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Assessing the Feasibility of the Trans-Caspian Pipeline: Prospects and Constrains*

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Abstract

The importance of energy transmission pipelines, particularly for natural gas, is widely recognized due to the global dependence on energy. For landlocked Central Asian countries, natural gas pipelines play a crucial role in sustaining their energy-driven economies. Given its geographical constraints, Turkmenistan places significant emphasis on projects like the Trans-Caspian Pipeline. This pipeline, if implemented, would enable Turkmenistan to export natural gas to Azerbaijan, potentially bringing substantial changes to the region's energy landscape. This article adopts a qualitative research method and employs the theoretical framework of the Copenhagen School. The central research question is: What are the key drivers and obstacles to the implementation of the Trans-Caspian Pipeline in the coming years? The research hypothesis suggests that factors such as the finalization of the convention on the legal status of the Caspian Sea, Turkmenistan's energy security concerns, the resolution of disputed energy fields between Azerbaijan and Turkmenistan, and the impact of the Russia-Ukraine war serve as major driving forces. Conversely, environmental concerns, Turkmenistan's economic and political situation, and opposition from Iran, Russia, and China are among the key obstacles hindering the project's realization.

Keywords: Caspian Sea, Energy Security, Russia, Trans-Caspian pipeline, Turkmenistan

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* The authors have no affiliation with any organization with a direct or indirect financial interest in the subject matter discussed in this manuscript.

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1. Introduction

The Caspian Sea has drawn significant attention in recent years due to its vast oil and gas resources. During the Soviet era, these reserves were less attractive, as the Soviet Union had access to numerous other, more easily exploitable energy sources. However, following the collapse of the Soviet Union in 1991 and the subsequent independence of the Caspian states, the region underwent a major geopolitical and geo-economic transformation. The newly independent states sought to explore and develop oil and gas resources to enhance their export potential in the energy sector.

Given their limited energy resources, these independent countries have increasingly turned their focus to the Caspian region. After gaining independence and delineating territorial boundaries, some states initiated new exploration projects. The proposed Trans-Caspian Pipeline is a key element in these efforts. The pipeline, which would stretch 338 km from Turkmenistan's Turkmenbashi gas field to Azerbaijan's Sangachal terminal, is designed to transport 30 billion cubic meters of natural gas annually. Previous estimates suggest that the pipeline's construction would cost approximately $5 billion. However, as of now, the project remains at the planning stage and has yet to be implemented (Akyener, 2014, p. 70). The multidimensional nature of the Trans-Caspian Pipeline—spanning economic, political, and security concerns—has ensured that its significance extends beyond its energy function. The research hypothesis highlights key issues influencing the project's feasibility. On the one hand, factors such as Europe's need to diversify its energy import routes, Turkmenistan's energy security concerns, and the ongoing war in Ukraine serve as driving forces. On the other hand, environmental

concerns and geopolitical opposition pose significant obstacles to its implementation.

This research adopts a theoretical approach to examine both the factors that could accelerate the pipeline's realization and those that hinder its progress.

2. Literature Review

Chumakov (2019), in his article titled '*Prospects of Trans-Caspian Gas Pipeline*', discusses the background and current status of the Trans-Caspian Gas Pipeline (TCGP). The author explains how new international agreements will affect the cooperation of governments in further construction of the TCGP. The pipeline should connect the gas fields of Turkmenistan and Azerbaijan to supply more gas to Europe. Each Caspian country has its own opinion on the TCGP. Russia and Iran agree to comply with all environmental standards. Turkmenistan is interested in diversifying gas export destinations. Ashgabat must expand the scope of gas production activities, since Turkmenistan depends on gas exports to China. The entry of a new country into the supply chain will mean the entry of a new competitor into the European market. The European Union is developing its energy security policy, which will eliminate the monopoly of gas supplies, especially from Russia. For this reason, the European Union needs to establish relations with the countries of Central Asia and the South Caucasus. The European Union offers to attract investment for the construction of the TCGP.

Amirahmadian et al. (2024) in article '*The Geopolitical and Geoeconomic Effects of the Trans-Caspian Pipeline*' (1996) Implementation on Regional Countries: A Case Study of Iran, the authors of this article state that the Trans-Caspian Pipeline**.** This

project is considered as one of the most important initiatives of Turkmenistan the development of natural gas exports is due to the significant importance of the Trans-Caspian Pipeline for the countries of the region, especially Iran. It is also stated that the implementation of the Trans-Caspian Pipeline will have different impacts on Iran Geopolitical and Geoeconomic**.** The implementation of the Trans-Caspian Pipeline will raise various geopolitical and Geoeconomic challenges for Iran, especially the threat to energy security and the impact on military and political dimensions. Given these concepts, the developments related to the Trans-Caspian Pipeline require more attention. In particular, considering their potential to reduce Iran's influence in the region, change the balance of power in favor of Western countries and weaken Iran's role as an energy transit route and supplier to the European market.

In article '*Trans-Caspian Gas Pipeline-Real Opportunities or Endless Promises*', by Shirvanova (2020), the author of the article notes that the current prospects and opportunities for the implementation of the long-term Trans-Caspian gas pipeline project have been analyzed. This infrastructure could transport Turkmen gas from Turkmenistan to Azerbaijan and from there to Europe thanks to the Southern Gas Transport Corridor. Such a global network of gas pipelines could connect Western Europe and the Far East thanks to Turkmenistan's gas reserves. But the implementation of the Trans-Caspian gas pipeline seems to be out of reach, and its 'responsibility' lies with the main partners and other regional stakeholders. In addition, Russia and Iran have always carefully assessed possible scenarios for the development of this project, as they fear a possible change in the usual gas route and the loss of their intermediary role. The convention signed in Aktau on the status of the Caspian Sea opened up two possible

paths: either the Trans-Caspian project will be revived due to the renewed interest of all parties, including the European Union, or nothing will change, and Russia and Iran will have.

