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THE RELATIONSHIP BETWEEN ECONOMIC GROWTH, FOSSIL FUELS ABUNDANCE AND ENVIRONMENTAL SUSTAINABILITY IN COUNTRIES OF CIS: THE CASE OF OIL AND GAS EXPORTING COUNTRIES

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The article investigates the relationship between indicators of the country's economic sustainability, the fuel, and energy potential of the state, and the country's environmental sustainability, as well as the major problems of the development of the fuel and energy complex. The major issues of the fuel and energy complex development and the necessity of the national production greening are analyzed, as well as its nexus with the economic growth within CIS countries exporting energy resources.

Keywords: *Sustainable development, economic growth, resource safety, environmental sustainability, environment and economy*

INTRODUCTION

Modern economic realities convincingly indicate that the dynamic development of the national economy is impossible without a balance in the complex triad "resources - economy (production) - ecology". Global economic crises and the globalization of the world economy make the task of maintaining this balance more urgent. For the third year, the world community has been operating under special conditions caused by the pandemic. On the one hand, the harsh conditions for restricting economic activity have shown the "vulnerability" of the global economy, but on the other hand, they have activated the "internal" reserves of many countries.

Most countries do not demonstrate high rates of development, the energy sector of the world economy is experiencing certain difficulties, and environmental disasters are becoming sustainable. Quite a lot of works have been devoted to the issues of studying the mutual influence of providing resources to business entities (resources in general and fuel and energy, in particular), stable economic growth, and environmental sustainability.

A significant increase in the attention of theorists and practitioners to the issues of the relationship between the provision of fuel and energy resources (FER) and sustainable development is noted in the 70s of the last century when the energy crisis forced entrepreneurs from leading countries to develop and implement resource-saving technologies [30]. Then, such a term as "energy security of the country" appeared. The International Energy Association (IEA) defines energy security as the uninterrupted availability of energy sources at an affordable price. The IEA recommends that its main elements be considered: the availability and access of energy, access to electricity for the population, and energy intensity [25]. Unfortunately, the issues of energy security today have acquired a military context. The Iranian-American conflict, recent events in Afghanistan, the conflict in Ukraine confirm this thesis. In addition, since 2008, energy security issues have become a separate area of research for the senior leadership of NATO countries.

For a long time, the issue of sustainable development, reliability of energy supply, and energy security was considered from the standpoint of resource-saving in general and energy saving in particular [35,

37]. Quite significant results in the implementation of this policy have been achieved by such countries as Germany, Sweden, Denmark, etc. [1,4].

A little later, the “lens” of researchers shifted to powerful industrial clusters, the core of which are oil and gas producing, oil and gas processing, petrochemical enterprises, infrastructure facilities, and marketing complexes for the sale of products of the cluster industries.

A significant number of works is devoted to the so-called "resource curse", i.e., the problem of ensuring the dynamic development of countries with significant FER. This term was introduced by the English economist R. Authy to explain a phenomenon: a significant drop in living standards in oil-exporting countries in 1970s and 1980s. Since 1974, GDP per capita in the OPEC countries has been declining by an average of 1.3% per year, while in other developing countries it has grown by an average of more than 2% per year [32].

It is noted in [29] that despite a sharp increase in prices commodities still can provide the country with additional economic growth, however, in the long term, such dependence of the economy on commodities clearly correlates with slow economic growth. In this context, we note that maintaining a leading position in the world trade of energy resources, as well as exporting almost half of the primary energy produced has a negative effect for countries of CIS. This negativity is expressed in the high dependence of the domestic economy on the fuel and energy sector (FES) and the export of energy resources [4, 13].

Undoubtedly, FER plays an important role in ensuring the sustainable development of national economies. However, there are other resources that can destabilize the economic situation. Some researchers believe that the next war may take place not for land, but for water, this is what is being increasingly discussed in Arab countries today. Such a serious prediction has an equally serious reason. Water supply in the Middle East is the most important problem today.

Indeed, the Arab countries occupy 9% of the land and the fifth largest population in the world. Meanwhile, its water resources account for only 0.7% of the total world reserves and the volume of water per capita is 1.5 thousand cubic meters per year with an average global supply of 13 thousand cubic meters.

The situation is such that the growing shortage of water will soon become an important constraint for economic growth here. No coincidence that the problem of water in the Middle East is increasingly becoming an object of disagreement in the relations of the Arabs with neighboring countries and among themselves. The shortage of water resources has long been initiating contradictions between Turkey, Syria and Iraq, between Israel, Syria and Jordan, between Egypt and Sudan. Thus, the problem of water becomes a life-support issue and becomes of paramount importance within the framework of national security. Based on the current situation, since the mid-1980s, the question of the growing threat of conflict over water has been increasingly raised in the Arab world [21].

After studying the researches of russian speaking CIS scientists as Belov S.V., Domracheva V.A., Fedorets A.G. and others devoted their scientific works to the study of the general strategy of greening national production. It is their studies that allow us to use a rich range of definitions of environmentally friendly use of resources, technosphere safety and environment. The issues of the relationship between sustainable development and environmental safety of production are the object of research by such scientists as Muratova T., Kiushkina V. Kokorina A. and others.

