Global Essay Competition 2025

Title: ACTIONS is All We Need to Secure Global Energy

Essay:

1. Introduction

In 2022, Europe experienced one of its worst energy nightmares following the Russian invasion of Ukraine. Two weeks into the war, the gas, coal and oil prices across Europe increased by 180%, 130% and 40%, respectively (Adolfsen et al., 2022). However, the storm is far from being over as the continent wrestles yet another possible crisis as projected from the recent increase in prices,[1] including a 40% increase in gas prices between September and December 2024 (Sullivan, 2024). Besides the Russia-Ukraine war, the Middle East conflicts, the US-China dynamics and the cascading effects of the worsening climate change have all contributed to the resurgence of the volatile global energy prices that impact nations and industries alike.

Internationally, the shift in the global balance of power toward a multipolar world has increased protectionism and geopolitical tensions that are shaping the global energy system (Rystad et al., 2025). Notably, there are growing concerns about the politicization of energy policies and the weaponization of energy supplies (LaBelle, 2023). The dynamics of a multipolar world coupled with pressing global challenges like climate change pose a big threat to global energy security.[2] Importantly, despite the efforts to address this challenge, the lack of consensus on the definition of energy security (Winzer, 2012) further impedes the development of a globally oriented energy security framework and policies.

To achieve and safeguard global energy security, I propose that the international community and stakeholders adopt a more holistic definition of energy security that reflects the complexity of the contemporary energy sector. Subsequently, I provide a definition and operationalize it by proposing a comprehensive global energy security framework (dubbed ACTIONS) that goes beyond the traditional view of energy security to capture the emerging challenges of a multipolar world. Through ACTIONS, we can redefine our understanding and response to 21st century energy challenges and chart our path towards sustainable development goal (SDG) number seven by providing everyone with reliable, affordable and clean energy.[3]

2. Redefining Global Energy Security

The debate on energy security concept causes more confusion than clarification. Historically, it originated in the early 20th century in connection to the need to supply adequate oil to the armies[4]

[1] https://www.bloomberg.com/news/articles/2024-11-23/europe-is-already-facing-its-next-energy-crisis
[2] https://www.weforum.org/stories/2024/05/why-geopolitics-matters-more-than-ever-in-a-multipolar-world/
[3] https://sdgs.un.org/
[4] https://www.danielyergin.com/books/theprize

before gaining momentum during the 1970s oil crises and the rising demands and supply disruptions in the 2000s (Hancock & Vivoda, 2014). Until recently, the definitions have mainly centered around the geopolitics of fossil fuels, often emphasizing a reliable supply of affordable fossil fuels and the need to protect national interests with regard to control of energy resources and supply chains.

The International Energy Agency (IEA) defines energy security as the "uninterrupted availability of energy sources at an affordable price" (IEA, 2024). According to Cherp and Jewell (2014), it is the "low vulnerability of vital energy systems." While these definitions cover the essential components of energy security, they certainly overlook emerging challenges like climate change, environmental degradation and global inequality. For example, fossil fuels are the primary drivers of climate change, accounting for approximately 90% of carbon emissions in 2024 (Hausfather & Friedlingstein, 2024). As such, climate and environmental goals are becoming an integral part of the modern design of energy systems and policies (Gitelman et al., 2023). Furthermore, these challenges are exacerbated by the unprecedented threats associated with the increased interconnection of energy systems and the transition from a unipolar to a multipolar world, such as disruptions due to geopolitical conflicts or cyber-attacks (IEA, 2024).

