European Energy Interconnection

Overview

The synchronous grid of covers territory of the ENTSO-E continental Europe regional group and some neighbouring countries not involved in the ENTSO-E. As of 2025, the synchronous grid includes all or parts of the following countries: • •.

Key Takeaways

European energy interconnections are cross-border electricity networks that enhance energy security, integrate renewables, and support a unified European electricity market.Overview and Purpose

European energy interconnections consist of high-voltage transmission lines and pipelines linking national power grids across the EU and neighboring countries . These interconnectors allow electricity to flow freely across borders, enabling countries to share surplus power, balance supply and demand, and stabilize the grid during peak periods . They are essential for energy security, economic stability, and geopolitical resilience, reducing dependence on single suppliers and mitigating risks from volatile energy prices .

EU Interconnection Targets

The EU has set a 15% interconnection target by 2030, meaning each member state should be able to import electricity equivalent to at least 15% of its installed production capacity from neighboring countries . This target builds on the previous 10% goal for 2020 and is part of the Energy Union Governance Regulation. Achieving this target supports the integration of renewable energy, improves market efficiency, and enhances security of supply .

Key Projects and Examples

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Europe already has numerous interconnectors, including:

• LitPol Link (Lithuania-Poland)

• Estlink 1 and 2 (Estonia-Finland)

• Alegro (Belgium-Germany)

• Spain-France Interconnector

• Upcoming projects like the Celtic Interconnector (France-Ireland) These projects facilitate cross-border energy flows, allow surplus renewable energy to reach high-demand regions, and improve grid reliability .

Benefits and Strategic Importance

• Renewable Integration: Interconnectors enable the transfer of wind and solar power from regions with high generation to areas with higher demand, reducing curtailment and supporting decarbonisation .

• Market Efficiency: Cross-border flows help harmonize electricity prices and reduce wholesale market volatility .

• Security of Supply: Interconnections allow countries to assist each other during shortages or emergencies, enhancing resilience against blackouts .

• Economic and Geopolitical Advantages: Shared infrastructure reduces reliance on single suppliers and strengthens the EU's energy independence .

Future Outlook

Studies using models like AFRY's BID3 indicate that increasing interconnection capacity combined with flexible demand can significantly lower electricity costs, improve reliability, and accelerate decarbonisation across Europe . However, interconnection projects typically take around nine years to complete, highlighting the need for timely planning and investment . Data tools, such as Ember's Europe Electricity Interconnection Data Tool, provide insights into flows, capacities, and renewable integration potential, helping policymakers and operators optimize the network . In summary, European energy interconnections are a critical backbone for a secure, efficient, and decarbonized electricity system, supporting both national and EU-wide energy goals while enabling a more resilient and integrated energy market.

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Article Content

Continental Europe Synchronous Area

The synchronous grid of continental Europe covers territory of the ENTSO-E continental Europe regional group and some neighbouring countries not involved in the ENTSO-E. As of 2025, the synchronous grid includes all or parts of the following countries: • Albania• Austria

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