Environmental restrictions, according to scientists, should be the basis for the formation of the main proportions of the economy. This will help to achieve coherence between the economic and environmental components of sustainable development.

Economic growth should be accompanied by adequate social transformations and contribute to solving the problem of improving the quality of the natural environment. Otherwise, the growth of the economy will be deprived of any sense from the point of view of mankind development. Most scientists argue the need to find new approaches to reduce the environmental burden on the environment and ways to develop environmentally-oriented activities of enterprises and industries. In modern society, environmental campaigns and programs find their supporters and lobbyists at the highest levels of government.

In the context of the relationship between the use of resources and environmental sustainability, one can recall the environmental catastrophe that was the result of the conflict between Iraq and Kuwait. During this war, 700 powerful oil wells were set on fire, which had burned for eight months.

As the review of the main areas of scientific research has shown, most of them focus on one of the problems of the scientific triad that we have chosen as the object of research: either “resources or sustainable development”, or “resources and ecology”, or “sustainable development and ecology”. In our opinion, it would be legitimate to combine all of these areas.
The purpose of the current article is to develop a model that demonstrates the relationship between such elements of the country's economic development as fuel and energy resources, economic growth, and environmental sustainability. The depth of the study is determined by the regional aspect, i.e. the object of the study was the indicators of socio-economic development of the CIS countries.

UNDERSTANDING THE TERMS

Based on the fact that the object of the current study are three concepts - FER (FEC), economic growth and environmental sustainability, it is necessary to conduct a brief study of these concepts, i.e. consider the tools used from the standpoint of the synthesis of these concepts. The result of the research is presented in Table 1.

Table 1. Semantic analysis of the main concepts of the study

Author (source)	Meaning (interpretation)
Fuel and Energy Resources	
Bolotov G. [1]	a set of different types of fuel and energy (products of the extraction of fuel and energy minerals, the production of petroleum products, electricity and heat), which are necessary to ensure the production process of industrial organizations.
Russian Financial dictionnary [10]	Reserves of fuel and energy in nature, which, with the current level of technology, can be practically used by man for the production of material goods
Fuel and Energy Complex	
Bolotov [1]	A complex system that includes a set of industries and processes for the extraction of fuel and energy resources, their transformation, transportation and consumption
Economic growth / sustainable development	
Galuzina S., Turovskaya M. [12]	the possibility and ability of the region's economy to gradually improve the quality of life of the population at the level of generally accepted standards, to withstand the influence of internal and external threats at the optimal cost of all types of resources and the rational use of natural factors, to ensure socio-economic and general political stability
Environmental sustainability	
Philosophic dictionnary [6].	The ability of an ecological system to maintain its structure and functions under the influence of internal and external factors

Assessing the development of the fuel and energy complex (FEC) from the perspective of the world economy, it should be noted that the global demand for energy in the modern world economy retains its leading position. Despite a certain decrease in the growth rate of this demand, the energy sector as a branch of the world economy is among the leaders. Over the last 150 years of history, energy sector as an industry has shown a 35-times increase [31, 34]. The group of distinctive features of modern world energy can include: significant changes in regional proportions, high shares and growing volumes of consumption of fossil fuels, problems of ensuring investments in the development of the energy sector, increasing quality requirements for energy supply and other equally important trends. FER influence the formation and development of the national economies of many countries. Currently, there are several “growth points” in the global petrochemical complex. These are areas where there are large reserves of oil and gas raw materials, the necessary infrastructure has been created, qualified personnel has grown, a noticeable innovation potential has been created, the largest petrochemical companies and serious investors have been attracted. Now, oil and gas chemical clusters in Saudi Arabia, South Korea, Brazil, China, and India have been added to the “old” petrochemical centers in the USA, Canada, Western European countries, and Japan [2]. Over the past 20-30 years, significant regional and structural shifts have taken place in the global petrochemical industry. Regional shifts have manifested themselves in

the rapid development of the industry in the Asia-Pacific regions, the countries of the Middle East and a number of countries in South America. The role of China has especially increased [13]. The sustainable development of national economies in the context of the petrochemical business in world practice occurs in the following main areas:

- expansion and improvement of the resource base through the involvement of new types of raw materials (shale gas ethane, directly natural gas, gas condensate, bio-raw materials);
- improvement of equipment for the preparation and processing of raw materials;
- search for new technologies, primarily methane processing technologies, biotechnologies, nanotechnologies;
- expansion of the range of manufactured products through the production of polymers with predetermined properties, special plastics, bioplastics, membranes, etc.;
- improvement of methods for substantiating the directions of technological and organizational and economic development of petrochemicals, development and implementation of investment projects [11].

However, the disproportionate development of the country's fuel and energy complex may lead to the dependence of the national economy on imports of fuel and energy resources, as well as to the emergence of a structural monopoly of producers in some sectors of the economy. As a result, certain industries may lose competitive advantage in a competitive market due to the price factor and lower profits. On the other hand, the consequence of the structural monopoly of individual producers may be unreasonably high costs, low profits, and low development opportunities.

