

BIMSTEC Energy Cooperation

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Policy Brief

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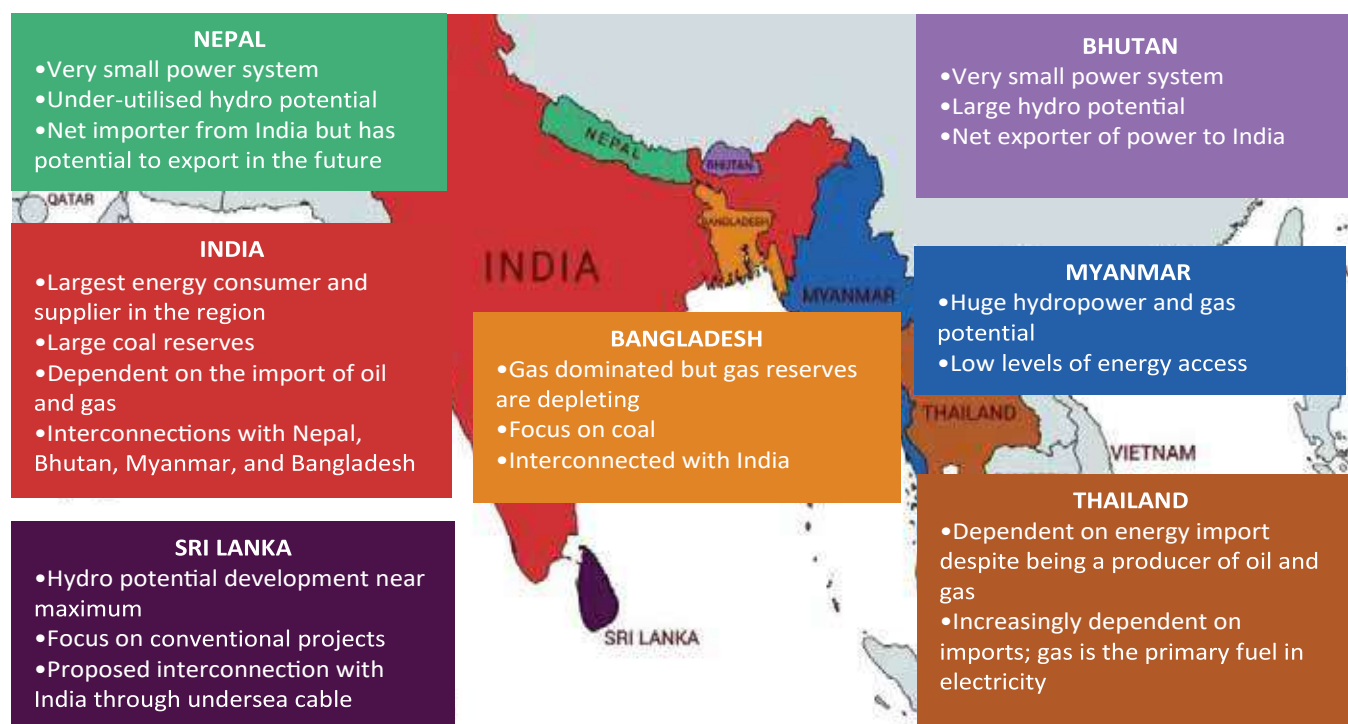
Background

The Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC) was established in 1997 to promote cooperation among South and Southeast Asian countries. As a sector-driven regional organization, BIMSTEC initially focused on six priority sectors, including energy, which is essential for the region's economic growth and stability. While BIMSTEC nations represent some of the world's fastest-growing economies, they are all energy-deficit and rely on imports of various energy resources to meet their needs. India, the largest country in the region with substantial natural resource reserves, also depends on imports to meet its energy demands due to its scale of consumption. Thus, the countries in the region could mutually benefit from promoting energy and electricity trade among themselves.

A prime example of such cooperation is the hydropower trade between Bhutan and India, which has significantly contributed to Bhutan's GDP, accounting for 6-10 percent between 2012 and 2019. This collaboration not only stimulates economic growth but also attracts foreign direct investment, such as India's major stake in Nepal's 900 MW Arun-III hydropower project. These investments boost power generation capacity while freeing up capital in host countries for broader development initiatives (SARI/EI-IRADe, 2021). Energy cooperation is also vital for ensuring energy security, a key factor in industrial growth and socioeconomic stability. By providing a buffer against supply disruptions, energy trade enhances national security and supports sustained economic progress through a reliable energy supply for industries and households. Furthermore, such cooperation fosters economic integration by reducing energy costs and improving efficiency, strengthening political and economic ties within the region, and creating a more cohesive and attractive market for investment.

