

ENVIRONMENTAL SUSTAINABILITY AND ENERGY MANAGEMENT DURING THE WAR CRISIS

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Purpose: The new reality of the ongoing war in Europe, in addition to the enormity of the unimaginable human tragedy, has generated serious problems of various categories, especially in the field of energy security management. Thus, there is a hypothesis that in the current situation, the implementation of the idea of sustainable development in terms of energy development and maintenance of measures for achieving climate goals, may be significantly hampered and slowed down. Based on the analysis, it was determined that there are legitimate concerns about the existence of obstacles to the process of achieving sustainable development in the context of interest.

Design/methodology/approach: Research related to this issue consisted of a literature analysis of available texts. This article is purely theoretical in nature and is based on a literature analysis. For the purpose of it, three groups of keywords were developed to reflect their diverse characteristics, in order to identify the state of the current literature covering the knowledge of energy management in the energy crisis associated with the outbreak of war in Ukraine.

Findings: The issues raised in this article are merely an exemplification of the problems concerning further energy development and the implementation of the concept of environmental sustainability caused by the invasion of Ukraine by the Russian Federation. From a sketchy analysis of the available information, it can be deduced that, on the one hand, the effect of this aggression on the realisation of the concept of sustainable development may be an acceleration of, for example, decarbonisation, but, on the other hand, it is a very complex problem, as it may trigger a crisis whose scale and effects we are not yet able to determine.

Originality/value: The article deals with new problems emerging in the space of energy management and the implementation of environmental sustainability in the context of armed conflict in Europe. The considerations presented may open up new fields and directions of research exploration for researchers.

Keywords: energy, management, crisis, sustainable development, war, climate.

Category of the paper: Conceptual paper/ Literature review.

1. Introduction

The globalization of all areas of the economy, such as technology, production, finance, trade, institutions of various kinds, and energy, has brought the world economy into a web of various interdependencies, creating a kind of system. Embedded in the operation of this system is the realization of the idea of sustainable development, which aims to pass our planet on to the next generation in such a condition that they can live to enjoy health and a high standard of living. Related to its implementation is the protection of the environment, which depends, among other things, on optimal global energy management. The events surrounding the Russian Federation's aggression against Ukraine show how fragile the foundations of global interdependence are and how easily the entire world economy is shaken. The Russian Federation's aggression against Ukraine on February 24, 2022 deeply shook not only all of Europe, but also the entire world. It has caused great tragedy and suffering for millions of Ukrainian citizens, as well as people around the world. The brutality of the aggressor causes a sense of helplessness, in all those who have sensitivity to the suffering of others. In addition to the usual human reflexes of empathy, it brings consequences in the form of various concerns about the continued existence in the world and problems arising on various levels. Russia's bellicose actions in Ukraine have shaken the security of the energy market and caused a jolt to secure global energy development. Energy is an important factor in sustainable development efforts. And sustainable energy development is the process of sustainably, safely and efficiently providing energy for CSR (Graczyk, 2017). Energy security and attempts to become independent of raw materials imported from Russia have therefore become a priority issue in Europe (FE, 2022). The development of civilization increasingly based on consumerism requires more and more raw materials for the production of goods. On the one hand, it leads to human dependence on a comfortable and prosperous life, on the other hand, it causes a deterioration in the quality of this life, health and the environment. It threatens not only present but also future generations (Kielczewski, 2010; Marszałek-Kotzur, 2021). In turn, the development of technology in military terms has resulted in the temptation of unbridled aggression and a catastrophic vision of the world for future generations. The multidimensional personal, nuclear, energy, food and ecological catastrophe mentioned by A. Kuzior is slowly being realized, the consequences of which for our planet may be lamentable. The so-called normative turn, which proclaims the axiological and ethical neutrality of technology, has led to its valuation and revealed the need to develop the issue of human responsibility (Kuzior, 2006; Marszałek-Kotzur, 2019; Jonas, 1996). In order to ensure the quality of human life, various measures are taken within the framework of the concept of sustainable development. Responsibility, and especially the institutional responsibility of states, is a key element for these activities. It is referred to, among other things, the Rio Declaration, one of the most important final documents of the 1992 Earth Summit. The emergence of this document proves that man

has realized the scale of the dangers of leading to an environmental crisis and is making an effort to prevent it (Piątek, 2005). Thus, the fundamentals of the global economy demanded the development of a new paradigm that respects the principles of global sustainability (Bocian, 2011). The necessity to meet the needs of the currently living generation while taking care of the needs of future generations was taken as the starting point in discussions of the idea of sustainable development. An important feature of sustainable development is the sustainability of intergenerational prosperity. The introduction of the concept of sustainable development aims to ensure a compromise between economic, social and environmental goals (Herrmann et al., 2020). The concept of sustainable development is based primarily on policies of economic interventionism. The practical application of sustainability in organizations is humanistic management, which can be defined as guided by the perception of humans as the center in their natural and social environment (Kuzior et al., 2022).

