

GREEN ECONOMY AS A FACTOR OF SUSTAINABLE DEVELOPMENT

Inna Tomashuk¹, Vasyl Baldynyuk², Liudmyla Boltovska³

Abstract. *The purpose* of the article is to study the directions of development of the green economy in Ukraine as a factor of ensuring the transition to sustainable development of the country. *Methodology.* One of the main elements of the methodology for conducting research on the green economy as a factor of ensuring sustainable development are evaluation methods. Comparative, balance, graphic, economic-mathematical and other methods of economic justification are used in the work. The methods of systematisation and generalisation were used to study the principles of further ecologically balanced development, economic-statistical, structural-logical and analytical – for the development of methods and indicators for the analysis of the system of directions of the green economy, graphic – for the visual presentation of the dynamics of indicators of sustainable development. The results of the work show that the growth of income and employment in the green economy is guaranteed at the expense of public and private investments aimed at increasing energy efficiency, reducing the negative impacts of economic activity and increasing the diversity and productivity of the biosphere, in the interests of the entire population, especially the poorest. It is important to emphasise that the concept of the green economy does not replace the concept of sustainable development, but develops it and is a means of putting it into practice. Green development can only be ensured if environmental and economic policies are integrated in such a way that social progress, economic growth and improvement in the quality of life of the population take place against a background of reduced threats to the surrounding natural environment. *Practical implications.* The concept of green growth emphasises the importance of integrating environmental and economic policies in order to identify new potential sources of economic growth without placing an "unsustainable" burden on the quantity and quality of natural resources. The transition to a green economy requires the application of a wide range of measures, including economic instruments (taxes, subsidies, emissions trading schemes), government regulatory measures (setting standards) and non-economic measures (voluntary initiatives, provision of information). *Value/originality.* Important economic indicators of sustainable environmental and economic development are a nature-intensive economy and a structural indicator that reflects the specific weight of products and investments in the natural resource-based sectors of the economy.

Key words: green economy, resources, sustainable development, environment, transformations, environment, innovation, strategies, concepts, investments.

JEL Classification: Q50, E60, F60

1. Introduction

The existence of humanity today requires an amount of resources that exceeds the Earth's capacity. In the last quarter of a century, world GDP has quadrupled, but economic growth has been achieved mainly through

the consumption of natural resources. If humanity's demand for natural resources continues to grow at the current rate, the equivalent of two current planets will be needed to sustain human life in 2030, and 2.8 planets in 2050 ("Green" economy, old.livingplanet.org.ua).

¹ Vinnytsia National Agrarian University, Ukraine (*corresponding author*)

E-mail: Tomashuk.inna@ukr.net

ORCID: <https://orcid.org/0000-0001-6847-3136>

ResearcherID: I-5387-2018

² Vinnytsia National Agrarian University, Ukraine

E-mail: baldynyuk@gmail.com

ORCID: <https://orcid.org/0000-0001-9014-8866>

³ Vinnytsia National Agrarian University, Ukraine

E-mail: ludmyla.fushtei@gmail.com

ORCID: <https://orcid.org/0000-0002-6202-998X>

ResearcherID: L-3460-2018



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Threats of depletion of limited natural resources and climate change as a result of accelerated growth of the world population and economies of emerging countries, accompanied by negative impacts on the environment, cause widespread recognition of the need to introduce new approaches to ensuring economic growth and development, which include minimising the burden on the base of natural resources and environmental living conditions of the population due to the use of additional sources of growth (Makovoz, Perederii, 2018). It is obvious that fundamentally new steps are needed, a transition to such a concept of development, which will allow to comprehensively solve social, financial, fuel and climate problems.

According to scientists, such a solution is the concept of green economy ("Green" economy, old.livingplanet.org.ua). In Ukraine, the need to implement the concept of green economy is associated with a difficult socio-economic situation, low quality of the natural environment in most regions, dependence on foreign markets for resources and energy, low energy efficiency of national production (Borovyk, Yelagin, Polyakova, 2020), deterioration of the nation's health and quality of life of the population.

Today in Ukraine the institutional foundations of green growth have not been finalised, therefore it is very important to determine the priority areas of innovative development of state policy based on the priority of implementation of international and European standards, which will allow to use the experience and achievements of developed countries in the "greening" of the national economy (Galushkina, Musina, Potapenko, 2017).

The purpose of the study is to examine the directions of development of the green economy in Ukraine as a factor of ensuring the transition to sustainable development of the country. In order to achieve this goal, the following tasks were solved: a wide range of tools for the transition to a green economy was proposed; the principles of further ecologically balanced development were studied; the system of directions of a green economy was presented; green growth was characterised as a means of stimulating economic development.

The theoretical and methodological research consisted of the dialectical method of cognition, the basic provisions of economic theory and management of organisations, scientific works of the motherland's and foreign scientists with the problem of the organisational component of the institutional mechanism of the green economy.

In the course of the research the following methods were used: cause-and-effect analysis (to identify institutional obstacles to the development of the green economy); statistical and economic

(to search and process statistical data and to research indicators of the green economy); logical generalisation (to form conclusions); graphic (to create graphs and drawings for the visual representation of statistical data and the conclusions formed regarding the correctness of determining the directions of transformation of the nature management system on the basis of the concept of the green economy in accordance with innovative waves).

This study of the main aspects of the effectiveness of the green economy, which strengthens the relationship between environmental and economic interests, serves as a guideline for achieving sustainable environmental and economic development at regional level. The main features of the green economy are: recognition of the value of natural capital as a source of social well-being; the need to invest in natural capital; reducing inequality and overcoming poverty; creating jobs and ensuring social justice; using renewable energy sources and low-carbon technologies; efficient use of resources and energy; creating sustainable cities (eco-cities) using green technologies.