If the country's FER can be assessed by a simple summation of all their types, then such concepts as economic growth (stability) and environmental sustainability are synthetic and are determined by a set of indicators, in which an indicator is understood as the most general indicator on the basis of which changes in the state of the economic system can be established [7].

Indicators can have both absolute and relative values; in some cases they can have an interval expression. To assess the country's economic growth, existing domestic and foreign practices provide a significant range of approaches, concepts, techniques and methods. In the most aggregated form, economic growth (in the current study, a synonym for economic sustainability) is assessed by five main indicators:

- GDP per capita (EU countries - 38.9 thousand international dollars (2020));
- inflation rate;
- volume of external debt;
- the share of imports in domestic consumption;
- human development index.

A significant place in the system of ensuring economic growth is occupied by environmental sustainability, since, according to Jacque Fresco, "science and education, devoid of social consciousness and concern for environmental and human problems, do not make sense."

The problem of effective nature management does not lose its relevance. On the contrary, every sector of the national economy is looking for ways to “softer” use of natural resources, including fuel and energy. Issues of environmental sustainability are relevant for all countries, including the CIS. This thesis is confirmed by the relevant regulatory and legislative framework (Table 2).

Table 2. Legal and regulatory framework of the CIS countries regulating environmental issues

Country	Law and regulations
Azerbaijan + Russia	Law "On Ecological Expertise" Law "On Environmental Education"
Azerbaijan + Kazakhstan + Russia	Law "On Specially Protected Natural Territories" Law "On the Protection of Atmospheric Air" Law "On drinking water and drinking water supply"
CIS	Forest, Land, Water, Ecological model codes. "Code on Subsoil and Subsoil Use for the CIS Member States" Law "On Environmental Audit" Law "On Environmental Safety" Law "On ecological agricultural production" Law “On Conservation and Restoration of Biological Diversity” Law "On elimination of accumulated environmental damage"

	Law "On state information systems in the field of environmental protection, nature management and environmental safety", Law "On the development and protection of mountain territories", Law "On the legal regime of territories subjected to radioactive contamination" Law "On the Fundamentals of Ecological Entrepreneurship"

The environmental burden on the environment is manifested even in the conditions of conventional production through the consumption of natural resources. Thus, obtaining each ton of grain of wheat requires 2,500 tons of water, rice - 4,560 tons, cotton - 10,000 tons, beef - 30,000 tons. For the smelting of one ton of steel, 30 tons of water are required, for alcohol this value is 300, for cellulose - 500, for synthetic fibers - 5000, etc. [2]. As follows from the report of the United Nations Commission on Environmental Problems (UNEP), the forecast for the development of mankind until 2032 is disappointing. Under the influence of human activity, irreversible changes will occur on the planet. More than 70% of the earth's surface will be deformed in one way or another, more than 1/4 of all species of the animal and plant world will be irretrievably lost, safe air, clean drinking water, undisturbed landscapes will become an irreplaceable deficit, and the ability of nature to recover after anthropogenic impact will decrease [27]. Noteworthy are the works of such scientists as Kokorina A., Muratova T., Egorova M., Levchenko L., who investigate the main causes of environmental problems in the fuel and energy complex. In the scientific developments of scientists, it is noted that the main cause of environmental problems is the global problem of the raw material orientation of the economies of some countries (Table 3).

Table 3. The share of raw materials in the exports of some countries, %
(compiled according to [19])*

Country/group of countries	2005	2010	2020
EU (mineral fuels, mineral oils, and products of their distillation)	4,8	4,3	5,9
Latin America (oil and oil products)	18	17	14
USA (oil, gas)	16	10,5	8,3
Canada	33	62	59

*Source: World Bank database

Under current conditions of globalization, ignoring environmental requirements can be costly for the manufacturer. Today in the world practice there are uniform environmental standards and in case of violation of these standards, manufacturers cannot participate in international contracts. In modern society, the greening of production performs various functions: reproductive, spatial, socio-ecological. The reproductive function of production greening is based on the possibility of creating optimal conditions for the conservation and reproduction of natural potential. The substantiation of the system of ecological zoning, the formation of territorial schemes for nature management, the identification of disagreements within environmental and economic regions form the basis of the spatial function of the greening of production. The implementation of this function contributes not only to the optimization of the distribution of productive force, but also to the rational use of natural resources. No less important is the socio-ecological function associated with the environmental education of the population, the improvement of the general culture of production [9]. Currently, the issues of greening the fuel and energy complex are being actively discussed, taking into account the preservation of its financial stability. By 2050, the global energy sector will get rid of greenhouse gas emissions, the total amount of which today is 11 gigatonnes per year [4, 15]. The decarbonization policy aims to reduce greenhouse gas emissions in the global economy as part of the fight against climate change. Thus, at the UN climate conference COP-21, this was held in December 2015, out of 162 adopted national plans, 106 made a special emphasis on accelerating the development of renewable energy.

