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ABSTRACT

of the dissertation for the degree of Doctor of Philosophy

MODELING OF THE GREEN ECONOMY (IN THE REPRESENTATION OF AZERBAIJAN)

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INTRODUCTION

Relevance of the topic and degree of development. The continuous increase in the energy demand of the countries of the world makes environmental problems even more acute. Since the beginning of 2020, the spread of the COVID-19 pandemic on a global scale and still continuing requires special attention to be paid to environmental problems. Environmental problems now require the unification of the efforts of not one country, but the countries of the world. The adoption of the concept of Sustainable Development by the United Nations in the 90s of the last century implies the importance of the balance between economic, social and ecological systems and the formation of the economy based on new paradigms. At the core of these paradigms is the provision of economic growth under the condition of protecting the environment and social spheres.

The consequences of climate changes and the increase in average temperature at the global level have become acute in some regions. Concerns about climate change are growing. Research on climate change suggests that this problem will continue under all scenarios and will seriously affect almost all areas of the economy and social life. In a comprehensive report prepared by the Intergovernmental Panel on Climate Change (IPCC) in 2014, the effects of climate change on all spheres of the economy, social sphere and the environment were broadly explained. In recent decades, the pace of using alternative energy sources has lagged behind the pace of global population growth and the growth of quality of life, suggesting that the amount of carbon emissions released into the environment will not decrease in the near future. This indicates that climate changes and global temperature will continue to increase.

It should be noted that the Green Economy concept requires a certain change of the state policy related to the economy. So, even A. Smith considered it harmful for the state to interfere in the economy. He believed that the economy would regulate itself based on market competition. But the constant increase in consumption stimulated production, and the introduction of new technologies, in most cases, caused serious damage to the environment. Climate changes, the

increase in the concentration of harmful substances in the atmosphere, soil and water made it inevitable that new demands would appear before the world. This is due to the increase of state intervention in the economy, both at the global and local level, to protect the environment. The UN and the Intergovernmental Panel on Climate Change (IPCC) have supported the expansion of the Green Economy Concept to prevent the negative effects of climate change in the future. This means the strengthening of state intervention in the economy. Because it is impossible to implement these measures without appropriate state policy.

It should be noted that in paragraph 5 of the document "Azerbaijan 2030: National Priorities for socio-economic development" approved by the Decree of the President of the Republic of Azerbaijan dated February 2, 2021, which is called "Clean environment and "green growth" country" in order to reduce waste and mitigate the negative effects of climate change on the economy, the widespread use of renewable energy sources has been reflected. However, as we mentioned above, a full transition to renewable energy sources in thermal power plants is not possible in the short term. Taking this into account, the "National Priority" document set the goal of increasing the share of alternative energy in the country's energy balance to 30% by 2030.

All this confirms how necessary it is to transition the economy to a green model both at the global level and at the regional and local levels. That is why, in our research, we approached the problems of transition to a green economic model in Azerbaijan as a scientific problem, carried out its quantitative evaluation and comparative analysis, and tried to determine which indicators have weaknesses.

As we mentioned, the concept of green economy can be realized due to the increase of state intervention in the economy both at the local and global level. As a result, green economy problems are more widely studied by research groups gathered around international organizations and operating with their direct support. The research groups operating within the framework of the mechanisms created to implement the tasks defined by the UN concept of Sustainable Development, IPCC, and the Organization for Economic Cooperation

and Development (OECD) have conducted extensive and useful research on the green economy, its various models, evaluation, and other issues. Individual researchers, including Pearce D.W., Zysman J., Clark H., Burkart K., Gurieva M.A.; Research conducted by Rudneva L.N., Binh P. T., Reilly J. M., Zervas E. made an important contribution to the development of the green economy model.

The problems related to various aspects of this problem are addressed by Imanov G., Gasimov V., Gulaliyev M., Valiyev Z., Khumbatov M., Hajiyev Sh. And it has been studied by other researchers. Evaluating the importance of the conducted studies, it should be noted that the level of development of green economy construction in Azerbaijan was not quantitatively evaluated in these studies. However, without cross-country evaluations, it is impossible to assess the current state of the green economy model, nor to make predictions about future prospects. Proposing a composite index for the quantitative evaluation of the green economy model in the presented dissertation has important scientific and practical importance in identifying weaknesses in the process of transition to a green economic model.

The purpose of the study: The main purpose of the study is to develop the green economy model in Azerbaijan.

Aims and tasks of the research: To achieve the aim of the research, the following tasks are expected to be fulfilled:

- Comparative study and classification of approaches to the green economy concept;
- Considering that the green economy can be measured quantitatively, a comparative analysis of the methods of determining and measuring its main indicators;
- Analysis of the main framework of the green economy model widely discussed in the economic literature in recent decades;
- Comparative analysis of the experience of other countries to determine the level of development of the green economy in Azerbaijan;
- Determination of the main indicators for the purpose of studying the modern state of the green economy in Azerbaijan;

• Analysis of the state policy related to the green economy in Azerbaijan, as well as the implemented programs;

• Classification of necessary measures for the transformation of Azerbaijan's economy in the direction of green economy;

• Preparing proposals for improving the legislative framework in order to develop the determinants that hinder the development of the green economy model;

• Evaluation of the possibilities of applying the GEM model to environmental protection in Azerbaijan;

• Determining the possibilities of using economic and fiscal mechanisms in order to transition to a green economy in the country;

• Determining the possibilities of using institutional processes for the purpose of transition to a green economy;

• Assessment of the possibilities of application of the GEM model in the economic field in Azerbaijan;

• Possibilities of financing the transition to a green economic model in Azerbaijan;

The object of the study - the economy of Azerbaijan was taken as the object of the study.

The subject of the study - It is the evaluation of the economic, social and environmental determinants directly related to the concepts of "green economy" and "sustainable economic development" and determining the development trend.

Theoretical and methodological bases of research - The UN Sustainable Development Concept, State Programs of the Republic of Azerbaijan, Strategic Roadmaps, Global Green Economy Index developed by Dual Citizens Inc., "Global Cleantech Innovation Index" and "The Clean Energy Patent Growth Index" calculated by Gleantech Group, as well as green materials of a large number of conferences dedicated to the economy, and the results of scientific researches.

The main indicators given for Green Economy in the data of ARDSK were taken as the information base of the research. The database of the World Bank and the International Finance Corporation was used when making calculations for other countries.

The main scientific provisions of the study are as follows:

1. By comparing various approaches in the existing literature regarding the Green Economy concept, it is concluded that there is still no general scientific approach related to these concepts. However, despite the diversity of this concept, there are common aspects that unite them.

2. To assess the current state of the green economy model, a Green Economy Composite Index consisting of five sub-indices, which is completely new in the economic literature, is proposed.

