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EU4ENERGY PHASE II

Integrating flexibility into electricity grid operation

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Energy Community Secretariat

Regional Workshop on Accelerating Market Integration of Renewables: Focus on Flexibility and Active Consumers
13-14 November 2025
Paris

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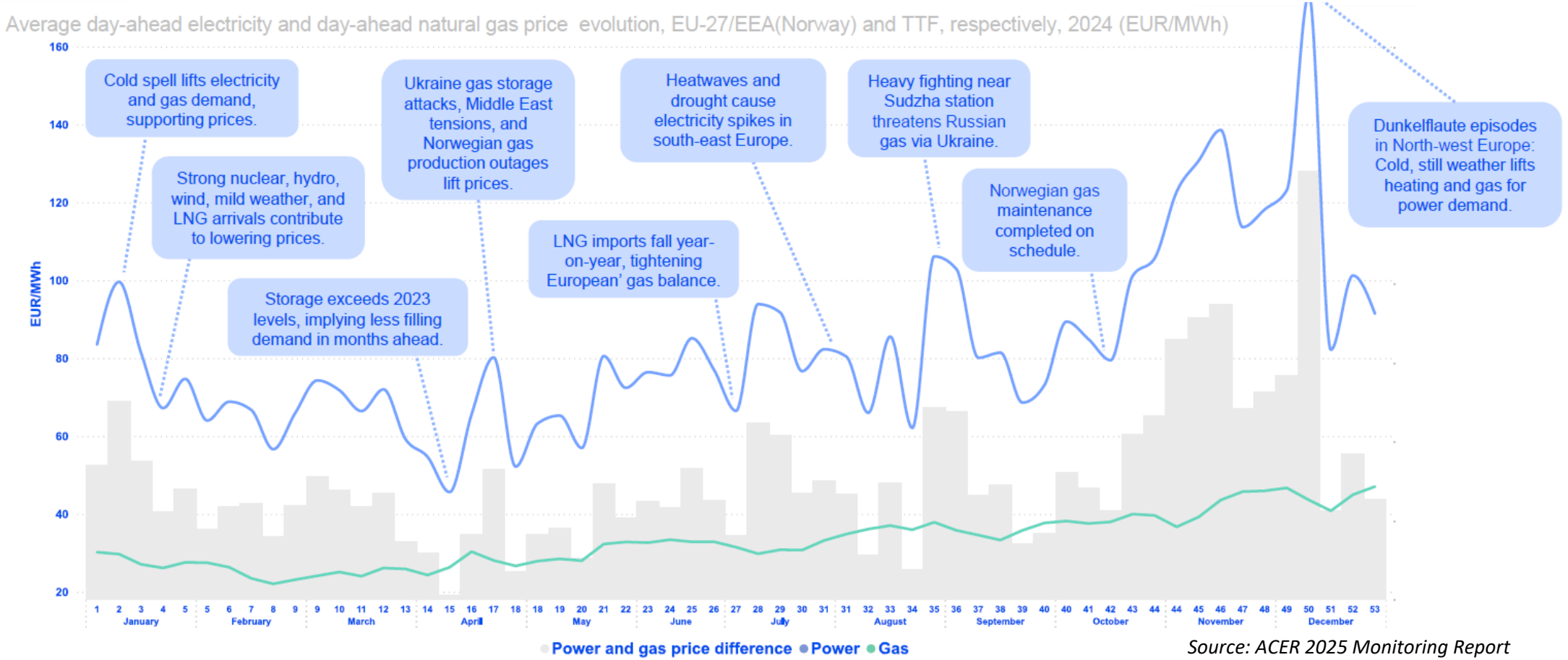
EU energy market dynamics in 2024



Source: ACER 2025 Monitoring Report

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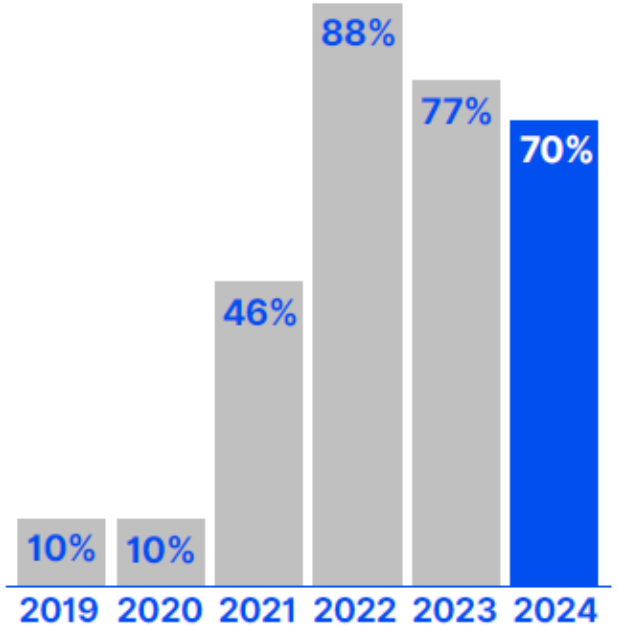
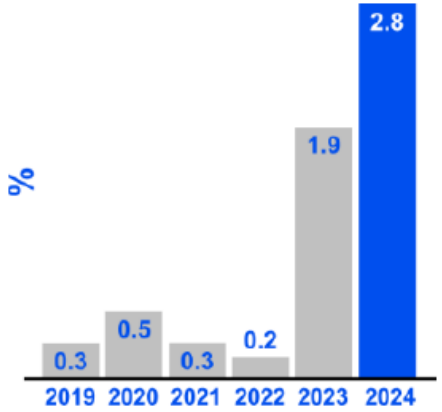
Markets becoming more volatile

Figure 2: Volatility as represented by the annual percentage of days when the electricity price varies over 50 EUR/MWh in a day, EU-27/EEA(Norway)

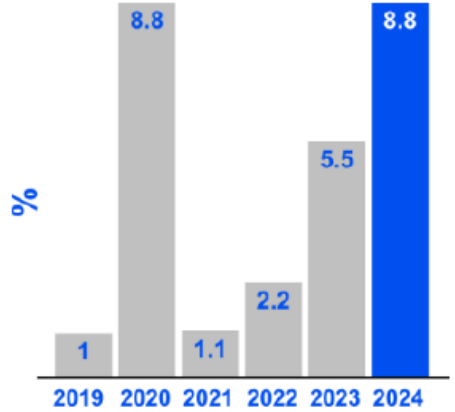


Source: ACER[7]

Annual percentage of the time when prices were negative, EU-27/EEA (Norway), 2019-2024 (%)



Annual percentage of the time when prices were <5EUR/MWh, EU-27/EEA (Norway), 2019-2024 (%)



