Keeping the Lights On: Why the Iberian Blackout Demands Urgent Grid Modernisation

2 October 2025

1. Executive Summary

The April 2025 Iberian blackout left millions in Spain and Portugal without power, transport, or communications for nearly 16 hours. It underscored how insufficiently robust grids, and limited interconnections threaten reliability and consumer welfare. The event is a warning: grids must be modernised and consumer interests prioritised. Without urgent action, disruptions, higher costs, and inequality will rise. Investment in smart, flexible, and interconnected networks is essential to ensure reliability, affordability, and public trust.

2. What Happened: The Iberian Blackout as a Wake-Up Call

On **28 April 2025**, shortly after midday, large parts of **Spain experienced a sudden and widespread loss of electricity**. What began as a localised disturbance rapidly escalated into a cascading failure, causing system-wide outages that extended into **Portugal** within minutes.[1]

For several hours, the **entire Iberian Peninsula** was effectively disconnected from the rest of the European grid. Trains ground to a halt, hospitals switched to emergency generators, telecom networks collapsed, and in many rural areas, communities were left completely cut off.

Millions of residents found themselves plunged into darkness without basic communications. Families struggled to reach elderly relatives or confirm whether children had returned safely from school. Public transport was paralysed with nearly 35,000 train passengers stranded and requiring evacuation. In Portugal, emergency services fielded numerous calls from citizens trapped in elevators.[2]

Power was gradually restored overnight, but **full recovery only came the following morning**, after almost **16 hours** of disruption.

The blackout caused significant hardship, especially for **vulnerable consumers**. Elderly residents dependent on medical equipment, families in poorly insulated homes, all faced acute impacts. Public authorities were caught off guard: emergency response centres were overwhelmed, and no coordinated communication plan was activated.

The blackout did not just interrupt daily life, it **eroded trust** in the reliability of essential services and the institutions responsible for them.

According to the **Spanish government's preliminary investigation**, the failure was caused

[1] **ENTSO-E (2025)**, 28 April 2025 Iberian Blackout, Report in progress. https://www.entsoe.eu/publications/blackout/28-april-2025-iberian-blackout/

[2] **AP News (2025)**, Massive power outage in Spain and Portugal leaves thousands stranded and millions without light, 28 April 2025. https://apnews.com/article/spain-portugal-power-outage-electricity-b0c5fbca49b8422248c4f933e20303b3

by:

- Poor planning by Red Eléctrica de España (REE), which failed to schedule adequate thermal generation to manage an overvoltage incident;
- Premature disconnection by several operators who failed to absorb required reactive power;
- A system-wide collapse triggered by these compounding errors.[3]

The Iberian blackout cannot be seen as just a local failure — it is a case study in what happens when infrastructure modernisation, system planning, and consumer protection are not prioritised to create a truly connected Europe.

3. Europe's Grid Challenge: Interconnected, Resilient, and Consumer-Centric

The Iberian blackout offers a stark warning: Europe's electricity systems are not yet ready for the demands of the green and digital transitions. Electrification of heating, transport, and industry is ramping up, alongside a growing share of renewable and decentralised energy sources. These trends are essential to achieving the EU's climate goals, but they also demand more flexible, resilient, and intelligent energy grids, which many systems are not yet prepared to deliver. Meanwhile, the incident showed how exposed consumers are to the consequences of opacity and delay, facing higher bills and reduced trust when information is withheld or action is too slow.

3.1 A Grid Not Yet Ready for the Green and Digital Transitions

The EU's electricity grids are under growing strain from a combination of structural and environmental challenges. Climate change is increasing the frequency of extreme weather events, such as heatwaves, storms, and floods, that can physically damage infrastructure and alter patterns of electricity demand, particularly through increased use of cooling.

At the same time, the transition to renewable energy is shifting the supply landscape, with a greater share of variable sources like wind and solar entering the system. These changes require more flexible, digitally enabled grids that can manage decentralised inputs, balance supply and demand in real time, and withstand external shocks. Without investment in modernisation and adaptation, grid reliability will remain at risk.[4]

In a recent opinion on Electricity National Development Plans, the ACER underscored that "the transformation of the energy system towards the 2050 climate objectives" requires

[3] **Ministerio para la Transición Ecológica y el Reto Demográfico (2025)**, Se presenta el informe del Comité de análisis de la red eléctrica del futuro, https://mcusercontent.com/2702b812ce1f3e6da64933b9d/files/f543f912-b15e-d3ae-8a8a-e393bf6fdfb6/20250617_NdP_Se_presenta_el_informe_del_Comit_eacute__de_an_aacute_lisis_de_la.pdf

[4] See **Associação Portuguesa de Energias Renováveis (APREN) (2025)**, Produção, https://www.apren.pt/pt/energias-renovaveis/producao

"a resilient and future-ready electricity grid infrastructure".[5] Electrification of heating, transport, and industry, all key to delivering Europe's industrial and green ambitions, is driving up demand, while the shift to decentralised and variable renewables is introducing more volatility into the system.

