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HOW EU MARKET DESIGN CAN MAKE POWER CLEAN AND AFFORDABLE

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Businesses are queueing up to integrate new renewable and flexibility assets onto grids across the EU, while industry faces barriers to electrification. Bold and swift implementation of the Electricity Market Design (EMD) framework is needed to accelerate renewable energy investment in the interests of the EU's competitiveness and economic resilience. The planned revision of the EMD framework in 2026 should reform grid planning governance and introduce locational pricing as a route to cost-effective planning and affordable energy.

The need to accelerate renewable energy investment and reduce dependence on fossil fuels is supported by a broad political consensus in the EU, as evidenced by Commission President Von der Leyen's political guidelines,[1] her mission letters[2] to her new team, the Competitiveness Compass,[3] and the recently launched Affordable Energy Action Plan. This priority answers concerns about the EU's ability to be competitive towards China and the US in particular, and its vulnerabilities to overseas gas supplies. Meanwhile, the possibility of future gas spikes continuously threatens to make already high cost-of-living pressures worse.

Yet, building out renewable energy and electrifying the EU's industries is subject to barriers and delays. The recently agreed Electricity Market Design (EMD)

[1] Von der Leyen, U, European Commission, 18 July 2024, **Europe's Choice Political Guidelines for the Next European Commission 2024-2029**.

[2] European Commission, 17 September 2024, **Mission Letter Teresa Ribera Rodríguez Executive Vice-President-designate for a Clean, Just and Competitive Transition**.

[3] European Commission, 29 January 2025, **A Competitiveness Compass for the EU**

framework needs to be swiftly implemented and fully used to respond to these challenges, to address the EU's most pressing needs.

Further reform to the EMD framework is also needed in the planned 2026 revision, to ready it for the longer-term, fast-moving trends in the energy landscape. To anticipate those changes, while keeping operational costs low, the approach to the governance of grid planning needs to become more independent and transparent. Introducing locational price signals will enable consumers to access cheap renewable energy sources at the local level.

Key policy recommendations

We propose a three-level policy action framework to balance immediate concerns with longer-term structural measures:

1. **Baseline:** Swift and targeted implementation of the recently decided EMD reforms and outstanding technical network codes, with progress on implementation monitored by a new taskforce within the European Electricity Regulatory Forum.
2. **Zero-emissions flexibility accelerator package**, to include:
    a. EU-level digitalisation and industry electrification initiatives, with regard to interoperability and data exchange standardisation, data access and management, cybersecurity and product standards.
    b. An electrification plan for industrial demand.
    c. Guidelines for Member States to harmonise national tariffs, demand side response frameworks, and support schemes for investment in grid flexibility.
3. **EMD reform in 2026:**
    a. Reform of the national and EU infrastructure planning structures to improve preparedness and provide more agility in the connection of new renewable energy and industry electrification investments. This should include full network unbundling of planning and operation from investment and asset management at the national level, and development of planning capabilities within existing EU-level bodies.
    b. Locational price signals to allow consumers to access cheap local renewable energy resources.

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The case for action in the energy policy landscape

As the Draghi report indicates,[4] the EU's competitiveness is linked to accelerating decarbonisation in a cost-efficient way. There is strong interest in investing in these needs, and economics will increasingly lead to businesses and households electrifying their consumption. According to the International Energy Agency,[5] the market for clean technologies – like electric vehicles, batteries, solar PV, wind, electrolysers and heat pumps – is expected to triple between 2023 and 2030. Also, the Commission's impact assessment[6] for the 2040 climate target assumes that the share of electricity in total energy consumption will double from 25% to 50% over this period.

This trend will likely have a large impact at the local level, creating new challenges for electricity system operation and planning. There is pressure on electricity system operators to meet grid connection requests – for example in the Netherlands, where businesses in some regions are facing up to ten years waiting time to connect to the grid.[7] Renewable energy investors face similar constraints on the electricity generation side, with over 330 GW of wind energy waiting to be connected in eight EU Member States – almost 20 times as much as the wind energy capacity deployed in 2023 in the EU.[8] In addition, new green energy investments will likely lead to a new geography of demand clusters.

The EMD framework already provides solutions to some of the most pressing constraints in connecting new renewable energy and industrial electrification investments to the grid.[9] It is thus essential to fully use the EMD framework and seek to develop new initiatives that maximise its impact.

[4] Draghi, M., September 2024, **The future of European competitiveness Part B | In-depth analysis and recommendations**.