Source: ACER 2025 Monitoring Report

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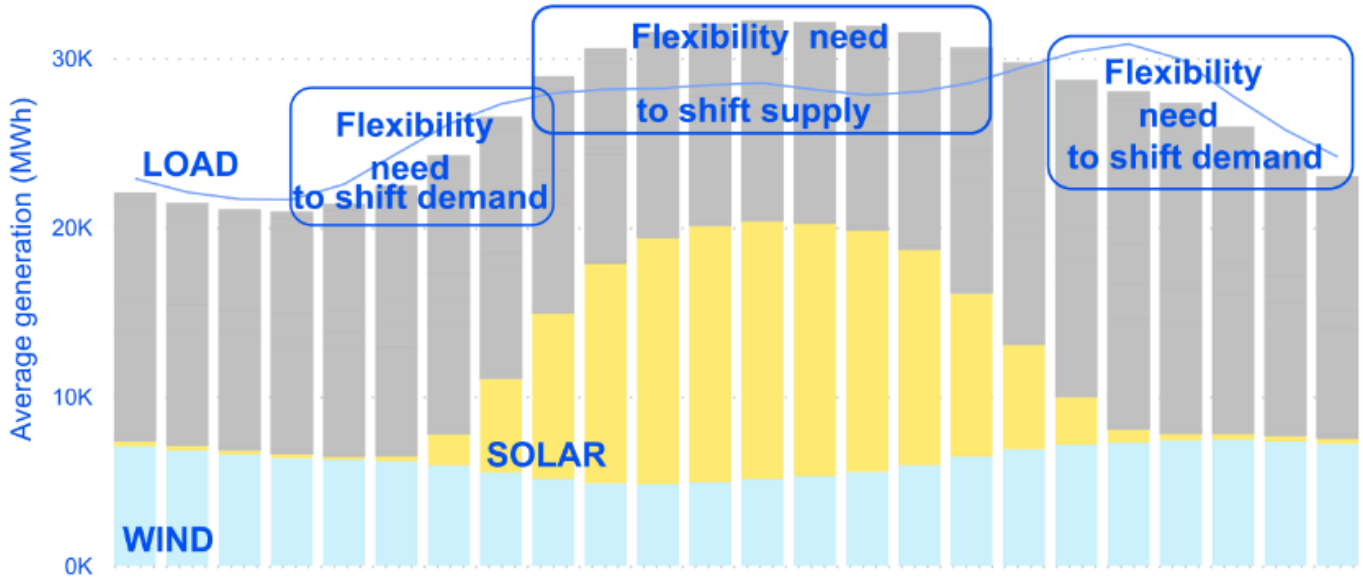
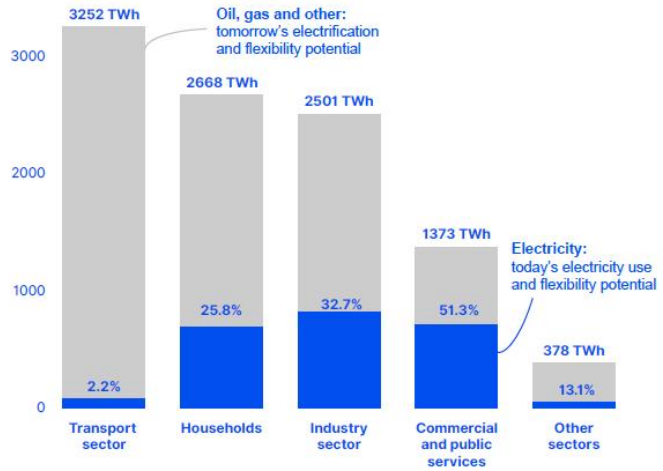
Flexibility is needed



Source: ACER 2025 Monitoring Report, ACER report on Unlocking flexibility: No-regret actions to remove barriers to demand response

Figure 7: Energy and electricity usage for different categories of consumers, 2023 (TWh)



Source: ACER, based on Eurostat data

Flexibility Services Provided by Various Technologies

Real time	Day/week	Month/year
Demand-side response		Energy efficiency
Batteries		
Storage (depending on the technology)		
Hydro storage		
	Hydrogen/biomethane	
Electricity network - interconnections		
Gas storage		
Thermal generation unit		

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ACER's Recommendations

ACER proposes 12 actions to remove barriers to demand response

Action 1	Recognise the new actors: clarify responsibilities for emerging market players in national laws
Action 2	Faclilitate market entry: remove obstacles to market access
Action 3	Let aggregators play their role: remove legal obstacles for aggregators
Action 4	Kick-start the smart revolution: deploy smart meters and ICT services to enable consumers' smart responses
Action 5	Optimise the energy cost component of electricity bills: offer time-differentiated retail contracts to enable alternative flexible offers
Action 6	Optimise the network component of electricity bills: incentivise the uptake of time-of-use tariffs
Action 7	Give an extra push: implement measures to enhance consumers' participation in demand response
Action 8	Transform balancing practices: shift from non-market-based to market-based balancing
Action 9	Lower barriers to provide balancing services: simplify the prequalification process
Action 10	Share balancing services across EU borders: ensure balancing products and market structures meet EU requirements
Action 11	Cut through red tape: ease administrative burdens and simplify processes for new entrants and small actors
Action 12	Think outside the wires: encourage non-wire solutions as alternatives to traditional grid investments

Source: ACER report on Unlocking flexibility: No-regret actions to remove barriers to demand response

