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The Power to Compete: Europe's Energy Reset

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Foreword

Europe's place in the global economy is being reshaped by a new energy reality.

For years, the energy transition has been understood primarily as a climate challenge, one defined by targets, timelines and emissions reduction. But that framing is no longer sufficient. In a world of geopolitical instability, rising electricity demand and intensifying economic competition, energy has become a question of power in the most literal sense.

The countries that succeed in the decades ahead will not simply be the ones that decarbonise fastest. They will be the ones that can deliver abundant, secure and affordable energy at scale.

Across the world's largest economies, this shift is already underway.

In the world's largest emitters – China, the United States and India, which together account for more than half of global emissions and an even greater share of future demand – energy policy is being reorganised around a clear priority: ensuring supply. These countries are building generation, expanding grids and securing domestic capacity at speed. Clean energy is growing rapidly – often faster than in Europe – but it is being deployed within systems designed first and foremost to deliver reliable and low-cost power.

The result is a more pragmatic transition. Clean energy expands where it strengthens the system – where it is the cheapest, fastest and most effective way of meeting demand. Emissions fall not because growth is constrained, but because energy systems become larger, stronger and more efficient.

This is the strategic reality Europe must confront.

Europe has led the world in climate ambition and made real progress in reducing emissions. That achievement matters. But the global centre of gravity has shifted. The future of the energy system will be determined in economies where demand is rising rapidly – and where the overriding priority is to ensure that supply keeps pace.

At the same time, the nature of demand is changing. Electrification across transport, industry and heating is accelerating. Digital infrastructure – particularly artificial intelligence – is creating new, structurally significant sources of demand. In this environment, access to abundant and competitively priced electricity is becoming a defining condition of economic strength.

On this measure, Europe is under increasing pressure.

High energy costs, slow infrastructure deployment and constraints on system expansion are beginning to weigh on competitiveness. The risk is not simply economic underperformance. It is a gradual loss of industrial capacity and strategic relevance in a world where energy underpins both.

What is required now is a shift in approach.

Decarbonisation remains essential. But it cannot be pursued in isolation from the broader objective of building energy systems capable of delivering at scale. Cost, capacity and security must move from secondary considerations to central design principles.

This is not an argument for weakening climate ambition. It is an argument for embedding it within a more effective strategy – one that recognises that clean energy succeeds when it helps deliver abundant and affordable power.

Europe has the capabilities to lead in this next phase. But doing so will require a clearer narrative, stronger political direction and a renewed focus on delivery.

The lesson from the world's largest emitters is straightforward. The transition will be won by those who build.

In the end, cheap and secure power wins.

Unless Europe aligns its strategy with that reality, it risks falling behind those already shaping the energy systems – and the economic order – of the future.

Tony Blair, Executive Chairman

Matteo Renzi, Strategic Counsellor

Executive Summary

Energy is the foundation of Europe's prosperity, security and global influence. Every factory, every data centre, every household depends on it. Europe has extraordinary assets: the world's strongest offshore wind resource, decades of nuclear expertise and one of the most interconnected electricity systems on Earth. Yet today those strengths are undermined by a system that is too fragmented, too slow and too expensive.

The facts are stark. Power prices remain two to three times higher than in the United States or China. Europe imports nearly 60 per cent of the energy it consumes.[1] Geopolitical shocks like the Iran war leave Europe hopelessly exposed – with households and industries paying the price.

For much of the past two decades, European energy policy was framed primarily as a climate challenge rather than as a question of economic power and system capability. Emissions targets drove deployment and regulation, but the parallel task of building a low-cost, resilient and scalable energy system received less strategic attention. The result was not that Europe moved too fast on decarbonisation, but that it often moved without fully aligning climate ambition with industrial competitiveness, affordability and security.

This framing is no longer sufficient. In the emerging geopolitical economy, the primary task of energy policy is to build systems capable of delivering abundant, affordable and secure power at scale. Decarbonisation remains essential, but it must increasingly be understood as an outcome of successful system design rather than the organising principle of strategy itself.

The global energy landscape is shifting, fast. In the previous century, power belonged to those who controlled oil and gas. In this one, it will belong to those who can produce abundant, affordable electricity and command the clean-tech supply chains behind it. The US and China have moved with

clarity and scale. Europe has not. The result? A widening competitiveness gap and a growing risk that Europe becomes a follower in these era-defining industries.

This is already visible. In the late 1990s, US and European power prices were broadly similar. Today the US enjoys some of the lowest industrial electricity prices in the world; Europe endures some of the highest. America is now a net energy exporter; Europe remains dependent. This divergence influences everything: industrial investment, artificial-intelligence capacity, manufacturing, household bills – and Europe's geopolitical weight.

Energy is now Europe's strategic test. Without cheap, reliable power, European economies will not reindustrialise; countries will not retain strategic industries; and governments will neither meet climate goals nor maintain public consent. But Europe also has an extraordinary opportunity. No region has more to gain from the shift to an electrified, clean-tech economy. No region has deeper engineering capabilities, more sophisticated energy markets or stronger innovation talent. No region has a larger integrated grid. And no region has more to lose by failing to act.

Five interlinked priorities must drive a new European energy strategy:

1. **Plan the system as one continent:** Create a Continental System Planner to coordinate Europe's grid, optimise investment and end fragmented national planning.
2. **Build the physical backbone for cheap power:** Expand interconnection, deliver a continental firm-power strategy, and fix permitting and connection bottlenecks to allow clean power to flow.
3. **Modernise markets to reflect physics:** Reform bidding zones, strengthen flexibility and long-term markets, and introduce pricing that rewards location, timing and system value.
4. **Make electrification a competitiveness strategy:** Use clear price signals, industrial energy-demand clusters and connections reform to grow flexible demand and lower system costs.

5. **Rebuild Europe's clean-tech industrial base through innovation:** Prioritise technologies where Europe can lead, build continent-scale clusters, and reform financing to cut capital costs and secure supply chains.

If Europe delivers this agenda, energy becomes our advantage – not our constraint. We can anchor AI capacity at home. We can restore competitiveness. And we can project a new kind of European leadership: clean, secure, technologically advanced and confident in its future.

The path ahead is challenging, but it is also full of possibility. Europe has the resources, the talent and the scale. What it needs now is the courage to act with the clarity this moment demands.

If we choose ambition over drift, coordination over fragmentation and delivery over debate, Europe can lead – not follow – in the new energy age.

01

Europe Is Falling Behind in the New Energy Paradigm

As the old international order that underpinned Europe's security, economic and institutional model crumbles, power is shifting and strategic frameworks are being rewritten. Geopolitical power in the mid-21st century will rest on three factors: autonomous military capability, the political cohesion required to act decisively, and the ability to demonstrate both frontier-technology leadership and economic strength. Energy underpins all three. A successful energy strategy is foundational to Europe's future.

At the same time, the global energy system itself is undergoing a profound shift. The age of hydrocarbons is giving way to an era defined not only by fossil fuels, but by electrification, clean-tech manufacturing and AI-driven demand.

The New Energy Order

In the emerging era of AI and great-power competition, access to abundant, reliable and affordable electricity has become a primary determinant of national strength. Since the 20th century, geopolitical leverage rested on hydrocarbons: those who controlled oil and gas shaped markets, alliances and even wars. In the 21st century, influence is increasingly tied to electricity – grids, clean-tech supply chains and the financing of vast new energy systems. Carlyle has called this a New Joule Order.[2] JPMorgan describes it as a New Energy Security Age.[3]

Alongside global decarbonisation efforts, this shift has been building for years, but it is now accelerating sharply as economies electrify and digitalise. Artificial intelligence is the catalyst. Global demand for data-centre capacity is projected to grow by around 20 per cent per year to 2030, driven largely by AI workloads. The International Energy Agency (IEA) expects electricity demand from data centres to more than double by the end of the decade, with AI alone consuming nearly 3 per cent of global power.[4] Some forecasts suggest the emergence of trillion-dollar AI clusters in the 2030s,

requiring up to 100 gigawatts (GW) of firm power[5] – more generation capacity than many European countries possess today. Robust domestic AI infrastructure is becoming a prerequisite for economic competitiveness and technological sovereignty.

At the same time, countries are jostling to lead in other energy-intensive industries. Together, these forces are driving a worldwide scramble for new electricity generation, grids and storage solutions, and the minerals and manufacturing needed to build them.

The scale of energy required to compete in the AI age is reshaping national strategies. Climate concerns remain important, but they are increasingly rivalled – and sometimes overshadowed – by imperatives of security, competitiveness and resilience. As Bloomberg's Liam Denning puts it, the new ESG (environmental, social and governance) is economics, security and geopolitics.[6] The IEA is now expected to push back its projected peak in fossil-fuel demand,[7] even as global investment in solar and nuclear power reaches record levels.

JPMorgan's 2025 report *Power Rewired: The New Map of Energy and Geopolitics*[8] states that "Nations' economic futures hinge on how they play the natural resources hand they have been dealt – via policy, investment, and alliances – amid AI-driven demand spikes, conflict shocks, and access to capital. In this era, seeking energy resiliency, if not dominance, is a strategic imperative."

02

Petrostates Versus Electrostates

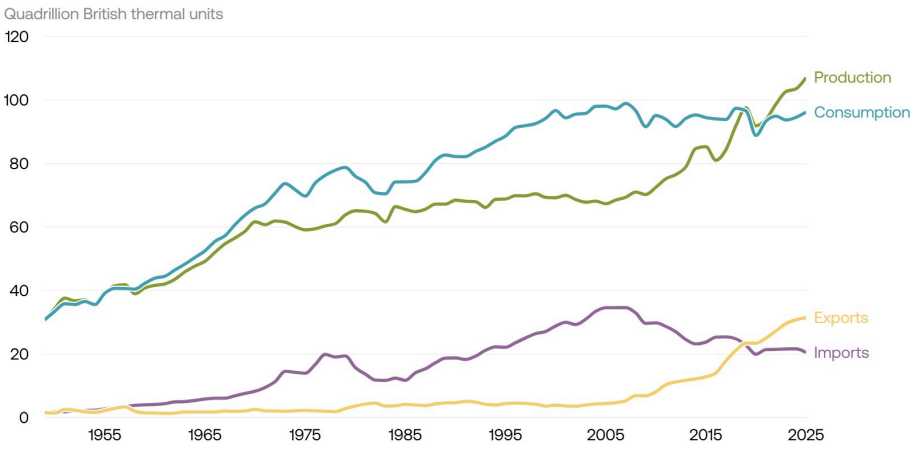
Countries are broadly pursuing one of two overlapping paths: becoming "petrostates", which leverage domestic fossil abundance to gain energy security and export strength, and "electrostates", which build industrial power around electrification, clean technologies and domestic manufacturing.[9] Both paths lead to energy security; failure to choose a path will result in energy dependency. The world's superpowers currently organise their energy strategies around one of these two models. Both models are being reinvented for the AI age.