METHOD AND CALCULATIONS

The next stage of the study is to assess the state and dynamics of these categories in the CIS countries.

The fuel and energy complex occupies a special place in the development of the CIS countries that export the corresponding resources (Table 4).

Table 4. Share of FEC in GDP of CIS, %

Country	2000	2005	2010	2015	2020
Azerbaijan	19,6	20,3	22,1	26,2	32,5
Kazakhstan	21,1	25,2	22,5	26,9	29,7
Russia	30,5	29,3	28,6	25,9	23,6
Turkmenistan	9,2	15,4	16,2	21,1	22,0

*Source: World Bank database

All considered countries of the commonwealth are characterized by a high level of fuel and energy complex in the formation of GDP. Over the past years, despite the imposed sanctions, investments in fixed assets of enterprises for the extraction of crude oil and natural gas have been constantly increasing. Similar trends are typical for other CIS countries that export oil and gas. We calculate the general indicator of sustainable economic development (SD) using the multiplicative model (1):

$$K_{sd} = \prod_{i=1}^{5} K_i \quad (1)$$

where K_i is the coefficient of intermediate indicators of sustainable development (in Tables 5-9, these are indicators 1-5). The coefficient of intermediate indicators of sustainable development is calculated using the coefficient method (2.3):

$$K_i = I_f : I_{opt} \quad (2$$

or

$$K_i = I_{opt} : I_f \quad (3)$$

where I_f is the actual value of the indicator, I_{opt} is the optimal value of the indicator
Formula (2) is used for stimulating indicators, and formula (3) is used for destimulating indicators. General indicator of sustainable economic development of the CIS countries exporting fuel and energy resources is presented in Tables 5 - 9.

Table 5. Sustainable Development Index of the Republic of Azerbaijan
(compiled according to [3] [20], [28], [33], [36])

Index	Optimal value	2000	2005	2010	2015	2020
1	2	3	4	5	6	7
1. GDP per capita, thousand int. dollars (countries with an average level of development)	1,1 < GDP < 10	3,6	6,8	10,0	7,8	14,5
- coefficient	x	0,36	0,68	1	0,78	1,45
2. Inflation rate, % per year	10	2,2	5,4	7,9	7,6	2.6
- coefficient	-	4,54	1,85	1,27	1,32	3,85
3. Volume of external debt, % of GDP	25	22,8	13,5	12,5	28,3	20,1
- coefficient	x	1,10	1,85	2,0	0,88	1,24
4. Share of imports in domestic consumption, %	30	31,6	39,8	25,8	34,8	36,5
- coefficient	x	0,95	0,75	1,16	0,86	0,82
5. Human Development Index	-	0,64	0,758	0,713	0,751	0,756
- Optimal value	x	0,917	0,968	0,938	0,944	0,957
- coefficient	-	0,698	0,783	0,760	0,796	0,790
Sustainability summarizing factor	x	1,19	1,37	2,23	0,62	4,48

The generalizing coefficient of sustainable development of the Republic of Azerbaijan is quite stable. Over the past 20 years, only in 2015 is its value below 1. Moreover, with an optimal value of 1, in 2020 it was almost 4.5. The stable value of this coefficient is achieved by curbing inflationary processes. A positive fact is also the growth of GDP per capita. For other indicators, the actual values are below the optimal values. The Republic of Kazakhstan over the past 20 years has been steadily improving the indicators of the sustainable development coefficient. Since 2005, the value of the generalizing indicator has exceeded 1, and in 2020 its value exceeded 3. This indicates the presence of a certain margin of "strength" in the economy. This stable position is achieved due to the growth of GDP per capita, relatively low inflation rates and reduced dependence on imports. However, the growth of external debt reduces the indicators of the general indicator of sustainable development. It should be noted that the average indicators for countries with an average level of development were chosen as the optimal base. It is quite logical to assume that Kazakhstan should be transferred to a higher category of countries.

Table 6. The coefficient of sustainable development of the Republic of Kazakhstan (compiled according to [3] [20], [28], [33], [36])

Index	Optimal value	2000	2005	2010	2015	2020
1	2	3	4	5	6	7
1. GDP per capita, thousand int. dollars (countries with an average level of development)	1,1 < GDP < 10	7,7	13,9	12,6	13,7	26,6
- coefficient	x	0,77	1,39	1,26	1,37	2,66
2. Inflation rate, % per year	10	9,8	7,5	7,8	13,6	7,5
- coefficient		1,02	1,33	1,28	0,73	1,33
3. Volume of external debt, % of GDP	25	17,7	7,5	11	22	27,4
- coefficient	x	1,41	3,33	2,27	1,14	0,91
4. Share of imports in domestic consumption, %	30	54,8	46,7	29,6	24,5	26,5
- coefficient	x	0,55	0,64	1,01	1,22	1,13
5. Human Development Index	x	0,685	0,807	0,714	0,788	0,825
- Optimal value	x	0,917	0,968	0,938	0,944	0,957
- coefficient	x	0,747	0,834	0,761	0,835	0,862
Sustainability summarizing factor		0,45	3,28	2,81	1,16	3,14

