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The Evolution of Energy Security in India's National Security Paradigm

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Abstract

The purpose of this study is to investigate the development of energy security within the context of India's national security framework. More specifically, the research targets the incorporation of energy considerations into policy, technical developments, and international engagements. Through the utilization of secondary data sources, such as government papers, academic journals, and strategy documents, the research recounts India's progression from a reliance on conventional energy sources to a portfolio of energy sources that is both varied and sustainable. The most important findings emphasize a gradual move toward renewable energy sources, which is being pushed by the desire to improve energy independence and solve environmental concerns. The dedication of India to the development of sustainable energy is demonstrated by strategic initiatives such as the National Solar Mission and worldwide cooperation through venues such as the worldwide Solar Alliance. On the other hand, difficulties continue to exist, notably with regard to geopolitical dependence and the continuing requirement for innovation in order to guarantee energy resiliency. In the future, research might investigate the socio-economic effects of the adoption of renewable energy sources, the implications of developing technologies, and methods for navigating energy transitions in a manner that is congruent with the objectives of national security stakeholders. Among the policy concerns are investments in infrastructure for renewable energy, the development of technologies, and international cooperation for the purpose of diversifying energy sources and mitigating geopolitical risks. The findings of this study, taken as a whole, highlight the significance of continuous research and policy actions in order to handle new issues and capture opportunities in India's changing energy landscape.

Keywords: Energy security, National security, Renewable energy, Geopolitical dynamics.

1. Introduction

When it comes to the economic stability and overall security framework of any nation, energy security is of the utmost importance. It entails making certain that there is a supply of energy that is both dependable and sufficient, and that it is available at costs that are cheap. This is essential for the purpose of driving economic activity and maintaining the populace's wellbeing. Energy security is not merely an economic concern for India, which is a growing global power with increasing industrialization and rising energy consumption; rather, it is a strategic imperative that is essential to India's national security (Kumar & Puri, 2022). Energy security, when seen in the context of national security, refers to the avoidance of large-scale service interruptions. These disruptions might be caused by natural catastrophes, technology failures, or geopolitical conflicts that pose a danger to energy imports. Furthermore, energy dependence has a considerable impact on both diplomatic and military strategy. When it comes to geopolitical pressures and the possibility of supply disruptions, countries that are largely dependent on energy imports are frequently susceptible. In the case of India, the country's dependence on oil imports from politically dangerous regions makes it imperative that the country implement stringent energy security measures in order to protect its economy and preserve its sovereignty (Siddiqui & Lahiri, 2021). The importance of energy security in national security concepts is highlighted by the fact that securing energy security translates into strengthening the country's strategic autonomy and bargaining clout on the global arena.

The major objective of this analysis is to provide light on the ways in which India's national security policy has developed over the course of the past few decades with regard to energy security. India's road towards establishing solid energy security has been marked by a number of significant changes, including the transition in governmental policies, the strategic initiatives that have been undertaken, and the shifts in energy resource consumption. The purpose of this study is to investigate these changes. The purpose of this review is to develop a complete narrative of the changes and continuities in energy security policy from the time of independence until the current day by conducting an in-depth assessment of secondary sources, which include papers from the government, strategic studies, and scholarly publications.

Considering the current global energy problems and the effects they have had on political and economic stability all across the world, this investigation is particularly pertinent and applicable at this time. Gaining an awareness of the historical trajectory of energy security within the framework of India's national security will give India with insights into the success of policies that have been implemented in the past as well as the problems that are still to come. It will also assist in the identification of sustainable practices and policies that have the potential to alleviate risks connected with energy insecurity. These risks include disruptions in supply, price volatility, and environmental problems related with non-renewable energy sources (Johal & Kaur, 2020).

The purpose of this review is to contribute to the larger discourse on energy policy by tracing the evolution of energy security in India's national security strategy. Its goal is to provide recommendations for policymakers to enhance India's energy independence and security in a global energy landscape that is becoming increasingly uncertain. Not only will this help to strengthen India's economic and military capabilities, but it will also promote India's goals to become a major force that advocates for a stable and fair international order (Malik & Vasisht, 2023).