2. Green Economy as a Foundation for Social Welfare

The term "green" economy was first used in 1989 in a report prepared for the UK government by a group of environmental economists as part of a consultation on how to ensure sustainable development and how to measure it (Pearce, Markandya, Barbier, 1979).

The green economy is an economic model that strives for sustainable and profitable development, seeking situations that bring economic, social and environmental benefits. In this context, the green economy claims that social welfare can be achieved by reducing environmental risks and threats (Green economy, uk.economy-pedia.com; Tomashuk, Baldynyuk, 2023). Therefore, a green economy consists of a long-term vision in which companies, markets and investors strive for sustainable development that guarantees long-term profitability.

The theory of the green economy is based on 3 axioms:

1. It is impossible to expand the sphere of influence infinitely in a limited space.
2. It is impossible to demand the satisfaction of endlessly growing needs in conditions of limited resources.
3. Everything on the earth's surface is interconnected (Green economy, 4ua.co.ua). Figure 1 shows a functional scheme with a positive inverse relationship with the deterioration of the quality of natural resources.

The concept of "green economy" incorporates the ideas of many other schools of economic thought and philosophy (feminist economics, postmodernism,

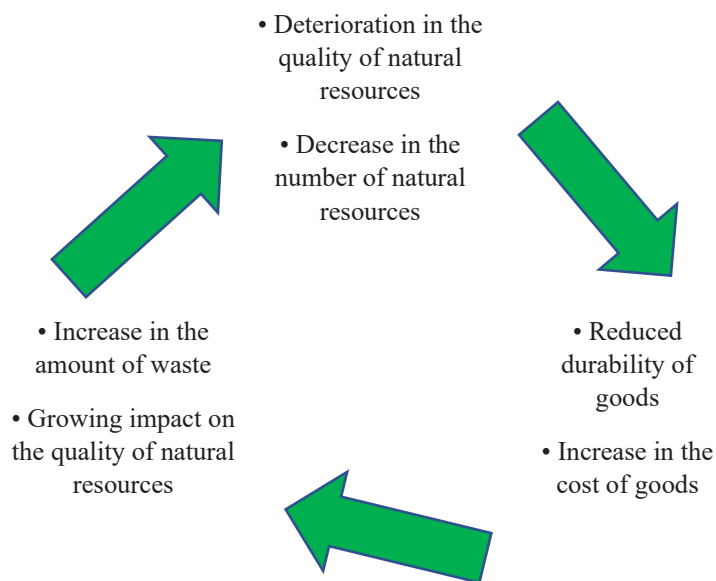


Figure 1. Functional diagram with a positive inverse relationship of deterioration in the quality of natural resources

Source: (Galushkina, Musina, Potapenko, 2017)

ecological economics, environmental economics, anti-globalisation, international relations theory, etc.) related to the problems of sustainable development (Green economy, 4ua.co.ua).

The main goals of the green economy are:
 – improving social welfare, fighting for social justice, combating deficits and reducing environmental threats;
 – resource efficiency, carbon reduction and social responsibility;
 – increased public funding to tackle carbon emissions and create green jobs;
 – strong commitment to energy efficiency and biodiversity (Green economy, uk.economy-pedia.com).

Today, the survival and development of humanity requires a transition to a green economy, i.e., a system of economic activities related to the production, distribution and consumption of goods and services that in the long term will lead to an increase in human well-being, while not exposing future generations to the consequences of significant environmental risks or environmental deficits (Green economy, 4ua.co.ua). In Figure 2, the directions of transformation of the system of nature management based on the concept of green economy are presented in accordance with innovative waves.

In the business world, the concept of a green economy is at the centre of attention. Financial funds, venture capitalists, governments of advanced countries, businessmen and consumers are already building a green economy (Green economy, 4ua.co.ua). Investments in energy-efficient technologies and natural infrastructure are already yielding reasonable returns.

A wide range of tools is available to help transition to a green economy:

- in accordance with the principles of sustainable pricing, including the elimination of inefficient subsidies, the valuation of natural resources in monetary terms and the introduction of taxes on things that harm the environment;
 - a public procurement policy that encourages the production of environmentally friendly products and the use of production methods that comply with the principles of sustainable development;
 - reforming the system of "environmental" taxation, which involves shifting the emphasis from labour tax to taxes on environmental pollution;
 - increase public investment in sustainable infrastructure (including public transport, renewable energy, energy-efficient buildings) and natural capital to restore, preserve and, where possible, enhance natural capital;
 - targeted government support for research and development related to the creation of environmentally friendly technologies;
 - social strategies designed to ensure coherence between social goals and existing or proposed economic strategies (Green economy, 4ua.co.ua).
- According to the forecasts of the Organisation for Economic Co-operation and Development (OECD), by 2050, with the current method of production and level of resource consumption, the world will lose 61-72% of flora and fauna compared to 2000, and the preservation of natural territories will be irreversibly disturbed by 7.5 million km² (Borovyk, Yelagin, Polyakova, 2020). In this context, one of the incentives for the development of the green economy is trade liberalisation, which can lead to an increase in trade flows of goods and services for environ-

