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THE ROLE OF CRITICAL INFRASTRUCTURE IN REGIONAL SECURITY: AN ANALYSIS OF GEORGIA IN THE CONTEXT OF THE CAUCASUS REGION

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ABSTRACT

This paper examines the current state of critical infrastructure and the security challenges faced by Georgia and the South Caucasus region. In accordance with Georgian legislation, critical infrastructure encompasses both public and private assets that provide services in sectors such as energy, water, agriculture, healthcare, finance, and communications. Hydropower serves as the cornerstone of the country's energy sector. The future of the Enguri hydroelectric power plant remains uncertain due to the situation in occupied Abkhazia, and the oil and gas pipelines (BTC and South Caucasus Pipeline) are potential targets for terrorists in the event of hostilities in the region. The East-West Highway is considered a critical investment in transportation infrastructure. The 2008 war highlighted the vulnerability of the country's digital infrastructure in terms of cybersecurity. Additionally, the regional context presents a complex power rivalry: Armenia is pursuing closer ties with Western nations, Azerbaijan aims to enhance economic diversification, and Russia, Turkey, and Iran are actively seeking to preserve their influence in the area. Special emphasis is placed on the Zangezur (Syunik) corridor. Within this geopolitical framework, the Zangezur corridor, which links the western part of Azerbaijan to Nakhichevan, has emerged as a significant issue of concern for regional and global security.

Keywords: critical infrastructure, regional security, geostrategy, Caucasus, Zangezur Corridor

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INTRODUCTION

Critical infrastructure serves as the foundation of modern states and regions, underpinning public welfare, economic efficiency, and national security. In Georgia and throughout the South Caucasus, infrastructure plays a particularly vital role due to the region's geopolitical position as a corridor connecting Asia and Europe, which presents both opportunities and threats. This study aims to analyze critical infrastructure in Georgia and the Caucasus region as an interconnected systemic complex, with its legislative framework, energy facilities, transport networks, cybersecurity, regional context, and geopolitical challenges. Special emphasis is placed on the Zangezur (Syunik) corridor, which has recently become a symbol of regional power distribution.

MAIN PART

Definition of Critical Infrastructure

According to the international definitions, various documents, doctrines, and concepts, critical infrastructure is considered to be systems and assets whose disruption directly affects the functioning of society and the economy. The Canadian Ministry of Public Security specifically describes it as "processes, systems, facilities, technologies, networks, assets, and services that are essential for health, safety, and economic well-being."[4]

The US National Institute of Standards and Technology (NIST) dictionary defines critical infrastructure as, "Systems and assets, whether physical or virtual, so vital that the incapacity or destruction of such systems and assets would have a debilitating impact on security, national economic security, or national public health.[5] Private sector blogs and cybersecurity companies (e.g., Palo Alto Networks) also emphasize that critical infrastructure includes the food and agriculture sector, transportation systems, water

[4] „Canada's Critical Infrastructure (CI)“, government of Canada. Public Safety Canada, https://surl.lu/nigjsy, (Accessed 23.12.25)
[5] critical infrastructure, Computer security resource center , https://surli.cc/martir, (Accessed 23.12.25)

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supplies, internet and mobile networks, public health, energy, financial services, and telecommunications.[6]

The definition of critical infrastructure sectors varies by country. Canada's critical infrastructure is categorized into ten sectors: energy and utilities, finance, food, government services, health, information and communications technology, manufacturing, security, transportation, and water.[7] The US Cyber and Infrastructure Security Agency (CISA) identifies 16 sectors, including chemical, commercial facilities, communications, critical manufacturing, dams, defense industry, emergency services, energy, financial services, food and agriculture, government facilities, public health sector, information technology, nuclear reactors/materials, transportation systems, and water and wastewater sector.[8] The EU NIS2 Directive identifies operators of essential services (energy, transport, banking, healthcare, water supply, and digital infrastructure) and digital service providers, which are subject to specific cybersecurity and incident reporting requirements.[9]

