

India-Central Asia Energy Cooperation : A Study from the Perspective of India's Energy Security

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Abstract:

Energy security has emerged as a central component of India's foreign policy and economic development, particularly in the context of its growing energy requirements, rapid industrialization, and substantial dependence on imported hydrocarbons. In this context, Central Asia, endowed with significant reserves of oil, natural gas, uranium, and hydropower resources, occupies an important position in India's search for diversified and reliable sources of energy. This study examines the evolving nature of India - Central Asia energy cooperation from the perspective of India's energy security. It explores the major areas of cooperation, including hydrocarbons, civil nuclear energy, renewable energy, and regional energy connectivity. The study argues that enhanced energy cooperation with Central Asia can contribute to the diversification of India's energy sources and strengthen its long-term energy security. However, the success of such cooperation depends upon improved regional connectivity, stronger institutional mechanisms, strategic investments, and sustained diplomatic engagement. By analysing both the opportunities and challenges of India-Central Asia energy relations, the study seeks to provide a comprehensive understanding of the role of Central Asia in India's evolving energy security strategy and its broader engagement with the Central Asia.

Keywords: India - Central Asia Relations, Energy Cooperation, Energy Security ,TAPI Pipeline, Renewable Energy, Regional Connectivity , Geopolitics ,INSTC .

Introduction:

The dissolution of the Union of Soviet Socialist Republics and the formation of Central Asian nations including Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan in the early 1990s, provided these countries with a renewed opportunity to form their own destinies without any geopolitical influence (Khan, India and Central Asia: Geopolitics, Economy and Culture, 2016). India's relation with CAR countries not only emerged after the soviet dissolution in 1991 as an independent Central Asian states but their relations deeply rooted in ancient history since 3rd century BC. India was the first country to formally recognise them as an independent entities. At that era ancient Silk route was the crucial trade route for the exchanges of ideas , Culture and overland trade. As a region with numerous natural resources CAR region increasingly drawing the attention of major powers such as US, China, Russia and Iran. (Mazulevsky, 2016). Energy is one important element that has captivated the world's attention ; global conflict and geopolitical aspirations of nations are closely linked with it. Melvin A. Conanant and Fren gold in 1978 said that , “ *Access to raw materials especially access to energy is a top priority of*

International political relation” (Khan, India and Central Asia, 2016). When we examine India's relations with Central Asia, the issue of energy security cannot be ignored. Energy is one of the most important and significant factor shaping India's co-operation and engagement with the Central Asian region. Energy is such important factor that shapes nations identity, nation's interests and prosperity. Therefore, we cannot afford to ignore this factor. Even though there are challenges in India - Central Asia relations, particularly in terms of connectivity, it is still very important for us to study India's energy policy in central Asia in order to fulfil India's energy security. The disintegration of the Union of Soviet Socialist Republics in 1991 marked the beginning of meaningful energy cooperation between India and the Central Asian states. Co-operation in the field of energy sector forms an important component of India's Central Asia Policy (Pradhan, Geopolitics of Energy in Central Asia: India's Position and Policy, 2021)

According to the World Nuclear Association Report in 2026 found that Kazakhstan possesses 14% of the world's total uranium reserves, and since 2009, it has remained the world's largest uranium-producing country. Bilateral cooperation between India and Kazakhstan has facilitated the supply of uranium to India's nuclear power plant.¹

Kyrgyzstan has abundant water resources, enabling India to develop hydropower projects there to fulfil its growing energy needs. Furthermore, Kyrgyzstan can significantly support India's Green Energy Mission through cooperation in the hydropower sector. “While solar and other renewable sources like geothermal and biomass are still in early stages of development in Kyrgyzstan, there's a growing need for technology and expertise to unlock their potential. The country's geography and climate are highly suitable for solar power. With its mountainous terrain (94% of the land) ranging from 800 to over 4,000 meters above sea level, and an average of 260 sunny days per year, Kyrgyzstan has significant resources to harness solar energy. India can leverage its expertise in the renewable energy space by exporting machinery and equipment or setting up plants, thus fostering the domestic technology and manufacturing capabilities for renewable energy technologies like solar panels and wind turbines.”²

When we try to look at the importance of Turkmenistan to India, it becomes evident that Turkmenistan is particularly significant because of its abundant natural gas resources. Turkmenistan possesses some of the world's largest natural gas reserves, making it an important potential partner for India's energy security.³

