

Article Overview

The 2070 Global Energy Interconnection envisions a fully interconnected, clean-energy-dominant global electricity network linking continents through ultra-high voltage systems and smart grids.

Overview of Global Energy Interconnection (GEI)

The Global Energy Interconnection (GEI) is a proposed worldwide electricity network designed to integrate renewable energy sources, enhance energy security, and support sustainable development goals. It is spearheaded by the State Grid Corporation of China (SGCC) and promoted internationally by the Global Energy Interconnection Development and Cooperation Organization (GEIDCO). GEI aims to create a clean energy-dominant, electric-centric system that is globally interconnected, jointly constructed, and mutually beneficial.

Phased Development Toward 2070

The GEI project is structured in three main phases:

- o Phase 1 (Near-term): Integration of national grids, construction of new smart grids, and expansion of renewable energy usage within countries.
- o Phase 2 (Mid-term): Connection of continental grids to enable regional energy interconnection and cross-border electricity trade.
- o Phase 3 (2030-2070): Development of Afro-Eurasian transcontinental grids linked by ultra-high voltage (UHV) systems, forming a global electricity backbone capable of transmitting clean energy across continents. By 2070, the vision is for power grids of all continents to be interconnected, with global clean energy exceeding 70% of total energy consumption and a significant reduction in carbon emissions from the energy sector.

Technological Framework

GEI relies on advanced technologies to achieve global interconnection:

- o Ultra-High Voltage (UHV) Transmission: Enables long-distance, high-capacity electricity transfer with minimal losses.
- o Smart Grids: Incorporate automation, real-time monitoring, and interoperability to optimize energy flow and integrate variable renewable sources.
- o Energy Storage Systems: Support grid stability and balance supply-demand fluctuations from renewable generation.
- o International Standards and Specifications: Facilitate global adoption, procurement, and system integration.

Global Impact and Objectives

The 2070 GEI aims to:

- o Promote sustainable development: Support UN Sustainable Development Goals, reduce global poverty, and foster equal development .
- o Enhance ecological restoration: Save water resources and reduce environmental degradation .
- o Ensure energy security: Guarantee reliable electricity supply worldwide through interconnection, co-construction, and sharing .
- o Accelerate decarbonization: Enable large-scale deployment of renewable energy, contributing to climate change mitigation and compliance with the Paris Agreement .

Organizational and Collaborative Efforts

GEIDCO coordinates international collaboration, technical standardization, and research initiatives. Since its establishment, it has conducted over 100 research projects and hosted 30 international conferences, engaging experts, policymakers, and organizations from more than 100 countries . This global cooperation is essential for overcoming the unprecedented system integration challenges of a worldwide energy network .

Conclusion

By 2070, the Global Energy Interconnection envisions a fully integrated, low-carbon, and smart global electricity network that connects continents, maximizes renewable energy utilization, and supports sustainable economic and social development. It represents a transformative approach to global energy governance, climate action, and technological innovation in the power sector .

Such efforts - and those of the many institutions including GEIDCO that are promoting the energy transition - will help

Against the background of energy consumption transformation and climate governance, Global Energy Interconnection

The International Energy Agency (IEA) was asked by the COP26 Presidency in 2021 to give an indication of what achieving the 1.5

Summary Global Energy Interconnection (GEI) provides an infrastructure platform through which clean energy can be largely

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Organization, Mr. Elnar Remi Holmen,

The Global Energy Interconnection is a proposed global electricity network (Super grid).

The Global Energy Interconnection (GEI) is a clean energy-dominant, electricity-centered, interconnected and shared modern energy

Energy concerns the overall situation of sustainable development. To address serious challenges confronting the

Global Energy Interconnection established by Global Energy Interconnection Development and Cooperation Organization (GEIDCO),

Here, we demonstrate the potential of a globally interconnected solar-wind system to meet future electricity demands.

The Global Energy Interconnection is a proposed global electricity network (Super grid). World map of high voltage transmission lines

Global energy interconnection (GEI) represents the ultimate evolution of the trend towards greater interconnection of power systems.

Thus this White Paper aims to highlight the concept of GEI and begin laying the foundations for identifying and addressing the

The provision of low carbon energy to our society is a key issue at the heart of sustainable development of global energy supply. The

The Global Energy Interconnection (GEI) is a global electricity network that China's leadership wants completed by 2070. It is to be

Concept of Global Energy Interconnection o GEI is an interconnected modern energy system, dominated by clean energy and

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