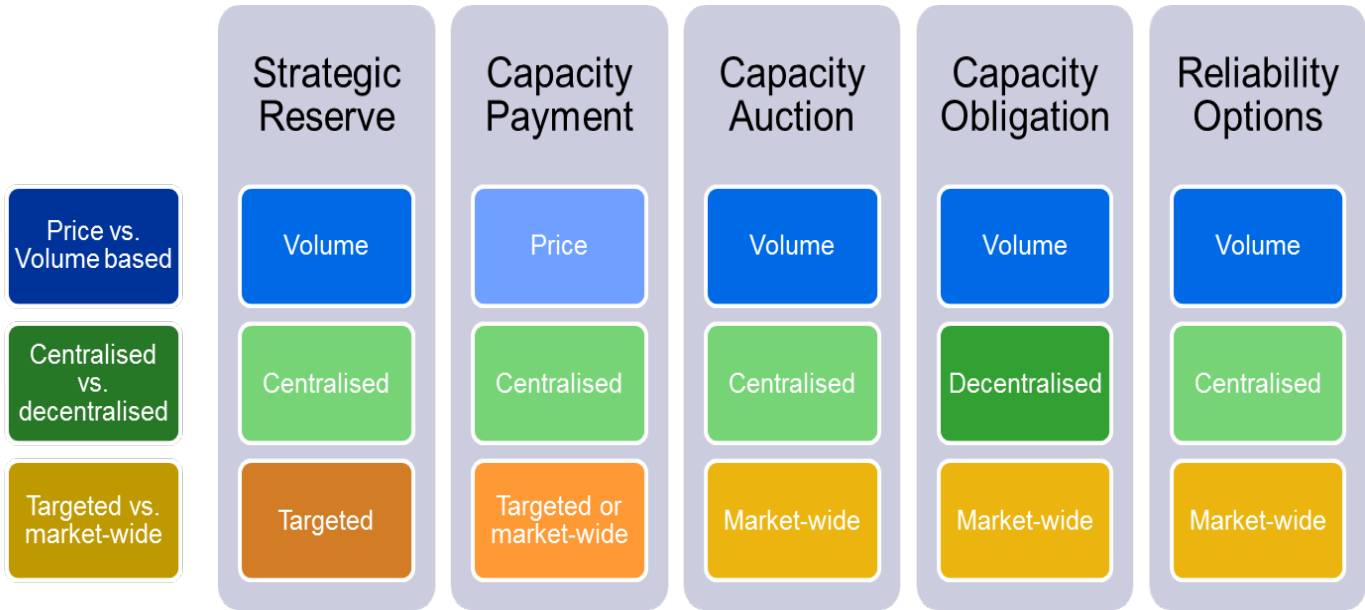
Key aspects of the different types of capacity mechanisms

Capacity mechanisms differ on key aspects such as whether the mechanism is:

- **Price-based or volume-based:** in a price-based mechanism, policymakers set price and let the market invest taken into account this stimulus, whereas, in a volume-based mechanism, the capacity requirement is defined and a price will emerge through a market dynamic;
- **Centralised or decentralised:** contracts can be awarded centrally or though bilateral arrangements;
- **Market-wide or targeted at specific plants or technologies:** the mechanism can reward all capacities or only a subset of them.



A patchwork of national approaches – drivers of capacity mechanisms

Drivers of capacity mechanisms: the good, the bad, and the ugly…

Economic drivers

Drivers of implementation of capacity mechanisms

- Guarantee politically determined security of supply criteria
- Provide adequate and timely investment incentives
- Address missing money issue and provide fair remuneration to all assets

- Rescue stranded thermal plants
- Smooth power prices to reduce "politically unsustainable" volatility
- Dampen investment and retirement cycles

Political drivers

- **Drivers of reform depend on many country specific factors:**
  - Existing generation mix and flexibility
  - Market arrangements
  - Level of interconnection
- **Looking forward, member states have different needs:**
  - Some countries need more dependable capacity, others need flexibility to support renewables, others are over-supplied by all measures…
  - One-size-fits-all approach unlikely to work

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Local system issues affecting capacity mechanism design

