Problems Facing the Global Energy Interconnection



Overview

Geopolitical tensions are laying bare fragilities in the Hosted by the UK government in London, the Summit will assess the existing and emerging risks faci.

Key Takeaways

The Global Energy Interconnection faces challenges in technology, finance, regulation, and geopolitics that complicate the integration of cross-border electricity networks.

Technical Challenges

Building a global electricity grid requires advanced transmission technologies such as High Voltage Direct Current (HVDC) systems, which are more efficient than traditional AC lines for long distances but still face limitations in underground and submarine applications, energy losses, and material requirements. Integrating diverse renewable energy sources across regions with varying generation profiles demands flexible capacity, storage solutions, and grid stability mechanisms, which are complex to design and operate at a global scale. Additionally, existing national grids often operate in isolation, as seen in Japan and South Korea, limiting the immediate benefits of interconnection.

Financial and Investment Barriers

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Global interconnection projects require massive capital investment, often in the billions of dollars, with long payback periods. Despite clean energy investment exceeding $2 trillion globally, it remains far below the $5. 6 trillion needed annually to meet net-zero targets.

Emerging economies, which account for over 80% of future energy demand, face higher financing costs and limited access to capital, creating a mismatch between where investment flows and where energy demand is growing. Convincing governments and private investors to commit to long-term projects, such as the Australia-Asia PowerLink or CASA-1000, remains a significant hurdle. Regulatory and Policy HurdlesCross-border electricity trading requires harmonized regulations, standardized technical protocols, and coordinated policies among multiple countries.

Differences in energy market structures, tariffs, and legal frameworks can delay or block interconnection projects. Policymakers must dismantle regulatory barriers and align national energy strategies to enable seamless integration, which is often complicated by domestic priorities and energy sovereignty concerns.

Geopolitical Risks

Global interconnections are vulnerable to geopolitical tensions, as energy infrastructure can become a point of strategic leverage or conflict. Political instability, trade disputes, and differing national interests can slow project approvals, disrupt construction, or limit cross-border cooperation. Ensuring energy security while promoting interconnectivity requires careful diplomacy and multilateral agreements, as demonstrated by trilateral initiatives like the UAE-Albania-Italy agreement.

Social and Environmental ConsiderationsLarge-scale interconnection projects may face public opposition due to land use, environmental impacts, and social concerns. Submarine and overland transmission lines can affect ecosystems, fisheries, and local communities, requiring extensive environmental assessments and mitigation strategies.

Conclusion

While the Global Energy Interconnection promises enhanced energy efficiency, renewable integration, and system resilience, its implementation is hindered by technical complexity, high capital requirements, regulatory fragmentation, geopolitical risks, and social-environmental challenges. Overcoming these difficulties will require coordinated international efforts, innovative financing mechanisms, and robust technological solutions to achieve a truly interconnected and sustainable global energy system.

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