In light of the emerging energy threats, governments and policymakers must adjust their energy priorities and policies to adapt to the new realities and uncertainties, starting by redefining energy security. To do so, we need to start by understanding what the term 'security' implies. According to Baldwin (1997), security is the "low probability of damage to acquired values" (pg. 23). He further emphasizes the importance of asking additional questions like security for who, for which values and against what threats. Notably, these questions have not been explicitly answered in the existing definitions of energy security. Therefore, I propose defining energy security as:

> *The ability of a nation or a region to reliably and equitably meet its current and future energy demands through sustainable and affordable means with minimal environmental impacts and maximum regional and international cooperation.*

I believe that the diverse definitions and expressions of energy security do not necessarily imply the existence of different energy security concepts. This definition is not meant to be exhaustive but rather to provide conceptual clarity in navigating the challenges of the modern energy sector. A clear understanding will support the development of rational and effective policies by providing the basis for learning and international comparison.

3. The ACTIONS Framework

The energy sector is vital to facilitating social and economic development and societal wellbeing. The highly influential 4As (availability, affordability, acceptability and accessibility) framework for assessing energy security threats (APERC, 2007) often forms the basis of contemporary energy studies and

policy formulation. Building on this foundation, I proposed the ACTIONS framework to operationalize the newly proposed definition of energy security. This framework has seven components: Adaptability (A), Cooperation (C), Technology (T), Innovation (I), Optimization (O), Networks (N) and Sustainability (S).

Adaptability. In the rapidly evolving energy landscape, flexible and adaptive energy systems and policies are necessary. In this context, adaptability refers to how well the energy systems and policies can respond to emerging threats and opportunities associated with global challenges, changing energy demands and technological advancements. It requires continuous assessment of energy risks to develop resilient energy systems capable of withstanding or quickly recovering from unprecedented disruptions. Adaptive policies and systems will make energy production more economically feasible and energy products more affordable.

Corporation. Presently, the world is grappling with an ambitious plan to significantly reduce its dependence on fossil fuels, which still account for about 80% of world energy supplies (Statista, 2024). According to IEA, the threat posed by disruptions of fossil fuels will not end in the distant future (IEA, 2024). International governance and cooperation are necessary to promote shared responsibility in protecting supply chains and managing geopolitical conflicts that could disrupt the supply of energy from diverse sources. For example, while some EU leaders and policymakers claim to have weakened Russian grip on EU energy market (Sullivan, 2024), recent data shows that Europe continues to import significant amounts of Russian supplies, purchasing 40% and 49% of Russia's pipeline gas and liquified natural gas (LNG) exports, respectively, between December 2022 and December 2024 despite its economic sanctions on Russia (Raghunandan & Katinas, 2025). Perhaps a more structured approach to managing EU-Russian conflicts could have abated the supply disruptions and high prices. Effective international collaboration is also vital for harmonizing regulations and policies to facilitate cross-border trade and investment in clean energy. Examples of key international bilateral activities are those between the United States and India, China, Norway and Japan that focus on accelerating net-zero emissions by 2050.[5]

Technology and Innovation. Growth in technology-driven energy innovations is led by the changing customer and market needs and reflects the current shifts in the production and consumption of energy (Derrick, 2024). Leveraging advanced technologies like artificial intelligence will facilitate the creation and deployment of innovative and sustainable energy solutions as well as accelerate the transition to a low-carbon economy. Renewable technologies like smart grids, energy storage and integration solutions will enhance grid stability, reduce consumption of fossil fuels and improve the efficiency, reliability and affordability of clean energy sources, especially in underserved regions.

Optimization. Optimizing energy systems at national, regional and global levels involves strategic planning, investing and creating diversified energy sources and supply chains. Renewable sources

[5] https://www.energy.gov/fecm/international-cooperation

like hydropower, biomass, wind and solar energy have proved effective in meeting a significant portion of our energy needs. According to IEA, a total of US$ 1.1 trillion was invested in low-carbon energy technologies by 2022, with the figure projected to reach a staggering US$ 4.5 trillion if global warming is to be limited to 1.5°C by 2030 (Derrick, 2024). This underscores a collective commitment to sustainable and diversified energy solutions. Expanding energy options and trade routes can help improve resiliency and reduce market volatility by offering flexibility during disruptions.