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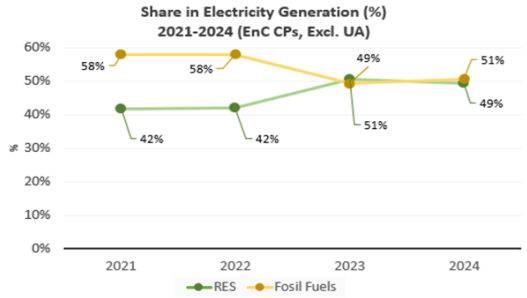
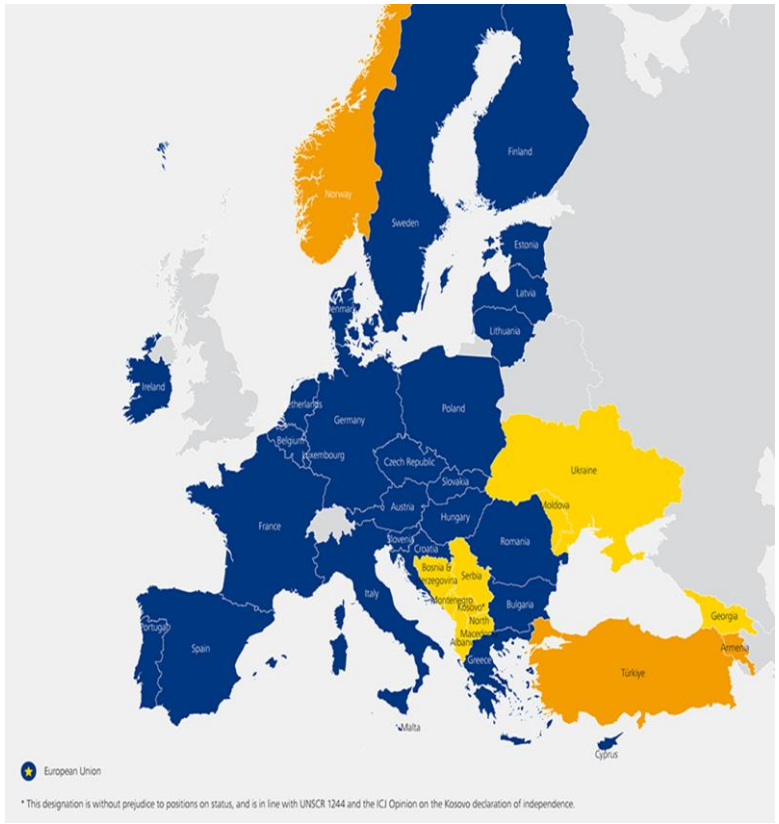
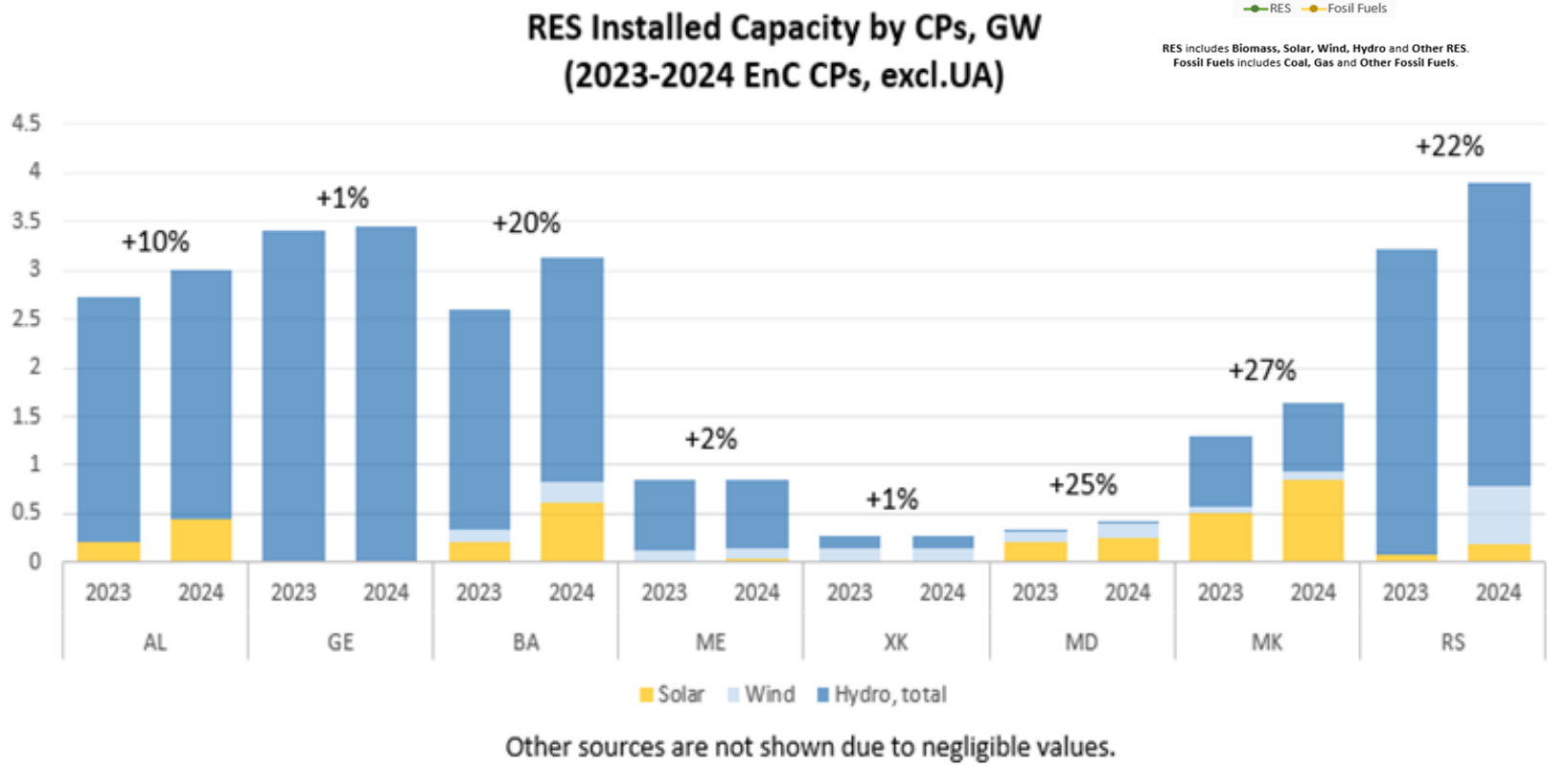
RES Development in EnC



RES includes **Biomass, Solar, Wind, Hydro** and **Other RES**.
Fossil Fuels includes **Coal, Gas** and **Other Fossil Fuels**.





Other sources are not shown due to negligible values.

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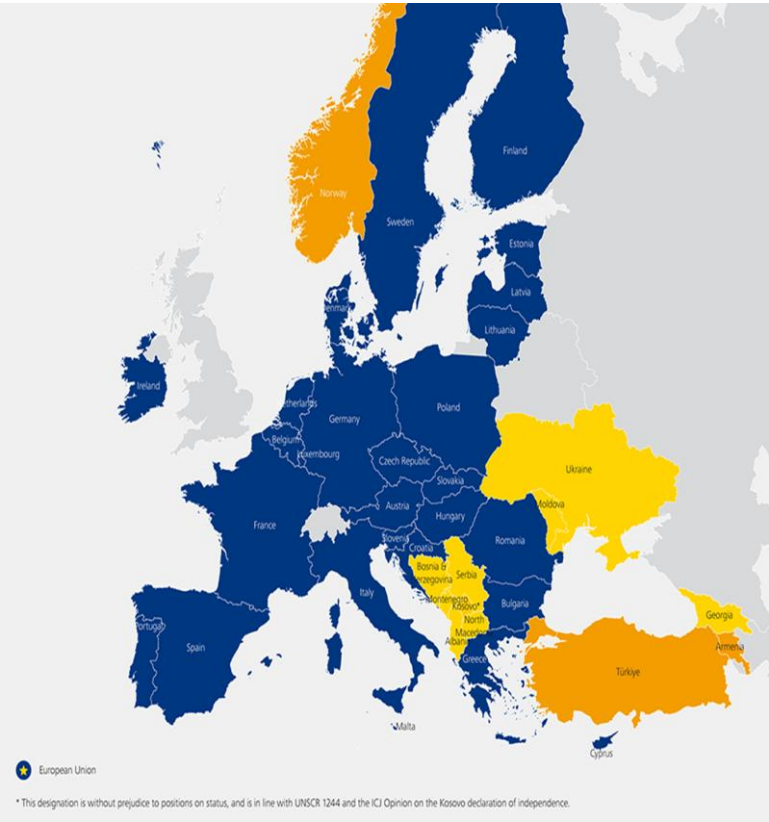
Flexibility enablers in EnC