	FRANCE	GERMANY	UK	SPAIN	ITALY
Local specificities	- Thermo sensitivity of power demand (electric heating) - Growth of peak demand	- Grid constraints in the South - Nuclear phase-out - Strong RES growth	- Large retirements of thermal plants - Limited interconnection - Strong RES growth	- Weak demand - Strong RES growth - Limited interconnection - Quasi-obligatory pool	- Internal zones and grid constraints - Strong RES growth - Central dispatch
Key issues	- Peak demand growth (+25% in 10 yrs.) - Missing money for peaking plants - Low profitability of CCGTs	- Capacity needs in the south - Need for flexibility - Low profitability of CCGTs	- Major investment needs ('capacity gap') - Retirements driven by LCPD and IED - Need for flexibility	- Overcapacity and low profitability of CCGTs - Need generation back-up due to RES penetration	- Overcapacity and low profitability of CCGTs - Coordination of generation and network investment - Need for flexibility
Main objectives of CM	- Maintain generation adequacy - Development of demand-response - Robust to exercise of market power	- Retain existing capacity in the south & drive new investment - Ensure availability of flexible back-up generation	- Maintain generation adequacy - Drive new investment in CCGTs - Ensure availability of flexible back-up generation	- Incentivize availability and flexibility of existing plants - Manage smooth rebalancing / avoid massive retirements - Limit price spikes & volatility	- Incentivize availability and flexibility of existing plants - Manage smooth rebalancing / avoid massive retirements - Robust to exercise of market power

Other elements of energy market design affect capacity mechanism choice

Convergence?

	Ireland	ES, PT, IT	Nordic, CWE	GB
Forward Market	• No meaningful forward market	• Financial forward market	• Financial and physical forward markets	• Mainly physical forward market
Day Ahead	• Central dispatch • Traded volumes/ prices not firm • Locational bidding	• Quasi-mandatory day-ahead auction • Locational bidding	• DA auction with strong market support • Portfolio bidding	• No particular significance of DA • Portfolio bidding
Intraday	• D-1 gate closure • No intraday market	• Intraday auction slots • H-4 gate closure or more	• Continuous trading • H-1 gate closure (or less being considered)	• Continuous trading • H-1 gate closure
Capacity	• Fixed capacity payment	• Capacity and availability payment	• Strategic reserve (Nordics, Be, De?) • Decentralized capacity market (Fr)	• Centralized forward capacity market

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EC guidelines for capacity mechanisms

Where to start to harmonize / coordinate CRMs?

Key issues

- Will there be capacity leakage – i.e cross subsidization of capacity across borders?
- Will capacity mechanisms affect the location of new investments?
- What will be the energy price effects of capacity mechanisms on neighbouring markets?
- What will be the impact on interconnection flows, and on the utilisation of interconnectors?

Steps for an integrated approach

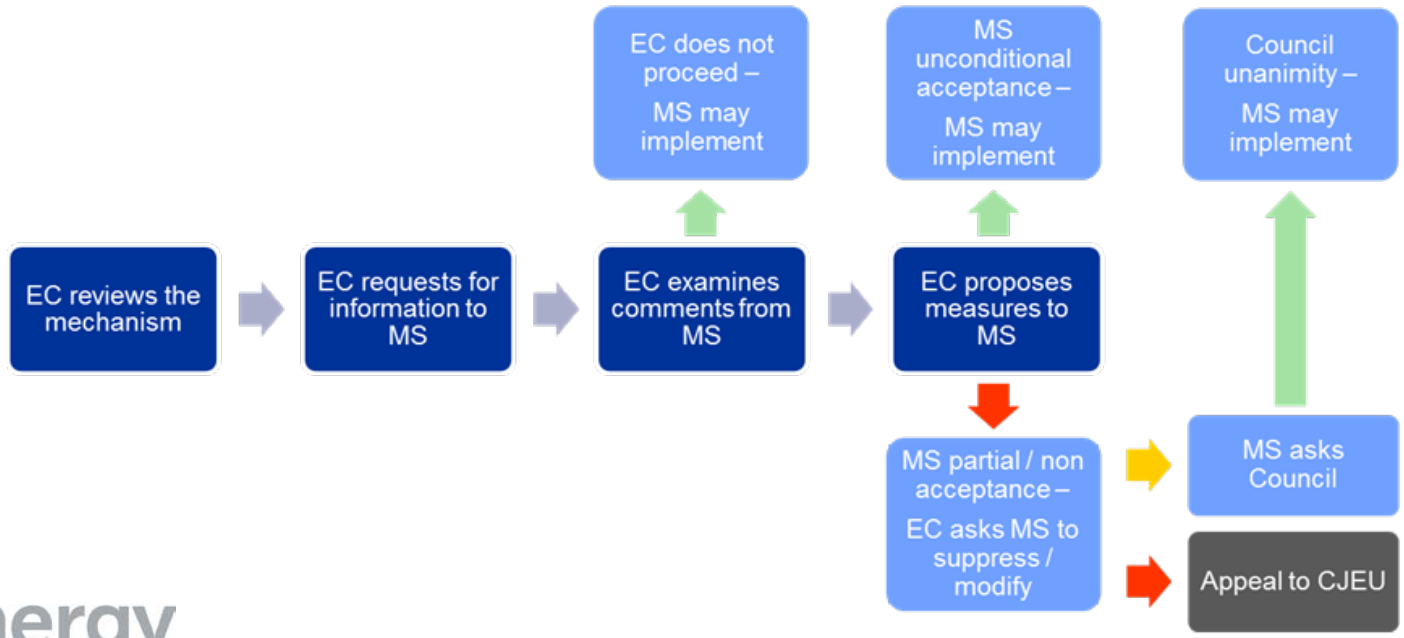
- Define a common reliability standard criteria (e.g. loss of load probability)
- Common methodological framework for resource adequacy assessment (ENTSOE work underway)
- Define common certification & verification procedures for plants & DSM by harmonizing TSO's practices
- Develop a cooperation framework, including operational rules, to deal with situations of system stress
- Identify best practice and define guidelines for design of CMs