3. Assessments of some components of the modern state of the green economy in Azerbaijan show that the policy implemented in the direction of the green economy in Azerbaijan in the last 17 years (2005-2022) has yielded its results, and the "Growth parameters and socio-economic essence" indicator of the transition to the green economy is positive. is directional.

4. The environmental and resource efficiency sub-index of the Azerbaijani economy is negative on some indicators. Although Azerbaijan's indicators on this sub-index are weak, changes in a positive direction can be felt in recent years.

5. Based on Azerbaijan's position on the indicators included in the "natural resources group" of the Green Economy model, we can note that the possibilities of our country's transition to the Green Economy model on these indicators are somewhat limited. However, the state policy in the direction of implementing oil and gas production with newer technologies, the measures taken by the government in recent years regarding water supply, the use of green technology in the land areas allocated for the agricultural sector, and the increase of forest massifs are bearing fruit.

6. In the last 30 years, the "Environmental quality of life" sub-index, which is a component of the Green economy index in Azerbaijan, has a decreasing trend. The decrease of both of the above-mentioned indicators led to the decrease of this indicator as well. However, the positive relationship of the first indicator with the volume of GDP per capita, and the negative relationship of the second indicator actually results from the fact that economic development has a dual nature.

7. The research shows that necessary measures have been implemented in Azerbaijan in recent years in the field of tourism development, which is one of the components of the green economy model. However, as a result of the COVID-19 pandemic, this sector has weakened considerably. The tourism sector in Azerbaijan has developed only in the last 10-15 years. In that period, his contribution to the economy of Azerbaijan exceeded 4%.

8. Taking into account the 5 main sub-indices of the Green Economy index, we can note that the main component that has a negative effect on the GEI composite index in Azerbaijan is the large oil and gas rent. While the green economy composite index for other indicators was mostly positive, the negative value of the sub-indicator of the natural resources group led to a decrease in the composite index.

Scientific novelty of the research. The scientific novelty of the dissertation consists of the following:

• Based on the data of ARDSK, a Green Economy Index is proposed, which is different from GGEI and GEM models, and also allows for cross-country comparison;

• Based on this index, assessments were made on the indicator "growth parameters and socio-economic essence";

• "Environmental and resource efficiency group of the economy" was accepted as one of the main sub-indices of the green economy index, and comparative assessments were conducted on this indicator;

• "Natural resources group" indicators were accepted as a sub-index of the Green Economy Model and comparative assessments were made on these indicators;

• "Environmental quality of life measurement group" was accepted as a sub-index of the green economy model and comparative assessments were made on this indicator;

• Based on the role of "Group of economic opportunities and instruments of politics" indicators in the development of the Green Economy, comparative assessments were made on this indicator as well;

Theoretical and practical significance of research. The results of the research work and the summarized provisions of the dissertation can be used as a methodological basis for conducting necessary

research in the process of transition to the Green Economy model in Azerbaijan. On the other hand, the obtained results can be used in the state programs prepared for the development of the Green Economy Model.

Approval and implementation of work results. The main results of the dissertation work are reflected in 5 articles published in scientific journals recommended by the Higher Attestation Commission under the President of the Republic of Azerbaijan, two articles published in two scientific journals recommended by the Higher Attestation Commission of the Russian Federation and included in the RINS database. Regarding the results of the dissertation, presentations were made at two conferences held in Azerbaijan, one in the Russian Federation and one in Ukraine.

The name of the organization where the dissertation work was carried out is the Institute of Management Systems of the Ministry of Science and Education of the Republic of Azerbaijan.

Structure and scope of the dissertation. Dissertation consists of introduction, 3 chapters, ten paragraphs, conclusion and list of used literature. Dissertation is 145 pages long, including 210,000 characters and 245,000 characters, excluding tables and bibliography. 22 tables and 40 graphs, as well as 4 schemes were used in the work. The literature list consists of 114 names. The used literatures are grouped by Azerbaijani, English and Russian languages, as well as websites, and are listed with the appropriate serial number.

Dissertation structure

INTRODUCTION

CHAPTER I: THEORY AND METHODOLOGICAL BASIS OF THE GREEN ECONOMY.

1.1. Green economy concept
1.2. Main indicators and measurement methods of green economy
1.3. The main indicators of the green economy and their measurement
1.4. The basic framework of the green economy model

CHAPTER II: LEVEL OF DEVELOPMENT OF THE GREEN ECONOMY IN AZERBAIJAN

2.1. Possibilities of using intersectoral balance model in the process of transition to green economy in Azerbaijan
2.2. Current state of green economy in Azerbaijan (Green Economy Index) (GEI)
2.3. State policy on green economy in Azerbaijan

CHAPTER III: TRANSFORMATION OF AZERBAIJAN ECONOMY IN THE DIRECTION OF GREEN ECONOMY

3.1. Environmental and resource efficiency sub-index of Azerbaijan economy and its assessment
3.2. The place of natural resources in the model of transition to a green economy in Azerbaijan
3.3. Increasing environmental quality in the process of transition to a green economic model.

Conclusion and suggestions

Literature used

THE MAİN SCİENTİFİC PROVİSİONS SUBMİTTED TO THE DEFENSE

The first provision: By comparing different approaches in the existing literature on the Green Economy concept, it comes to the conclusion that there is still no general scientific approach to these concepts. However, despite the diversity of this concept, there are also common aspects that unite them.

At the global level, the threat of disruption of the mutual harmony between the economy, the social sphere and the environment forces both developed and developing countries to adopt an agreed joint policy on sustainable development. The new economic model called "green economy" envisages efficient use of natural resources, reduction of carbon emissions, maximum reduction of environmental damage and formation of higher inclusive social societies. However, it should be taken into account that the concept of "green economy" has not yet been fully formed in the economic literature, and its various aspects are more emphasized by different researchers.

Along with the concept of "green economy", there is also the concept of "sustainable development" in the economic literature. There is a need to define the differences between these two concepts. Therefore, in our comparative study, it is intended to clarify several questions. First, a comparative analysis of approaches to the concept of "green economy" in the economic literature is provided. Secondly, there is a need to classify the main differences between the concept of "green economy" and the concept of "sustainable development". Then, views in the economic literature on the issues related to the reduction of carbon emissions, climate change problems, renewable energy problems, water management, waste management, land management, construction and transportation system were compared.

Definitions of "green economy" essentially include several key facts. First, "Green Growth" insists on the sustainability of economic growth and economic development. Second, such growth must be inclusive and ensure the participation of all members of society. Third, "green growth" should not damage the environment and should be realized on the basis of technological innovations that promote the

reduction of carbon emissions. Fourth, green growth should involve efficient use of natural resources. Fifth, "green growth" should stimulate the creation of new jobs. Sixth, green growth should expand the use of green technology and green energy.