The United States: A Reinvented Petrostate

Over the past two decades, the US has turned domestic geology into strategic leverage. The shale revolution transformed the country from a major energy importer into a net energy exporter by 2019, underpinning its industrial competitiveness and geopolitical reach.[10]

FIGURE 1

Shale-driven production growth reversed decades of US energy-import dependence



Source: US Energy Information Administration, *Monthly Energy Review*, April 2024

Under President Donald Trump, this strategy has been deepened through a declared "energy emergency" aimed at maximising domestic fossil-fuel production for both domestic use and export markets.[11] But this is not a repeat of the 20th century. Alongside fossil-fuel expansion, the US is investing heavily in nuclear, grid modernisation and advanced clean technologies, positioning its energy system to absorb the explosive load growth coming from AI.

The US is not naturally designed for rapid electrification. Just like Europe, its transmission and distribution grids are under strain. But reforms to permitting, siting and interconnection are accelerating, and its vast wind and solar resources remain a largely untapped competitive advantage.

China: The Creation of the Electrostate

China, by contrast, has pursued a strategy built on electrification, domestic clean-tech dominance and sheer scale. Lacking abundant domestic oil and gas, it has expanded every form of electricity generation to reduce its dependence on imports.[12]

In 2024, China's electricity demand increased by 6.6 per cent.[13] China contributed more than half of the global increase in both solar and wind generation in 2024, and is on track to have at least 2461GW of renewable electricity capacity installed by 2030, doubling the 2022 figure.[14] In addition to renewables, the country is running an ambitious nuclear-power programme, with the country expecting to reach 65GW of installed nuclear-power capacity by the end of 2025 and 200GW by 2040,[15] and continues to use coal as a backbone of domestic production – in 2024 alone, China started construction on 94.5GW of new coal-fired power capacity.[16] This build-out across sources means China is adding more electricity production capacity per year than any other country in the world.

This strategy has also involved a mass electrification of the economy – according to RMI, China has been electrifying at 10 percentage points per decade, nine times faster than the rest of the world.[17] China now accounts for roughly one-third of global electricity demand.[18] As a result, while China's energy-import reliance continues to increase due to significant demand growth, this is likely to peak in future as a result of its electrification progress.

This has come alongside concerted state-led efforts to dominate in clean technologies like solar, batteries and critical minerals, and increasingly other technologies like electric vehicles. In 2024 alone, China captured 76 per cent of global clean-tech factory investment, and today emerging markets buy 43 per cent of its clean-tech exports, up from 24 per cent between 2022 and 2024.[19]

Two Models With a Common Lens

These categories blur. Petrostates like the US and the Gulf states are investing in clean energy, and electrostates like China still rely on fossil-fuel foundations. Other countries are shaping distinct models based on their advantages – Australia on critical minerals, South Korea on electro-manufacturing, and Canada on nuclear and hydro.

But the strategic lesson is clear. Every major power is now turning domestic strengths into an integrated strategy for energy security, energy abundance and lower energy costs – because in the 21st century, energy is the platform upon which industrial and geopolitical strength is built.

03

Europe's Place in the New Energy Order

Europe has not yet adapted to the structural transformation underway in the global energy system. This failure is not simply a matter of market outcomes or technological lag. It reflects deeper strategic misjudgements about how energy policy relates to security, industrial power and geopolitical competition. As a result, Europe enters the new energy age with significant structural vulnerabilities that are already affecting its economic performance and political cohesion.

Throughout this paper, "Europe" refers to the continental energy system – encompassing the EU, accession states, the UK, Norway, Switzerland and, over time, a reconstructed Ukraine. These economies are already deeply interconnected through shared infrastructure, markets and strategic interests. Their energy futures are therefore inseparable.

Past Mistakes, Current Vulnerabilities

Europe's current position reflects a set of strategic errors in how the energy transition was conceptualised and implemented. At its core, from the mid-2000s onwards, energy policy came to be framed primarily as an environmental and carbon-reduction project rather than as a pillar of economic power, industrial strategy and geopolitical resilience. Climate ambition drove policy design, but questions of energy security, system cost and technological sovereignty were often treated as secondary considerations.

This framing shaped a series of policy choices that now define Europe's structural vulnerabilities.

A few specific mistakes flowed from this, with significant implications:

1. **Europe focused on deploying clean generation without driving electrification across the wider economy at sufficient speed.** Renewable capacity expanded, but progress in electrifying industry, heating and transport lagged. As a result, fossil fuels remained deeply embedded in final energy consumption, limiting the structural benefits of the transition and prolonging exposure to volatile global energy markets.
2. **The energy transition was pursued without adequate system design.** Wind and solar capacity were often added faster than grids, storage and clean firm power (electricity generation that is guaranteed to be constantly available) – driven by capacity-related target-driven policy. This created congestion, curtailment and price volatility, preventing the full economic benefits of low-cost renewable technologies from being realised.[20] At the same time, market frameworks continued to reward volume rather than system value, while electrification lag meant that the fixed costs of a more capital-intensive system were spread across too little demand.
3. **Fossil-fuel production was deprioritised while dependence remained high.** Europe's long-standing reliance on Russian fossil fuels has now been slowly replaced by dependence on Middle Eastern and American supplies. The decisions of key producers like Denmark and the UK to phase out fossil-fuel production[21] have made the region more exposed to international markets in increasingly unstable times.
4. **Electrotech manufacturing was outsourced to China.** Europe led on renewables deployment but treated decarbonisation as a question of megawatt targets, while offshoring the supply chains and much of the manufacturing value required to meet those targets. National and EU subsidies boosted demand without anchoring domestic production. While China's industrial policies have been the key to making electrotech affordable and available – making the electrostate feasible – it does mean that Europe's fossil-fuel-based manufacturing and technological base is disappearing without being replaced by alternatives. At the same time, China's policies create significant dependencies, which can cause economic disruption and weaken European economies further. For instance, in late 2025, European carmakers were facing production

disruptions as Chinese export controls tightened access to key semiconductor components, forcing plants to revise output schedules and halt lines.[22]

5. **Europe attempted to manage this transformation primarily through national strategies rather than as a coordinated continental system.** Different starting points, political choices and resource endowments produced asymmetric pressures across national systems. Yet because Europe's electricity network is deeply interconnected, local constraints quickly became continental risks.

The consequences are now visible. Europe has made substantial progress in reducing emissions and expanding renewable generation – moving from coal-heavy generation across the continent to a grid where renewables (including hydro and bioenergy) now account for almost 50 per cent of electricity generation and around 23 per cent of the EU's final energy consumption.[23] However, it has not yet built an energy system that is simultaneously affordable, resilient and globally competitive. In effect, Europe has paid three times in the transition: through the higher integration costs of moving first, through continued exposure to fossil-fuel price shocks and through dependence on foreign manufacturing for the technologies of the future.

This is putting the continent at a comparative disadvantage. In the late 1990s, energy costs in the United States and the EU as a whole were broadly similar. Since then, US prices have fallen sharply while Europe's have stayed high. Both were once import-dependent, but today the US is a net energy exporter, while Europe remains heavily reliant on foreign supply.

This divergence means Europe enters the age of AI at a disadvantage: it lacks the cheap, secure energy that underpins competitiveness and geopolitical power.

Europe's Energy Problem

Europe's energy disadvantage is evident across three core metrics, all of which are foundational to the future success of the continent.

1. EUROPE'S ENERGY COSTS ARE AMONG THE HIGHEST AND MOST VOLATILE IN THE WORLD

In the wake of an energy crisis triggered by Russia's invasion of Ukraine and the disruption of gas supplies to Europe, energy prices remain structurally elevated compared to historical norms. In 2024, EU industrial electricity prices averaged €85 per megawatt hour (MWh) compared with €36 in the US and €53 in China.[24,25] The Title Transfer Facility gas benchmark, a leading wholesale price reference for Europe, averaged €47/MWh in early 2025 – half its 2022 peak, but still double pre-crisis levels. With wholesale electricity prices often set by gas-fired generation and fossil fuels still accounting for much of Europe's energy use, elevated gas costs continue to directly influence high power prices.

Since Russia's invasion of Ukraine, European households and businesses have also been exposed to repeated swings in energy markets. Gas prices remain far above pre-crisis levels, while electricity markets have seen spikes above €250/MWh during peak mid-crisis periods.[26] The extreme spikes of 2022 to 2023 have eased, but volatility remains far higher than it was. Wholesale electricity prices continue to swing sharply according to weather, renewable output and gas-storage levels, and even "normal" market conditions now produce day-ahead fluctuations that regularly reach many multiples of the annual average.[27]

High and volatile costs represent a significant challenge to European competitiveness and to household trust (people's confidence that energy will remain cheap during the transition).

For energy-intensive industries, this can be the decider between operating in Europe or relocating abroad. Deloitte has found that 6 in ten respondents say that their operating costs are more than 10 per cent higher in Europe than elsewhere.[28] Similarly, cement prices in Germany are more than twice as high as in the US and more than four times Chinese prices.[29] Manufacturing in Europe has plummeted. In 2024 the EU's manufacturing sold-production value fell by around 2 per cent, after a similar drop in 2023,[30] and the share of manufacturing in value added remains at around 15 per cent – well below the levels of the mid-1990s. Europe lost an estimated

2.3 million manufacturing jobs between 2008 and 2023.[31] For digital infrastructure, it is the difference between hosting sovereign AI clusters or depending on foreign providers. Europe's energy disadvantage is becoming a competitiveness crisis.