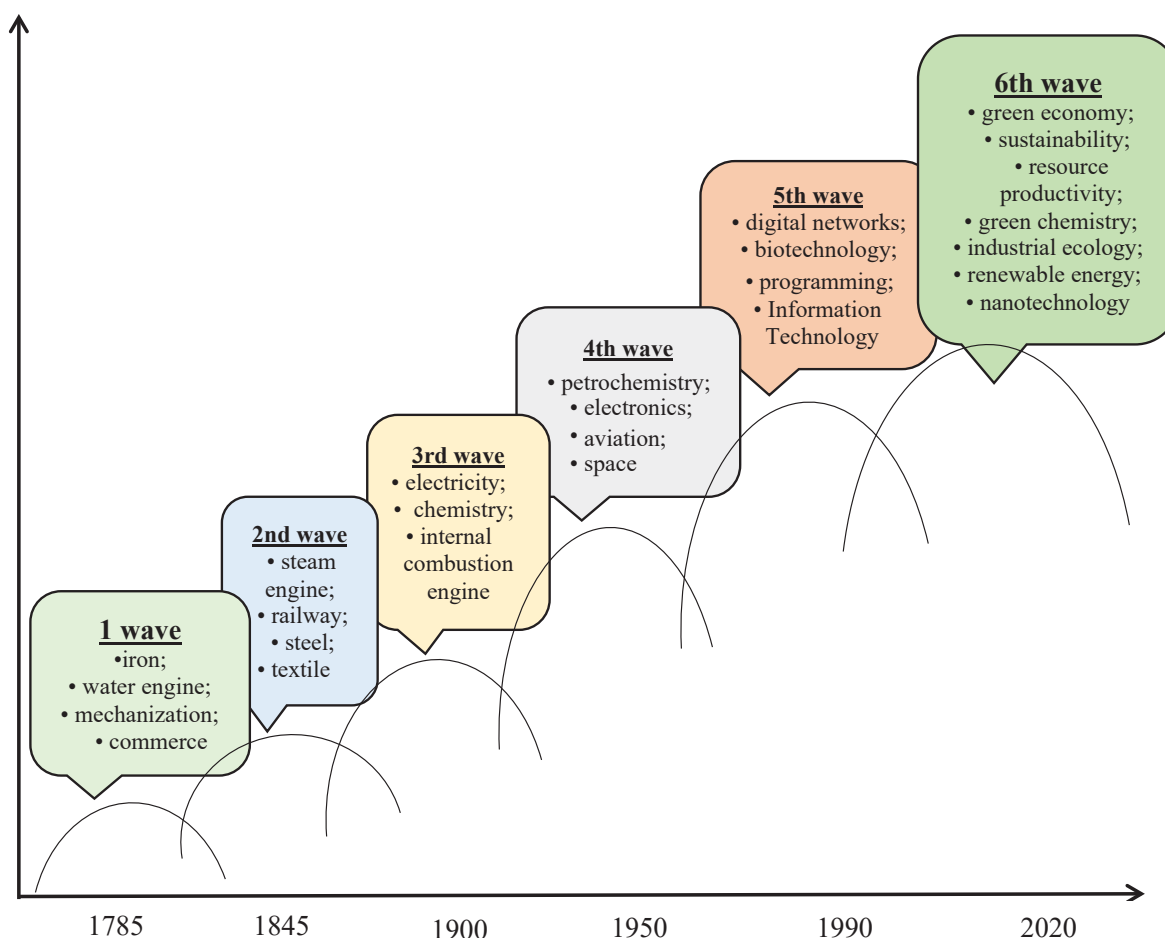


Figure 2. Directions of transformation of the natural resource management system based on the concept of green economy in accordance with innovative waves

Source: formed on the basis of research results

mental protection. This, in turn, will accelerate the replacement of old technologies and contribute to reducing the level of pollution and environmental damage caused by waste.

3. Principles for Further Environmentally Sustainable Development

The course of greening the economy led by the European Union is based on the principles of the concept of sustainable development. Accordingly, the scope of cooperation activities between the EU and Ukraine in the field of environmental protection and greening of the economy of Ukraine is defined by the desire to minimise environmental externalities for the full existence of future generations ("Green solution" of business – unity for sustainable development, www.gs.dp.ua).

In the Declaration of the United Nations Conference on Environmental Problems (zakononline.com.ua), signed as a result of the Conference on Environmental Problems held in Stockholm from 5 to 16 June 1972, 26 international legal principles for

the further ecologically balanced development of society were defined for the first time (Table 1).

In addition, the Green Economy Coalition also proposes a number of principles for the formation of a green economy in the context of globalisation (Table 2).

At the heart of the green economy are green technologies that address the causes, rather than the effects, of environmental problems by radically changing approaches, products and, no less importantly, consumer behaviour. These include: energy efficiency and alternative energies, electricity management systems, ecological transport, waste management, air and water emissions. These technologies will make it possible to achieve the clear objectives set by the modern world economy, namely:

1. Reducing pollution and improving resource efficiency in construction, manufacturing, agriculture and infrastructure.

2. Mitigating adverse climate change through the transition to greener, cleaner energy (wind, solar, geothermal, tidal, hydro, bio, waste-to-energy,

Table 1

List of principles for further environmentally sustainable development

N ^o	Characteristics of the principles
1	– Freedom, equality and favourable living conditions for people in the environment;
2	– Protecting natural resources for the benefit of present and future generations;
3	– Supporting, restoring and enhancing the country's natural resources;
4	– Prioritising the protection of the natural environment when planning economic development;
5	– Careful and maximum beneficial use of the Earth's non-renewable resources;
6	– Reducing greenhouse and other harmful emissions;
7	– Prevention of marine pollution;
8	– Economic and social development to improve the quality of life;
9	– Financial and technical assistance to developing countries to cope with environmental and natural disasters;
10	– Stability of commodity prices in developing countries;
11	– Setting international environmental standards that can be met by countries at different levels of economic development;
12	– Providing financial and technical assistance (where necessary) to countries to ensure the availability and conservation of resources;
13	– Comprehensive planning of countries' development to ensure rational management of resources;
14	– Rational planning aimed at achieving a balance between the needs of development and the protection of the environment;
15	– Planning the urbanisation of settlements to avoid negative impacts on the environment;
16	– Controlling the demographic situation;
17	– Planning, management and regulation of the quality of natural resources;
18	– Use of science and technology to prevent and combat environmental risks and solve environmental problems;
19	– Environmental education and public access to information;
20	– Stimulating scientific research in the field of the environment at national and international levels;
21	– Not causing environmental damage to other States in the course of organising activities within their own jurisdiction;
22	– The development of international law in relation to the determination of responsibility and compensation for damage to victims of pollution;
23	– Consistency between international and national standards;
24	– International cooperation within the framework of multilateral and bilateral agreements for effective control, prevention, reduction and elimination of negative impacts on the natural environment;
25	– The coordinating role of international organisations in the field of environmental protection and improvement;
26	– Non-use of nuclear weapons and all other means of mass destruction.