Table 7. The coefficient of sustainable development of the Russian Federation (compiled according to [3], [8], [20], [28], [33], [36])

Index	Optimal value	2000	2005	2010	2015	2020
1	2	3	4	5	6	7
1. GDP per capita, thousand int. dollars (countries with an average level of development)	1,1 < GDP < 10	9,5	16,2	20,5	24,1	28,2
- coefficient	1	0,95	1,6	2,05	2,4	2,82
2. Inflation rate, % per year	10	20,2	10,9	8,6	12,9	4,9
- coefficient		0,49	0,92	1,16	0,78	2,04
3. Volume of external debt, % of GDP	25	93,4	9,6	7,5	16,2	17,8
- coefficient	x	0,27	2,60	3,33	1,54	1,40
4. Share of imports in domestic consumption, %	30	34,7	15,2	44	35,4	28,2
- coefficient	x	0,86	1,97	0,68	0,85	1,06

5. Human Development Index	x	0,720	0,806	0,719	0,798	0,824
- Optimal value	x	0,917	0,968	0,938	0,944	0,957
- coefficient	x	0,785	0,833	0,766	0,845	0,861
Sustainability summarizing factor		0,08	6,28	4,12	2,07	7,35

The generalizing coefficient of sustainable development in the Russian Federation does not have stable values: its growth in 2005 was replaced by a reduction in 2010 and 2015. However, in 2020 the situation changed for the better. Growth of GDP per capita and relatively low inflation rates play a significant role in stabilizing this coefficient. Compared to Azerbaijan and Kazakhstan, Russia has a higher human development index.

Table 8. The coefficient of sustainable development of Turkmenistan
(compiled according to [3] [20], [28], [33], [36])

Index	Optimal value	2000	2005	2010	2015	2020
1	2	3	4	5	6	7
1. GDP per capita, thousand int. dollars (countries with an average level of development)	1,1 < GDP < 10	2,6	5,8	6,8	8,0	14,3
- coefficient		0,26	0,58	0,68	0,8	1,43
2. Inflation rate, % per year	10	10,9	7,5	8,2	10,3	15,6
- coefficient		0,92	1,33	1,22	0,97	0,64
3. Volume of external debt, % of GDP	25	25,6	38,2	42,5	35,3	30,9
- coefficient	x	0,98	0,65	0,59	0,71	0,81
4. Share of imports in domestic consumption, %	30	42,8	51,5	42,5	46,8	54,3
- coefficient	x	0,70	0,58	0,71	0,64	0,55
5. Human Development Index	x	…	0,728	0,669	0,688	0,715
- Optimal value	x	0,917	0,968	0,938	0,944	0,957
- coefficient	x	…	0,752	0,713	0,723	0,747
Sustainability summarizing factor		0,16	0,22	0,25	0,25	0,30

Among the countries considered above, the Republic of Turkmenistan has the lowest indicators of the generalizing coefficient of sustainable development. Moreover, the best value is only 30% of the optimal (2020). For all indicators as basis of calculation for the summarizing coefficient the actual values are much lower than the optimal level.

Table 9. The coefficient of sustainable development of the Republic of Uzbekistan
(compiled according to [3] [20], [28], [33], [36])

Index	Optimal value	2000	2005	2010	2015	2020
1	2	3	4	5	6	7
1. GDP per capita, thousand int. dollars (countries with an average level of development)	1,1 < GDP < 10	1,8	2,4	3,0	2,0	7,8
- coefficient	x	0,18	0,24	0,3	0,2	0,78
2. Inflation rate, % per year	10	28,2	7,8	7,3	5,6	11,1

- coefficient	x	0,35	1,28	1,37	1,78	0,90
3. Volume of external debt, % of GDP	25	30,5	49,3	38,4	25,4	30,8
- coefficient	x	0,82	0,51	0,65	0,98	0,81
4. Share of imports in domestic consumption, %	30	25,7	28,6	25,0	17,0	15,2
- coefficient	x	1,17	1,05	1,2	1,76	1,97
5. Human Development Index	x	0,595	0,701	0,617	0,675	0,720
- Optimal value	x	0,917	0,968	0,938	0,944	0,957
- coefficient	x	0,649	0,724	0,658	0,715	0,752
Sustainability summarizing factor		0,03	0,12	0,21	0,44	0,84

The low values of the generalizing coefficient of sustainable development of the Republic of Uzbekistan are "compensated" by its stable growth. For 20 years, this indicator has increased by 28 times and such dynamics is not typical for other analyzed countries.

To a greater extent, this is due to low starting values. More clearly, the change in the generalizing indicator of sustainable development of the analyzed countries is shown in Figure 2.

Analyzing the coefficient of sustainable development, it is necessary to take into account its generalizing nature. This means that its change does not always correlate with the dynamics of sustainable development of a separate community of people.