Key Enabler	Current Regional Status
Aggregation & market access	Legal in **UA, ME, RS, NM, MD, BiH** Implemented only in **UA**
Energy storage regulation	Defined in **UA, ME, RS, NM, MD** Operational only in **UA**
DSO procurement of flexibility	Legal in **RS, NM, ME, MD** No tenders executed
Demand-side response & dynamic pricing	Legal references in **UA, RS, ME, NM, MD** Dynamic pricing in **UA, RS, ME, NM** No structured DSR programmes
Smart meter coverage	Coverage ≈ **ME 80 %**, **NM 21 %**, **RS 16 %**, **KS*** 16 %, **UA 19.7 %**, **GE 6.8 %**, **AL < 1 %**

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Prevalence of Dynamic Pricing: Energy Price Component

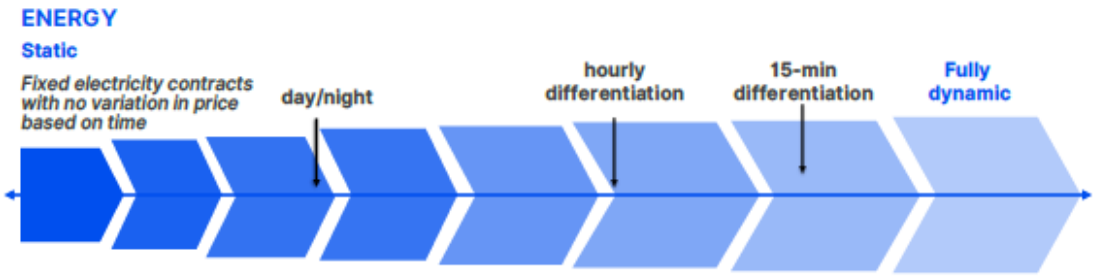


Figure 19: Share of non-household dynamic contract uptake per Meml and in EEA member Norway (% of some form of dynamic co

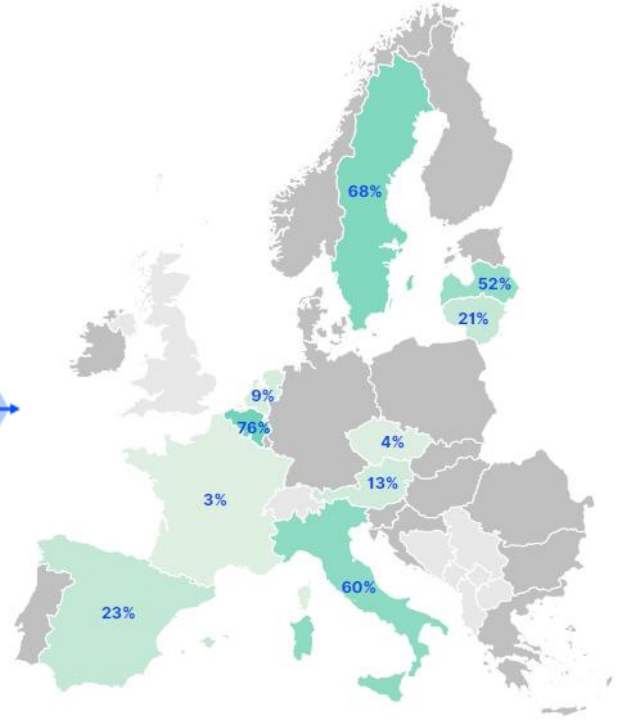
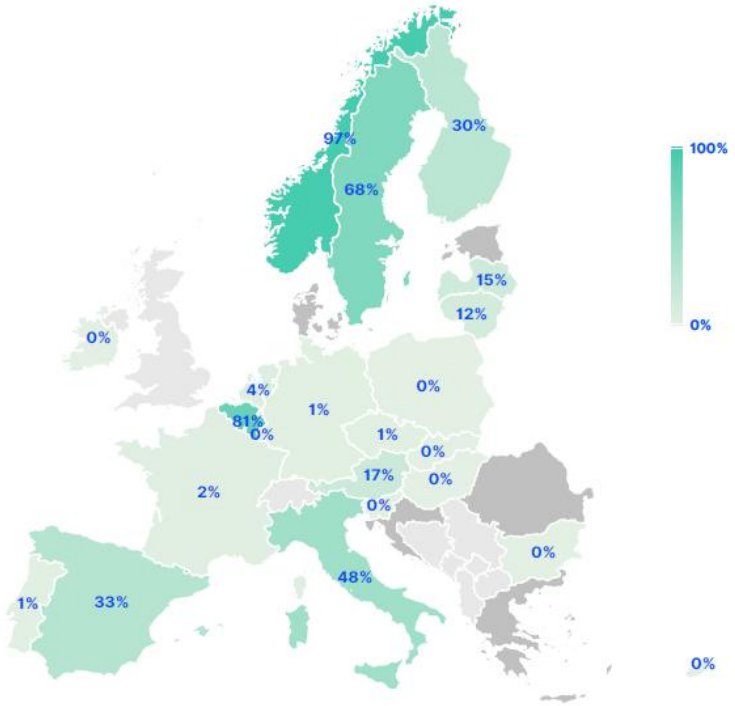


Figure 17: Share of household dynamic contract uptake per Member State and in EEA member Norway (% of some form of dynamic contracts)



Source: ACER report on Unlocking flexibility: No-regret actions to remove barriers to demand response

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Prevalence of Time-of-use Pricing: Grid Tariff Component