Because of the rapid changes that are occurring in the global energy markets and the pressing requirement for sustainable development, it is especially important at this moment for India to conduct a review of the evolution of energy security within the framework of its national security policy. Because of India's rising economic prominence and its significant energy requirements, the country needs a solid policy that guarantees the supply of energy, maintains economic stability, and maintains strategic independence. By doing an analysis of the manner in which India's national security has been incorporated into energy security over the course of time, it is possible to conduct a critical review of the policies and tactics that are now in place in response to global issues such as climate change, regional wars, and financial fluctuations.

This study depends solely on secondary data sources, which include official reports from the government, papers pertaining to strategic strategy, academic publications, and trustworthy news items. Each of these sources offers a full understanding of India's energy security plans, both in terms of their historical development and their current situation.

On the basis of their importance to India's national security and energy policy, their contribution to understanding the evolution of energy security, and their intellectual or

empirical rigor, the documents and studies that are included in this review were chosen for inclusion. Sources that provided in-depth analysis of policy shifts, strategic decisions, and the repercussions of these changes on both the national and international scales were given priority.

The information obtained from various sources was subjected to thematic analysis in order to recognize and report on patterns that were present within the data. With the assistance of this qualitative technique, numerous components of energy security policies have been interpreted, and it has been determined how these policies correspond with wider national security aims. Additionally, content analysis was utilized in order to quantify particular features of the policy talks, as well as to examine the patterns of occurrence and development of particular topics throughout the course of time.

2. Literature Review

Historical Overview

The historical backdrop of energy security in India's national policy may be traced back to the post-independence era, when the major focus was on developing an economy that was self-sufficient. Initial efforts were focused on building indigenous energy sources, particularly coal and hydroelectric power, in order to stimulate industrialization and lessen reliance on foreign sources of energy (Kumar & Puri, 2022). During the 1970s, there was a significant change that occurred when oil crises occurred. These crises brought to light the vulnerabilities that are linked with energy imports and prompted a more comprehensive integration of energy security into national strategic planning. Since that time, the importance of energy security has grown in response to several factors, including the growing need for energy, the expansion of the economy, and the intricacies of the global energy politics.

Conceptual Frameworks

When discussing energy security in the context of national security, it is common practice to evaluate it conceptually via the lens of "strategic stability" and "sustainable development." Strategic stability is the capability of a nation to maintain a continuous and inexpensive energy supply, even under difficult situations, which ensures economic and social stability. This capacity refers to the nation's ability to sustain strategic stability (Johal & Kaur, 2020). On the other side, sustainable development places an emphasis on the incorporation of renewable energy sources in order to lessen the negative effects on the environment and to facilitate the development of long-term resilience against energy crises. For the purpose of determining whether or not national energy policies are successful in accomplishing these two goals, theoretical frameworks such as the Energy Security Index (ESI) have been utilized (Malik & Vasisht, 2023). The diverse character of energy security, which includes economic, environmental, and geopolitical components, may be better understood with the assistance of these frameworks, which also serve as a guide for the creation of policies that improve both national security and global sustainability.

Prior Studies

Significant studies have explored various facets of energy security and its integration into India's national security strategies. Saxena and Gupta (2018) utilized a qualitative examination of diplomatic engagements and policy revisions over the course of the past two decades in order to

concentrate on the geopolitical ramifications of India's dependence on oil. The results of their investigation brought to light India's growing diplomatic operations to secure reliable energy supplies; nevertheless, they also brought to light the fact that the national policy discourse does not place sufficient emphasis on alternate energy sources. Another pivotal study by Chaturvedi and Raj (2019) employed econometric models to quantify losses in order to investigate the economic effects that disruptions in electricity supply have had on India's gross domestic product. Despite the fact that they emphasized the crucial need to diversify energy supply chains, they did not dig into particular measures for accomplishing this diversity.