Source: (Declaration of the United Nations Conference on Environmental Problems, zakononline.com.ua)

Table 2

List of basic principles of the green economy

N ^o	Characteristics of the principles
I	– The principle of ensuring sustainable development is embodied in the unity of environmental, social and economic components.
II	– The principle of equality and justice aims at equalising countries and eliminating social differences within national borders, respecting human rights and gender equality.
III	– Respect for the dignity of the individual manifests itself in the reduction of poverty through the transformation of "traditional" jobs and the active creation of new ("green") jobs, the development of human potential, improved access to social services and the promotion of the right to development.
IV	– The principle of frugality of the green economy is implemented by minimising the impact on the environment, taking into account ecological limits and ensuring economic activity within them, preliminary assessment of the potential impact of new technologies on the environment, optimal and rational use of natural resources.
V	– The principle of participation is based on the combination of transparency and openness of the activities of all interested parties (citizens, businesses, state institutions), providing the possibility of effective participation of citizens in the process of making management decisions at all levels.
VI	– Governance is implemented through regulation based on consultation with all stakeholders, the development of standards to assess progress, the development of international cooperation and international responsibility for damage.
VII	– The sustainability of the green economy is manifested in the development of social and environmental protection systems, the support of different green economic models that can be applied to different ecologically oriented economic models.
VIII	– The principle of efficiency requires that the pricing of goods and services takes into account social and environmental costs, the life cycle of the product, the relationship between the dynamics of production and consumption, and possible negative social and environmental impacts.
IX	– The intergenerational principle of the green economy is embedded in long-term decision-making, attracting financial support for the development of different models of sustainable development and supporting the production of green goods and services.

Source: (Chmyr, Zakharkevich, 2013)

hydrogen) and low-carbon end-use processes (electric or hybrid engines).

3. Reducing vulnerability and adapting to climate change by developing early warning systems and technologies resistant to temperature anomalies; improving management of biodiversity and forest resources.

4. Increased well-being as a result of more productive and sustainable use of biodiversity resources, including natural cosmetics and pharmaceuticals (Solosych, Podlisnyuk, 2013).

World society therefore needs a new concept of development that will enable it to solve social, financial, fuel, climate and other problems in a comprehensive manner and to achieve not only quantitative growth but also significant qualitative and real improvements.

4. System of Green Economy Directions

The transition to a green economic model can be ensured by annual investments of 2% of world GDP (about 1.3 trillion USD) over the period 2012–2050. The green investment scenario will provide higher annual growth rates for 5–10 years than investments in conventional development. The "greening" of the economy is a way to eradicate poverty ("Green" economy, old.livingplanet.org.ua). There is a direct link between poverty eradication and the rational management of natural resources and ecosystems, as the poor benefit directly from the increase in natural capital. Table 3 presents the system of directions of the green economy.

The main strategic document of the state policy in the environmental sphere is the Basic Principles (Strategy) of the State Environmental Policy of Ukraine for the period up to 2030, approved by the

Law of Ukraine of 28 February 2019 (Gula, 2021). In the current Strategy until 2030, the goal of the national state environmental policy is defined, which consists, in particular, in achieving a satisfactory state of the environment through the introduction of an ecosystem approach to all spheres of social and economic development of Ukraine, in order to ensure the constitutional right of every citizen of Ukraine to a clean and safe environment, the introduction of balanced nature management, and the preservation and restoration of natural ecosystems (Gula, 2021).

Increasing the use of energy from renewable sources and alternative fuels is considered an important part of Ukraine's strategy to preserve traditional fuel and energy resources and reduce the associated negative impact on the environment (Gula, 2021). Figure 3 provides information on biodiesel production in EU countries in 2021–2022.

For Ukraine, which has many problems and imbalances in the development of the labour market, the disclosure of the social potential of the green economy is of great practical interest, as it will contribute to the study of ways to overcome unemployment through the implementation of promising innovative mechanisms that have not received enough attention so far (Perga, 2012). The creation of green jobs depends, of course, on the prospects for the development of the green market.

Agriculture, which is largely dependent on climate change, can now safely be described as the largest consumer and polluter of water, the cause of deforestation and the loss of biodiversity. At the same time, this sector is a potentially great source for creating additional (including green) jobs and solving related social problems, especially considering

Table 3

System of directions of "green" economy

№	The name of the direction	Characteristics of directions
I	<i>Implementation of renewable energy sources</i>	– According to environmentalists, more than half of all fossil fuels should remain unexplored to avoid significant climate change on the planet.
II	<i>Improvement of the waste management system</i>	– At present, in the developed countries of the world 1–3 kg of solid household waste is produced per capita per day, and only in the USA this amount increases by 10% every 10 years. In Ukraine, the total area of landfills is more than 42 thousand km ² .
III	<i>Improvement of the water management system</i>	– Today, one in six people on the planet suffers from a lack of fresh drinking water.
IV	<i>Development of clean (sustainable, green) transport</i>	– UNEP is working on ways to reduce the demand for transport, especially private cars, without compromising overall mobility.
V	<i>Organic farming in agriculture</i>	– Presupposes the refusal to use herbicides, pesticides, toxic chemicals and fertilisers of artificial origin. Organic products do not contain genetically modified organisms, are processed without the use of e-ingredients and are stored away from contact with artificial substances.
VI	<i>Energy efficiency in the housing and utilities sector</i>	– The presence of residential complexes with inefficient thermal insulation structures and heat supply systems causes significant heat losses.
VII	<i>Protecting and effectively managing ecosystems</i>	– All the diversity of human activities in the biosphere leads to changes, the direction and extent of which are commonly referred to as an environmental crisis.

