

Article Overview

South Asia is advancing toward integrated power grids and digital energy networks to enhance cross-border electricity trade, renewable energy integration, and energy access.

Regional Power Connectivity

South Asia is actively developing cross-border electricity trade (CBET) to optimize energy resources and reduce deficits. Bangladesh, India, and Nepal have finalized a tripartite power trade agreement, enabling real-time and day-ahead market participation, while Nepal and Bangladesh plan to trade 40-50 MW during the monsoon season through the Indian grid. This integration allows countries to pool seasonal surpluses and deficits, improve cost efficiency, and attract private investment, while also generating environmental benefits from renewable energy sources like hydropower and solar power (UNESCAP) .

Renewable Energy and Energy Transition

The region is undergoing a major energy transition, shifting from fossil fuels to renewable energy to meet climate goals and ensure energy security. India is expanding solar capacity, Nepal focuses on hydropower, and other countries are leveraging biomass and wind resources. Coordinated regional planning can reduce peak energy deficits, create economies of scale, and support sustainable economic growth. Digital tools and smart grids are critical for managing variable renewable energy and enabling efficient market operations (CEEW/ISAS) .

Digital Energy Infrastructure

The Asian Development Bank (ADB) is supporting a \$70 billion initiative to connect power grids and expand digital networks across Asia, including South Asia. The Pan-Asia Power Grid Initiative aims to integrate 20 GW of renewable energy, connect 22,000 circuit-kilometers of transmission lines, and improve energy access for 200 million people by 2035. Simultaneously, the Asia-Pacific Digital Highway will enhance broadband access and enable AI-driven energy management, facilitating real-time monitoring, grid digitalization, and efficient electricity trading (ADB) .

Opportunities and Challenges

- o Opportunities: Integrated power markets can attract investment, increase energy reliability, and generate export revenues. Digitalization enables smart metering, predictive maintenance, and AI-based load balancing, improving operational efficiency. Cross-border trade allows countries to leverage seasonal renewable surpluses, reducing reliance on fossil fuels (UNESCAP) .
- o Challenges: South Asia faces high capital requirements, governance bottlenecks, and socio-economic

impacts of large-scale renewable projects. Infrastructure gaps, limited domestic manufacturing, and geopolitical risks require coordinated policy frameworks and regional cooperation to ensure a just and sustainable energy transition (CEEW/ISAS) .

Strategic Pathways

To fully realize the South Asia Power and Energy Internet, countries should:

- o Develop integrated regional power markets with transparent pricing and reliable cross-border trade mechanisms.
- o Invest in digital infrastructure for grid management, AI-driven forecasting, and energy efficiency.
- o Leverage renewable energy resources through regional hubs and hybrid generation-storage systems.
- o Coordinate finance, technology, and capacity building to accelerate the energy transition at scale.
- o Promote South-South and North-South collaborations to combine resource availability with capital and technology expertise (CEEW/ISAS) . By combining renewable energy integration, cross-border electricity trade, and digital energy networks, South Asia can create a resilient, efficient, and sustainable energy system that supports economic growth, climate goals, and energy access for hundreds of millions of people.

This paper investigates the prospects of sustainable energy transition in South Asia in terms of resources,

The global experiences of integrated power pools, as well as the recent CBET milestones in

Pankaj Batra is the Project Director of South Asia Regional Initiative for Energy Integration (SARI/EI) program funded

Source: Compiled from UNESCAP, Integrating South Asia's Power Grid for a Sustainable and Low Carbon Future, Bangkok: ESCAP

Greenhouse gases generated through energy production represent 63% of regional emissions. The transition to low

ADB will back \$70 billion in new energy and digital infrastructure initiatives by 2035, aiming to connect power grids,

Clean EDGE Asia fellow Rajiv Ratna Panda explores electricity grid integration in South and Southeast Asian

South Asia Fossil fuels such coal, oil and natural gas continue to dominate power generation in South Asia

It further identifies pathways for strengthening cooperation among South Asian countries, with their varied resources and

Nepal's electricity exports to Bangladesh via India mark a breakthrough in South Asia's cross-border power trade,

In South Asia, like other advanced markets, current energy market disruptions due to conflict, soaring demand for

South Asia's clean energy transition requires coordinated policy action and regional cooperation, together with the

An important implication of this is that with careful planning and negotiations peak energy deficits can be reduced substantially over

The Central Asia-South Asia (CASA) project is a first step toward realizing the potential for energy trade

U.S. Agency for International Development (USAID) formulated the South Asia Regional Initiative/Energy's (SARI/E)

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