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Which market design for Europe? The role of capacity mechanisms

King's College London, College of Europe conference

Capacity mechanisms in Europe – The fundamental issues behind the ongoing sector inquiry

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Agenda

- What are the drivers of capacity mechanisms?
- Energy only or capacity mechanism?
- Debunking myths about capacity mechanisms
- How to ensure cross border participation in capacity mechanisms?
- Conclusions

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
- Address market failures affecting security of supply (missing money)
- Support timely investment

- 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 embedded 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 well supplied by all measures…

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How much harmonization is necessary ?

A wide range of market arrangements across Europe…

	Model 1: Ireland	Model 2: ES, PT, IT	Model 3: Nordic, CWE	Model 4: GB
Forward Market	▪ No meaningful forward market	▪ Financial forward market	▪ Financial and physical forward markets	▪ Mainly physical forward market
Day Ahead	▪ Central dispatch with complex bids\offers ▪ 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 forward capacity market (Fr)	▪ Centralized forward capacity market

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… which suggests harmonization of CM will be as challenging

Drivers of capacity mechanisms

Member states have different issues and needs…

	FRANCE	GERMANY	UK	SPAIN	ITALY
Local specificities	- Thermo sensitivity of power demand (electric heating) - Peak demand growth	- Grid constraints from North to 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-mandatory pool	- Internal zones and grid constraints - Strong RES growth - Central dispatch
Key issues	- Peak demand growth (+25% in 10 years) - Missing money for peak plants - Low profitability of CCGTs	- Capacity needs in Southern Germany - Flexibility needs - Low profitability of CCGTs	- Major investment needs (capacity gap) - Retirements driven by Large Combustion Plant Directive and Industrial Emissions Directive - Need for flexibility	- Overcapacity and low profitability of CCGTs - Generation back-up necessary due to RES penetration	- Overcapacity and low profitability of CCGTs - Coordination of generation and network investment - Flexibility needs
Main objectives of capacity mechanisms	- Ensure generation adequacy - Support the development of demand response - Prevent market power abuses	- Retain existing capacity in the Southern Germany & drive new investment - Ensure availability of flexible back-up generation	- Ensure generation adequacy - Drive new investment in CCGTs - Ensure availability of flexible back-up generation	- Incentivise availability and flexibility of existing plants - Manage smooth rebalancing / avoid massive retirements - Limit price spikes & volatility	- Incentivise availability and flexibility of existing plants - Manage smooth rebalancing / avoid massive retirements - Prevent market power abuses

=> This suggests that a 'one-size-fits-all' approach is unlikely to work

Energy only or capacity mechanism?

Energy only or capacity mechanisms?

Scarcity pricing is key…

Available online at www.sciencedirect.com
ScienceDirect
Utilities Policy 16 (2008) 171–183