The concept of "green growth" entered the economic literature earlier than the concept of "green economy" and was the subject of discussion from various aspects. However, the essence of both concepts is the requirement to comply with environmental standards in economic activity, including the requirement to reduce the effects of climate change and environmental pollution. On the other hand, both concepts imply economical and more efficient use of natural resources in economic activity. Both concepts reflect the application of innovations and new technologies in the economy. However, the differences between these two concepts should be taken into account. Thus, the concept of "green economy" implies the essential renewal of economic activity by reducing the environmental threat and focusing on ensuring economic justice in society and improving social security.

Such renewal of the economy is related to the formation and development of a new market related to "green investments", "green jobs", new environmental services. One of the important goals of the green economy is to eliminate poverty and support the development of low-income countries. However, the main goal of the "green growth" concept is the continuation of economic growth. However, unlike classical growth theories, "green growth" supports the provision of such growth provided that environmental requirements are taken into account. The main difference between the concepts of "green economy" and "green growth" is that the former focuses more on population welfare, while the latter focuses more on economic growth. However, the common aspect of both concepts is that environmental requirements are taken as a basis.

Second provision: To assess the current state of the green economy model, a Green Economy Composite Index consisting of five sub-indices, which is completely new in the economic literature, is proposed.

The main indicators that are essentially related to the green economy model are classified in five groups of indicators in ARDSK. Each of these groups includes several sub-indicators. These groups are:

1) Growth parameters and socio-economic essence (. This group consists of 10 sub-indicators: a) GDP per capita; b) the volume of products produced by 1 employee in 1 hour; c)GP_t)Level of economic activity of the population of working age (percentage); d) Unemployment level (percentage); e) Special weight of the minimum wage on the average monthly nominal wage (percentage); f) Poverty level (percentage); g) Education level (percentage); h) Population aging rate (percentage);i)Population density (people/km2);j)Life expectancy at birth (for age 0) (age).

2) The environmental and resource efficiency group of the economy includes 15 sub-indicators: a) (ERE_t)Carbon dioxide (CO2) released into the atmosphere from stationary sources (thousand tons);b)Volume of water consumption for irrigation needs (million cubic m); c)Volume of water losses (million cubic m); d)Volume of water loss during use for irrigation needs (million cubic m);e)Volume of industrial waste per person (kg);f)Volume of solid household waste per person (kg);g)Total final consumption of energy (min net);h)Total final consumption of energy (teracoul);i)Energy capacity (kg of oil equivalent/thousand manats);j)Electricity production (million Kwts);k)Production of renewable energy sources (million Kwts);i)Amount of mineral fertilizers per hectare of cultivated area (kg/ha);m)Amount of organic fertilizers per hectare of cultivated land (kg/ha);n)The share of energy supply from renewable sources in the total energy supply (percentage); o) Value of 1 kg of produced energy product in GDP (1 manat/kg of oil equivalent).

3) group of natural resources (includes 10 sub-indicators: a) Fresh water taken from natural sources (million cubic meters); b) Water consumption (million cubic m); c) Oil production (thousand tons); d) Gas production (thousand tons); e), The structure of the land fund according to its purpose: Total land area of the country - total (thousand hectares); f) Land suitable for agriculture (thousand hectares); g) Non-agricultural lands (thousand hectares); h) Fishing (tons); i) Water resources utilization index (percentage); j) Area covered by forest (percentage).NR_t)

4) The environmental quality of life measurement group () includes 5 sub-indicators: a)EFL_tVolume of polluting substances released into the atmosphere per person of the population (kg); b) Diseases of respiratory organs (person); c) Patients with acute intestinal infections: children under 0-17 years of age (person); d) People with acute intestinal infections: people over 18 years old (people); e) Sewage discharged without treatment (million cubic m).

5) The group of economic opportunities and tools of the policy () includes 7 sub-indicators: a)EOP_tThe number of foreigners and stateless persons who came to Azerbaijan for the purpose of tourism (people); b) Average annual concentration of ammonium ions (NH4) in rivers; c)Share (percentage) of investments directed to fixed capital for environmental protection and efficient use of natural resources in total investments; d) Share of tourism activity in GDP (percentage); e) Payments for atmospheric air pollution (thousand manats); f) Payments due to pollution of water resources (thousand manats); g) Fees for waste disposal (thousand manats).

Using these indicators, the Green Economy Composite Index ($GEC\dot{I}_t$)

$$GEC\dot{I}_t = \frac{GP_t+ERE_t+NR_t+EFL_t+EOP_t}{5} \quad (1)$$

Note that this composite index can also be expressed as a geometric mean:

$$GEC\dot{I}_t = \sqrt[5]{GP_t * ERE_t * NR_t * EFL_t * EOP_t} \quad (2)$$

We will assume that each of these sub-indices characterizing the green economy has the same weight (20%). On the other hand, we will assume that during the calculation of sub-indices, the sub-indices characterizing the sub-indicators included in the composition of each group of indicators have the same weight. But in this case, we will use the formula to bring all indicators to the same size. Hence, for each sub-index, the corresponding sub-index after the "normalization" operation is performed $I_i = \frac{X_i - X_{min}}{X_{max} - X_{min}}$

$$S\dot{I}_i = \frac{\sum_{i=1}^{n} I_i}{n} \quad (3)$$

will be calculated by the formula.

The third provision: assessments of some components of the modern state of the green economy in Azerbaijan show that the policy implemented in the direction of the green economy in

Azerbaijan in the last 10 years has yielded its results, and the "Growth parameters and socio-economic essence" indicator of the transition to the green economy is positive;

So 1)Parameters of growth and socio-economic essence for the group of indicators (GP_t)sub-index

$$GP_t = \frac{\sum_{i=1}^{10} I_i}{10} = \frac{I_1+I_2+I_3+I_4+I_5+I_6+I_7+I_8+I_9+I_{10}}{10} \quad (4)$$

orr

$$GP_t = \sqrt[10]{\prod_{i=1}^{10} I_{it}} \quad (5)$$

Here,GDP per capita. This indicator is entered with "+" and ;$I_1 - I_{1,min} = 0;\ I_{1,max} = 250000$ USD. Data on this indicator are obtained from the national statistical database or the official statistical database of the World Bank. According to this indicator, Luxembourg is currently the leader, and the value of the product per worker in this country is 242 thousand US dollars at PPP (PPP) [**Ошибка! Источник ссылки не найден.**].

I_2 −The value of the product produced by 1 worker in 1 hour. This indicator is entered with "+" and$I_{2,min} = 0;\ I_{2,max} = 300$It is US dollars.

