

India-Bangladesh Clean Energy Alliance: Advancing Sustainability and Regional Development

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India and Bangladesh have developed a strategic alliance centered on renewable energy cooperation to address the dual goals of environmental sustainability and regional energy security. With both countries experiencing rising energy demands and the pressing impacts of climate change, collaboration in the clean energy sector has emerged as a vital component of their sustainable development agendas. This paper investigates the progression of renewable energy partnerships between India and Bangladesh, emphasizing major initiatives, supportive policy frameworks, and technological innovations. Key areas of cooperation include cross-border power exchange, joint ventures in solar and wind energy projects, and collaborative efforts in sustainable energy research and practices. India's prominent role in global renewable energy development, combined with Bangladesh's growing dedication to clean energy adoption, has led to significant bilateral agreements aimed at reducing reliance on fossil fuels and improving energy efficiency. The study further explores how policy tools, financial incentives, and diplomatic initiatives have helped deepen the renewable energy relationship between the two neighboring countries. This study explores the socio-economic and environmental advantages stemming from renewable energy cooperation between India and Bangladesh, such as lower carbon emissions, enhanced economic development, and improved energy access. It also addresses the key obstacles that hinder progress, including inadequate infrastructure, financial limitations, and regulatory challenges. By advancing collaborative efforts, both countries have the potential to accelerate their clean energy transition and support broader regional and global sustainability objectives. The research emphasizes the critical role of harmonized policy frameworks, increased investment in green energy infrastructure, and the adoption of innovative technologies in building a secure and sustainable energy future. The insights presented in this paper demonstrate how cross-border collaboration in renewable energy can provide a replicable model for other developing regions aiming to balance environmental goals with economic growth.

Keywords: India-Bangladesh, Clean Energy, Renewable Energy, Environmental Sustainability, Cross-Border Cooperation, Energy Security, Climate Change, Economic Progress.

Introduction

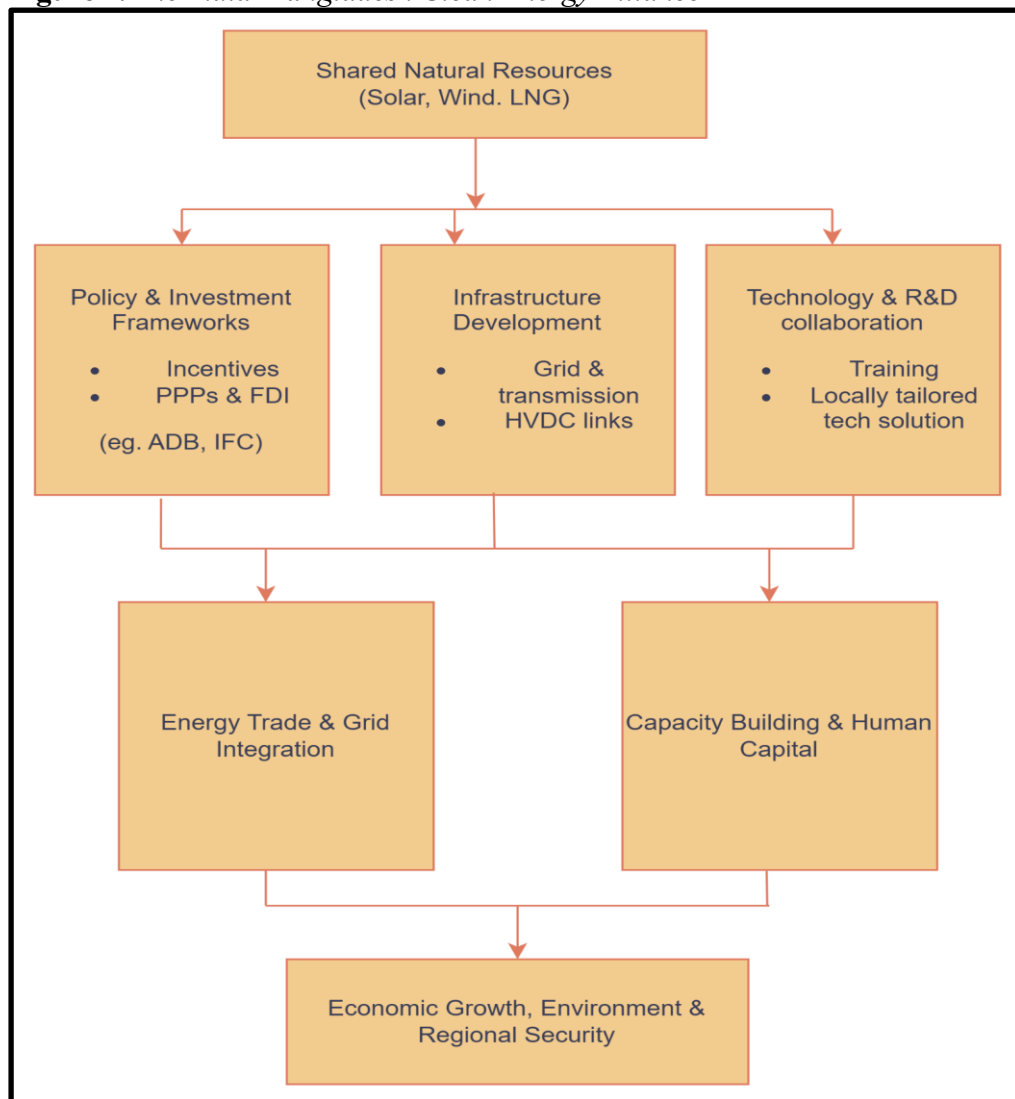
India and Bangladesh, two closely linked South Asian neighbors with deep-rooted historical, cultural, and economic connections, hold significant potential for