Cutler (2021), in his article titled '*The Trans-Caspian Gas Pipeline for Peace-Building in the South Caucasus*', argues that the EU should focus on three key areas of success in its bilateral cooperation with the countries of the South Caucasus: energy, security and transport. This includes the construction and development of the Trans-Caspian Gas Pipeline (TCGP, often referred to as the 'TCP' and previously a Project of Common Interest), which in the new geopolitical context could transit gas from Azerbaijan via Armenia. The pipeline, which could be designed to be hydrogen-ready, would meet the EU's energy needs at the lowest possible cost, without compromising Europe's green principles, and reduce Europe's dependence on gas.

The above articles did not take into consideration the obstacles or drivers for the implementation of the pipeline, which is why this article is of great importance in this regard.

3. Theoretical Framework

The Copenhagen School is one of the pioneering approaches in establishing an independent position for security studies. This school has placed greater emphasis on security studies in the post-Cold War period, considering the extensive transformations that have occurred in this field. According to Buzan (1991), security has moved beyond its traditionally narrow, military-focused definition under the new international conditions. In the post-Cold War era, the scope of security has expanded to encompass multiple dimensions, including military, political, economic, social, and

environmental aspects. Buzan (1991) argues that security is an intersubjective concept, shaped by the decisions of relevant actors. He defines security as freedom from threat, asserting that security can only be understood in relation to the presence or absence of a threat.

For security to be truly multidimensional, Buzan emphasizes the need to consider factors such as culture, geography, environment, civilization, religion, and most importantly, identity. This framework is based on the theory of security, where a time issue is considered as a security threat when it is introduced as an existential threat and requires emergencies beyond ordinary policies that, if the threat is not properly dealt with, it is possible to change a minor threat to a major one. A key concept within the Copenhagen School is securitization, which frames security as a speech act, making the articulation of security threats a central focus of analysis. In the context of national security, Buzan et al (1998, pp. 116-133) categorize threats into five groups:

a) Military Threats

Military threats represent the traditional focus of security studies, encompassing direct challenges to state sovereignty such as warfare, armed aggression, or nuclear proliferation. While these remain central to conventional security paradigms, the Copenhagen School argues that securitization occurs when a state frames another state's military actions as an existential threat. For example, Russia's invasion of Ukraine was justified by Moscow as a response to NATO's eastward expansion, which it securitized as an existential threat to Russian national security.

b) Political Threats

Political threats refer to challenges that undermine state stability, governmental legitimacy, or political order, including coups,

terrorism, or authoritarianism. According to the Copenhagen School, these threats become securitized when political elites successfully present them as existential dangers to the established political system.

c) Social Threats

Social threats target a nation's social identity, cohesion, or cultural integrity, such as mass migration or ethnic conflict. The Copenhagen School posits that societies securitize such issues when they perceive their collective identity to be at risk.

d) Economic Threats

Economic threats include risks to a nation's prosperity, trade relations, or financial stability, such as sanctions, economic stagnation, or resource scarcity. From the Copenhagen perspective, economic issues are securitized when they are framed as survival threats, such as economic warfare or targeted attacks on a country's financial system.

e) Environmental Threats

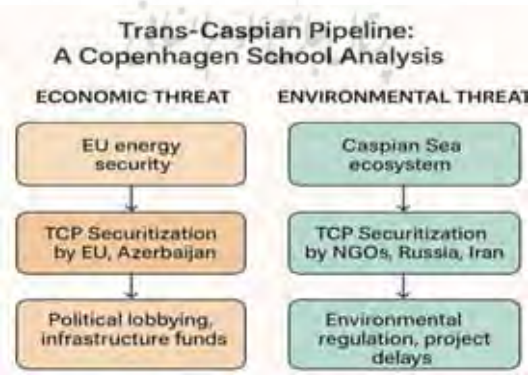
Environmental threats arise from climate change, pollution, or resource depletion, endangering both human survival and ecosystems. The Copenhagen School suggests that these issues are securitized when governments declare them existential threats—for instance, by framing climate change as a national security crisis.

According to the Copenhagen School's theory and the concept of securitization, the implementation of the Trans-Caspian Pipeline project can be analyzed from two perspectives: economic threats and environmental threats. The first type of securitization involves economic threats. The Trans-Caspian Pipeline could intensify

competition over energy resources in the Caspian region and affect the economic interests of some countries (such as Russia or Iran). Iran and Russia may also identify the project as a threat leading to Western/EU domination. Alternatively, this project could be seen as contributing to economic sanctions or reduced energy revenues in some countries, such as Iran, while reducing Turkmenistan's need to rely on Iran for energy exports.

The second type involves environmental threat securitization. The construction of the Trans-Caspian Pipeline may increase environmental risks such as damage to the marine ecosystem and water pollution due to the enclosed nature of the Caspian Sea. In this regard, environmental activists and coastal governments may identify the project as an existential threat to the Caspian Sea. Additionally, the slope of the Caspian Sea floor toward the Iranian coast makes Iran more sensitive to environmental issues in the Caspian Sea than any other country. Figure 1 provides a clearer picture of the threats facing the Trans-Caspian Pipeline through the lens of the Copenhagen School's securitization theory, the following diagram has been developed.

