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Electricity market design - The role of capacity mechanisms

Joint Seminar on Capacity Remuneration Mechanisms
And Inauguration of the 'World Energy Council' Think Tank - Belgium

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- 3 Nobel Laureates
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AMCF Association of Management Consulting Firms

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About FTI

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• Policy Evaluation	• Project Finance and Transaction Support	• Business Planning , root cause analysis, and performance improvement
• Resource, Technology & Market Assessment	• Dispute Resolution	• Procurement & Contracting Best Practices
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• M&A / Transaction Support	• T&D Analysis	• Insolvency

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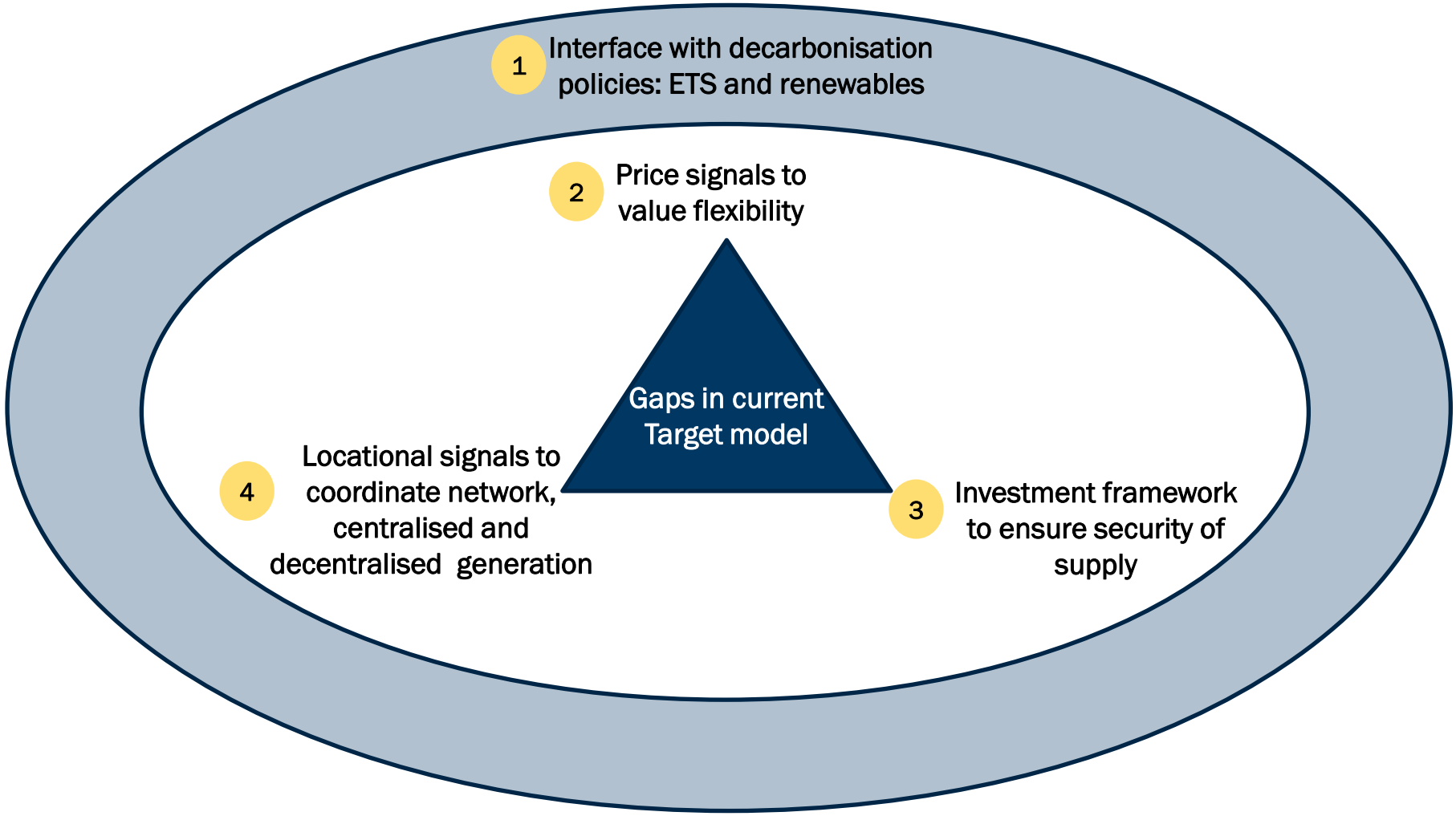
Agenda