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advancing joint efforts in renewable energy. Both countries grapple with comparable issues ranging from ensuring energy security to addressing environmental concerns and supporting economic growth. In this context, cross-border collaboration in the renewable energy sector emerges as a strategic necessity. As the global community intensifies efforts to lower carbon emissions and embrace cleaner energy alternatives, a robust partnership between India and Bangladesh in this domain can yield shared benefits, promoting a resilient and sustainable energy future for both nations (Amin et al., 2021).

Bangladesh has experienced significant economic growth in recent decades, which has led to a sharp rise in energy consumption. However, the country's heavy dependence on fossil fuels, especially natural gas, has raised serious concerns regarding the sustainability and security of its energy supply in the long term. In parallel, India has set ambitious goals for renewable energy expansion and is making considerable strides in developing solar, wind, and hydroelectric power. A collaborative approach that combines India's technological capabilities with Bangladesh's increasing energy demand could pave the way for a strategic renewable energy alliance. Such cooperation would not only reduce fossil fuel reliance but also enhance regional energy security and foster long-term stability (Aneek Chatterjee, 2010).

A major factor promoting renewable energy collaboration between India and Bangladesh is their shared geographical advantage. Both countries are endowed with rich natural resources. Bangladesh's coastal regions offer strong solar and wind potential, while India's northeastern states possess significant hydropower capacity. These complementary resources create an ideal foundation for developing a connected and efficient regional energy network. Collaborative efforts, such as establishing cross-border transmission lines and implementing joint renewable energy projects, can significantly improve energy accessibility and reliability, delivering tangible benefits to millions across the region.

Figure 1. *The India–Bangladesh Clean Energy Alliance*

Source: (Energy Cooperation in the BBIN Region - Ccier, 2019)

The environmental advantages of enhanced renewable energy cooperation between India and Bangladesh are both significant and urgent. As climate-vulnerable nations, both countries face mounting risks from rising sea levels, unpredictable weather events, and worsening air quality all of which pose serious threats to socio-economic resilience. Expanding investment in clean energy infrastructure, including solar parks, wind energy systems, and hydropower facilities, can play a pivotal role in reducing carbon emissions and advancing sustainable development goals. In addition to environmental gains, renewable energy collaboration offers economic opportunities, such as stimulating industrial activity and generating employment. With its well-established renewable energy sector, India is well-positioned to assist Bangladesh through technology sharing, workforce training, and joint initiatives (Delli Paoli & Addeo, 2019). Creating a conducive environment for such collaboration will require supportive policies such as regulatory reforms, incentives for private sector involvement, and mechanisms that facilitate cross-border investments. However,

several obstacles remain, including differing regulatory standards, limited financial resources, underdeveloped infrastructure, and complex geopolitical dynamics. Addressing these challenges will require robust policy coordination, transparent bilateral agreements, and sustained diplomatic dialogue (Barry, 2014).