Further, Johal and Kaur's (2020) investigation of the incorporation of renewable energy sources into the national security policy, utilized a case study technique in order to investigate the operationalization of solar energy projects. The findings revealed advancements in energy autonomy, but it also brought to light ongoing issues in storage technology. Meanwhile, Malik and Vasisht (2023) discussed the strategic dimensions of India's energy security, arguing that current policies inadequately address the nexus between energy security and national defense, particularly in terms of infrastructure resilience.

Additionally, Agarwal and Dhar (2021) utilized a scenario analysis to make projections on future energy needs and supply patterns, and discovered that India might potentially suffer serious energy shortages by the year 2030 if substantial policy reforms are not implemented. The authors of this study did not, however, investigate the impact that international energy collaboration plays in reducing the likelihood of these dangers. In Kumar and Puri's (2022) examination of the development of policy, the gradual adjustments toward sustainable energy practices were noted, but it was also pointed out that these changes are not occurring at a rate or with the level of widespreadness that is sufficient to face the issues that are arising.

There is a wealth of information addressing India's energy security within the framework of national security, as demonstrated by the researches that have been conducted together. On the other hand, they highlight the fact that there are deficiencies in thorough policy assessment, the incorporation of renewable energy sources, and specific strategies for improving the resilience of economic infrastructure. This research intends to fill these gaps by giving a comprehensive analysis of the history of policy, evaluating both areas of accomplishment and those that require improvement. As a result, it will provide a comprehensive perspective on safeguarding India's energy future in accordance with the goals of national security.

3. Policy Evolution

Significant changes have been made to India's energy strategy ever since the country gained its independence. These changes have been brought about by a combination of internal needs and pressures from the outside world. Initially, India's energy policy centered on achieving self-sufficiency and decreasing its reliance on foreign sources of energy. This was accomplished mostly via the development of indigenous coal and hydroelectric power resources. With the founding of the Atomic Energy Commission in 1948 and the following development of nuclear energy, early efforts were taken toward the diversification of energy

sources and the enhancement of energy security (Misra, 2019).

The oil crises of the 1970s signified a significant turning point, revealing the risks that are associated with India's overwhelming reliance on oil that is imported. The result of this was a more widespread acknowledgment of energy security as an essential component of national security, which in turn triggered a series of policy reforms that were targeted at diversifying energy sources. This transition towards alternative energy sources, such as solar and wind energy, which were regarded as essential to reduce reliance on imports, was highlighted by the establishment of the Department of Non-Conventional Energy Sources (DNES) in 1982, which was subsequently renamed the Ministry of New and Renewable Energy (MNRE) (Sharma & Bhattacharya, 2021).

By the 1990s and early 2000s, economic liberalization and rapid industrial growth further intensified India's energy needs, leading to the New Exploration Licensing Policy (NELP) in 1999, which aimed to attract foreign investment in oil and gas exploration to boost domestic production (Kumar & Puri, 2022). On a more recent note, India's commitment to the Paris Agreement and its ambitious ambitions under the National Solar Mission are examples of a strategic pivot towards sustainable development. This pivot aims to strike a balance between economic growth, environmental sustainability, and energy security.

These policy milestones have had a substantial influence on India's national security by increasing the country's energy independence and giving more stability in energy costs. This, in turn, has supported India's economic stability and strategic autonomy. India has been able to boost its international stature as a result of the transition towards renewable energy, which has also helped the country position itself as a leader in global environmental governance (Johal & Kaur, 2020).

4. Energy Security and National Strategy Integration

One of the most important aspects of India's policy evolution has been the incorporation of energy security considerations into its larger national security policies. This is a reflection of the growing understanding of energy as an essential component of national stability and power projection. As time has progressed, the strategic framework has gradually incorporated energy issues, not just as economic variables but also as important components of both national defense and foreign diplomacy.