“TAPI is one of the important pillar of India-Turkmenistan energy Partnership. It consist of 4 countries such as Turkmenistan-Afghanistan-Pakistan-India. TAPI is the flagship project of India-Turkmenistan energy cooperation. The pipeline is intended to transport natural gas from Turkmenistan through Afghanistan and Pakistan to India. India joined the project primarily from the perspective of its energy need and energy security along with diversifying its sources of natural-gas imports and strengthen its long-term energy security.”⁴ The project is also significant beyond energy. It has the potential to promote regional connectivity, economic interdependence and cooperation between Central Asia and South Asia.⁵ The Turkmenistan section has been completed, while work in Afghanistan has continued; however, the overall project still faces major challenges relating to security, financing and implementation.⁶

Kazakhstan is the main oil producer in Central Asia as compared to other central Asian countries. It is an oil producer country since the 1991 and has the potential to second largest oil production among the former

¹ [Uranium and Nuclear Power in Kazakhstan - World Nuclear Association](#)

² [EDB India CA Report EN.pdf](#)

³ [Turkmenistan Energy Profile: Natural Gas, Oil, Electricity and New Export Routes - Without Borders Energy](#)

⁴ [Proposal for India joining the Turkmenistan-Afghanistan-Pakistan natural gas pipeline project](#)

⁵ [10 chapter 3.pdf](#)

⁶ [Turkmenistan's Energy Sector: Energy. Partnership. Progress.](#)

soviet states except Russia. (Pradhan R. , 2021) “Kazakhstan is blessed with huge deposits of minerals and hydrocarbon resources. It is home to 99 types of minerals out of 105 elements in the periodic table. It has already explored 70 of these minerals and is involved in the production of at least 60. As far as Uranium, Coal, oil and gas are concerned Kazakhstan ranks 2, 7, 12 and 24, respectively” (Pradhan R. , India-Kazakhstan energy relations: Looking back and Looking ahead, 2022)

Tajikistan’s cooperation in the field of energy from the perspective of India’s energy security has always been a key area of co-operation . “Energy security is one of the main priorities of India's domestic and foreign policy, and is related to the country's economic development and social policy”. (Muhammadzoda, 2025) . Hydropower sector is one of the numerous natural resource in Tajikistan which attracts Indian companies to engage with them from the perspective of its energy security and fulfil its energy needs and also they are providing an opportunity to Indian private companies to engage in prospective energy projects such as generation of renewable energy through mutual cooperation. “Cooperation with such Indian companies as Bharat Heavy Electronics Limited (BHEL), KEC International, Kalpataru Projects International Limited, among others is a worthy example of our cooperation. However, there are more opportunities for Indian companies to engage and participate in Tajikistan's energy sector, including the construction of the Rogun hydropower plant, which will increase electricity generation and significantly reduce harmful emissions in the region.” (Ibid) ⁷

India’s co-operation with Uzbekistan in the field of the renewable energy sector is particularly noteworthy. Uzbekistan is rapidly moving towards a renewable energy transition and has set an ambitious target of generating 50% of its electricity from renewable sources by 2030. The country also aims to achieve net-zero emissions by 2050. With over US\$35 billion invested in the energy sector, Uzbekistan is creating significant opportunities for international cooperation, including with India.⁸ In the field of energy cooperation international energy exhibition BES 2026, held in New Delhi, a meeting took place between representatives of Tajikistan’s energy sector and Indian business circles. The Minister of Energy and Water Resources of the Republic of Tajikistan, Daler Juma, visited the pavilion of the Indian energy giant Tata Power and reviewed the company’s latest technological solutions and investment proposals, including developments in renewable energy, grid digitalization, and energy efficiency enhancement.”⁹

Research Objectives :

1. To examine the challenges and opportunities in India - Central Asia energy relations.
2. To examine the importance of India's energy security and its implications for India’s economic growth and strategic interests.

Research Questions :

1. What are the major barriers hindering energy relations between India and Central Asia?
2. How can India - Central Asia energy cooperation contribute to India's long-term energy security and economic growth?

⁷ [Tajikistan-India Relations: Areas of Future Cooperation - India, Tajikistan, Central Asia](#)

⁸ [India's Renewable Energy Moment in Uzbekistan](#)

⁹ [Meeting Between Tajikistan’s Energy Sector and Indian Business at BES 2026 | Embassy of the Republic of Tajikistan in the Republic of India](#)

Methodology :

This study adopts a qualitative and descriptive research methodology, supported by secondary data analysis from official documents, academic literature, and policy reports.

