



Electricity Decarbonization, Diversification and Security of Supply: How to Meet the 2030 Challenge in North-West Continental Europe?

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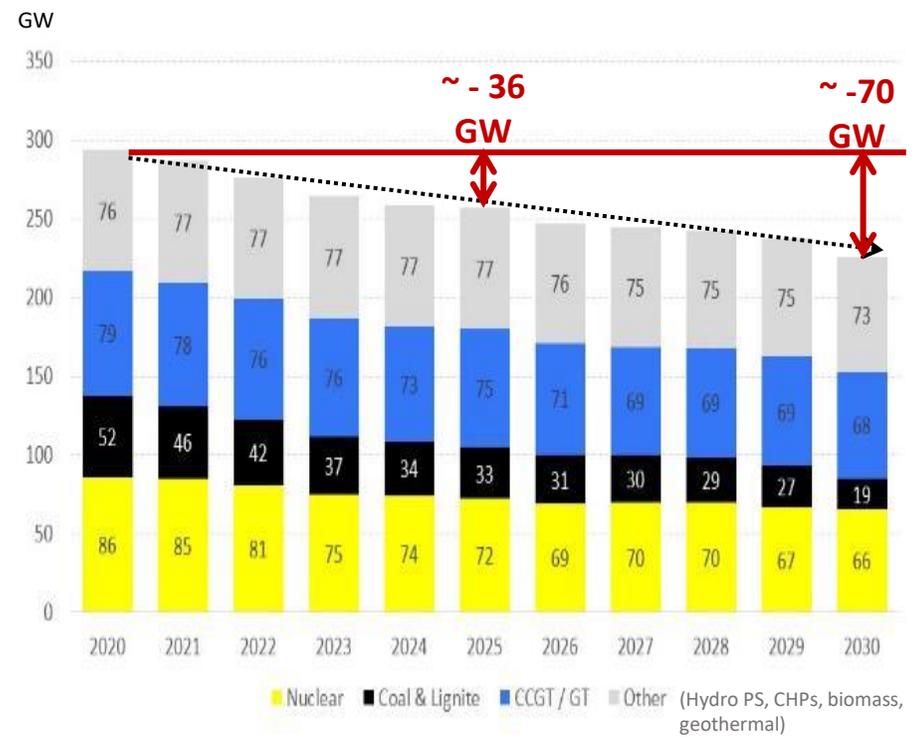
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Evolution of Adequacy Fundamentals

In CWE+UK*, almost 70 GW of reliable capacity is expected to disappear between now and 2030 (+ some acceleration?). Candidate sites for closure are usually well-identified (nuclear and coal phase-out decisions). Mainly compensated by increasing RES in a context of growing demand

Future evolution of dispatchable capacity*



*Belgium, France, Netherlands, Germany, UK

Nuclear

- 6 GW (representing ~50% of production mix) by end of 2025 following nuclear phase-out law.
- 8 GW by end of 2022 following nuclear phase-out law.
- 14 reactors closed by 2035 following PPE. Flamanville expected commissioning in 2024. Availability of French nuclear is a key risk factor for adequacy in CWE (historically, availability has systematically been overestimated).
- 4 GW by 2025 in line with EDF decommissioning dates. Hinkley Point expected to come online by 2026-2027.

Coal & Lignite

- 4 GW by end of 2029: 1 unit closed in 2024 (600 MW) and debates ongoing to close early another one
- 25 GW (10 GW lignite, 15 GW hard coal) by 2030. Complete phase-out by 2038.
- 7 GW by 2025: legally binding coal phase-out (2025), plans to advance to October 2024.

CCGTs & OCGTs

Based on an optimistic assumption (40 years lifetime), only **11 GW** will leave the market by 2030. However, aging power plants will need to make investments and more could close if support is lacking.

Intermittent capacity**



Source: ENGIE Impact (2020)

**Belgium, France, Netherlands, Germany

A View on Stakeholders' Perception (1/2)

To ensure their security of supply Member States/policy makers should navigate among imperfect adequacy studies and take decisions based on a patchwork of stakeholders' interests. Although the framework for resource adequacy exists the corresponding analyses lead to results that should always be put into perspective...

Consumer Views

- Not fully aware of entering a new era...
- More active participation / flexibility is expected on the consumers' side (via demand response / aggregation)
- "Past performance is no guarantee of future results" !