I_3 −Level of economic activity of working-age population (percentage). This indicator is also entered with "+" and$I_{3,min} = 0;; I_{3,max} = 100$

I_4 −Unemployment rate (percentage). This indicator is entered with "-" and$I_{4,min} = 0;; I_{4,max} = 100$

I_5 −Specific weight of the minimum wage on the average monthly nominal wage (percentage). This indicator is also entered with "+" and$I_{5,min} = 0;; I_{5,max} = 100$

I_6 −Poverty level (percentage). This indicator is entered with "-" and$I_{6,min} = 0;\ I_{6,max} = 100$

I_7 −Education level (percentage). This indicator is also entered with "+" and$I_{7,min} = 50;\ I_{7,max} = 100$.Indicators related to the level

of education were obtained from the official database of the World Bank.

I_8 −Population aging rate (percentage). Considering that the scientific justification of the direct effects of this indicator on the green economy is ambiguous, we do not include it in the equation (4) and (5). Nevertheless, note that$I_{8,min} = 1$; $I_{8,max} = 50$can be taken.Population aging raterelated indicators are obtained from the official database of the World Bank.

I_9 −Population density (people/).km^2Considering that the scientific justification of the direct effects of this indicator on the green economy is ambiguous, we do not include it in the identity of (4) and (5). Nevertheless, note thatFor population density $I_{9,min} = 0.01$; $I_{9,max} = 30000$can be taken. It is obtained from the official database of the World Bank.

I_{10} − Life expectancy at birth (for age 0) (age).This indicator is included in the identity of (4) and (5) with "+" and$I_{10,min} = 20$; $I_{10,max} = 100$can be taken. Information on this indicator can be obtained from the official database of the World Bank.

The calculation of the GP_t sub-index on the basis of the identity (4) of the indicator "Growth parameters and socio-economic essence" is given in table 1. As we mentioned above, identity (4) does not include I_8 and I_9, and I_4 and I_6 are included with a negative sign. The time series for sub-indices covers the years 2005-2022.

$$GP_t = \frac{\sum_{i=1}^{8} I_i}{8} = \frac{I_1+I_2+I_3-I_4+I_5-I_6+I_7+I_{10}}{8} \quad (6)$$

$$GP_t = \sqrt[8]{I_1 * I_2 * I_3 * \left(\frac{1}{I_4}\right) * I_5 * \left(\frac{1}{I_6}\right) * I_7 * I_{10}} \quad (7)$$

"Parameters and socio-economic nature of growth" indicatorGP_t The calculation of the sub-index based on the identities (4) and (5) shows that the green economy indicator in Azerbaijan has continuously developed according to this sub-index.

Table 1

"Parameters and socio-economic nature of growth" indicator sub-index and its components

	I_1	I_2	I_3	I_4	I_5	I_6	I_7	I_{10}	$GP_t(4)$	$GP_t(5)$
2005	0.005977	0.0054	0.745	0.073	0.243	0.293	0.99	0.655	0.2848	0.1299
2006	0.008833	0.008	0.731	0.066	0.201	0.208	0.976	0.655	0.2882	0.1318
2007	0.013186	0.011967	0.72	0.063	0.232	0.158	0.976	0.6625	0.2993	0.1425
2008	0.018415	0.0167	0.709	0.059	0.273	0.132	0.976	0.6675	0.3087	0.1531
2009	0.016133	0.014633	0.709	0.057	0.252	0.109	0.976	0.66875	0.3088	0.1426
2010	0.019012	0.0172	0.701	0.056	0.256	0.091	0.996	0.67	0.3140	0.1454
2011	0.023012	0.0209	0.694	0.054	0.257	0.076	0.996	0.6725	0.3167	0.1484
2012	0.023864	0.0216	0.701	0.052	0.235	0.06	0.996	0.67375	0.3174	0.1433
2013	0.025033	0.023	0.705	0.05	0.247	0.053	0.996	0.6775	0.3213	0.1434
2014	0.025072	0.022333	0.718	0.049	0.236	0.05	0.996	0.6775	0.3220	0.1411
2015	0.022826	0.020333	0.717	0.05	0.225	0.049	0.996	0.69	0.3215	0.1373
2016	0.025078	0.022	0.728	0.05	0.21	0.059	0.996	0.69	0.3203	0.1426
2017	0.028904	0.025333	0.731	0.05	0.219	0.054	0.996	0.6925	0.3236	0.1470
2018	0.032625	0.028333	0.734	0.049	0.239	0.051	0.996	0.6975	0.3284	0.1518
2019	0.033075	0.028667	0.738	0.048	0.394	0.048	0.996	0.705	0.3498	0.1608
2020	0.029031	0.028	0.735	0.072	0.353	0.062	0.996	0.660	0.3334	0.1675
2021	0.037116	0.035	0.738	0.06	0.341	0.059	0.996	0.666	0.3368	0.1720
2022	0.053025	0.049333	0.739	0.056	0.357	0.055	0.996	0.700	0.3479	0.1868

Note: calculated by the author

The fourth provision: the environmental and resource efficiency sub-index of the Azerbaijani economy is negative on some indicators. Although Azerbaijan's indicators on this sub-index are weak, changes in a positive direction can be felt in recent years.

As the second important sub-index of the Green economy Index, which we propose to evaluate the transition to the green economy model, the sub-index of environmental and resource efficiency of the economy includes 15 sub-indicators. These indicators are not only ecologically relevant, but also express the efficiency of the use of natural resources. Nevertheless, the 15 sub-indicators can be divided into two groups - environmental and resource efficiency. The main reason for such separation is to take into account whether the effects of these indicators are positive or negative during indexation. (ERE_t)

Environmental and resource efficiency sub-index of the economy based on these sub-indicators

$$ERE_t = \frac{\sum_{i=1}^{6} E_{it}}{6} \quad (8)$$

will be calculated as

Note that in addition to the identity (8), we can also take the geometric mean for: ERE_t

$$ERE_t = \sqrt[6]{\prod_{i=1}^{6} E_{it}} \quad (9)$$

Each sub-indicator will be given equal weight. However, the determination of $E_{i,min}$ and $E_{i,max}$values for each sub-indicator are the possible minimum and possible maximum values for these sub-indicators. In order to make cross-country comparisons, it would be more accurate to calculate some indicators per capita.

Thus, the green economy index "for sub-indicators of the ecological and resource efficiency of the economy" sub-index$E_{i,max}$ and we can define the values as follows.$E_{i,min}$

a)Per capita volume of carbon dioxide (CO2) released into the atmosphere from stationary sources (metric tons)- (E_1);

The second important sub-index of $ERE_t$is "Volume of industrial waste per person (kg) - (E_2)". It is clear that as the volume of carbon emissions per capita and the volume of industrial waste per capita increase, the economy moves away from the green model. Although a certain part of the waste is made suitable for recycling, some waste is inevitably incinerated or buried. A certain amount of electricity is produced from the incineration of waste in Azerbaijan energy is produced.We can accept $E_2 = 50$ t for the maximum volume of industrial waste per person and $E_{2,min} = 0$for the minimum volume.

