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Trends in the Field of Energy Security

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ABSTRACT: The predicted impact of climate change is becoming increasingly visible. Environmental and climate-related risks, including extreme weather events, water scarcity and failure to adapt to and mitigate climate change, are among the main risks facing the world. Policymakers, researchers and the public increasingly recognize the need to address climate-related security risks through cooperation and dialogue. Thus, the global energy sector is going through a deep and rapid transformation and failure to recognize megatrends would be harmful to the development of energy security strategies.

KEYWORDS: trends in energy, geo-economics, energy, security strategies

Introduction

The energy sector has gone through major transitions from the use of wood as the dominant fuel to the adoption of coal and, more recently, oil. In the 21st century, gas prices have risen faster than any other fossil fuel, and today renewable energy is rising even faster. The changes, combined with volatile energy prices and occasional shocks, create complex scenarios for the socio-economic development and future of energy security. In this sense, it is imperative that political factors take into account current megatrends and the implications of unique shocks - such as the COVID-19 pandemic or the Russian-Ukrainian war - in defining long-term strategies for a resilient energy sector.

The current geo-economic context

Today's society is now heavily influenced by the most important events on the world geo-economic scene. The COVID-19 pandemic, the growing climate crisis and, most recently, the war in Ukraine represent interconnected shocks that lead to the reshaping of the geo-economic and political order. They also have major effects on livelihoods and societal stability. The solutions addressed by policymakers must also be interconnected, cooperative and sustainable.

Faced with the worst supply chain crisis in decades during the COVID-19 pandemic, then a war generating a rapid and widespread energy crisis and substantial inflation, the current economic environment is quite shaky and business is at risk existentially. At the same time, the drive for higher productivity coming from the organizational policy level, which underpins the economic strategies for the development of companies, is now intersecting with the demand from employees and customers for increased flexibility. Customers now expect the same level of flexibility from manufacturers and e-commerce as they did during the pandemic. The step has been taken and it must be maintained.

As time goes on, the global economy returns to what it was in the mid-2020s and adjusts to the new disruptive factors that have emerged. The IMF estimates that global GDP grew by 4.4% in 2022, half a percentage point less than previously expected (The Economist 2022). The conclusion is that these events, along with others, will cause a still formidable growth in the global economy. The 4,446 CEOs from 89 countries and territories who responded to PwC's 25th Annual Global CEO Survey (PwC 2022) are optimistic about

continued economic resilience even if threats, uncertainties and tensions abound (For the past 25 years, PwC's global survey of CEOs has provided leaders of organizations, authorities and the business community around the world with a unique insight into the vision and business decisions of company executives worldwide. For the 25th edition of the study, published in January 2022, PwC interviewed 4,446 CEOs from 89 countries (including Romania), regarding the most important aspects of today's society). The same study found that CEOs are most concerned that a cyberattack could inhibit innovation and sales, or that a macroeconomic shock undermines their company's financial goals, and are less concerned about current challenges, such as climate change and social inequality, which appear to pose less immediate threats to incomes.

The optimism of Romanian CEOs regarding the evolution of the Romanian economy has decreased after the outbreak of the war in Ukraine considering the way the health crisis, the energy crisis, the accelerated inflation and the war have appeared and overlapped in the last two years, all with their wide-ranging effects and specific consequences. The war in Ukraine is taking its toll on the confidence of CEOs in our country and on the ability of their own companies to grow their revenues over the next 12 months. Thus, only 20% of respondents declare themselves extremely or very confident in the possibility of increasing the turnover (percentage decreasing from 54%), while another 49% of them are somewhat confident in the prospect of a better year (PwC 2022).

The conclusion that can be drawn is that the current geopolitical context affects the optimism of company directors and imposes an increased resilience of the business environment to the risks and crises of the moment. Caution in the face of increasing threats can be considered a natural reaction. In this sense, following the survey carried out, in the perception of general managers in Romania, macroeconomic volatility overtakes the health situation and cyber security as the top risk factors.

However, business leaders are beginning to understand the role they must play in society and the commitments they must make to avoid, or at least mitigate, the potential ill effects of global threats, such as climate change. The questions that arise are these: can climate change and decarbonization commitments become a priority in this very turbulent geo-economic context? What are the costs imposed on this process by this complex reality and how can they be assumed?

The geopolitical context of changes in the energy field

The ripple effects of climate change events have spread beyond cities to neighboring countries with geographical, climatic or economic ties. Most investors and lenders react with relevant signals in their companies' risk assessment. This is of course not enough, as climate change and geopolitics are often interrelated given that this disruptive factor acts as a strong multiplier of geopolitical risk.