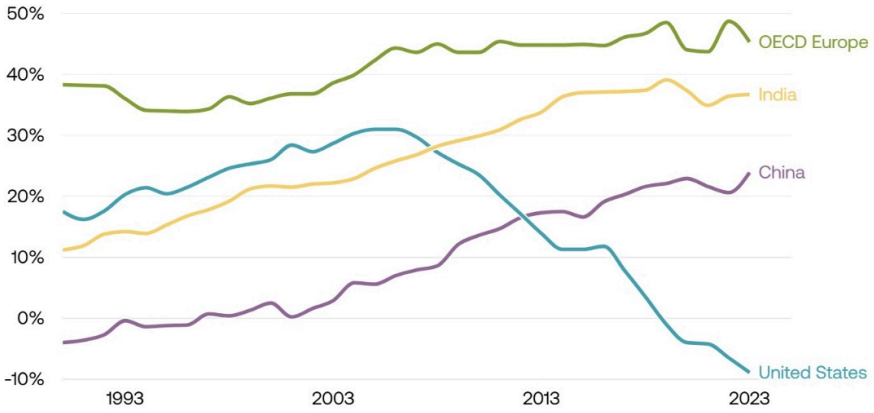
This is not only an industrial issue but a social one. More than 46 million Europeans are classed as energy poor,[32] and in many countries high energy bills are now a leading source of public anger. When households feel that the energy transition raises their costs without improving security, trust in both governments and the European project itself erodes.

2. EUROPE'S IMPORT DEPENDENCE IS HIGH

The EU's energy-import dependency rate stood at 58 per cent in 2023.[33] This number has grown steadily since the 1980s and is far higher than the rate of countries like the US, China and India.

FIGURE 2

Europe has a higher net fossil-fuel import dependency as a share of demand than comparable countries

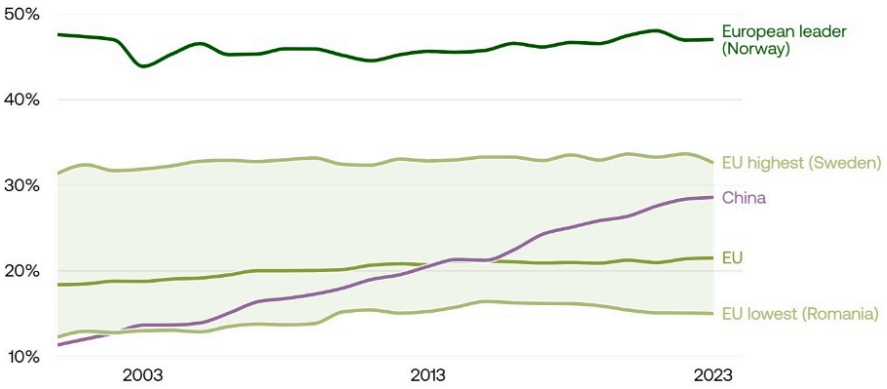


Source: IEA World Energy Balances, Ember calculations for Greater Europe (I)

This is because fossil fuels still make up more than a quarter of Europe's electricity generation and almost all transport fuels, leaving the continent vulnerable to global price shifts and geopolitical coercion. In 2024, 85.6 per cent of the EU's natural gas demand [34] was met by imports; the same was true of 94.8 per cent of EU oil[35] needs in 2023.

FIGURE 3

EU electrification has not progressed since being overtaken by China in 2014

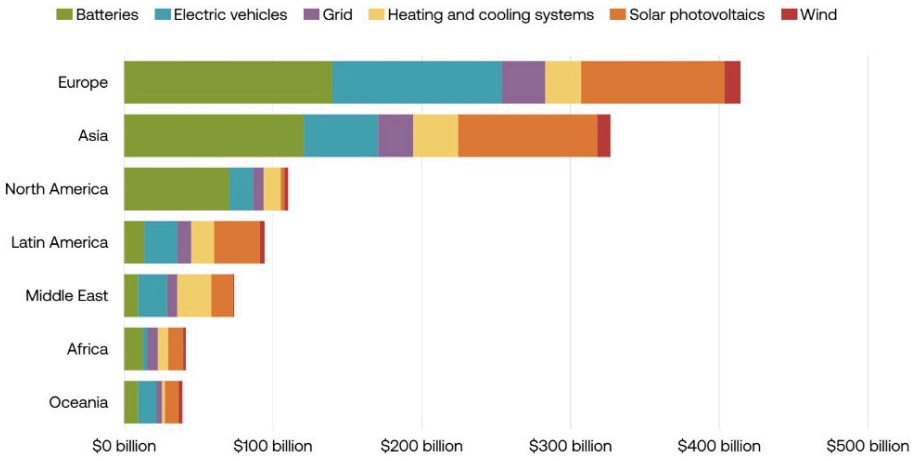


Source: Ember, IEA WEB

In clean energy, Europe is also dependent: while the EU has invested heavily in renewables, the solar panels and batteries that make up much of this transition are overwhelmingly manufactured in China – the recipient of 76 per cent of global clean-tech factory investment in 2024.[36] In some cases, European subsidies have underwritten this manufacturing dominance, fuelling demand without building domestic supply.[37] Europe risks spending heavily on the energy transition without anchoring the supply chains that underpin it.

FIGURE 4

Europe has been the top market for China's clean-tech exports, followed by Asia and North America



Source: Ember via Reuters

3. THE EUROPEAN ENERGY SYSTEM IS FRAGILE

Europe's physical system is struggling under the weight of its own transition. Grids and storage have not kept pace with the rise of renewables or the coming wave of electrification. The April 2025 blackout in Spain and Portugal – caused by a voltage-control failure that spread across borders – demonstrated how even a single grid disturbance can trigger continent-scale outages. That risk is structural: as grids expand and renewables scale up, inadequate voltage control, insufficient inertia and limited redundancy turn every grid constraint into a potential systemic failure. Winter 2025 came close to exposing even deeper structural weaknesses, when Germany narrowly avoided shortages during prolonged low-wind, low-sun periods.

At the same time, grey-zone threats are multiplying: cyber-attacks on pipelines, substations and cross-border interconnectors are becoming more frequent and sophisticated, exploiting an increasingly digitalised system.

Taken together, this all points to the same conclusion: without major investment in flexibility, storage, resilience and interconnection, Europe will achieve neither security nor stability in the next phase of the transition.

Playing Catch-Up in the New Energy Order: Turning Strengths Into Strategy

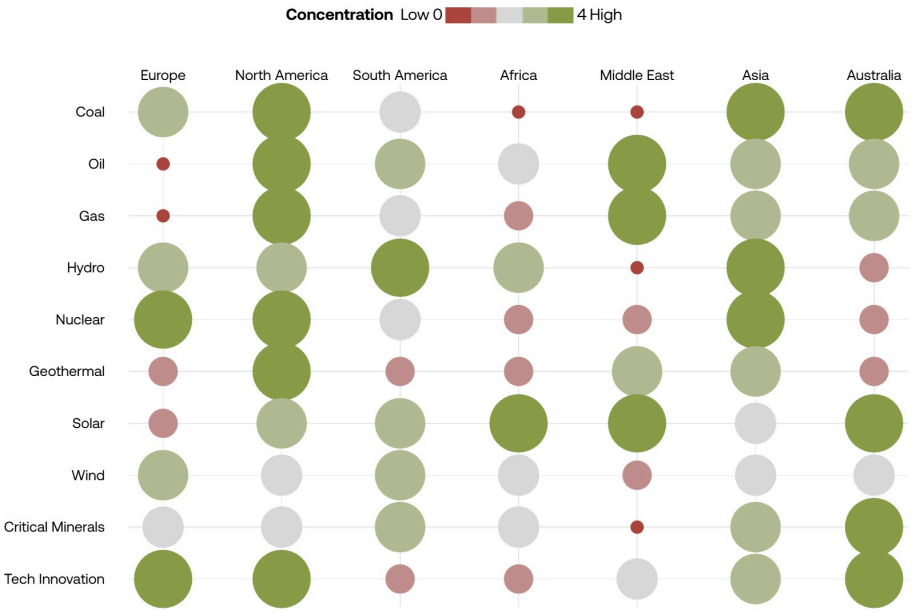
These are Europe's starting conditions. But in a rapidly changing world, Europe cannot afford to continue maintaining the status quo. Europe must pair efficiency with abundance – delivering cheap, secure clean power at scale – or it will be a customer, not a leader, of the AI age. Europe needs an energy strategy designed to command economic and geopolitical power in the 21st century.

Europe has been treating energy primarily as a climate-policy challenge at precisely the moment it is re-emerging as a foundation of economic and geopolitical power. The result is a growing gap between ambition and capability. Without a coordinated strategy to lower costs, expand supply and strengthen system resilience, Europe will struggle to anchor the industries, technologies and political cohesion required for long-term influence.

Recent strategic assessments increasingly warn that Europe risks marginalisation in a new map of energy power shaped by US energy abundance and China's industrial scale. Unlike in previous eras, the continent cannot rely on favourable global conditions or stable supply chains. Europe's limited fossil-fuel resources and uneven renewable potential across member states create structural asymmetries that make coordination a strategic necessity.

FIGURE 5

Europe's fossil-fuel weakness contrasts with its strength in nuclear and innovation



Source: JPMorganChase Center for Geopolitics. *Power Rewired: The New Map of Energy and Geopolitics*

Note: Nuclear is based on uranium-fuel access and geothermal is based on 2,000m depth.

Yet starting from behind does not mean being destined to remain in this position. Europe retains the foundations for an energy model different to both its existing model and that of its global peers – one based not on resource abundance alone but on integration, technological depth and institutional scale. The question is whether these advantages can be mobilised with sufficient speed and strategic clarity to translate into a competitive and resilient energy system.

Europe's competitive advantage lies not in a single resource, but in a combination of structural capabilities that few regions possess simultaneously:

- **A dense, interconnected grid that can become the backbone of a truly continental electricity market – if modernised and expanded.** The ENTSO-E network of 40 transmission-system operators (TSOs) across 36 countries operates the largest interconnected electrical grid in the world.
- **World-leading grid companies and innovative utilities.** The top 20 European grid operators are projected to invest billions over the next few years to expand and digitalise electricity networks and to support renewable integration across the EU's internal energy market. Meanwhile, innovative European utilities are driving technological leadership.
- **Offshore-wind leadership and strong onshore-wind and solar resources.** The North Sea has become the global epicentre of offshore wind, hosting more than 80 per cent of Europe's installed offshore capacity, with regional plans to reach at least 300GW by 2050 through the North Seas Energy Cooperation.[38] Southern Europe, meanwhile, benefits from some of the continent's highest solar-irradiation levels, placing the region among the best in the world for solar-photovoltaic generation.
- **Decades of nuclear expertise, from France's fleet to new build programmes in Central and Eastern Europe**. France operates 57 nuclear reactors, which supply around 65 to 70 per cent of the country's electricity and form the backbone of Europe's nuclear engineering and regulatory know-how.[39] In Poland, the government has approved €14 billion in funding between 2025 and 2030 to support its first nuclear power plant, expected to begin operating in the mid-2030s.
- **High-value innovation in strategic sectors**. Clean-energy patent filings at the European Patent Office have grown by 64.8 per cent since 2015,[40] making electrical machinery, apparatus and energy the fastest-growing of all technology fields. Public spending on energy research, development and demonstration (RD&D) is also strong, with the IEA reporting €11.5 billion in total energy RD&D budgets across IEA Europe countries in 2024.[41] Even in a tougher global funding environment, clean tech remains the third most active venture sector in Europe, with nearly a thousand deals completed in 2025[42] – more than fintech, health tech or life sciences. European fusion companies, advanced electrotech firms and new grid-technology startups continue to raise significant capital.[43]

- **A stable investment environment and enduring commitment to climate action that can attract capital and talent.** Under the European Climate Law, the European Commission has set a legally binding target of reducing net greenhouse-gas emissions by at least 55 per cent by 2030 compared to 1990 levels. In addition, the Commission has adopted a 2040 target of a 90 per cent reduction in emissions as part of its post-2030 strategy, sending a clear long-term signal to investors.

