Energy management decarbonization policy and its implications for national economies

N Savina¹, Y Sribna¹, N Pitel², L Parkhomenko², A Osipova² and V Koval³

¹National University of Water Management and Environmental Engineering, Rivne, 33000, Ukraine
²Uman National University of Horticulture, Institutska st. 1, 20300 Uman, Ukraine
³National Academy of Sciences of Ukraine, Volodymyrska St., 54, 01601 Kyiv, Ukraine

E-mail: e.v.sribna@nuwm.edu.ua

Abstract. The article explains the stages of modern environmental policy formation and analyzes decarbonization as a component of climate change, which requires the introduction of global regulation without taking into account any national priorities and the transition to global control over national economies through the OPEC oil and gas sector. The content of greening is revealed and it is noted that global warming in the climate has shifted to stable and dynamic regional geographical cooling, which makes not only doubt the causes of global ecological warming, but also to identify political motives for decarbonization and primarily in energy. The intensified development of wind farms has been noted as a result of the global policy of developed countries that do not have sufficient own reserves of coal and oil and gas hydrocarbons.

1. Introduction

Modern energy has undergone radical changes due to the adoption of packages and programs for the transition to environmental requirements. This transition is due to the fact that the energy sector of thermal power plants has become a potential most powerful source of emissions of harmful gases into the air, which enhances the greenhouse effect, and ultimately leads to an increase in average Earth temperature. Therefore, the principle of abandoning the use of coal and shale for the production of electricity by thermal power plants and power plants has emerged. That is, due to the processing of fossil fuels (coal, oil), greenhouse gas emissions are growing, and to reduce these emissions, the world community has planned to replace traditional energy resources with natural energy sources. In the implementation of this principle, wind and solar energy began to develop rapidly, as well as the transition from gasoline and diesel fuel to environmentally friendly fuel obtained from the processing of industrial crops. In this regard, the EU in 2020 set an additional goal that by 2050 EU countries should achieve zero emissions of carbon dioxide, the so-called "pure zero", while a significant proportion of carbon dioxide can be absorbed by plants and it will increase for due to soil storage, increased reforestation and protection of peatlands, wetlands and marine environment.

However, the realities of the environment in the last two years have shown a reverse trend, when there is no increase in temperature, but a shift in seasonality of the seasons in the direction of abnormal trends (sharp rise in temperature and sharp cooling in geographical regions where it has not been observed for hundreds of years).
Accordingly, there is a global problem of adapting energy production in the new natural and climatically dynamically changing environment in order to maintain and increase the production of electricity and heat in accordance with the environmental measures adopted by countries in energy.

2. Research results

The facts of global warming are always on the front pages of the press and publications and news. And the world community is developing and implementing various measures to reduce carbon emissions. According to the IEA Net Zero report, there is an instruction to completely ban the investment of oil and gas projects with the sole purpose - to achieve carbon neutrality by 2050 [1, 2]. Carbon neutrality - the complete cessation of emissions of greenhouse gases (primarily carbon dioxide and methane) by the manufacturer, or compensates for these emissions at the expense of non-carbon projects. In the same vein, IEA Executive Director F. Birol points out the deepest goal for achieving carbon neutrality - it is necessary to completely stop investing in exploration and development of new oil and gas fields [3]. However, this measure will result in a sharp reduction in oil and gas production.

However, hydrocarbon neutrality without any political whims and sober logic comes down to the fact that the amount of carbon dioxide waste from transport, energy and various enterprises in their location reached such a volume that could be absorbed by all vegetation in the area. In other words, production - did not disturb the carbon dioxide balance of the territory. Therefore, the Chinese and Indian authorities openly point out that achieving carbon neutrality is the goal of Western developed countries to slow down the development of developing countries, but is covered by beautiful slogans on environmental protection [4, 5, 6]. After all, the cessation of oil and gas wells causes a decrease in its supply, which automatically leads to an increase in the price of these resources, which is not only fuel oil products, but also the entire chain from the chemical to agricultural industries. The logical sequence of implementation of environmental policy for energy decarbonization is shown in Figure 1.