In addition to addressing energy security, regional cooperation in renewable energy offers significant environmental benefits. Renewable energy projects play a vital role in reducing the region's carbon footprint, helping BIMSTEC countries align with global efforts to mitigate climate change. This transition to cleaner energy technologies also promotes long-term environmental sustainability, an essential aspect of modern energy strategies.

BIMSTEC Energy Profile



Source: Author's compilation and BIMSTEC Energy Outlook, 2030

Resource Potential

The BIMSTEC region is rich in natural resources, with significant reserves including 337 billion tonnes of coal, 718 million tonnes of oil, 76 trillion cubic feet (TCF) of natural gas, 386 GW of large hydropower capacity, and a potential 1,359 GW of renewable energy (Table 1). India holds the largest reserves across nearly all resource categories, particularly in coal and renewable energy. Bhutan and Nepal, while abundant in hydroelectric potential, are less endowed with other natural resources.

Table 1: Energy resource potential of the BIMSTEC nations

Resources Countries	Coal (Million Tonnes)	Oil (Million Tonnes)	Gas (Trillion Cubic Feet)	Bio-mass (MT)	Hydro (GW)	Renewable (GW)
Bangladesh	3,089	8	12	218	-	4
Bhutan	1	-	-	625	41	13
India	372,256	619	49	4,150	145	1,242
Myanmar	544	14	7	3,303	100	61
Nepal	<1	-	-	1,056	83	5
Sri Lanka	-	-	-	156	2	12
Thailand	1,063	77	9	1,838	15	23
BIMSTEC Total	376,953	718	76	11,346	386	1,359

Source: BIMSTEC Energy Outlook, 2035

Access to Energy

Thailand, Sri Lanka, and Bhutan have successfully extended electricity coverage to their entire populations, with Bhutan being the first BIMSTEC country to achieve this milestone. Over the past decade, Bangladesh has made the greatest strides in expanding electricity access, with a notable 43.73 percentage point increase, followed by Bhutan. In contrast, Myanmar has the lowest electricity coverage in the region (Table 2), highlighting the need for targeted infrastructure development and enhanced regional cooperation to address this gap.

Table 2: Share of population with access to electricity

Entity	2010	2021	Absolute Change (Percentage Point)	Relative Change
Bangladesh	55.26	98.99	43.73	79%
Bhutan	73.28	100	26.72	36%
India	76.30	99.57	23.27	31%
Myanmar	48.80	72.47	23.67	48%
Nepal	68.60	89.90	21.30	31%
Sri Lanka	85.30	100	14.70	17%
Thailand	99.70	100	0.30	0%

Source: World Bank

Table 3: Share of the populations with access to clean fuels for cooking

Entity	2010	2021	Absolute Change (Percentage Point)	Relative Change
Bangladesh	12.7	26.5	13.8	108.66%
Bhutan	64.4	87	22.6	35.09%
India	35.6	71.1	35.5	99.72%
Myanmar	9.6	43.5	33.9	353.13%
Nepal	21.3	35.2	13.9	65.26%
Sri Lanka	22	32.6	10.6	48.18%
Thailand	73.2	85.1	11.9	16.26%

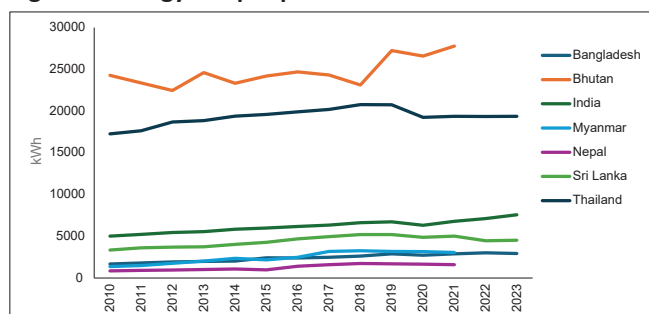
Source: World Health Organization - Global Health Observatory (2024)

Among BIMSTEC nations, Bangladesh has the lowest proportion of its population with access to clean cooking fuels, while Bhutan has the highest, followed by Thailand (Table 3). Between 2010 and 2021, both Myanmar and India have shown significant improvements in access to clean cooking fuels, though Bangladesh continues to lag behind in this regard.