2. Methods

This article is purely theoretical in nature and is based on a literature analysis. For the purpose of it, three groups of keywords were developed to reflect their diverse characteristics, in order to identify the state of the current literature covering the knowledge of energy management in the energy crisis associated with the outbreak of war in Ukraine. According to these groups, several phrases were formulated for a query in the Scopus Database. The results of documents in keywords, titles and abstracts were taken into account. The first group concerns activities related to the implementation of the idea of sustainable development and climate change (sustainable development, climate change). The phrase "sustainable development" received 388,667 document results, and the phrase "climate change" received 469,422 document results. The second group is related to energy management and energy crisis (management of energy, energy crisis). For the query "management of energy" there were 284,038 and for the query "energy crisis" there were 21,438 document results. The third group represents the question of the war in Ukraine and further development of energy in its context (war in Ukraine, energy, energy development). For the phrase "war in Ukraine" 2189 document results were obtained, for the word "energy" 4428 document results, and for the phrase "renewable energy" 6 document results. The literature review was aimed at identifying research on the topic and implementing a scientific process, eliminating the researcher's bias. The literature on the topic addressed in the article is quite extensive on the issue of implementation of sustainable development, climate change and energy management. The literature on energy development in the situation of war in Ukraine is not numerous. Taking into account the above-mentioned research gap along with the intention to identify it, an analysis of this issue was made. The verified hypothesis is as follows: there are legitimate

concerns about the existence of serious constraints in the process of achieving the objectives of sustainable development. The research questions posed are contextual and descriptive in nature. The article uses some of the studies describing the concept of sustainable development (Stiglitz, 2002; Kuzior, Ober, Karwot, 2021; Kuzior, 2010; Kuzior, Kwilinski, Hroznyi, 2021) and decarbonization activities (Kuzior, Postrzednik-Lotko, Postrzednik, 2022). Also used were a small number of available materials on the current state of energy in Ukraine (Kuzior, Lobanowa, Kalashnikowa, 2021), the European Union's activities in this area, as well as media published statements of experts in conducted discussions on the further development of the energy crisis related to Russia's aggression against Ukraine (Wang et al., 2022; Pereira et al., 2022; Rozenas, Vlasenko, 2022; Europe..., 2022; Kagerl et al., 2022; Esfandabadi, 2022; Fishedick, 2022). The literature study, i.e. the analysis and critique of the literature of selected publications, made it possible to determine what and how was analyzed in the topic of sustainable development itself and issues related to further energy development in the context of the war, and allowed to outline the direction of further research. The focus was on the issues of defining what sustainable development is in its essence, what climate goals have been set in connection with its implementation, and what actions the European Union has taken in terms of moving away from fossil fuels and energy independence from supplies from the Russian Federation. Some sample suggestions for energy management solutions were also cited. According to the study, the global network of various interconnections, including energy, generates serious problems and a lot of difficulties are posed by sustainable energy management. There is also a lack of sufficient reflection on the dangers of pushing back the implementation of climate goals since the outbreak of the war in Ukraine. The considerations presented here obviously do not exhaust the entirety of the problems, but represent a selective reflection on some of them. It seems that they can open new fields and directions of research exploration.

3. Results

3.1. Decarbonization and climate neutrality

An important element of sustainable development is the acquisition and use of energy. Seventeen goals have been adopted as part of the new 2030 Agenda for Sustainable Development. Goal seven proclaims to ensure affordable access to stable, sustainable and modern energy for all. Energy is necessary, among other things, for doing work, providing security, producing food and fighting climate change. Sustainable energy is an opportunity for a better human future, a satisfactory state of the economy, a clean planet and saving the climate (SDG, 2022). Exactly four days after the Russian aggression against Ukraine, the second part