Renewable energy collaboration between India and Bangladesh offers a promising route to achieving both environmental sustainability and economic progress. By leveraging their individual strengths and shared resources, the two nations have the potential to drive a regional shift toward clean energy, serving as a model for cross-border cooperation in the global South. Realizing this vision will require robust policy alignment, increased technological cooperation, and the active involvement of both public and private sectors. Together, these efforts can help build a more sustainable, energy-secure, and climate-resilient future for South Asia.

Review of Literature

A combination of an emphasis on important topics like India-Bangladesh clean energy alliance, this study investigates the promotion of sustainability and regional development. It assesses critically the notion that attaining these objectives can spur the uptake of renewable energy. Furthermore, the study reviews adaptation and mitigation strategies and looks at the clean energy alliance (Agbakwuru et al., 2024).

The book highlights Bangladesh's emphasis on energy security while offering a theoretical understanding of clean energy and its relationship to sustainable development goals. The country's deconcentration of renewable energy's contribution reserves will be adequate only for a decade, and growing power consumption would need to be addressed through sustainability and regional development (Narayan & Datta, 2020).

Objectives of the Study

The researchers have identified two objectives, including –

- a) To examine how clean energy alliances promote sustainable development in India-Bangladesh.
- b) To explore how clean energy will ensure a regional development in India-Bangladesh.

Research Questions

The researchers have identified two research questions, which are mentioned below

- a) How do clean energy alliances promote sustainable development in India-Bangladesh?
- b) Does clean energy ensure a regional development in India-Bangladesh?

Methods of Study

The researchers have followed the qualitative method, and in a few cases researchers followed exploratory, case study, and content analysis as part of the qualitative method for the study. Simultaneously, the researchers have followed books, book chapters, journals, periodical articles, websites, etc., as secondary sources for the study.

Theoretical Framework

The India-Bangladesh Clean Energy Alliance could be explained using theories of regional integration, sustainable development, and energy transition. Regional integration focuses on the dependency between neighboring nations in responding to common challenges, with cooperation on clean energy as a strategic measure for 0 of economic growth, environmental conservation, and social justice, thus positioning renewable energy cooperation as the key to attaining the Sustainable Development Goals (SDGs). Energy transition models emphasize the transition away from fossil fuel dependence towards renewable energy systems, with a focus on technological innovation, policy coordination, and investment flows. Collectively, these views affirm that a bilateral clean energy partnership not only strengthens energy security but also boosts regional resilience, minimizes carbon footprints, and facilitates inclusive growth. Therefore, the partnership serves as a development and geopolitical instrument for championing sustainability and regional development.

Enhancing India-Bangladesh Partnership for Accelerated Renewable Energy Growth

India and Bangladesh have maintained a strong tradition of collaboration across multiple domains, such as trade, infrastructure, and energy. In recent times, renewable energy has gained prominence as a key focus of their bilateral engagement. Both countries acknowledge that transitioning to sustainable energy sources is essential for promoting economic advancement, protecting the environment, and ensuring long-term energy security. Expanding joint efforts in the renewable energy sector holds the potential to significantly advance regional development and contribute to a more sustainable future for South Asia.

India-Bangladesh Agreements and Energy Policy Frameworks

Establishing a robust policy framework is crucial for ensuring sustained cooperation in the renewable energy sector. India and Bangladesh have made notable advancements through bilateral agreements that encourage clean energy investment and cross-border electricity trade. The Energy Cooperation Memorandum of Understanding (MoU) has been a significant step in enabling the exchange of electricity generated from renewable sources such as solar and wind. To further

strengthen this collaboration, future agreements should include more specific provisions on renewable energy integration, financial incentives, and joint innovation initiatives. Moreover, aligning policies related to tariffs, grid infrastructure, and regulatory processes will be essential for smooth and efficient energy sharing. A unified and transparent policy approach will not only enhance mutual benefits but also attract both domestic and international investment, driving the growth of large-scale renewable energy projects in the region.