![Figure 1. Implementation of global environmental policy in energy and its consequences.](image-url)
However, such a policy has led to a violation of the energy balance of Italy, Germany and the United States, resulting in insufficient electricity supply, and in exchange trade to a sharp rise in natural energy prices.

For reserve currency issuers, such changes do not affect the economy in any way. However, for developing countries, this is an economic collapse, because everything is becoming more expensive from electricity to food and dooms the national economy to the loss of economic independence and political sovereignty. Ultimately, such an environmental concept will lead to widespread popular resistance.

In another perspective, more short-term, hydrocarbon neutrality will lead to the fact that only those countries remain in the industry, where the cost of oil and gas production will be the lowest. Accordingly, only OPEC members will remain such operators. Note that in OPEC countries, 100% control of this industry remains with the state.

In general, we have a situation that violates the principles of a liberal economy. - due to greening, the state controls the national economy through the oil and gas industry. Today, OPEC controls about 37% of oil and gas resources, and due to greening, this share will be more than 52% [8].

The natural season of 2020-2021 indicated a significant adjustment in global warming. In general, global warming was accompanied by local cooling. Thus, the temperature in Japan for 14 days was 5 degrees below average over long-term observations. The 15-degree frost in the Beijing area lasted for more than 7 days. In Madrid, 10-15 cm of snow fell and frosts persisted. In northern Germany and Poland, night temperatures reached minus 20 degrees [9]. 71% of the United States is affected by frost. The most severely affected by the Texas cold was estimated at $90 million [10].

New terms have appeared in the circulation of technical literature: dark calm - weather in which there is no wind, and caution is very high; dark-cold calm - weather in which there is no wind, and caution is very high at low temperatures. If during the last ten years the volume of coal production has sharply decreased due to the implementation of the decarbonization program (Fig. 2), the climatic anomalies of 2020 forced to assess the processes of decarbonization more in a practical economic direction.

![Figure 2. Supplies of lignite and hard coal in the EU during 1990-2020, million tons. Source: based on [8-9].](image-url)

In fact, this has led to higher gas and coal prices, as coal prices have risen by 23% and sales by 20% [11]. The Chinese government is increasing coal purchases for local energy and industry. Such purchases are estimated at millions of tons, however, despite the resumption of electricity production by thermal power plants, there is an acute shortage of electricity in the consumption networks, which
leads to disconnections from the grid. China has a fairly clear understanding of all global environmental policy, and in two ways. At the level of summits and programs, it agrees with the global dimensions of greening, and its own five-year plans lay down opposite approaches. Yes, the old thermal power plants were closed, but new thermal power plants with a total capacity of 30 GW were built in 2020 [12].

European countries have also felt the urgency of the energy supply problem. A clear example is the behavior of Hungary, which focuses on its own national priorities and has signed contracts with Russian Gazprom for the supply of natural gas outside the transit flow through Ukraine. This behavior of the Hungarian government is an imitation of the national policy of the Austrian government, which not only concluded an agreement on direct natural gas supplies and became the organizer and one of the investors in the construction of Nord Stream 2. For Estonia, national energy security despite penalties for air pollution.

In 2019, the main importer of coal in the world was Japan (17.9% of world imports, $ 23 billion), the second position was taken by India (17.4%, $ 22 billion), followed by China (14.6%, $ 18.9 billion), North Korea (10.8%, $ 14 billion), other Asian countries (5.39%, $ 6.98 billion). Asia is immediately followed by Germany, which in 2019 accounted for 3.54% of world coal imports, ahead of countries such as Turkey, Vietnam, Malaysia and Brazil [13]. In 2021, prices for thermal coal remained positive. Growth rates were 4.9% and 3.0% in Europe and Asia [11]. Thus, in 2021 there was a stabilization in the coal European and Asian markets.