Europe cannot replicate America's geology or China's centralised model, but it can build something neither possesses: a continent-scale electrostate grounded in integration, technological depth and democratic legitimacy. Achieving this will require political resolve comparable to that shown during the most decisive phases of European integration, sustained with the same urgency today.

04

Europe's Strategy for the New Energy Age

Europe does not lack ideas on energy. What it lacks is a strategy aligned with the realities of a more contested geopolitical era. The pace of change in global energy systems and industrial competition now requires Europe to move from incremental reform to strategic transformation.

Understanding the Objectives for the European Energy System

Europe's energy strategy must now be organised around a hierarchy of objectives that differ from previous decades. The energy transition can no longer be understood primarily as an environmental or market challenge. It is a question of economic power, geopolitical resilience and the continent's ability to shape its own future in a more contested world.

Four strategic imperatives should therefore underpin Europe's energy system.

The first is security. Energy security has re-emerged as the central organising principle of energy policy. Russia's weaponisation of gas and Iran's closure of the Strait of Hormuz have demonstrated the dangers of structural dependence in an era of geopolitical rivalry, and the close link between energy security and national security. But the concept of security must now be understood more broadly. Risks arise not only from fossil-fuel supply chains but also from cyber vulnerabilities and infrastructural fragility in clean-energy supply chains, as well as dependence on critical clean-energy technologies and components. A resilient European energy system must therefore reduce exposure to external shocks while strengthening the continent's capacity to act autonomously in times of crisis.

The second is the need to expand energy supply through electrification. The defining structural transformation of the 21st-century energy system is not simply decarbonisation, but the shift from molecules to electrons – from burning fuels at the point of use to using electricity instead. Electrification underpins industrial transformation, digitalisation and the deployment of advanced technologies across the economy. Only regions capable of delivering abundant, reliable electricity at scale will anchor the industries of the future – from advanced manufacturing to AI infrastructure. For Europe, expanding electricity supply is therefore not only an environmental necessity but a strategic economic imperative.

The third is affordability. In an electrified economy, the cost of electricity becomes a central determinant of competitiveness, social stability and investment decisions. Europe currently faces a structural disadvantage relative to the United States and China, where industrial power prices are significantly lower. High electricity costs risk locking in fossil-fuel dependence, slowing electrification and driving industrial activity abroad. Ensuring affordable power is therefore the enabling condition for achieving security, industrial transformation and climate objectives simultaneously.

The fourth is decarbonisation. Reducing greenhouse-gas emissions remains essential to Europe's long-term prosperity and global credibility. But climate change is inherently a global challenge, and Europe today accounts for less than a tenth of global emissions.[44] This means that the continent's contribution to global climate-change mitigation will ultimately depend less on solely meeting domestic targets and more on its ability to demonstrate an energy system that is secure, affordable and scalable internationally. Decarbonisation must therefore be pursued in a way that strengthens Europe's economic and strategic position rather than undermining it. A successful European energy strategy will show that clean power can deliver competitiveness, resilience and growth – thereby accelerating global adoption rather than relying solely on regional ambition.

These four objectives are not equal in strategic function. Security, supply expansion and affordability are enabling conditions; decarbonisation is the long-term system outcome they make possible. Together, these objectives redefine the logic of Europe's energy transition. The challenge is no longer

simply to reduce emissions, but to build an energy system capable of sustaining economic strength, geopolitical influence, and political cohesion in a rapidly changing world.

Principles for Building Europe's Strengths in the New Energy Age

Europe's energy transition now requires a governing doctrine rather than a collection of targets or technology preferences. The challenge is not only to define what the continent seeks to achieve, but to determine the structural model through which it can do so. Building an energy system capable of delivering abundance, resilience and competitiveness simultaneously will require deliberate system design at continental scale.

This doctrine rests on two layers: first, the design principles that define the architecture of Europe's future energy system; and second, the delivery conditions required to realise it.

DESIGNING THE SYSTEM: STRUCTURAL PRINCIPLES

The first set of principles defines the structural characteristics of the system Europe must build.

1. Europe's Future Is as an "Electrostate"

Europe's strategic future rests on becoming an electrostate: a continent powered predominantly by domestically generated clean electricity, with most end-use energy electrified. This is no longer solely a climate objective but the foundation of economic security and technological competitiveness.

The global energy system is undergoing what global energy think-tank Ember has called an "electrotech revolution".[45] Solar, wind, batteries, heat pumps, power electronics and advanced control systems are scaling at extraordinary speed – driven by manufacturing, industry learning curves and innovation, not by policy alone. These technologies are modular, replicable

and getting cheaper every year. They are doing for energy what semiconductors did for computing: enabling abundance, speed and flexibility on a scale the fossil-fuel system cannot match.

For Europe, which remains highly dependent on imported fossil fuels, this transition offers the most durable path to long-term resilience. An electrostate replaces structural exposure to imported hydrocarbons with an integrated system built on diversified generation and expanded grids, storage and digital system management. A model like this can reduce vulnerability to geopolitical shocks while anchoring industrial-value creation within the continent.

Parts of Europe are already living this future. Norway[46] and Sweden[47] have some of the world's highest electrification rates, fully decarbonised power systems, and rapid uptake of heat pumps, electric vehicles (EVs) and low-carbon industrial processes. The experiences of these countries show that high security, affordability and electrification rates can reinforce each other – when the system is designed around clean electricity from the ground up.

With existing technologies, electricity can cover more than 75 per cent of Europe's final energy demand – a share that will rise as electrotech penetrates industry, mobility and heating.[48] Europe cannot replicate America's geology or China's centralised industrial model, but it *can* build the world's first fully integrated, continent-scale electrostate. This is the model that can most strengthen Europe's security, competitiveness and technological position in the new energy age.

2. Affordability Is the Enabling Condition

If Europe wants to become an electrostate, affordability must come first. Low-cost electricity is the foundation on which every other objective rests: electrification, decarbonisation, supply expansion, energy security and industrial competitiveness. No country has achieved high electrification rates with high electricity prices,[49] and European countries will not become the first.

In an electrified system, electricity prices shape investment decisions across the entire economy – from industrial location and technology adoption to infrastructure deployment – as well as public acceptance. High costs risk slowing the transition, prolonging fossil dependence and accelerating industrial relocation. By contrast, competitive electricity prices can create a reinforcing cycle of deployment, cost reduction and industrial scale.

Affordability alone will not deliver the transition. Significant investment in generation, networks and firm low-carbon capacity remains essential. But without affordable power, this investment will not translate into system-wide transformation at the pace required.

In this sense, affordability of power is not one objective among many. It is the enabling condition that determines whether Europe can achieve security, decarbonisation and economic renewal simultaneously.

3. Strategy Must Be Anchored in Techno-Economic Realism

Ambition without deliverability is not strategy. Europe's transition into an electrostate must therefore be grounded in engineering realities, system physics and hard economic constraints.

For a decade, falling renewables costs created the impression that the transition was self-propelling. But cost declines in isolation are no longer enough. The key constraint today is not the price of individual technologies, but the cost and complexity of integrating them into a functioning system. A megawatt of wind in Spain is not equivalent to a megawatt in Poland if it cannot be transmitted, stored or balanced. And a megawatt of wind is not equivalent to a megawatt of gas if it is not available when needed. Across Europe, congestion, curtailment, grid-connection delays and balancing costs now reach multi-billion-euro levels annually. For example, the cost of grid-congestion management in the EU amounted to approximately €4.2 billion in 2023.[50]

The result is a paradox: Europe has more renewables than ever, yet some of the highest electricity prices in the world. These outcomes are symptoms of a system where integration has become the binding constraint.

Putting techno-economic feasibility first means:

- Expanding capacity where it adds the most system value, not simply where targets are easiest to meet.
- Investing in grids, storage and flexibility at the same pace as generation, so clean power can flow to where it is needed, when it is needed.
- Sequencing build-out intelligently to avoid bottlenecks, stranded assets and price volatility.
- Prioritising technologies with strong learning curves, manufacturability and scalability, not technologies that are too inefficient or too costly to scale.
- Recognising the ongoing role of nuclear, firm low-carbon power and fossil-fuel backup as part of a reliable system during the transition.

Techno-economic feasibility is not a constraint on ambition – it is the only way to deliver ambition at continental scale. A system designed around engineering truths, not political preferences, is one that keeps costs down, maintains public trust and ensures that Europe's transition strengthens competitiveness rather than undermining it. Reality must lead; politics must follow.

DELIVERING THE SYSTEM: CONDITIONS FOR SUCCESS

The second set of principles defines the political and institutional conditions required to deliver Europe's future energy system.

1. Political and Social Feasibility Must Not Be Ignored – But Cannot Be a Reason for Stepping Back

Electrification reshapes daily life – affecting bills, homes, mobility and local landscapes. When these changes are perceived as costly or imposed, political backlash follows. Legitimacy must therefore be treated as a design constraint, not an afterthought.

The timing of Europe's transition compounds this challenge. The need for rapid system transformation has emerged at a moment when public trust in institutions is fragile, fiscal space is constrained and political fragmentation is increasing. This increases the risk that necessary reforms are delayed, diluted or reversed before their economic benefits become visible.

Public consent is ultimately grounded in economics and practicality. Clean technologies that are affordable, reliable and convenient are adopted willingly; those that are expensive or poorly integrated provoke resistance. Designing the transition around affordability and system reliability is therefore the most durable route to political stability.

At the international level, the challenge takes a different form. A highly integrated energy system depends on trust and perceived fairness, yet national interests do not always align. Managing these tensions will be essential to sustaining continental cooperation. Political constraints cannot become a justification for delay: failure to reform Europe's energy system would weaken both the continent's economic performance and its strategic cohesion.

