FINDING · REGULATION AS A WEIGHTED SCENARIO TIMELINE

Whether the commitment holds is decided at the ballot box — a breach costs you ~€29m, largely independent of your base case.

WE WEIGHT THE BREACH AT 25%.

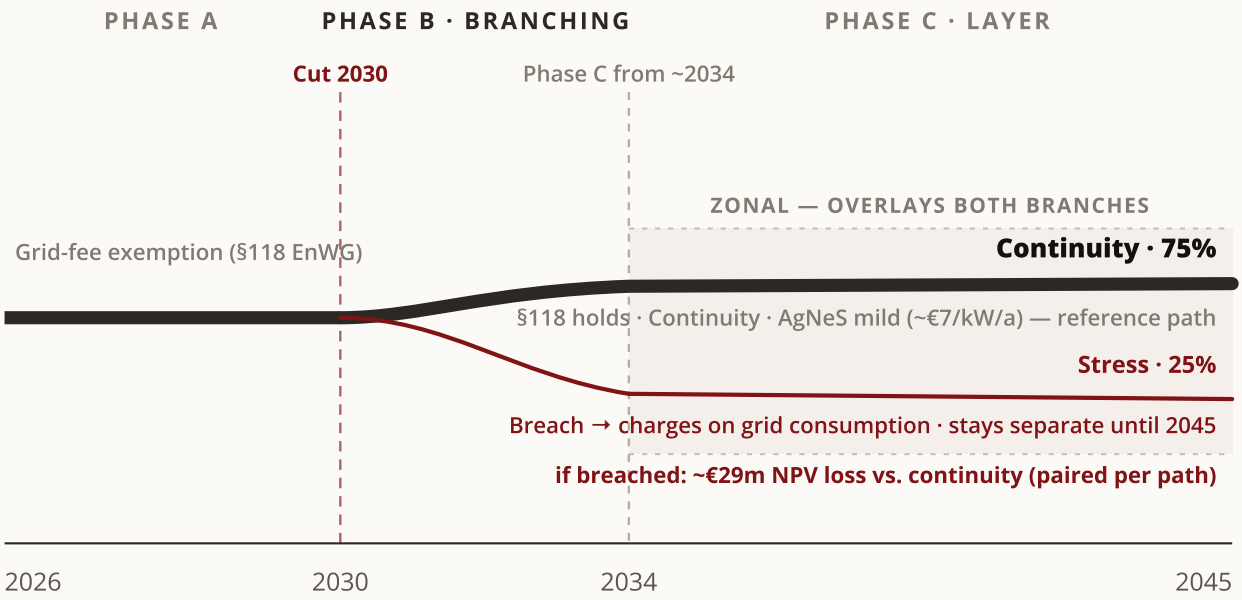


FIG. 1 Regulatory timeline as a fork: Phase A (exemption) branches at Phase B into Continuity (thick, 75%) and Stress (thin, 25%) — line weight carries the path weight. The fork never closes: once the branch splits, the stress path runs separately to the end of life in 2045 — the breach is permanent. Conditional breach effect, paired per path: median ~€29m, IQR 27–32. Phase C (zonal pricing, from ~2034) overlays both branches — no third branch; detailed in the annex.

Why now: The commitment can be breached — and the breach is permanent.

TODAY'S COST	Your bank prices this risk in today — debt sizing runs off the downside case: now, not only if the break occurs. Diffuse regulatory risk costs you return either way.
MECHANISM	Capital is committed on the basis of a state commitment — and the commitment changes after the capital is sunk. Regulatory trust can be breached; a breach acts forward, applying only from the cut-off onwards.
EVIDENCE	MEAG / Spain shows the magnitude: a granted benefit, later withdrawn — losses in the hundreds of millions. A risk everyone knows — and nobody models.
CONSEQUENCE	In the likely case, it stays at the mild capacity charge (~€7/kW/a). If the exemption is breached, the hit is permanent: ~€29m, **weighted at one quarter (25%)**.
BOTTOM LINE	A basis for decisions, not a point estimate: both branches quantified separately, downside stated as VaR — board-ready before FID.

DATA SOURCES:
Digital: SMARD.de (BNetzA), CC BY 4.0 — aggregated/processed. Day-ahead as a licence-driven surrogate for the intraday model — DA carries lower intraday spreads than ID3, revenues correspondingly more conservative. 15-min resolution 10/2025–07/2026 (~9 months, not a full annual cycle). Reference asset: 50 MW / 200 MWh · Seed-reproducible. · Replaces v2.10 — correction of FCR remuneration calculation, 07/2026.

METHODOLOGY · EVIDENCE · CONTACT

What the model does: empirical market data instead of static assumptions.

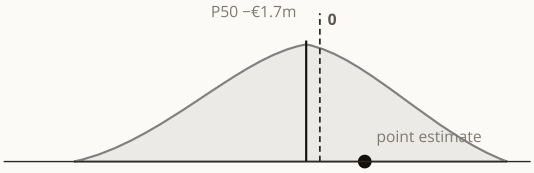
Python model, 1,000 stochastic paths (Monte Carlo, block bootstrap on empirical market prices, 15-min resolution), path-wise valuation, aggregation via quantiles. Output: NPV/IRR distributions and downside metrics (VaR, revenue at risk).

TRC: LP optimisation under perfect foresight — a mathematical upper bound, not a forecast.
ORC (roadmap): rolling optimisation without perfect foresight, interface for customer forecasts as the realistic complement.

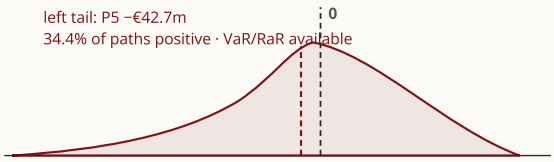
The quiet evidence: A single number hides the spread — the distribution shows it, two runs show the difference.

