

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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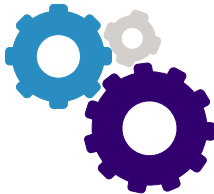
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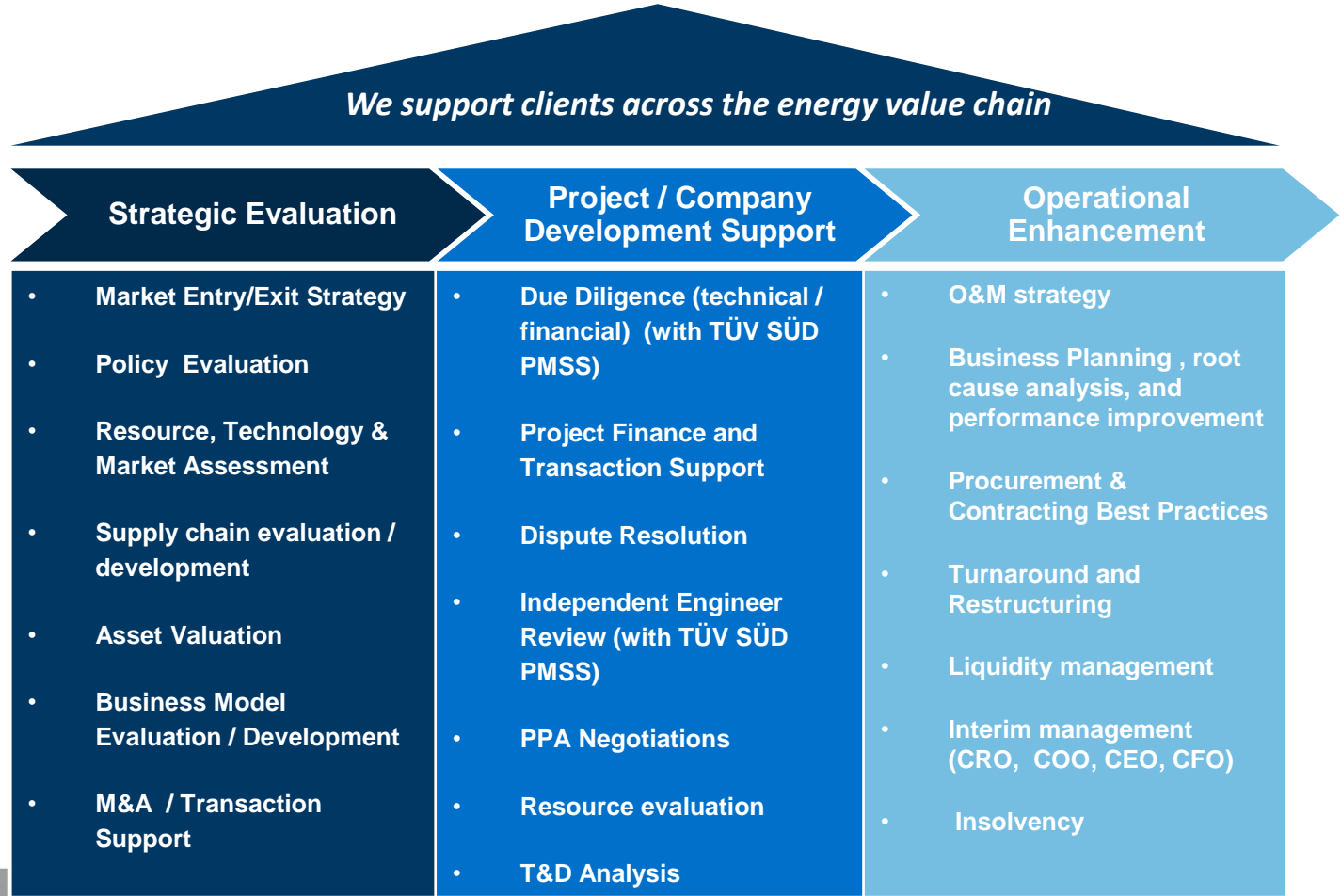


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Agenda

- 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

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...