Such stabilization is due not only to market factors, but also to technological processes that allow more efficient treatment of gas emissions from thermal power plants. However, in the long run, coal prices will increase due to factors of limited resources (compared to oil and gas reserves, coal reserves are relatively depleted and non-renewable).

Accordingly, there is a global problem of adapting energy production in the new natural and climatically dynamically changing environment in order to maintain and increase the production of electricity and heat in accordance with the environmental measures adopted by countries in energy.

Figure 3. Coal prices in the world, USD / t.

Source: based on [9-11].

According to the results of the crisis year 2020, investments in coal-fired power generation amounted to $ 50 billion, which is 11.5% less than in 2019 [14]. And between 2015 and 2020, total investment fell by a third. Geographically, investments in coal generation in 2020 fell mainly on the countries of the Asia-Pacific region (over 76%), on the countries of Europe and Eurasia - 8-10%, on the countries of America and Africa - 5.3% [15]. In addition, despite the fact that the British company HSBC has announced the cessation of funding for coal and coal in developed countries by 2030 and...
developing countries by 2040, but is actively investing in the construction of 73 coal-fired power plants in 11 countries in Africa and Asia. With the support of HSBC, coal-fired power plants are expected to be built in Bangladesh, China, India, Korea, Indonesia, Japan, Madagascar, Pakistan, the Philippines, South Africa and Vietnam [16]. In addition, despite the fact that the British company HSBC has announced the cessation of funding for coal in developed countries by 2030 and developing countries by 2040, but is actively investing in the construction of 73 coal-fired power plants in 11 countries in Africa and Asia. With the support of HSBC, coal-fired power plants are expected to be built in Bangladesh, China, India, Korea, Indonesia, Japan, Madagascar, Pakistan, the Philippines, South Africa and Vietnam [17]. Thanks to North Korean government funding, about $1.9 billion has been allocated to Jawa9.10 projects in Indonesia, which are scheduled to be completed in 2024.

Such trends are a clear example of "carbon leakage", which is facilitated by the formalized domestic environmental agenda of the Republic of Korea. The main flow of Japanese investment is directed to the construction of coal-fired power plants in Vietnam, Indonesia and Bangladesh. For example, Mitsubishi has invested in the Vung Ang 2 project, and has stopped participating in the Vinh Tan 3 project in northern Vietnam. And, despite the statements of the Japanese authorities that investments are directed to the nearest energy-efficient power plants, real financial flows do not comply with the policy of low-carbon development.

Summarizing the analysis, we note that on the one hand, the global environmental policy to reduce the average annual temperature of the planet by 1.5-2 °C has been successfully implemented. This performance was not due to the efforts of environmentalists and the relevant environmental policy decisions, but solely due to changes in natural seasonal conditions, when the climate during the ten high-temperature years began to change to decline. In turn, this provoked an immediate solution to the urgent energy problems of national economies [18-21].

With regard to alternative energy, such natural changes have noted its role as an additional factor in the energy security of a particular country. It has not become a priority, despite the fact that there have been significant investments and funding of both relevant technologies and practical implementation projects. Its share in the energy supply of countries remains at 10-15%.

3. Conclusions
The process of decarbonization is a consequence of the policy of combating climate change as a priority in environmental policy. Moreover, this policy is highlighted through intensive promotion in scientific publications. Nominal economic policies of national economies strongly support these environmental initiatives. However, the real national policy remains quite pragmatic, focused on the real needs of society's economy, namely obtaining resources for electricity and heat production. And for this period, coal is a universal resource that is distributed on the planet more or less evenly. In addition, it is available in most countries that are not major exporters in the world market, and is a sufficient condition for the development of national energy. However, its peculiarity is manifested in the fact that for a single coal section shows a specific characteristic (ash content, impurities, associated gases, etc.), which is not constant. As for the logistics component, this fuel does not require the cost of specific storage. Due to this, the cost of electricity production at CHP and TPP is relatively low. The problem of thermal energy is only in the development of appropriate environmental technologies for coal burning, which are absent due to the specifics of the fuel itself.