EC & Regulators Views

- 2019/2020: Revision of EU electricity market design + ACER methodology for resource adequacy assessments
- New European regulatory framework: MS have an option to set up their own flavour of capacity mechanisms to solve identified issues and trigger much needed investments.
- "The proof of the pudding is in the eating"

ENTSO-E View (from MAF to ERAA)



MAF 2020 indicates mostly low risks of inadequacy in the system for 2025 & 2030

- ENTSO-E: The absence of adequacy issues for a specific country does not necessarily mean that there is no scarcity but should instead be **seen in the context of the assumptions forming the underlying input data.**
- Several TSOs are pointing out that the results can present an **optimistic view on the European adequacy situation**: Large amounts of new capacities assumed, Absence of economic viability or feasibility checks, etc.
- Evolution of existing capacities and development of new capacities are both **subject to high uncertainties !**
- "Results are as good as the assumptions"

Local TSO Views (NRAA)



- National studies are affected by similar shortcomings
- Cross-border contributions during stress events are *nevertheless* expected to solve the local issues...
- Intermittent RES generation is expected to trigger more internal congestions: their impacts on adequacy and cross-border sharing should be considered more explicitly
- There is a strong lack of clarity on how much (and how) scarce capacity resources can be shared across borders during stress events.
- "We all count on our neighbours' support" – is it really realistic ?

A View on Stakeholders' Perception (2/2): A Market Player

Long-term visibility is key for all investors (renewable generation, firm flexible generation, storage, demand response). Market players will not invest without sound perspectives

Poor characterization of Stress Events

- **Lack on information** in resource adequacy assessments **about stress events** (duration, frequency, shortage depth).
- This information is needed to **design the “insurances”** consumers / authorities should “buy”:
 - Which technology/solutions could be expected to be deployed by market players ?
 - Generation (baseload, mid-merit, peak), storage, demand response

Uncertainty on Future (dispatchable) Supply

- Conviction that **thermal assets** will be needed for flexibility and integration of intermittent renewable generation
- Strong appetite/requirement to **decarbonize thermal generation fleet**, but :
 - Fear of stranded assets based on fossil fuel paradigm, even if gas-fired assets can burn renewable and low-carbon gases
 - Lack of visibility on regulatory framework: e.g. CO₂ price, CCS, support for green gases deployment
 - Public support focused on intermittent RES
 - Painful memories of “CCGT impairment wave” in the early 2010s

Take-Aways & Recommendations

Power adequacy is increasingly difficult to assess correctly while investments needed to anticipate and address potential issues on security of supply should be encouraged in the short-term. A sound regulatory framework providing visibility and appropriate incentives for these investments to happen (e.g. capacity markets, CO2 price floor, etc.) is essential in a context of deep decarbonization.

Key Take-Aways

- **Assessing power system adequacy is getting more and more difficult**, esp. for mid- and long-term horizons
- **Illusion of security based on the past**: new era with less margins and more uncertainties is ahead of us
- **Good illustration in France**: evolutions between PPE* exercise and latest Bilan Prévisionnel published by RTE
 - When an adequacy problem is identified in the coming 4 years it is too late !
 - Is the shortage of capacity anticipated in the short-term structural ?

*PPE: Programmation Pluriannuelle de l'Énergie (~ Multi-year Energy Programming performed by French authorities)

Recommendations

1. **Assumptions for adequacy assessments** : More realism/pragmatism/transparency is needed on existing and new built capacities in adequacy studies – sensitivity analyses on supply and demand sides should be compulsory
2. **Results**: Beyond adequacy metrics, characterization of stress events (duration, frequency) and of system needs (beyond stress events) should be provided to market players and help them identify the best way to complement intermittent RES generation (generation: baseload/mid-merit/peak, demand response, storage).
3. **Scenario/Sensitivity analyses**: A European stress test to assess the resilience of the energy system (e.g. realistic cold events reflecting climate change) is needed.
4. **Investment framework**: An adapted taxonomy enabling decarbonization, allowing the integration of renewables and ensuring security of supply is needed.
5. **Timing**: Investments for the horizon 2025-2030 require actions by all stakeholders (authorities, system operators, market players, etc.) now !