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	<ul style="list-style-type: none"> No meaningful forward market 	<ul style="list-style-type: none"> Financial forward market 	<ul style="list-style-type: none"> Financial and physical forward markets 	<ul style="list-style-type: none"> Mainly physical forward market
Day Ahead	<ul style="list-style-type: none"> Central dispatch with complex bids\offers Traded volumes/prices not firm Locational bidding 	<ul style="list-style-type: none"> Quasi-mandatory day-ahead auction Locational bidding 	<ul style="list-style-type: none"> DA auction with strong market support Portfolio bidding 	<ul style="list-style-type: none"> No particular significance of DA Portfolio bidding
Intraday	<ul style="list-style-type: none"> D-1 gate closure No intraday market 	<ul style="list-style-type: none"> Intraday auction slots H-4 gate closure or more 	<ul style="list-style-type: none"> Continuous trading H-1 gate closure (or less being considered) 	<ul style="list-style-type: none"> Continuous trading H-1 gate closure
Capacity	<ul style="list-style-type: none"> Fixed capacity payment 	<ul style="list-style-type: none"> Capacity and availability payment 	<ul style="list-style-type: none"> Strategic reserve (Nordics, Be, De) Decentralized forward capacity market (Fr) 	<ul style="list-style-type: none"> Centralized forward capacity market

Member states have different issues and needs...

	FRANCE	GERMANY	UK	SPAIN	ITALY
Local specificities	<ul style="list-style-type: none"> - Thermo sensitivity of power demand (electric heating) - Peak demand growth 	<ul style="list-style-type: none"> - Grid constraints from North to South - Nuclear phase-out - Strong RES growth 	<ul style="list-style-type: none"> - Large retirements of thermal plants - Limited interconnection - Strong RES growth 	<ul style="list-style-type: none"> - Weak demand - Strong RES growth - Limited interconnection - Quasi-mandatory pool 	<ul style="list-style-type: none"> - Internal zones and grid constraints - Strong RES growth - Central dispatch
Key issues	<ul style="list-style-type: none"> - Peak demand growth (+25% in 10 years) - Missing money for peak plants - Low profitability of CCGTs 	<ul style="list-style-type: none"> - Capacity needs in Southern Germany - Flexibility needs - Low profitability of CCGTs 	<ul style="list-style-type: none"> - Major investment needs (capacity gap) - Retirements driven by Large Combustion Plant Directive and Industrial Emissions Directive - Need for flexibility 	<ul style="list-style-type: none"> - Overcapacity and low profitability of CCGTs - Generation back-up necessary due to RES penetration 	<ul style="list-style-type: none"> - Overcapacity and low profitability of CCGTs - Coordination of generation and network investment - Flexibility needs
Main objectives of capacity mechanisms	<ul style="list-style-type: none"> - Ensure generation adequacy - Support the development of demand response - Prevent market power abuses 	<ul style="list-style-type: none"> - Retain existing capacity in the Southern Germany & drive new investment - Ensure availability of flexible back-up generation 	<ul style="list-style-type: none"> - Ensure generation adequacy - Drive new investment in CCGTs - Ensure availability of flexible back-up generation 	<ul style="list-style-type: none"> - Incentivise availability and flexibility of existing plants - Manage smooth rebalancing / avoid massive retirements - Limit price spikes & volatility 	<ul style="list-style-type: none"> - 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?

Scarcity pricing is key...



Available online at www.sciencedirect.com



Utilities Policy 16 (2008) 171–183

UTILITIES
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www.elsevier.com/locate/jup