Process for state aid assessment by the European Commission

- **According to articles 107 and 108 a measure amounts to State aid, if the following criteria are met:**
  - involve a transfer of aid through State resources;
  - entail an economic advantage for undertakings;
  - distort competition by selectively favouring certain beneficiaries; and
  - produce an effect on intra-Community trade.

- **Certain categories of aid may be considered compatible with the internal market, when meeting certain criteria** (such as regional development, R&D, environmental protection and rescue/restructuring of failing firms).

- **Where aid is not automatically exempted, it is necessary to notify aid to the Commission, who then balances the necessity and the proportionality of the aid measure versus the distortion of competition brought about by it.** The process to be followed to assess potential state aid measures is depicted in the Figure below:



Criteria introduced by the EC Guidelines on State aid for environmental protection and energy (April 2014)

- **Contribution to a well-defined objective of common interest**
  - The objective of the measure may vary but needs to be consistent with ENTSO-E adequacy analyses; and
  - It should not contradict the objective of phasing out environmentally harmful subsidies.
- **Need for State intervention to be demonstrated**
  - Impact of RES development, but also on remaining regulatory and market failures.
- **Appropriateness of the aid measure**
  - The CM should be open to both existing and future generators, as well as storage or DSR; and should take into account the potential contribution of interconnection.
- **Incentive effect**
  - The aid should not change the behaviour of the market players.
- **Proportionality of the aid (aid to the minimum)**
  - A competitive bidding process is recommended to lead to reasonable rates or return; and
  - The measure should be designed so that the price paid tends to zero when the level of capacity supplied is adequate
- **Avoidance of major undue negative effects on competition and trade between Member States**
  - There should be no discrimination aside technical performance required
  - Operators from other member states should be allowed to participate where it is physically possible;
  - Negative effects on the internal energy market should be avoided, e.g. price caps or bidding restrictions; and
  - The measure should not reduce incentives to invest in interconnection or undermine generation investment.
- **Transparency of aid**:
  - Need for easy access to all relevant acts and to pertinent information about the aid awarded thereunder.

Cross border participation – mapping potential approaches

Rationale for participation of interconnected capacity in capacity mechanisms

Operational (dispatch) efficiency

- **Impact of CM on power prices depends on price setting behavior**
  - If price-setting behaviour is based on SRMC +markup) and consistent across the two markets

    => no distortion to plant dispatch
  - If one market has prices based on SRMC whilst the other market has prices clearing at SRMC + markup

    => distortions of merit order leading to a welfare loss
- **Impact of including interconnection capacity in the CM depends on generator's incentives**
  - Interconnector owner / operator will capture part (or all) of the value

Dynamic (investment) efficiency

- Not taking into account interconnectors in the capacity assessment would result in more domestic generation than necessary to meet peak demand
- Capacity payment in one country may favour investment in new generation units in this country, at the detriment of neighbouring countries without CM
- Excluding interconnectors from the CM revenues will result in underinvestment in interconnection and over investment in domestic capacity (assuming investment in interconnection is merchant)