- Key issues for European electricity markets
- What are the drivers of capacity mechanisms implementation?
- Debunking myths about capacity mechanisms
- Conclusions

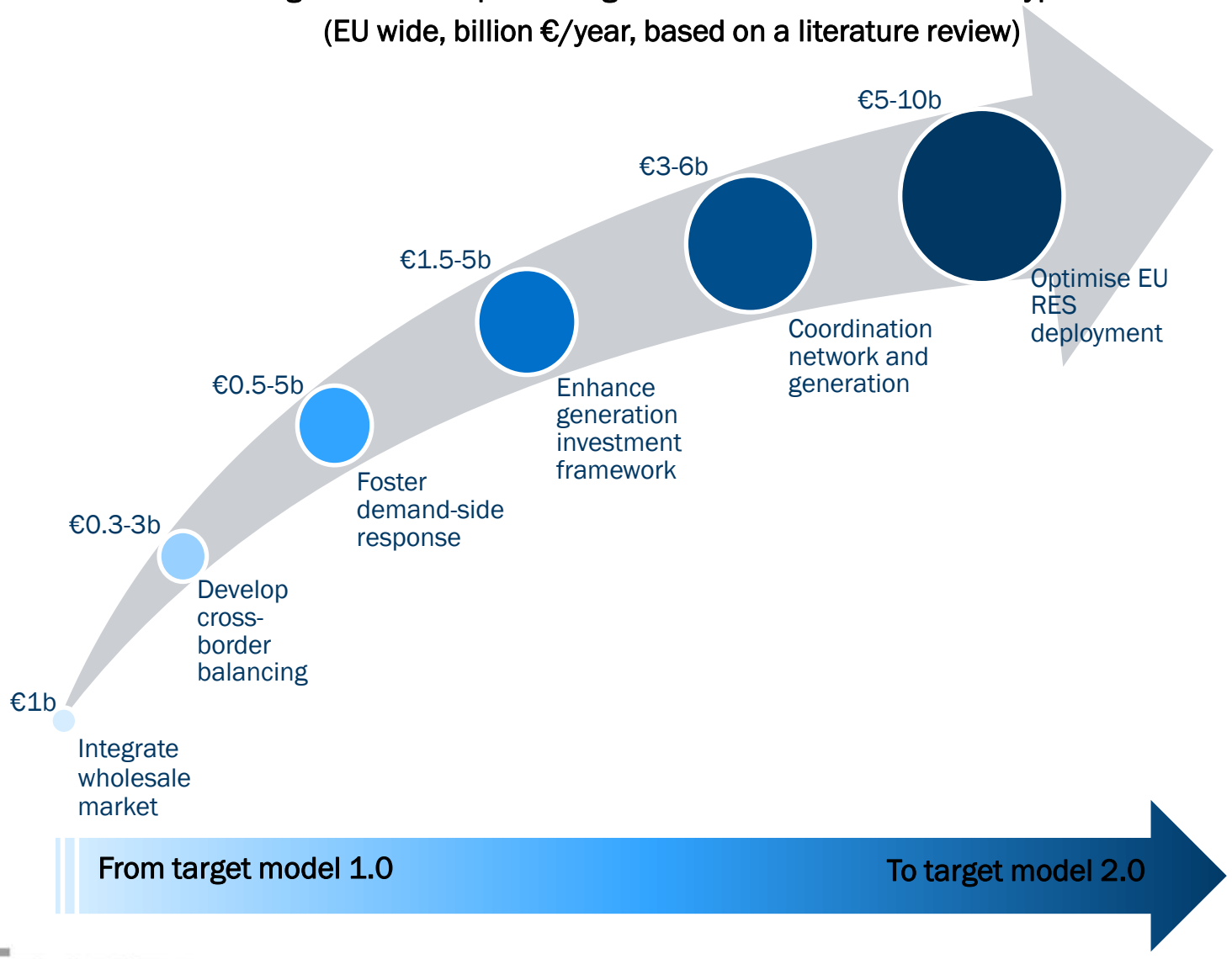
Key issues for European electricity markets