Source: (Borovyk, Yelagin, Polyakova, 2020)

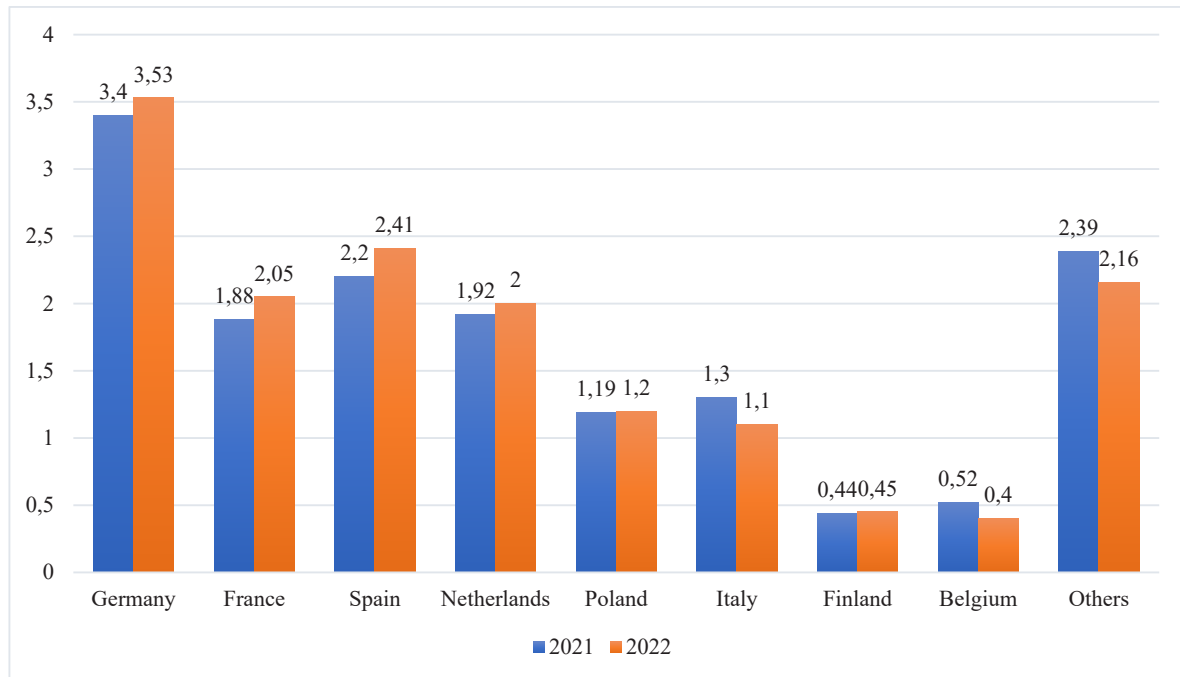


Figure 3. Biodiesel production in the EU, million tonnes, 2021–2022

Source: (Stepanenko, 2022)

the 1.3 billion people currently employed in it and the new trends of global development (Perga, 2012; Tomashuk, 2017). The introduction of economic incentives affects the greening of investments and the production of goods and services in general.

5. Green Growth as a Means of Stimulating Economic Development

The growth of the world economy under the existing model of production can create a situation when the damage caused by pollution and destruction of the natural environment begins to exceed the income received. Overcoming this situation is possible only thanks to the introduction of innovations for the reproduction of natural resources (Makovoz, Perederii, 2018).

Green growth is a means of stimulating economic growth and development that ensures that natural assets continue to provide the resources and environmental services on which people depend for their well-being. For this, it should serve as a catalyst for investment and innovation, which will be the basis for sustainable growth and lead to the emergence of new economic opportunities ("Green" economy, minpriroda.by; Mazur, Tomashuk, 2019). Figure 4 shows the dynamics of financing by developed countries to improve climate conditions in developing countries.

In order for a green economy to emerge, a number of conditions need to be in place. These include legislation that supports this type of economy,

increased public investment and private enterprise in the so-called green sectors, and public administration policies that promote the green economy. Many banks promote investment in environmental projects, known as green banks (Green economy, uk.economy-pedia.com).

In addition, the instruments of the new tax system include the provision of tax incentives for companies engaged in economic activities related to the processing of waste up to the disposal stage; the use of secondary raw materials for further production; the use of environmentally friendly packaging materials and their reuse; the introduction of low-waste, resource- and energy-saving technologies; investments in the development of green production and "green" products; the introduction of the latest technologies; the restoration of landscape areas to their original state, etc.

