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Green economy as the main way of development of society

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Abstract. The 21 century put society before a choice on which path to develop further, which model of economic development to choose. The existing economic model of development generates certain contradictions. Economic development is accompanied by the emergence of crisis phenomena, predatory use of natural resources, changing landscapes, unjustified environmental pollution. An alternative way of economic development of society could be a model of a green economy, which is being formed today, before our eyes. The research is devoted to the consideration of three of the six directions of the implementation of the green economy model. The current state of clean energy, agricultural energy, and sustainable agriculture, including organic agriculture, is analysed. The steps taken to switch to the green economy model are analysed. According to the results of the study, conclusions are drawn related to the transition to this model of economic development.

Keywords: green economy, sustainable development, renewable energy, agriculture

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Зеленая экономика как основной путь развития общества

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Аннотация. XXI век поставил общество перед выбором, какие путь и модель экономического развития выбрать. Существующая экономическая модель развития порождает определенные противоречия. Экономическое развитие сопровождается воз-

никновением кризисных явлений, хищническим использованием природных ресурсов, изменением ландшафтов, неоправданным загрязнением окружающей среды. Альтернативным путем экономического развития общества могла бы стать модель зеленой экономики, которая формируется сегодня на наших глазах. Рассматриваются три из шести направлений реализации модели зеленой экономики. Анализируется текущее состояние чистой энергетики, сельскохозяйственной энергетики и устойчивого сельского хозяйства, включая органическое сельское хозяйство. Проанализированы шаги, предпринятые для перехода к модели зеленой экономики. По результатам исследования сделаны выводы, связанные с переходом к данной модели экономического развития.

Ключевые слова: зеленая экономика, устойчивое развитие, возобновляемые источники энергии, сельское хозяйство

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Introduction

Currently, the problem of greening the economy and rational use of natural resources is coming to the fore. Since the industrial revolution, society has been using an economic model that implies the predatory use of natural resources, a high anthropogenic load on the Earth's biosphere. With his economic activity, a person changes natural landscapes, some animal species disappear. More and more often, scientific and political circles are talking about changing the economic model of development, about the need to transition to a new economy, an economy based on the principles of rational use of human resources, principles that would create well-being for all, and not for individual groups of the population, principles that allow for the sustainable development of society. This model of economic development is called the green economy. The term "green economy" was proposed in 1989 by environmental economists David Pierce, Edward Barbier, Emil Markand in his work "A plan for a green economy". The term was reborn in 2008, when the global economy entered the phase of one of the most serious crises since the Great Depression in the United States. It was during this period that UNEP proposed the development of "green incentive packages" to provide analysis and policy support for investments in green sectors and industries that intensively pollute the environment.[1]

But what is a green economy? There is no single interpretation of this term. Since 2008, it has undergone several interpretations: from "economic activities related to the production, distribution and consumption of goods and services that lead to improving people's well-being in the long term, at the same time, without exposing future generations to significant environmental risks and reducing the shortage of environmental resources" to "an economy that focuses on using opportunities to simultaneously promote economic and environmental goals".[2]

[1] The concept and essence of the green economy. (In Russ.) Available from: http://greeneconomy.kg/theory/ponyatie-i-sushhnost-zelenoy-ekonomiki/ (accessed: 05.07.2021).

[2] Ibid.

Whatever the interpretation of the term "green economy", its main goal is to ensure economic growth that improves the quality of the environment and social integration.

The following main directions of implementation of this economic model of development are distinguished (Figure 1).