Key issues in current regulatory framework



Potential benefits of market reforms focussed on investment largely outweigh gains associated with Target Model 1.0

Orders of magnitude of the potential gains associated with different types of reforms
(EU wide, billion €/year, based on a literature review)



Drivers of capacity mechanisms

The good, the bad, and the ugly…

Economic drivers

Political 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

- **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…

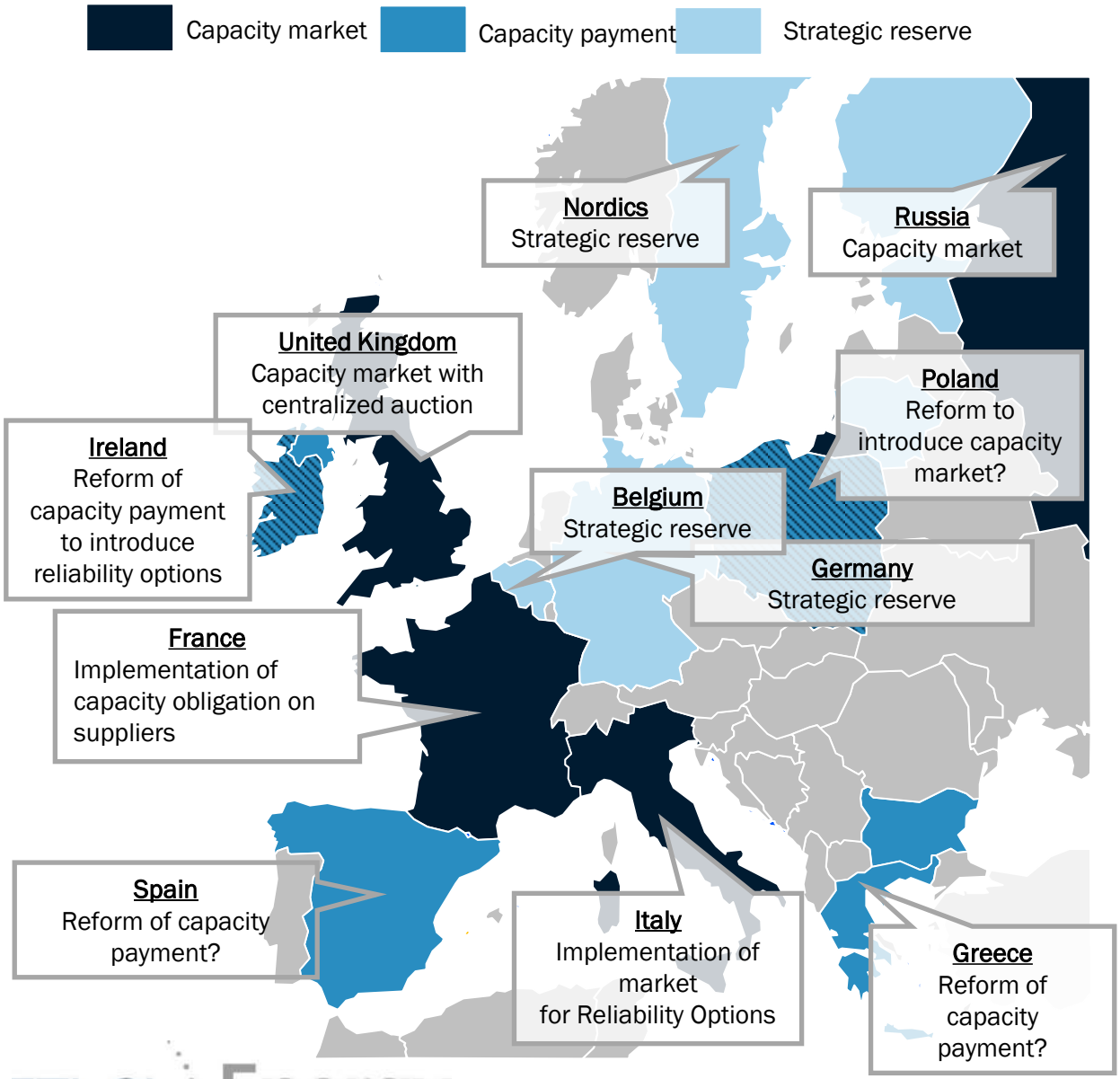
Drivers of capacity mechanisms

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

A patchwork of different capacity mechanisms across Europe



- Ongoing reforms / discussions mark a shift toward market based capacity mechanisms
- Reforms in France, Italy, and United Kingdom share common approach (volume based and market wide)
- Significant differences in local needs and type of security of supply issues explains different design choices