2. Speed of Delivery Will Be Paramount – But Delivery Is Driven by Action, Not Targets

Europe's challenge is not only to decarbonise, but to expand electricity supply rapidly enough to support industrial transformation, digitalisation and rising demand. While other major economies are increasing both clean and fossil capacity, Europe faces the more complex task of building a low-carbon system while maintaining competitiveness.

This makes speed essential. Recent years have shown that Europe can act quickly when political alignment and urgency exist. Since Russia's invasion of Ukraine in early 2022, the EU has proposed, revived or fast-tracked around 30 terminals for liquified natural gas, while Germany, Finland and Greece have deployed new floating-storage regasification units in record time.[51] These crisis-driven interventions demonstrate that the European system can operate at speed when required, but risk locking in short-term structures that undermine long-term system efficiency.

In reality, Europe cannot rely on crisis response and emergency conditions to drive long-term transformation. Europe needs a new strategic delivery model built for constant urgency: accelerated permitting, coordinated planning, market frameworks that reward timely build-out and institutions capable of executing multi-country projects. This means shifting the focus of policy from target-setting to delivery – accelerating permitting, coordinating infrastructure planning and creating institutions capable of executing projects at continental scale.

3. Europe Must Collaborate to Build the Electrostate

Europe's energy success will be achieved collectively or not at all. No single country possesses the resource base, industrial capacity or system scale required to build a competitive electrostate independently. The geography of clean energy makes continental integration a structural necessity rather than a political choice.

An electrostate depends on diversified generation deployed where it performs best: solar in southern Europe, offshore wind in the North Sea, hydropower in Scandinavia, nuclear where it commands public support, and emerging sources such as geothermal and long-duration storage where resources allow. This system must be underpinned by expanded grids, high-voltage interconnection, and storage and digital coordination capable of balancing variable supply across borders.

Such integration would transform Europe's energy model. It would shift the system from reliance on imported hydrocarbons towards domestic production of clean technologies and electricity. In this framework, supply disruptions may constrain growth but would no longer threaten economic stability.

Europe already possesses one of the world's most interconnected electricity systems, supported by shared markets and institutional coordination. Yet this integration remains incomplete and politically fragile. The next phase of the transition will require deeper cooperation – not only within the EU, but with neighbouring energy powers such as the UK, Norway and Switzerland.

Collective action is Europe's principal source of leverage in a global energy system dominated by much larger economies. Integration is therefore not just desirable. It is the condition under which the electrostate becomes feasible.

05

A European Energy Strategy Fit for the Future

Europe cannot afford to continue with business as usual. Energy is no longer simply a climate challenge; it is the foundation of competitiveness, cohesion and sovereignty. To secure its future, Europe needs an energy strategy that matches the scale and urgency of the new energy age.

There are no shortcuts to energy competitiveness. European energy costs will remain above those of certain global competitors for some time, reflecting both structural constraints and past policy choices. But that is not a reason to accept the status quo. Europe can still lower system costs, strengthen resilience and restore industrial competitiveness – provided it focuses first on the reforms that reshape the system itself, rather than those that merely redistribute its costs.

The challenge now is less one of diagnosis than of execution. The priority must be to sequence reforms in the right order: first to build the foundations of a continental electrostate, then to modernise the markets and institutions that govern it, and finally to rebuild the industrial base that can turn energy strength into wider economic advantage.

An ambitious European strategy should therefore advance five priorities:

1. **Plan the system as one continent** through a Continental System Planner capable of coordinating networks, interconnection, flexibility and firm capacity across borders.
2. **Build the physical backbone of the electrostate** by expanding interconnection, strengthening grids, deploying grid-enhancing technologies and developing a continental firm-power strategy.
3. **Modernise electricity markets around system value** so that prices reflect physical reality, reward flexibility and firm capacity, and lower the cost of capital for investment.

4. **Make electrification a core economic strategy** by expanding demand where clean power can be delivered cheaply, supporting industrial clusters, and reforming connections and pricing to accelerate uptake.
5. **Rebuild Europe's electrotech and clean industrial base** by concentrating support on scalable technologies, mobilising finance and linking industrial strategy to continental energy strengths.

Plan the Electricity System as One Continent

Europe's electricity system already operates as a continental machine – but it is still governed as a collection of national ones. In an era of geopolitical rivalry and technological competition, this institutional mismatch is no longer just inefficient; it is a strategic vulnerability.

RECOMMENDATION: CREATE A CONTINENTAL SYSTEM PLANNER TO COORDINATE EUROPE'S ELECTRICITY SECTOR

Market rules, grid investment, flexibility planning and security assessments remain overwhelmingly national, even though congestion, price volatility and system stress are shared across borders. The result is duplication, sub-optimal investment and decisions that have optimal outcomes within countries rather than for Europe as a whole.

Regulators and experts from Bruegel[52] to the EU's Agency for the Cooperation of Energy Regulators (ACER)[53] reach the same conclusion: Europe has operators and regulators, but no institution responsible for planning the system as one integrated entity.

ACER can approve methodologies but cannot design the system. ENTSO-E has the engineers but is a federation of national TSOs with national incentives. No existing body can prioritise cross-border investments, resolve inconsistencies between national plans or design Europe's system around least-cost continental optimisation.

This fragmentation is structural. TSOs answer to national regulators, face political pressure to prioritise domestic customers and are incentivised to invest in domestic grids rather than cross-border optimisation. Key reforms, from bidding zones to interconnectors, are routinely stalled by national veto points. The physics of the system is continental; its governance is not. As long as Europe governs electricity like a veto-heavy confederation, it will keep paying excessive prices and risk gradual deindustrialisation.

Other major economies have already adapted to this reality. China's rapid expansion of transmission, firm capacity and industrial electrification has been possible because it treats the electricity system as strategic infrastructure rather than a fragmented market. System planning, industrial policy and security considerations are aligned within a single framework. Europe cannot and should not replicate China's governance model. But it must match this level of strategic coordination if it is to remain economically and technologically competitive.

Why Previous EU Reforms Failed

European cooperation on energy has evolved slowly and unevenly, even though concerns about security of supply have been present since the earliest days of integration. The Coal and Steel Community and the Euratom Treaty created some of the first supranational tools for managing essential resources, yet for decades EU member states continued to control their own energy choices and favoured national solutions. Through the 1960s and 1970s the European Commission repeatedly warned that growing import dependence and limited diversification were dangerous trends, even describing the lack of integration as a risk to Europe's security of supply.

When the 1973 oil crisis struck, governments responded alone rather than through the Community, and momentum for a common approach repeatedly faded. The energy shocks, unlike other crises, did not translate into deeper European integration.

Today, climate pressures, diversification needs and competitiveness challenges again place Europe at a moment where integration could advance if the political will exists. Yet the lessons of history remain clear. Europe has attempted to coordinate electricity planning before, but each effort has hit the same political and institutional obstacles.

There are some notable recent examples of how progress on shared action has stalled.

- **The Third Energy Package created ACER and strengthened ENTSO-E**, but both operate within mandates that avoid encroaching on national sovereignty. ACER regulates; ENTSO-E coordinates; neither can *plan* nor *prioritise* investments across borders.

- **ENTSO-E's ten-year network-development plan (known as the TYNDP) identifies cross-border projects**, but it is **non-binding**, dependent on national data and filtered through TSO incentives that remain nationally anchored.
- **Bidding-zone reform repeatedly stalled** because EU member states resisted internal price splits and feared regional redistribution – showing how difficult it is to align market design with physical reality when national vetoes exist.
- **The 10 per cent (2020) and 15 per cent (2030) interconnection targets have spurred investment but progress has been uneven,**[54] hindered by weak enforcement, underfunded links, and political resistance where infrastructure is controversial.
- **The 2015 EU Energy Union framework improved rhetoric more than delivery**; coordination remained voluntary and project-level rather than system-wide.

The result is predictable: a continental system run through national incentives, with no institution empowered to optimise investment or operation at the scale required by an interconnected grid, where cross-border flows and real-time balancing make national optimisation inefficient.

As proposed by Bruegel in 2025, Europe needs a European independent system operator with a mandate to produce integrated network plans, identify cross-border priorities, and coordinate flexibility and firm-capacity needs.[55] This continental system planner would not replace national TSOs but would sit above them as the continental intelligence and optimisation layer the system currently lacks. To be credible, this planner needs a political

framework that matches the physics, with the EU setting the rulebook and optimisation objective while allowing structured participation from closely connected non-member countries whose grids already move with Europe's system. Member states should accept that transferring more competence to the EU level in electricity system planning is not a loss of sovereignty, but an economic and security advantage that can unlock billions in savings through better design and faster delivery.

A European planner would:

- Identify cross-border infrastructure with the highest system value
- Coordinate where flexibility, storage and firm capacity are required
- Highlight where bidding zones or market rules misalign with physical flows
- Reduce duplication and speed up delivery
- Enable open, interoperable energy data and transparent policy modelling
- Guide grid reinforcement for AI-era industrial clusters
- Strengthen Europe's resilience to shocks, cyber-attacks and weather volatility
- Support a shift from target-driven energy policy to system-based delivery

This planning function must also reflect the reality of Europe's physical system: it should not stop at the EU's borders. The UK remains tightly integrated physically, but since leaving the Internal Energy Market, both sides have experienced falling trading efficiency, rising congestion rents and diverging system planning. A credible continental planner should therefore be accountable at EU level but designed in a way that allows partners such as the UK, Ukraine and other synchronised neighbours to opt into shared modelling, adequacy assessments and interconnector planning. In the long term, the UK–EU relationship must converge towards a common-market framework – not for political reasons, but because the physical realities of Europe's interconnected energy systems leave no alternative.

Data must sit at the core. Today, TSOs hold the operational data needed to understand where reinforcement and flexibility are most valuable, but it remains fragmented and siloed. A continental planner must aggregate and publish this information to enable credible system-wide modelling and make it politically harder to block beneficial projects.

Europe's high prices are not caused by excessive demand; they are the product of uncoordinated, inefficient expansion. Grids, interconnectors, storage and firm power have not kept pace with renewables – because planning is fragmented. A continental planner would optimise where grids are reinforced, where firm power is built and which interconnectors unlock the greatest benefit – lowering system costs through better design rather than rationing demand. This is the same logic as the UK's National Energy System Operator reform,[56] applied at continental scale. Delivering this agenda will also require major investment, which Europe can mobilise through mechanisms such as the Savings and Investments Union, with capital targeted at grid reinforcement, interconnection and modernisation.