Infrastructure Planning and Renewable Energy Investment

A major obstacle to the expansion of renewable energy is the requirement for significant investment in infrastructure, such as solar farms, wind energy facilities, and transmission systems. India's proven capabilities in renewable technology and experience in managing large-scale energy projects position it as a valuable partner in advancing Bangladesh's clean energy ambitions. Collaborative models like joint ventures and public-private partnerships (PPPs) can serve as effective channels for attracting investment into utility-scale renewable initiatives. Establishing cross-border grid connectivity specifically designed for transmitting renewable energy could greatly enhance regional energy security. The current India-Bangladesh power grid, which facilitates the exchange of conventional electricity, presents an opportunity for modernization to support clean energy flows. Upgrading transmission infrastructure and integrating smart grid technologies will be essential for improving operational efficiency and ensuring reliable, equitable energy distribution across both countries.

Advancing Technology and Building Local Expertise

India's progress in solar and wind energy technologies offers a valuable opportunity for Bangladesh to accelerate its transition to renewable energy by tapping into India's expertise. Collaborative efforts in technology transfer such as shared knowledge, capacity-building workshops, and joint research projects can significantly enhance Bangladesh's ability to develop, operate, and sustain renewable energy systems. Workforce empowerment through targeted training in areas like solar panel installation, wind turbine operation, and energy storage management will further support the growth of the sector in both countries. Establishing dedicated training centers and research institutes focused on renewable energy can act as regional hubs for innovation and technical advancement. Additionally, promoting decentralized energy solutions such as solar microgrids and rooftop solar systems can ensure reliable and sustainable electricity access in off-grid and underserved regions. India's successful experience in implementing decentralized renewable energy initiatives offers a practical blueprint for Bangladesh to adopt and scale up similar models tailored to its local needs.

Green and Economic Gains

Enhancing renewable energy collaboration between India and Bangladesh supports both countries' national sustainability objectives and aligns with broader global climate goals. Transitioning to cleaner energy sources can play a crucial role in cutting greenhouse gas emissions, improving air quality, and addressing the long-term impacts of climate change. For Bangladesh, which faces heightened vulnerability to climate-related risks, accelerating the adoption of renewable energy can greatly enhance its resilience to environmental shocks. On the economic front, scaling up renewable energy trade has the potential to generate employment, boost industrial development, and make energy more affordable. Additionally, reducing reliance on imported fossil fuels will strengthen economic stability and help narrow trade imbalances linked to energy expenditures (Arndal Woods & Már Kristófersson, 2015).

Prospective Developments and Strategic Roadmap

To maintain steady progress in renewable energy collaboration, India and Bangladesh must outline a comprehensive roadmap featuring well-defined milestones and actionable implementation plans. Creating a joint task force dedicated to renewable energy could play a vital role in coordinating projects, tracking progress, and addressing potential obstacles in a timely manner. Expanding collaboration to include other South Asian countries and engaging with multilateral organizations can further accelerate clean energy development. Active involvement in regional energy platforms and cooperative agreements can unlock additional resources, such as funding opportunities, technical expertise, and support for aligning policy frameworks across the region.

Deepening renewable energy cooperation between India and Bangladesh represents a strategic move toward promoting environmental sustainability and shared economic growth. Through coordinated policy efforts, increased investment, technological collaboration, and a focus on ecological benefits, both countries have the opportunity to lead the transition to a cleaner energy future. This partnership not only supports national development goals but also strengthens regional energy security and encourages greater economic integration across South Asia.

Enhancing Sustainable Progress through Cross-border Renewable Energy Initiatives

Collaborative energy initiatives between India and Bangladesh offer a valuable pathway for promoting sustainable development across the region. As both nations work toward cleaner and more efficient energy systems, renewable energy cooperation stands to deliver substantial advantages in terms of economic development, environmental protection, and energy security. By engaging in joint investments, exchanging technological expertise, and aligning policy frameworks, the two countries can build a strong foundation for cross-border renewable energy projects. Such a partnership will not only support long-term sustainability goals but also

contribute to greater regional stability and integration (Cross-Border Electricity Trade: A Decade of Progress).