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Belgium has some specific drivers and constraints regarding capacity mechanisms

- Belgium has a number of specific drivers regarding capacity mechanisms:
  - Need to ensure adequacy to meet the reliability standard set by law (3 hours of LOLE)
  - Potential need for system flexibility as the mix evolves

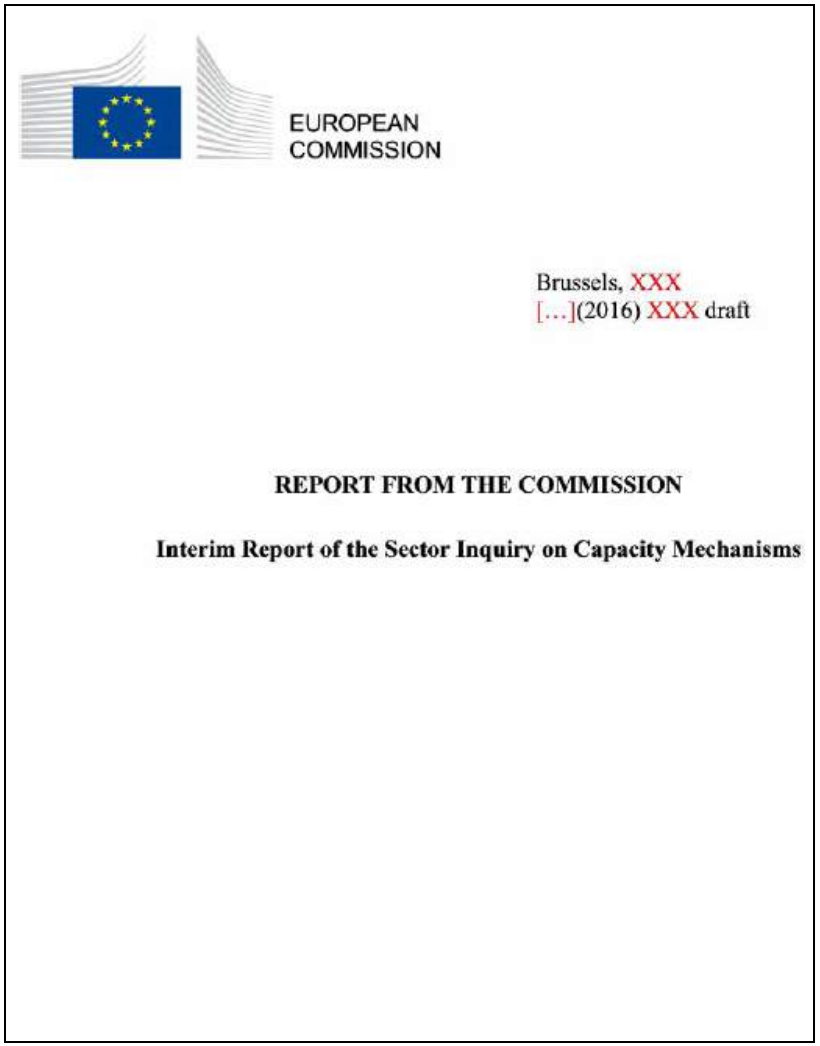
  ⇒Forward adequacy assessments suggest a need for new investment on the 2025 horizon

- Belgium has a number of specificities and constraints that need to be taken into account:
  - high **interconnection capacity**
  - relatively small size compared to some neighbouring markets
  - Relatively concentrated market

- A regional approach for a market wide capacity market would be a first best approach…

- …but there is no consensus on the way-forward in the CWE region and the compatibility of some of neighbouring countries' CM with European rules is still under investigation by the Commission (e.g. France)