Alternative approaches for cross border participation in CM

	No participation by interconnectors	Interconnection specific capacity payment	Participation by non-GB generation	Participation by interconnectors
Key features	■ Interconnector contribution to security of supply assessed ■ Netted off overall volume required to be procured ■ No payment to interconnectors	■ As per first option albeit interconnector remunerated ■ May be based on CM clearing price (or other)	■ Non GB generation can participate ■ Must demonstrate that has sufficient interconnection rights	■ Interconnector participates in CM ■ Acts as intermediary between CM and non-GB generation
Assessment	■ Easiest implementation ■ Undermines dynamic efficiency (underinvestment in interconnection)	■ Same as first option with improved investment incentives in interconnection	■ Complex implementation ■ Investment incentives in interconnection depend on split of revenues with generators ■ Need for mechanism to allocate interconnection capacity	■ Potentially easier implementation ■ Strong investment incentives as interconnection captures full value of CM ■ Key issue lies in ability of interconnector operator to control power flow

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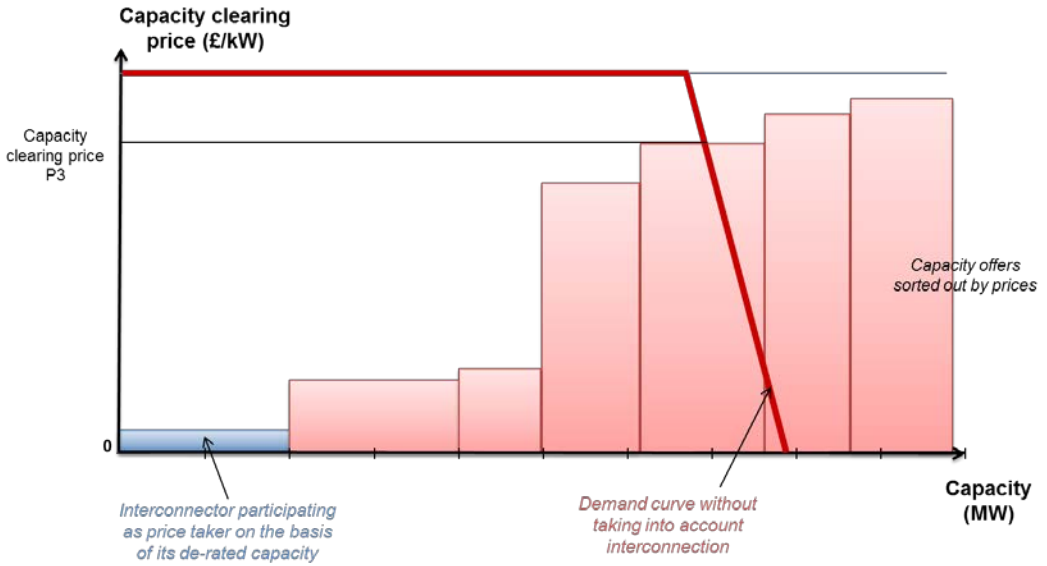
Impact of cross border participation on capacity prices depends on bidding behaviours

- Direct foreign generators' or interconnection participation in CM
  - Does not necessarily lead to higher competition
  - Does not necessarily lower costs for consumers
  - Bidding rules may influence the outcome (e.g. price taker / price maker rules in GB CM)

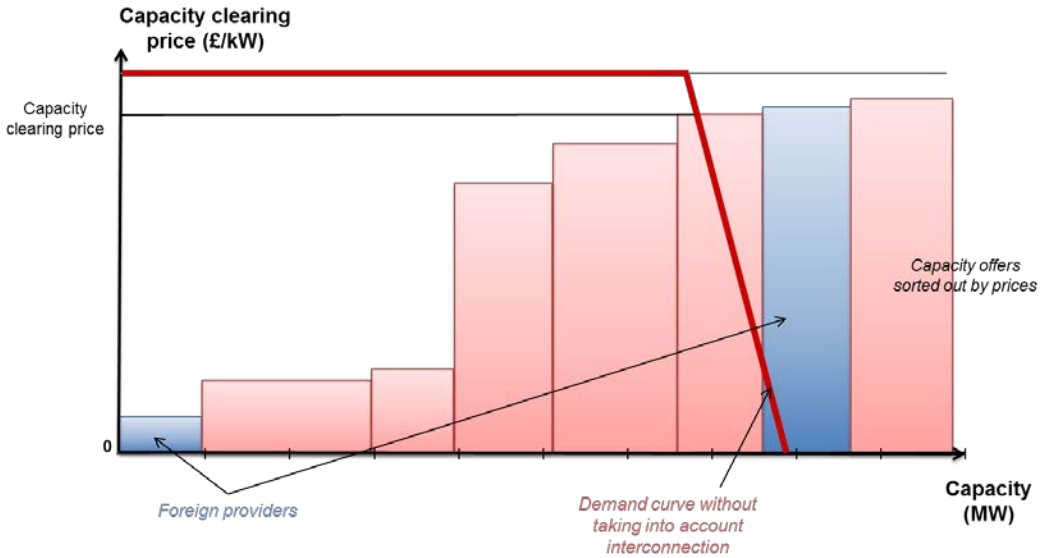
BUT

  - May give long-term signals to drive investments and limit dynamic investment inefficiencies