Figure 1: Trans-Caspian Pipeline Economic and Environment Threat



Source: Authors

4. Prior Trans-Caspian Pipeline

In this section, we have examined the historical background of the Trans-Caspian Pipeline project. In the 1990s, the U.S. initiated efforts to build a pipeline beneath the Caspian Sea to transport gas from Turkmenistan. During the same period, General Electric was selected as the contractor to conduct a feasibility study for the pipeline. A few years later, in 1999, Turkmenistan, Azerbaijan, Georgia, and Turkey signed agreements to collaborate on constructing the pipeline under the seabed. However, the project was stalled due to legal disputes over the Caspian Sea's status. The lack of an agreement among Caspian littoral states on resource utilization and pipeline construction led to its suspension for years. Figure 2 illustrates the proposed route of the Trans-Caspian Gas Pipeline, which would connect Turkmenistan to the Sangachal Terminal in Azerbaijan via the Caspian Sea.

Figure 2: Trans-Caspian Pipeline

Source: Karayianni, 2018

Momentum for the project resurfaced during the 2006 summit, following the Russia-Ukraine gas dispute and the potential disruption of Russian gas exports to Europe. As a result, European countries began to take the pipeline's construction more seriously (Cutler, 2020, pp. 4-5). That same year, Azerbaijan's Prime Minister, Saparmurat Niyazov, strongly endorsed the project. At the same time, Andris Piebalgs, representing the European Union, toured the region to express the EU's official support for the Trans-Caspian Pipeline. In addition to European Union officials, Azerbaijani authorities also voiced strong backing for the project. However, Russia, opposing the pipeline for both political and economic reasons, intensified its efforts to prevent its completion (O'Keefe, 2021, pp. 665-667). Russia argued that the pipeline posed both economic and ecological risks, claiming that it would threaten the Caspian Sea's ecosystem. When its environmental objections failed to halt the project, Russia resorted to political and economic pressure to dissuade participating countries from moving forward with the pipeline's construction. Similarly, in 2007, Russia sought to reinforce and expand gas transport routes from Central Asia to Europe by signing a trilateral agreement with Turkmenistan and Kazakhstan. This move was, in part, an attempt to discourage Turkmenistan from pursuing the Trans-Caspian Pipeline.

Four years later, in 2011, recalling the 2007 gas supply disruption and Russia's suspension of exports to Europe, the European Union took steps to revive the Trans-Caspian Pipeline negotiations. The EU granted the European Energy Commission the authority to lead discussions, and the commission formally announced its intention to purchase gas through the pipeline. This development encouraged Turkmenistan to move forward with the project.

In the subsequent years, the broader infrastructure for the Trans-Caspian Pipeline began to take shape. The completion of the Trans Adriatic Pipeline (TAP) and the Trans-Anatolian Natural Gas Pipeline (TANAP) in 2012 and 2015 effectively completed the pipeline network. With these critical components in place, the Trans-Caspian Pipeline entered its final phase (Islamli, 2022, p. 12). European countries aimed to increase Turkmenistan's gas exports and reduce their dependence on Russian gas by completing the Trans-Caspian Pipeline and integrating it with the TANAP and TAP pipelines. While both the European Union and individual European states provided political and economic support for the project, their efforts to secure firm commitments for the pipeline ultimately fell short. However, negotiations between Azerbaijani and Turkmen officials in 2021 regarding oil and gas fields in the Caspian Sea fostered closer cooperation and renewed momentum for the project, paving the way for the eventual completion of the Trans-Caspian Pipeline (Mustafayeva, 2021, pp. 42-45).

Türkmengaz and Turkmenistan's national oil company serve as the contractors for the Trans-Caspian Pipeline (Cutler, 2021, pp. 7-8). This pipeline is considered part of the Southern Gas Corridor, a project aligned with U.S. strategic interests. The Southern Gas Corridor aims to diversify energy routes and reduce Europe's reliance on a single supplier. The project pursues four key objectives, the first of which is to capitalize on the development of the Shah Deniz gas field, increasing its production capacity and subsequently boosting gas exports to Europe. Additionally, the project seeks to complete the TAP and TANAP pipelines, a massive $45 billion infrastructure initiative spanning 3,500 km, making it one of the most significant energy projects in the Central Asia and Caucasus region (Karagianni, 2022, pp. 3-7). Figure 3 shows the route of the Southern Gas Corridor, which transports

Azerbaijani gas from the Shah Deniz field to Europe (Italy) through the South Caucasus, Trans-Anatolian, and Trans-Adriatic pipelines.

Figure 3: Southern Gas Corridor

Source: Ramazanova, 2024

The Trans-Caspian Pipeline is another key objective of the Southern Gas Corridor project. Once completed, the pipeline will contribute 30 billion cubic meters of gas annually to the Southern Gas Corridor, representing a significant capacity increase. Various scenarios have been proposed regarding the pipeline's final destination. One widely discussed plan involves integrating the Trans-Caspian Pipeline into the Southern Gas Corridor. Another proposal connects it to the White Stream pipeline, which links to Romania and other European countries, providing a strategic opportunity for Turkmenistan to export its gas (Siddi, 2019, pp. 132-135).