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

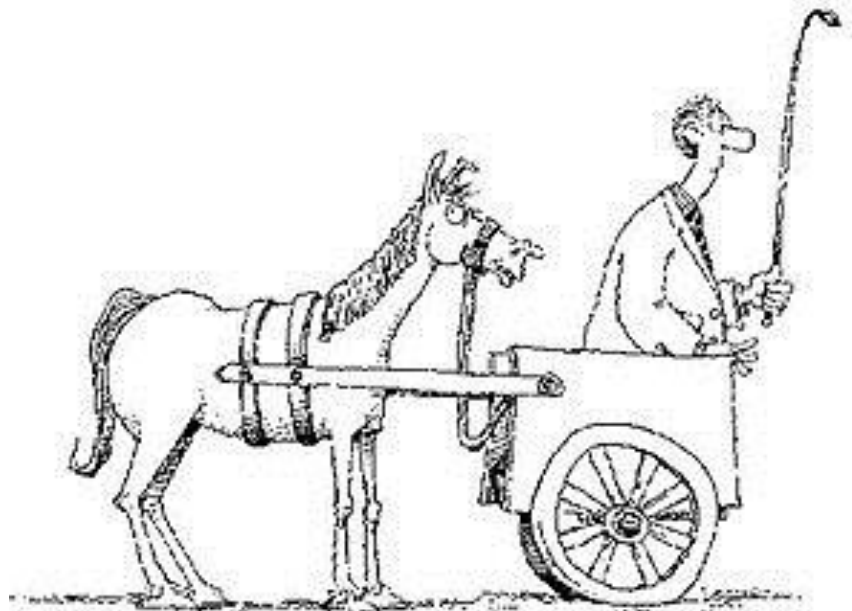
Fabien A. Roques^{*}

- *“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”

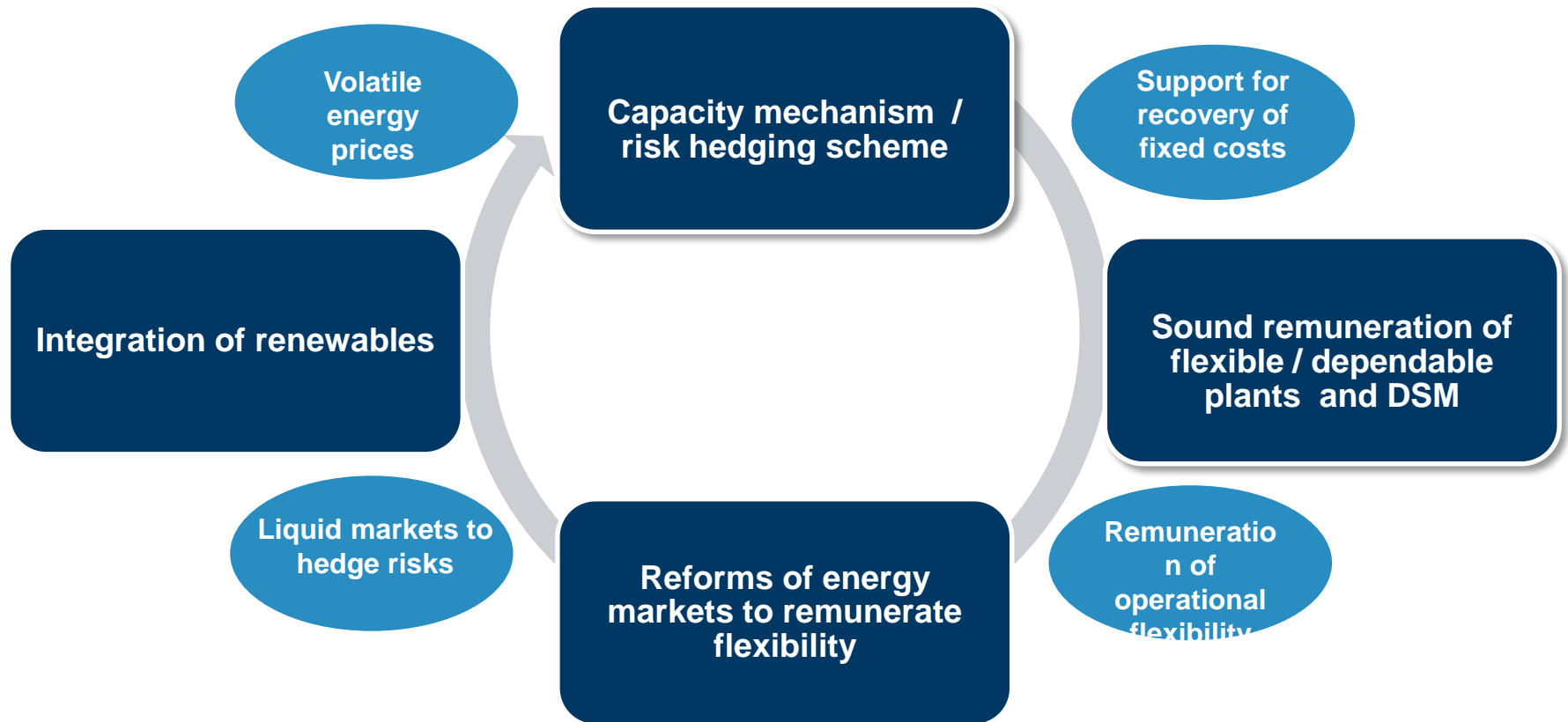


Hang on.. I must be doing something wrong..
How does that saying go again?