Commission Sector Inquiry on Capacity Mechanisms



EUROPEAN
COMMISSION

Brussels, XXX
[…](2016) XXX draft

REPORT FROM THE COMMISSION

Interim Report of the Sector Inquiry on Capacity Mechanisms

- The interim report of the Commission staff on the sector inquiry on capacity mechanisms documents the key issues with CM but leaves options open:
  - **Capacity payments** are the least favoured option, mainly because they do not provide a market-based price signal for adequacy.
  - **Capacity markets** are recognised to address market failures related to generation adequacy, but the Commission stresses on the difficulty to implement these mechanisms. The Commission gives preference to a centralised mechanism, considering that it is more competitive.
  - **Tenders and strategic reserves** could be transitory measures to attract necessary new investment, possibly in a certain location if there is a specific local need, or avoid the shutdown of useful capacity, but they do not address the underlying market failures and do not give a long-term solution to the problem.

European Commission State Aid criteria

1/ Contribution to a **well-defined objective of common interest**

2/ **Need for State intervention**

3/ **Appropriateness** of the aid measure

4/ **Incentive** effect

5/ **Proportionality** of the aid (aid to the minimum)

6/ **Avoidance of major undue negative effects** on competition and trade between Member States

7/ **Transparency** of aid

Justification	Must be a clear need for state intervention and the objectives must be clearly defined	Objective must be consistent with phasing out environmentally harmful subsidies	
Design	Aid should not change the behaviour of market players and be non discriminatory	Aid to the minimum: the amount paid should tend to zero as capacity available approaches the required level	Must have reasonable rates of return: a competitive bidding process is encouraged
International	Operators from other member states should be allowed to participate	Negative effects on the internal market should be avoided	Should not reduce incentives to invest in interconnection

⇒The State Aid guidelines provide a framework to guide CM design

⇒Main issues include: a justification of the need for intervention, maintaining aid to the minimum, being open to cross-border participation and avoiding negative effects on the internal energy market

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Debunking myths about capacity mechanisms

3 misconceptions about capacity mechanisms

1. There is a choice between two opposite directions : scarcity pricing or capacity mechanisms
2. Capacity mechanisms will distort power prices
3. Capacity mechanisms are national policies that go against European market integration

⇒These incorrect common beliefs derive from:

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

Reforms to improve scarcity pricing are key…

ELSEVIER

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

UTILITIES POLICY
www.elsevier.com/locate/jup

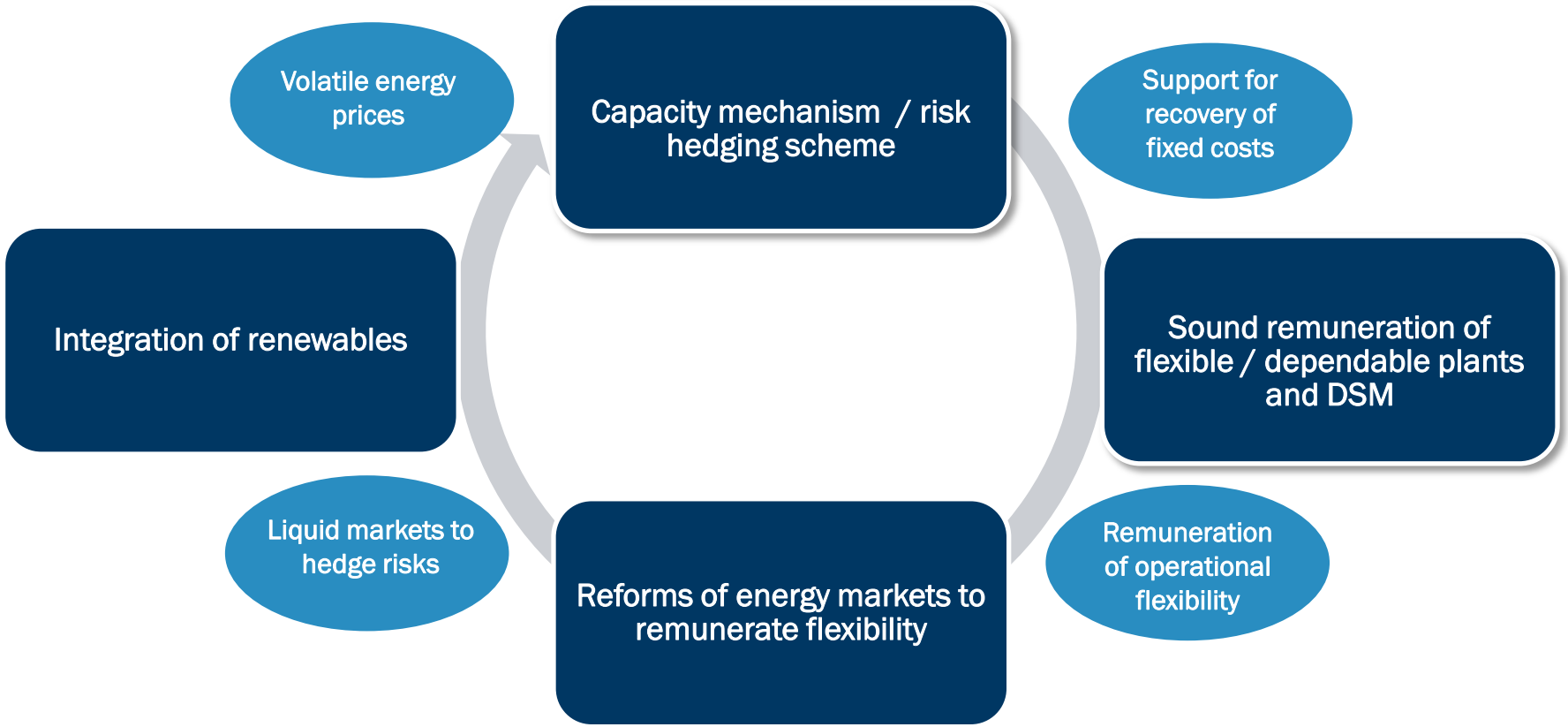
Market design for generation adequacy: Healing causes rather than symptoms☆

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"*

1 **Energy only or capacity mechanism?**

Scarcity pricing and capacity mechanisms are complimentary



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2 Capacity mechanisms will distort power prices

Interface energy markets / capacity mechanisms

What are the concrete interactions between energy and capacity mechanism?

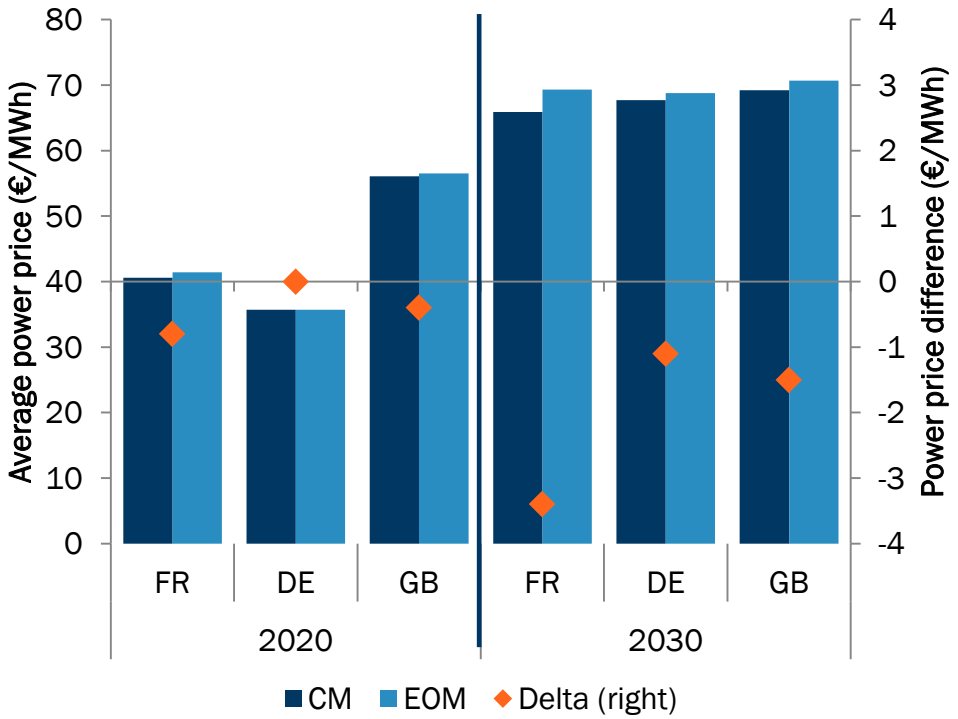
- **No bidding strategies modifications unless capacity mechanism is badly designed**
  - No effect on bidding strategies in spot market unless capacity product is linked to physical injection (none if product based on availability), and even in this case limited to crisis situations
  - Second order 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 will induce changes in merit order and price dynamic but this is a necessary condition to maintain security of supply**
  - Different generation mix (changes in plant retirements / investment decisions) will affect power price dynamic.
  - However, these changes are not distortions as long as they induce and optimal generation mix
  - Design parameters (technology neutrality, market based, etc.) are critical and can lead to potential deviations from optimal mix (peak versus base load, supply versus demand, etc.)
  - For instance, subsidies for overcapacity only materialize if target capacity is not aligned with reliability criteria determined by policy makers