Additionally, the White Stream pipeline, when supplied by the Bulgaria-Romania-Hungary-Austria pipeline, would further enhance and diversify Turkmenistan's energy export routes. This

diversification is particularly crucial for Turkmenistan, given its heavy dependence on gas exports as a primary source of revenue. Recognizing the pipeline's importance for Europe's energy security, the European Commission has classified the project as one of its key strategic energy initiatives. Consequently, financial resources have been allocated to Turkmenistan and Azerbaijan to support its completion and implementation. Furthermore, as part of its broader geopolitical interests, the U.S. has strongly backed the project. By listing the Trans-Caspian Pipeline among the EU-supported projects, the U.S. has also facilitated its development through financial and logistical support via international development funds (Bryza & Cutler, 2020, pp. 5-8).

5. Propellant Factors

5. 1. Convention on the Legal Status of the Caspian Sea

The history of the Caspian Sea's legal status dates back to the treaties of 1921 and 1940. Under these agreements between the Soviet Union and Iran, the Caspian Sea was effectively divided into two equal parts, with one half allocated to Iran and the other to the Soviet Union (Seyrafi, 1399 [2020 A.D.], pp. 125-127). However, following the Soviet Union's collapse and the emergence of four new independent states along the Caspian Sea's coastline, the issue of its division became increasingly significant. Russia, Azerbaijan, Kazakhstan, and Turkmenistan successor states to the Soviet Union—brought renewed attention to the need for revising the sea's legal status.

The 1921 and 1940 treaties did not specify precise territorial divisions, instead treating the Caspian Sea as undivided shared waters. According to international law governing post-Soviet

states, newly independent countries were expected to uphold agreements from the Soviet era. However, given the Caspian Sea's vast oil and gas resources, its littoral states did not fully accept this principle, leading to disputes over its division and usage. By 1994, disagreements over the Caspian Sea's legal framework had intensified. In 1998, Russia asserted that all littoral states must reach a consensus before any unilateral actions could be taken in the Caspian. Kazakhstan, on the other hand, argued that since the Volga River flows into the Caspian, it should be classified as an international body of water and divided accordingly.

Kazakhstan later proposed a compromise, suggesting that each state should be granted 12 nautical miles of territorial waters from its coastline. However, Iran held a different perspective on the division and usage of the Caspian Sea, further complicating negotiations. Iran advocated for a legal framework in which the surface waters of the Caspian Sea would remain free and communal for all littoral states, while the seabed and its resources would be divided among the five countries. Iran placed particular emphasis on the equitable division of the sea's underground resources. Disputes over the legal status of the Caspian Sea and the use of its resources continued until the adoption of the Aktau Convention. However, before this agreement, several proposals were introduced, although none received unanimous approval from the involved states (Latsabidze, 2023, pp. 2-3). To understand the legal status of the Caspian Sea, it is essential to consider relevant international legal principles. According to international maritime law, lakes surrounded by multiple countries are classified as internal waters. However, a crucial distinction exists: the Caspian Sea lacks any direct connection to the open ocean. Under the United Nations Convention on the Law of the Sea (UNCLOS), international lakes are typically divided based on agreements

between the bordering states (Zheng, 2021, pp. 10-12). There are three recognized methods for dividing lakes under international law: full division, equal division, and shared (or communal) division.

1. Full Division: This method allocates shares based on the length and shape of each country's coastline. States with longer coastlines receive a proportionally larger share of the water body.

2. Equal Division: This approach disregards the length of the coastline and instead divides the water body into equal portions for each bordering country. However, this method is often disputed, as states with longer coastlines argue that it is unfair and does not align with their national interests.

3. Shared (Communal) Division: Under this system, no single country claims exclusive ownership over specific portions of the water body. Instead, all littoral states have collective rights to its use. A key principle of this arrangement is the necessity of cooperation and coordination among states, often through joint regulatory mechanisms and mutual agreements (Churchill, 2022, pp. 200-205). The choice of division method significantly impacts resource management and geopolitical relations among the Caspian littoral states, shaping both economic opportunities and regional stability.

The legal status and division of the Caspian Sea are critical issues directly affecting the Trans-Caspian pipeline. One of the most significant aspects of the Caspian Sea legal framework is the management of its underground resources, particularly oil and gas, as well as the construction of transmission pipelines. Following the collapse of the Soviet Union, the strategic importance of the Caspian Sea increased dramatically as newly independent states

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began exploring and discovering additional oil and gas reserves. This growing significance extended to discussions surrounding the Caspian Sea Legal Status Convention, making it a central issue in regional energy politics.

Article 14 of the Caspian Sea Legal Convention specifically addresses the development of pipelines along the seabed. Azerbaijan, Kazakhstan, and Turkmenistan have advocated for greater autonomy in constructing pipelines through the Caspian, while Iran and Russia have strongly opposed such measures (Dragomir, 2024, pp. 58-61). According to the Convention, coastal states have the right to construct and operate pipelines under the Caspian Sea.

5. 2. Turkmenistan Energy Security

Turkmenistan's energy security is a crucial factor influencing energy pipeline development in the Caspian region. With its vast gas reserves estimated at 480 trillion cubic feet, ranking fourth globally Turkmenistan plays a significant role in the global energy market. Since gaining independence from the Soviet Union, the country has prioritized the exploration and development of new gas fields, often in collaboration with foreign companies. However, due to its landlocked geography, Turkmenistan faces challenges in exporting gas, necessitating the consideration of multiple pipeline routes to access international markets. The absence of direct access to the high seas has hindered its ability to export gas globally and has slowed down its development projects.