One of the most important aspects of the transition to a green economic model is related to the efficient use of drinking water resources. So, despite the fact that two-thirds of the Earth is covered by ocean, sea, lake and river water, the amount of water suitable for domestic use and agriculture is small in most countries, and this amount is gradually running out on a global scale. Azerbaijan's water resources are also small compared to other countries of the region. The main problem is related to the formation of Azerbaijan's water resources in other neighboring countries. Since the main part of the water resources used by Azerbaijan in household and agriculture comes through the territory of Turkey, Georgia, Armenia and Russia, the problem of pollution of these resources with industrial waste deepens the problem of our country regarding water. In particular, the pollution of the Araz River, which passes through Armenia, with industrial waste, and the Kura River, which passes through Georgia with household waste, is observed from time to time.

One of the important indicators in the transition model to the Green Economy is the possibility of using renewable energy. But for cross-country comparisons, "It is more convenient to use the indicator of the share (percentage) of energy supply from renewable sources in the total energy supply. According to this indicator $(E_6)E_{6,max} = 100$, can be taken.$E_{6,min} = 0$

Table 2

Environmental and resource efficiency sub-index of Azerbaijan economy and its components

	$İ_1$	$İ_2$	$İ_3$	$İ_4$	$İ_5$	$İ_6$	ERE_t-(4)	*ERE-(5)*
2005	0.0427	0.0102	0.0040	0.0333	0.0033	0.0013	-0.0154	-0.0079
2006	0.0404	0.0093	0.0039	0.0330	0.0033	0.0010	-0.0148	-0.0074
2007	0.0346	0.0084	0.0047	0.0326	0.0040	0.0011	-0.0139	-0.0076
2008	0.0365	0.0085	0.0049	0.0378	0.0052	0.0010	-0.0153	-0.0082
2009	0.0342	0.0087	0.0050	0.0315	0.0030	0.0012	-0.0135	-0.0074
2010	0.0318	0.0086	0.0050	0.0320	0.0045	0.0018	-0.0134	-0.0084
2011	0.0301	0.0100	0.0047	0.0345	0.0030	0.0013	-0.0135	-0.0076
2012	0.0268	0.0102	0.0051	0.0350	0.0040	0.0008	-0.0134	-0.0073
2013	0.0321	0.0090	0.0052	0.0363	0.0040	0.0007	-0.0143	-0.0073
2014	0.0338	0.0078	0.0049	0.0377	0.0048	0.0006	-0.0147	-0.0072
2015	0.0290	0.0082	0.0043	0.0378	0.0058	0.0007	-0.0141	-0.0073
2016	0.0306	0.0095	0.0042	0.0388	0.0110	0.0009	-0.0155	-0.0088
2017	0.0335	0.0088	0.0040	0.0380	0.0158	0.0008	-0.0165	-0.0091
2018	0.0372	0.0094	0.0040	0.0398	0.0180	0.0008	-0.0179	-0.0096
2019	0.0317	0.0107	0.0040	0.0453	0.0205	0.0007	-0.0186	-0.0098
2020	0.0326	0.0116	0.0034	0.0446	0.0203	0.0005	-0.0187	-0.0091
2021	0.0326	0.0127	0.0031	0.0476	0.0118	0.0006	-0.0179	-0.0087
2022	0.0278	0.0132	0.0031	0.0524	0.0163	0.0007	-0.0187	-0.0094

Note: calculated by the author

Thus, we can calculate the environmental and resource efficiency sub-index of the Azerbaijani economy (ERE_t)based on the dynamics of its components for 2005-2022, as in table 2. Note that during the calculation, $İ_1, İ_2, İ_3, İ_4$ and $İ_5$will be included in the formula (8) with negative values, and $İ_6$with a positive value. (ERE_t) indicator will also be negative due to the fact that Azerbaijan's indicators on $İ_6$are much weaker. However, the fact that Azerbaijan's indicators on negative components are small in absolute terms has had a positive effect on the final results.

Fifth provision: Based on Azerbaijan's position on the indicators included in the "natural resources group" of the Green Economy model, we can note that the possibilities of our country's transition to the Green Economy model are somewhat limited. However, the implementation of oil and gas production with newer technologies, the measures taken by the government in recent years regarding water supply, the use of green technology

in the land areas allocated for the agricultural sector, as well as the state policy in the direction of increasing forest massifs are bearing fruit.

One of the important components of the composite index of the green economy model is related to the use of natural resources. The use of new technologies during the use of natural resources and the observance of savings during such use, the increase of the area offorest cover and the volume of water basins, and other measures are important in the transition to the green economy model.

As we mentioned in the previous paragraphs, the "natural resources group" sub-index (NR_t) of the green economy index includes 10 sub-indicators: a) Fresh water taken from natural sources (million cubic m); b) Water consumption (million cubic m); c) Oil production (thousand tons); d) Gas production (thousand tons); e), The structure of the land fund according to its purpose: Total land area of the country - total (thousand hectares); f) Land suitable for agriculture (thousand hectares); g) Non-agricultural lands (thousand hectares); h) Fishing (tons); i) Water resources utilization index (percentage); j) Area covered by forest (percentage); k) Share of specially protected nature areas in the total territory of the country (percentage).

We will assume that the 10 sub-indicators of the "group of natural resources" sub-index (NR_t)characterizing the green economy have the same weight (10%) each. But in this case, we will use the formula $I_i = \frac{X_i - X_{min}}{X_{max} - X_{min}}$ to bring all indicators to the same size.

Using these sub-indicators, the sub-index of the Green Economy Composite Index (NR_t)

$$NR_t = \frac{\sum_{j=1}^{11} I_{jt}}{11} \tag{10}$$

with the formula or

$$NR_t = \sqrt[11]{\prod_{j=1}^{11} I_{jt}} \tag{11}$$

can be calculated as

Also, taking into account the effects of quantitatively changing the 11 sub-indicators of the "group of natural resources" sub-index (NR_t) on the green economy, "+" or "-" signs will be assigned to them. For

example, 1) The abundance of fresh water resources taken from natural sources is "+"; 2) Increase in water consumption "+"; 3) Increase in oil production "-"; 4) Increase in gas production "-"; 5) Increase of the total land area of the country "+"; 6) Increase of land suitable for agriculture "+"; 7) Area of non-agricultural land "+"; 8) Increase in fishing "-"; 9) Increase of the index of use of water resources "+"; 10) Increase in the area covered by forest "+"; 11) The share (percentage) of specially protected nature areas in the total territory of the country will be considered "+". Using these indicators, we can add a new indicator - the share of agricultural land in the total land area. This indicator will enter the 10th and 11th identity with a negative sign, and we will denote it by $\dot{I}_6$.