- 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

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

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 availability, design parameters, etc.)

How to ensure cross border participation in capacity mechanisms?

The different methods

1

No Contribution

Neither interconnectors nor foreign providers contribute

This applies to most countries with capacity payment mechanisms (price based)

2

Statistical contribution

Contribution evaluated statistically and deducted from capacity target

Initial GB (net 0 contribution) and French approaches (~7GW out of 9GW of import capacity)

3

Interconnector participation

Interconnector participates directly in capacity mechanism

Solution implemented in GB from 2015 onwards, work in progress in France

4

Foreign Capacity participation

Foreign capacity providers participate directly in capacity mechanism

This has been implemented in the PJM Capacity Market

5

Cross-border Capacity Mechanism

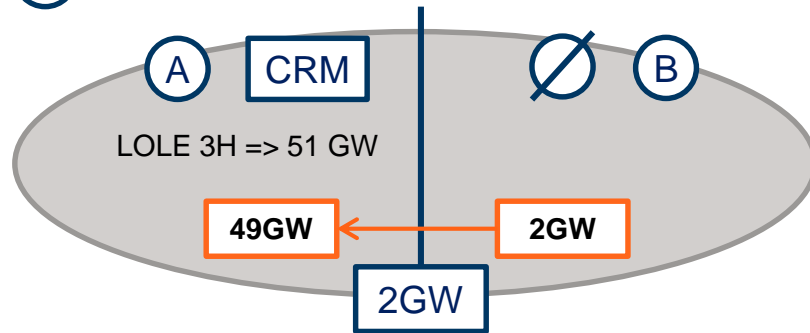
Capacity mechanisms cover several zones OR national capacity mechanisms are "coupled"

No current international examples (except zones in PJM and Italy)

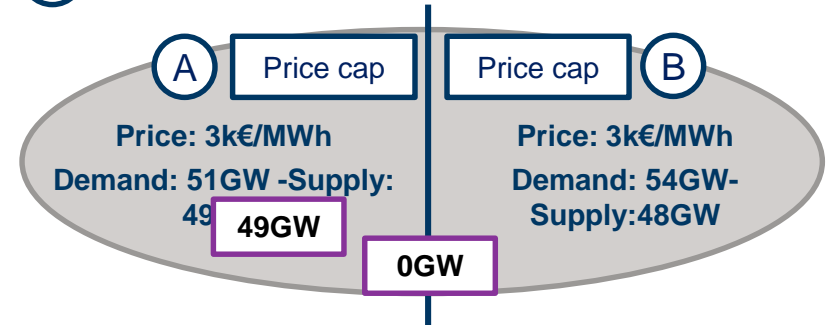
The definition of capacity products is a key – particularly whether the obligation is based on energy delivery or availability

Need for a framework to deal with situations of coincidental scarcity

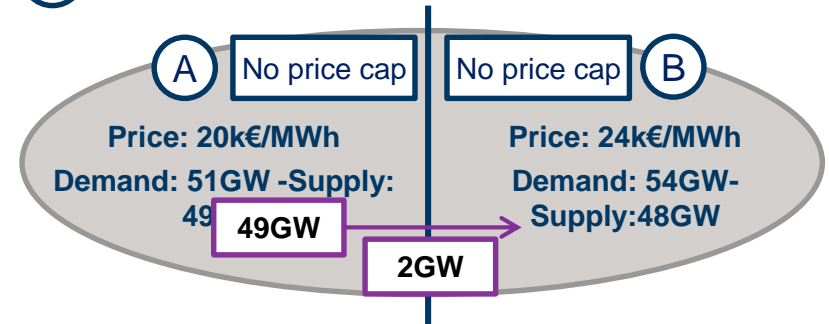
1 Capacity procurement



2a Energy market: scarcity situation simultaneously in A & B



2b Energy market: scarcity situation simultaneously in A & B



- 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**

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](#)



Thank you for your attention

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