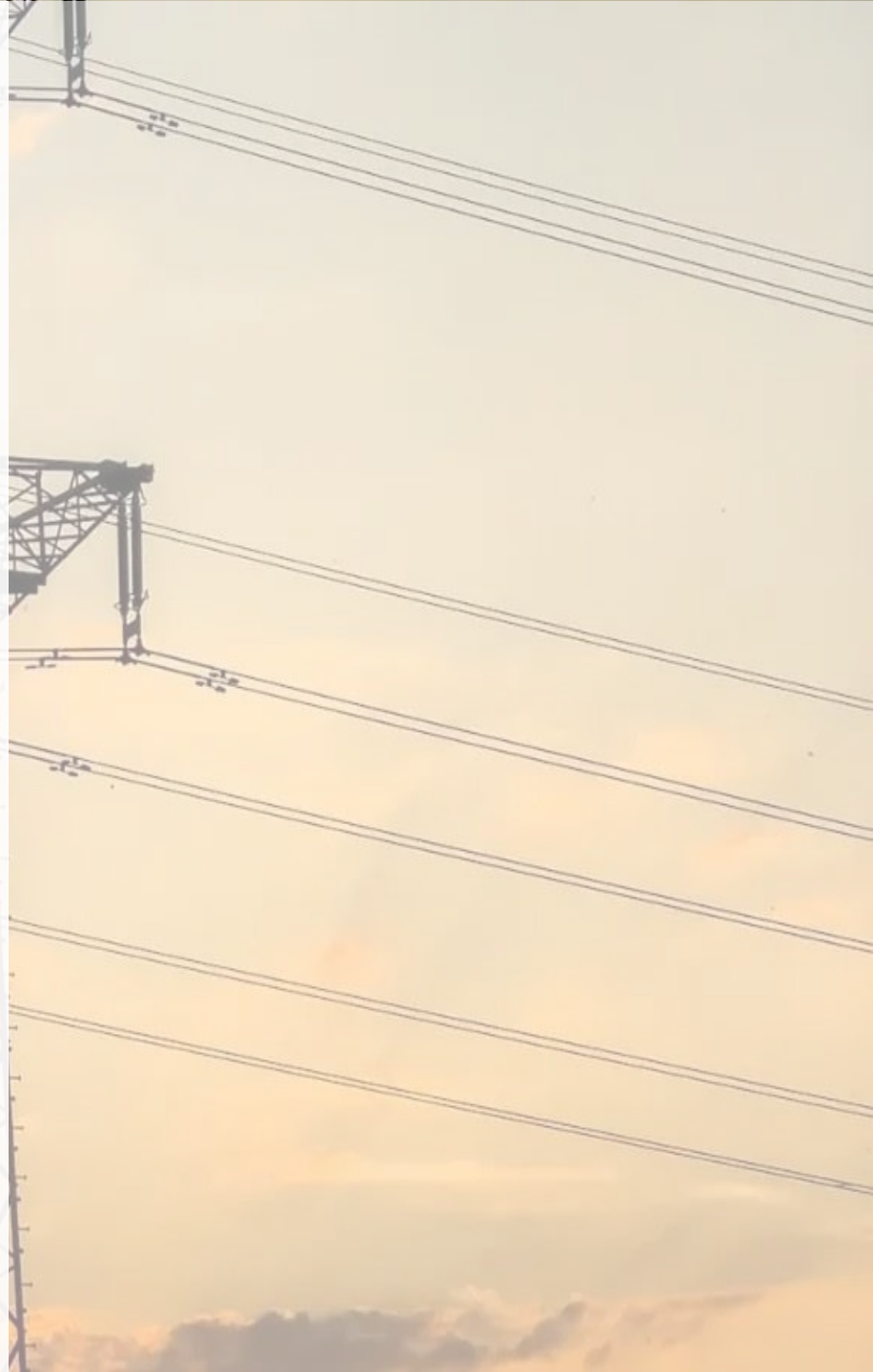
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8 JANUARY 2026 · ACER & CEER

Regulators now measure what smart grids deliver

The new European smart grid output KPIs — and how FLEX delivers the evidence



enlite energy · November 2026

EXECUTIVE SUMMARY

Smart grids now have to prove their results

1

Outputs, not inputs

ACER (3 KPIs for TSOs) and CEER (14 indicators for DSOs) define how regulators measure what smart grids deliver.

2

Every KPI is a pair

Results must be shown with and without smart measures. Building that counterfactual is the hard part, and most operators lack the tools.

3

FLEX delivers the evidence

Topology Time Machine, Dynamic Operating Envelopes and reinforcement learning produce the with-vs-without comparison by design.

Sources: ACER Position Paper; CEER Paper C25-DS-98-7.1 (both 8 Jan 2026)

From counting devices to measuring results

BEFORE · INPUTS

“What did you install?”