"Determining X_{min} and X_{max}during normalization is also important. We will assume that $X_{min}$and $X_{max}$are theoretically the smallest and largest possible values of any parameter. For example, X_{min}=0, X_{max}=100 can be taken for the "forested area" indicator.

Based on some of the key indicators above, the "natural resources group" (NR_t) sub-index of the Green Economy Composite Index

$$NR_t = \frac{I_1 - I_{3,4} - I_6 + I_{10}}{4} \quad (11)$$

Here, I_1-"volume of annual renewable domestic fresh water collection per capita"; $I_{3,4}$- "share of oil and gas revenues in GDP"; I_{10}- are the relevant indices of the share of forested area in the total land area. During the calculations for this subindex, I_1 and I_{10} were taken into account with a positive value, and $I_{3,4}$ with a negative value. Note that $I_{3,4}$- was calculated as the total share of two indicators, oil and gas revenues, in GDP.

The dynamics of Azerbaijan's "natural resources group" sub-index (1992-2022) suggests that Azerbaijan's performance on this sub-index is not so good. The high share of the land allocated to the agricultural sector in the total land area in the country, as well as the high share of oil revenues in the GDP, sharply reduce the indicators of this sub-index.

Table 3

Natural resources group sub-index of Azerbaijan economy and its components

	I_1	$I_{3,4}$	I_6	I_{10}	NR_t-(9)	NR_t-(10)
2005	0.0028	0.0044	0.5491	0.12	-0.1077	0.9044
2006	0.0029	0.0054	0.5492	0.12	-0.1079	0.9045
2007	0.0028	0.0056	0.5492	0.12	-0.1080	0.9045
2008	0.0026	0.0055	0.5493	0.12	-0.1081	0.9045
2009	0.0025	0.0045	0.5493	0.12	-0.1078	0.9045
2010	0.0024	0.0048	0.5504	0.12	-0.1082	0.9049
2011	0.0025	0.0050	0.5507	0.12	-0.1083	0.9050
2012	0.0026	0.0045	0.5506	0.12	-0.1081	0.9049
2013	0.0025	0.0041	0.5508	0.12	-0.1081	0.9050
2014	0.0024	0.0036	0.5508	0.12	-0.1080	0.9050
2015	0.0024	0.0028	0.5507	0.12	-0.1078	0.9050
2016	0.0024	0.0032	0.5511	0.12	-0.1080	0.9051
2017	0.0025	0.0036	0.5517	0.12	-0.1082	0.9053
2018	0.0024	0.0040	0.5519	0.12	-0.1084	0.9054
2019	0.0025	0.0037	0.5519	0.12	-0.1083	0.9054
2020	0.0024	0.0028	0.5520	0.12	-0.1081	0.9054
2021	0.0026	0.0037	0.5520	0.12	-0.1083	0.9054
2022	0.0026	0.0047	0.5520	0.12	-0.1085	0.9054

Note: calculated by the author

The sixth provision: In the last 30 years, the "Environmental quality of life" sub-index, which is a component of the Green economy index in Azerbaijan, has a decreasing trend. The decrease of both of the above-mentioned indicators led to the decrease of this indicator as well. However, the positive relationship of the first indicator with the volume of GDP per capita, and the negative relationship of the second indicator actually results from the fact that economic development has a dual nature.

The fourth Green Economy index - "Environmental quality of life measurement group" (EFL) includes 5 sub-indicators: a) Volume of polluting substances released into the atmosphere per capita (kg); b) Diseases of respiratory organs (person); c) Patients with acute

intestinal infections: children under 0-17 years of age (person); d) Patients with acute intestinal infections: people over 18 years old (people); e) Sewage discharged without treatment (million cubic m). The inclusion of such sub-indicators in the group of environmental quality of life measurement is not accidental. So, one of the four main factors affecting health is related to the environmental situation. The effect of the environmental condition on health is attracting more and more attention compared to other factors, i.e. a) lifestyle, b) level of health development, c) genetic factors. Because this factor is more related to global problems. Respiratory diseases are more dependent on air pollution, and acute intestinal infections are more dependent on water pollution.

$$S\dot{I}_t = -\frac{\sum_{i=1}^{5} I_{it}}{5} \tag{13}$$

will be calculated by the formula.

Note that instead of the identity (13), we can also use the geometric mean. In this case

$$S\dot{I}_t = -\sqrt[5]{\prod_{i=1}^{5} I_{it}} \tag{14}$$

The fact that the relationship between this indicator and GDP per capita is also negative creates the claim that both indicators have opposite effects on each other. Indeed, the health of the population determines the development of human capital. Developed human capital is one of the main factors of GDP. Also, the increase in the income of the population guarantees the development of the health care system and the development of opportunities for ensuring the health of the population.

Table 4

	$I_{1,t}$	$I_{2,t}$	$EFL_t - (14)$	EFL_t-(15)
2005	0.0013	0.0104	-0.0058	-0.0037
2006	0.0010	0.0099	-0.0054	-0.0031
2007	0.0011	0.0107	-0.0059	-0.0034
2008	0.0011	0.0105	-0.0058	-0.0034
2009	0.0011	0.0107	-0.0059	-0.0034
2010	0.0011	0.0106	-0.0058	-0.0034
2011	0.0011	0.0107	-0.0059	-0.0034
2012	0.0012	0.0111	-0.0061	-0.0036
2013	0.0012	0.0112	-0.0062	-0.0037
2014	0.0012	0.0114	-0.0063	-0.0037
2015	0.0012	0.0116	-0.0064	-0.0037
2016	0.0012	0.0115	-0.0063	-0.0037
2017	0.0012	0.0113	-0.0062	-0.0037
2018	0.0011	0.0117	-0.0064	-0.0036
2019	0.0011	0.0119	-0.0065	-0.0036
2020	0.0008	0.0104	-0.0056	-0.0029
2021	0.0009	0.0137	-0.0073	-0.0035
2022	0.0009	0.0125	-0.0067	-0.0034

Note: calculated by the author

Environmental quality in the process of transition to the Green economic model based on the two indicators mentioned aboveEFL_twe can calculate the subindex both by the 1st method and by the second method, respectively:

$$EFL_t = -\frac{I_{1,t}+I_{2,t}}{2} \quad (15)$$

or

$$EFL_t = -\sqrt[2]{\prod_{i=1}^{2} I_{it}} \quad (16)$$

we can calculate with formulas.