Strengthening Energy Stability and Resilience

Energy security is a pressing issue for both India and Bangladesh, as growing demand highlights the need for dependable and sustainable energy alternatives. Strengthening their collaboration in renewable energy can play a vital role in decreasing reliance on fossil fuels and addressing potential disruptions in energy supply chains. India's established capabilities in solar and wind energy offer an opportunity to assist Bangladesh in expanding its clean energy infrastructure through technical cooperation and investment. Incorporating renewable sources into a shared regional grid will help both countries achieve a more reliable and resilient energy system, minimizing power outages and contributing to long-term economic stability.

Catalyzing Economic Progress and Investment Opportunities

Collaborative ventures in renewable energy have the potential to spur economic expansion by drawing investment from both the public and private spheres. India's proficiency in solar, wind, and hydropower technologies positions it to help Bangladesh scale up its clean-energy capacity. Joint projects and public-private partnerships can generate jobs, strengthen local industries, and boost revenue for both countries. In addition, an integrated regional energy market can reduce electricity prices and increase competitiveness, delivering tangible benefits to businesses and consumers alike.

Technological Exchange and Skills Development

An essential component of cross-border energy collaboration is the exchange of technology and the development of local expertise. India's progress in areas such as solar photovoltaic systems, wind energy efficiency, and energy storage technologies presents valuable opportunities for supporting Bangladesh's renewable energy expansion. Joint efforts including technical training, collaborative research, and the sharing of expertise can help build a skilled workforce equipped to lead the clean energy transition. Moreover, promoting innovation through shared research and development (R&D) initiatives can accelerate the adoption of advanced green technologies, contributing to the region's broader sustainable energy goals.

Improving Regulatory Policies and Strategic Frameworks

To ensure the success of cross-border energy collaboration, aligning the policy and regulatory frameworks of India and Bangladesh is crucial. Harmonized approaches to grid connectivity, tariff design, and energy trade agreements can foster a supportive environment for the development of large-scale renewable energy projects. Creating joint regulatory bodies or committees to manage cross-

border electricity exchange can enhance coordination, streamline approvals, and effectively tackle issues such as grid reliability, transmission efficiency, and pricing strategies. A unified regulatory structure will not only enable smooth energy transfers between the two nations but also boost investor confidence and support sustained growth in the renewable energy sector.

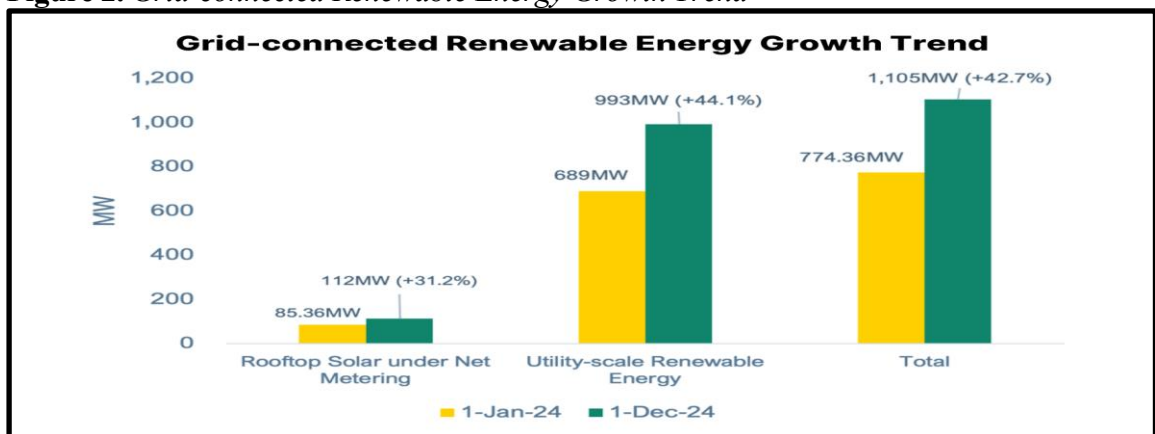
Environmental Protection and Climate Progress

Shifting to renewable energy through cross-border collaboration can play a vital role in lowering greenhouse gas (GHG) emissions and addressing the challenges of climate change. Transitioning from fossil fuel-based power generation to clean energy alternatives allows both India and Bangladesh to advance their national climate goals and uphold their commitments under the Paris Agreement. Strengthened cooperation in this area can enhance air quality, reduce overall carbon emissions, and promote the sustainable use of natural resources. Furthermore, incorporating climate adaptation and resilience measures into energy infrastructure planning will be crucial in mitigating the impacts of rising temperatures, extreme weather, and other climate-related risks (Byravan et al., 2017).