www.elsevier.com/locate/jup

Market design for generation adequacy: Healing causes rather than symptoms☆

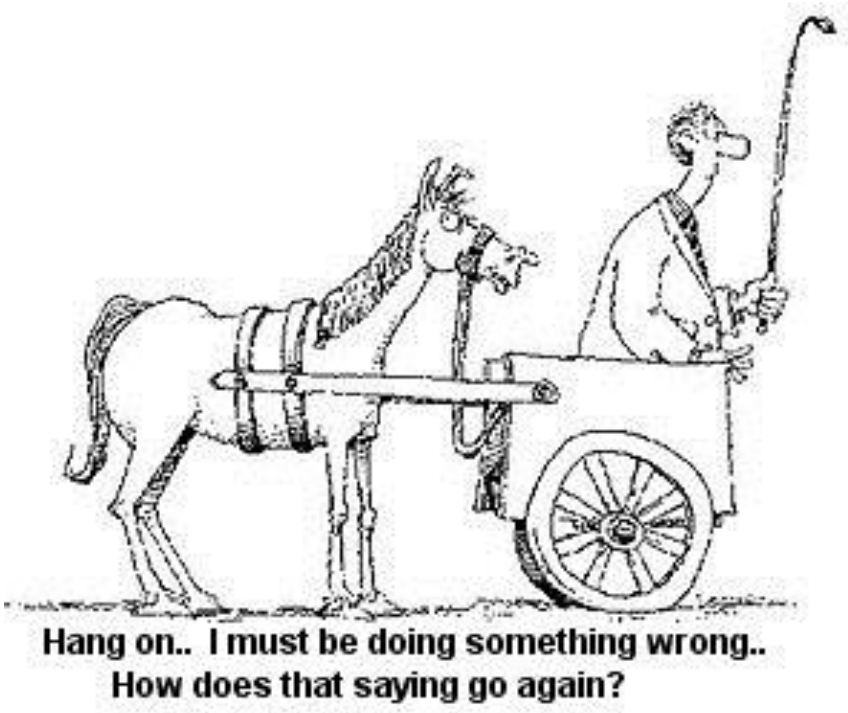
Fabien A. Roques*

- *"Electricity market reform and particularly the need for complementary mechanisms to remunerate capacity need to be analysed in the light of the local regulatory and institutional environment.*
- *If there is a lack of investment, the priority should be to identify the roots of the problem.*
- *The lack of demand-side response, short-term reliability management procedures and non-market ancillary services provision often undermine market reflective scarcity pricing and distort long-term investment incentives"*

Energy only or capacity mechanisms?

...But risk hedging mechanisms are necessary

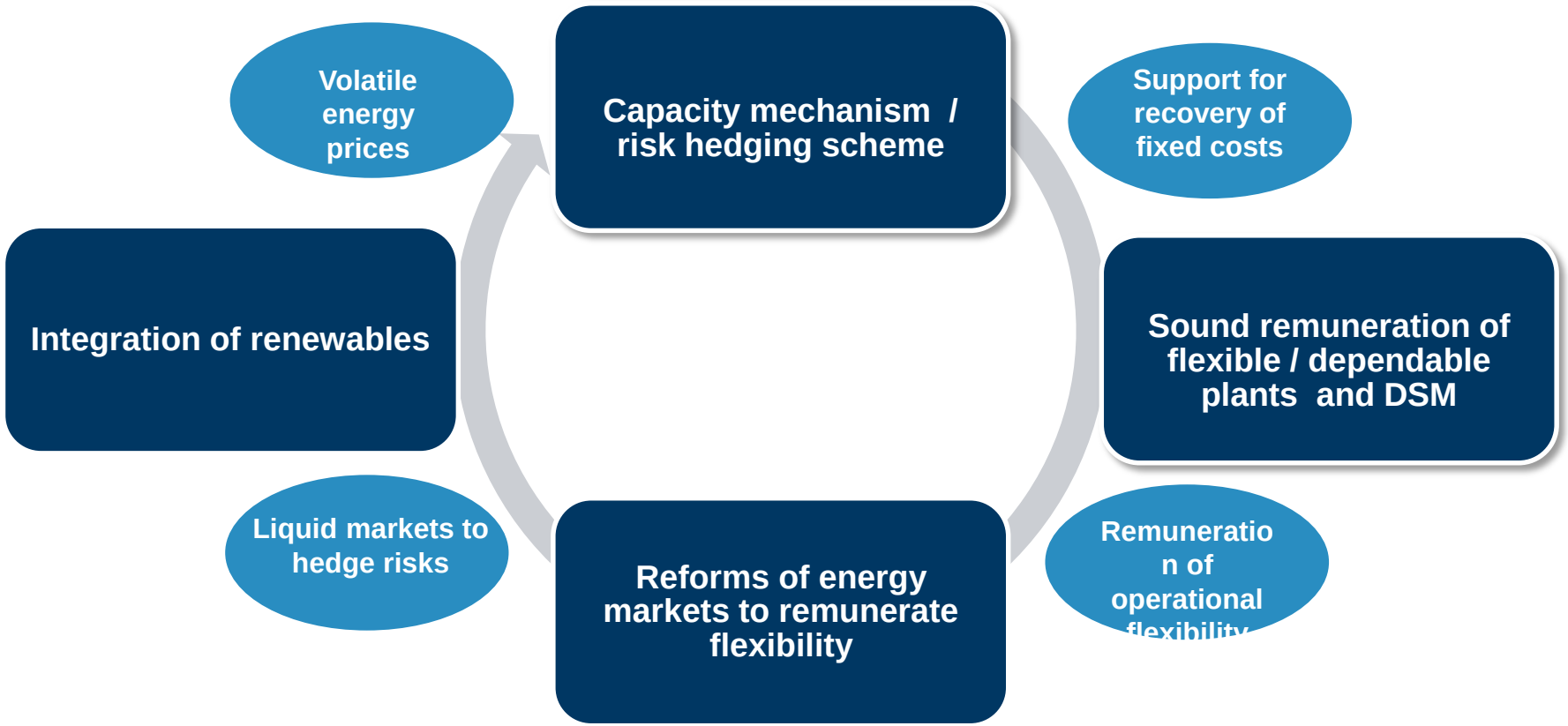
- **The old saying goes "Don't put the cart before the horse"**