of the Sixth Summary Report of the Intergovernmental Panel on Climate Change (IPCC) was released (IPCC, 2022). In it, the expert team formulated a warning about the need for immediate preventive measures related to the systematically escalating climate crisis. Specifically, the issue is the burning of fossil fuels, which leads to anthropogenic carbon dioxide emissions into the atmosphere. In it, experts point out the disturbing fact that the aggression against Ukraine has pretty much overshadowed the problem of the worsening climate crisis. Scientists from the Polish Academy of Sciences have also published a communiqué on addressing the climate crisis, but it has been relegated to the background in the wake of the outbreak of war in Ukraine. The achievement of the European Union's climate neutrality, set for 2050, was adopted in the "Fit for 55" Climate Solutions Package, announced on July 14, 2021. It primarily assumed reform of the EU's emissions management system for new economic sectors, and a higher share of renewable energy sources in the European Union's diversified energy mix. It also envisaged tightening emission standards for the land transport sector. In turn, the imposition of a carbon tariff on countries with no climate policy should have strengthened the competitiveness of the EU economy. Among other things, the implementation of the climate goals was to involve the systematic abandonment of Russian hydrocarbons such as gas, oil and coal. This was an important part of decarbonization relevant to climate protection. This process was accelerated by Russia's invasion of Ukraine. The war has undoubtedly caused a variety of additional problems. First, the war is causing a tremendous amount of damage to the lives, health, psyche and well-being of people living in Ukraine, but also in other parts of the world. Second, the impact of the warfare itself on the climate has not yet been studied. It seems that the fires still breaking out after rocket attacks in cities, warehouses of various toxic substances, factories, ammunition or fuel depots are indifferent to the environment. Thirdly, a serious problem has arisen in terms of further energy development and safe energy management. The cutoff of fuel supplies from Russia and their rising prices have shaken the fuel market. Russia is a major supplier in the global energy market and accounts for 18% of global coal exports, 11% of oil and 10% of gas (3trzy3, 2022). The system, which had been under construction in Europe for several decades, was based on buying large quantities of them from Russia. Giving up Russian hydrocarbons, first of all, will have a positive impact on the environment and will partially halt and perhaps even reverse adverse climate change. This situation, paradoxically, on the one hand, may be a lifesaver for our climate and may mobilize Europe to abandon fossil fuels more quickly in general and accelerate work toward renewable energy sources and the atom. The search for an energy path of our own, independent of Russia, could become the impetus for accelerating the Green Deal. Expensive energy forces radical improvements in energy efficiency and accelerates the development of RES due to the fact that renewables are not burdened by fuel and CO₂ costs. According to PAN scientists, both renewables and nuclear power are not only beneficial for the climate, but also needed in the context of independence from Russia and the problems associated with cutting off fossil fuel supplies. The role of RES and nuclear in the coming decades will undoubtedly be crucial,

they stress. The need for independence from Russian gas, among others, was recently emphasized by the International Energy Agency (IEA), which presented a list of 10 points that countries could benefit from while accelerating their energy transition (Bełdowicz, 2022). It represents a plan to make the European economy independent of fossil fuels from Russia (AEO, 2022). On the other hand, there was the crucial question of how to reconcile ensuring the security of energy supply for the residents of the European community while not abandoning measures to pursue the goal of climate neutrality.

3.2. Energy security in Ukraine

In late February, EU energy ministers met in Brussels to discuss the energy situation in Ukraine. They identified the current state of energy supplies, stocks and flows in Ukraine and Europe in the context of the Russian Federation's aggression. The need to secure supplies, optimize stockpile management and improve coordination among member states was expressed. There was also discussion of ways to reduce the impact of energy prices on industry and individual households. A readiness to provide energy assistance to Ukraine was declared (EU a, 2022). Given the real threat of missile attacks, there was a need to ensure the security of Ukraine's nuclear facilities, with the support of the International Atomic Energy Agency (EU b, 2022). The area of hostilities in Ukraine coincides with the area of the most numerous coal, gas and nuclear power plants. There are frequent failures of transmission networks. The Russians are trying to capture key facilities, hoping to take over the energy infrastructure. In Ukraine, work on the construction and expansion of renewable energy sources, has developed dynamically. About 5% of Ukraine's total energy comes from them. Since the location of wind farms and photovoltaic installations are large clusters, so they are vulnerable to destruction or takeover. They are mostly located near Moldova and near the border with Romania. If this territory is cut off from Ukraine, the photovoltaic farms will be disconnected from the grid and the ability to supply energy to a large part of the country. The development of renewable energy sources has come to a standstill because of the war. For example, a huge photovoltaic farm was to be built near Chernobyl, but work had to be stopped. The Chernobyl area was occupied by the Russians, who destroyed a research laboratory and high-emission samples of isotopic materials. With the cessation of work on renewable energy development, climate protection is bound to suffer severely. Experts are already pointing to toxic materials being released into the air, soil and water from ruined buildings, exploding pipelines, damaged sanitation systems and fuel and chemical dumps (RP a, 2022). There is also a real threat of contamination and environmental catastrophe on a massive scale if nuclear power plants are destroyed.