- Kilometres of lines with dynamic line rating
- Substations automated
- Smart meters rolled out

→

NOW · OUTPUTS

“What did it deliver?”

- **More capacity from existing assets**
- **Lower costs to keep the grid secure**
- **Less curtailment, faster connections**
- **Grid expansion avoided or deferred**

ACER · FOR TSOS

Three transmission KPIs, each against a counterfactual

KPI PET — target > 1

More from existing assets

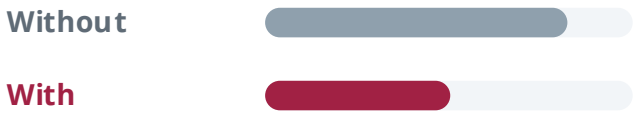
Ampacity applied in real-time operation ÷ static rating of the limiting lines and transformers



KPI SEC — target < 1

Lower security costs

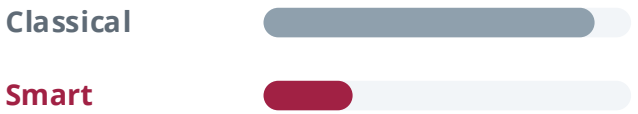
Actual redispatch and remedial-action costs ÷ costs with static ratings and no smart optimisation



KPI GEP — target < 1

Cheaper than copper

TOTEX of the realised smart solution ÷ TOTEX of the classical reinforcement with equal benefit



ACER recommends a **2–3 year transition** for data, modelling and reporting — not yet linked to incentives.

CEER · FOR DSOS

14 indicators in six dimensions – flexibility moves seven

1 · RENEWABLES

Curtailment of renewables
Connection time, generation
Hosting capacity, injection

2 · ELECTRIFICATION

Connection time, loads
Hosting capacity, withdrawal

3 · CONTINUITY OF SUPPLY

Long interruptions
Short interruptions
Extreme-event risk

4 · QUALITY OF SUPPLY

Voltage quality events
Customer request time
Asset availability

5 · ENERGY EFFICIENCY

Distribution losses

6 · DATA

Online data access
15-minute data availability

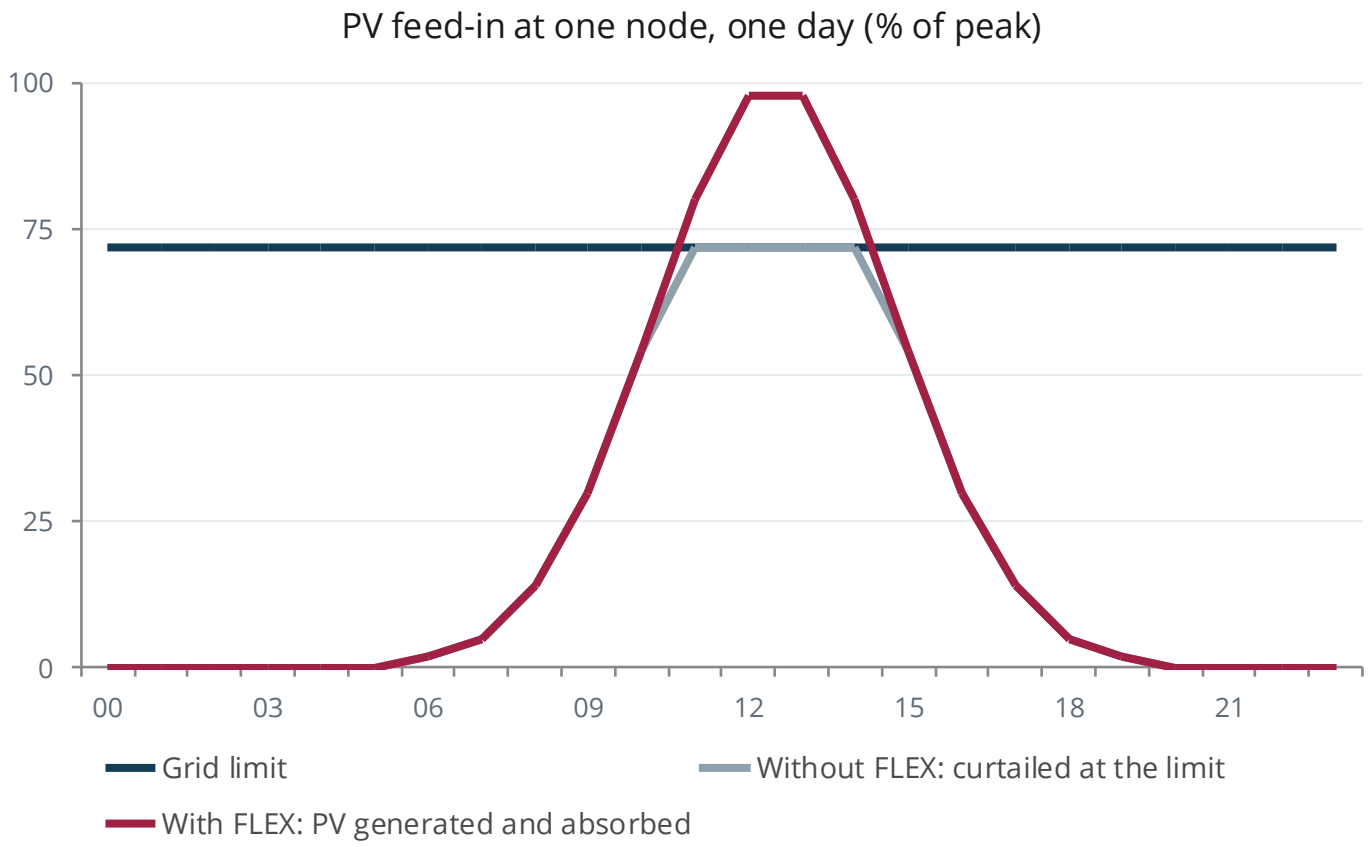
● **Where grid flexibility (taps, reactive power, storage, heat, EVs) moves the number**