With proper coordination, Europe can build the integrated, low-cost, resilient electrostate needed for competitiveness in the AI age.

Build the Physical Backbone of the Electrostate

Europe cannot compete in the new energy age without a physical electricity system capable of delivering abundant power at continental scale. Today that foundation is too weak: interconnection remains insufficient, grids are congested and infrastructure planning still reflects a fossil-era geography of demand. In a world where economic, technological and military power increasingly depend on electricity, system capacity is now a strategic variable. Europe must therefore shift from incremental expansion to deliberate build-out of the infrastructure that allows cheap power to flow to where it creates the greatest value.

RECOMMENDATION: IMPROVE EUROPE'S DEVELOPMENT OF THE PHYSICAL INFRASTRUCTURE NEEDED TO LOWER BILLS AND COMPLETE THE ENERGY UNION

Integration is Europe's scale advantage. Shared resources – Spanish solar, Nordic hydro, French nuclear, Baltic wind – can deliver cheaper, more resilient power than 27 isolated national transitions. But this requires planning around continental optimisation, not national self-sufficiency. That is why the Continental System Planner matters here too. It should translate Europe-wide optimisation into a clear, enforceable pipeline of priority energy investments. No single country has the ideal mix, but the continent as a collective does: ultra-cheap southern solar, northern and Alpine hydro, western nuclear, and central industrial demand. A more integrated grid lets Europe build where it is cheapest and deploy where it delivers most value; 27 parallel national transitions guarantee higher costs.

Europe is already the most interconnected region in the world, yet still lacks the physical capacity needed for a weather-dependent, renewable-dominant system. ACER has shown that deeper interconnection reduces price volatility, lowers system costs and strengthens security of supply – but only if the physical capacity exists to move power to where it is needed.[57] The economic case is significant: further integration of European electricity markets, enabled by interconnectors, could raise annual consumer benefits from €34 billion today to €40–43 billion by 2030. It can also reduce system-wide flexibility investment needs by up to 20 per cent.[58]

But progress has stalled because of two structural barriers.

First, financing bottlenecks. Cross-border projects often fail because one country bears the cost while neighbours reap the benefits. Existing cost-allocation tools are slow and contested. Europe needs EU-level guarantees, shared cost-allocation frameworks and a clearer European Investment Bank role in de-risking continent-scale projects. The Continental System Planner should support this by identifying which projects deliver the highest system value, providing a credible evidence base for cost allocation and reducing disputes that slow investment decisions.

Second, political will and coordination failures. Interconnection delivers clear system-wide benefits but the politics and regulation of electricity remain overwhelmingly national. Projects stall when governments fear higher local prices, imported volatility or loss of control. Norway is re-evaluating its cables to Germany and Denmark as real-time pricing exposes households to continental spikes; Sweden rejected a 700MW link to Germany in 2024 on price-stability grounds;[59] and in southeast Europe, Bulgaria and Romania have long identified upgrades as strategic but continue to face procurement disputes, unstable governments and fears of volatility. These challenges are reinforced by structural incentives: national regulators must minimise domestic costs, not continental ones, and TSOs are rewarded for domestic grid investment rather than cross-border optimisation. The result is predictable: even when interconnection is economically beneficial, both political pressure and regulatory design push countries to act in their own short-term interests, slowing delivery of the Energy Union.

Completing the Energy Union therefore requires binding commitments – timelines for priority interconnectors, streamlined approvals, enforcement mechanisms and far better data on costs and benefits to build political support. Ultimately, the Continental System Planner should turn commitments into delivery by tracking progress and keeping Europe on a least-cost continental path.

RECOMMENDATION: DEVELOP A CONTINENTAL FIRM POWER STRATEGY

A credible Energy Union cannot function without firm power. Europe has successfully scaled wind and solar, but its policy framework still treats the system as a contest of "renewables shares" rather than as a whole-system optimisation challenge. In a renewable-dominant grid, firm clean capacity (nuclear, sustainable hydro, geothermal, long-duration storage) is the backbone that keeps prices stable, industries running and electrification feasible.

Renewables are essential, but they cannot guarantee the round-the-clock reliability Europe's economy demands. Storage and interconnectors help smooth volatility, but they cannot yet replace the need for abundant, always-

available baseload. Without new firm capacity across the continent, the Energy Union will remain politically fragile and Europe will not achieve the energy security needed for an electrified, AI-driven economy.

Recent tensions in the Nordics reveal this vulnerability clearly. Norway, long treated as Europe's flexible baseload, has warned it can no longer shoulder the continent's shortfall in firm power. Germany's uniform national pricing leads to heavy Norwegian exports during scarcity events, pushing up domestic prices for real-time-billed households in Norway and fuelling pressure to reconsider interconnection. Nordic ministers have been explicit: Europe must build more of its own firm capacity rather than relying on hydro-rich neighbours to stabilise the system. This is a political warning, not just an engineering one.

Countries with low prices and low emissions, from France and Canada to the Nordics, all combine renewables with substantial clean baseload. This is not coincidence: as renewable penetration rises, the value of firm, always-available power increases. Nuclear and hydro reduce system-balancing costs, provide synchronous inertia and reactive power, limit the need for long-distance grid reinforcements and stabilise prices during scarcity periods. System-wide modelling reinforces this: the US Department of Energy finds that adding nuclear to a renewables-based system cuts total generation and grid costs by 37 per cent compared to a renewables-and-storage-only model.[60]

Beyond cost, clean firm power also supports operability. As renewable penetration rises, system inertia falls, reactive power requirements grow and balancing becomes more volatile. Low-inertia periods increase sharply in renewable-dominant systems, requiring synchronous generation or grid-stability interventions that raise costs and emissions. Nuclear alleviates these pressures by providing inertia, voltage support and reliable capacity through scarcity periods, reducing system-wide balancing and stability costs.

But clean firm power is capital-intensive, slow to scale without coordination and faces financing barriers that individual countries struggle to overcome. A continental strategy is therefore essential.

The answer is not for each country to act alone, but for Europe to move together. A continental nuclear programme could deliver the scale needed to cut costs, shorten timelines and attract investment. A continental programme should remain open to participation from the UK, which has deep nuclear-construction experience, and from Ukraine, where post-war reconstruction will include major nuclear investment.

Regulation should be streamlined so that a reactor approved in one member state can be deployed across others. Procurement should be coordinated to unlock the programme effects seen in South Korea and China, where costs fell by as much as 40 per cent as a result of standardised and repeated reactor design, which cuts costs through efficiency and predictability. Small modular reactors, designed for replication, will only deliver their promise if Europe aggregates demand across borders.

Even with these efficiencies, the challenge of financing remains significant. But here Europe has a strategic advantage – new industrial and digital demand can be harnessed as an anchor for investment. Heavy industry is electrifying, large manufacturers are seeking long-term power purchase agreements (PPAs) and AI data centres are emerging as Europe's fastest-growing source of continuous power demand. This demand profile is a strategic asset: it can provide the long-term revenue certainty needed to unlock investment in clean firm power, long-duration storage, new nuclear and advanced geothermal power, and large-scale grid reinforcement. Evidence from AI operators globally suggests that baseload power reduces decarbonised data-centre costs by around 40 per cent compared with renewables-plus-storage approaches – highlighting the complementarity between firm power and Europe's digital strategy.

Meeting Europe's industrial and digital power demand will require financing arrangements that reflect the scale, duration and risk profile of firm low-carbon assets. Europe should introduce:

- **Reverse contracts for difference (CfDs) for firm power**, guaranteeing long-term revenues for nuclear, geothermal and long-duration storage while protecting consumers when high prices fall.

- **Hybrid PPA/CfD structures** that allow data centres and industry to contract directly for clean firm power with state-backed risk sharing.
- **The Mankala model** (as used in Finland), enabling large industrial consumers to co-invest in firm generation and receive electricity at cost.
- **Portfolio-based offtake agreements**, where multiple industrial users jointly contract for a "basket" of firm assets.

These mechanisms would unlock investment in the kinds of power Europe needs for competitiveness but that current market structures do not yet reward. They also mirror emerging models in the UK, US and Asia for financing AI-era electricity systems.

RECOMMENDATION: IMPROVE SPEED OF DELIVERY THROUGH CONNECTIONS AND PERMITTING REFORMS

Europe's central constraint is no longer technology or capital availability but the institutional capacity to deliver infrastructure at speed. In systems constrained by permitting delays and connection bottlenecks, market price signals cannot translate into investment. Without reform of these delivery institutions, market-based energy strategies alone will fail.

Europe has made serious progress in recent years. The EU has introduced statutory permitting deadlines, "acceleration areas" and one-stop shops designed to cut red tape, and is currently working on the acceleration of permit-granting procedures (the European Grids Package). But the main barrier is no longer EU policy – it is domestic implementation.[61] The rules exist on paper. What is missing is capacity, authority and accountability.

One-stop shops, for example, only accelerate delivery when they are properly staffed, empowered to coordinate across agencies and held to binding time limits. Where this has happened – as in parts of Germany, where certain states (Länder) have restructured permitting authorities and increased staffing – project timelines have already begun to fall. Where it has not, delays remain measured in years.[62]

Environmental rules raise a separate challenge. Europe must speed up deployment without weakening environmental protection, which means adopting the reforms used in Denmark and the Netherlands: parallel approvals, digital application-tracking and clear criteria for acceleration areas that meet environmental standards from the outset.

Permitting reform cannot stop at large projects. Every country should also identify small regulatory barriers that slow clean-tech adoption: rules governing rooftop photovoltaics, building-level heat pumps, local storage, charging points and industrial electrification. Removing these micro-barriers cumulatively delivers macro-impact.

Fixing incentives matters as much as fixing rules. In Finland, local authorities retain business rates when renewable projects are built; in Sweden, they do not – a single policy difference that explains far higher acceptance and faster development in one country than the other. Across Europe, aligning local incentives with national goals will be essential to accelerating delivery.

Modernise Europe's Electricity Markets to Reflect Physical Reality and Reward System Value

Europe is reaching the limits of a target-driven approach to energy policy. Wind- and solar-deployment targets were essential for scaling clean generation, but they do not by themselves deliver an efficient or competitive electricity system. A renewable-dominant, electrified economy cannot operate effectively on market structures that are designed for fossil-era systems characterised by predictable generation and largely national flows.