The energy sector constitutes a critical component of essential infrastructure and serves as a fundamental driver for various other sectors. According to the Cybersecurity and Infrastructure Security Agency (CISA), energy infrastructure "protects a network of diverse electricity, oil, and natural gas resources and assets to ensure uninterrupted energy supply and the health and well-being of the nation." A comprehensive analysis of the energy sector reveals that this infrastructure is vital for sustaining economic activity; Without it, the stability of public health and the economy is threatened.[10]

Interdependencies and Risks

The strong interdependencies among critical infrastructure sectors render them particularly susceptible to vulnerabilities. In the contemporary, technology-driven

[6] „What Is Critical Infrastructure?“, Paloalto, https://surl.li/gajotu, (Accessed 23.12.25)
[7] Ibid. government of Canada.
[8] „Homeland Security Presidential Directive 7“, Amerika’s Cyber Defense Agency, https://surl.li/eyimjg, (Accessed 23.12.25)
[9] Ibid. „What Is Critical Infrastructure?“.
[10] Ibid. „Homeland Security Presidential Directive 7“.

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landscape, where the Internet serves as a fundamental enabler, cyberattacks have the potential to trigger cascading disruptions across critical infrastructure systems.

Canada's National Strategy for Strengthening Critical Infrastructure Resilience adopts a risk-based framework, emphasizing the importance of partnerships, information sharing, and protection measures. Various initiatives have been established to mitigate the impacts of both intentional and unintentional incidents, as well as natural disasters. It is essential to implement business continuity procedures and contingency plans to guarantee minimal service disruptions.[11] CISA and NIST are actively enhancing digital security. Furthermore, the EU NIS2 Directive obliges member states to strengthen cybersecurity capabilities and ensure the implementation of security measures.[12]

Critical Infrastructure Analysis of Georgia and the Caucasus Region, Legislative Framework

In Georgia, critical infrastructure refers to both physical and virtual assets owned or managed by the state or the private sector that provide essential services to society. These services include energy, fuel, water, agriculture, healthcare, finance, and communications. Georgia is currently updating its legislation, drawing on experiences from Europe. The report titled "Creating a Legislative Framework for the Protection of Strategic Assets" emphasizes the need to establish modern criteria and legal regulations. This will help identify critical infrastructure, analyze risks, and allocate responsibilities effectively.[13]

Energy, Oil and Gas Pipelines

The energy sector constitutes a fundamental component of Georgia's critical infrastructure. The country derives approximately one-third of its electricity from the Enguri hydroelectric power station, which was commissioned in 1978 and remains the largest power generation source in the region. A part of the station is situated on Georgian-controlled territory, while the main power station building is located 15 kilometers away in the occupied Abkhazia. According to a 1996 agreement, Tbilisi supplies Abkhazia with

[11] Ibid. government of Canada.
[12] Ibid. „What Is Critical Infrastructure?“.
[13] Economic Policy Research Center, EPRC https://surl.li/cisbts, (Accessed 08.12.25)

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approximately 40 percent of its hydroelectric power generation at no cost. In return, Abkhazia (along with Russian military forces) acknowledges Georgian ownership of the Enguri hydroelectric power station.

The Caucasus region serves as the center of the Southern Gas Corridor, which supplies natural gas to Europe. The most renowned oil pipeline in this area is the **Baku-Tbilisi-Ceyhan (BTC)** pipeline. Stretching 1,768 kilometers, it connects Baku and Ceyhan, passing through Tbilisi and Erzurum en route. The first shipment of oil occurred in May 2006. From a security standpoint, the BTC pipeline has faced multiple attacks. In 2007, Turkey enhanced the security measures surrounding the pipeline. On August 5, 2008, a significant explosion took place in the Refahiye district of Turkey, temporarily disrupting the flow of oil. The Kurdistan Workers' Party initially claimed responsibility for this incident.

Additionally, the **South Caucasus Pipeline** transports gas from Azerbaijan's Shah Deniz field to Turkey. This pipeline runs parallel to the BTC and is 692 kilometers long, with 248 kilometers located in Georgia. It was inaugurated in 2006, but in August 2008, it was closed for two days due to a military operation between Russia and Georgia. This incident highlighted how regional conflicts can directly threaten energy supplies.