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Source: CEER Paper C25-DS-98-7.1, 8 Jan 2026

THE HARD PART

Proving it needs a counterfactual



Re-simulate a full year with static limits, fixed topology and no flexibility — then compare it with what actually happened.

ENTSO-E flagged reliable “non-smart” counterfactuals as the main difficulty. Most operators have no tool for it today.

TRANSITION PERIOD

2026 – 2028

2–3 years to build data, models and reporting

WHAT IS AT STAKE

Where results are rewarded, the numbers get big

€800M

reward to Terna after dispatching costs fell by an estimated €2.2bn

€143M

bonus for added cross-zonal capacity through capital-light solutions

1,450 MW

of cross-zonal capacity added, including dynamic thermal rating

Italy shows the direction: **once outputs are measured, they can be rewarded.** Finland and Portugal already collect output data.

ARERA decisions on Terna, as reported in the ACER Position Paper, 8 Jan 2026

HOW FLEX DELIVERS IT

Three engines: with vs. without, by design

1

TOPOLOGY TIME MACHINE

Know the grid

The network as it actually was, at every point in time: topology, switching state, ratings, interventions. The audit trail behind every KPI.

→

2

DYNAMIC OPERATING ENVELOPES

Know the limits

Physics-based import and export limits per connection point, every 15 minutes, N-1 secure. This is the no-FLEX baseline.

→

3

REINFORCEMENT LEARNING

Move the limits

Agents combine the flexibility levers below and quantify how much hosting capacity each one adds.

LEVERS

Tap | P / Q | BESS SoC | Power-to-heat | V2G

OUTPUT KPI pairs for ACER & CEER — hosting capacity · curtailment · losses · voltage quality · security cost

WHICH ENGINE DELIVERS WHICH KPI

Each KPI draws on all three engines

KPI	Topology Time Machine	Dynamic Operating Envelopes	Reinforcement learning
CEER · Hosting capacity	Real switching state over time	Node envelope = the limit	Raises the limit; HC with vs. without
CEER · Curtailment	Logs time and cause of each intervention	Curtailment schedule per plant	Shifts energy into BESS, heat, EVs
CEER · Losses & voltage	Actual topology for realistic flows	Losses and violations per 15 min	Tap and Q optimisation
ACER · Security cost (SEC)	Real operating states to re-simulate	OPF and N-1 with costs	Non-costly actions before redispatch
ACER · Grid expansion (GEP)	Grid before and after a measure	Capacity gained without copper	Gain per lever vs. reinforcement
ACER · Existing assets (PET)	Static and applied rating per asset	Limits from dynamic ratings	Uses the headroom it creates

PRODUCT ROADMAP

Four steps to regulator-ready KPI reporting

1

Hosting capacity with vs. without

Year-long DOE runs on measured data, plus TTM event log

UNLOCKS

CEER hosting capacity, curtailment, losses

2

Baseline switch and costs

Reference policy and cost model in OPF and RL

UNLOCKS

ACER SEC, DSO business case

3

Dynamic ratings

Weather-based ratings and versioned ratings in TTM

UNLOCKS

ACER PET

4

Reinforcement comparison

Classical alternative sized and priced per bottleneck

UNLOCKS

ACER GEP, CEER three-option comparison

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Less copper. More code.

Get your KPI baseline in 90 days

We replay a year of your grid with and without FLEX: hosting capacity, curtailment, losses — per lever, per node.

www.enlite.ai

Sources: ACER, Output performance indicators … grid-enhancing technologies (8 Jan 2026); CEER, Electricity “Smart Grid” Performance Indicators, C25-DS-98-7.1 (8 Jan 2026)