Can we have capacity mechanisms in Europe?

HARVARD ELECTRICITY POLICY GROUP SESSION

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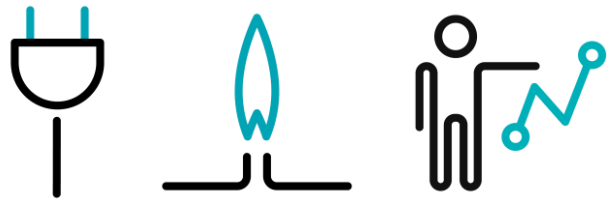

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Commission for Electricity and Gas Regulation

Goal of presentation

This presentation claims that, given European Regulation 2019/943 and the subsequently approved methodologies, one can never assess if there is a resource adequacy concern in a Member State of the EU and hence no capacity mechanism (CM) can be introduced.

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1. Regulation 2019/943

- New European Regulation 2019/943: this law is directly applicable in all 27 Member States of the EU
- Chapter IV (articles 20-27) on 'Resource adequacy'
- Resource Adequacy Assessment on European (ERAA) and National (NRAA) level
- Article 21.4: "Member States shall not introduce CMs where both the ERAA and the NRAA (…) have not identified a resource adequacy concern."
- Resource adequacy concern: when reliability standard (RS) is not met
- **Article 10: no price caps on wholesale markets**

1. REGULATION 2019/943

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2. ERAA / Reliability Standard

- ACER + NRAs have approved the methodologies on ERAA and Reliability Standard
- ERAA is a probabilistic adequacy assessment
- **Reliability Standard** is a LoLE-target, with the social optimal:

$$LOLE_{\mathrm{RT}} = \frac{CONE_{fixed}}{VOLL_{RS} - CONE_{var}}$$

- LoLE_RT =Loss of Load Expectation of a reference technology (expected number of hours per year)
- CoNE_fixed = fixed Cost of New Entry (yearly annuity, €/MW)
- VoLL_rs = Value of Lost Load of consumers likely to be impacted by emergency load shedding
- (we will assume CoNE_var <<)

2. ERAA / Reliability Standard

- If the yearly expected revenue of a capacity is higher than its cost (CoNE), then the capacity will come to the market
- During LoLE-hours, when supply cannot meet demand, the market price goes to the price cap

  ➔ yearly expected revenue during scarcity = LoLE * priceCap

- If priceCap > VoLL_rs, then yearly expected revenue during scarcity is higher than CoNE (= LoLE * VoLL_rs)

  ➔ revenue during scarcity hours is already sufficient for new capacity to come to the market

  ➔ <u>no adequacy concern if priceCap > VoLL_rs</u>

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3. Price cap

- Article 10 of Regulation 2019/943: “no maximum limit to the wholesale electricity price”
- There can be a **technical bidding limit** (price caps). Currently, this is 3000 €/MWh on day ahead
- Price cap in EU increases by 1000 €/MWh every time the market price reaches at least 60% of the price cap

⇒ When there is (near) scarcity, the price cap increases by 1000 €/MWh

⇒ As long as LoLE is not zero, the price cap is expected to become higher than VoLL_rs

3. Price cap > VoLL_rs

- One could argue that price caps that are higher than VoLL_rs could be politically unstable
- However, this is not regulated by politicians, but by ACER (the European Agency and 27 NRAs), confirmed by the Regulation which was introduced by the Member States
- In addition, VoLL_rs does not need to be that high. It is the VoLL that reflects the willingness to pay to avoid a forced load shedding during an emergency plan. This emergency plan needs to be cost-efficient, according to European legislation => <u>VoLL_rs needs to be as low as possible</u>

[For Belgium, consumers in the emergency plan are mostly households in rural areas with an estimated VoLL of about 3000-5000 €/MWh, while the current price cap for real time prices in Belgium is already 13500 €/MWh]

1. INTRODUCTION

2. ADEQUACY ASSESSMENT

3. PRICE CAPS

4. MARKET REVENUES AND RISK AVERSION

4. Market revenues and risk aversion

- LoLE is the “loss of load expectation”: a probability-weighted average of scarcity hours over all simulated scenarios in the probabilistic ERAA
- Due to wind/temperature/outage variability, there can be a few years with high LoLE, and many years without LoLE
- Assume an average LoLE of 3 hours, with 9 years of 0 hours LoLE (and no high prices) and 1 year with 30 hours LoLE (with price = price cap)
- Why would a **risk-averse investor** want to invest in (peak) capacity, running the risk of never having peak prices?