Technically, the EU needs grid upgrades that go far beyond cables and pylons. Smarter, digitally enabled grids with real-time monitoring, automated balancing, and dynamic voltage control are essential. Investments must also target grid storage, demand-side flexibility, and cybersecurity, ensuring the system can adapt, self-correct, and withstand shocks.

This matters because grid failures hit consumers hardest. EU-level action must ensure that resilience and consumer protection are built into every step of the energy transition.

3.2 Poor Interconnection Undermines Resilience

Compounding the challenge is the lack of cross-border connectivity. Despite years of planning, the **Iberian Peninsula remains one of the least interconnected regions in the EU**, falling well below the 15% interconnection target. While key Projects of Common Interest (PCIs), such as the **Bay of Biscay interconnector**, are underway, they are not yet operational, and progress has been slow.[6] Meanwhile, EU initiatives such as TEN-E and REPowerEU provide a strategic vision, but on-the-ground progress remains patchy and slow.

Yet as of 2024, **half of the EU's cross-border electricity needs for 2030 (32 of 66 GW) were still unaddressed**, with the gap expected to rise to **37 GW by 2040**.[7] This underscores a growing mismatch between climate ambition and grid readiness.

[5] **ACER – Agency for the Cooperation of Energy Regulators (2025)**, Supporting EU's energy infrastructure through planning and financing: ACER calls for greater consistency in European electricity network plans, 22 July 2025. https://www.acer.europa.eu/news/acer-calls-greater-consistency-european-electricity-network-plans

[6] **HVDC World (2025)**, Iberian Blackout May Drive Stronger EU Cooperation on Interconnectors, 20 May 2025; **European Parliament (2025)**, Electricity grids: the backbone of the EU energy system, Resolution P10_TA(2025)0136, 19 June 2025.

[7] **ACER (2024)**, Electricity infrastructure development to support a competitive and sustainable energy system, Monitoring Report. https://www.acer.europa.eu/sites/default/files/documents/Publications/ACER_2024_Monitoring_Electricity_Infrastructure.pdf

Spotlight: From Portugal to Belgium — A Corridor of Opportunity // The Value of Connection

Our members span four countries: **Portugal**, **Spain**, **Italy**, and **Belgium**, a corridor that should be seamlessly connected by energy infrastructure.

A truly interconnected grid would let these complement each other — **sunny Spain and Italy exporting solar to cloudy days in Northern Europe, hydro in Portugal balancing peak wind, and Belgian wind stabilising supply** — delivering stable, clean energy across the network. A well-connected network would unlock this complementarity, lowering costs, stabilising supply, and putting Europe's clean energy to work for all consumers.

Imagine this chain working as it should:

- **Portugal** and **Spain** export surplus solar and wind power across the Pyrenees.
- **Italy** helps balance the load through hydro and demand-side response.
- **Belgium**, as a grid hub, ensures delivery to industrial users and residential consumers across northwest Europe.

But this vision isn't yet reality. The **Bay of Biscay interconnector** is still years from completion. Bottlenecks between **Italy and France** limit flexibility. Cross-border planning and funding remain slow.

The blackout made clear that inadequate cross-border capacity increases systemic risk and limits any attempts at a European response. It also undermines affordability by restricting access to cleaner, cheaper power from neighbouring markets.

3.3 Consumers Are Still Sidelined

When grid failures occur, consumers face the consequences: outages, loss of services, economic harm, and too often, **a lack of information, accountability, or redress**. In the Iberian case, communication during the crisis was patchy, compensation unclear, and protection for vulnerable consumers minimal.

The Iberian blackout exposed not only vulnerabilities in the grid but also a breakdown in public accountability. In the **weeks and months** following the April 2025 outage, consumers in Spain and Portugal were **left without a clear explanation** of what had happened. No public report was issued, no official causes were confirmed, and no timeline was provided, despite the massive disruption and impact on daily life.

When the official report was finally released, it confirmed what many had feared: the blackout was preventable, triggered by poor planning and operational failures. But by that time, the damage from the delay had already been done. In the absence of reliable

information, **regulators, system operators, and energy suppliers implemented precautionary measures** that came at a direct cost to businesses and consumers alike.

