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IMPLEMENTING THE SUSTAINABLE DEVELOPMENT GOALS IN UKRAINE: FINANCING FRAMEWORK

Abstract. The article examines the features of sustainable development processes in Ukraine. In particular, the works of scientists on the issues of sustainable transformations of the economy, the problems of establishing a mechanism for the transition to the use of renewable energy sources and reducing carbon dioxide emissions are analyzed. The basic principles of legislative regulation of the processes of sustainable transformation in the context of Ukraine's integration into the international model of sustainable development according to the UN Framework Convention on Climate Change are studied. The research objective is to study the mechanism of implementation of sustainable transformations in the economy of Ukraine, identification of the main problems of low-carbon strategy establishment in the context of harmonization of international and state legislation and identification of effective mechanisms for financing sustainable development processes. During the research, methods were used, such as: the dialectical method and methods of analysis and synthesis — to carry out a comparative analysis of legislation that regulates the processes of sustainable development, ways to implement a low-carbon strategy, study trends in carbon emissions in Ukraine; statistical method — to analyse the targets for changing the greenhouse gas emissions of Ukraine in 2020—2030 and the proposed target for 2050; structural and logical analysis — to study effective mechanisms of financing the processes of sustainable development in Ukraine, identify the ways of sustainable development projects funding. In general, the article reveals a number of problems that Ukraine faces as a signatory to the Kyoto Protocol. The main tools of the country's transition to a low-carbon strategy have been identified. The economic mechanisms to ensure the fulfillment of the country's obligations under the Kyoto Protocol have been studied. Possible ways of financing the processes of sustainable transformation are considered, among which, in particular, we can highlight the scheme of «green» investments.

Keywords: sustainable economic development, Framework Convention on Climate Change, Kyoto Protocol, low carbon economy, mechanism for financing sustainable development.

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ІМПЛЕМЕНТАЦІЯ ЦІЛЕЙ СТАЛОГО РОЗВИТКУ В УКРАЇНІ: ЗАСАДИ ФІНАНСУВАННЯ

Анотація. Досліджено особливості провадження процесів сталого розвитку в Україні. Зокрема, проаналізовано праці науковців, які стосуються питання сталих перетворень економіки, проблем налагодження механізму переходу на використання відновлюваних джерел енергії та зниження викидів двоокису вуглецю. Досліджено основні засади законодавчого врегулювання процесів сталих перетворень у контексті інтеграції України в міжнародну модель сталого розвитку згідно з Рамковою конвенцією ООН зі зміни клімату. Метою статті є дослідження механізму впровадження сталих перетворень в економіку України, виявлення основних проблем імплементації низьковуглецевої стратегії в контексті гармонізації міжнародного і державного законодавчого врегулювання та ідентифікація дієвих механізмів фінансування процесів сталого розвитку. У процесі дослідження використано методи: діалектичний і метод синтезу та аналізу — для здійснення порівняльного аналізу нормативно-правових актів, які врегульовують процеси сталого розвитку, шляхи впровадження низьковуглецевої стратегії, дослідження тенденцій зміни викидів двоокису вуглецю в Україні; статистичний метод — для аналізування цілей зміни викидів парникових газів України у 2020—2030 роках і пропонованої цілі на 2050 рік; структурно-логічний аналіз — дослідження дієвих механізмів фінансування процесів сталого розвитку в Україні. Загалом, виявлено низку проблем, з якими зіштовхується Україна, будучи підписантом Кіотського протоколу. Ідентифіковано основні інструменти переходу країни до низьковуглецевої стратегії. Досліджено економічні механізми з метою забезпечення виконання своїх зобов'язань згідно з Кіотським протоколом. Розглянуто можливі шляхи фінансування процесів сталих перетворень, серед яких, зокрема, можна виділити схему «зелених» інвестицій.

Ключові слова: сталий розвиток економіки, Рамкова конвенція зі зміни клімату, Кіотський протокол, низьковуглецева економіка, механізм фінансування сталого розвитку.

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Introduction. Today the ecological situation in Ukraine and the world requires decisive action to prevent and avoid new challenges we face. The transition to the model of sustainable development has long become top priority throughout the world, because the effects of mass consumption and uninterrupted greenhouse gas emissions we are already seeing. And although Ukraine is a signatory of international agreements on climate change, the process of transition to sustainable development requires overcoming many problems and avoiding a number of risks. However, the urgency of these actions is obvious given the state of the environment in Ukraine and in the world and the rising cost of fossil fuels.

