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Reinforcing NATO's energy security

North Atlantic Council

Empowering Future Generations: Cultivating Global Literacy and Enlightenment

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Introduction

Energy security is a key part of keeping countries safe and stable. It affects how well economies function, how independent nations can be, and how strong their military forces are. For NATO, energy security is not just about economics, it is a critical part of ensuring the safety of its member countries. NATO depends on a steady and reliable supply of energy to keep its economies running and its military operations ready for action. Any disruptions to this supply, whether from natural disasters, price changes, or deliberate attacks, can lead to serious problems and even threaten international security.

There are many issues that can pose a risk to energy security. Political tensions in important energy-producing areas, like the Middle East, Eastern Europe, or any other oil producing region, can lead to shortages or higher prices. Some countries or groups also use energy as a weapon, cutting off supplies to put pressure on others. Cyberattacks on key energy systems, such as pipelines or power grids, are becoming a bigger threat and could cause major damage. At the same time, the shift to renewable energy, while important for the environment, creates new challenges like managing rare materials or maintaining steady energy supplies.

For NATO, protecting energy security is essential to keeping its member countries strong and prepared. By defending energy systems, promoting diverse energy sources, and staying ready for new risks, NATO can help ensure safety and stability in an energy-dependent world.

Definition of Key Terms

Energy Security

The reliable availability of energy sources at an affordable price. It ensures that countries can meet their energy needs without interruptions.

Critical Energy Infrastructure
Physical systems like pipelines, power plants, and grids that are essential for energy production and delivery.

Energy Weaponization
When countries or groups use energy resources, like oil or gas supplies, as tools to pressure or threaten others.

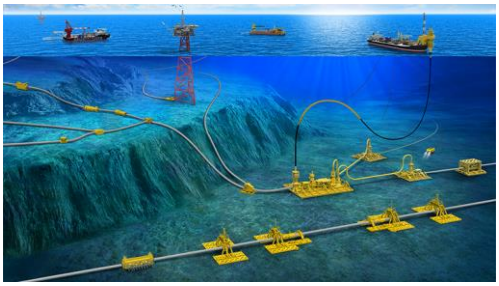
Cyberattacks
Attempts by hackers to disrupt or damage computer systems, often targeting energy infrastructure like power grids or refineries.

Renewable Energy
Energy from sustainable sources like wind, solar, and hydropower, which are essential for reducing dependence on fossil fuels.

General Overview

The issue of energy security lies in 2 different fields. One of them is the supply of energy from Russia and other non-NATO members, which needs to be protected. The other is about internal protection of energy supplies.

Oil rigs and pipelines
The importance of oil and gas in today's world is abnormal. Eighty percent of the world's energy comes from fossil fuels. For Europe, it is almost the same, and most of it is either imported from Russia or produced locally. The oil has to be transported from the North sea and Atlantic oil rigs to the mainland with pipelines or via the Nord Stream pipelines into Germany. The transport through oil pipelines together with the oil rigs provide two choke points which can be targeted by enemies of the alliance. The current protections set in place are not quite enough as seen in the Nord Streams attacks. The measures taken by the alliance include patrolling ships around oil rigs and normal surveillance. These measures do not provide the proper protection but there are not many other cost-effective solutions at hand. Protecting a 1000 km long pipeline can be a difficult project to undertake and the alliance has to work together to prevent Russia and other organisations from sabotaging the pipelines. As seen on the picture below, oil pipelines lie directly on the surface and are an easy target for either underwater explosives placed down by divers, earthquakes loosening the construction or even anchors as seen in the Baltic Sea.



Anchors in the Baltic Sea

Russia's Role

Our pipelines and oil rigs need protection, especially from the Russians. The protection can span from patrol boats around oil rigs, to counterintelligence against Russian tactics. That is also the reason why the protection of the oversea infrastructure is a role that NATO has imposed upon themselves. Despite the ongoing war in Ukraine, Russia has not postponed their investments in both submarines and their hybrid tactics for sabotaging purposes. Many funds were withheld for the navy, yet the Russian submarine industry continued thriving and these submarines could impose heavy damage upon allied infrastructure by executing certain missions.