Transport and Logistics Infrastructure

Georgia and the South Caucasus serve as the basis of Eurasian transit routes. The **East-West Highway** connects the eastern and western regions of the country and is part of the E60 European transit route. The most challenging section of this highway, the Rikoti Pass, is 50 kilometers long. Construction of 97 bridges and 51 tunnels in this area is nearing completion. The project cost is approximately 3 billion GEL (around 1 billion euros), with key funding provided by the Asian Development Bank (ADB), the World Bank (WB), and the European Investment Bank (EIB). Chinese companies are responsible for the construction work. Once completed, the highway aims to double transport capacity and reduce travel times. Additionally, the extension of the Baku-Tbilisi-Kars railway line represents another vital freight corridor in the Caucasus.

Cybersecurity

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During the 2008 Russo-Georgian War, significant cyberattacks targeted both private and state websites in Georgia. These attacks commenced on July 20 and reached their peak on August 8. As a result, most of the Georgian government's websites were taken down. To maintain communication, the government relocated essential internet resources to servers of the United States, Estonia, and Poland.[14]

In the 1990s and beyond, Georgia's telecommunications networks lacked adequate resilience. Ongoing reforms, along with integration with the European Union, aim to enhance the resilience of digital infrastructure and introduce consultative principles. However, cyber disruptions, particularly from Russia, continue to pose a significant threat.

Security Challenges

The South Caucasus region serves not only as a vital transit corridor but is also characterized by significant security challenges. Although new geopolitical actors are increasingly involved in the South Caucasus, Moscow continues to wield influence through its established economic and cultural connections. However, this influence has become increasingly unequal and asymmetrical. Analysts specializing in Eurasian affairs observe that, despite existing tensions, Russia is actively seeking to consolidate its authority in the South Caucasus by pursuing new initiatives and seizing political opportunities, even as its influence appears to be waning in certain areas.[15]

Georgia's Challenges. The main challenges for Georgia still remain the occupied territories and the Russian military forces stationed there, as well as the legislative framework for critical infrastructure with its protection mechanisms, and cybersecurity.

Armenia's Dilemma. Yerevan's move toward Europe and America, as part of the 2025 deal, means less dependence on Russia; however, this strategic shift involves substantial economic and political risks. Armenia remains dependent on Russian energy supplies and remittances, and a rapid severance of trade and economic ties with Russia could damage the economy.

[14] Andria Gotsiridze. „The Cyber Dimension of the 2008 Russo-Georgian War“, https://surli.cc/nxlbir, (Accessed 08.12.25)
[15] „South Caucasus: Strategic Security Risk and Russia's Geopolitical Dynamics“, https://surl.li/yfuixf, Accessed 08.12.25)

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Azerbaijan's Balance. Baku collaborates closely with Turkey but also maintains important economic ties with Russia. The country is striving to diversify its economy and expand its network of international partners. Severing ties with Russia could negatively impact trade, logistics, and overall international engagement.

Russia's Asymmetrical Position. Although the Kremlin's influence in the South Caucasus has somewhat diminished, it still remains significant. Analysts suggest that Russia is attempting to strengthen its power in the region. The opening of an airport in Abkhazia, the port of Ochamchir, and the military bases are examples of this.

This trend indicates that the region is actively seeking new partners while also reducing its reliance on traditional allies. The main security challenges stem from unresolved conflicts (such as those in Abkhazia and the Tskhinvali region), alongside great power competition and economic instability. Additionally, institutional weaknesses and socio-economic inequality further intensify these tensions, and implementing any significant investment and infrastructure project requires multilateral security guarantees.

The 2020 Agreement and the Corridor Idea

The ninth paragraph of the ceasefire agreement between Russia, Armenia, and Azerbaijan, dated November 10, 2020, stated that all economic and transport communications in the region should be opened. Armenia was to provide security guarantees, and the Russian Federal Security Service (FSB)[16] would safeguard the transport route that passes through its territory. This provision hinted at the restoration of historical railways and roads linking the western region of Azerbaijan to its Nakhichevan region, as well as to Turkey. This would create a direct connection from Azerbaijan through the Syunik province of Armenia. However, despite the agreement's details, it has not been practically implemented.