Networks. Global energy networks are more interconnected and complex than ever. Decentralizing from large-scale and centralized energy infrastructure to more localized and community-based systems can reduce vulnerabilities to attacks and disruptions of centralized energy infrastructure. This is possible with increased investment in clean energy and support for localized energy infrastructure like microgrids, community wind projects and home solar systems. Local communities should also be empowered to effectively and efficiently manage their energy needs to promote overall energy reliability and stability.

Sustainability. Sustainability refers to “meeting the needs of the present without compromising the ability of future generations to meet their own needs” (Kuhlman & Farrington, 2010). It is essential for long-term viability and security of energy systems. While sustainability is often associated with minimizing the environmental impacts of human activities, it also extends to long-term social and economic viability. Energy systems and policies that fail to prioritize social, environmental and economic sustainability not only risk aggravating climate change, environmental degradation and social inequality but also threaten the realization of SDGs. Indeed, there is a collective agreement that energy security is essential for achieving SDGs (International Energy Forum, 2022; Luty et al., 2023; Minas et al., 2024).

4. Implementation: A Roadmap to 2050

According to IEA’s, the world’s energy will undergo significant change by 2030, including ten times more electric cars, 50% of global electric energy coming from renewables, 7% decrease in fossil fuels consumption, 45% increase in LNG and 75% decrease in carbon emissions (IEA, 2023). However, as we edge closer to our deadlines, it becomes obvious that achieving most of these goals is nearly impossible. This leads to an important question: are we going to keep pushing our deadlines or change our approach? The ACTIONS framework seeks to change how we approach energy security in the contemporary world by prioritizing actions based on their feasibility at given time frames. As such, the framework can be implemented in the short, mid and long terms.

Short-term (2025 – 2029). In the short-term, the world should focus on addressing immediate energy security challenges by conducting holistic energy audits to identify vulnerabilities, flawed policies and high-priority areas. Strategic energy reserves and flexible energy policies and low-carbon subsidy programs can alleviate the short-term impacts of disruptions and increase investment and adoption of renewable solutions across all sectors. Initiating global dialogues and partnerships will help identify and resolve geopolitical risks, harmonize global energy and trade policies, protect supply chains and

fast-track investment in alternative energy sources. In this phase, educating the public and communities on energy efficiency and conservation approaches is also important for meeting national energy needs. These efforts will bolster resiliency and pave the way for future energy advancements.

Mid-term (2030 – 2039). In the mid-term, governments and stakeholders should channel their efforts to address geopolitical, economic and systematic barriers to energy security through collaboration and effective energy governance. Continuous strengthening of bilateral and multilateral ties is pivotal to managing crises of the multipolar world and forging a collective responsibility of securing global energy through increased investment and stricter regulations to meet climate and environment goals. Scaling up low-carbon solutions and expediting diversification of energy infrastructure will significantly contribute to capacity building at national and regional levels. Additionally, it is imperative to develop a framework for continuous monitoring and evaluation of existing policies and structures and develop strategies for mitigating emerging threats.

Long-term (2040 – 2050). From 2040, the focus should shift to ensure that our efforts results in tangible and quantifiable energy transformation across all sectors powered by advanced technologies, international coordination and streamlined energy regulatory processes. These sustainable and equitable changes should ensure stable and affordable energy production and consumption.

5. Conclusion

The rapidly evolving global energy landscape poses a threat to energy security but also offers immense opportunities to create sustainable, secure and inclusive energy solutions. The ACTIONS framework provides a clear understanding of energy security in the 21st century and a path to its realization. As the IEA convenes in London this coming April 2025 to deliberate on the future of global energy security,[6] the proposed framework could provide a basis for understanding, identifying and addressing the traditional and emerging energy security challenges in the era of a multipolar world. Energy security is a collective responsibility that will ensure peace and prosperity for the people by paving the way for the realization of the ambitious SDGs.

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[6] https://www.iea.org/news/international-summit-on-future-of-energy-security-to-take-place-24-25-april-2025-in-london

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