Energy and Electricity Consumption

Bhutan has the highest per capita energy consumption, followed by Thailand, while Nepal and Bangladesh have the lowest figures (Figure 1). Bhutan's high energy use per person is largely due to its substantial reliance on hydropower for both domestic consumption and export, in contrast to the energy deficits experienced in Bangladesh and Nepal.

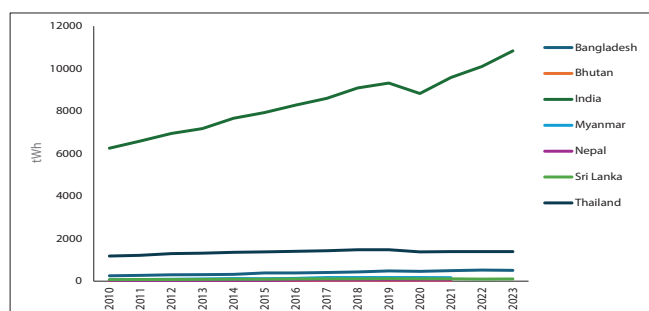
Figure 1: Energy use per person.



Source: U.S. Energy Information Administration (2023); Energy Institute - Statistical Review of World Energy (2024); Population-based on various sources (2023)

India significantly leads in total primary energy consumption, followed by Thailand, with the other BIMSTEC countries trailing far behind (Figure 2). India's substantial energy consumption highlights its role as a regional powerhouse, influencing its energy security policies and shaping its regional cooperation initiatives.

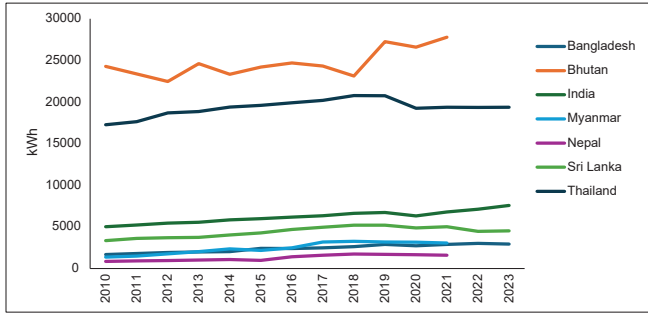
Figure 2: Annual Primary Energy Consumption



Source: U.S. Energy Information Administration (2023); Energy Institute - Statistical Review of World Energy (2024)

Bhutan ranks highest in per capita electricity generation, reflecting its robust hydropower capacity (Figure 3). This position underscores the success of Bhutan's hydropower industry, which could serve as a model for other countries with similar potential, such as Nepal.

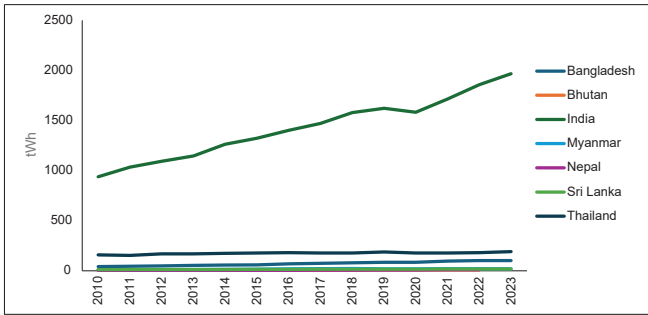
Figure 3: Per capita electricity generation.



Source: Ember (2024); Energy Institute - Statistical Review of World Energy (2024); Population-based on various sources (2023)

India leads in total annual electricity generation, followed by Thailand, with Bhutan and Nepal making significant contributions through hydropower (Figure 4). This underscores India's central role in regional energy production, while also highlighting the crucial role of hydropower for smaller countries like Bhutan and Nepal.