Another threat imposed by the Kremlin is their use of hybrid tactics. The wide range of possible tactics is a difficult one to counter for NATO countries. The boundaries of war and peace are getting more grey and Russia is the major factor for this. It is clear that these specific tactics are hard to counter and also hard to notice.

Other dangers

NATO's energy security is deeply intertwined with the stability and security of its external trade networks. Member countries rely heavily on global trade routes for the transportation of vital energy resources, such as oil, natural gas, and coal. These trade routes are the backbone of the energy supply chain, ensuring that economies function, homes are heated, and military operations remain operational. However, this heavy reliance on external sources makes NATO vulnerable to a range of threats, including geopolitical tensions, supply disruptions, and the weaponization of energy. To safeguard energy security and economic stability, NATO must adopt a multifaceted approach that includes protecting external trade routes, diversifying energy sources, and transitioning to renewable energy.

One of the most significant vulnerabilities in NATO's external trade lies in its reliance on critical energy infrastructure and chokepoints. Key maritime passages, such as the Strait of Hormuz, the Suez Canal, and the Turkish Straits, handle a significant proportion of the world's energy trade. Any disruption in these regions—whether due to geopolitical conflict, piracy, or natural disasters—can lead to severe supply shortages and price spikes. For instance, tensions

in the Strait of Hormuz, a vital artery for oil shipments from the Middle East, highlight the risks NATO faces when global energy trade depends on unstable regions. Safeguarding these trade routes requires a robust naval presence, intelligence sharing, and partnerships with regional allies to ensure the uninterrupted flow of energy.

Despite efforts to secure trade routes, reliance on external energy supplies remains a long-term risk. Many NATO member states import significant amounts of energy from regions outside the alliance, such as the Middle East, North Africa, and Russia. This dependency not only makes NATO countries vulnerable to supply disruptions, but also exposes them to the weaponization of energy. Russia, for example, has historically used its natural gas supplies as a tool of political coercion, cutting off or threatening to cut supplies to Europe during times of heightened tension. This underscores the importance of energy diversification—ensuring that NATO members rely on a wide variety of energy sources and suppliers to mitigate risks.

One effective way to achieve energy independence is by transitioning to renewable energy. Renewable energy sources, such as wind, solar, and hydropower, offer NATO countries the opportunity to reduce their reliance on imported fossil fuels and build self-sufficient energy systems. Unlike oil and gas, which are often concentrated in specific regions, renewable energy resources are more evenly distributed and can be developed locally. For example, NATO countries like Germany, Denmark, and the United States have made significant investments in wind and solar power, demonstrating the feasibility of large-scale renewable energy adoption.

However, transitioning to renewables presents its own set of challenges. Renewable energy systems often rely on critical materials, such as lithium, cobalt, and rare earth metals, which are essential for producing batteries, wind turbines, and solar panels. These materials are often concentrated in a few countries, including China, which currently dominates the global supply chain for rare earth metals.

Major Parties Involved

United States of America

The United States plays a central role in NATO's energy security efforts as the country supports NATO's energy diversification. Additionally, it provides military and technological capabilities to protect critical energy infrastructure from hybrid threats.

Russia

The Kremlin poses the biggest threat to national security mainly by using their hybrid tactics. Sabotaging oil pipelines and more are on their agenda. The major losses in Ukraine didn’t stop Russia's effort and submarine investments have not fallen prey to the budget cuts the Kremlin was forced to make.

Gazprom

Gazprom is the owner of the Nord Stream pipelines and a Russian state owned company. Gazprom heavily relies on its exports to Europe and the Nord Stream attacks. The company suffered greatly after the attacks in Ukraine and on the Nord Stream pipeline and is trying to find new buyers for its fossil fuels.

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Timeline of Events

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April 4th, 1949	Establishment of NATO.
June 2011	Creation of Nord Stream 1.
February 24th, 2022	Russia continues it's war with Ukraine and invades the entirety of Ukraine. This attack greatly threatened Europe's energy security with Putin threatening to cut off gas supplies
September 26th, 2022	The Nord stream pipelines attacks caused a giant leak of oil in Denmark.
July 11th, 2023	The creation of the Maritime Centre for the Security of Critical Underwater Infrastructure.
March 7th, 2024	Admission of Sweden, after Finland's admission, into NATO.