Advancing Regional Electricity Grid Linkages

Establishing a unified regional energy grid can significantly improve operational efficiency and maximize the use of available resources. By combining India's robust renewable energy generation with Bangladesh's increasing energy needs, an interconnected grid can enable the seamless transfer of electricity during periods of high demand or excess supply. Upgrading transmission systems and incorporating smart grid technologies will further support efficient cross-border energy flow, ensuring optimal distribution of clean energy. Expanding such grid connectivity not only strengthens bilateral cooperation but also lays the groundwork for broader regional energy partnerships with countries like Nepal and Bhutan, fostering greater integration across South Asia's energy landscape.

Figure 2. Grid-connected Renewable Energy Growth Trend



Source: (Sharma, 2024)

Energy cooperation between India and Bangladesh plays a crucial role in advancing sustainable development and supporting the shift toward cleaner energy systems. Through joint efforts in renewable energy, both countries have the opportunity to strengthen energy security, boost economic progress, encourage technology exchange, and address the challenges of climate change. Achieving these goals will require greater policy coordination, enhanced regional grid integration, and increased investment in collaborative clean energy initiatives. As their partnership deepens, India and Bangladesh are positioned to lead by example, demonstrating how cross-border energy collaboration can drive sustainability and regional development across South Asia and beyond.

Advancing Green Energy for Prosperity and Environmental Protection

India and Bangladesh, as close neighbors with aligned economic and environmental priorities, are well-positioned to collaborate in harnessing renewable energy for shared growth and sustainability. Emphasizing joint efforts in the development of clean energy can enable both nations to pursue economic progress while safeguarding ecological balance. Such cooperation not only supports global climate commitments but also enhances regional energy resilience and long-term security.

The Economic Impact of Sustainable Energy Solutions

Renewable energy, especially solar and wind, holds substantial potential to stimulate economic growth in both India and Bangladesh. The region's rich natural resources provide a strong foundation for clean energy investments, which can generate employment, attract foreign capital, and boost industrial efficiency. Shifting away from fossil fuels toward renewables allows both countries to reduce reliance on energy imports, achieve greater price stability, and limit exposure to global fuel market fluctuations. As Bangladesh faces rising energy demand due to rapid urbanization and industrial growth, it stands to benefit significantly from India's experience and technological capabilities in the renewable sector. Joint ventures in solar and wind energy can help lower electricity costs, expand rural electrification, and foster the growth of small and medium-sized enterprises (SMEs). In return, India can utilize Bangladesh's strategic location to enhance cross-border energy exchange, ensuring more efficient and balanced use of renewable resources across the region.

Sustainable Environmental Gains Through Renewable Partnerships

Shifting to renewable energy not only supports economic resilience but also plays a crucial role in protecting the environment. By decreasing dependence on coal and other fossil fuels, both India and Bangladesh can significantly cut carbon emissions, enhance air quality, and reduce environmental harm. The adoption of solar and wind energy lessens the need for deforestation and minimizes the ecological damage often linked to conventional power generation. Furthermore, renewable energy systems are more efficient in terms of water usage. Unlike thermal power plants, which require substantial water for cooling, solar and wind technologies demand very little, aiding

in the preservation of vital water resources. This is particularly important in regions already facing water scarcity. Through joint efforts in renewable energy, India and Bangladesh can lead by example in promoting sustainable environmental practices across South Asia (Dahal et al., 2018).

Improving Policy Alignment and Investment Mechanisms

To fully realize the potential of renewable energy collaboration, India and Bangladesh must enhance their policy frameworks and investment strategies. Promoting greater involvement from the private sector, minimizing administrative barriers, and creating a supportive regulatory environment can help fast-track the adoption of clean energy technologies. Establishing joint ventures, offering trade incentives, and enacting investor-friendly policies will strengthen bilateral cooperation in the renewable sector. Additionally, international financial institutions and development partners have a key role to play in supporting large-scale renewable initiatives. By working together, both countries can access funding from global entities such as the World Bank, the Asian Development Bank, and the International Solar Alliance. These investments will not only boost infrastructure development but also support capacity-building efforts, including technical training and knowledge transfer, essential for advancing renewable energy expertise.