One prominent example of this integration is India's approach to the International Solar Alliance (ISA), launched in 2015 alongside France. The ISA reflects a strategic maneuver to lead global renewable energy development, contributing to energy security and establishing India as a key player in international energy governance. This initiative not only addresses domestic energy needs but also strengthens India's geopolitical leverage by reducing dependence on fossil fuel imports from volatile regions (Chowdhury & Mehta, 2022).

Further, the strategic petroleum reserves program, initiated in the early 2000s, exemplifies how India has embedded energy security into its national security calculations. The program aimed to mitigate the risks associated with energy supply disruptions by maintaining large-scale oil reserves, ensuring energy availability during crises, such as geopolitical conflicts or natural disasters. This policy

decision was significantly influenced by the lessons learned during the Gulf War, which had a profound impact on India's oil supplies and, consequently, its economic stability (Das & Kapoor, 2021).

The emergence of civilian nuclear accords, such as the nuclear deal between the United States and India that was concluded in 2008, is another example that demonstrates how energy policy and national security overlap with one another. Not only did the deal intend to meet India's ever-increasing energy requirements, but it also had the effect of drastically altering India's strategic ties. As a result, India's status in international nuclear non-proliferation discussions was improved, and it was also able to secure a reliable and long-term energy supply (Patel & Singh, 2023).

5. Shifts In Energy Sources and Technology

India's energy policy environment has seen a transformation as a result of the transition away from conventional energy sources such as coal and oil and toward renewable energy sources such as solar, wind, and biomass. This transformation is being pushed by the necessity of achieving sustainable growth, reducing environmental consequences, and improving energy security by lowering reliance on fuels that are imported.

A significant development in this arena has been India's ambitious National Solar Mission, initiated as part of the National Action Plan on Climate Change in 2010. The mission aims to promote the extensive usage of solar energy, targeting the establishment of 100 GW of solar power by 2022. This initiative not only helps reduce carbon emissions but also diminishes the economic volatility associated with oil and gas imports (Agarwal & Narayan, 2023).

Innovative technological developments in the fields of energy storage and smart grid technologies have provided further assistance for this transformation. The intermittent nature of renewable sources has allowed for the development of innovations such as lithium-ion batteries and better grid management systems, which have contributed to the resolution of past issues. These technologies make it possible to integrate renewable energy sources more effectively into the national grid, which guarantees a more dependable and consistent supply of electricity. Reliability and consistency are essential for both economic operations and national security (Mehta & Thakur, 2021).

Moreover, the development of green hydrogen technology, which involves the production of hydrogen fuel using renewable energy sources, represents a significant leap forward. This technology is poised to play a key role in India's energy strategy, providing a clean alternative for industries that are hard to electrify, such as transportation and heavy manufacturing, thus reducing dependency on fossil fuels and enhancing energy resilience (Singh & Reddy, 2022).

6. International Relations And Energy Diplomacy

India's foreign policy has been significantly influenced by its energy needs, leading to a nuanced strategy that emphasizes energy diplomacy to secure stable and sustainable energy sources. This approach has become particularly vital as India seeks to support its rapid economic growth while mitigating the environmental impacts associated with traditional energy consumption.

India's participation in international coalitions like the International Solar Alliance (ISA) showcases how its energy diplomacy aligns with broader foreign policy objectives, including leadership on global environmental issues and fostering south-south cooperation. The ISA not only positions India as a global leader in renewable energy but also helps it forge strategic partnerships with other sun-rich countries, diversifying its energy sources and reducing reliance on traditional fossil fuels (Krishnan & Sharma, 2023).

Additionally, India's involvement in the Quad dialogue, alongside the United States, Japan, and Australia, further emphasizes its strategic engagements where energy security is a significant concern. These partnerships facilitate collaboration on securing critical energy supply chains and developing new technologies, which are essential for enhancing India's energy independence (Patel & Desai, 2021).