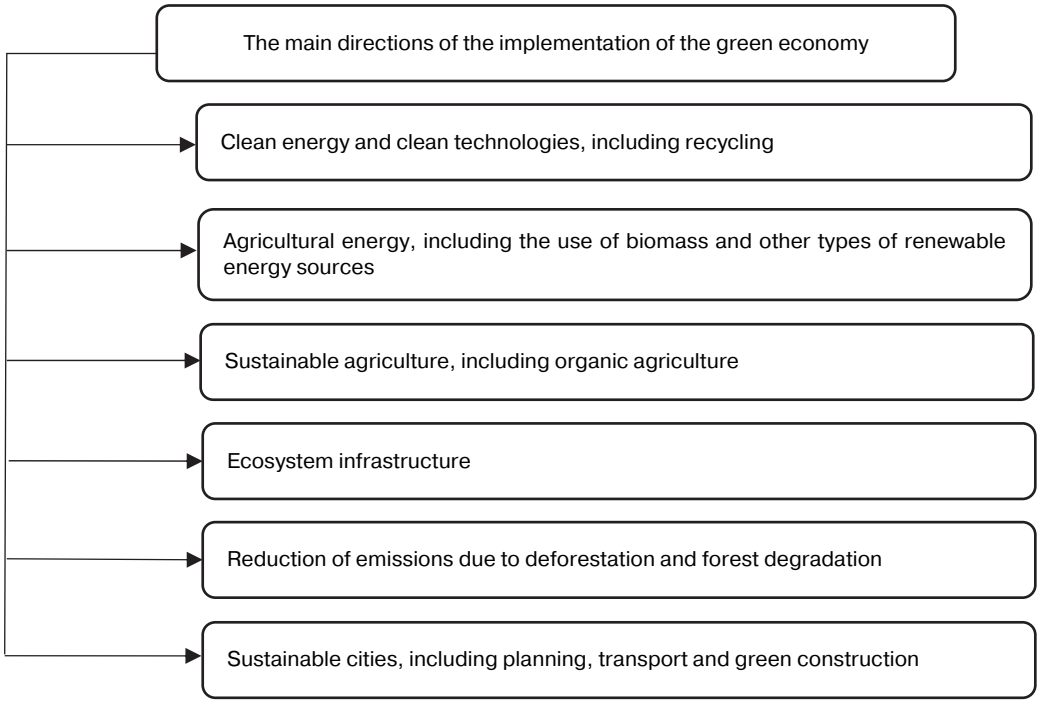

Figure 1. The main directions of the implementation of the green economy

Source: compiled by the authors according to: UNEPCOM. *Russian National Committee for supportting UNEP. Global green new deal.* Available from: http://greeneconomy.kg/theory/ponyatie-i-sushhnost-zelenoy-ekonomiki/ (accessed: 05.07.2021).

Let's take a closer look at three of these directions.

Results and discussion

One of the most important areas is the development of clean energy and clean technologies. Clean energy is understood as a promising branch of energy that involves the use of unconventional (renewable and practically inexhaustible) energy sources, which include: solar radiation, kinetic wind energy, water movement in rivers, heat of the earth's surface, biofuels and others.

Analyzing the data, we note that oil consumption increased by 0.9 million barrels per day. This is due to the growth of consumption in China, Iran, India, Algeria and Russia. A decrease in consumption is noted in Mexico, Italy, Pakistan and other countries. The growth of gas exports is noted in the United States, Russia, Australia, Algeria, and a decrease – in Indonesia. The growth of imports is in China, Great Britain, France, Spain, and Italy. As for the production and consumption of coal, its consumption in the world decreased by 0.6% in 2019.

As a result, the share of coal in primary energy has decreased to 27%, which is the lowest value in the last 16 years. Coal consumption is increasing in developing economies. So, the growth is observed in China, Indonesia, Vietnam. According to analysts, a steady increase is observed in the consumption of energy obtained from renewable sources. The consumption of energy received from hydroelectric power plants increased by 0.8%, and the consumption of energy received from nuclear power plants increased by 3.2%.[3]

Table 2

Fuel shares of primary energy and contributions to growth in 2019[4]

Energy source	Consumption, exajoules	Annual change, exajoules	Share of primary energy	Point change in share from 2018, %
Oil	193.0	1.6	33.1%	–0.2
Gas	141.5	2.08	24.2%	0.2
Coal	157.9	–0.9	27.0%	–0.5
Renewables	29.0	3.2	5.0%	0.5
Hydro	37.6	0.3	6.4%	–0.0
Nuclear	24.9	0.8	4.3%	0.1
Total	**583.9**	7.7		