Thus, the introduction of environmental taxes in Ukraine will also stimulate the introduction of the green economy in the context of the transition to sustainable development (Solosych, Podlisnyuk, 2013). The main budgetary source of financing environmental protection in Ukraine today is the environmental tax, which is a compulsory payment based on the actual volume of various emissions, discharges and waste dumping into the environment. To develop a green economy in Ukraine, it is necessary to create a reliable source of funding for environmental protection activities and stimulate the introduction of resource-saving and environmentally friendly

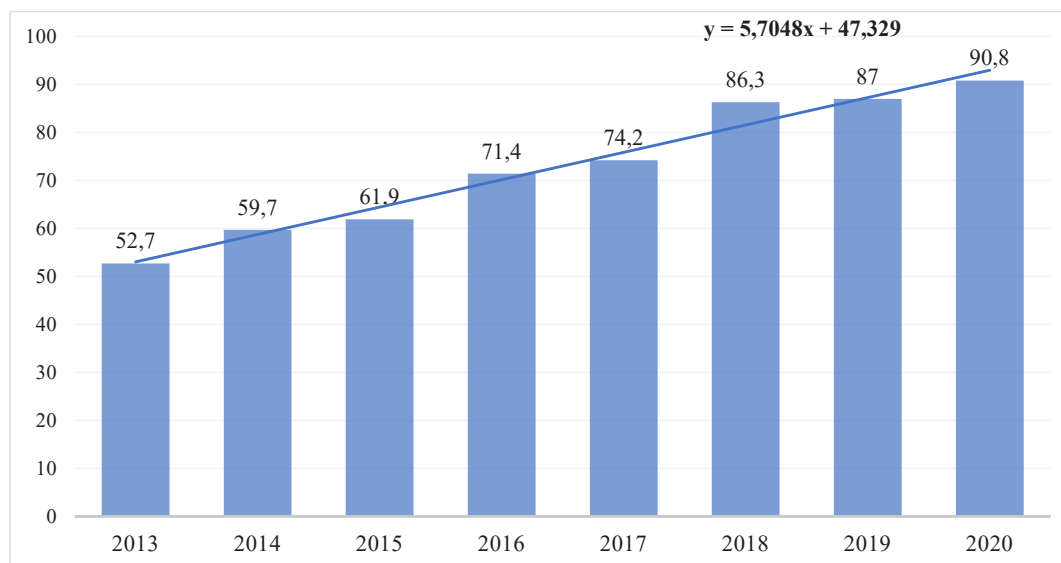


Figure 4. Financing by developed countries of measures to improve climate conditions in developing countries, 2013–2020, billion USD

Source: (Finance for climate action. Scaling up investment for climate and development, 2022)

technologies into production, for which it is necessary to improve the current system of environmental taxation by introducing the following:

- preferential taxation for companies that reduce emissions, discharges and waste disposal;
- taxation of environmentally hazardous products that cause damage to the environment (e.g., fertilisers, electrical and electronic equipment);
- taxation of the harmful effects of physical and biological factors on the environment and humans (noise, electromagnetic radiation);
- fines for environmental violations; gradual approximation of environmental tax rates in Ukraine to the European ones, which will meet the requirements of the EU-Ukraine Association Agreement;
- enshrining in the Budget Code of Ukraine the requirements for the targeted use of environmental tax revenues exclusively for environmental purposes (Gula, 2021).

Today, Ukrainian enterprises are looking for new ways to achieve ecological cleanliness of production, which opens new ways of applying the green economy, which allows not only to preserve the environment, but also to improve their competitiveness on foreign and domestic markets due to the modernisation of the production process (Makovoz, Perederii, 2018).

Reconciling economic growth and environmental safety, finding tools for decarbonisation and choosing effective measures for adapting to climate change – these are the tasks facing scientists, experts, public organisations, business representatives and politicians who are not indifferent to the modern problems facing humanity. In this context, the

Ukrainian Wind Energy Association (UWEA) has submitted its proposals for the National Renewable Energy Action Plan (NREAP) 2030, which include a number of measures, namely:

- stimulating electricity production from renewable energy sources on a market basis;
- stimulating the production of electricity from RES on a market basis without government support (corporate PPA);
- include in the Energy Strategy of Ukraine until 2050 a scenario for the construction of manoeuvrable capacities and energy storage facilities;
- laying the groundwork for the development of hybrid renewable energy plants in Ukraine;
- promoting the development of offshore wind energy and hydrogen technologies (Green economy: how to strike a balance, 2021).

In the international practice of ecological economy, among its competitive strategies is used the strategy of ecological tax reform, which allows to create jobs and preserve the environment at the same time, as it shifts the base from income and wage fund to consumption of natural resources and harmful emissions (Solosych, Podlisnyuk, 2013). It increases wages in line with economic development and stimulates investment in innovative technologies, reduces the cost of natural resources by reducing the material intensity of production and energy consumption, i.e., significantly reduces harmful emissions.

Economic growth has contributed to the revision of approaches aimed at harmonising the principles of income maximisation with the intensive use of resources and the principles of rational management