According to the theoretical framework of energy security, ensuring a stable demand and securing long-term customers such as European nations is essential for Turkmenistan. European countries, in turn, present a viable long-term market for Turkmen

gas. Additionally, energy security theory highlights the importance of diversification in export routes to prevent over-reliance on a single country or corridor. In line with this approach, Turkmenistan has developed multiple pipelines, including Lines A, B, C, and D, which facilitate gas exports to East Asia. Furthermore, the country is actively pursuing the construction of the TAPI pipeline to expand exports to the Indian subcontinent. Figure 4 displays the network of Turkmenistan's natural gas pipelines connecting the country to its neighbors, including China, Afghanistan, Pakistan, India, and across the Caspian Sea to Azerbaijan.

Figure 4: Turkeminstan Natural Gas Pipeline

Source: Hedlund, 2019

In addition to the previously mentioned pipelines and Turkmenistan's gas export routes to Iran, the construction of the Trans-Caspian pipeline is also expected. A key factor driving this project is the critical role of energy security in its execution. Given Turkmenistan's heavy economic dependence on gas exports, the country seeks to increase sales volume and diversify its export routes—an objective closely aligned with the Trans-Caspian

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pipeline. If implemented with a capacity of 30 billion cubic meters per year, the pipeline will not only enhance Turkmenistan's economic strength, but also provide substantial financial resources to the country on an annual basis (Khan, 2024, pp. 9-10). The need for Turkmenistan to generate revenue from natural gas sales remains a major motivation behind the project's development.

On the other hand, Azerbaijan, despite not sharing a land border with Turkmenistan, can establish a connection through this pipeline. In general, factors such as energy security, natural gas sales, and—most importantly—the diversification of export routes are key drivers behind the Trans-Caspian pipeline. These considerations will likely encourage Turkmenistan's authorities to move forward with its implementation.

Moreover, one of the most important issues regarding the implementation of the Trans-Caspian pipeline is Iran's energy security. The United States' sanctions against Iran and the policy of excluding Iran from energy projects in the Central Asian and Caucasus regions are rather significant issues. In this regard, the West and the United States support energy projects, such as the Trans-Caspian pipeline to diminish Iran's role. The implementation of this pipeline could threaten Iran's security. This is because the reduction of Turkmenistan's dependence on Iran and the resulting threat to Iran's energy security due to Turkmenistan's decreased need for Iran to connect to the Caucasus and Europe would marginalize Iran in these developments. This point demonstrates that the threat to Iran's energy security is a critical issue. The Iranian economy's dependence on revenues from the sale and transit of energy means that a reduction in such revenues would create security challenges, posing serious economic threats to Iran.

5. 3. Solving the Disputed Area of Energy Between Turkmenistan, Azerbaijan

The dissolution of the Soviet Union and the emergence of newly independent states have complicated relations among nations. In particular, the formation of multiple countries in Central Asia and the Caucasus has made regional cooperation more challenging. Among these newly independent states are Turkmenistan and Azerbaijan. Despite not sharing a land border and being separated by the Caspian Sea, Turkmenistan and Azerbaijan have worked to improve their bilateral relations and economic cooperation. Over the years, their relationship has experienced fluctuations. During the presidency of Saparmurat Niyazov in Turkmenistan, interactions between the two countries were minimal, and cooperation remained limited. However, after Gurbanguly Berdimuhamedow came to power, relations between Turkmenistan and Azerbaijan gradually strengthened and expanded. While these ties continued to develop, certain issues led to tensions and a decline in the level of cooperation between the two nations (Mustafayeva, 2021, pp. 40-43).

One of the main points of contention between Turkmenistan and Azerbaijan has been the division of the Caspian Sea and the exploitation of its resources. This dispute emerged after the collapse of the Soviet Union and persisted until the signing of an agreement establishing the legal framework for the Caspian Sea. However, this process led to a gradual decline in relations between the two countries (Kasim, 2021, p. 953).

In recent years, tensions have resurfaced over ownership and rights to an oil and gas field in the Caspian Sea. The Dostluk (Friendship) field, jointly shared by Azerbaijan and Turkmenistan, was initially a source of dispute. However, negotiations over its

development have significantly improved the prospects for bilateral cooperation (Liakopoulou, 2021, pp. 8-10).

On the other hand, relations between Turkmenistan and Azerbaijan have seen positive developments, particularly with the signing of a tripartite energy agreement between Turkmenistan, Iran, and Azerbaijan at the end of 2021. Such agreements reflect growing cooperation in the energy sector (Shana Petro Energy Information Network, 2022).

One of the most critical projects that could further strengthen ties between Azerbaijan and Turkmenistan is the implementation of the Trans-Caspian pipeline. However, political and economic factors have slowed progress on this initiative. During the presidency of Saparmurat Niyazov, strained relations between the two countries hindered major projects such as the Trans-Caspian pipeline. Nevertheless, ongoing bilateral cooperation continues to create opportunities for enhanced economic and diplomatic relations. Implementing projects like the Trans-Caspian pipeline will deepen economic and political ties between Turkmenistan and Azerbaijan.