[5] International Energy Agency, November 2024, **Energy Technology Perspectives 2024**.

[6] European Commission, February 2024, **Europe's 2040 climate target and path to climate neutrality by 2050 building a sustainable, just and prosperous society.**

[7] TenneT Netherlands, 19 December 2024, **Komende tien jaar in groot deel Noord-Holland geen extra ruimte op elektriciteitsnet**

[8] Wind Europe, 12 January 2024, **The EU built a record 17 GW of new wind energy in 2023 – wind now 19% of electricity production**

[9] E3G, January 2024, **EU Power Market Reform, a launchpad for deep decarbonisation of EU power**

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The 2024 EMD reform and outstanding challenges

The 2024 EMD reform was limited in scope but delivered several important outcomes. It improved conditions for renewable energy investment by making 2-way Contracts for Difference (CfD) a preferential support instrument, and by addressing barriers to Power Purchase Agreements (PPA). It also created specific provisions that aim to foster investment in non-fossil grid flexibility technologies – assets that optimise the balancing of increasingly decarbonised electricity systems. Specifically, the reform created a governance framework for the assessment of grid flexibility needs – which are required to take the EU's climate targets into account – and introduced the possibility for Member States to launch support schemes for grid flexibility investment.

The 2026 EMD revision offers the opportunity to address remaining structural challenges to make the EMD better suited to support fast-paced change in the energy network. The two main outstanding challenges are:

1. Governance processes are not enabling new projects – driven by strong investment interest – to connect swiftly to the grid.
2. Market structures need to better enable households and industrial consumers to access local cheap renewable energy sources.

Governance processes are not enabling new projects – driven by strong investment interest – to connect swiftly to the grid

Lengthy planning procedures are leading to delays in connecting new demand and generation investments. Planning needs to better anticipate these developments with stronger and more independent institutions – setting energy-related assumptions and integrating the latest technology assumptions. It also needs to better improve linkages with the infrastructure of other vectors of a decarbonised energy system, like hydrogen and CO_2, making a significative contribution to the achievement of EU's pressing political objectives to be clean and competitive.

Complex validation processes exist at the national level to mitigate against any bias arising from commercial interests of the transmission systems operators (TSOs), requiring multiple steps and lengthy multi-layered approval of planning proposals. There are also notable shortcomings in plotting out how production and demand will evolve – especially post-2030 and particularly regarding the decommissioning of gas plants – and in identifying the assets needed for efficient grid balancing as decarbonisation progresses.

For its part, the EU level has also not been able to approach these developments systemically, putting further integration of the single energy market at risk. This is particularly visible in the European Resource Adequacy Assessment (ERAA), which according to the European Union Agency for the Cooperation of Energy Regulators (ACER) lacks on identifying long-term needs.[10]

Improved planning governance will improve the ability not only to anticipate fast-paced changes in the energy sector, but also to determine the grid balancing assets needed to keep operation costs low for a defined level of system reliability. These grid balancing assets should be mobilised through investment instruments that are fit to deliver long-duration output and are flexible and adaptive to the needs of a changing energy landscape, going beyond the current Capacity Remuneration Mechanisms. These are still too focused on procuring firm capacity, reflecting the assumption of a gradually evolving system with predictable power flows.

Market structures need to better enable households and industrial consumers to access local cheap renewable energy sources

The current market framework still poses several barriers for consumers to directly experience in their bills the benefits of investment in cheap renewable energy sources. Electricity prices do not sufficiently reflect local supply and demand conditions, which means industry and households do not directly experience the benefits from local renewable energy projects, which impacts the support for these investments. The system also does not direct investment to locations where it makes more economic sense and leads to lower overall system costs.

Current market structures do not give clear signals for new demand to be located where it can access cheap renewable energy sources, creating inefficiencies in the form of excessive grid development and system management costs that increase electricity bills overall. In the Netherlands, for example, the inability of grid investments to keep pace with industrial electrification will mean a delay for relevant business investments.[11]

In short, current market structures are making it more difficult for European citizens and businesses to experience the benefits of investment in cheap renewable energy. This has severe impacts on the cost of living for households

[10] ACER, 8 August 2024, **European Resource Adequacy Assessment**

[11] Reuters, 22 January 2024, **Dutch employers warn electric grid problems are harming investment**

and delays Europe's increased competitiveness and its ambition to continue to be a relevant industrial region at the global level.