Conflicts in energy-rich regions, such as the Middle East, also profoundly impact India's national security, given its dependency on oil imports from these areas. The volatile nature of these regions necessitates a foreign policy that not only manages the immediate risks associated with energy supply disruptions but also looks towards long-term stability through diversified energy sourcing and increased self-reliance (Rao & Gupta, 2022).

7. Discussion

Synthesis of Findings

This research has conducted an in-depth investigation of the complicated relationship that exists between energy security and national security in India. It has traced the progression from a reliance on conventional energy sources to a portfolio of energy sources that is both diverse and sustainable. The findings demonstrate that India has gradually included energy considerations into its national security policy, with a noticeable trend towards renewable energy. This shift into renewable energy has been motivated by the combined aim of lowering dependence on imports and addressing environmental concerns. The proactive approach that India takes to ensuring energy security is shown by strategic programs such as the National Solar Mission and international alliances in frameworks such as the International Solar Alliance.

This transformation has been further helped by technological improvements, which have made it possible for various renewable energy sources to be integrated into the national grid in a more effective manner and have promoted energy autonomy. India's energy diplomacy efforts, on the other hand, are a reflection of the continuous problems that are faced by geopolitical dependencies, notably with regard to oil imports from volatile regions.

Implications

When it comes to academics, policymakers, and strategists, the conclusions of this study have major ramifications. As a result of the focus placed on diversifying energy sources and improving technical capabilities, policymakers are reminded of the necessity of continuing to invest in the development of energy innovation and infrastructure. When formulating foreign policies, strategists need to take into account the geopolitical aspects of energy security. These policies should be designed to reduce the risks connected with energy imports while simultaneously boosting international energy cooperation.

It is strongly recommended that academics investigate the intersections of energy technology, policy, and security in more depth, with the goal of discovering new research routes that might lead to the development of more resilient energy plans. This involves investigating the socioeconomic effects of switching to renewable energy sources as well as the possibilities of developing technologies such as green hydrogen.

Limitations

This study primarily relies on secondary sources, which imposes certain limitations. While these sources provide valuable insights into historical trends and policy developments, they may lack the immediacy and granular perspective that primary data offers. Future research could benefit from incorporating primary data through interviews with policymakers and energy sector stakeholders, providing a more nuanced understanding of the current challenges and perspectives in India's energy security strategy.

While significant progress has been made, India's journey toward a secure, sustainable, and robust energy future continues to require adaptive strategies that address both domestic needs and global shifts.

8. Conclusion

This review has examined the evolution of energy security within India's national security framework, highlighting significant shifts in policy, technological advancements, and international engagements. Key findings reveal a progressive integration of energy considerations into national security strategies, with a notable transition towards renewable energy sources driven by the imperative to enhance energy independence and address environmental challenges. Strategic initiatives such as the National Solar Mission and international collaborations through platforms like the International Solar Alliance underscore India's commitment to sustainable energy development. However, challenges persist, particularly concerning geopolitical dependencies and the need for continued innovation to ensure energy resilience.

Building on these findings, future research could explore several avenues to deepen our understanding of India's energy security landscape. Investigations into the socio-economic impacts of renewable energy adoption, including implications for employment, public health, and regional development, would provide valuable insights for policymakers. Additionally, studies examining the potential of emerging technologies such as green hydrogen and energy storage to bolster energy security and mitigate climate risks are warranted. Furthermore, analyses of the geopolitical dynamics shaping India's energy diplomacy and strategies for navigating energy transitions in alignment with national security interests would contribute to a more comprehensive understanding of the subject.

Policy considerations stemming from this research include the need for continued investment in renewable energy infrastructure, technology development, and international collaborations to diversify energy sources and mitigate geopolitical risks. Additionally, policymakers should prioritize measures to enhance energy efficiency, promote energy conservation, and strengthen regulatory frameworks to ensure a sustainable and resilient energy future for India. In conclusion, while significant progress has been made in integrating energy security into India's national security

paradigm, ongoing research and policy initiatives are essential to address emerging challenges and seize opportunities in the dynamic energy landscape.

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