Figure 4: Annual Electricity Generation

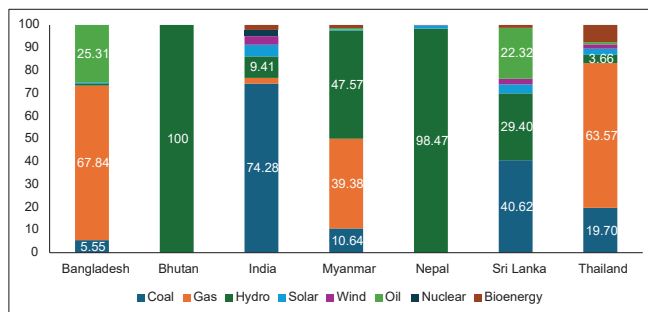


Source: Ember (2024); Energy Institute - Statistical Review of World Energy (2024)

Electricity Mix

The electricity mix varies significantly across the BIMSTEC region, with coal dominating in India and Sri Lanka, gas in Bangladesh and Thailand, and hydro in Bhutan, Nepal, and Myanmar (Figure 5). This diversity in energy sources reflects the different energy strategies employed by each country, highlighting the need for coordinated energy policies and enhanced cooperation within BIMSTEC.

Figure 5: Share of electricity production by source (2022)

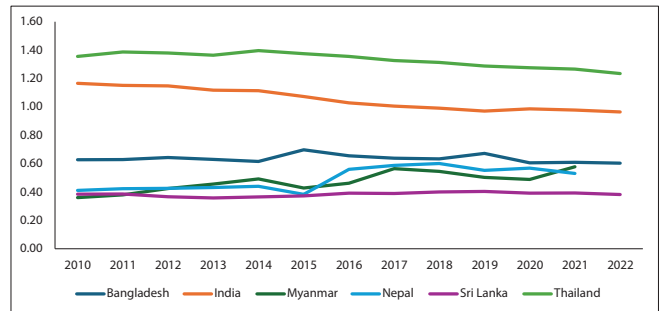


Source: Ember (2024); Energy Institute - Statistical Review of World Energy (2024)

Energy and Carbon Efficiency

Figure 6 measures the energy intensity of BIMSTEC nations, with a lower value indicating better energy efficiency—meaning less energy is consumed per unit of GDP. Sri Lanka, Myanmar, Nepal, and Bangladesh have lower energy intensity, suggesting that these countries can generate economic output with relatively less energy consumption. This could be attributed to less energy-intensive industries or more efficient energy-use practices.

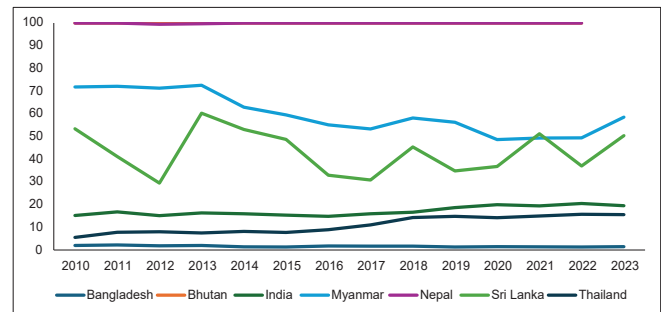
Figure 6: Primary energy consumption per GDP (kWh/\$)



Source: Ember (2024); Energy Institute - Statistical Review of World Energy (2024)

Figure 7 illustrates the share of renewables in the electricity generation mix, with Bhutan and Nepal leading due to their reliance on hydropower. This heavy dependence on renewable energy in both countries highlights a sustainable energy trajectory that could be further expanded across the region to reduce carbon footprints.

Figure 7: Renewables - % of electricity.



Source: Ember (2024); Energy Institute - Statistical Review of World Energy (2024)

Existing Initiatives for Collaboration, their Features and Challenges

Oil and Gas Sector	Power/Electricity Sector	Non-Conventional Sources of Energy
Project: Trans BIMSTEC Gas Pipeline Project	Project: BIMSTEC Trans Power Exchange and Development	Focus: Hydropower, solar, biomass
Goals: Regional gas grid, address resource distribution, reduce energy costs, enhance security	Goals: Cross-border trade, new transmission lines, infrastructure upgrades	Initiatives: Thailand's biofuels, biomass gasification
Challenges: Political instability, funding issues, technical difficulties	Benefits: Optimize supply, reduce shortages, stabilize prices	Benefits: Reduce fossil fuel dependence, lower emissions, sustainable future
	Challenges: Grid standards, regulatory frameworks	Challenges: Investment costs, technological barriers

Source: BIMSTEC Energy Outlook 2030 and 2035

Given the importance of energy in the economic development of the country, various initiatives were taken in the a) oil and gas sector b) power/electricity sector c) non-conventional sources of energy.

