

INDEPENDENT VOLTAGE



NEOSLAB



European Grid Resilience,
Energy Sovereignty and
EU Compatibility Standards

Independent Voltage

Energy Sovereignty in Austria: Why Grid Expansion and Public Acceptance are the Missing Link, by Markus Fischer

Context:

Europe is facing the second energy crisis this decade. The EU imported 97% of oil and 85% of fossil gas in 2024.¹ **Austria imported 97% of its oil and 77% of its fossil gas** in 2024, coming at a cost of roughly €12 billion.² From Russia-driven supply shocks to rising instability in key exporting regions, the number of reliable suppliers has decreased sharply.

Problem:

In Austria, the central constraint is not a lack of renewable potential, but the system's limited ability to convert it into energy sovereignty. While domestic wind, hydro, and solar resources are abundant, grid expansion and interconnection are lagging behind. Austria requires around 920 km of new transmission lines, but **permitting delays, driven largely by insufficient public acceptance, have become the central bottleneck.** Current policy focuses on accelerating procedures and strengthening administrative capacity. However, legal and institutional reform needs to be complemented with targeted efforts to improve societal buy-in. Without trust and transparency, permitting measures risks backlash. As a result, electrification stalls, renewable potential remains underutilised, and dependence on foreign fossil fuels persists.

Policy Recommendations:

General:

Make strengthening public acceptance and maintaining a positive attitude towards the energy transition a clear policy priority

Encourage trade associations to run nation-wide campaigns framing the energy transition as freedom from foreign fossil fuels³

Turn energy infrastructure into visible and accessible public spaces, as exemplified by the visitor wind turbine in Lower Austria⁴

Work actively with influencers and artists to promote the energy transition, for example as in the 1mio views DJ-set from a wind turbine YouTube video⁵

1 Eurostat 2026: Energy in Europe: imports dependency - News articles - Eurostat

2 ibid & Statistik Austria: https://www.statistik.at/fileadmin/pages/201/ITGSKompakt_01-12.2024e.pdf

3 The award-winning "Holz ist Genial" campaign by the Austrian wood and forestry industry association could serve as a

template
4 Herzlich willkommen am Ausflugs-Windrad in Bruck an der Leitha
5 youtube.com/watch?v=y5X0RGNy2dl

Project level:

1 Address behavioral aspects in economic benefits

- Frame impact in terms of avoiding relatable losses such as fuel price volatility, rather than highlighting intangible long-term gains
- Make community benefits (e.g. upgrade to the local school) highly visible at an early stage to avoid availability bias

2 Leverage social dynamics and peer effects to display early project support

- Activate and amplify local energy-transition-champions to signal that support for the projects is socially widespread
- Focus communication efforts on existing supporters and the silent majority instead of wasting resources on opponents

3 Pay attention to the emotional aspects of local and landscape impacts

- Acknowledge that resistance often reflects legitimate concerns about place attachment and emotional ties to the Heimat
- Embed projects in local political and social networks, rather than dismissing opposition as simple NIMBYism

4 Design an inclusive, fair and transparent public participation process

- Involve stakeholders early, give them insight into the processes, and make them feel to have real influence
- Build bottom-up participation capacity (e.g. local citizen panels, community working groups) instead of relying mainly on top-down communication (e.g. one-way information event)
- Adapt the process to dynamically evolving acceptance-levels

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Grid Resilience and Energy Sovereignty in Bosnia and Herzegovina: Challenges and Alignment with the EU Energy Transition

by Nihad Harbaš

Context:

Bosnia and Herzegovina has an important role in the Southeast European electricity network due to its strong hydropower resources and extensive cross-border connections. In 2025, the country generated about 14,540 GWh of electricity, importing 2,810 GWh and exporting 5,137 GWh, which highlights its regional market integration. Renewable energy is also growing, with around 914 MW of solar and 270 MW of wind capacity installed.

Problem:

Despite its strong energy potential and important role in regional electricity trade, Bosnia and Herzegovina faces significant structural challenges in achieving long-term energy sovereignty. The electricity system remains heavily dependent on lignite, while thermal generation has declined to its lowest level since 2006. Hydropower remains a key resource, but growing hydrological variability and climate-related risks increasingly affect its reliability. The transmission system includes around 4,000 km of high-voltage lines and more than 6,500 km of total transmission infrastructure, as well as 37 cross-border interconnections, demonstrating a high level of regional integration. However, much of the network is ageing and lacks modern digital and flexibility-enhancing technologies. In addition, institutional fragmentation and the slow implementation of Energy Community reforms continue to limit investment coordination, market development, and the integration of expanding renewable energy capacity.