In addition, climate change has major socioeconomic consequences for how different countries operate. As the resources needed for economic development are affected, productivity is also affected and the vulnerabilities of institutions are more exposed. As a consequence, populations feel the impact directly on their own livelihoods, and then there is an impact both within countries and between countries or between governments.

Climate change, accelerated by population growth and declining water resources, can lead to rapid and radical structural changes in the economies and demography of different countries. We argue that water rights, access to water resources, management, the effects of climate change, and other water-related risks are drivers of geopolitical conflict in areas where watersheds lie across national borders (Dover 2021).

Where are the most exposed geopolitical regions? Here, in this geographical space, we look at the Danube River, which crosses nine member countries of the European Union (EU)

and five non-members and which generates certain tensions between countries regarding a variety of issues.

European Union (EU) documents show that populations in this area are not growing, nor is there widespread dependence on agriculture. But water stress and changing weather patterns are real, and the need for cooperation and coordination among a disparate group of economies presents its own problems (European Commission June 2020).

The economic environment of the Danubian states derives from the significant socio-economic difference in the region. In general, EU member states are wealthier, enjoy higher quality infrastructure, and are more dependent on industry than agriculture. In addition, the Upper Danube region has more diversified economies and the Lower Danube region is more dependent on agriculture and has a less diversified economy. All 14 countries share poor demographic projections, according to the World Bank (World Bank Open Data September 2021). Also, in most countries of Eastern Europe and the Balkans, there is a fragile infrastructure construction in the period since their transition to democracy.

However, the largest investor in the Danube region remains the EU, although it faces many obstacles to sustainable economic progress (e.g., inefficient use of EU funds). From the analysis, the largest water consumption in the region is given by hydropower generation (92%), followed by water supply to society (4%), only 1% being intended for agriculture, forestry and fishing (Management Plan of the Danube River 2022) and Romania is one of the countries dependent on water capture for hydropower. The natural question is what will happen with the increase in investments in digitization and how much will this affect the current geopolitical context in the economic structure of the Danube riverside states? What will the changes in the power game be, and how will strategies, policies and, especially, funding to delay climate change adapt?

Until now, climate change recorded and presented especially in the academic environment failed to attract the attention of many of the main actors of world geopolitics, so for a long time, there was a lack of tangible cooperation between them. COVID-19 has acted as a catalyst for better cooperation among competing powers, all of whom have a concrete fight to wage against a world-class enemy. We appreciate that after a common reaction to the global pandemic, countries will be able to ally themselves in the fight against climate change and their strategies will be common and effective.

Trends in the energy field

The energy future seems to be shaped by some newly emerging behaviors and due, in particular, to the crises we have experienced in recent years. Thus, we are talking about the new socio-economic and political developments, the unique shocks, the accelerated use of renewable sources, the technological innovations in the energy markets, to which the change in consumer behavior is also added. These trends highlight the major opportunities that renewable energies represent. Moreover, it is well known that the sector has been disrupted in the short term by COVID-19, and the major global changes imposed on the energy sector and energy security by the Russian-Ukrainian war are more than evident.

In today's world, understanding the interdependencies and opportunities, the risks associated with the energy field and the awareness of how they could affect economies, societies, countries and even the North Atlantic Alliance will allow NATO to better prepare for future security challenges.

Until recently at the level of the European Union, it was decided to build the Energy Union with its five closely related and mutually reinforcing dimensions: "security, solidarity and trust which consists in the diversification of energy sources to which is added the assurance of energy security; a fully integrated internal energy market that entails adequate infrastructure backed by barrier-free regulations; improved energy efficiency that will lead

states to reduce energy imports; decarbonization of the economy as well as research, innovation and competitiveness to stimulate the energy transition" (European Commission).

The period we are going through is also marked by the socio-economic and political consequences of Brexit, an event that cannot quickly erase the 50 years of England's accession to the European Union (EU). They facilitated a series of "electricity and gas pipeline interconnections between Great Britain and Northern Ireland on the one hand and France, the Netherlands, Belgium and Ireland on the other" (European Commission). As a result, energy trade is no longer managed through the existing instruments of the single market and requires measures appropriate to the post-Brexit period, measures which in turn lead to the creation of new infrastructures in the field, doubled by new policies.

