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India's Green Energy Diplomacy in South Asia: Prospects and Challenges for Regional Cooperation

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Abstract
The global transition toward renewable energy has emerged as a central component of contemporary strategies for sustainable development and climate change mitigation. Growing concerns regarding environmental degradation, rising energy demand, and dependence on fossil fuels have encouraged countries across the world to adopt renewable energy technologies such as solar, wind, and hydropower. In this context, India has increasingly positioned itself as a significant actor in promoting green energy development both domestically and regionally. Over the past two decades, India has implemented several policy initiatives aimed at expanding renewable energy capacity and strengthening energy security. Major policy frameworks such as the National Action Plan on Climate Change (2008), the National Solar Mission (2010), and the National Green Hydrogen Mission have significantly accelerated India's renewable energy transition. Beyond domestic initiatives, India has also used renewable energy cooperation as an important instrument of regional diplomacy in South Asia. Through cross-border electricity trade, hydropower partnerships, and renewable energy projects with neighbouring countries such as Bangladesh, Bhutan, Nepal, and Sri Lanka, India has sought to strengthen regional energy connectivity and promote sustainable development. South Asia remains one of the fastest-growing energy markets in the world, yet many countries in the region continue to face challenges related to electricity shortages, infrastructure limitations, and dependence on imported fossil fuels. This study examines the evolution of India's green energy initiatives and their implications for regional cooperation in South Asia between 2005 and 2026. Using a qualitative and analytical research approach based on secondary data sources. The study argues that India's green energy diplomacy has significant potential to enhance regional energy security and economic integration.

Keywords
Green Energy Diplomacy, Renewable Energy, India, South Asia, Regional Cooperation, Energy Security, Cross-border Electricity Trade.

Introduction

Energy security and climate change mitigation have become two of the most significant challenges of the twenty-first century. Rapid industrialization, population growth, and technological advancement have significantly increased global energy demand. Traditionally, the global energy system has relied heavily on fossil fuels such as coal, oil, and natural gas. However, excessive dependence on fossil fuels has contributed to environmental degradation, greenhouse gas emissions, and climate change. As a result, many countries have begun transitioning toward renewable energy sources such as solar, wind, hydropower, and biomass. Renewable energy offers several advantages including reduced carbon emissions, sustainable energy supply, and long-term economic benefits. Consequently, renewable energy has become an important component of national development strategies and international climate agreements. India has emerged as one of the most important actors in the global renewable energy transition. Over the past two

decades, India has implemented ambitious policies aimed at expanding renewable energy capacity and reducing dependence on fossil fuels. India's renewable energy transition gained momentum with the introduction of the National Action Plan on Climate Change (2008) and the National Solar Mission (2010). These initiatives significantly accelerated the development of solar and wind energy in the country.

By the early 2020s, India had become one of the largest renewable energy producers in the world. The Indian government has set an ambitious target of achieving 500 gigawatts of non-fossil fuel electricity capacity by 2030, reflecting its commitment to climate action and sustainable development. The importance of renewable energy is particularly significant for South Asia. The region faces serious challenges related to energy shortages, infrastructure deficits, and environmental vulnerability. Countries such as Bangladesh, Nepal, Bhutan, and Sri Lanka are experiencing rapidly increasing electricity demand due to economic development and population growth. At the same time, many of these countries possess significant renewable energy potential, particularly in hydropower and solar energy.

Literature Review

The growing importance of energy security, renewable energy transition, and regional cooperation has attracted significant scholarly attention in recent decades. Scholars from the fields of international relations, political economy, and environmental governance have examined how the transformation of global energy systems is reshaping patterns of international cooperation and regional integration. One of the earliest discussions on energy security in global politics was presented by Daniel Yergin (2006), who argues that energy security has become one of the central strategic concerns of modern states. According to Yergin, the diversification of energy sources and technological innovation are essential for maintaining stability in global energy markets. Similarly, Benjamin K. Sova cool (2011) highlights the transformative potential of renewable energy technologies in reducing carbon emissions and promoting sustainable economic development. Scholars have also examined the institutional and governance aspects of global energy transition. Andrea's gold Thau and Jan Martin Witte (2010) analyse the evolving structure of global energy governance and emphasize the importance of international institutions in coordinating energy policies. Their work suggests that cooperation among states and international organizations plays a crucial role in facilitating energy transitions and managing global energy challenges. In the Indian context, Navroz K. Dubash (2013) examines India's climate policy and argues that India's renewable energy strategy reflects a balancing act between economic development and environmental sustainability. Similarly, Kumar and Sharma (2018) highlight the rapid expansion of solar and wind energy in India, emphasizing that supportive policy frameworks and government incentives have played a crucial role in accelerating renewable energy development. Hydropower cooperation between India and its neighbouring countries has received particular scholarly attention. Shrestha (2015) highlights Nepal's enormous hydropower potential and argues that cross-border electricity trade with India could support both economic development and regional energy integration. Upreti (2018) examines hydropower cooperation between India and Bhutan and describes it as one of the most successful examples of regional energy partnership in South Asia. Several scholars have also analysed the strategic dimension of India's energy diplomacy. Harsh V. Pant (2019) argues that energy cooperation has become an important component of India's regional foreign policy. Similarly, Srivastava (2021) suggests that renewable energy diplomacy has strengthened India's role as a regional leader in South Asia