4. Market revenues and risk aversion

- Capacity is being hedged on the **forward market, which reflects the expected spot prices** => also the exceptional year with 30 hours of LoLE is reflected in the forward price (weighted with its probability of occurrence)
- There are **two sides on the risk** of (not) having price spikes: a producer missing out on revenue and a power supplier risking to pay scarcity prices => both are willing to hedge this risk
- The big market players are vertically integrated, being supplier and producer

4. Market revenues and risk aversion

- The automatic adjustment of the price cap will make the cap as high as needed to ensure market entry (i.e. will eventually increase to cover the risk premium)
- If the cost of new capacity (CoNE) would increase due to increased market price risk, this also relaxes the reliability standard through a higher LoLE-target, because LoLE = CoNE / VoLL

➔ **Conclusion**: every ERAA that properly implements Regulation 2019/943 and its methodologies cannot conclude that there is an adequacy concern and hence **no CM can be introduced**

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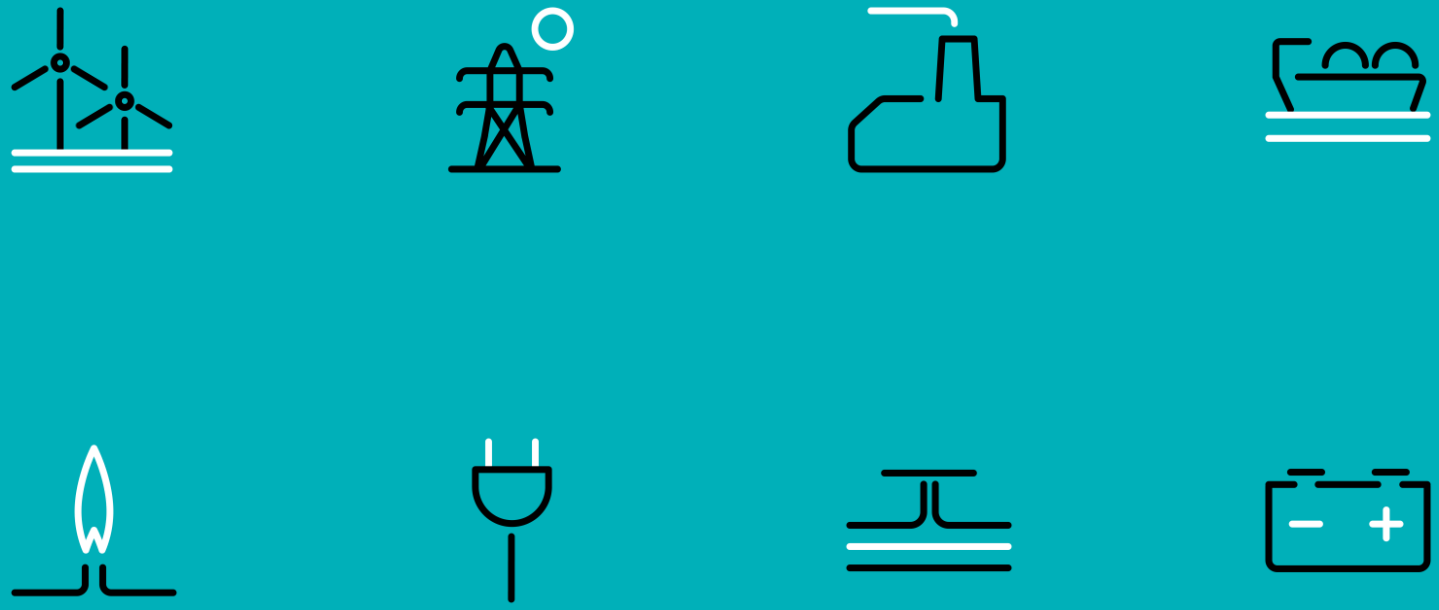

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ADDITIONAL SLIDES

LoLE => 0

- LoLE-target = CoNE / VoLL => non-zero target
- As long as there are LoLE hours, the price cap will continue to increase (see Acer decision)
- This will attract new capacity, since revenue during LoLE will increase
- This will only stop when there is sufficient capacity to have no LoLE hours
- This implies an overinvestment, because real LoLE < LoLE-target = CoNE/VoLL (which is considered as the social optimal LoLE)

Economic viability test

- Simulated revenues by Belgian TSO for different types of capacity: (dark) grey bars
  - Top end of bar: 90th percentile of revenue
  - black dot: 50th percentile of revenue (median revenue)
  - Low end of bar: 10th percentile of revenue