In reality, Europe's electricity system is continental, weather-dependent and increasingly decentralised. Yet market design still assumes national optimisation. This misalignment raises system costs, suppresses flexibility, distorts investment signals and slows electrification. Curtailment projections of 100–310 terawatt-hours by 2040 illustrate the scale of inefficiency that arises when prices fail to reflect physical constraints.[63]

In an electrified geopolitical economy, market design is no longer a technical detail but a determinant of industrial competitiveness and energy security. Europe must therefore move from target-driven deployment to system-optimised market economics: aligning price signals, investment incentives and demand growth with the realities of a continental clean-power system.

RECOMMENDATION: ALIGN PRICES WITH PHYSICS

Electricity markets cannot deliver affordability or security until prices reflect the constraints and opportunities of the grid. Most EU member states still operate as single national bidding zones despite significant internal bottlenecks. As a result, low-cost power is frequently stranded, redispatch costs rise and consumers face unnecessarily high prices.

Independent analysis has repeatedly shown that alternative bidding-zone configurations could deliver substantial economic benefits. In the German–Luxembourg zone alone, ACER finds that when realistic assumptions are used, the potential economic surplus is €450–540 million per year – up to 70 per cent higher than the estimates submitted by TSOs.[64] Europe is leaving large efficiency and affordability gains on the table. The IEA similarly warns that markets without sufficient locational and temporal granularity cannot operate efficiently in renewable-dominant systems.

Yet reform remains stalled by national veto points. Aligning prices with physical reality therefore requires a binding European framework that combines independent system analysis with transitional support for affected regions.

Reform should include mandatory, harmonised bidding-zone reviews, a "comply or justify" mechanism where misalignment imposes demonstrable system costs, and EU-level financial support for grid reinforcement and regional adjustment. Over time, stronger locational and temporal price signals – including time-differentiated tariffs and explicit congestion markets – will be essential to guide investment towards the regions and technologies that minimise system costs. Europe does not need to replicate full nodal

pricing models (where prices differ between specific locations, depending on grid conditions), but it does need markets that reveal where electricity is abundant, constrained or scarce.

RECOMMENDATION: STRENGTHEN MARKETS FOR FLEXIBILITY, STORAGE AND FIRM CAPACITY

Flexibility is now foundational. Recent ACER analysis shows that inadequate flexibility and poor cross-border coordination are already driving system stress.[65] *Dunkelflaute* (periods of low wind and solar output) conditions in 2024 saw central European prices more than double monthly averages; southern Europe faced spikes approaching €1,000/MWh during heatwaves.

Current markets undervalue the very assets needed to manage this volatility. Europe needs frameworks that:

- Allow flexible loads to participate fully in balancing and ancillary services.
- Provide predictable revenue streams for long-duration storage.
- Support capacity mechanisms that are technology-neutral and recognise the system value of nuclear, geothermal and future clean firm technologies.
- Integrate AI-enabled forecasting and real-time operations to reduce balancing costs.

Without these reforms, Europe will continue to overpay for balancing and underpay for the resources that make renewables reliable.

RECOMMENDATION: EXPAND LONG-TERM CONTRACTING FRAMEWORKS TO REDUCE THE COST OF CAPITAL AND STABILISE PRICES

A capital-intensive, renewable-dominant system depends on deep, liquid long-term markets. Europe's forward markets remain thin, PPAs fragmented and CfDs uneven. This raises financing costs and therefore consumer prices.[66]

Europe needs a more coherent long-term contracting framework that:

- **Expands standardised PPAs**, with clear rules on transparency, negative-price clauses and credit support so they reflect real system costs rather than reinforcing distortions.
- **Strengthens forward markets** through harmonised long-term capacity allocation, deeper liquidity and improved market transparency.
- **Uses CfDs more strategically** – not only for early renewables but for mature technologies where price stability lowers the cost of capital and protects consumers.
- **Supports demand pooling**, allowing SMEs and public bodies to aggregate demand and access long-term clean electricity at lower prices.

Critically, PPAs and CfDs must be aligned with locational signals. Today, long-term contracts are largely "location-blind", reinforcing congestion and raising redispatch costs. Integrating zonal elements into contracts is essential for system-wide cost reduction.

RECOMMENDATION: DIGITAL AND DATA-DRIVEN SYSTEM OPERATION

Europe cannot run a renewable-dominant grid without far better operational data. Much of the system remains a black box: sub-hourly data are rare, DERs are invisible and congestion costs are opaque. This makes optimisation and political accountability impossible. It also makes continental planning harder, because without operational data the Continental System Planner cannot reliably identify where reinforcement, flexibility and cross-border investment deliver the highest system value.

Europe should therefore mandate:

- Real-time publication of congestion, curtailment and redispatch costs.
- Sub-hourly generation, demand and renewable output data in standardised formats.
- Visibility of distributed energy resources (DERs) through shared telemetry.

- Granular grid-flow and topology data, and integrated planning frameworks that use this information to guide grid reinforcement and bidding-zone reform.

Digitalisation must accompany transparency. AI-enabled operations (digital twins, dynamic line rating, predictive congestion management, real-time flexibility optimisation) are essential to cut balancing costs and operate a cheap, reliable electrostate. They also give the Continental System Planner a stronger operational view of constraints and options, linking day-to-day operation with long-term network planning and helping to prevent local bottlenecks from becoming security problems.

Develop an Electrification Strategy That Supports Lower Prices

Electrification is the most powerful – and most neglected – lever in Europe's energy transition. It is the only pathway that simultaneously reduces dependence on imported fossil fuels, lowers long-term system costs and supports industrial competitiveness. Yet despite rapid expansion of renewable generation, electricity's share of final energy consumption in Europe has barely increased over the past decade.

This imbalance reflects a strategic error. Europe has focused heavily on transforming energy supply, but far less on transforming energy demand. As a result, fixed system costs are spread across too small a base of electricity consumption. Infrastructure is under-utilised, flexibility remains rare and fossil fuels continue to dominate key sectors. In an electricity-centred economy, insufficient demand is itself a driver of high prices and continued import dependence.

Electrification must therefore be treated not primarily as a climate policy but as an economic and geopolitical strategy. Expanding electricity demand allows Europe to capture the full value of low-cost renewables, improve system utilisation and permanently reduce exposure to volatile hydrocarbon markets.

RECOMMENDATION: EXPAND AND STEER DEMAND WITH CLEAR PRICE SIGNALS

A European electrification strategy should reverse today's low-demand, high-cost dynamic. That means enabling industry to electrify through stable, long-term price signals; supporting households to adopt heat pumps, EVs and digital energy services; and introducing tariffs that reward flexible consumption.

Deloitte's industrial surveys show the appetite is already there: 61 per cent of respondents draw between 31 per cent and 50 per cent of their energy from the grid, and many are already using PPAs, onsite generation and real-time optimisation.[67] But without a continental strategy, these efforts remain fragmented and slow.

Crucially, electrification must take place where clean, affordable power can actually be delivered. Today demand arises wherever a connection can be secured – not where the system can support it cheaply. The result is rising costs and deeper congestion. Europe needs a strategy that guides electrification towards regions with strong renewable resources, firm-power access and available grid capacity.

RECOMMENDATION: BUILD ENERGY–INDUSTRIAL CLUSTERS TO ANCHOR AFFORDABLE, CLEAN DEMAND

Energy–industrial clusters can anchor this strategy by coordinating the development of clean generation, grid infrastructure and industrial demand. Co-locating electrified industry, digital infrastructure and firm low-carbon power provides the stable demand needed to unlock investment in capital-intensive assets such as nuclear power, geothermal energy and long-duration storage.

China's experience demonstrates the economic benefits of aligning energy and industrial planning at scale. Europe does not need to replicate China's governance model, but it can adopt the underlying logic: infrastructure and

demand must be developed together. Properly designed clusters can lower system costs, accelerate electrification and support industrial renewal in regions undergoing structural transition.

RECOMMENDATION: ADDRESS CONNECTION QUEUES THROUGH CONNECTIONS REFORM

Connection queues have become one of the largest bottlenecks in Europe's energy transition. In 2024–2025, around 1,700GW of renewable and hybrid projects were stuck in connection queues across 16 European countries[68] – a sign not only of slow grid build-out, but of a mismatch between infrastructure planning and real demand growth. If Europe builds new generation and networks while electricity consumption stagnates, the burden of system costs will fall on too few users, pushing prices up and weakening competitiveness.

Across the continent, renewable, storage and industrial projects are waiting years to receive a grid connection. This slows electrification, raises costs while also pushing developers to request more grid capacity than they actually need as a buffer against uncertain timelines and outcomes.

Today's "first come, first connected" system was designed for fairness, not efficiency. But under conditions of network constraint, it encourages speculative applications and locks in long queues. Europe needs a smarter model that prioritises projects on readiness, system value and delivery potential – while accelerating grid reinforcement so the queue itself shrinks over time. Some EU member states are already experimenting with more strategic allocation mechanisms, including auction-based or "open season" approaches to grid access, which could offer useful models for wider reform.

A faster energy transition is possible. But it requires member states to implement the reforms they have already agreed upon, build institutional capacity in permitting and grid-connection authorities, and redesign incentives so that local communities, regulators and system operators all benefit from getting projects built.

Improve the Clean-Technology Industrial Strategy

Europe faces a decisive decade. The global clean-tech race is accelerating, and while Europe remains strong in engineering, research and industrial depth, it is losing ground in manufacturing scale, cost competitiveness and supply-chain resilience. A successful strategy must therefore move beyond broad ambitions and focus on where Europe can lead, how it can manufacture at scale and how it can secure the inputs needed to do so.

Even at early-stage level, Europe continues to generate world-class clean-tech innovation – nearly a thousand VC-backed clean-tech deals were completed this year, spanning next-generation nuclear power, grid technologies and energy-efficiency platforms.[69] But without continental-scale manufacturing, stronger capital markets and clearer demand signals, these startups struggle to scale at home and are often commercialised elsewhere.

But strategic clarity requires political realism. Europe's industrial strategy is often undermined by the political dynamics of localisation: every member state wants gigafactories, electrolyser plants, heat-pump factories and grid-technology facilities on its own territory. Strategic autonomy has too often been interpreted as national autonomy, not European autonomy. The result is duplication, fragmented subsidies and a lowest-common-denominator approach, where everyone gets a little and no one reaches scale. A credible strategy must therefore confront these political incentives and instead build a model of shared strategic advantage, where Europe specialises based on real comparative advantage.