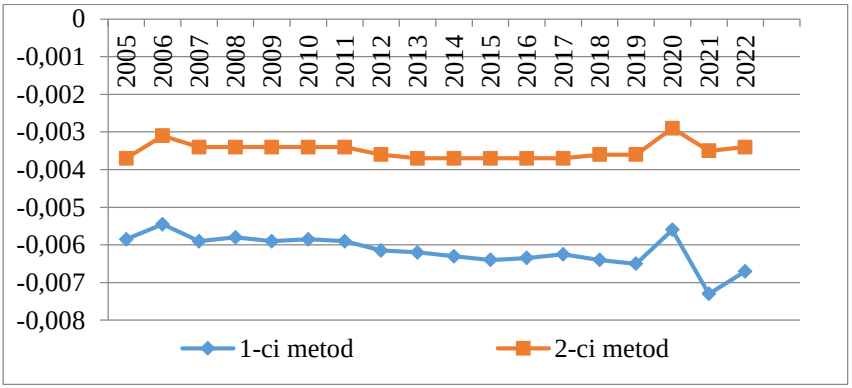

Chart 4. For Azerbaijan "Environmental quality of life" sub-index

It can be seen from the 4th graph that the "Environmental quality of life" sub-index, which is a component of the Green economy index in Azerbaijan, has an increasing trend over the last 30 years. The increase of both of the above-mentioned indicators led to the increase of this indicator as well. However, the positive relationship of the first indicator with the volume of GDP per capita, and the negative relationship of the second indicator actually results from the fact that economic development has a dual nature. So, if the economic development is based on the processing industry or extractive industry that causes environmental pollution, then the pollution caused by it will also cause the increase of diseases. The resulting diseases will have a negative impact on economic development for a long period of time. Therefore, it is necessary to replace economic growth with Green growth and allocate investments to the development of production areas that enable the reduction of the amount of harmful substances released into the environment.

The seventh provision: The study shows that in the field of tourism development, which is one of the components of the green economy model, necessary measures have been implemented in Azerbaijan in recent years. However, as a result of the COVID-19 pandemic, this sector has weakened considerably. The tourism sector in Azerbaijan has developed only in the last 5-6 years. In

that period, his contribution to the economy of Azerbaijan exceeded 4%.

State policy plays an important role in the formation of the green economic model. Such a policy covers a wide range of activities, from the support of green business to the imposition of fines for violations of environmental norms. In the information of ARDSK, in the section of green economy, "Group of economic opportunities and tools of the policy" (EOP_t) is mentioned separately. This group includes 8 sub-indicators: 1)EOP_tThe number of foreigners and stateless persons who came to Azerbaijan for the purpose of tourism (people); 2) Average annual concentration of ammonium ions (NH4) in rivers: Kura (mg (NH4+)/l); 3) Average annual concentration of ammonium ions (NH4) in rivers: Araz (mg (NH4+)/l); 4)Share (percentage) of investments directed to fixed capital for environmental protection and efficient use of natural resources in total investments; 5) Share of tourism activity in GDP (percentage); 6) Payments for atmospheric air pollution (thousand manats); 7) Payments due to pollution of water resources (thousand manats); 8) Payments for disposal of waste (thousand manats).

Thus, the sub-index connecting the 1st and 5th groups is cold

$$EOP_t = \frac{I_1 + \dot{I}_2}{2} \tag{17}$$

$$EOP_t = \sqrt[2]{\prod_{i=1}^{2} I_{it}} \tag{18}$$

Also, taking into account the effects of the quantitative change of both indicators on the green economy, "+" signs will be assigned to them. Thus, both the intensity of the arrival of tourists to the country and the increase of the income from tourism in the GDP are among the priorities of the Green economic model.

Based on the 4th table, we can claim that the tourism potential in Azerbaijan has not been fully utilized and the transition to a green economic model is necessary for the development of the tourism

industry. Because the main requirements of the Green economic model stimulate the demand for the development of the tourism industry.

Table 5

Dynamics of indicators in Azerbaijan$I_1 I_2$

	Ratio of incoming tourists to the country's population (%)	I_1	Share of tourism revenues in GDP (%)	I_2	EOP_t-(16)	EOP_t-(17)
2005	14.03	0.0009	0.75	0.0094	0.0052	0.0029
2006	14.87	0.001	0.96	0.012	0.0065	0.0035
2007	15.53	0.001	0.96	0.012	0.0065	0.0035
2008	21.67	0.0014	0.78	0.0098	0.0056	0.0037
2009	20.46	0.0014	1.23	0.0154	0.0084	0.0046
2010	21.68	0.0014	1.5	0.0187	0.0101	0.0051
2011	24,41	0.0016	2.27	0.0284	0.0150	0.0067
2012	26.72	0.0018	3.78	0.0473	0.0246	0.0092
2013	26.64	0.0018	3.53	0.0441	0.0230	0.0089
2014	24.1	0.0016	3.61	0.0451	0.0234	0.0085
2015	20.79	0.0014	4.78	0.0597	0.0306	0.0091
2016	23.05	0.0015	7.54	0.0942	0.0479	0.0119
2017	27,37	0.0018	7.86	0.0983	0.0501	0.0133
2018	28.67	0.0019	6.01	0.0751	0.0385	0.0119
2019	31.63	0.0021	4.16	0.052	0.0271	0.0104
2020	7.88	0.0005	0.8	0.01	0.0053	0.0022
2021	7.81	0.0005	0.53	0.0066	0.0036	0.0018
2022	15.8	0.0011	1	0.0125	0.0068	0.0037

Note: calculated and compiled by the author

Eighth provision: Taking into account the 5 main sub-indices of the Green Economy index, we can note that the main component that has a negative effect on the GEI composite index in Azerbaijan is the large oil and gas rent. For other indicators, the green economy composite index was mostly positive, while the negative price of the natural resources group had a negative effect on the composite index.

Thus, taking into account the 5 main sub-indices of the Green Economy index, we can group its dynamics in Azerbaijan as shown in

the 6th table. It can be seen from the table that the main component that has a negative effect on the GEI composite index in Azerbaijan is the large oil and gas rent. While the green economy composite index was positive for other indicators, the large negative price of the natural resources group weakened the result of the composite index.

Although the weak Green Economy Index shows that the country's economy is still far from the Green model, it is necessary to support measures implemented in the country, especially in the field of alternative energy. The construction of green villages in the territories freed from Armenian occupation, the measures implemented in the direction of transition to renewable energy sources create confidence that the GEI of the country will also change in a positive direction.