Today's market arrangements are complex, reflecting system conditions at different network levels and with specific grid balancing needs. Retailers are pushed to focus on adapting and optimising their systems to these complex structures and mobilising energy volumes for economic returns. The complexity results in less transparency for consumers on how prices are set and on how market costs impact bills. Reducing the complexity would put the consumer back at the forefront of retailer priorities, directing innovation to reduce costs for consumers. This in turn would incentivise consumers to electrify demand, quickly reducing dependence on gas consumption. It would also incentivise consumers to adopt smart and digital devices that would contribute to increased system management efficiency, lowering the system costs that feed into electricity bills.

A framework for policy action in the new EU political cycle

Pressure to improve the EU's competitiveness, and address energy security and cost-of-living concerns, have put energy prices and electricity market design back on the EU policy agenda. A revision of the EMD in 2026 poses an opportunity to structurally address relevant outstanding challenges.

We propose a policy action framework to balance immediate concerns with the structural measures that will contribute to delivering the EU's political objectives (see also Figure 1):

1. **Baseline** – Full implementation of the current framework.
2. **Zero emissions flexibility accelerator –** A package launched by the European Commission to help increase flexibility supply within the current legal framework.
3. **Reform of the EMD framework in 2026** to prepare for a fast-evolving energy landscape and meet the Council's calls[12] for improved grid planning.

Taking into account the different legislation requirements, this framework can be rolled out according to the timeline shown in Figure 2.

[12] Council of the European Union, 30 May 2024, **Advancing Sustainable Electricity Grid Infrastructure - Council conclusions (30 May 2024)**

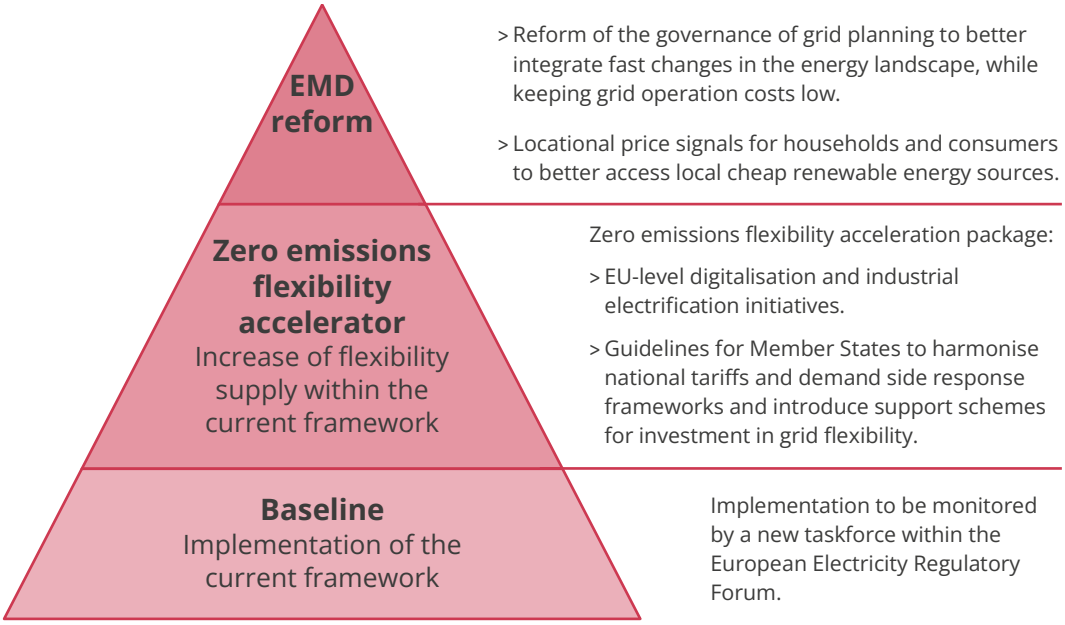

Figure 1: Three-level policy action framework for the EU Electricity Market Design