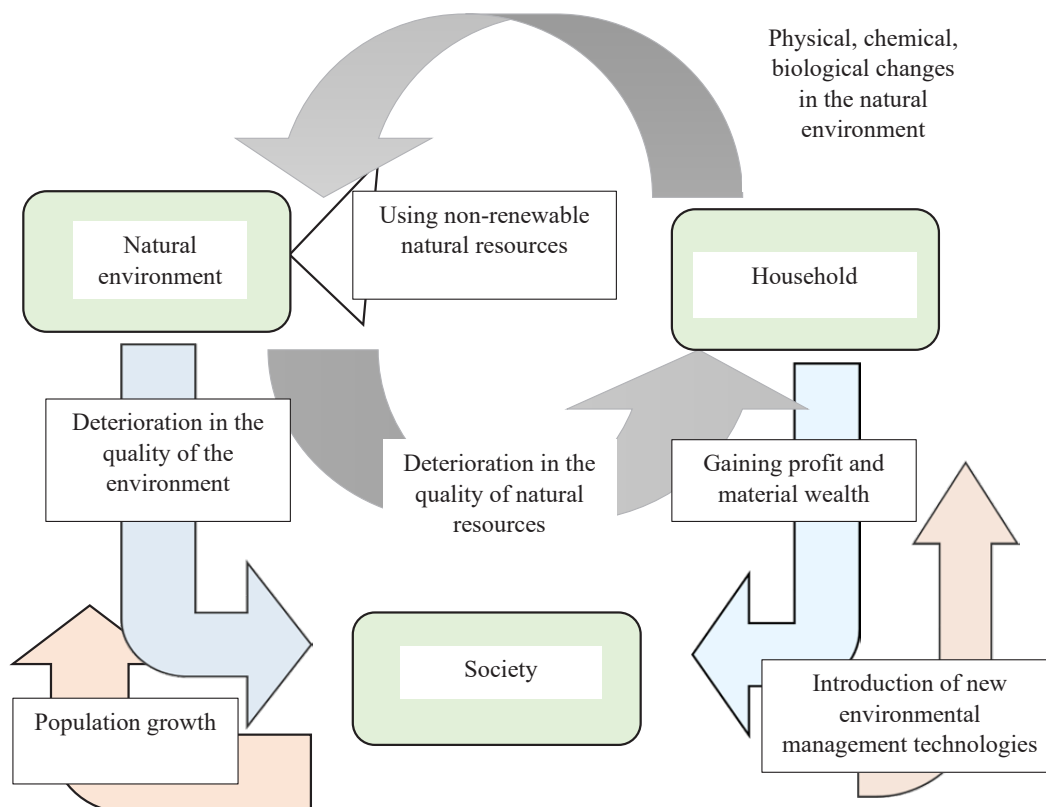


Figure 5. Key processes in the environmental management system that influence the formation of sustainable development

Source: formed on the basis of research results

of nature, taking into account the needs of future generations (Solosych, Podlisnyuk, 2013). In fact, the green economy should be considered as a way to sustainable development. Figure 5 shows the main processes in the system of nature management that influence the formation of sustainable development.

The transition to a green economy must take into account the opportunities and conditions of each country, its level of development, political situation and public preferences. Over the past decade, the concept of a green economy has become a strategic priority for many governments and intergovernmental organisations. Around 100 countries have embarked on the path towards an inclusive green economy and green growth strategies. By transforming their economies into engines of sustainability, these countries are poised to address the major challenges of the XXI century, from urbanisation and resource scarcity to climate change and economic instability.

6. Advantages of Applying the Green Economy

The implementation of the green economic model involves increasing the role of the state and intergovernmental bodies in economic regulation, creating conditions for business development based on

new environmental standards and cleaner production technologies, and greening industrial sectors of the economy ("Green" economy, old.livingplanet.org.ua). Ukraine, as part of the European family, cannot remain aloof from these processes. Therefore, today it is necessary to look ahead and propose concrete solutions so that Ukraine becomes an integral part of these global changes. Table 4 provides an analysis of the benefits of applying the green economy for the state and business entities.

In the conditions of resource and energy dependence of Ukraine, created by the situation when ecologically harmful technologies are used in outdated energy-inefficient enterprises, it is the gradual replacement of the "brown" industrial economy by a new "green" one as a strategic priority of development that gives a chance to ensure the national security of the state in the coming decades ("Green" economy, old.livingplanet.org.ua). Table 5 presents indicators of the green economy progress index.

It is important to emphasise that the concept of the green economy does not replace the concept of sustainable development, but develops it and is a means of putting it into practice. "Green" development can only be ensured if environmental and economic policies are integrated in such a way that social

Table 4

Analysis of the benefits of green economy for the state and business entities

Advantages of applying the green economy	
for the state	for business entities
<ul style="list-style-type: none"> – Reducing the economy's dependence on external supplies of raw materials and price fluctuations; – Implementation of energy and resource-saving technologies; – Access to new markets through clean technology; – Attracting foreign direct investment; – Improving the environmental situation and preserving natural resources; – Creating a positive "green" image. 	<ul style="list-style-type: none"> – Reducing the specific costs of resource consumption; – Modernisation of production; – Generating additional income through the use of available resources (through waste recycling); – Improving product quality and competitiveness; – Possibility to receive state benefits; – Diversifying the asset structure and reducing strategic risks associated with traditional production.

Source: (Makovoz, Perederii, 2018)

Table 5

Indicators of the progress index of the "green" economy

№	Indicator	Description of the indicator	Number of countries to measure	Resource
1	Green trade	Exports of eco-goods according to OECD and APEC standards (% of total exports).	128	COMTRADE, OECD, APEC
2	Environmental patents	As an indicator of innovation in the field of green technologies (% of the total number of patents).	61	WIPO
3	Renewable energy sources	Share of renewable energy sources (in total energy supply).	129	WDI
4	Energy use	Energy consumption (kg of oil equivalent) per \$1,000 of GDP.	132	WDI
5	The score of Jose Gabriel Palma	The ratio of the income of the richest 10% of the population to the share of the poorest 40%.	121	OECD, APEC
6	Access to basic services	Access to improved water sources (% of total population), access to electricity (% of total population), access to sanitation	198	WDI
7	Air Pollution	Average annual PM2.5 pollution (micrograms per cubic metre).	186	WDI
8	Ecological footprint	Consumption of biotic and abiotic resources (t/person).	175	UN
9	Marine and terrestrial protected areas	Total protected area (% of total land area) and marine protected area (% of territorial waters).	195	UNEP-WCMC
10	Index of gender inequality	An indicator that reflects the inequality in achievements between women and men in three dimensions: reproductive health; empowerment; and labour market.	129	UN
11	Pension coverage	The proportion of the population above the statutory retirement age who receive a contributory old-age pension.	102	ILO
12	Education	The average number of years of education received by persons aged 25 and over is calculated by dividing the level of education by the official duration of study at each level.	170	UN
13	Probable life expectancy	Life expectancy at birth indicates the number of years a newborn child will live if the prevailing mortality rate at birth remains unchanged throughout life.	200	WDI

Source: (Green economy progress measurement framework, 2017)

progress, economic growth and improvement in the quality of life of the population take place against a background of reduced threats to the surrounding natural environment.