Review of Literature :

Mihir kaulgud (2022), in his article titled, “*India-Central Asia Energy Relations : Prospects and barriers*” said India has lagged behind in developing energy relations with Central Asia primarily due to the lack of efficient connectivity and transportation infrastructure for energy resources. As a result, India has been unable to effectively compete with major powers such as China and Russia in the region. Therefore, Government and policymakers should focus on improving connectivity and transportation networks before focusing solely on Central Asia's abundant reserves of natural gas, oil, and mineral resources. Improved connectivity would enable India to access the region's energy resources more efficiently and enhance its long-term energy security. Therefore, from this article i understood that connectivity has always been a major barrier for improving energy relations between India and Central Asia.

Ramakrushna Pradhan (2021), in their book titled, “*Geopolitics of energy in Central Asia : India's Position and Policy*” In this book, the authors provide a comprehensive discussion of energy, energy security, and the geopolitics of energy in Central Asia. They examine the evolution of India - Central Asia ties from ancient times to the present and also discussed the future prospects for strengthening these relations. This book gave me a detailed understanding of India's energy profile, covering the period from 1980 to 2018. It focuses extensively on nuclear energy, hydroelectric power, coal, and India's future energy requirements. This book has provided substantial knowledge about the energy relations between India and Central Asia. It also helped me to understand the major challenges affecting energy relations, along with the opportunities and future prospects for enhancing cooperation in the field of energy sector.

P. Stobdan (2023), In their book *India and Central Asia : The strategic dimension*, there is a chapter titled, “*Energy Deal : Untying the Gordian Knot*” talk about The authors state that India has aware of the mineral resources available in Central Asia for fulfilling its energy need from the perspective of its energy security . In this book he discussed the major challenges that are hindering the India-Central Asia Energy Co-operation , he argued that India's energy diplomacy in Central Asia cannot succeed if India continues to ignore the Russia factor in its policy. Furthermore he emphasized on how Russia is an important factor in India's Central Asia Energy policy in particular. He also suggest that India needs to formulate new strategic policy which will strengthen its energy investments and energy partnerships in Central Asian region.

The authors also focused on the challenges posed by Pakistan and China, which made it difficult for India to invest in the region. They identify this as a major challenge of India's energy diplomacy in Central Asia. In addition to this, he argued that the Chabahar Port will play a crucial role in facilitating India's energy cooperation and energy ties in order to secure Indias's energy security.

Result and Discussion .

When we look at Central Asian energy reserves from the perspective of India's energy need and energy security then after analysing the existing literature we can say that India has great potential in energy co-operation with Central Asia but not reached to it fullest as compared to China due to the lack of direct connectivity ,institutional failure and regional instability . Energy reserves in Central Asia such oil and natural gas, hydrocarbons, uranium and hydropower potential helped India in fulfilling their energy needs

from the perspective of its energy need and energy security. Central Asian region consisting of five energy rich economies namely Kazakhstan, Turkmenistan, Tajikistan, Kyrgyzstan due to its vast natural and energy reserves had drawn the attention of many global powers such as China, Russia, USA etc. This region has numerous and great the potential to engage and cooperate with India's wider aim of diversification of its economy through the energy sources in Central Asia. India remains highly dependent on external sources of energy particularly crude oil. The International Energy Agency notes that India was the world's second - largest net crude oil importer in 2023 and projects further growth in crude oil imports toward 2030. Therefore, energy cooperation with Central Asian countries has the great potential to reduce excessive dependence on traditional suppliers and it will help in broadening India's energy partnerships. From the perspective of energy need and energy security, diversification is important because it will help in reducing the risks linked with supply variations, price volatility and geopolitical crises. However, the results suggest that resource availability alone does not guarantee energy security. Though Central Asia possesses numerous energy resources but India's ability to access and transport these resources remains the major barrier.

This particular study shows us that Kazakhstan has always been a important player in India's energy diversification and engagement with Central Asia. India has developed engagement in hydrocarbons as well as civil nuclear energy. India and Kazakhstan concluded an agreement on cooperation in the peaceful uses of atomic energy, which provides a framework for areas including uranium supply, exploration, joint research and other nuclear-energy activities. This cooperation is strategically significant because nuclear energy can contribute to India's long-term energy security by diversifying the country's energy mix. Kazakhstan's importance is therefore not confined to conventional fossil fuels; it also extends to India's search for reliable sources of uranium. The findings further demonstrate that cooperation with Kazakhstan represents one of the more institutionalised and tangible dimensions of India Central Asia energy relations. Nevertheless, geographical distance and transportation constraints continue to limit the expansion of hydrocarbon cooperation.