Innovative Energy Solutions and Smart Grid Development

Technological advancement is a critical component in effectively utilizing renewable energy resources. For India and Bangladesh, investing in research and development (R&D) is essential to improve energy storage capabilities, enhance grid reliability, and build intelligent distribution systems. The adoption of cutting-edge technologies such as artificial intelligence (AI) and blockchain can boost energy efficiency, streamline resource management, and facilitate secure and efficient cross-border energy exchanges. One of the main challenges in renewable energy deployment is the intermittent nature of solar and wind power. To address this, both countries must focus on strengthening their grid infrastructure to accommodate variable energy inputs. Establishing interconnected national grids and cross-border electricity-sharing mechanisms will help maintain a consistent energy supply, thereby reducing reliance on traditional fossil fuel-based sources.

Collaborating on renewable energy development offers India and Bangladesh a powerful avenue for advancing both economic growth and environmental sustainability. By combining their natural resources, technical capabilities, and investment potential, the two nations can work toward long-term energy security while actively addressing the challenges of climate change. Key to this progress will be the reinforcement of supportive policies, the promotion of technological innovation, and the integration of modern, efficient power grids. With a coordinated approach, India and Bangladesh have the opportunity to position renewable energy at the heart of their development agendas laying the foundation for a cleaner, more resilient, and sustainable regional future.

Aligning Policies and Investments to Foster Green Energy Alliances

India and Bangladesh have long-standing historical and economic ties that have expanded into strategic cooperation across multiple sectors, including energy. As both countries pursue a shift toward cleaner and more sustainable energy sources, the development of robust policy frameworks and targeted investment strategies becomes critical to advancing green energy collaboration. This section examines the essential policy instruments, regulatory structures, and financial tools that can support and accelerate joint efforts in renewable energy between the two nations.

Strategic Policy Foundations for Green Energy Partnerships

1. Bilateral Cooperation and Policy Synchronization

To ensure successful collaboration in the renewable energy sector, it is essential for India and Bangladesh to align their respective energy policies. Establishing bilateral agreements that define common goals such as enhancing energy security, integrating power grids, and facilitating technology exchange can create a solid foundation for joint efforts. Ongoing policy dialogues and the formation of dedicated working groups can further support the alignment of regulations, including those related to tariffs, power purchase arrangements, and grid compatibility standards.

2. Regulatory Frameworks for Cross-Border Energy Trade

A significant milestone in India-Bangladesh energy collaboration is the development of a cross-border electricity trade framework. India's launch of the South Asian Regional Energy Cooperation (SAREC) has created a regional platform that facilitates smooth electricity exchange among neighboring countries. Bangladesh, already engaged in electricity imports from India, stands to gain even more from policies that enable long-term power purchase agreements (PPAs) focused on renewable energy. Such frameworks can enhance energy reliability and support the transition to cleaner power sources.

3. Incentive Structures for Renewable Energy Development

Both India and Bangladesh should implement supportive measures such as tax incentives, feed-in tariffs, and subsidies for solar and wind energy to promote cross-border renewable energy initiatives. Establishing policies that actively encourage private sector involvement will help attract greater investment and accelerate the growth of the clean energy sector.

Green Energy Investment Models for Bilateral Collaboration

1. Public-Private Partnerships (PPPs)

An effective investment approach should prioritize strong collaboration between the public and private sectors. Governments can stimulate investment by providing attractive incentives, including tax breaks, access to land, and streamlined regulatory procedures. Promoting private sector involvement will enhance the pace

of infrastructure development and foster innovation in renewable energy technologies, ultimately accelerating the clean energy transition.

2. Foreign Direct Investment (FDI) and Green Financing

Foreign Direct Investment (FDI) is vital for financing major renewable energy initiatives. India's success in drawing sustainable energy investments offers valuable insights for Bangladesh's own green transition. Support from international financial organizations such as the World Bank, the Asian Development Bank (ADB), and the International Finance Corporation (IFC) can be instrumental through grants and concessional loans. Furthermore, the issuance of green bonds can attract funding from investors focused on environmentally responsible projects. To maximize these opportunities, both nations should establish transparent investment frameworks and implement measures to mitigate financial risks.