Research Gap

Although a substantial body of literature exists on energy security, renewable energy transition, and regional cooperation, several important gaps remain in the existing scholarship. Many studies have examined the global transformation of energy systems and the increasing importance of renewable energy in addressing climate change and sustainable development challenges. For instance, scholars such as Daniel Yergin (2006) and Benjamin K. Sova cool (2011) have emphasized the strategic importance of energy security and the role of renewable energy technologies in reducing dependence on fossil fuels. Similarly, studies by Godthab and Witte (2010) highlight the institutional dimensions of global energy governance and the importance of international cooperation in facilitating energy transitions. Research on South Asian energy cooperation has also received attention in recent years. Scholars such as Bhattacharya (2019), Singh (2017), Shrestha (2015), and Upreti (2018) have analysed cross-border electricity trade and hydropower partnerships between India and neighbouring countries such as Nepal and Bhutan. While these studies highlight the importance of regional energy cooperation, they generally focus on specific bilateral energy projects rather than examining broader regional energy diplomacy. Therefore, this study seeks to address this gap by analysing the role of India's green energy initiatives in shaping regional energy cooperation in South Asia between 2005 and 2026. By examining policy developments, cross-border electricity trade, and regional energy partnerships,

this research aims to contribute to a deeper understanding of the relationship between renewable energy transition and regional diplomacy in South Asia.

Objectives of the Study

In this context, the study seeks to achieve the following objectives:

1. To examine the evolution of India's green energy initiatives between 2005 and 2026.
2. To analyse the major renewable energy policies and programs adopted by India to promote sustainable energy development.
3. To explore the role of renewable energy in India's regional diplomacy and its cooperation with South Asian countries.
4. To identify the major opportunities and challenges associated with regional renewable energy cooperation in South Asia.

Research Questions

1. How have India's green energy initiatives evolved between 2005 and 2026?
2. What are the major renewable energy policies and programs adopted by India to promote green energy development?
3. How do India's green energy initiatives influence regional energy cooperation in South Asia
4. What are the major political, economic, and institutional challenges affecting regional renewable energy cooperation in South Asia?
5. How can green energy initiatives contribute to sustainable development and regional integration in South Asia?

Research Methodology

The present study adopts a qualitative and analytical research methodology to examine the evolution of India's green energy initiatives and their implications for regional energy cooperation in South Asia. The main objective of the research is to analyse how India's renewable energy policies and initiatives have influenced regional energy partnerships and cross-border cooperation with neighbouring South Asian countries during the period from 2005 to 2026.This study primarily follows a qualitative research approach. Qualitative research is particularly suitable for analysing complex political, economic, and institutional processes such as energy diplomacy, regional cooperation, and renewable energy policy development. The research seeks to understand the broader dynamics of India's green energy initiatives and their impact on regional cooperation rather than measuring numerical relationships. The research design of the study is descriptive and analytical in nature. The descriptive component focuses on tracing the evolution of India's renewable energy policies, institutional frameworks, and energy initiatives since the mid-2000s. This includes examining major policy programs such as the National Action Plan on Climate Change, the National Solar Mission, and other renewable energy development initiatives introduced by the Government of India. The analytical component of the research evaluates how this policy initiatives have influenced regional energy cooperation in South Asia.

The study is primarily based on secondary data sources. Secondary data has been collected from a wide range of academic and institutional sources to ensure the reliability and credibility of the research. These sources include scholarly books, peer-reviewed journal articles, gover-nment policy documents, official reports published by the Government of India, and reports from international organizations such as the International Energy Agency, the World Bank, and the International Renewable Energy Agency. In addition, newspaper articles, policy reports, and energy statistics have also been consulted in order to analyse recent developments in regional energy cooperation. The theory of complex interdependence, developed by Robert Keohane and Joseph S. Nye, highlights the increasing economic and institutional linkages among states. Cross-border electricity trade and renewable energy investments create networks of cooperation and mutual dependence among countries. India's energy partnerships with Bangladesh, Nepal, and Bhutan illustrate how energy cooperation can strengthen regional interdependence. Regionalism theory also helps explain the development of energy cooperation in South Asia. Regionalism refers to the process through which neighbouring countries develop institutional mechanisms and cooperative frameworks to promote economic integration and collective development. India's efforts to promote cross-border electricity trade and regional energy connectivity reflect an emerging form of regional energy cooperation in South Asia.