Therefore, given the European integration processes in Ukraine, the only option of possible actions is a sustainable reduction of energy consumption and active development of renewable energy. In particular it concerns a significant increasing of the renewable energy use and a gradual sustainable growth of share of RES[1]in the final energy consumption.

Analysis of recent research and problem definition. Many publications are devoted to the problems of climate change, environmental protection and ways to improve the ecological situation in Ukraine.On the one hand, there are thorough comprehensive studies conducted with the

[1] RES — renewable energy sources, which include hydroelectric, wind and solar power, biofuels and waste.

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assistance of foreign environmental funds, on the other — there are individual publications of Ukrainian scientists.

Research on climate issues and prospects for the project «The future of the Eastern Partnership in the context of the European Green Course» was conducted by the NGO «Resource and Analytical Center «Society and Environment» with the support of the Konrad Adenauer Foundation in Ukraine from the Federal Budget of the Federal Republic of Germany [1]. The authors of the study emphasized the problems of: climate policy of the Eastern Partnership countries and the EU, the role of public organizations in the process of determining the climate policy of the state, the prospects for the development of climate policy of the Eastern Partnership countries.

With the support of the Government of Sweden, the Razumkov Center project «Ukraine and the policy of combating climate change: the economic aspect» was implemented [2]. The project was implemented under the leadership of Corresponding Member of the NAS of Ukraine, Doctor of Economics V. Sidenkau in 2016. The authors of this study have developed a number of recommendations. In particular, on the effective implementation of low-carbon development policy in Ukraine and raising Ukraine's compliance with international obligations under the UN Framework Convention on Climate Change, as well as ensuring the effective implementation of the Paris Agreement and the relevant provisions of the Association Agreement between Ukraine and the EU.

The research of scientists of the National Institute for Strategic Studies is also devoted to the problems of climate change [3]. They studied global trends in climate change, which pose a threat to the population, the environment and the economy. Along with the analysis of the effects of global climate change on land and water resources and various types of economic activity, the possibilities of adapting international experience to the conditions of Ukraine are shown and the relevant recommendations are made to the state authorities of Ukraine.

Narrower areas of research are works and relevant publications that do not address global climate issues, but certain aspects of environmental activities. The issue of carbon emissions and the associated process of mining coal and other fossil fuels is a widely recognized and extremely important factor influencing climate. The National Institute for Strategic Studies has conducted a study on this issue [4] related to the implementation of the Kyoto Protocol, in particular on the so-called flexible mechanisms that have created carbon markets.A toolkit has been developed to facilitate the implementation of quantitative commitments to reduce greenhouse gas emissions for developed countries and to provide opportunities for financing the modernization of economies in transition, including Ukraine. NGO «Dixie Group»with the support of the Heinrich Böll Foundation conducted a study «Assessing the effectiveness of public spending on the restructuring of the coal industry» [5]. The purpose of the analysis was to determine the effectiveness of state budget expenditures in the period 2015—2020. The study showed, on the one hand, the focus of costs on the restructuring of coal enterprises, and on the other — the dependence of the coal industry on government subsidies. The researchers concluded the need to increase the social acceptability of the process of phasing out coal and justified the need to switch to «green» energy.

Also important for the greening of economic activity, from the point of view of the world community, is the development of small hydropower. At the request and with the financial support of the World Wide Fund for Nature (WWF) in Ukraine, the team of the «Institute of Ecology and Energy Conservation» LLC conducted a study «Small Hydropower of Ukraine» [6]. As a result, an analytical review of technologies used in small hydropower plants in Ukraine in mountainous and lowland regions with an emphasis on the Carpathian region (Transcarpathian, Ivano-Frankivsk, Chernivtsi and Lviv regions) and compared with modern counterparts used in the European Union was published. An assessment of their impact on the environment (including the river ecosystem) and the effectiveness of their use was conducted.