Additionally, an Energy Centre was established to coordinate, facilitate and strengthen cooperation in the energy sector in the BIMSTEC region by promoting experience sharing, capacity building and best practices.

Current State of Cooperation

At present, Cross-Border Electricity Trade (CBET) is actively taking place within BIMSTEC, notably between Bhutan-India, India-Bangladesh, India-Nepal, and India-Myanmar, accounting for a robust overall trade of nearly 15,681 MU. Within BIMSTEC, Bhutan has the highest percentage of CBET, expressed as a percentage of the total generation. Table 4 presents data on cross-border electricity trade within BIMSTEC, highlighting India's role as a major exporter to neighbouring countries.

Table 4: Cross border power trade in BIMSTEC, in Million Units (MUs)

Countries	2014	2015	2016	2017	2018	2019	2020
Bhutan to India	5,555	5,109	5,557	5,864	5,611	4,657	6,311
India to Bangladesh	1,448	3,272	3,654	4,420	4,809	5,690	6,988
India to Myanmar				3	5	7	9
India to Nepal	840	997	1,470	2,021	2,389	2,799	2,373
Myanmar to China	2,532	1,463	1,239	2,381			
South-East Asia to Thailand	10,193	12,148	18,389	23,321	25,576	22,665	21,779

Source: BIMSTEC Energy Outlook, 2035

India-Bangladesh: Bangladesh imports over 7 percent of its electricity from India. Power trade is managed by the Bangladesh Power Development Board, with imports facilitated through Indian entities such as PTC India and NTPC VidyutVyapar Nigam Ltd. The Bheramara–Baharampur 400 kV HVDC transmission link, initiated in 2013, has expanded its capacity from 500 MW to 1000 MW. Additionally, a 132 kV line connects Tripura in India to Bangladesh, enabling the import of 160 MW of electricity.

India-Bhutan: India and Bhutan have extensive collaboration in hydropower development under intergovernmental agreements. Notable projects include the Chukha, Kurichhu, Tala, and Mandhechu HPPs. India has committed to supporting Bhutan's goal of developing 10,000 MW of hydropower by 2020, with surplus electricity being exported to India.

India-Nepal: Nepal relies on India to meet its electricity demand due to the underdevelopment of its large hydropower potential. Power trade is facilitated through bilateral treaties and agreements, with several cross-border transmission lines, including the Dhalkebar-Muzaffarpur link.

Cross-border electricity trade (CBET) also extends beyond BIMSTEC countries to include non-BIMSTEC nations.

Myanmar-China: Energy cooperation focuses on export-oriented hydropower projects, such as the Shweli 1 HPP and Dapein 1 HPP, with transmission lines exporting power to China.

Thailand-Laos: Thailand imports electricity from Laos through various hydropower projects, including Nam Theun 2, TheunHinboun, and Houay Ho HPPs.

Thailand-Malaysia: The HVDC interconnection facilitates energy exchange between the two countries.

In contrast to power grid interconnections, cross-border gas pipelines are still in the early stages of development, with operational pipelines currently linking Myanmar to Thailand and China. Notably, the Myanmar-China gas and crude oil pipelines, as well as the Motihari-Amlekhgunj petroleum pipeline between India and Nepal, are already operational.

Prospects

BIMSTEC is well-positioned to enhance energy security across South and Southeast Asia by strengthening regional cooperation. The establishment of the BIMSTEC Energy Centre in India is a significant step toward coordinating energy initiatives among member states. With key policies such as the BIMSTEC Energy Master Plan and frameworks for electricity transmission and trade nearing completion, the region is moving closer to a connected and resilient energy network. Cross-border electricity trade (CBET) within BIMSTEC is already thriving, particularly between Bhutan-India, India-Bangladesh, and India-Nepal, with plans to expand these connections further. New transmission lines, including a potential undersea HVDC cable between India and Sri Lanka, are being developed to enhance regional integration. Furthermore, ongoing discussions about expanding oil and gas cooperation through projects like the India-Bangladesh Friendship Pipeline and potential gas pipelines involving Myanmar underscore the growing spirit of collaboration within the region.