Capacity mechanisms will distort power prices

Impact on power prices of the French capacity market

Impact assessment of French capacity market (CM) on power prices compared to Energy only (EOM)



Source: FTI-CL Energy study for RTE

The CM does not modify the behaviour and strategies of market players in the energy market and the short-term merit order

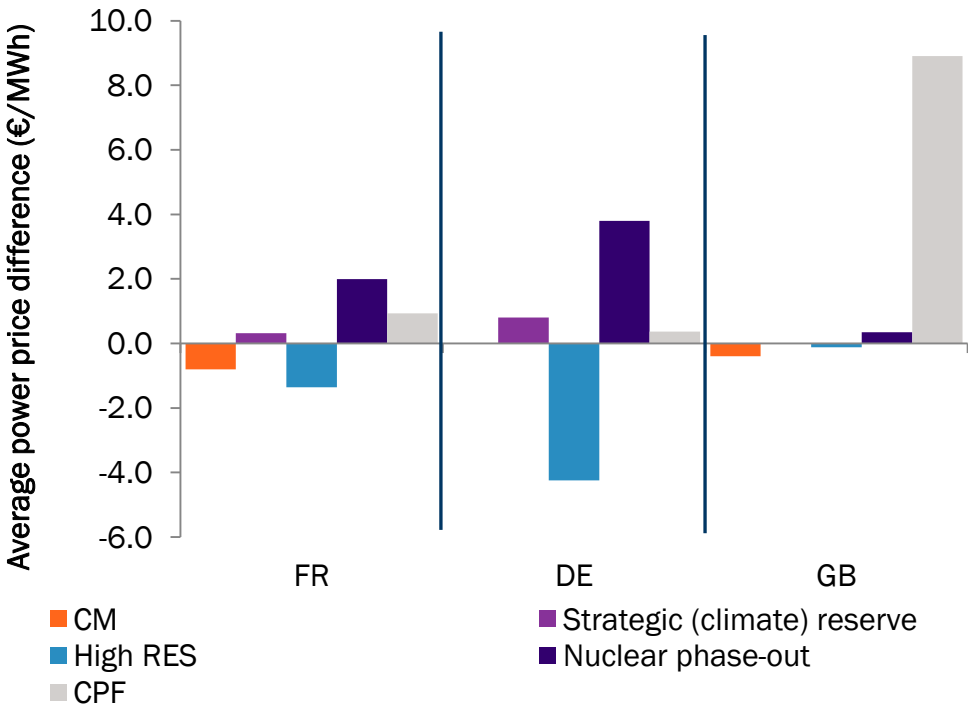
- In a longer horizon, the wholesale electricity price reduces because of additional capacity to ensure adequacy and, as a result, a lower occurrence of price spikes.
- As more efficient generation and DSR assets are built, the CM increases exports at mid-load periods and reduces imports at peak times.