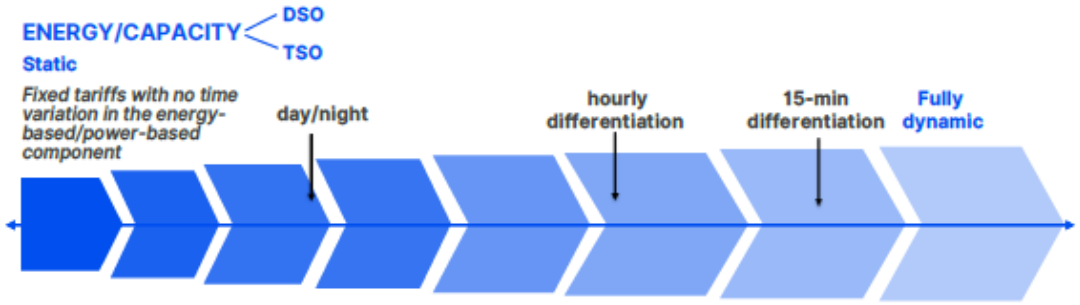
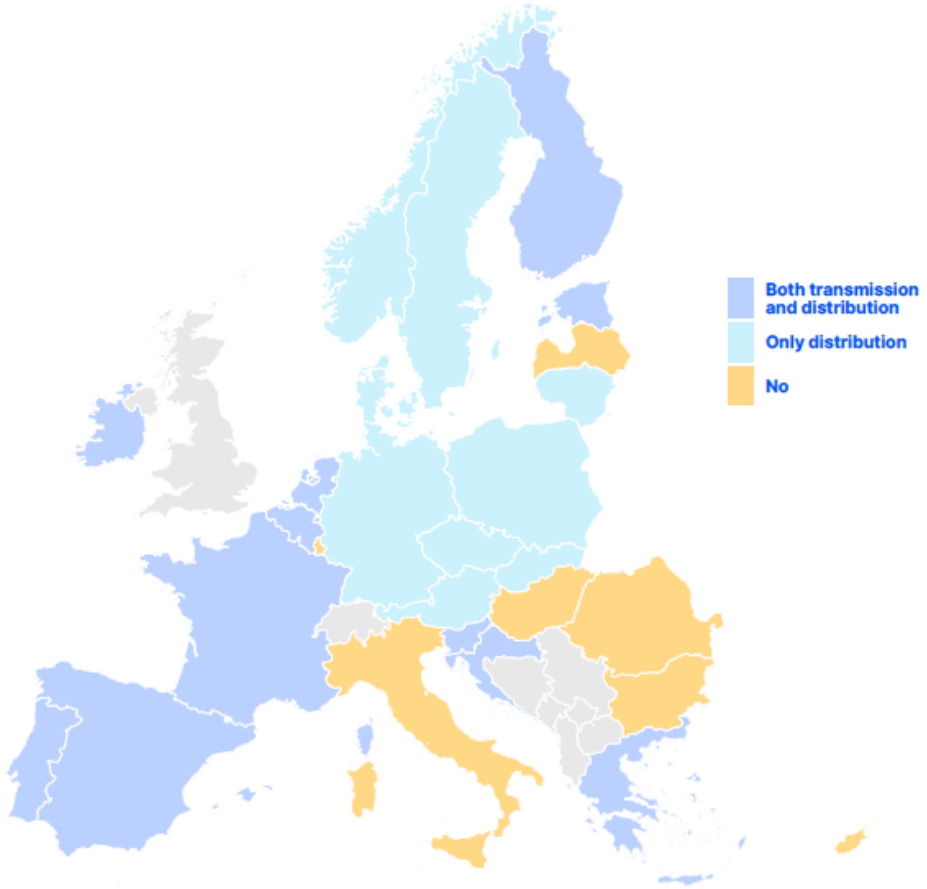


Figure 20: Time-of-use tariffs for transmission and distribution, EU-27/ EEA(Norway), 2023



Source: ACER report on Unlocking flexibility: No-regret actions to remove barriers to demand response

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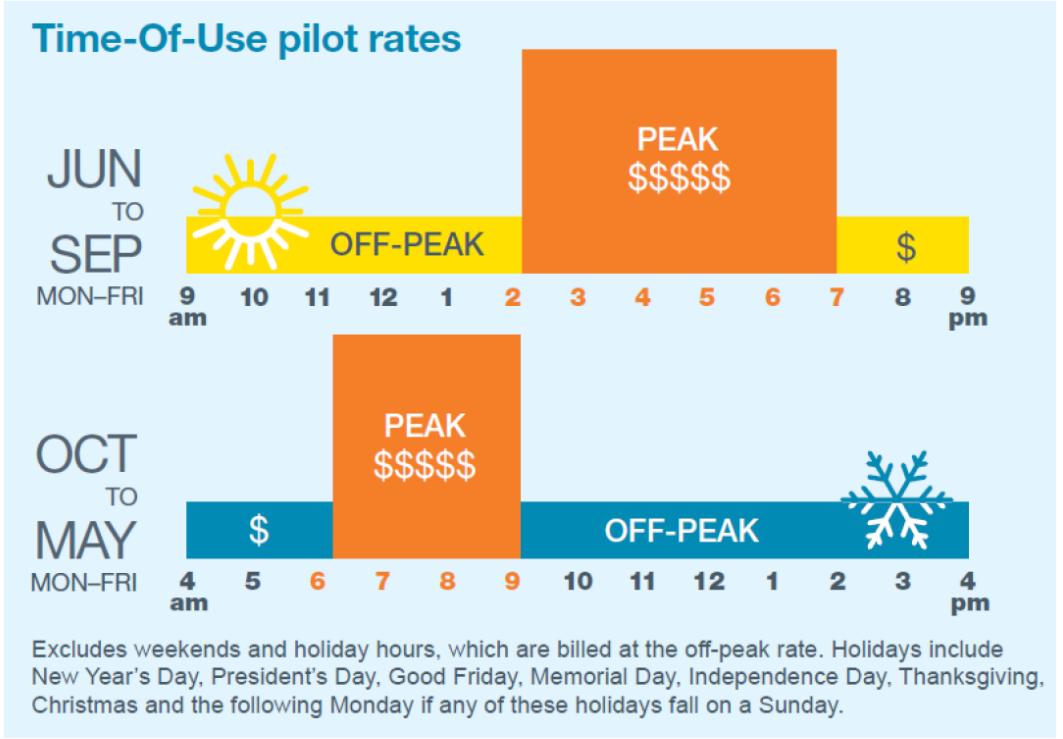
Demand response pilots in MD

FIGURE 3: RATES DURING THE FIRST YEAR OF THE PILOT

	Summer (June 2019 - September 2019)				Non-Summer (October 2019 - May 2020)			
	Peak	Off-Peak	Peak to Off-Peak Ratio	Default "R" Rate	Peak	Off-Peak	Peak to Off-Peak Ratio	Default "R" Rate
BGE	$0.343	$0.074	4.63	$0.108	$0.360	$0.080	4.52	$0.115
Pepco	$0.406	$0.096	4.22	$0.163	$0.426	$0.105	4.07	$0.139
DPL	$0.493	$0.082	6.01	$0.135	$0.501	$0.086	5.82	$0.137