- **Can all parties (including renewables operators) exposed to market price risks hedge their risk exposure?**

- **Scarcity pricing needs to be supplemented by hedging products / fixed cost recovery mechanisms**
  - There are - rare – cases of voluntary long term hedging mechanisms (CFDs, reliability options in Australia)
  - In case of missing market / product for hedging, consider legal obligations on suppliers or centralized procurement of forward capacity / hedging products

Conclusion: scarcity pricing and capacity mechanisms are complimentary



Debunking myths about capacity mechanisms

Debunking myths

4 misconceptions about capacity mechanisms

1. **There is a choice between two opposite directions : scarcity pricing or capacity mechanisms**
2. **Capacity mechanisms are subsidies to stranded assets**
3. **A capacity mechanism will remove price spikes necessary to stimulate efficient system response**
4. **Capacity mechanisms defined nationally are distorting EU energy markets**

⇒**These incorrect common beliefs derive from:**

- Biased comparison of a perfect theoretical energy only market with an imperfect capacity mechanism
- Misunderstanding of the interface between energy market and capacity mechanisms

Debunking myths

How do energy and capacity markets interface?

- **What are the concrete interactions between energy and capacity mechanism?**
  - **Short term dispatch effects**
    - No effect on spot market unless capacity product is linked to physical injection (none if product based on availability), and even in this case limited to crisis situations
    - Second order effects associated with changes in maintenance schedules, etc.
    - No impact on cross border flows unless specific curtailment / redispatch rules are implemented
  - **Long term mix effects**
    - Different generation mix (changes in plant retirements / investment decisions): overcapacity only if target capacity not aligned with reliability criteria determined by policy makers
    - Design parameters (technology neutrality, market based, etc.) critical to drive potential deviations from optimal mix (peak versus base load, supply versus demand, etc.)
- **Are the potential effects of these interactions significant?**
  - **Short term dispatch effects**
    - Likely insignificant, and smaller than distortions induced by uncoordinated RES policies, national generation mix interventions (support to local fuels, nuclear phase out), ETS exemptions and carbon price floor, etc.
  - **Long term mix effects**
    - Potentially significant, but no more than RES policies / national generation mix interventions, etc.
- **How can the potential distortions be minimised?**
  - Sound design (product definition based on availibility, design parameters, etc.)

How to ensure cross border participation in capacity mechanisms?

Cross-border participation in capacity mechanisms

The different methods

	1	2	3	4	5
	No Contribution	Statistical contribution	Interconnector participation	Foreign Capacity participation	Cross-border Capacity Mechanism
	Neither interconnectors nor foreign providers contribute	Contribution evaluated statistically and deducted from capacity target	Interconnector participates directly in capacity mechanism	Foreign capacity providers participate directly in capacity mechanism	Capacity mechanisms cover several zones OR national capacity mechanisms are “coupled”
	This applies to most countries with capacity payment mechanisms (price based)	Initial GB (net 0 contribution) and French approaches (~7GW out of 9GW of import capacity)	Solution implemented in GB from 2015 onwards, work in progress in Fnrance	This has been implemented in the PJM Capacity Market	No current international examples (except zones in PJM and Italy)

The definition of capacity products is a key – particularly whether the obligation is based on energy delivery or availability