Evolution of India's Green Energy Initiatives

Over the past two decades, India has experienced a remarkable transformation in its energy sector through the expansion of renewable energy initiatives. Growing concerns over climate change, environmental sustain-nability, and energy security have encouraged the Government of India to promote clean and renewable energy sources such as solar, wind, and hydropower. As a result, several policy frameworks and institutional reforms have been introduced to support the transition toward a sustainable energy system. One of the earliest policy frameworks that supported renewable energy development in India was the Electricity Act of 2003. This legislation created a favourable regulatory environment for renewable energy by encouraging the generation of electricity from

non-conventional sources and promoting renewable purchase obligations. These measures laid the foundation for the rapid expansion of renewable energy in the country. A major turning point in India's renewable energy policy came with the introduction of the National Action Plan on Climate Change in 2008. The plan introduced several national missions aimed at addressing climate change and promoting sustainable development. Among these initiatives, the Jawaharlal Nehru National Solar Mission launched in 2010 became one of the most significant programs for accelerating solar energy development in India. The mission aimed to expand solar capacity and reduce the cost of solar power generation through technological innovation and government incentives. In recent years, India has set ambitious targets for renewable energy development. The government has announced a goal of achieving 500 gigawatts of non-fossil fuel electricity capacity by 2030. New initiatives such as the National Green Hydrogen Mission also demonstrate India's long-term commitment to transitioning toward a low-carbon and sustainable energy system.

South Asia is one of the fastest-growing regions in terms of energy demand, yet it continues to face significant challenges related to electricity supply and energy infrastructure. Rapid population growth, economic development, and urbanization have increased energy demand across the region. However, many countries in South Asia still depend heavily on imported fossil fuels, creating economic and environmental vulnerabilities. India's renewable energy initiatives have increasingly become an important component of its foreign policy and regional diplomacy. As global concerns about climate change and sustainable development have intensified, energy cooperation has emerged as a strategic instrument of international engagement. One of the most important developments in India's renewable energy diplomacy was the establishment of the International Solar Alliance in 2015. This initiative aims to promote solar energy development in tropical countries by mobilizing financial resources, technological cooperation, and policy support. Through the International Solar Alliance, India has positioned itself as a global leader in renewable energy cooperation.

In South Asia, India has promoted renewable energy partnerships with neighbouring countries including Bhutan, Nepal, Bangladesh, and Sri Lanka. These partnerships involve investments in hydropower projects, electricity transmission infrastructure, and renewable energy development. Such initiatives strengthen regional energy connectivity and economic cooperation. Political mistrust among countries in the region sometimes creates uncertainty regarding long-term energy agreements. In addition, many South Asian countries lack the necessary energy infrastructure such as cross-border transmission networks and integrated power grids required for large-scale electricity trade. Financial constraints also represent a significant barrier because renewable energy projects require substantial investment. Furthermore, differences in national energy policies and regulatory frameworks create institutional obstacles to regional energy cooperation.

Policy Recommendations

To strengthen regional renewable energy cooperation in South Asia, several policy measures should be considered. First, countries in the region should work toward developing a regional electricity grid that facilitates cross-border electricity trade. Such a grid would allow countries to share renewable energy resources more efficiently. Second, governments should encourage greater investment in renewable energy infrastructure and cross-border transmission networks. International financial institutions and public–private partnerships can play an important role in mobilizing financial resources for these projects. Third, South Asian countries should strengthen regional institutional frameworks that support energy cooperation. Improved policy coordination and regulatory harmonization can help reduce barriers to cross-border electricity trade.

Conclusion

The global transition toward renewable energy has become a defining feature of contemporary international politics and sustainable development strategies. Growing concerns over climate change, environmental sustainability, and energy security have compelled countries to shift from fossil fuel–based energy systems to cleaner and more sustainable alternatives. Within this broader global transition, India has emerged as an important factor in promoting renewable energy development and advancing green energy initiatives both domestically and regionally. This study examined the evolution of India's green energy initiatives and their implications for regional cooperation in South Asia during the period from 2005 to 2026. The analysis demonstrates that India's renewable energy sector has expanded significantly over the past two decades as a result of supportive government policies, technological advancements, and increased global attention to climate change mitigation. Policy initiatives such as the National Action Plan on Climate Change, the National Solar Mission, and the establishment of the International Solar Alliance have strengthened India's position as a leading country in renewable energy development. However, the research also identifies several structural challenges that continue to hinder deeper regional energy cooperation. Political tensions, infrastructural constraints, financial limitations, and regulatory differences remain significant

barriers to the development of a fully integrated regional energy system. Looking ahead, strengthening regional institutional cooperation, improving cross-border energy infrastructure, and promoting policy harmonization will be essential for advancing renewable energy integration in South Asia. Future research may further explore the role of emerging technologies such as green hydrogen and regional energy markets in shaping the future of energy cooperation in the region.

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