Source: BGE recruitment letter

Source: Brattle report on PC44 Time of Use Pilots: Year One Evaluation (2020)

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Demand response pilots in MD

FIGURE 18: ESTIMATED BGE SUMMER WEEKDAY IMPACTS BY CUSTOMER GROUP AND PERIOD

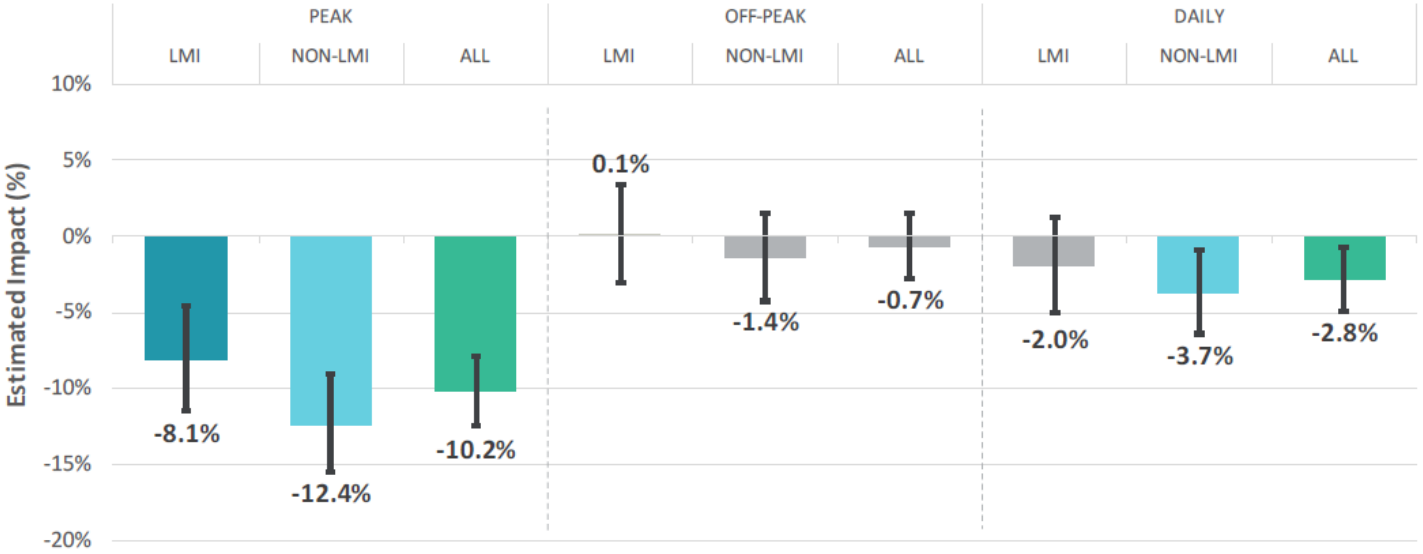
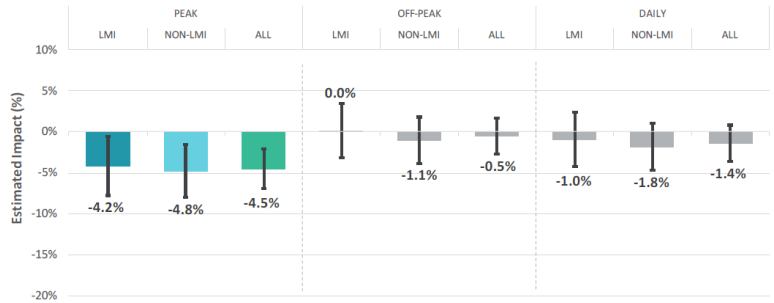


FIGURE 19: ESTIMATED BGE SUMMER WEEKEND IMPACTS BY CUSTOMER GROUP AND PERIOD



Source: Brattle report on PC44 Time of Use Pilots: Year One Evaluation (2020)

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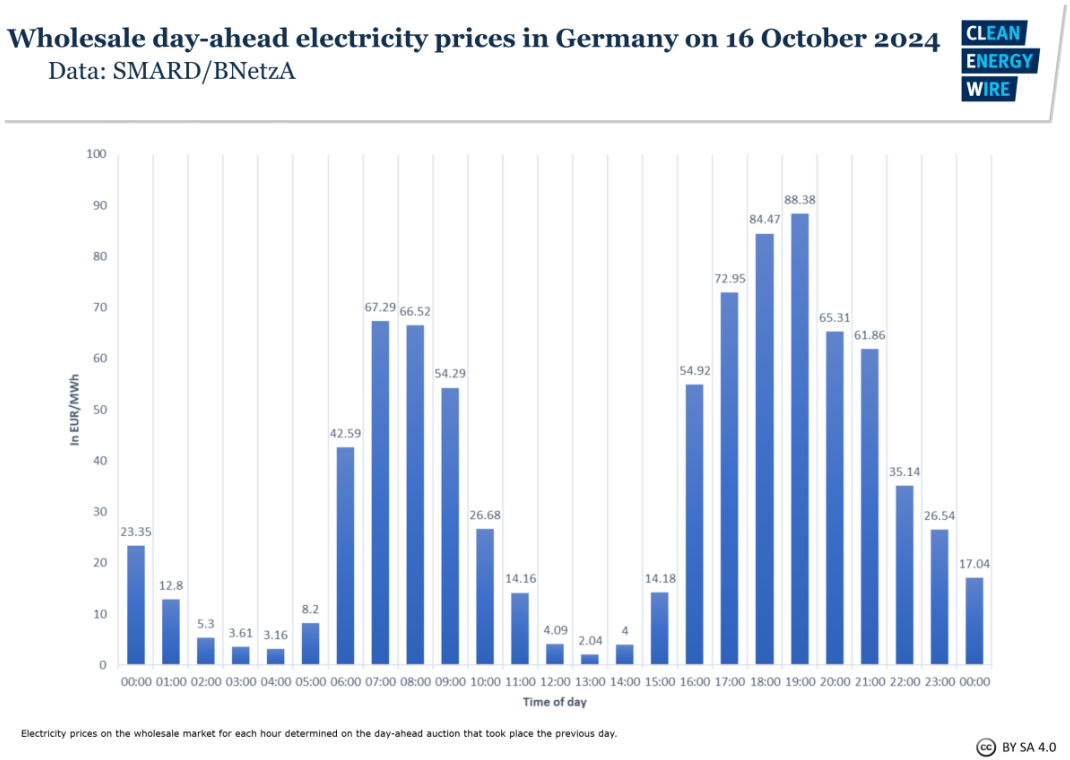
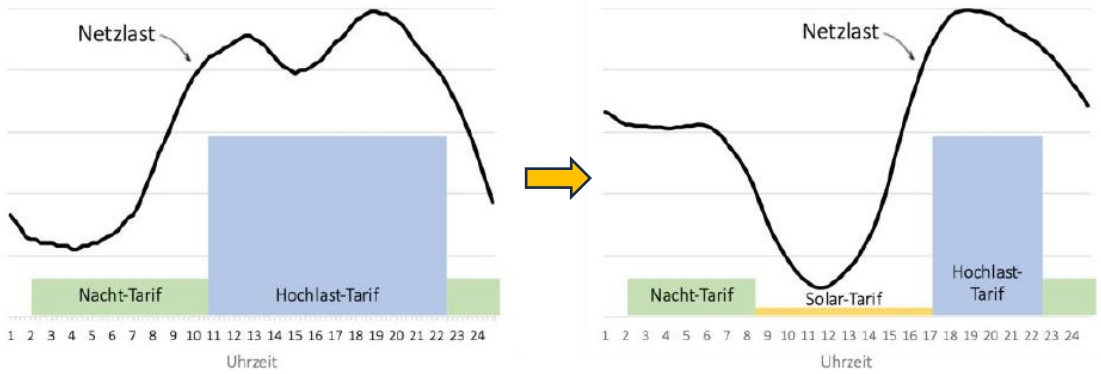
Grid tariffs in AT and DE