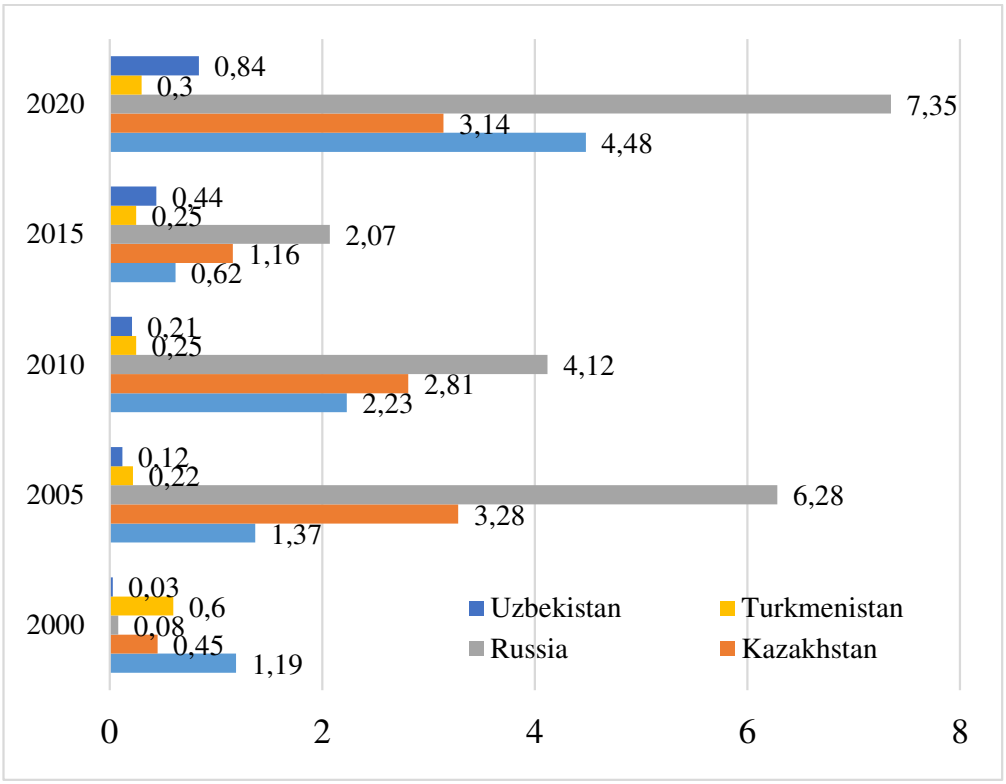

Figure 2. Sustainability summarizing factor (based on author's calculations)

The social orientation of the economy, written in the Constitutions of most of the countries under consideration, suggests that the interests of the individual should be the basis for ensuring the sustainable development of the country.

Unfortunately, under modern conditions, the most elementary requirements of sustainable human economic development are not always guaranteed (Table 10).

Table 10. Dynamics of availability of main food groups (g/person/day), 2005-2020 (compiled according to [5], [19], [24])

Group of products	Azerbaijan	Kazakhstan	Russia	Turkmenistan	Uzbekistan	EU-15
Fruits	156-258	69-191	99-105	177-162	123-268	146-215
Vegetables	368-494	421-542	303-354	385-400	394-793	388-533
Vegetable oils	34-55	39-58	42-62	18-20	30-30	26-31
Whole plant origin	1-1	2-1	1-2	0-3	0-0	2-4
Legumes	520-790	531-791	990-1005	580-585	547-1092	502-803
Fish	11-15	10-19	15-17	9-13	25-39	13-18
Milk	356-570	682-750	608-564	403-391	386-554	445-506
Poultry	42-52	29-49	70-85	3-5	28-43	17-24
Red meat	209-232	267-291	273-301	248-308	133-183	178-214
Whole animal origin	807-893	986-1110	990-1206	669-717	572-819	653-767

Table 10 is given to demonstrate the generalizing nature of the indicator considered above, the use of which is advisable at the macro level. To assess the environmental sustainability of countries under consideration, we use the index of environmental efficiency, the calculation method of which was proposed by Yale and Columbia Universities in cooperation with the Joint Research Center of the European Commission [18]. The list of countries according to the environmental performance index has been presented at the World Economic Forum for 15 years now. When calculating the environmental sustainability factor, the best value is taken into account, i.e. the value of the country that in the specified year occupied the 1st place in the ranking. Calculations of environmental sustainability of the countries under consideration are presented in Table 11.

Table 11. Calculation of environmental sustainability of the CIS countries (compiled according to [18], [38])

Indices	2005	2010	2015	2020
Optimal value	94,5	93,5	90,68	82,5
1. Azerbaijan	70,9	62,5	83,78	46,5
- coefficient	0,750	0,668	0,924	0,564
2. Kazakhstan	87,9	71,6	90,68	44,7
- coefficient	0,930	0,766	1	0,542
3. Russia	67,2	61,2	83,52	50,5
- coefficient	0,711	0,655	0,921	0,612
4. Turkmenistan	58,1	38,4	70,24	43,9
- coefficient	0,615	0,411	0,775	0,532
5. Uzbekistan	35,6	35,8	63,67	44,3
- coefficient	0,377	0,383	0,702	0,537

The index of environmental efficiency in general for 180 countries of the world has a clear downward trend, so if in 2005 the highest value of the index was 94.5, then in 2020 - 82.5, i.e. the reduction was almost 13%. This fact is a clear confirmation of the deterioration of the environmental situation in the global economy. A significant improvement in environmental performance was noted in 2015, but this environmental balance was not maintained over the next five years. More clearly, the change in the index of environmental efficiency for group of chosen CIS countries is shown in Figure 3.