According to some experts, "the industry is becoming more 'green,' despite the opposition of the countries exporting hydrocarbons."[5] Many companies invest in renewable energy sources. Many, such as Statoil, are diversifying their business.[6] At the same time, there are changes in the energy policy of entire states. For example, in the United States, a plan was developed according to which the American energy sector will get rid of carbon emissions by 2035, by 2050 it is planned that the country will become carbon neutral.[7] The proposed plan will give an additional boost to growth. Analysts expect an increase in the share prices of companies related to solar energy. South Korea plans to become a carbon neutral economy by 2050, and China by 2060.[8]

The second equally important area of implementation of the concept of green economy is agricultural energy, including the use of biomass and other types of renewable energy sources. It should be noted that biomass has been used for human energy production for a long time. Every year, up to 83 billion tons of biomass are produced on Earth, from which people process 9 billion tons no more

[3] British Petroleum. *Statistical Review of World Energy 2020.* 69th edition. Available from: https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/energy-economics/statistical-review/bp-stats-review-2020-full-report.pdf (accessed: 05.07.2021).

[4] Ibid.

[5] Proskuryakova L. Russia and clean technologies: on the strategic vision of green economic growth. *Valdai. International Discussion Club*. (In Russ.) Available from: https://ru.valdaiclub.com/a/highlights/rossiya-i-chistye-tekhnologii/ (accessed: 05.07.2021).

[6] Ibid.

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than 15–20% is used for food production [1]. One of the distinctive features of biomass is its self-creation. The following forms of biomass can be used for energy purposes (Figure 2).

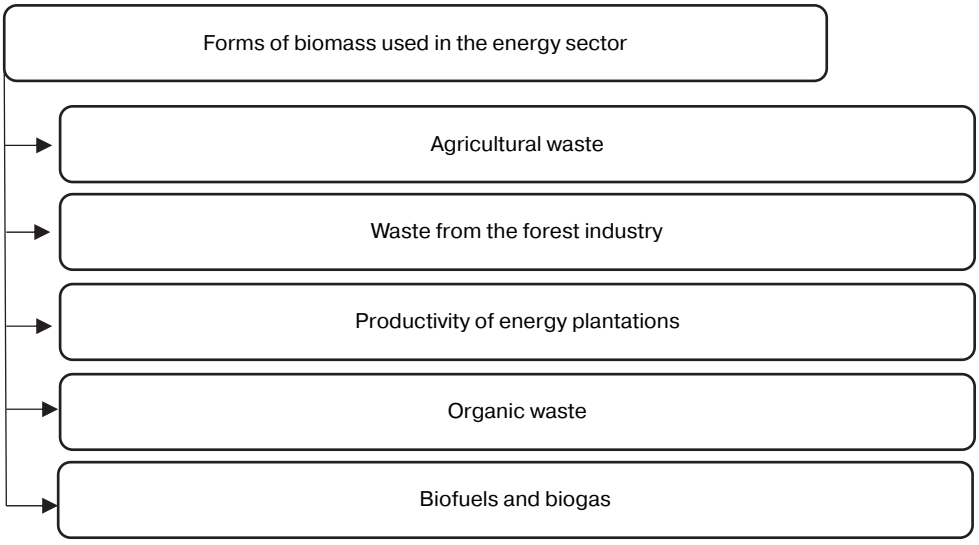

Figure 2. Forms of biomass used in the energy sector

Source: compiled by the authors according to: Alter 2020. *Biomass as an energy source.* Available from: https://alter220.ru/bio/biomassa-kak-istochnik-energii.html (accessed: 05.07.2021).