Source: Neon Neue Energieökonomik GmbH: Zeitvariable Verteilnetzentgelte (2023)

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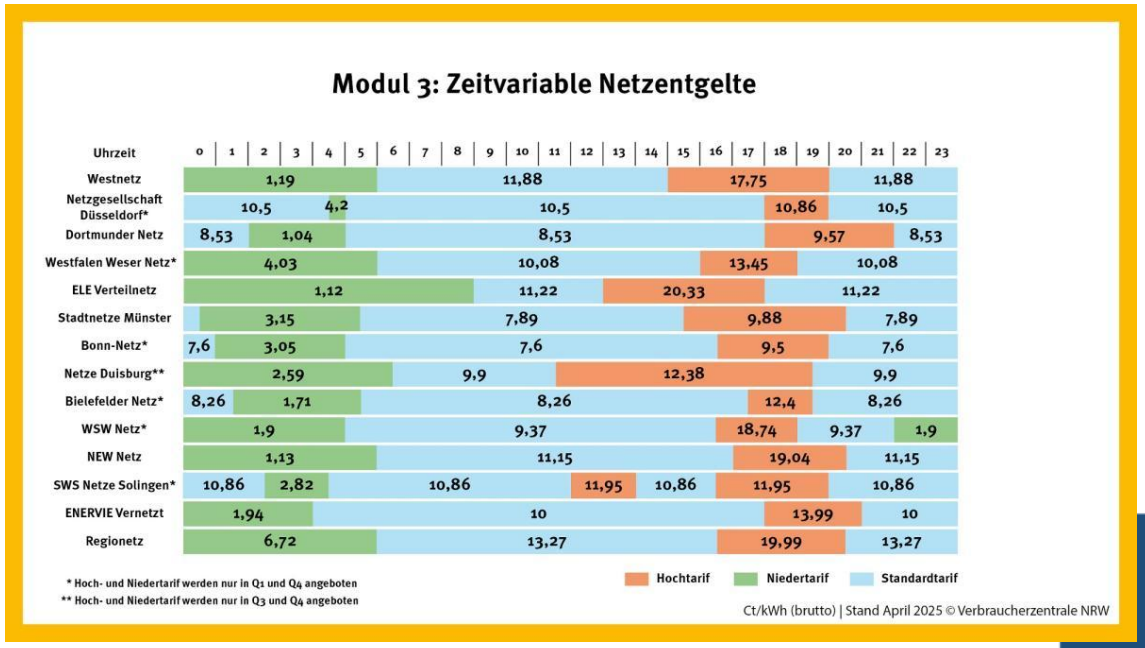
Grid tariffs in AT and DE

Austria(from 2026)

- Flexible grid fees for electricity distribution aimed at encouraging consumers to use more electricity during "*sun window*" (hours of high renewable generation, especially solar)
- Grid fees will be reduced by 20% for consumption between 10:00 and 16:00 from April to September, coinciding with peak solar production.
- Customers must have an enabled digital quarter-hour meter.

Germany (from 2025)

Flexible grid fees to be rolled-out in three phases – nation-wide, regional, and dynamic.



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Grid tariffs in SWE

Table 1 Pricing of network tariff cost components

Fee/cost component	Pricing	Price dynamics
Energy fee	Volume (SEK/kWh)	Static/ToU
Customer-specific fee	Fixed (SEK/customer)	Static
Power fee	Power (SEK/kW)	CPP/ToU
Fixed fee	Fuse/subscribed power	Static

Source: Swedish Energy Market Inspectorate

Energy fee

- Based on the short-term variable costs and be charged at a rate per kilowatt hour (SEK/kWh).
- Time-differentiation with two or more different prices at different times of the day or season, depending on feasibility and potential benefit to the grid.

Power fee (capacity tariff component)

- based on the forward-looking costs and charged based on the customer's use of the grid and the total load on the grid.
- time-differentiated to signal the long-term costs of customer's current grid use, typically based on the most critical peak hours or a Time-of-Use (ToU) profile.

From 2027, dynamic grid tariffs shall be introduced.