7. Findings

Green growth and an improved version of sustainable development are interpreted by some scientists as a new economic engine capable of solving a number of acute problems of modern socio-economic development, including the threat of environmental degradation, the depletion of reserves of basic natural resources, an increase in the frequency of weather anomalies and climate change. In this context, special attention should be paid to solving the most acute social problems, namely: poverty, lack of food for a large part of the world population, low level of medical care, deepening of social stratification, lack of access to basic infrastructure services (Goncharenko, Parkhomenko, Luchyn, 2020). Fig. 6 shows a diagram of the directions of economic influence on the formation of balanced relations between man and the environment.

The environment and its quality are increasingly seen as a value in themselves, a consumer good, and society should be prepared to pay for this by recognising the priority of environmental interests. In this context, it is important for rational nature management to consider the environment not so much as a resource base, but as natural capital, as part of a single whole – capital.

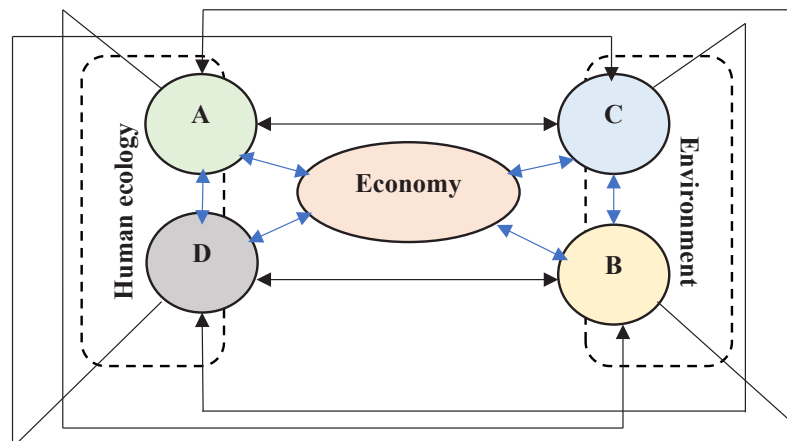
Table 6 shows the production stages of the transition to a green economy.

Thus, sustainable development strategies of countries with developed economies are complex long-term documents that, firstly, provide for the adoption of balanced decisions regarding the rates of economic growth, social development and the maintenance of ecosystems in a satisfactory state; secondly, they pay considerable attention to technological development and innovation as important factors in increasing the efficiency of resource use and environmental protection; thirdly, they are based on the involvement of business and the public in their discussion and adoption (Ivashura, 2022).

The goal of the green economy is to ensure the implementation of the cooperation of the three main directions of development, namely social welfare, economic growth and environmental protection. This means that the green economy requires the well-established and effective functioning of the three main factors of sustainable development – social, economic and environmental. It should be emphasised that the efforts of all stakeholders in the transition to a green economy must combine the need for short and medium-term profit with the long-term systemic transformation. Economic growth is key to providing the resources and ensuring the social protection and equity needed to finance the actions and build the capacity to transition to a green economy.

8. Conclusions

The green economy is the basis for implementing the concept of sustainable development based on



- A – human biophysiological essence (individual and population health, etc.)
- B – quasi-natural and unnatural formations (ecologically oriented technosphere)
- C – the supra-biological essence of the human being (spirituality, culture, social and production potential, etc.)
- D – natural formations (biosphere-forming components)

Figure 6. Diagram showing the directions of economic impact on the formation of a balanced relationship between people and the environment

Source: formed on the basis of research results

Table 6

Production stages of the transition to a green economy

Process	Process
Goal	
– Environmental friendliness of the product, its suitability for repair, reuse and recycling	– Analysis of materials and identification of alternatives
– Eco-packaging. Packaging design and strategies to comply with the basic principles of packaging	– Life cycle assessment and the so-called environmental product declaration
Production	
– Determining the environmental impact of enterprises and processes (screening)	– Optimising energy, water and resource consumption
– Waste minimisation and management, utilisation of by-products	– Waste minimisation and management, utilisation of by-products
– Transparent supply chains	– Promoting the company's corporate principles of environmental friendliness and sustainable development
Business operations	
– Business screening in the green economy	– Production impact on the environment
– Transitioning from a product to a product as a service (turning data into profit, ongoing customer relationships, after-sales service)	– Setting up reverse logistics and return schemes
– Creating road maps for CO ₂ emissions	– Introducing a system of consumer responsibility (extended consumer responsibility). This method of economic regulation obliges manufacturers and importers to recycle products at the end of their life cycle

Source: (Ivashura, 2022)

more efficient use of resources and energy, reduction of CO₂ emissions, reduction of harmful effects on the environment and development of a socially integrated society. The concept of a green economy provides a solution to various crises: financial and economic, food, climate, fuel, water and biodiversity. The strategy for the transition of the European Community to a green economy by 2050 indicates that such an economy should be identified with a system that unites ecosystems (natural capital), the economy (physical capital) and society.

Progress in supporting the stable mutual development of the economy and the natural environment is primarily linked to government

policy. It is proposed to develop a global innovative breakthrough strategy to move towards a future integrated society based on the partnership of civilisations. The main task of this strategy is to ensure the harmonious co-evolution of society and nature by creating economic levers for resource conservation, large-scale shifts in the economic structure and production technologies (significant reduction of the share of nature-consuming industries and sectors while increasing the share of nature-reproducing industries, widespread use of recycling processes for natural substances, development of more advanced disposal technologies).

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