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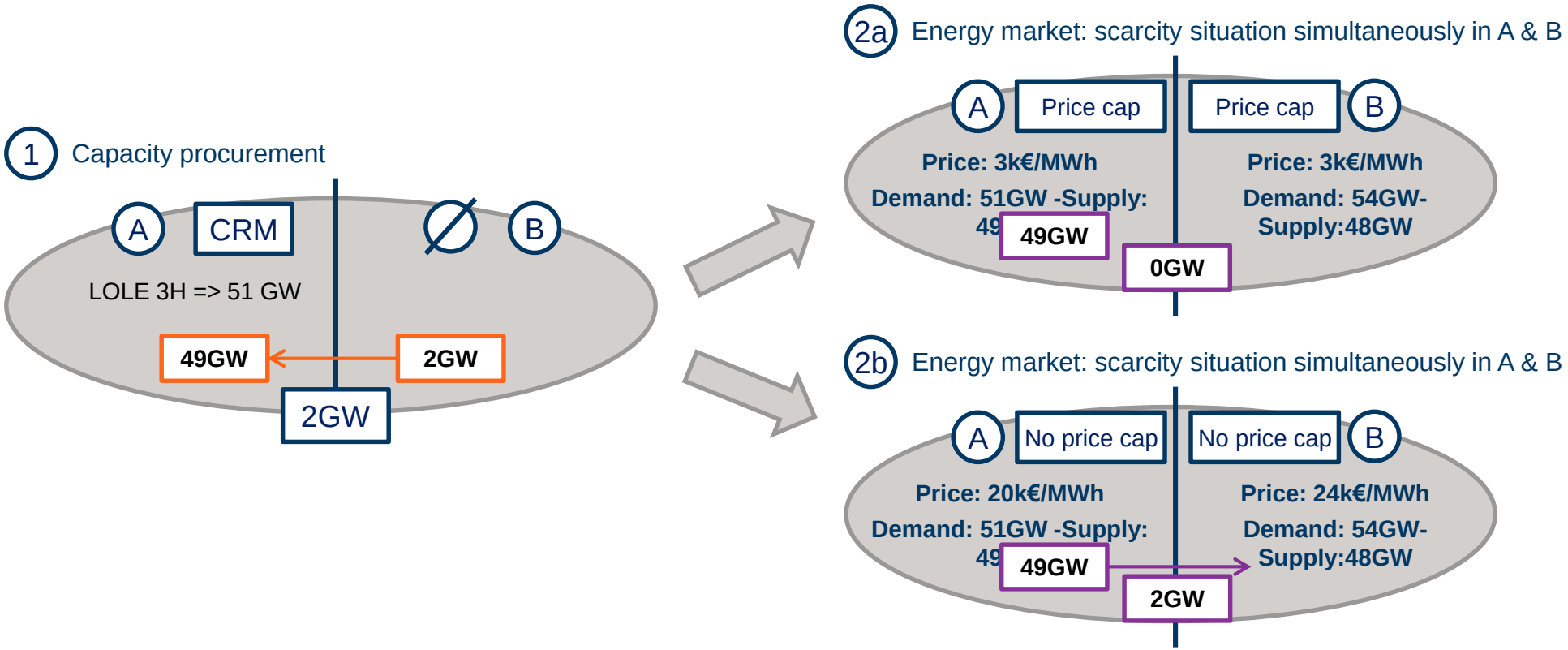
Need for a framework to deal with situations of coincidental scarcity



- In this example, country A contracted capacity up to 51GW, but only 47-49GW of its demand is satisfied depending on the situation
- **Without specific rules to control on capacity contracted abroad at times of scarcity, cross border participation has no value added in terms of security of supply over a simple statistical approach**

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Conclusions

Conclusions

- **Current European electricity markets are incomplete and do not send the right price signals:**
  - Reforms of energy markets to reward flexibility and capacity mechanisms (CMs) are both needed and complementary
  - Drivers for implementation of CMs differ across member states and explain patchwork of approaches
  - One-size-fits-all approach unlikely to work and not necessary
- **Interaction of CM and energy market are misunderstood and largely overplayed:**
  - Well designed CM will not reduce price spikes, or affect cross border flows significantly
  - Magnitude of potential distortions is small compared to distortions associated with other public interventions (RES support, etc.)
- **Cross border participation in CMs raises complex issues:**
  - Several approaches possible for explicit foreign participation with pros and cons
  - Need for a European framework to deal with situations of coincidental scarcity
- **Capacity mechanisms are only a stepping stone - long term market design challenges:**
  - TM historically focussed on short term operational issues, focus needs to turn to investment incentives
  - Risk hedging/sharing mechanisms such as long term contracts to reduce financing costs and support investment
  - Coordination mechanisms for transmission, merchant generation and policy driven clean technologies

References

Toward the Target Model 2.0 – Policy Recommendations for a sustainable market design

Web link

Publications on capacity mechanisms

- Market design for generation adequacy: healing causes rather than symptoms Web link
- Coordinating capacity mechanisms – which way forward? Web link
- European electricity market reforms: the "visible hand" of public coordination Web link

Publications on European electricity markets

- The new European Energy Union - Toward a consistent EU energy and climate policy? Web link
- European electricity markets in crisis: diagnostic and way forward Web link

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Thank you for your attention

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