5. 4. Russia - Ukrainian War

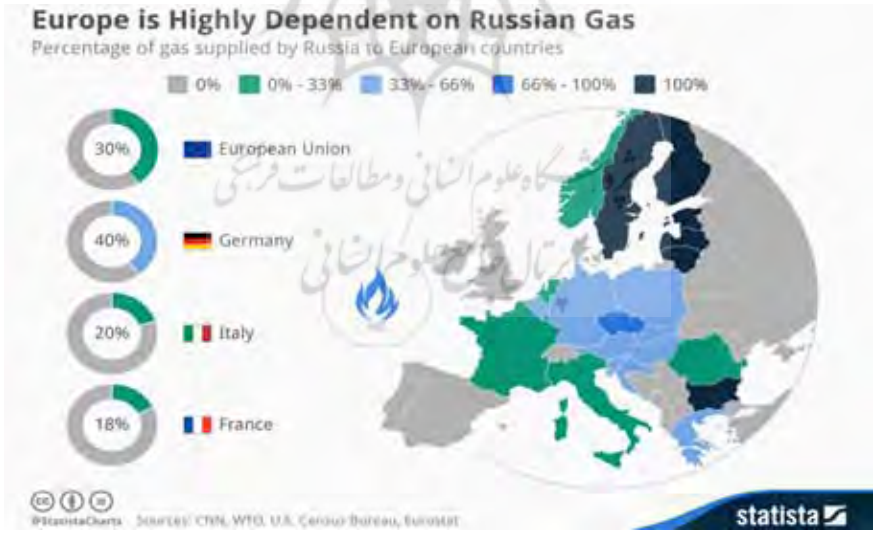
The Russia-Ukraine war has had far-reaching global consequences since its inception, leading to soaring prices, supply shortages, and inflation in many countries. The shortage of wheat and the subsequent rise in its price have created serious challenges for countries dependent on wheat imports. Similarly, the war has exacerbated energy-related concerns, particularly in Europe, where reliance on Russian gas is a critical issue.

During this period, oil and gas prices have surged dramatically. While energy-producing nations have benefited from higher

revenues, energy-consuming countries—particularly in Europe—have faced serious economic challenges. The most pressing issue for European nations has been securing natural gas supplies.

European countries import over 40% of their gas from Russia, a dependency that has been deeply affected by the war. The sharp increase in gas prices, combined with Europe's heavy reliance on Russian energy, has raised serious concerns. This situation has also revived fears reminiscent of the 2009 gas crisis, when a dispute over transit fees and debt led Russia to halt gas exports to Ukraine and Europe, resulting in a 20-day gas shortage (Zhiznin & Dineva, 2020, pp. 11-14). Figure 5 shows the geopolitical importance of Russian gas for Europe and the strategic significance of the Trans-Caspian Pipeline in reducing the European Union's energy dependence.

Figure 5: Europe Dependence on Russian Gas



Source: McCarthy, 2014

In response to these challenges, European leaders have increasingly focused on energy security theory, emphasizing the diversification of energy routes. As part of this strategy, European countries have sought to reduce their dependence on Russian gas by supporting and participating in alternative energy projects. In recent years, discussions have intensified around initiatives such as the Southern Gas Corridor and pipelines like the Blue Stream.

Russia's threats to cut off gas supplies—particularly its demand for payments in rubles—have further highlighted the urgency of diversification. The gas supply to Poland and Denmark was already disrupted under these conditions, prompting European nations to explore new import routes and alternative suppliers (Jacobsen, 2022).

Reducing reliance on Russian gas is not only an economic priority, but also a geopolitical necessity, given Russia's repeated use of energy as a political weapon, as seen during the 2009 gas crisis and the ongoing Russia-Ukraine war (Selei, 2022, pp. 2-3). One of the key projects that could help mitigate this dependence is the Trans-Caspian pipeline. With a capacity to export 30 billion cubic meters of gas annually to European markets, this project could address a significant portion of Europe's energy needs. Beyond its economic benefits, European countries view the pipeline as a strategic tool to weaken Russia's dominance in the energy sector, thereby reshaping the geopolitical balance in the region.

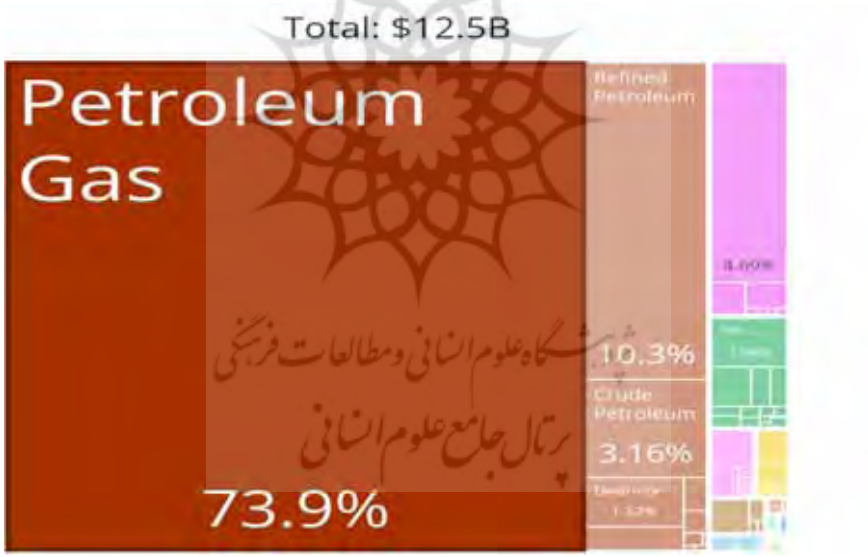
6. Barriers to Building the Trans-Caspian Pipeline

6. 1. Turkmenistan's Economic and Political Status

Turkmenistan's economy remains relatively weak, having experienced a severe crisis following the collapse of the Soviet

Union and its subsequent independence. Over time, gas exports gradually increased, providing some economic stability. However, the country's economy remains heavily reliant on oil and, particularly, gas sales (Soyunova, 2019, p. 30). This dependence on a single-product economy makes Turkmenistan vulnerable to fluctuations in global energy prices, as any increase or decrease in gas prices significantly impacts its economic stability. Figure 6 shows the composition of Turkmenistan's exports in 2022, based on a total export value of $12.5 billion.