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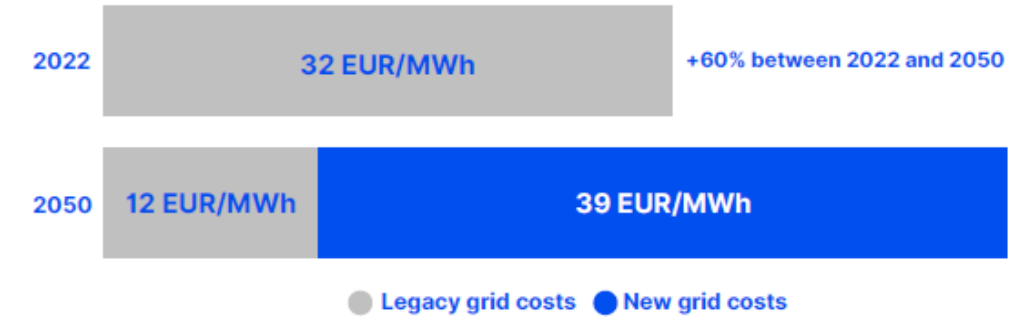
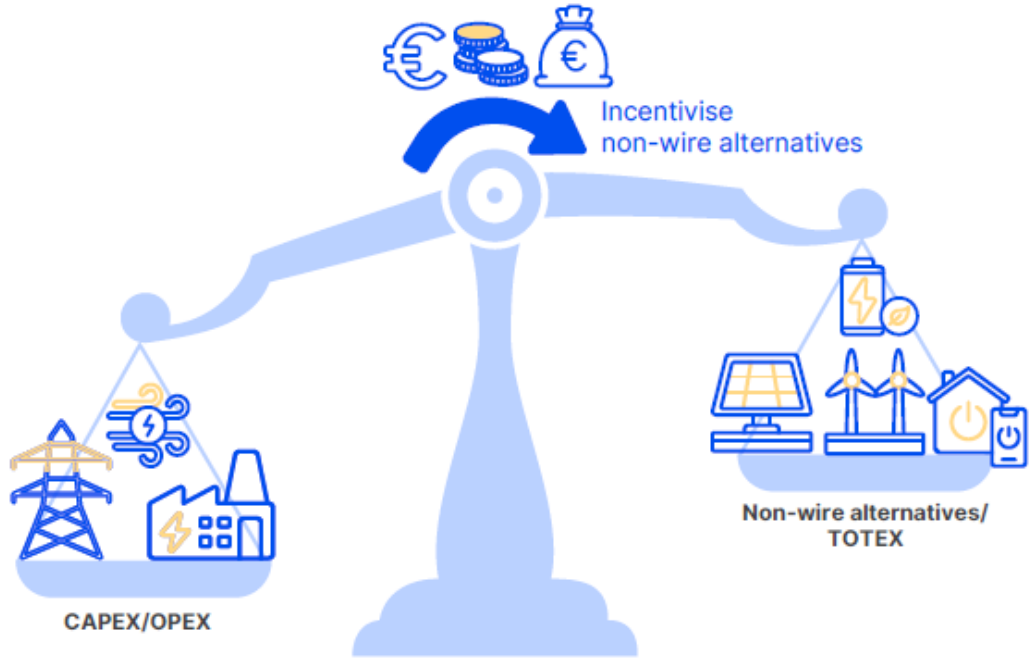
Flexibility first: More “steel & concrete” is not always needed to expand grid capacity

Figure 28: Evolution of total grid costs (EUR/MWh)



Source: ACER[55]

Figure 29: Incentivising system operators by prioritising flexibility solutions and considering a TOTEX approach



Source: ACER report on Unlocking flexibility: No-regret actions to remove barriers to demand response

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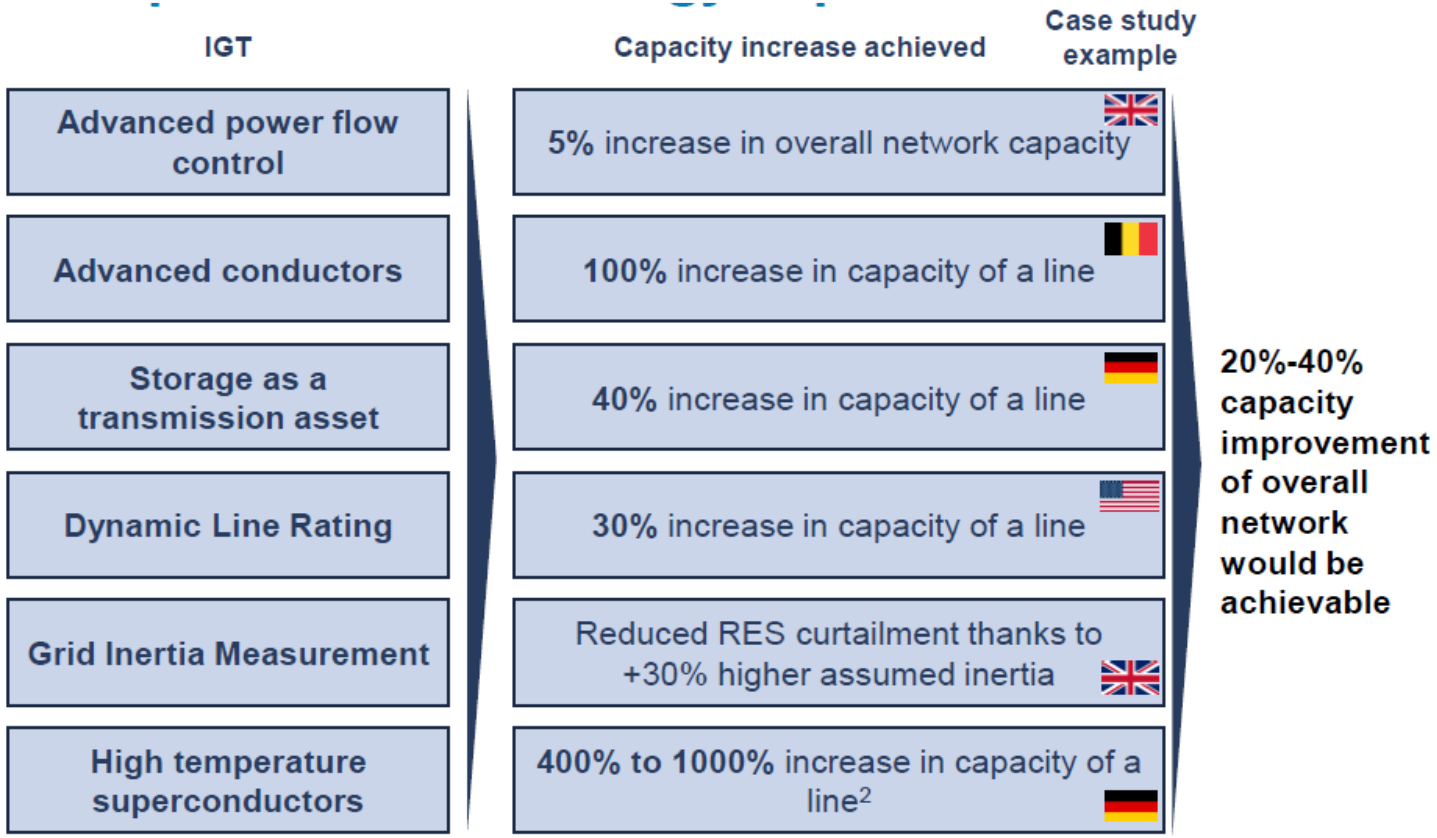
Innovative approaches could release existing grid capacity

- Innovative power grid technologies (IGT) could release 20 - 40% of new capacity in existing grids, as estimated in a recent study for CurrENT

- **Measures aiming at better utilization of existing grid shall complement grid development planning**



Source: CurrENT, Prospects for innovative power grid technologies, 2024

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