2

Capacity mechanisms will distort power prices

Comparison of impact of different policy interventions

Power price impact of the French capacity market and other policy interventions vs. counterfactual scenario without policy measure (2020)



Public interventions may drive electricity prices upwards or downwards, but the impact of the French capacity market in absolute terms on power prices is comparable to the other policy interventions such as:

- The strategic (climate) reserve in Gemrany
- The nuclear phase-out in Germany
- The national carbon price floor in the UK
- the support of renewables (EEG) in Germany

Source: FTI-CL Energy study for RTE

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3 **Capacity mechanisms are national policies that go against EU market integration**

The different methods for cross border participation

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)

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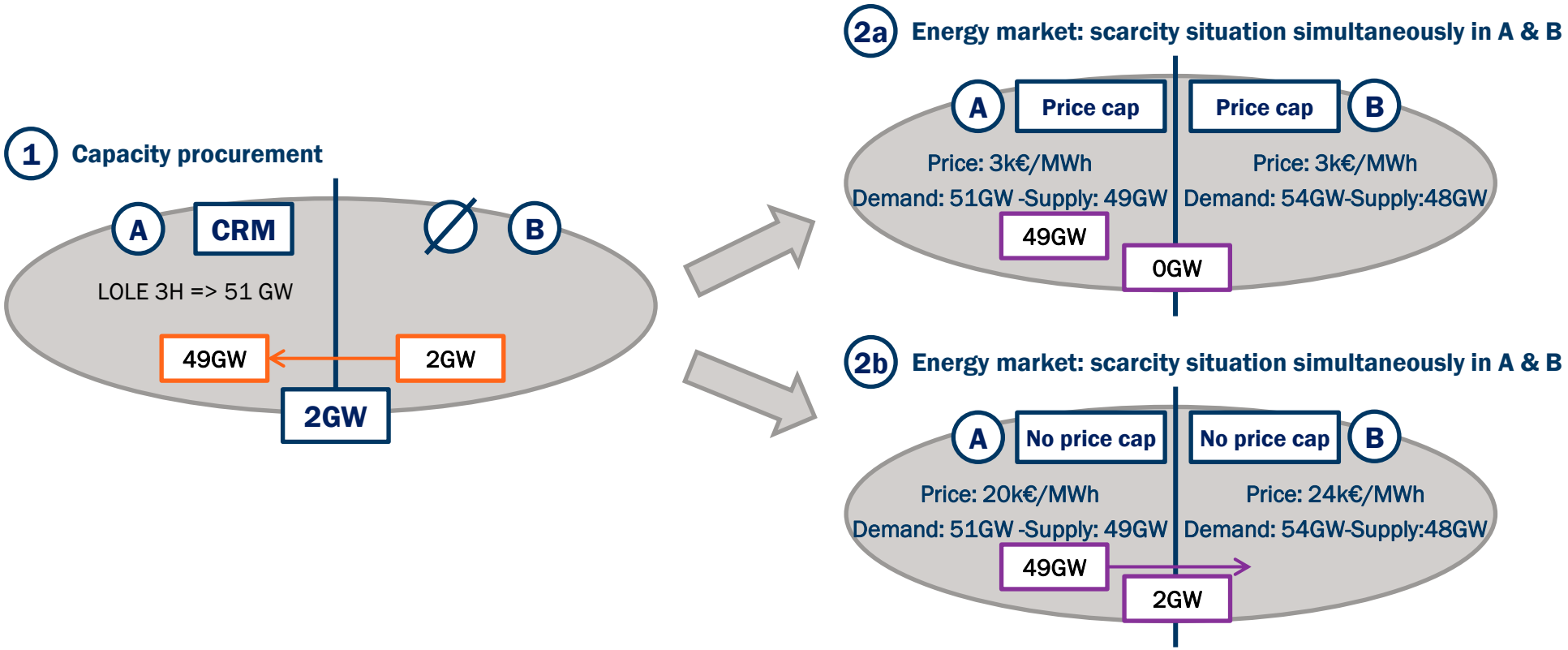
2

Capacity mechanisms are national policies that go against EU market integration

Need 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 affect bidding strategies in energy market, although change in generation mix will modify prices
  - Magnitude of potential effects 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:**
  - European power market model historically focussed on short term operational issues, focus needs to turn to investment incentives, risk hedging/sharing mechanisms , and coordination mechanisms for transmission, centralised and decentrlaised generation

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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