Environmental global dimensions focus solely on the approach of prohibition, not on the approach of setting up environmental technologies. Therefore, the artificial injection of enhanced wind farm development is part of the global policy of developed countries that do not have sufficient own reserves of coal and oil and gas hydrocarbons. In a purely theoretical approach, greening and especially decarbonization is a hidden process of moving away from the modern liberal platform of market regulation. The purpose of such a global environmental policy is rather vague, but pursued - to create conditions for full state control over the extraction and processing of carbohydrates, first by some economically powerful countries, and later by separate financial groups.
References

[1] IEA 2021 Global Energy Review 2021. https://www.iea.org/reports/global-energy-review-2021?mode=overview

[2] IEA 2021 Net Zero report. https://www.iea.org/reports/net-zero-by-2050

[3] Riley Ch 2021 Oil companies told to stop drilling now to save the planet. CNN Business. https://edition.cnn.com/2021/05/18/investing/premarket-stocks-trading/index.html

[4] Unnada Chewpreecha 2020 Net-zero China: millions of workers will be affected. https://www.camecon.com/blog/2020/10/13/net-zero-china-millions-workers-affected/

[5] ET EnergyWorld 2021 OPINION: Why industrial decarbonization is an opportunity for India to fight climate change 2021 Energyworld.com from The Economic Times https://energy.economictimes.indiatimes.com

[6] Shuying X, Jiaqiao X, Christopher H and Harmony E 2021 China's decarbonization agenda poses emerging business risks. https://www.greenbiz.com/article/chinas-decarbonization-agenda-poses-emerging-business-risks

[8] OPEC 2020 Annual Report https://www.opec.org

[9] National Centers for Environmental Information 2021 Global Climate Report. https://www.ncdc.noaa.gov/sotc/global/202001

[10] Hayhoe K 2021 What the New Climate Change Report Means for Texas. Texas Monthly. https://www.texasmonthly.com/news-politics/new-climate-change-texas/

[11] Metal Expert's Spot Steel Markets 2021 https://metalexpert.com/en/latestissue?issue=153&select=MK_CISCM

[12] Myllyvirta L, Zhang SH and Shen X 2021 Analysis: Will China build hundreds of new coal plants in the 2020s? Carbon Brief. https://www.carbonbrief.org/analysis-will-china-build-hundreds-of-new-coal-plants-in-the-2020s

[13] IEA 2020 Changes in metallurgical coal imports https://www.iea.org/data-and-statistics/charts/changes-in-metallurgical-coal-imports-2019-2020

[14] Sausmikat N and Ganswindt K 2021 Europe and the US keep investing in Chinese coal. The Third Pole. https://www.thethirdpole.net

[15] IEEFA 2021 Asset managers are leaving coal. https://ieefa.org/asset-managers-leaving-coal/

[16] Espiner T 2021 HSBC plans to phase out coal financing by 2040 BBC News. https://www.bbc.com/news/business-56352203

[17] Asia Investor Group on Climate Change 2021 International investors: KEPCO should reconsider supporting new overseas coal power plants. https://www.aigcc.net

[18] Andersson E, Dernegård H, Wallén M and Thollander P 2021 Decarbonization of industry: Implementation of energy performance indicators for successful energy management practices in kraft pulp mills. Energy Reports 7 1808-1817

[19] Filipishyna L, Hryshyna L, Zhuvahina I, Ponedilchuk T and Paska I 2020 Model scenarios of sustainable development strategy in the formulation of mechanisms for enterprise support resources. Intellectual Economics 14(1) 31-44

[20] Koval V, Sribna Y, Kaczmarzewski S, Shapovalova A and Stupnytskyi 2021 Regulatory policy of renewable energy sources in the European national economies. Polityka Energetyczna – Energy Policy Journal 24(3) 61-78. https://doi.org/10.33223/epj/141990

[21] Chorna M, Filipishyna L, Nord G, Tkachenko S and Velychko K 2019 Analytical support for organizations'economic and environmental safety management. Journal of Security & Sustainability Issues 8(3)