Figure 6: Turkmenistan Export 2022



Source: The Observatory of Economic Complexity, 2022

Political interference and a lack of transparency in Turkmenistan have contributed to significant financial challenges, hindering the

country's economic and industrial development. The absence of clear financial regulations and reporting has made Turkmenistan an unattractive destination for foreign investors. This reluctance to invest is closely tied to the country's limited economic capacity, the high demand for energy resources, and the development of its oil and gas sector, which remains highly dependent on foreign investment.

Turkmenistan's economic conditions also play a crucial role in the construction of the Trans-Caspian Pipeline. The country's financial constraints have led to delays in the project, as its economy lacks the capacity to support such large-scale infrastructure developments. In this regard, Turkmenistan's economic situation remains a major obstacle to the pipeline's progress. Beyond economic challenges, political factors further complicate the implementation of the pipeline. Saparmurat Niyazov served as Turkmenistan's first president until his death in 2006. He was succeeded by Gurbanguly Berdimuhamedow, who remained in power until 2022. Following his tenure, his son, Serdar Berdimuhamedow, assumed the presidency on March 19, 2022.

Turkmenistan's presidency has long been dominated by a single individual, contributing to a high degree of political stability. The President holds extraordinary power and plays a central role in state affairs, with most major decisions and projects requiring presidential approval. Following Serdar Berdimuhamedow's inauguration in March 2022, it was natural for certain projects to be temporarily halted, as he consolidated his political position (Ibragimova, 2023). This transition led to delays in projects such as the Trans-Caspian Pipeline, as political shifts often result in temporary pauses in decision-making. The uncertainty surrounding the new leadership also made foreign investors more cautious about

committing to investments in Turkmenistan. However, this political situation is temporary and will likely stabilize once the new administration clarifies its policies and priorities regarding the Caspian gas pipeline. If the project aligns with Serdar Berdimuhamedow's broader economic strategy, it may be pursued more aggressively.

Ultimately, Turkmenistan's economic and political conditions remain significant obstacles to the pipeline's implementation. These two factors play a more decisive role than any other in determining the project's future.

6. 2. Environmental Issues

One of the most significant obstacles to the Trans-Caspian Pipeline is environmental concerns. Across the world, regions involved in gas exploration and transportation face pollution-related challenges that not only harm the environment, but also disrupt ecosystems and threaten wildlife. These issues have drawn increasing global attention. The Caspian Sea—more accurately described as a lake—is a completely enclosed body of water with no direct connection to open seas. This unique characteristic amplifies environmental concerns, making pollution in the Caspian a more pressing issue than in many other regions. As a result, environmental sensitivities have played a role, albeit a secondary one, in limiting the development of the oil and gas industry in the Caspian region (Mityagina, 2022, pp. 9–11).

The enclosed nature and shallow depth of the Caspian Sea exacerbate environmental risks. Incidents such as oil well fires have led to severe pollution, occurring multiple times and causing

lasting ecological damage. Given that the Caspian lacks a natural water exchange with open seas, pollutants accumulate over time, potentially turning the sea into a toxic reservoir. If pollution continues unchecked, the Caspian Sea may reach a point in which its waters become unusable. Among the littoral states, Iran exhibits the highest sensitivity to environmental concerns in the Caspian Sea. This is primarily due to the sea's natural slope, which directs pollutants toward Iran's shores, making the country particularly vulnerable to ecological damage.

This environmental vulnerability explains why oil pollution has been increasingly observed along the Caspian Sea's shores in recent years. However, environmental concerns are not just ecological, but also political. The issue has often been leveraged as a political tool, with countries using environmental arguments to advance their own interests. As seen in the legal commission discussions on the Caspian Sea, Iran and Russia have actively sought to prevent pipeline operations under the pretext of environmental protection. A key legal instrument in these debates is the Ramsar Convention, which has been central to opposition against pipeline projects in the Caspian (Stroud, 2022, pp. 1107–1109).

The Ramsar Convention, which focuses on wetland preservation and the protection of bird habitats, plays a crucial role in safeguarding lakes and wetlands. The convention sets strict guidelines for the use and development of wetland areas, emphasizing the need for rigorous environmental assessments and strong protections for wildlife habitats (Bridgewater & Kim, 2021, pp. 268–270). Tehran Convention plays a crucial role, as it sets environmental regulations governing the use of the Caspian Sea and the construction of pipelines. This de facto veto power has

given both countries significant leverage over the implementation of energy infrastructure in the region.

According to Article 1 and Article 8 of the Caspian Sea Legal Status Convention, the Caspian Sea must be divided among the littoral countries, ensuring equal usage rights for all of them (Pecoraro, 2021, pp. 290-292).