The rising use of renewable energy is one of the most important trends for several reasons. The first is given by the fact that concerns related to global warming have increased in recent years and the complementary one consists of increased technological progress leading to cost reduction, thus becoming more and more competitive with fossil fuels. Global electricity production from renewable sources grew by 7% in 2018 and industry experts expect these trends to strengthen over the next decade. In this sense, globally in 2021, compared to 2020, there was a 17% decrease in annual wind capacity additions that was offset by the increase in solar photovoltaic energy and the increase in hydropower installations, say the statistical data (Renewable net capacity additions report 2019-2021). In terms of the annual growth rate of renewable capacity was slower in 2021, after an exceptional jump in 2020 as Chinese developers rushed to connect projects ahead of the phasing out of subsidies, particularly for onshore wind.

Renewable electricity capacity additions hit another record in 2021 and demand for biofuels has almost returned to pre-Covid levels, despite continued logistical challenges and rising prices. However, the Russian Federation's invasion of Ukraine is sending shockwaves through energy and agricultural markets, leading to an unprecedented global energy crisis. Thus, "the demand for renewable energy is estimated to increase globally by 64% between 2018 and 2030" (Real Instituto ELCANO, Royal Institute 2020). Currently, governments in many countries are trying to protect consumers from rising energy prices, while reducing dependence on Russian supplies and proposing policies to accelerate the transition to clean energy technologies.

Renewable energy has great potential to reduce prices and dependence on fossil fuels in the short and long term. Although the costs of new solar, photovoltaic and wind installations have increased, the prices of natural gas, oil and coal have increased much faster, thus further improving the competitiveness of renewable electricity.

However, the questions we need to answer boil down to this: how quickly can renewables replace fossil fuels, and how can an acceleration of the energy transition be achieved? What are the major factors influencing this trend? Will renewable energy sources expand despite current geo-political and macroeconomic challenges? Does renewable energy have the potential to significantly reduce dependence on the use of Russian gas in Europe? Depending on the answers given, the decision-makers will develop the most suitable and effective strategies and policies.

From another perspective, related to global warming, it is found that due to the lack of real developments in relation to environmental protection and the decisions that have been made in the last century regarding this aspect, more and more researchers evaluate climate policy as ineffective, lacking solid instruments or institutional solutions. This thesis is confirmed by the fact that the most developed countries in the world, which obtain the greatest benefits from the globalization process, do not always fully accept and do not implement policies to counteract climate change.

Research from International Renewable Energy Agency (IRENA) publications shows that current and planned global policies provide a relatively slow path for the world to exhaust

its energy-related "carbon budget" in less than 20 years, in which regarding the efforts to keep global temperate growth well below 2°C (Adnan Z. Amin, Director-General, IRENA). At the same time, in a report called The Age of Consequences, carried out by the US Center for Strategic and International Studies (CSIS), experts warn that climate change could lead to the end of globalization. So, what should be done?

Another solution to this problem can be seen in the implementation of the decline model of the global economy, combined with effective supra-state regulations. In order to replace fossil fuels with renewable sources and to be able to accelerate the energy transition, the necessary technological changes are required, which substantially raises the level of investments. Thus, the International Renewable Energy Agency Report 2018 estimates that the additional cost of the energy transition would be approximately 1.7 trillion USD annually (calculated at the level of 2050). Surely it can be dwarfed by the benefits calculated at an average of 6.3 trillion USD (at the level of the same year).

Methodology used

The research methodology used aims to describe the current economic, social and energy environment from various perspectives and to analyze the policies, strategies, statistics of the actors in the field of the researched field, to shed light on their reactions, limitations and resources and to clarify the consequences, reporting them to the trends determined in the energy sector of humankind.

In this endeavor, we used basic research, used for the purpose of improving knowledge and with the intention of going beyond known data and facts and contributing to the development of specific scientific analyses. We completed with applied research to identify social, political, economic and energy changes that have current and effective effects in the researched area and with descriptive research method to describe different data collections.

Conclusions

Given the current deployment trends, wind and solar expansion, we believe that the European Union has the potential to significantly reduce dependence on the use of Russian gas. However, the contribution of variable renewables will also depend on policies on energy efficiency measures and coal and nuclear phase-out policies in several Member States.

It is also increasingly clear that the global energy system must be adapted to new technology and new market demand. The consequence is that it has to be transformed from an energy supply system based largely on fossil fuels to a system based on renewable energy, which involves massive costs. But this process also establishes a path towards decarbonization based on high energy efficiency and renewable energy.

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