Table 6

Green Economy Composite index in Azerbaijan and dynamics of its main components (by method I)

	GP_t	ERE_t	NR_t	EFL_t	EOP_t	$GEİ_t$
2005	0.2848	-0.0154	-0.1077	-0.0058	0.0052	0.1611
2006	0.2882	-0.0148	-0.1079	-0.0054	0.0065	0.1666
2007	0.2993	-0.0139	-0.1080	-0.0059	0.0065	0.1780
2008	0.3087	-0.0153	-0.1081	-0.0058	0.0056	0.1851
2009	0.3088	-0.0135	-0.1078	-0.0059	0.0084	0.1900
2010	0.3140	-0.0134	-0.1082	-0.0058	0.0101	0.1967
2011	0.3167	-0.0135	-0.1083	-0.0059	0.0150	0.2040
2012	0.3174	-0.0134	-0.1081	-0.0061	0.0246	0.2144
2013	0.3213	-0.0143	-0.1081	-0.0062	0.0230	0.2157
2014	0.3220	-0.0147	-0.1080	-0.0063	0.0234	0.2164
2015	0.3215	-0.0141	-0.1078	-0.0064	0.0306	0.2238
2016	0.3203	-0.0155	-0.1080	-0.0063	0.0479	0.2384
2017	0.3236	-0.0165	-0.1082	-0.0062	0.0501	0.2428
2018	0.3284	-0.0179	-0.1084	-0.0064	0.0385	0.2342
2019	0.3498	-0.0186	-0.1083	-0.0065	0.0271	0.2435
2020	0.3334	-0.0187	-0.1081	-0.0056	0.0053	0.2063
2021	0.3368	-0.0179	-0.1083	-0.0073	0.0036	0.2069
2022	0.3479	-0.0187	-0.1085	-0.0067	0.0068	0.2208

Note: calculated and compiled by the author

Table 7

Evaluation of the Green Economy Composite index in the second version and the dynamics of its main components

	GP_t	ERE_t	NR_t	EFL_t	EOP_t	$GE\dot{I}_t$
2005	0.1299	-0.0079	0.9044	-0.0037	0.0029	0.0251
2006	0.1318	-0.0074	0.9045	-0.0031	0.0035	0.0249
2007	0.1425	-0.0076	0.9045	-0.0034	0.0035	0.0259
2008	0.1531	-0.0082	0.9045	-0.0034	0.0037	0.0270
2009	0.1426	-0.0074	0.9045	-0.0034	0.0046	0.0272
2010	0.1454	-0.0084	0.9049	-0.0034	0.0051	0.0286
2011	0.1484	-0.0076	0.9050	-0.0034	0.0067	0.0297
2012	0.1433	-0.0073	0.9049	-0.0036	0.0092	0.0316
2013	0.1434	-0.0073	0.9050	-0.0037	0.0089	0.0315
2014	0.1411	-0.0072	0.9050	-0.0037	0.0085	0.0311
2015	0.1373	-0.0073	0.9050	-0.0037	0.0091	0.0314
2016	0.1426	-0.0088	0.9051	-0.0037	0.0119	0.0347
2017	0.1470	-0.0091	0.9053	-0.0037	0.0133	0.0359
2018	0.1518	-0.0096	0.9054	-0.0036	0.0119	0.0355
2019	0.1608	-0.0098	0.9054	-0.0036	0.0104	0.0351
2020	0.1675	-0.0091	0.9054	-0.0029	0.0022	0.0245
2021	0.1720	-0.0087	0.9054	-0.0035	0.0018	0.0243
2022	0.1868	-0.0094	0.9054	-0.0034	0.0037	0.0289

Note: calculated and compiled by the author

CONCLUSION AND SUGGESTIONS

Studies show that some components of the Green Economy Index in our country are still negative. The fact that these indicators are negative shows that the country's economy is still far from the Green model.

• It is necessary to support the country-wide measures in the field of application of the Green Economy model, especially in the field of alternative energy.

• Construction of green villages in territories freed from Armenian occupation, measures implemented in the direction of transition to renewable energy sources create confidence that the GEI of the country will also change in a positive direction.

• Predominance of oil and gas rent in the national income creates favorable financial conditions for the development of the green economic model. There is a need to implement a broad economic policy to convert the income from energy production and export back into energy.

• The use of oil revenues, except for defense purposes, should be completely stopped and it is important that these revenues be directed only to the alternative energy sector. This would mean converting one type of energy, such as oil and gas, into another type of energy, such as solar and wind energy. Thus, the transition to a completely green economy model of Azerbaijan would be ensured in the coming decades.

The main theme of the research is published in the following scientific works of the author:

1. Гумбатова. С.Р, Тагиев, М.Р. Об одном методе оценки экологического состояния страны (на примере Азербайджанской Республики) // - Москва: Экономика и предпринимательство, 2019. № 4 (105), – с.456-462.
2. Hümbətova, S.R. Azərbaycanda yaşıl iqtisadiyyata keçid prosesində sahələrarası balans modelindən istifadə imkanları // - Bakı: AMEA-nın Xəbərləri. İqtisadiyyat seriyası 2021, - (may-iyun), - s.54-61.
3. Hümbətova, S.R. Yaşıl iqtisadiyyat konsepsiyası və onun dayanıqlı inkişaf konsepsiyası ilə əlaqəsinə müqayisəli baxış // AZMİU - Elmi əsərlər, 2021. №1, - s.150-156.
4. Hümbətova, S.R.. Yaşıl iqtisadiyyat konsepsiyası və yaşıl iqtisadiyyat indeksi // "Davamlı inkişaf strategiyası: qlobal trendlər, milli təcrübələr və yeni hədəflər" I Beynəlxalq elmi konfransın materialları, - Mingəçevir: 10-11 dekabr, - 2021, - II cild, -s.291-294.
5. Hümbətova, S.R. Yaşıl iqtisadiyatın əsas indikatorları və ölçülməsi metodları // - Bakı: Tikintinin iqtisadiyyatı və menecment, - 2021. № 3 (16), - s..467-474.
6. Hümbətova, S.R. Yaşıl iqtisadiyyat kompozit indeksi yanaşması // - Gəncə: Innovasiyali iqtisadiyyat və menecment – 2022. №1, - s.49-57.
7. Гумбатова, С.Р. Зеленая экономика и новый подход к ее измерению // - Алматы: Economics: the strategy and practice, 2022. Том 17 (3), – с.22-35.
8. Humbatova S.R. Literature review: Green economy // Мiжнароднi Мултидисциплiнарнi Науковi Iнтернет-Конференцiї – Украина: 23-24 червня, - 2022, с. 8-11.
9. Hümbətova, S.R. Yaşıl iqtisadiyyat indeksi // Ümummilli lider Heydər Əlirza oğlu Əliyevin anadan olmasının 99-cu ildönümünə həsr olunmuş "İqtisadi inkişafda qlobal çağırışlar və perspektivlər" mövzusunda Respublika elmi-praktik konfrans. -Bakı: 11 may, - 2022, - s.341 -343.
10. Гумбатова, С.Р. Основы концепции зеленой экономики // LXXI Международная научно-практическая конференция

«Научный форум: экономика и менеджмент», - Москва: - 26-29 февраля, - 2023, - с.26-29.

11. Hümbətova, S.R. Growing a green ecenomy// -Bakı: Qərbi Kaspi Universitetinin “Elmi xəbərlər” jurnalı, İctimai və Texniki elmlər seriyası, -2023. № 2 (13), s.219-225.

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