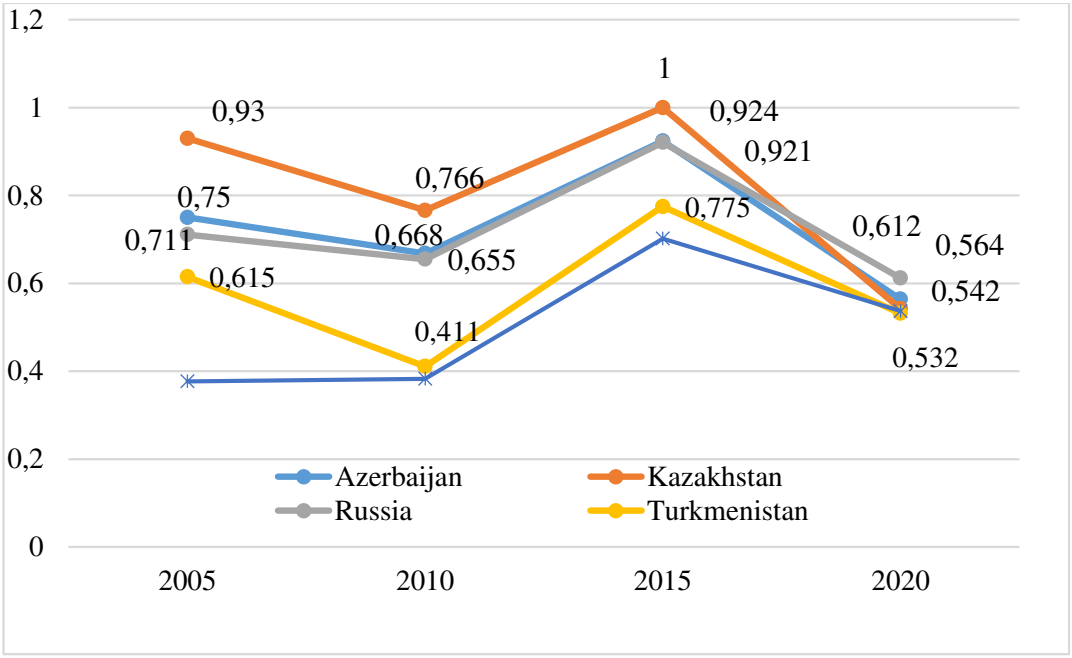

Figure 3. Indices of environmental performance of the CIS countries
Source: based on author's calculations

The decrease in the indicator of environmental efficiency is typical for all analyzed countries. There is no unequivocal leader among the five countries under consideration. The best indicators are kept by Azerbaijan and Kazakhstan. The position of an outsider is steadily occupied by Uzbekistan.
The conducted research allows compiling a generalizing Table 12. When presenting the values of the fuel and energy potential of countries, data on the ranking of countries in the world in terms of production, export and consumption of fuel and energy resources were used.

Table 12. Development indicators of the CIS countries exporting fuel and energy resources

Indices	2000	2005	2010	2015	2020
Azerbaijan					
Fuel and energy potential of the country	22 (0,18)	20 (0,2)	20 (0,15)	18 (0,17)	17 (0,18)
Sustainable development coefficient	1,19	1,37	2,23	0,62	4,48
Environmental sustainability coefficient	x	0,750	0,668	0,924	0,564
Kazakhstan					
Fuel and energy potential of the country	12 (0,33)	10 (0,4)	10 (0,3)	9 (0,33)	9 (0,33)
Sustainable development coefficient	0,45	3,28	2,81	1,16	3,14
Environmental sustainability coefficient	x	0,930	0,766	1	0,542
Russia					
Fuel and energy potential of the country	4 (1)	4 (1)	3 (1)	3 (1)	3 (1)
Sustainable development coefficient	0,08	6,28	4,12	2,07	7,35
Environmental sustainability coefficient	x	0,711	0,654	0,921	0,612
Turkmenistan					

Fuel and energy potential of the country	33 (0,12)	30 (0,13)	27 (0,11)	25 (0,12)	22 (0,14)
Sustainable development coefficient	0,6	0,22 ()	0,25	0,25	0,3
Environmental sustainability coefficient	x	0,615	0,411	0,775	0,532
Uzbekistan					
Fuel and energy potential of the country	35 (0,11)	27 (0,15)	28 (0,11)	27 (0,11)	25 (0,12)
Sustainable development coefficient	0,03	0,12	0,21	0,44	0,84
Environmental sustainability coefficient	x	0,377	0,383	0,702	0,537

The conducted studies have demonstrated the relationship between economic growth, the provision of the country with fuel and energy resources and environmental sustainability. These components have mutual influence and are in constant development (Figure 4).