Given the geographical characteristics of the Caspian Sea as a closed basin and its specific orientation toward Iran's coastline, environmental issues take on extraordinary significance. The spread of pollution and environmental threats could potentially lead to the securitization of this matter by Iran, highlighting the importance of Iran's extensive interests in the Caspian region. Within the framework of the Copenhagen School theory, environmental threats, as a core concept, can transform ecological pollution into a serious security challenge against Iran and neighboring countries. According to this theory, when an environmental issue is framed as an existential threat to national security, it transcends normal political discourse and becomes a security matter. In the case of the Caspian Sea, this process could lead to the development of a security discourse centered on protecting Iran's vital interests in this strategic region.

6. 3. Iran, Russia, and China Disagreement

The primary obstacles to the implementation of the Trans-Caspian Pipeline are Iran, Russia, and China. As with any major pipeline project, its construction has the potential to impact the political and economic interests of neighboring states, and Iran and Russia are no exception. Following the collapse of the Soviet Union and the

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expansion of pipeline networks, Russia emerged as the dominant energy power in the region, particularly in the gas sector. Naturally, Moscow seeks to counter any pipeline project that could weaken its energy dominance. In recent years, Russia has pursued a strategy of controlling energy flows, particularly to Europe, as part of its broader geopolitical approach. Any alternative pipeline that reduces Russia's share of the European energy market is seen as a direct threat to its strategic interests.

The Trans-Caspian Pipeline poses economic, political, and security challenges for Russia. It threatens Russia's energy security by creating an alternative supply route that could diminish its control over European gas markets. This is particularly significant given that the Russian economy is heavily dependent on energy exports (Geng, 2021, pp. 64–65). The ongoing war in Ukraine, coupled with Western sanctions, has already placed severe economic pressure on Russia, reducing its energy revenues. The potential emergence of competing gas routes only exacerbates these challenges.

Similarly, Iran opposes such projects for similar reasons. Pipelines like the Trans-Caspian and TAPI (Turkmenistan-Afghanistan-Pakistan-India) could undermine Iran's energy security by providing alternative routes for gas exports, reducing Iran's influence in regional energy markets. As a result, both Russia and Iran have actively resisted pipeline projects that bypass their territories. In recent years, Iran has distanced itself from regional energy initiatives, with its position in the region significantly weakened due to the U.S. policy of isolation (Tokar, 2022, pp. 58–63). Beyond economic concerns, Iran, like Russia, perceives the growing presence of European countries and the U.S. in the Caspian Sea as a threat to its national security. Such

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involvement could potentially escalate border disputes and lead to broader economic consequences for Iran. Additionally, as previously mentioned, Iran remains highly sensitive to environmental issues. Projects like the Trans-Caspian Pipeline pose significant ecological risks, with pollution threatening Iran's already vulnerable ecosystem.

China also opposes the Trans-Caspian Pipeline for similar reasons. The country's rapidly increasing energy consumption, particularly for natural gas, has made securing stable import routes a strategic priority. The most economically and logistically viable option for China is to import gas via pipelines from Central Asian countries, particularly Turkmenistan. These imports are not only crucial for China's energy security, but also cost-effective due to the geographic proximity and favorable pricing of Turkmen gas. Given these advantages, China prefers to maintain its energy dominance in Central Asia and opposes the development of alternative pipelines that could divert Turkmen gas exports elsewhere (Tang & Joldybayeva, 2022, pp. 16–19).

7. Conclusion

Political and economic factors remain central to determining the pipeline's feasibility. Turkmenistan's economic challenges and heavy dependence on energy exports have driven the country to diversify its export routes. In this regard, Turkmenistan has sought to resolve long-standing disputes over its shared gas field with Azerbaijan. Meanwhile, the war in Ukraine and Europe's growing need for alternative gas supplies have heightened interest in the Trans-Caspian Pipeline. However, strong opposition from Russia, often framed in environmental terms along with Europe's

increasing preference for liquefied natural gas (LNG), has cast doubt on the pipeline's future.

The Trans-Caspian Pipeline has the potential to significantly reshape the energy landscape, particularly for Europe. Its completion would effectively finalize the Southern Gas Corridor, enhancing Europe's energy security by diversifying its gas imports. This would bring substantial benefits not only to Europe, Turkmenistan, and Azerbaijan, but also introduce important geopolitical shifts in the Caspian Sea region. Moreover, the pipeline could reduce Europe's dependence on Russian gas and bypass Iran's role as a transit route for Turkmenistan's gas exports, both of which are key factors in transforming energy security for multiple countries. A crucial consideration in this regard is the impact on Iran. The implementation of the Trans-Caspian Pipeline could have multiple implications for Iran. From an environmental perspective, the project could pose serious risks to Iran's coastline. Severe pollution along Iran's northern coast might lead to the extinction of marine species and a decline in fishing revenues, dealing a significant blow to the regional economy.

From a geopolitical standpoint, the pipeline would eliminate Turkmenistan's reliance on Iran for access to the Caucasus, thereby undermining Iran's energy security. Existing arrangements, such as gas swap agreements with Turkmenistan and Azerbaijan, have allowed Iran to leverage these deals to strengthen its position in regional energy dynamics. However, reducing Turkmenistan's dependence on Iran for gas exports could disrupt natural gas supplies to northern Iran, particularly during winter—creating energy security challenges. From the perspective of the Copenhagen School, this could be interpreted as a threat to Iran's broader security framework. In the end, the realization of this

pipeline represents a major geopolitical development in Central Asia, the Caspian Sea, and the Caucasus. It signifies a shift in the region's traditional power dynamics, paving the way for new actors, while posing significant economic, political and environmental challenges to established players like Iran.

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