With a focus on hydropower, particularly in Bhutan and Nepal, and expanding grid interconnections, BIMSTEC is paving the way toward a more integrated and sustainable energy future. The region's ongoing efforts are poised to attract further foreign investment, stimulate economic growth, and contribute to environmental sustainability. Key ongoing and proposed energy infrastructure projects aimed at enhancing regional cooperation in South Asia and South-east Asia include:

India-Bhutan: Plans include establishing the Punatsangchu HEP–Alipurduar 400 kV double-circuit line and additional transmission lines to improve connectivity.

India-Nepal: Efforts are focused on upgrading existing transmission lines, introducing new ones, and developing evacuation lines for export-oriented hydropower projects.

India-Bangladesh: Proposed high-capacity transmission lines aim to strengthen energy links between the two countries.

India-Sri Lanka: Plans are underway for an undersea HVDC cable or overhead transmission line to enhance energy integration.

Thailand-Myanmar: While previous electricity purchase agreements have faced challenges, future discussions are ongoing.

Potential Connections: Prospective power links are being considered between Bangladesh and Myanmar, Thailand and Laos, and Myanmar and China.

Oil and Gas Collaboration: The India-Bangladesh Friendship Pipeline Project focuses on diesel transportation, while discussions are underway for a gas pipeline linking Bangladesh, Myanmar, and India's northeastern states, reflecting a broader commitment to energy cooperation.

These initiatives highlight the collaborative vision within the BIMSTEC region, focused on harnessing shared energy resources to promote sustainable development. Looking ahead, governments and utilities within BIMSTEC have identified key projects for future cross-border electricity trade (CBET), demonstrating a strong commitment to continued regional cooperation. Notable initiatives include India's support for Bhutan in developing at least 10,000 MW of hydropower, potential power exports from Bhutan to Bangladesh, and the planned import of electricity by India and Bangladesh from various projects in Nepal. These collaborative efforts exemplify the region's shared commitment to a more interconnected and sustainable energy future, fostering economic growth and promoting environmental sustainability.

Challenges

BIMSTEC identifies trade as a priority area, but the seven-member grouping has yet to make substantial progress in boosting intra-regional trade between South Asia and Southeast Asia. Currently, intra-regional trade within BIMSTEC accounts for only around 7 percent of total trade. While BIMSTEC aims to promote energy security through power trade and the development of clean energy resources such as hydropower and renewable energy, several significant challenges must be overcome. These challenges can be categorized into immediate, medium-term, and long-term issues, each requiring targeted strategies and coordinated efforts.

Infrastructure Deficits (Immediate and Medium-Term): There are significant disparities in energy access and infrastructure across BIMSTEC countries, particularly in Myanmar and Nepal. These deficits limit the capacity for regional energy trade and cooperation. Myanmar's lower electricity coverage and underdeveloped grid infrastructure present major obstacles to its integration into the regional energy market.

Regulatory Barriers (Immediate): Diverse regulatory frameworks, standards, and energy mixes across BIMSTEC member states create significant challenges for seamless energy cooperation and integration. These barriers complicate cross-border electricity trade and delay the implementation of joint projects. Differences in tariff structures and electricity trading policies, particularly between India and Bangladesh, have previously hindered the expansion of cross-border energy trade.

Political Instability and Commitment (Immediate and Medium-Term): Varying levels of political stability and differing national priorities among BIMSTEC member states can hinder consistent progress in energy cooperation. Political changes or instability in one country can disrupt ongoing projects or delay new initiatives. Political instability in Myanmar, for instance, has affected its ability to engage consistently in regional energy projects, slowing the overall pace of BIMSTEC's energy integration efforts.

Energy Access and Sustainability Disparities (Medium and Long-Term): Ensuring equitable energy access and transitioning to cleaner energy sources remain major challenges, especially in countries like Bangladesh and Myanmar, where reliance on traditional biomass and limited access to clean cooking fuels persist. Despite progress in electrification, Bangladesh continues to struggle with low access to clean cooking fuels, affecting public health and environmental sustainability.

Technological and Capacity Gaps (Medium and Long-Term): The varying levels of technological advancement and capacity in energy management across BIMSTEC member states pose challenges for implementing modern, efficient energy systems. Nepal's underutilized hydropower potential is partly due to a lack of technical expertise and modern infrastructure to fully harness and export this resource.