The Turkmenistan - Afghanistan – Pakistan - India (TAPI) gas pipeline represents the most ambitious energy - connectivity project linking India with Central Asia. The project is important because it could provide India with direct access to Turkmenistan's natural gas and potentially contribute to India's growing demand for natural gas. India's requirement for gas is expected to increase significantly, while domestic production growth is projected to remain relatively limited. The IEA projects India's LNG demand to rise substantially by 2030, increasing the importance of securing diversified and reliable gas supplies. However, the study finds that TAPI also represents the limitations of India–Central Asia energy cooperation. Political instability in Afghanistan, security concerns, transit-related issues and uncertainty surrounding project implementation have affected its progress. India and Turkmenistan have continued to recognise the importance of energy and connectivity cooperation, including the strategic relevance of TAPI and regional transport corridors. Thus, while TAPI has considerable potential, it remains an example of the gap between strategic aspiration and actual energy delivery.

The findings indicate that Uzbekistan has emerged as another important partner, particularly in the field of uranium and civil nuclear cooperation. India's official records have identified uranium supply agreements with Kazakhstan and Uzbekistan, demonstrating the significance of Central Asia in India's nuclear fuel security. This suggests that the most successful dimension of India–Central Asia energy cooperation may not necessarily be large-scale oil or gas transportation, but rather sector-specific cooperation, especially in uranium and nuclear energy. From India's energy-security perspective, nuclear

cooperation is important because it contributes to the diversification of the national energy mix and reduces overdependence on fossil fuels.

A major result of the study is that connectivity remains the central obstacle to the realisation of India–Central Asia energy cooperation. Unlike China and Russia, India does not have direct geographical access to Central Asia. India's access is complicated by the regional geography of South and Central Asia and by the lack of direct overland routes. Consequently, energy cooperation depends heavily on transit infrastructure and multilateral connectivity arrangements. The International North–South Transport Corridor (INSTC) has therefore acquired strategic importance. At the 2025 India–Central Asia Dialogue, the participating countries emphasised the importance of greater connectivity and optimum utilisation of the INSTC, while also identifying energy as an important sector for expanding cooperation. The discussion suggests that energy security and connectivity security are closely interconnected. India cannot fully benefit from Central Asia's energy resources without secure, economically viable and politically sustainable transport routes.

Conclusion

India - Central Asia energy cooperation holds significant strategic importance for India's long-term energy security. With India's growing economy, expanding industrial base, and increasing energy requirements, the diversification of energy sources and suppliers has become a major policy priority. Central Asia, with its substantial reserves of natural gas, oil, uranium, and renewable energy potential, offers India an important opportunity to diversify its energy partnerships and reduce excessive dependence on traditional energy suppliers and vulnerable maritime routes. The study demonstrates that India has gradually expanded its engagement with the Central Asian Republics in diverse areas of energy cooperation. Kazakhstan and Uzbekistan have emerged as important partners, particularly in the field of uranium and civil nuclear energy, while Turkmenistan possesses significant potential as a natural gas supplier through projects such as the TAPI pipeline. Furthermore, the region offers opportunities for cooperation in renewable energy, hydropower, and technological development. These partnerships can contribute not only to India's energy security but also to the broader objectives of economic cooperation and strategic engagement with Eurasia. However, the potential of India–Central Asia energy cooperation remains constrained by several geographical, geopolitical, infrastructural, and security-related challenges. The absence of direct land connectivity between India and Central Asia, instability in Afghanistan, uncertainties surrounding regional energy transportation projects, and the strategic competition among major powers have limited the effective realization of India's energy interests. Consequently, the success of India's energy strategy in Central Asia depends largely on its ability to develop reliable connectivity corridors, strengthen institutional and diplomatic mechanisms, and translate existing political goodwill into sustainable economic and energy partnerships. Therefore, India should adopt a comprehensive and long-term approach towards Central Asia that integrates energy cooperation with connectivity, infrastructure development, investment, technology transfer, and regional diplomacy. Greater emphasis on multilateral and regional mechanisms, along with initiatives such as the International North–South Transport Corridor and the development of alternative connectivity routes, can enhance India's access to Central Asian energy resources.

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