Capacity offers and demand with interconnector's direct participation



Capacity offers and demand with foreign generators' direct participation



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The devil is in the implementation details

- **The key challenge with interconnection's or foreign generators' participation is to make sure they actually provide capacity products comparable to national capacity providers, while:**
  - having no / limited negative impact on the energy market efficiency
  - being compatible with the target model: e.g. flows are determined by energy price differentials
  - not being discriminatory with them by putting too burdensome constraints they cannot manage

- **What is capacity? Two types of capacity products are often considered:**
  - capacity associated with **delivery of energy during specific periods** (e.g. UK)
  - capacity associated with **delivery or option to deliver energy during specific periods** (e.g. France, Italy)

- **Meeting the obligation associated with participation in the CM depends on different aspects, including:**
  - Availability of interconnector (depends on the interconnector)
  - Availability of generation in the foreign country (depends on foreign generators)
  - Direction of flows (depends on market rules and prices in both countries)

- **In the case of direct foreign generators participation, different approaches are possible for the allocation of interconnection capacity and remuneration of interconnection**
  - Explicit reservation of interconnection capacity (US approach) – not compatible with EC Target Model
  - Non GB participants acquire interconnection rights after bidding in CM
  - Non-GB generators acquire interconnection "tickets" through an auction before bidding into CM

  => Process and timing for allocation of interconnection capacity will have a large impact on split of revenues between generators and interconnector as well as economic efficiency

Possible approaches for foreign generators' reservation of interconnection capacity

	No constraints on interconnection access	Acquisition of transmission rights	Acquisition of specific interconnection "tickets"	Reservation of transmission capacity
Key features	■ Same obligation as national generators: either be available or generate ■ No constraint on the interconnection access / use	■ Same obligation as national generators ■ In addition, obligation to acquire transmission rights (and potentially nominate them)	■ Foreign generators have to acquire specific "tickets" to allow them to participate in the CM ("explicitly" or "implicitly") ■ Same obligation as national generators with adapted penalty regime	■ I/c capacity withdrawn from the market and reserved for SOS situations ■ Delivery on energy possible through the reserved i/c capacity
Assessment	■ All capacity revenues on foreign generators: no incentives to build new i/c + additional risk on i/c ■ No guarantee (neither physical nor financial) that contracted foreign generators contribute to national SoS	■ Same as previous options: ▪ Obligation to acquire TRs likely to have limited impact on i/c revenues ▪ Obligation to acquire / nominate TRs has no / limited impact on effective cross-border flows	■ Complex implementation: ▪ needs certification and monitoring procedures ▪ question of geographical scope (only neighbouring countries?) ■ No physical guarantee ■ Investment incentives in interconnection OK ■ "implicit" approach efficient	■ Inefficiencies in the energy market (reduced social welfare, higher prices in tight margin country) ■ Not compatible with target model

Conclusions

Conclusions

- **Drivers for implementation of CMs differ across member states and explain patchwork of approaches**
  - Concerns about resource adequacy, intermittency, & stranded assets drive different design choices
  - "One-size-fits-all" approach unlikely to work, but potential for regional harmonization

- **EC State Aid guidelines a first (insufficient) step toward coordination of CMs**
  - Non discrimination between generation and DSR, as well as inclusion of cross border capacity
  - Need to define a common security standard, and a common methodological framework
  - Need for TSO cooperation to define common certification and verification procedures, as well as operational procedures in situations of system stress

- **Inclusion of foreign resources into national CM yields potential benefits**
  - Operational (dispatch) efficiency: impact of distortions on energy prices unlikely to be significant
  - Dynamic (investment) efficiency: potentially large welfare gains as exclusion of interconnectors from CM would lead to underinvestment in interconnection and over investment in domestic capacity

- **Options for cross border participation in CM: direct or indirect interconnector participation?**
  - In the case of direct interconnection participation in CM, key issue is estimating potential sources of interconnector unavailability for derating assessment and defining appropriate penalty
  - In the case of direct foreign generators participation, different approaches are possible for the allocation of interconnection capacity and remuneration of interconnection

Thank you for your attention

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