Funding and Investment Shortfalls (Immediate and Medium-Term): Securing adequate funding for large-scale energy projects remains a challenge, particularly in countries with weaker economies or higher political risk. This can delay the development of critical infrastructure needed for regional energy cooperation. Delays in securing investment for the BIMSTEC Grid Interconnection Master Plan, for example, have hindered the realization of a connected regional grid.

Recommendations

Operationalize the BIMSTEC Energy Centre (BEC): Expedite the establishment and functioning of the BIMSTEC Energy Centre in India. Finalize the operational structure, funding mechanisms, and reporting protocols. This will provide a centralized platform for coordinating energy cooperation efforts, facilitating knowledge sharing, and driving policy harmonization across the region.

Finalize and Implement the BIMSTEC Energy Master Plan: Fast-track the finalization of the BIMSTEC Energy Master Plan

and ensure its adoption by all member states. The master plan will serve as a strategic roadmap for regional energy cooperation, identifying key projects, timelines, and investment needs.

Harmonize Regulatory Frameworks for Cross-Border Energy Trade Action:

Begin the process of harmonizing regulations related to electricity transmission, tariffs, and trade among member states. This can start with bilateral agreements between countries already engaged in cross-border electricity trade. A harmonized regulatory framework will reduce barriers to cross-border energy trade, making it easier and more efficient for member states to exchange electricity.

Upgrade Existing Transmission Infrastructure:

Identify and prioritize upgrades to existing cross-border transmission lines, such as the Dhalkebar-Muzaffarpur link between India and Nepal, to increase capacity and reliability. Improved infrastructure will enhance the efficiency and capacity of energy trade, helping to stabilize supply and reduce shortages.

Strengthen Capacity Building and Knowledge Sharing:

Organize workshops, training programs, and exchange visits among BIMSTEC member states to share best practices in energy management, grid integration, and renewable energy deployment. Building technical and managerial capacity across the region will improve the efficiency and effectiveness of energy initiatives, supporting long-term sustainability.

Secure Funding for Key Energy Projects:

Engage with development partners, such as the Asian Development Bank (ADB) and other international financial institutions, to secure funding for priority energy infrastructure projects. Access to funding will accelerate the development of critical energy projects, such as new transmission lines and renewable energy installations, boosting regional energy security.

Strengthen Political and Diplomatic Commitment:

Convene a high-level meeting of BIMSTEC energy ministers to reaffirm political commitment to regional energy cooperation and to endorse the immediate actions outlined in the policy brief. Strong political support is essential for driving forward the energy cooperation agenda, ensuring that the necessary resources and attention are dedicated to these initiatives.

Establish a Monitoring and Evaluation Mechanism:

Set up a monitoring and evaluation framework within the BIMSTEC Energy Centre to track the progress of energy cooperation initiatives and ensure accountability. Regular monitoring will help identify challenges early, allowing for timely interventions and adjustments to keep projects on track.

These immediate actions can provide a strong foundation for deeper and more effective energy cooperation within BIMSTEC,

helping to address the region's energy challenges while promoting sustainable development.

Conclusion

BIMSTEC energy cooperation holds immense potential for driving regional development and ensuring energy security across South and Southeast Asia. The region is rich in diverse energy resources, including abundant hydropower potential in Bhutan and Nepal, vast coal reserves in India, and growing renewable energy capacities throughout the member states. By leveraging each country's strengths, such as Bhutan's hydropower expertise, India's renewable energy advancements, and Bangladesh's energy access improvements, BIMSTEC can foster a dynamic, interconnected energy network.

Collaborative efforts within the region can lead to more sustainable energy solutions, reduce energy poverty, and stimulate economic growth by facilitating cross-border electricity trade, joint infrastructure projects, and investments in clean energy technologies. Through these initiatives, BIMSTEC countries can improve energy access, promote energy efficiency, and reduce reliance on fossil fuels, contributing to regional climate goals.

However, to unlock the full potential of energy cooperation, continued commitment and strategic investments are essential. Overcoming challenges such as infrastructure deficits, regulatory barriers, political instability, and technological gaps will require coordinated efforts among member states. This will also involve strengthening policy frameworks, enhancing cross-border energy connectivity, and securing funding for large-scale energy projects.

With sustained collaboration, BIMSTEC can create a more resilient and integrated energy market that benefits all member states, ensuring long-term energy security, boosting economic development, and improving the quality of life for millions of people in the region. The realization of these goals will significantly contribute to the region's social and economic progress, driving both regional stability and global competitiveness.

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