6,520 km

High-voltage transmission network

37

Cross-border interconnectors

Policy Recommendations:

1

Accelerate grid modernisation with a focus on renewable energy integration

It is necessary to prioritise distribution network reinforcement, digitalisation, and advanced monitoring to accommodate rapid solar growth and improve system flexibility, alongside VPP and aggregation models.

2 Strengthen cross-border interconnections

Bosnia and Herzegovina should expand transmission capacity with neighbouring countries to support regional market integration and balance increasing shares of variable renewable energy.

3 Diversify the electricity generation mix

Bosnia and Herzegovina should scale up solar and wind alongside hydropower while supporting flexibility through storage, demand-side management, and a gradual, just transition away from coal.

4 Improve regulatory alignment with EU energy markets

Bosnia and Herzegovina should continue advancing activities related to the finalization and future implementation of NECP, market coupling, and balancing mechanisms while strengthening regulatory certainty and transparency to attract investment.

5 Strengthen regional energy cooperation

Bosnia and Herzegovina should enhance operational market integration through coordinated capacity allocation and participation in regional balancing platforms.

6 Establish a state-level energy coordination mechanism

In Bosnia and Herzegovina, it's necessary to establish a functional coordination body to improve policy implementation, regulatory alignment, and access to EU funding and investment.

Strengthening grid resilience in Bosnia and Herzegovina supports national energy security while contributing to the stability and integration of the European electricity system.

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Spain as a Strategic Node in the European Energy Architecture:

Grid Resilience, Energy Sovereignty and EU System Integration

Context:

Spain occupies a strategically important position within the European electricity system. Located at the intersection of continental Europe, the Mediterranean, and North Africa, it serves as a potential gateway for renewable electricity flows and regional energy integration. Spain has become one of Europe's leaders in renewable energy deployment, with renewable sources accounting for 55.5% of electricity generation in 2025 and nearly 10 GW of new wind and solar capacity added during the year. Spain has also remained a net electricity exporter for four consecutive years while continuing to expand its transmission network and invest in grid infrastructure.

Problem:

Despite its strong domestic energy performance, Spain remains one of the least interconnected electricity systems in the European Union. While the EU has established a target of at least 15% electricity interconnection capacity by 2030, Spain's interconnection level stood at only 3.11% in 2026. This limits the ability of Spain's growing renewable-energy sector to contribute fully to European energy security, market integration, and system resilience.

The principal bottleneck remains the France–Spain interconnection corridor. Current exchange capacity with France remains insufficient relative to the size of the Spanish electricity system, creating congestion and limiting electricity flows between the Iberian Peninsula and continental Europe. Although major projects such as the Bay of Biscay interconnection are under construction, Spain's broader strategic contribution to European energy resilience depends on accelerating cross-border integration and strengthening system flexibility.

3.11%

Spain's electricity interconnection level in 2026



55.5%

Renewable share of electricity generation in 2025



~10 Gw

New wind and solar capacity added in 2025



4

Consecutive years as a net electricity exporter



~4,000 km

High-voltage transmission network (part of more than 45,000 km of total power transmission lines)



3

Major interconnection corridors
France (2.8 GW) | Portugal (2.3 GW)
Morocco (900 MW/600MW)

Policy Recommendations

1 Accelerate completion of the Bay of Biscay interconnection

The European Union and Spain should prioritise the rapid completion of the Bay of Biscay project and additional France–Spain reinforcement projects to reduce Iberian energy isolation and strengthen European grid resilience.

2 Treat interconnection as a pillar of European energy security

Cross-border electricity infrastructure should be recognised as a strategic investment supporting energy sovereignty, market integration, and security of supply throughout Europe.

3 Strengthen Spain's role as a renewable-energy hub

Greater interconnection capacity would allow Spain's growing renewable-energy sector to contribute more effectively to European decarbonisation objectives and electricity-market stability.

4 Expand energy-storage and flexibility solutions

Spain should continue developing storage technologies, demand-side response mechanisms, and smart-grid capabilities to support higher levels of renewable-energy penetration.

5 Promote deeper regional market integration

Closer integration between Spain, Portugal, France, and neighboring electricity markets would improve price convergence, system balancing, and operational resilience.

6 Support long-term investment in strategic grid infrastructure

European and national policymakers should continue supporting transmission-network expansion and cross-border projects that improve interoperability and preparedness for future energy challenges.



Strengthening Spain's interconnection with continental Europe could not only enhance national energy security but also improve the resilience, flexibility, and competitiveness of the wider European electricity system. Spain has already demonstrated leadership in renewable-energy deployment; the next challenge is ensuring that this progress is fully connected to Europe.

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