RECOMMENDATION: PRIORITISE TECHNOLOGIES WHERE EUROPE CAN LEAD, BASED ON A SHARED TECHNO-ECONOMIC FOUNDATION

The starting point is strategic clarity. Europe cannot, and should not attempt to, compete across every clean-tech sector. Solar manufacturing will remain dominated by China for the foreseeable future. But in other areas, Europe has real comparative advantages: power electronics, offshore wind, electrolysers, advanced turbines, grid technologies, heat pumps and next-

generation nuclear. A credible industrial strategy must therefore prioritise the technologies where Europe can sustain global leadership, rather than dispersing scarce capital and political attention across dozens of initiatives.

Europe's hydrogen experience is instructive. Over recent years, the EU committed tens of billions in support for green hydrogen, backed by ambitious electrolyser and deployment targets. But many of these investments were made without a clear assessment of cost curves, realistic industrial demand, system economics or the viability of competing technologies – in addition to being lumbered by complex regulation for proving what is "green". As a result, flagship projects stalled, offtakers failed to materialise and the expected scale-up did not occur. Hydrogen will play an important role in fertilisers, shipping and some heavy industrial processes, but the idea that it could become a pervasive energy carrier proved economically unrealistic. The lesson is clear: Europe cannot afford technology bets driven by political enthusiasm rather than engineering and economics.

To avoid repeating this pattern, Europe needs far stronger techno-economic intelligence. The US Department of Energy's Liftoff reports offer a model – rigorous assessments of cost trajectories, commercial barriers, supply-chain gaps and the scale required for competitiveness. Europe lacks an equivalent capability. Establishing a European Clean-Tech Intelligence Unit would give policymakers a consistent, data-driven foundation for prioritisation. This should be the analytical core of Europe's industrial strategy, shaping both technology choices and financing decisions.

RECOMMENDATION: BUILD CONTINENTAL-SCALE CLEAN-TECH MANUFACTURING CLUSTERS

Industrial strategy also requires scale. Europe has tended to pursue small pilots rather than large, coordinated clusters that can support full supply chains. Clean-tech manufacturing thrives where suppliers, logistics, infrastructure and skilled labour are concentrated; where industrial demand is predictable; and where risk-sharing frameworks reduce the cost of capital.

To compete with the US and China, Europe must establish large, cross-border industrial clusters for priority technologies – including offshore-wind components, power electronics, grid technologies and next-generation clean-firm technologies. These clusters should be backed by clear demand signals from public procurement, Energy Union planning cycles and long-term supply agreements that allow manufacturers to invest confidently in European production rather than opening facilities, inside or outside existing clusters, in the US or Asia.

But clustering cannot succeed without dismantling a core political barrier. Every member state wants clean-tech manufacturing within its borders, even when dispersed national production raises costs and weakens Europe's global competitiveness. The solution is not to spread factories thinly but to ensure fair distribution of benefits from concentrated production. That means creating mechanisms where countries that do not host manufacturing sites still gain through co-ownership models, revenue-sharing from EU-level contracts, joint equity stakes, shared IP pools, and mandatory inclusion of firms across member states in cluster supply chains. If the economic upside (jobs, supply-chain participation, tax revenue and procurement access) is shared, governments will have fewer incentives to block consolidation and can instead compete on specialisation rather than duplication.

RECOMMENDATION: REFORM EUROPE'S FINANCING ARCHITECTURE AND MOBILISE SAVINGS TO SUPPORT ENERGY-INFRASTRUCTURE INVESTMENTS

Europe's financial system is not designed for the scale of clean-tech and energy-infrastructure investment now required. Many EU programmes (Innovation Fund, InvestEU, REPowerEU, Cohesion Fund) contain substantial capital, but this funding is fragmented, slow and often directed through mechanisms too risk-averse to catalyse large projects.

The European Investment Bank (EIB) sits at the centre of the architecture, but its mandate prevents it from taking substantial risk onto its balance sheet. The result is a structural mismatch. Europe has enormous pools of public capital, but lacks a central mechanism capable of taking risk, pooling

guarantees and mobilising private investment at scale. Too often, the EIB ends up providing small grants or low-risk loans, while the projects that most need financing struggle to reach financial close.

A reformed model must separate **risk-taking capacity** from **risk-assessment expertise**. The EIB should remain Europe's centre of due diligence, project assessment and credit discipline but new EU-level risk-sharing tools must provide the guarantees and first-loss capital that the EIB cannot.

A modern financing framework should therefore include:

- A European Clean Infrastructure Facility that pools guarantees and first-loss capital from across EU programmes.
- Broader use of blended finance, including mezzanine layers (allowing lenders to convert debt into equity in case of default) and portfolio-level de-risking tools.
- Harmonised state-aid rules enabling multi-country financing of strategic clusters and cross-border projects.
- Prioritisation of financing based directly on the techno-economic assessments produced by the Clean-Tech Intelligence Unit (mirroring the role of the Liftoff reports in US financing).

This model keeps the EIB as Europe's analytical and structuring engine but uses EU funds to take the risk that unlocks private capital. It is faster, more scalable and far more aligned with the competitive pressures Europe faces.

Moreover, European households and institutional investors hold more than €30 trillion in savings, yet only a small fraction flows into the energy infrastructure, clean-tech manufacturing and AI-enabling projects Europe needs. Much of Europe's savings leave the continent entirely, invested in deeper US capital markets instead of Europe's own industrial future.

This is not a technical problem but a structural one. Europe's fragmented capital markets, inconsistent regulatory regimes and limited pan-European investment vehicles make it harder and more expensive to invest in long-

term projects. Until Europe fixes this, its cost of capital will remain significantly higher than in the US or China – a fundamental competitive disadvantage for energy-intensive industries.

This is exactly what the EU's Savings and Investments Union is designed to address – reducing fragmentation in Europe's capital markets so that household and institutional savings can be channelled more easily into long-term investments across borders. With that in mind, the Savings and Investments Union must therefore be treated as a pillar of Europe's energy and industrial strategy, not a parallel economic reform. This requires:

- Harmonised rules for cross-border investment and securitisation.
- Pan-European investment vehicles that channel pension and insurance savings into clean infrastructure, nuclear, grids and AI.
- Deepened equity markets capable of supporting scale-up manufacturing.
- Reforms that allow long-term investors to allocate more capital to infrastructure and clean tech.

A Savings and Investment Union built for the AI and energy age would complement the European Clean Infrastructure Facility and allow Europe's vast domestic savings to become a strategic asset – lowering financing costs, accelerating deployment and keeping value creation inside Europe rather than letting it escape overseas.

RECOMMENDATION: BUILD A EUROPEAN CLEAN-TECH EXPORT STRATEGY

A competitive industrial strategy must look outward as well as inward. The global market for clean technologies, from offshore-wind components to power electronics, advanced turbines, electrolysers, grid software and nuclear systems, is expanding rapidly and will define the industrial landscape of the next several decades. Yet Europe is ceding ground to China and the US not only in manufacturing, but in exports, standards and global influence.

Europe has deep strengths it can leverage: world-class engineering, leading offshore-wind original-equipment manufacturers, advanced grid-technology firms, strong nuclear expertise and rapidly growing digital energy capabilities. Innovation in the electrotech revolution does not rest on hardware alone. Increasingly, value lies in software, control systems and market design – from AI-enabled grid-operations tools and flexibility platforms to digital demand-response services and forecasting systems. These are areas in which Europe already has globally competitive firms and where its broader strengths in trusted AI and digital regulation can translate directly into exportable products and services.

Europe's decarbonisation pathway itself is an export asset. If the EU can show that it is possible to wean coal-dependent regions such as Poland off fossil fuels while maintaining competitiveness, creating new industrial jobs and avoiding a public backlash, it will offer a model that others can follow. Emerging and developing countries are not just looking for technologies; they are looking for politically viable playbooks – how to phase out coal without social collapse, how to design electricity markets that keep prices stable, how to integrate renewables while sustaining growth. A successful European electrostate, built around affordability, social consent and industrial renewal, would become one of the most powerful exports the EU has: a template for others.

A European export strategy should therefore:

- **Develop targeted export platforms** for sectors where Europe can genuinely lead – such as offshore wind, HVDC cables, power electronics, nuclear components, and AI-enabled grid and flexibility software.
- **Align industrial clusters with global demand**, ensuring Europe produces at the scale required for export competitiveness.
- **Use EU trade instruments, development finance and partnerships** to open markets and reduce barriers for European energy technologies and services, particularly in rapidly growing regions that will define future demand.

- **Tie CRM diplomacy to export growth**, ensuring raw-material partnerships support both domestic production and external-market penetration.
- **Promote European technical and regulatory standards globally**, especially in areas like system planning, flexibility markets and AI-enabled grid operation, strengthening both competitiveness and energy security.

By treating exports (of hardware, software and system know-how) as a strategic pillar rather than a by-product, Europe can turn its industrial strengths into global influence, reduce per-unit costs at home and secure a larger share of the value created by the global transition to clean energy and electrification.

Conclusion

Europe's energy transition is no longer primarily an environmental project. It is now a question of economic power, geopolitical resilience and technological sovereignty. In a world defined increasingly by electrification, digitalisation and industrial competition, the structure of energy systems will shape the hierarchy of nations. Climate leadership in this new era will be determined less by target-setting alone than by the ability to build energy systems that are affordable, secure and scalable.

Europe enters this new era with significant disadvantages: limited domestic fossil resources, fragmented governance and structurally higher costs. But it also possesses unique strengths – an integrated market, world-class engineering capabilities, deep capital pools and the political institutions required to coordinate action at continental scale. The challenge is not whether Europe can compete, but whether it can align these assets into a coherent strategy.

The reforms outlined in this report point towards a different model for the European energy system: one built on integrated planning, abundant clean electricity, credible firm capacity, efficient markets and accelerated electrification. Taken together, these elements amount to more than

incremental policy change. They define a new strategic project: the construction of a European electrostate capable of sustaining competitiveness, cohesion and security in the decades ahead.

If Europe succeeds, it will demonstrate that decarbonisation can be the outcome of a strategy centred on economic strength, industrial renewal and social consent. It will provide a model for others – not only for advanced economies but for emerging ones seeking to modernise without sacrificing stability or prosperity. In this sense, Europe's energy transition is not simply about meeting domestic targets – it is about shaping the global trajectory of the electrotech age.

The alternative is gradual marginalisation. Without decisive action, Europe risks becoming a consumer rather than a producer of the technologies that will define the next industrial era – dependent on external energy, external manufacturing and external innovation.

Energy integration was at the heart of Europe's founding settlement in coal and steel. Today, electrification and system integration must become the organising principles of its next phase. With clarity of purpose, institutional courage and sustained investment, Europe can turn energy from a structural vulnerability into the foundation of renewed prosperity and strategic influence.

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