REALISTIC · AGNES
~€7/KW/A

STRESS TIMELINE · BREACH BRANCH WEIGHTED AT 25%
(BREACH: ~€70/KW/A + €20/MWH ON CONSUMPTION)



P50 near zero · left tail negative · SCHEMATIC



P50 −€5.9m · heavy left tail · SCHEMATIC

FIG. 2 Point estimate vs. distribution, in both runs. Stated plainly: P50 ≈ 0 (−€1.7m) on a conservative day-ahead basis — 44.1% of 1,000 paths positive (TRC upper bound, see methodology). Right: the weighted timeline — the breach branch (25%) creates the heavy left tail (P5 −€42.7m); the conditional breach effect is shown in Fig. 1. Regulatory risk acts on financing terms via debt sizing — quantified and weighted, it becomes negotiable. *Curve shapes schematic.*

Next step: a project-specific briefing.

Input: storage specification, contractual position, site — a tailored single-asset assessment, not SaaS.
Scope: front-of-meter / grid-scale (arbitrage + FCR), one bidding zone per asset, no inter-zonal trading.

Sorin Pascu · sorin.pascu@appstam.com · appstam.com · +49 151 412 408 58

bess.appstam.com/en

This edition is deliberately conservative, based on day-ahead prices (licensing). The intraday analysis (ID3) is available in print only for licensing reasons — talk to us.

DATA SOURCES:
Digital: SMARD.de (BNetzA), CC BY 4.0 — aggregated/processed. Day-ahead as a licence-driven surrogate for the intraday model — DA carries lower intraday spreads than ID3, revenues correspondingly more conservative. 15-min resolution 10/2025–07/2026 (~9 months, not a full annual cycle). Reference asset: 50 MW / 200 MWh · Seed-reproducible. · Replaces v2.10 — correction of FCR remuneration calculation, 07/2026.

ANNEX · DEEP DIVE — ZONAL PRICING (PHASE C)

Deep dive: One zone per asset — North or South, additive price-level offset.

Model declaration: Zonal pricing as an additive level offset on the national price series (South +5, North −5 EUR/MWh[1]). The spread structure remains national — zone-specific spread changes are not modelled (roadmap), as they are not quantitatively substantiated. The offset acts over the full lifetime: a declared upper bound of the level effect in both directions — for the northern zone the permanent offset is accordingly a best-case assumption (grid build-out suggests convergence).

Result (full runs, paired, DA): southern zone −€0.31m, northern zone +€0.34m. Reading: a pure zonal price level is secondary for BESS arbitrage — due to round-trip losses the storage asset is a net consumer of energy; a higher level costs slightly, a lower one benefits slightly. What would matter is the zonal spread structure; we do not claim it, because the evidence base does not support it. The regulatory effect (conditional breach effect ~€29m, paired) is zone-robust.

The figures isolate the level effect. The unmodelled spread effect would likely act in the opposite direction — a southern scarcity zone primarily raises volatility, and volatility is the arbitrage lever. The siting question South vs. North is one this model structurally does not answer.

Regulatory context (as of Dec 2025): Germany rejected the split and submitted an action plan to the European Commission — the split is thus conditionally deferred, not settled (Art. 15 EU 2019/943: 70% capacity target, EU lever if missed; redispatch costs back at ~€3bn in 2025). If it comes: the North/South axis is the base geometry of every configuration studied (DE2–DE5, boundary along the northern borders of Bavaria/Hesse/NRW); earliest realistic horizon ~2030+. Our two-zone approximation is the coarsest resolution of the substantiated structure, not an arbitrary assumption.

[1] ±5 EUR/MWh: source Aurora 2030 ~+5 EUR/MWh southern premium, convergent range 5–10 (Fraunhofer/EWI); symmetric split around the national series as a simplification.

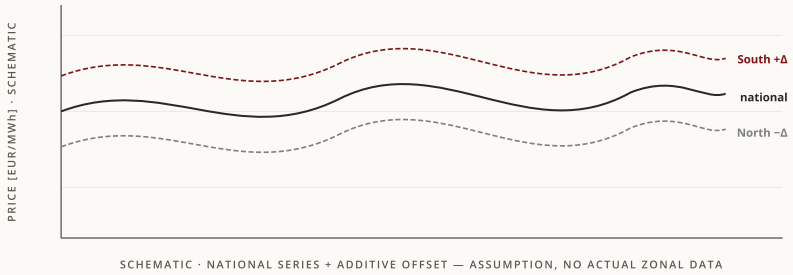


FIG. A1 Zonal price series as an additive offset on the national series (South +5 / North −5 EUR/MWh, footnote 1). One zone per asset, no inter-zonal trading. *Schematic illustration.*

DERIVATION OF THE STRESS VALUE · EVIDENCE

Stress charge ~€70/kW/a + €20/MWh (on grid consumption / charging only, not on discharge): full end-consumer grid-fee case at high-voltage level, German grid-fee sheets 2025/26 ~€50–90/kW/a + €15–30/MWh; 70 = upper middle of the HV range. A counterfactual break of the pledged exemption — not a BNetzA forecast (AgNeS status 27 May 2026 is mild; the break was rejected).

DATA SOURCES:
This page contains no market data — zonal series are synthetic (national series + offset), declared as an assumption. · Reference asset: 50 MW / 200 MWh · Price basis day-ahead (SMARD.de), CC BY 4.0 · Seed-reproducible. · Replaces v2.10 — correction of FCR remuneration calculation, 07/2026.