American 100/99 Year Lease Proposal and Reactions

16. „Confusing and contradictory statements on Zangezur road“. Harut Sassounian. July 25, 2025. https://surl.li/kjdggt, Accessed 08.12.25)

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In July 2025, the United States proposed a new model for managing the Zangezur Road. Speaking to reporters in New York, U.S. Ambassador to Turkey and Special Representative for Syria, Tom Barrack, announced that the United States was prepared to take over the management of the 32-kilometer road through a 100-year lease with a private American company. Barrack stated, “Azerbaijan and Armenia have a disagreement over the 32-kilometer road, so grant us a 100-year lease on this stretch, and both sides will benefit.” He emphasized that this corridor would help revitalize the main Asian-European trade route, known as the "Middle Corridor." Harut Sassounian. July 25, 2025. Confusing and contradictory statements on Zangezur road.

Yerevan promptly addressed this proposal. Government spokesperson Nazeli Baghdasaryan emphasized that Armenia is not considering transferring any parts of its sovereign territory to a third party. Therefore, control of the Syunik region cannot be handed over to another state or company. Turkey, in principle, supports the opening of the corridor, although Ankara claims it is not familiar with the specifics of the American plan.[17]

On August 7, 2025, in Washington, a peace treaty was signed at the initiative of the U.S. President between the President of the Republic of Azerbaijan and the Prime Minister of Armenia. According to this agreement, the management of the Zangezur Corridor was transferred to the American side for a period of 99 years. This treaty demonstrated that the Zangezur Corridor is not merely a logistical route; it also plays a significant role in influencing the balance of power among major players.

Military-strategic assessment: balance of power and distribution of influence

Russia

- **Operational objective: Maintain/expand influence in the South Caucasus; Contain NATO on the Black Sea coast.**
- **Active levers: Occupied territories as a forward support; Support for the Black Sea Fleet; Energy/cyber pressure.**

[17]US floats 100-year lease on Zangezur corridor to break Armenia-Azerbaijan deadlock, https://surl.li/ikqjsh, Accessed 08.12.25)

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- Constraints: Sanctions; Technological/industrial deficits; Geopolitical overload.
- Trend 2025: Stable, high-reaction capability in maritime-airspace; Probable goal is to increase control of the East-West corridor of transit routes.

Turkey

- Operational Objective: Consolidation of the South Caucasus transport/energy hub; Strengthening NATO's Black Sea vector.
- Active Levers: Integration with Azerbaijan; Reserve Logistics, Drone Umbrella, Experience.
- Constraints: Domestic Macroeconomics; Dependence on Western Technologies.
- Trend 2025: Increasing involvement in Georgian infrastructure nodes (peacekeeping/training activities, logistical access).

USA/NATO

- Operational Objective: Black Sea Security, Russian Deterrence, Partner Resilience.
- Active Levers: Training (“Agile Spirit”, “Noble Partner”), ISR/Cybersecurity, Infrastructure Modernization.
- Constraints: Lack of a permanent base; Political/Legal Constraints on Direct Engagement.
- Trend 2025: Enhancing technological support and establishing regular sea and air visits, prioritizing the resilience of critical infrastructure.

Iran

- Operational Objective: Northern Border Stability; Southern Corridor Strengthening; Western Influence Containment.
- Levers: Missile Potential; Economic-Logistical Channels; Asymmetric Instruments.
- Constraints: Sanctions; Regional Isolation; Limited Power in the Caucasus.
- Trend 2025: Cautious Economic-Logistical Expansion, with Low Probability of Direct Military Engagement.