Problems of climate change and ecology are reflected in the research of Ukrainian scientists, as evidenced by already defended scientific dissertations. Thus, the issues of energy policy related to the environmental aspects of the national economy are studied in the dissertations of A. S. Zaverbnyi [7], S. V. Moskalyuk [8]. Energy problems with renewable sources were

considered by G. O. Kuznetsova [9] and P. V Hazan [10]. I. V. Cheban researched the bioenergy market in Ukraine. Low-carbon development is considered in the dissertation of I. P. Gaidutskyi [12].

The authorities of Ukraine pay great attention to the problems of climate change, the impact of man-made factors on the environment and environmental protection [13; 14]. In particular, public authorities and administrations prepare reports for international organizations on environmental measures and compliance with the commitments made by the Government of Ukraine [15]. These issues are considered and the relevant plans are approved at the regional level, as exemplified by the material [16].

Along with fundamental comprehensive research of international and state funds and organizations, as well as dissertations, there are examples of publications by individual authors. Some of them study the compliance of Ukrainian measures with the requirements of international agreements and protocols, such as the work of O. A. Dyachuk [17; 18], O. I. Protsenko, V. G. Zhdanova [19], V. V. Yakubovskyi [20]. Other authors study the legal aspects of environmental protection, such as V. O. Vlasenko [21].

The research objective is to study the mechanism for implementation of sustainable transformations in the economy of Ukraine, identification of the main problems of low-carbon strategy establishment in the context of harmonization of international and state legislation and identification of effective mechanisms for financing sustainable development processes.

Research methodology. The methodological and source base of the study are international documents adopted by the UN, international congresses and conferences on climate change and environmental protection. The research materials are also based on domestic norms and legislation, on the publications of foreign and Ukrainian researchers on climate change and ecology in Ukraine.

The research methodology is based on the comparison of Ukrainian regulations with the documents of international agreements on climate change, in particular on the obligations to ensure the established reductions in temperature in the atmosphere, as well as related environmental issues.In particular, the range of research issues includes regulatory, energy, related to the reduction of carbon emissions.

The results of research. In the context of establishing global targets for keeping global temperature on Earth within 2 °C by 2100, Ukraine faces a rather ambitious goal to reduce greenhouse gas (GHG) emissions. Thus, in December 2015 the 21 th Conference of the Parties of the Framework Convention on Climate Change adopted a new climate treaty — The Paris Agreement[2]. During negotiations in Paris under the approved project of Ukrainian Intended National Determined Contributions (INDC)[3] was announced the target on reducing greenhouse gas emissions by 40% by 2030 relative to 1990 emission level. However, experts note according to calculations, that in order to match the script keeping global temperatures within 2° C according to new goals of the Paris Agreement, the task of reducing carbon dioxide emissions should be adjusted: from 40% to 70% in 2050 relative to 1990 year [22].

Interesting is also the fact that Ukraine has committed to reduce carbon dioxide emissions into the atmosphere, compared with 1990, but not compared to last years. So we are committed not to reduce emissions into the environment, but to increase them, thus denying the idea of participating in the UN Framework Convention and targets to improve environmental conditions of the country and the world.

Fig. presents Ukraine's global goals for reducing greenhouse gas emissions for 2020 and 2030. Thus, we see that we are committed to increase the volume of its emissions by 87.6% in 2020 and 40.7% — in 2030 compared to the year 2012. And only in case of our consent to adjust the emission reductions to 70% in 2050, we will reduce them by only 29.6% compared to the year 2012.

[2] Such Agreement replaces the Kyoto Protocol. The Paris Agreement potentially imposes on Ukraine new commitments to reduce greenhouse gases. This directly affects the development of the energy sector as the largest source of greenhouse gases [22].

[3] INDC — Intended National Determined Contributions [Lima Call for Climate Action. Annex. URL : http://unfccc.int/files/meetings/lima_dec_2014/application/pdf/auv_cop20_lima_call_for_climate_action.pdf.

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The project of Intended National Determined Contributions has several possible options by which Ukraine will change the amount of greenhouse gases. All proposed scenarios involve not reduction, but growth of these emissions. Ukraine thereby violates its obligations to the Energy Community and EU. Today, our country is in the top twenty countries that emit the most greenhouse gases in the atmosphere [23].