3. Technology Transfer and Joint Ventures

India's progress in solar and wind energy technologies positions it well to assist Bangladesh through structured technology transfer partnerships. Establishing joint research and development (R&D) centers can facilitate the creation of affordable, locally adapted renewable energy solutions. Collaborative ventures between companies from both countries will not only promote knowledge exchange but also enhance technical expertise and capacity building in the renewable energy sector.

Developing Energy Infrastructure to Foster Clean Energy Alliances

1. Establishing Regional Grid Connectivity

Establishing a unified power grid between India and Bangladesh is essential for facilitating efficient trade in renewable energy. Upgrading transmission infrastructure and adopting smart grid technologies will enable smooth and reliable electricity flow, thereby reducing reliance on conventional energy sources. The India-Bangladesh Friendship Power Transmission Line represents a significant milestone in this direction, and expanding such cross-border connectivity will further strengthen the integration and dependability of renewable energy systems.

2. Decentralized Renewable Energy Projects

In addition to large-scale infrastructure, decentralized energy solutions like solar mini-grids and rooftop solar installations can be collaboratively implemented in rural regions. These initiatives can expand energy access to remote communities while fostering local energy self-sufficiency.

3. Enhancing Technical Expertise and Workforce Readiness

Investing in human capital is essential to support long-term green energy collaboration. Collaborative training efforts, capacity-building programs, and knowledge exchange platforms can cultivate a skilled workforce equipped to manage, maintain, and advance renewable energy technologies.

Developing robust policy frameworks and targeted investment strategies is essential to advance green energy collaboration between India and Bangladesh. Harmonizing regulatory approaches, encouraging clean energy investments, and expanding cross-border infrastructure will enable both countries to meet their sustainability objectives while promoting economic development. This partnership strengthens regional energy security and supports the broader goal of creating an environmentally responsible South Asia. Ongoing diplomatic engagement, sustained financial support, and shared technological progress will be critical to unlocking the full potential of their renewable energy cooperation.

Conclusion

India and Bangladesh's collaboration in the renewable energy sector offers a significant opportunity to promote economic development, environmental stewardship, and regional energy resilience. By capitalizing on their geographic proximity, shared energy resources, and aligned strategic goals, both countries can establish a cooperative framework that supports the expansion of clean energy generation and use. This partnership can aid in achieving national renewable energy objectives while contributing to international efforts to reduce carbon emissions and curb fossil fuel reliance. To ensure long-term success, a well-defined policy structure backed by targeted investments is essential. Aligning regulatory policies, facilitating private sector engagement, and introducing mechanisms for cross-border energy trade will support the seamless integration of renewables into a regional power grid. Encouraging public-private collaborations and leveraging financial support from climate funds and development institutions can further advance this energy transition. Technological progress and modern infrastructure are also key to improving energy efficiency and maintaining grid reliability. Investment in solar and wind projects, energy storage systems, and smart grid solutions will enhance transmission capacity and reduce energy loss. Collaborative research and the exchange of expertise between institutions in both nations can foster innovation in green energy technologies, ultimately improving energy accessibility and affordability for communities across the region (Kauppi & Viotti, 2019).

In addition to its economic and technological advantages, renewable energy collaboration between India and Bangladesh carries important geopolitical and social dimensions. Closer cooperation in the energy sector can enhance mutual trust, contribute to regional peace, and support socio-economic development particularly by generating employment and improving livelihoods in underserved rural communities. Transitioning to cleaner energy sources also promises significant public health benefits, such as improved air quality and reduced environmental degradation, reinforcing long-term ecological resilience. As global energy needs escalate, joint efforts in renewable energy development will help position both nations as leaders in the sustainable energy transition. Aligning policy objectives, streamlining investment processes, and fostering cross-border initiatives are essential steps toward realizing this vision. By doing so, India and Bangladesh can serve as a regional model for cooperative climate action and inclusive development. Strengthening this energy partnership is

not only a pragmatic strategy but also a critical move toward securing a stable, sustainable, and energy-efficient future for South Asia.

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