The Cost of Delay: How Consumers Paid for Uncertainty

- **Cross-border energy restrictions led to higher prices**: With no clarity on the source of the instability, electricity flows between Portugal and Spain were restricted. These countries typically share almost identical wholesale prices. But in the immediate aftermath of the blackout, wholesale electricity prices in Portugal spiked to nearly five times those in Spain due to these artificial constraints.[8]
- **Increased use of expensive balancing services**: TSOs turned to "technical adjustment services" to maintain grid stability. These emergency tools are effective, but costly. Without knowing whether the system was still at risk, the use of these services **spiked**, and their price **nearly tripled**, pushing up bills for consumers on **variable-rate contracts**.
- **Solar power was curtailed during peak generation**: Out of an abundance of caution, grid operators reduced the input of solar electricity, even when generation was at its maximum. This led to the **underutilisation of cheap, clean energy** and forced reliance on more expensive alternatives.
- **Fixed-rate contracts came under pressure**: While consumers on fixed-price deals were temporarily shielded, suppliers faced mounting costs. Some responded by **raising rates across the board**, while others introduced **new contract clauses** that allow price changes during extraordinary events, weakening long-term predictability for households and small businesses.

In the end, **consumers bore the cost of institutional silence**. Without timely, transparent communication from grid operators or authorities, households faced **higher bills, reduced service confidence, and a growing sense of uncertainty**.

Resilience is not only about infrastructure, but also about governance. Delays in information create instability, and instability costs consumers. Consumers must no longer be passive recipients of infrastructure decisions. They must be seen as active participants, supported by transparency, rights, and digital empowerment.

4. Europe Has the Right Idea, But Must Deliver Results

The Iberian blackout revealed a gap not in vision, but in execution. The EU has the right frameworks in place — or in development — to modernise its electricity infrastructure and ensure resilience. But these tools must now be used decisively to deliver outcomes for consumers.

[8] **Financial Times (2025)**, "Power prices surge in Portugal as it suspends Spain link after blackout", May 9, 2025. https://www.ft.com/content/3875c630-215b-490b-a0a8-c6bcf3cfedc6?utm_source=chatgpt.com

The **Trans-European Networks for Energy (TEN-E) Regulation**, revised in 2022, provides the main legal basis for cross-border energy infrastructure. It aims to remove bottlenecks, enhance market integration, and strengthen competitiveness through regional coordination and planning. It introduced updated infrastructure categories, including hydrogen networks and offshore grids, and redefined priority corridors. Through **Projects of Common and Mutual Interest (PCIs and PMIs)**, the regulation enables targeted investment in strategic infrastructure within and beyond EU borders.

In parallel, the **2023 Action Plan for Grids** identified the electricity grid as the "backbone" of Europe's clean energy transition. It highlighted the need for digitalisation, faster permitting, better regional planning, and smarter use of existing capacity. Yet unless these priorities are reflected in tangible implementation, particularly through the upcoming **European Grids Package**, momentum will be lost.

This Grids Package, expected in late 2025, offers a unique opportunity to strengthen cross-border planning, accelerate delivery of interconnectors, and modernise distribution networks. It must also address consumer-facing risks: unequal cost burdens, lack of information, and weak crisis governance. Our consultation response to the Grids Package highlights these very gaps and urges a more **resilient, interconnected, and consumer-centred approach**.

Other recent initiatives reinforce this need. The **Clean Industrial Deal** and **Affordable Energy Action Plan** emphasise how unfinished infrastructure and fragmented grids push up costs and weaken competitiveness. Commissioner Jørgensen's mission letter explicitly calls for a revised legal framework to support **grid expansion, electrification, and faster permitting**. And the **Draghi and Letta reports** both underline the strategic importance of modern, connected grids for EU sovereignty, sustainability, and industrial leadership.

Together, these initiatives confirm that grid modernisation is now recognised as essential for affordability, decarbonisation, and security. But expectations must become delivery. Consumers cannot wait for the next blackout to see results.

In June 2025, the **European Parliament adopted its Own-Initiative Report on Energy Infrastructure**, calling for urgent measures to remove persistent grid bottlenecks, complete key interconnections such as the **Bay of Biscay link**, and reinforce consumer affordability.[9] The Parliament clearly signalled that fragmented delivery is no longer acceptable.

The strategy is in place. The blackout shows us what happens when delivery is not. Now is the time for action.

[9] **European Parliament (2025)**, Electricity grids: the backbone of the EU energy system, Resolution P10_TA(2025)0136, 19 June 2025.https://www.europarl.europa.eu/doceo/document/A-10-2025-0091_EN.html#_section2

5. What Needs to Happen Next: A Grid That Works for Consumers

1. Interconnection and Resilience

- Mandate the accelerated delivery of key cross-border interconnectors, especially for under-connected regions like the Iberian Peninsula.

2. Smart Grids and Flexibility with Consumer Safeguards

- Invest in digital grid infrastructure (smart meters, automated load management) with privacy by design.
- Expand access to demand-side response and energy communities, ensuring interoperability and affordability.
- Incentivise local flexibility markets that allow households and SMEs to support grid stability.

3. Consumer Rights and Crisis Preparedness

- Introduce minimum EU-wide standards for blackout communication, redress, and continuity of service.
- Require national crisis plans that include protocols for vulnerable groups.
- Ensure consumer representation in infrastructure planning and national energy dialogues.


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