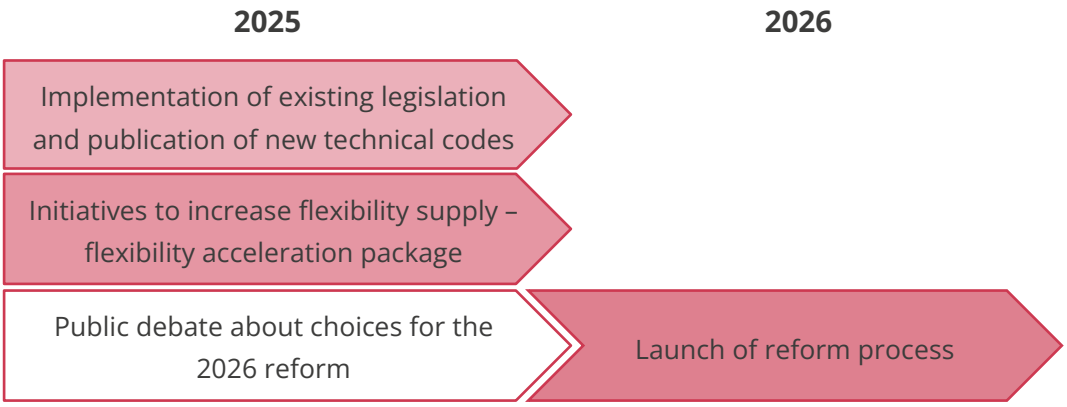

Figure 2: Timeline for the three-level policy action framework

Baseline

Given the pressing need to progress decarbonisation and respond to investment interest, EU institutions, regulators and national governments must implement the 2024 and 2019 reforms and technical codes swiftly and boldly.

Recommendation

Establish a taskforce within the European Electricity Regulatory Forum that monitors progress and issues recommendations on implementation of the Electricity Market Design framework.

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Flexibility accelerator

The current market mechanisms need to be followed with an encompassing initiative that accelerates, in the short term, the investment in and adoption of grid flexibility technologies. This would draw on the consensus among policymakers, EU institutions, civil society and industry on the role of grid flexibility, and address the recent call for action by Member States in the 30 May 2024 Energy Council meeting.[13]

Recommendations

Launch a zero emissions flexibility acceleration package containing the following elements:

> Fast-tracking of EU-level digitalisation initiatives with regard to interoperability and data exchange standardisation, data access and management, cybersecurity and product standards.

> Guidelines for Member States to:

  a. Harmonise tariffs and demand side response frameworks.

  b. Introduce better remuneration for support provided by flexibility services (such as locational or time-variant network tariffs).

> Removal of barriers that prevent grid flexibility participating in energy markets, thereby improving the economic case for households and industries to invest in electrification of demand.

> Alignment with the Electrification Plan[14] to be launched with the Clean Industrial Plan so more industrial demand can supply grid flexibility.

[13] Council of the European Union, 30 May 2024, **Council conclusions on advancing sustainable electricity grid infrastructure**

[14] E3G, October 2024, **An Electrification Action Plan to Secure EU Industry's Future Towards a Supportive Policy Framework**.

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EMD Reform

The 2026 EMD revision offers the opportunity to address the two main outstanding challenges introduced above:

1. Reform governance procedures to enable new projects to connect to the grid more smoothly, while keeping grid operation costs low.
2. Introduce locational price signals to enable households and industrial consumers to access local cheap renewable energy sources.

Reform governance procedures to enable new projects to connect to the grid more smoothly, while keeping grid operation costs low

At the Member State level, it is crucial to move to the next stage of independent system operation and planning to improve agility, save time and costs, and improve the capability to integrate the systemic impacts of strong investment interest in generation and demand. This requires taking the separation of ownership that started with the 3rd energy package further, making network planning and operation independent from network ownership (Figure 3).

The example of the UK shows the relevance of a change in governance to deliver political objectives. There, the National Energy System Operator has taken the planning and operation tasks from the TSO amid concerns about competitiveness and energy affordability. Taking this step at Member State level may help address capex-bias and provide regulators with more confidence that planning processes – including decisions related to anticipatory investments – deliver value to energy consumers.