3.3. War situation vs. EU energy action

The very next day after the start of the aggression against Ukraine, the European Union began discussions on banning the sale, supply, transfer and export to Russia of certain goods and technologies for oil refining. Discussions were also held on the introduction of restrictions on the provision of related services. The idea was to hamper the Russian oil sector and prevent Russia from modernizing its refineries, in order to limit Russia's export revenues. In 2019, for example, they amounted to €24 billion (EU c, 2022). In early April, the idea of a ban on the purchase, import or transfer of coal and other solid fossil fuels to the European Union originating in or exported from Russia emerged, which would take effect in August 2022. Coal imports to the European Union are currently worth €8 billion a year. Bulgaria was granted a temporary derogation for the import of Russian oil transported by sea, and Croatia for the import of vacuum gas oil. European Union leaders have assessed progress in increasing the Union's energy independence and agreed on further steps to ensure security of energy supply (EU d, 2022). The Russian invasion of Ukraine caused another increase in prices, which were already very high, and there were concerns that the European Union could have a serious problem securing a sufficient supply of energy. At an informal summit in March, EU leaders decided to gradually but steadily make the European Union less dependent on Russian fossil fuels. At the end of May, at an extraordinary summit of the European Council, EU leaders decided that the Union would stop importing almost 90% of its oil from Russia by the end of 2022 (EU e, 2022). Also in May, EU energy ministers, at an extraordinary Council meeting, exchanged views on possible measures to be taken in the event of an energy supply crisis, due to Gazprom's suspension of gas supplies to some member states. They also recalled solidarity with Ukraine (EU f, 2022). The Council and the European Parliament have tentatively agreed on new gas storage regulations, namely that member states are to fill their storage facilities before winter and make them available to other member states in a spirit of solidarity. Underground storage facilities on the territory of member states should be filled at least 80% before the winter of 2022/2023 and 90% before subsequent winters. In 2022. The European Union will try to fill underground storage facilities to a total of 85%. Since not all member states have gas storage facilities on their territory, it was agreed that member states without storage facilities will be able to use reserves stored in other member states (EU g, 2022). The ministers and the Commission decided to continue coordinated contacts with international partners and reliable suppliers, and to quickly establish a European gas purchasing platform to guarantee energy supplies to the EU at affordable prices (EU h, 2022). In early June, the Council adopted a sixth package of sanctions, a ban on imports of oil and refined petroleum products from Russia, with limited exceptions. The temporary exemption will apply to oil imported by pipeline to European Union member states that are particularly dependent on Russian supplies due to their geographic location and have no other viable options (EU I, 2022).

3.4. Europe's energy transition

Europe's energy transition slowed considerably during the 2020 pandemic. In 2021, relative stability was followed by an energy crisis in Europe, with gas and CO₂ costs rising sharply. The dynamic increase in energy commodity prices, translated into energy prices. The outbreak of war in Ukraine triggered another crisis. Most countries in Europe are dependent on the supply of energy resources from Russia. One of the most dependent countries in Europe on Russian supplies is Germany, but right behind it is Poland. Therefore, accelerating the energy transition in line with the European Union's climate policy is crucial. One of the most pressing climate issues is the need to move away from fossil fuels. According to the U.S. Environmental Protection Agency (EPA), emissions from fossil fuel combustion and industrial processes accounted for about 78 percent of the total increase in greenhouse gas emissions from 1970 to 2011 (RP b, 2022). It makes little sense to support coal-fired power generation, which is practiced by some countries, such as Poland, because of its destructive impact on the climate, but also because of the high cost of mining coal, which is not enough and must be imported from Russia. On top of that, there are high emission fees. The only reasonable solution, according to experts, seems to be the development of wind and solar power. Thus, the development of photovoltaics and onshore wind energy should be unblocked. This, of course, involves working on the reconstruction of the grid, which could accept electricity from these sources (PAN, 2022). At present, it is not possible to talk only about the climate neutrality of the world, Europe or the country, but it is necessary to emphasize the role of climate neutrality of each individual household. According to Prof. Popczyk, it is necessary to autonomize the electricity supply. Another important element is a mechanism for verifying the cost of electricity. It results from the environmental impact of a given technology in the form of the so-called carbon footprint. Experts believe that the creation of such solutions can significantly increase the security of electricity supply (OI, 2022). Energy savings are also influenced by improving the energy efficiency of buildings and installing heat pumps. This can be achieved by launching relevant programs for municipalities. It is also not without significance to carry out a parallel large-scale information campaign, making the public aware of how much savings, also in financial terms, can be given by lowering the indoor temperature even by one or two degrees in winter, or an analogous increase in temperature for air-conditioned rooms. The development of renewable energy sources in Poland has been slowed by unfavorable political decisions. In 2021, more than 75% of Poland's electricity was generated from coal, and electricity generated from renewable energy sources amounted to only 16.1% of total production. In March 2022, as much as 84% of Poland's electricity was generated from fossil fuels, including almost 76% from coal. After the Russian invasion of Ukraine, energy commodity prices skyrocketed, and almost all Western countries have declared a gradual shift away from Russian raw materials. Declarations by European Union countries show the likely trend for the coming years, which is to cut Russia off from its most significant