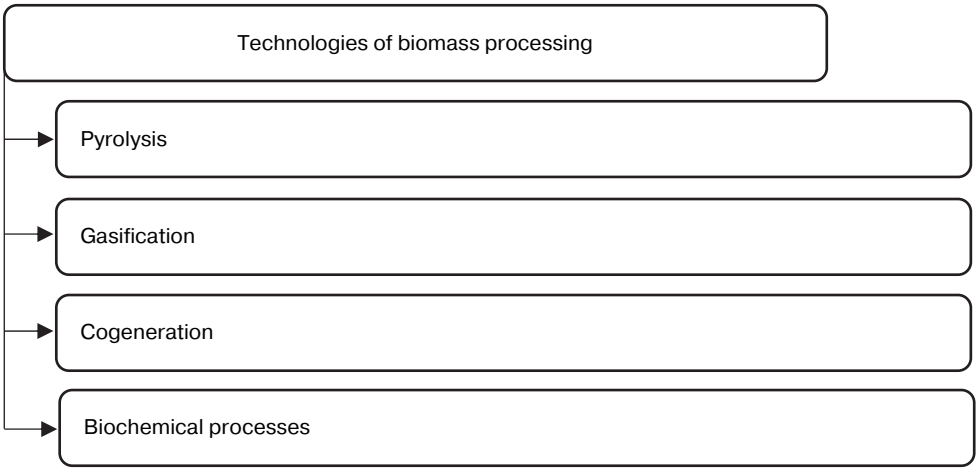

Figure 3. Technologies of biomass processing

Source: compiled by the authors according to: Alter 2020. *Biomass as an energy source.* Available from: https://alter220.ru/bio/biomassa-kak-istochnik-energii.html (accessed: 05.07.2021).

According to experts, in some countries, the use of biomass for energy purposes can account for up to 50% of total consumption. At the same time, it is expected that by 2025, the global consumption of biomass can reach 85 KW/h of electricity and 250 kW/h of thermal energy [1]. Currently, various technologies for processing biomass have been developed and are being implemented (Figure 3).

The third direction of the development of the green economy is the development of sustainable agriculture, including organic agriculture. As noted by A.A. Askarov and A.A. Askarova, the modern system of agricultural production has led to negative consequences, among which they distinguish [2]:

– soil erosion;

– poisoning of the natural environment with the remnants of mineral fertilizers;

– violation of the natural mechanisms of biological balance.

The processes caused by these phenomena slow down the development of ecosystems. Modern society meets its emerging needs at the expense of future generations. And as A.A. Askarov and A.A. Askarova note, "modern agricultural production has become, along with other spheres of human activity, a serious threat to achieving the goals of the global program of the world community" [2]. As a result, there is a transition to completely different principles of conducting activities in agriculture. First of all, environmental aspects are taken into account. This, in turn, contributed to the emergence of organic agriculture. The main indicators characterizing the development of organic farming in the world are presented in Table 3.

Table 3

Organic agriculture: key Indicators and top countries in 2019[9]

Indicator	Word	Top countries
Countries with organic activities	187	
Organic agricultural land	72.3 million hectares	Australia, Argentina, Spain
Organic share of total agricultural land	1.5%	Liechtenstein, Austria
Wild collection and further non-agricultural arias	35.1 million hectares	Finland, Zambia, Namibia
Producers	3.1 million producers	India, Uganda, Ethiopia
Organic market	106.4 billion euro	US, Germany, France
Per capita consumption	14 euro	Denmark, Switzerland, Luxemburg
Number of countries with organic regulation	108 countries	

According to many experts, sustainable agriculture will be aimed at achieving three main groups of goals:[10]

– economic;

– social;

– environmental.

The first group includes achieving economic security, economic viability, increasing value added, striving for minimal investments, and others. The second group of goals consists of creating good working conditions, ensuring food supplies, meeting local needs, creating gender balance, instilling respect for local culture, and ensuring product safety. The third group is based on: ensuring the balance of the system, ensuring no chemical pollution, increasing soil fertility, ensuring biological diversity, conservation of natural resources. The implementation of all three groups of goals is aimed at creating such agricultural production that does not have an adverse impact on animals.

[9] FIBL. *The word of organic agriculture. Statistics & emerging trends 2021.* Available from: https://www.fibl.org/fileadmin/documents/shop/1150-organic-world-2021.pdf (accessed: 05.07.2021).

[10] Organic farming. *Agrovestnik.* Available from: https://agrovesti.net/lib/advices/uchebnoe-posobie-po-organicheskomu-selskomu-khozyajstvu.html (accessed: 05.07.2021).

Conclusion

Thus, summing up, we can draw the following main conclusions. First, the society understands the need to change the existing model of economic development. If we continue to adhere to the model used, humanity may simply perish. Secondly, it is necessary to develop in detail the ways of transition to a new economic model of development. Thirdly, it is necessary to remember that the results of the efforts that are being applied today will affect future generations.

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