China (Indirect military factor)

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- **Operational objective: Provision of maritime-southern global logistics (“One Belt, One Road”).**
- **Levers: Investment/financial resources; Port/road financing.**
- **Constraints: Low level of military projection in the region; Risks of Western-Chinese confrontation.**
- **Trend 2025: Selective investments in ports/logistics; Dynamics strongly dependent on the security environment.**

SWOT Analysis - Military Strategic Positions of Major Players in Georgia and the Region

Player	Strengths (S)	Weaknesses (W)	Opportunities (O)	Threats (T)
Russia	·Direct military force in the region (occupied territories) · Zones on the Black Sea coast ·Energy and hybrid pressure tools	· Economic sanctions and technological backwardness · Exhaustion of resources by a large-scale war in Ukraine · Isolation from the West	· Strengthening military control over the Caucasus transit routes · Restoring influence over the former Soviet space	· Strengthening NATO in the Black Sea · Trilateral cooperation between Turkey-Azerbaijan-Georgia
Turkey	· NATO membership and a strong army · Close military alliance with Azerbaijan · Control of strategic transit infrastructure	· Internal political and economic instability · Dependence on Western military technologies	· Increasing engagement in Georgia's military infrastructure · Strengthening the energy and transport hub in the region	·Risk of direct confrontation with Russia ·Tensions with Iran and Armenia
USA / NATO	· High-tech military support · Training and education system · Cybersecurity support	· Absence of a permanent base in Georgia · Political constraints on direct intervention	· Strengthening the security of the Black Sea · Modernizing Georgia's defense capabilities	· Direct military response from Russia · Crossing of interests of regional partners (Turkey, Azerbaijan)
Iran	· Geographical proximity and transport links · Missile capabilities	· International sanctions and economic weakness · Limited military power in the Caucasus	· Strengthening the Southern Transport Corridor · Expanding trade and economic relations	· Growing influence of Turkey and Azerbaijan · Tightening of Western sanctions
China	· Strong economic and investment resources · Global logistics strategy (“One Belt, One Road”)	· Absence of direct military influence · Dependence on transit routes of Russia and Iran	· Involvement in Georgia's infrastructure projects · Development of Black Sea ports	Strengthening the Western positions in the South Caucasus

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Geographic Subzones/Actors (intensity/trend)

Subzone / Actor	Russia	Turkey	USA/NATO	Iran	China
Georgia (controlled territories)	**High (→)**	**Medium-high (↑)**	**Medium (↑)**	**Low (→)**	**Low (→)**
Tskhinvali Region, Abkhazia Occupied territory of Georgia	**Very high (→)**	**Low (→)**	**Very low (→)**	**Low (→)**	**Low (→)**
Black Sea waters (GE sector)	**High (↑)**	**Medium (↑)**	**Medium (↑)**	**Very low (→)**	**Low (→)**
Azerbaijan	**Medium (→)**	**Very high (↑)**	**Medium (↑)**	**Medium (→)**	**Low-medium (↑)**
Armenia	**High (↓)**	**Low-medium (→)**	**Low (→)**	**Medium-high (→)**	**Low (→)**

Notice: Intensity. Very low/low/medium/high/very high; trend ↑ increasing, ↓ decreasing, → stable.

CONCLUSION

Georgia and the South Caucasus serve as a bridge linking Europe and Asia through energy and transport networks. The energy sector relies on large hydroelectric power plants (Anguri, etc.) and a regional network of pipelines. The security and resilience of these systems are influenced by the political climate, natural conditions, and cybersecurity threats. Additionally, transport plays a vital role in facilitating transit, although geological factors (landslides and earthquakes) can make the region's infrastructure vulnerable.

Cybersecurity and regional conflicts present ongoing challenges. During the 2008 war, significant cyberattacks were launched that temporarily incapacitated Georgia's public information systems. To protect and modernize the country's critical infrastructure, it is essential to invest in technology, foster close international cooperation, ensure regional stability, and establish an effective legal framework.

The example of **the Zangezur Corridor** illustrates how a transport route can become the focal point for shifts in regional power. The 2020 agreement viewed the Syunik Road as a chance for economic integration and peace, but subsequent disputes have generated new tensions surrounding it. The proposal of a 100/99-year lease, suggested by the US, has captured significant attention in Georgian and Caucasian society. However, the legal and political controversies involved indicate that a final decision and its practical

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implementation are still distant. Therefore, the long-term stability of critical infrastructure relies not only on financial resources but also on agreements that respect sovereignty, ensure regional security, and uphold international law.

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