influence. However, in energy, Russian raw materials are difficult to eliminate entirely in the short term. In addition, there has been a real threat of their supply being interrupted by the Kremlin's decision, necessitating a revision of energy plans to prevent an even bigger crisis. In this connection, Belgium has put on hold for 10 years the closure of its nuclear reactors that produce about 40% of the country's energy. Germany has written into its strategy the construction of gas ports and an even stronger increase in renewables, reaching 80% as early as 2030 (ARE, 2022). One way to save energy could be to reduce energy consumption. However, the problem is that every consumer wants to meet their electricity needs. Another option is to strategically increase cooperation with the Ukrainian electricity system, which has been synchronized with the grid of continental Europe for some time. This is possible, provided that the priority of action is the common good, and not just individual needs or the shallow nationalism of decision-makers. Political decisions are often subject to a large margin of error and, as L. Michnowski points out, "the lack of knowledge of numerous - at first glance invisible, often qualitatively new feedbacks - interdependencies and side effects of political decisions, (...) causes their consequences radically different from the intended ones" (Michnowski, 2007, pp. 79-81). In order to avoid pregnant mistakes, it is necessary to equip politicians with the necessary knowledge and provide them with up-to-date scientific information on a given topic. The importance of the duty to think is also stressed, allowing for predictions about the future and calculations of risk at every level of life. In this particular case, the ability to peacefully manage energy and unleash war is a major risk. This risk factor is unquantifiable, due to human incalculability. No one knows what people are capable of in undertaking morally good or morally bad acts (Jonas, 1996).

4. Discussion and conclusions

The issues addressed in this article are merely an exemplification of the problems, concerning further development of energy and implementation of the concept of environmental sustainability, caused by the unjustified invasion of Ukraine by the Russian Federation. From the analysis of the available information, it can be concluded that, on the one hand, the effect of this aggression on the realization of the concept of sustainable development may be to accelerate, for example, decarbonization, but, on the other hand, it is a very complex problem, as it may cause a crisis, the scale and consequences of which we are not yet able to determine. First of all, it seems that the European Union is too entangled in supplies from Russia, and the construction of gas connections independent of Russia, will not happen in a short time, which may cause various problems. Certainly, the abandonment of Russian fuel supplies will make energy more expensive, at least for a while, which will affect the economy and livelihood of people around the world. In this context, sustainable development cannot be limited to

political strategies and attempts to operationalize them. The basis for solving emerging environmental, social and economic problems is the formation of the right type of social awareness, called sustainability consciousness. This is because it is easier to implement the principles of sustainable development if we have the openness and involvement of the entire society, which is not accustomed to treating nature instrumentally. It is about responsibility in the broadest sense. After all, sustainable development is directed toward action for future generations. Acting responsibly "for the future" means being ready to accept the consequences of one's own actions and behavior. It is not only about the civil-legal space, but also a reference to technological actions, the consequences of which are spread over many generations. Active responsibility is for those who are ready to arouse imagination-rich perspicacity and also sensitivity to become explorers of new forms of responsibility (Marszałek-Kotzur, 2019). In addition, only the interaction of the spheres of science, politics, business and society as a whole can produce tangible results in realizing the basic concept of sustainable development. The lack of free access to cheap energy resources is an opportunity for European science and industry, for which it can become a flywheel to accelerate development. However, unity and solidarity of the West is essential in this regard, which must consistently respond to Russian aggression with one voice. Russia's takeover of Ukraine and, in the long run, the subjugation of our part of the European Union, would mean the end of the pursuit of Europe's climate neutrality and the further realization of the idea of sustainable development (OF, 2022). This article is intended to highlight the problems arising in this context and encourage detailed research.

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