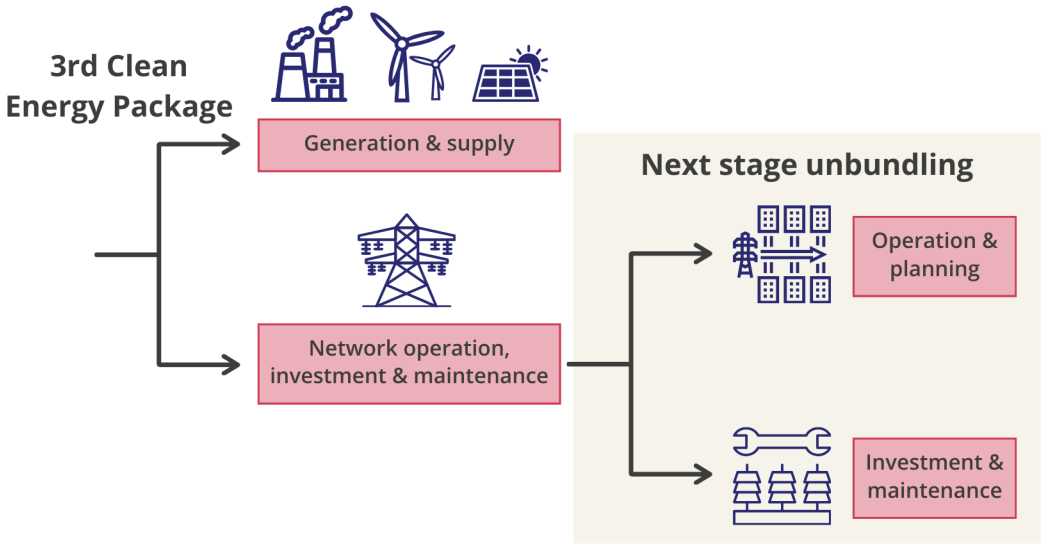

Figure 3: The next stage of electricity transmission unbundling

Improved understanding of the evolution of the system through independent system operation and planning will underpin better decisions in the design of grid asset investment mechanisms. These will mobilise the transmission-level assets, including grid balancing assets, that will deliver low operation costs, building on lower financing costs and location and performance criteria according to system needs.

At the EU level, different options need to be explored to strengthen capacities that are lacking in the current configuration and affect further integration of the energy single market. The ongoing accelerated energy transition requires independent and well sourced EU-level organisations able to integrate the systemic impacts of EU political goals on grid planning, especially in the long term. ACER's assessment[15] of the ERAA shows that there are still opportunities for improvement in the current architecture.

EU-level organisations should be able to make the planning process more agile by simplifying the current multi-layered network development plan process. They should also be in a position to plan system changes according to independent insight and analysis, with the capability to follow real economy and technology changes.

Stronger EU institutions can support better delivery of the 70% cross-border capacity rule[16] and 15% interconnection capacity goal[17] so citizens can benefit from faster access to renewable energy and improved security. This could be achieved either by strengthening Entso-E and ACER's mandates – realising their potential as key delivery and monitoring bodies of the EU single market and EU political goals – or by creating new functions elsewhere, for example within the European Commission or regional cooperation fora.

Introduce locational price signals to enable households and industrial consumers to access local cheap renewable energy sources

Locational pricing will better connect consumers with cheap renewable energy sources. It will also direct investment in grid assets to where they are most needed – particularly, areas with strong grid congestion – contributing to better

[15] ACER, 2 May 2024, **Decision No 06/2024 of the European Union Agency for the Cooperation of Energy Regulators of 2 May 2024 on the European Resource Adequacy Assessment for 2023**

[16] ACER, **ACER Q&A Everything you wish to know on the minimum 70% target**.

[17] European Commission, **Electricity interconnection targets**.

use of grids to solve grid congestion and efficient system management.[18] [19] The simplicity and transparency of locational pricing also sets strong incentives for consumer-focused and innovation-driven propositions for consumers.

Locational pricing will enable households to reap the benefits of cheap renewable energy in the short term. Also, industries interested in becoming more competitive will have price incentives to link their electrified processes with renewable sources at the local level.

Regions with high demand but lower renewable energy shares will have in place the price signals for strong investment in new generation, setting a sustained pathway for electricity price reduction. Power system management efficiencies resulting from locational pricing will contribute to grid operations at low costs, with positive impact on consumers' bills across the board. The price signal incentives for investment can also be compatible with mechanisms that shield vulnerable consumers from higher prices, if deemed necessary.

Recommendations

> Reform national and EU infrastructure planning structures to improve independent, transparent planning and swift delivery of EU political goals – such as competitiveness, security, climate and energy affordability.

  a. Member State level: full network unbundling to make network planning and operation functionally independent of network investment and asset management.

  b. EU level: development of planning capabilities within existing EU-level bodies, including Entso-e and ACER, or creation of additional functions elsewhere, for example within the European Commission or regional cooperation fora.

> Introduce locational price signals to allow consumers to access cheap renewable energy resources.

[18] Kopernikus Projekte, 2021, **Whitepaper Electricity Spot Market Design 2030-2050**

[19] Ofgem, 2023, **Assessment of Locational Wholesale Pricing for GB**

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About E3G

E3G is an independent climate change think tank working to deliver a safe climate for all.

We drive systemic action on climate by identifying barriers and constructing coalitions to advance the solutions needed. We create spaces for honest dialogue, and help guide governments, businesses and the public on how to deliver change at the pace the planet demands.

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