Previous attempts to solve the issue

NATO's Energy Security Centre of Excellence (ENSEC COE)

Established in 2012 in Lithuania, the Energy Security Centre of Excellence (ENSEC COE) is one of NATO's key initiatives to address energy security. It serves as a hub for research, training, and collaboration among NATO member states to improve resilience against energy-related threats. The centre focuses on protecting critical energy infrastructure, analysing risks such as

cyberattacks and supply disruptions, and promoting energy efficiency within NATO forces. While the ENSEC COE has been successful in raising awareness and building expertise, its impact has been somewhat limited by the voluntary nature of member contributions and its narrow focus on training and research rather than operational implementation. As energy threats evolve, the centre requires greater integration with NATO's broader strategic and operational frameworks to address challenges such as the weaponization of energy and the transition to renewable energy systems.

The NATO Pipeline System (NPS)

The NATO Pipeline System, established during the Cold War, was designed to ensure a steady supply of fuel for military operations across Europe. It includes a vast network of pipelines, storage facilities, and refineries spread across several member states. The system has been instrumental in securing fuel supplies during crises and conflicts, allowing NATO forces to operate effectively without dependence on external resources.

However, the NPS has faced challenges in recent decades. As Europe's energy needs and supply dynamics have shifted, the pipeline system has become less relevant for civilian energy demands. Additionally, the infrastructure is aging, and investments in modernization have been insufficient. While the NPS remains a valuable asset for military logistics, its role in broader energy security needs reassessment to align with modern challenges, such as renewable energy integration and cyber threats to infrastructure.

Diversification of Energy Sources in Europe

In response to reliance on Russian natural gas, NATO and the EU have supported efforts to diversify energy sources through projects like the Southern Gas Corridor and the development of Liquefied Natural Gas (LNG) terminals. These initiatives aim to reduce dependency on single suppliers by increasing access to alternative sources, such as Azerbaijani gas or American LNG.

While these projects have improved energy security for some NATO members, progress has been uneven across the alliance. Many countries, particularly in Central and Eastern Europe, remain heavily reliant on Russian gas due to historical ties and logistical constraints. Furthermore, these diversification efforts are still primarily focused on fossil fuels, delaying the transition to renewable energy. To build true resilience, NATO must complement these efforts with investments in sustainable energy solutions and improved regional cooperation on energy infrastructure.

Possible solutions

To avoid creating new dependencies, NATO must prioritize the diversification of supply chains for these critical materials. This could include forming partnerships with like-minded nations, investing in recycling technologies, and exploring alternative materials to reduce reliance on imports.

Renewable Fuel

Transitioning to renewable energy is essential for NATO to reduce its dependence on external fossil fuel supplies and mitigate vulnerabilities in global energy trade. Renewable energy sources, such as solar, wind, and hydropower, can be produced locally, providing a stable and sustainable energy supply for NATO member states. This transition would also align with NATO's climate goals and help future-proof its energy systems.

To achieve this, NATO could spearhead joint renewable energy initiatives among member states, focusing on large-scale deployment of clean energy technologies. Investments in advanced storage solutions, such as battery systems and hydrogen infrastructure, would ensure energy reliability during periods of low renewable generation. Additionally, NATO could be an example for the rest of the world, by incorporating renewable energy into its military operations, and reducing its operational carbon footprint while enhancing energy self-sufficiency. This shift would strengthen NATO's resilience against energy-related threats and position the alliance as a leader in global energy innovation.

Protecting Against Hybrid Threats

Hybrid threats, including cyberattacks on critical energy infrastructure and the weaponization of energy supplies, pose significant risks to NATO's energy security. To counter these threats, NATO must develop a comprehensive strategy that combines advanced technologies, intelligence-sharing, and coordinated defence measures.

Key actions include enhancing cybersecurity for critical energy systems such as power grids, pipelines, and refineries. NATO could create a centralized cyber defence unit dedicated to identifying vulnerabilities, responding to attacks, and sharing best practices across member states. Strengthening international partnerships with technology providers and private-sector energy companies would also improve defences.

Furthermore, NATO must address the strategic use of energy as a weapon. This involves diversifying supply chains, increasing storage capacities, and building resilience against potential blockades or disruptions. By proactively addressing hybrid threats, NATO can safeguard its energy systems, while maintaining operational readiness and economic stability across its member states.

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