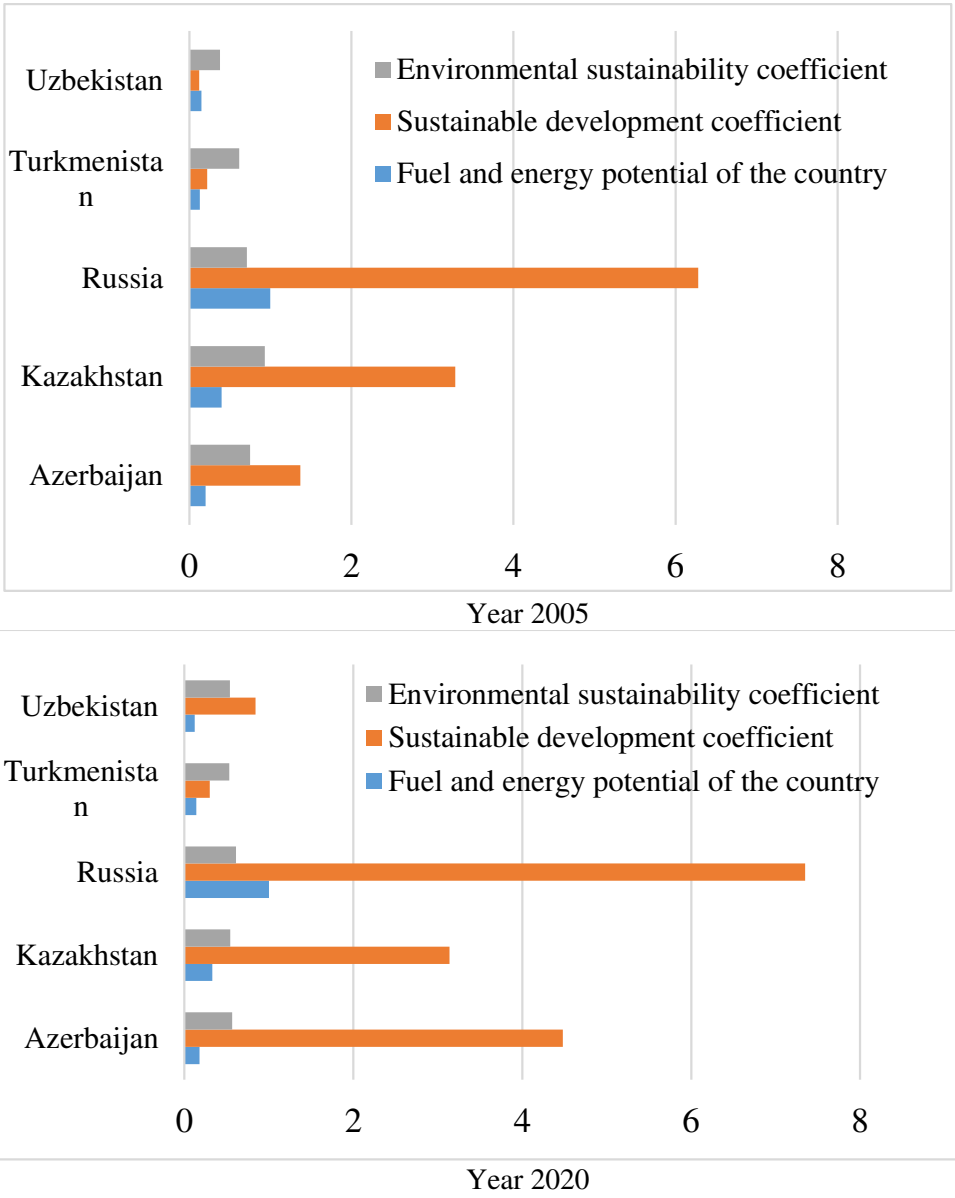

Figure 4. Development indices of CIS countries exporters of FER

CONCLUSION

It shall be noted that all countries analyzed in this paper have significant potential for the development of renewable energy. The conducted studies demonstrate a close relationship between such economic categories as fuel and energy resources, sustainable development and environmental sustainability. The assessment of the quality of development and functioning of modern industrial production technologies, which are based on the exhaustible resources of natural ecosystems, states the fact of their increased exploitation, and this poses a threat to the sustainable development of all mankind.

Today, the issues of greening national economies and sustainable environmental development among the global priorities of the world community are among the ten most important. The realization that the preservation and improvement of the environment is an essential condition for the sustainable development of each country has firmly established itself in the international agenda. In the end, it should be noted that the globalization of economic processes is manifested in all sectors of the world economy. Scientists and practitioners note that renewable energy is becoming the main direction in the development of global energy. Under the influence of changes in energy policy and the development of new technologies, the world economy is entering the stage of the 4th energy transition to the widespread use of renewable energy sources and the displacement of fossil fuels [26]. This naturally leads to corresponding changes in the formation of a strategy for economic growth and the greening of production.

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