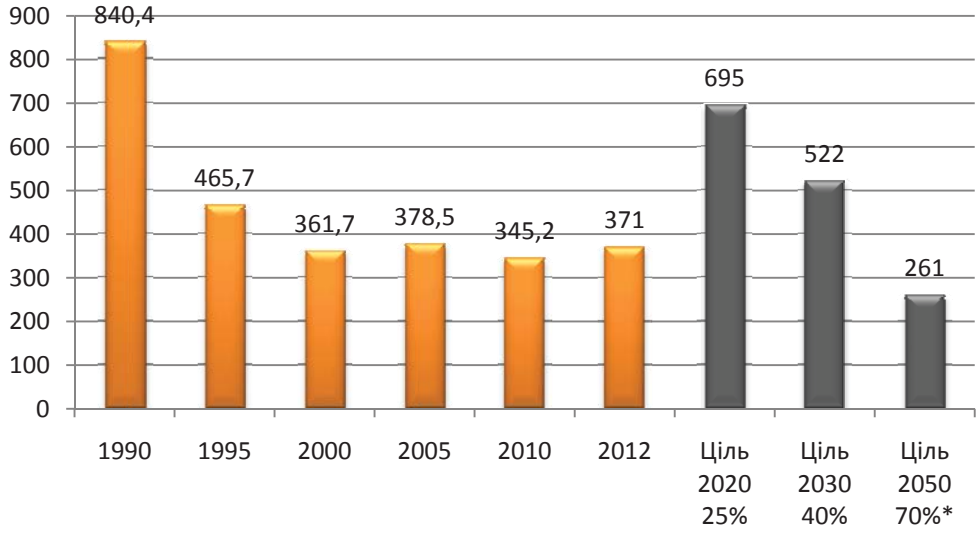

Fig. **Ukraine's greenhouse gas emission targets for 2020—2030 and the proposed target for 2050 (t CO2-eq)**

* Under the Paris Agreement and proportionate distribution between additional obligations (scenario of keeping the temperature within 2 °C).

Source: formed based on [22].

One of the requirements of the Paris Agreement to the signatory countries is to develop the low-carbon development strategy by 2050. As is known in Ukraine are developing several projects of new energy strategy by 2035. However, given the new planning horizon of the Paris Agreement — 2050 — and given the goal — 2 °C, this strategy is inconsistent with international realities [22].

According to the International Energy Agency, energy efficiency (40%) and renewable energy (30%) play a crucial role in preventing global temperatures increase by more than 2 °C and reducing carbon dioxide emissions during the period until 2050. It is obvious that to ensure fulfillment of the tasks we face, and to improve the ecological situation in Ukraine and around the world, a new energy strategy and low carbon development strategy should be based on the development of such areas [22].

For Ukraine Conservation Energy and gradual transition to renewable energy sources –are not only energy security, energy independence, economic stability and environmental protection but also the fight against global warming. These problems can not be resolved by raising utility tariffs and subsidy for citizens [23]. According to research by the Institute of Economics and Forecasting of NAS of Ukraine realization of a implementing energy efficiency and renewable energy resources scenario requires around 4% more than other offers. Through the introduction of such environmentally oriented project Ukraine could substantially reduce imports of energy resources. Increasing energy efficiency and use of renewable energies would have helped to abandon the imports of gas and coal [23].

An important issue in the context of the transition from fossil fuels to renewable energy sources is financing the proposed measures to reduce emissions. Thus participating countries of Framework Convention on Climate should not only prepare low carbon development projects, but also explain what mechanisms they will apply in transition to theeconomy, based on renewable energy. In other words it is clearly necessary to develop lending and financing programs.

Low carbon economy will be competitive thanks to two tools: to ensure the investors not to be interested to invest in fossil fuels, and create incentives to mske them invest in renewable types of energy [23]. Besides the experience of many countries shows that investment in the transition to renewable energy sources will not only improve the environmental situation, but is also a competitive and profitable type of investment.Thus, according to the International Agency for renewable energy, geothermal energy, biomass have long been competitive.

Doha amendment about the the second period of the Kyoto Protocol was adopted in 2012. In particular, Ukraine required to make exclusion and changes to the use of surplus emission allowances from the first period of the Kyoto Protocol. However, these changes other countriesdo not support[4]. The first period of the Kyoto Protocol expired, and free emission quotas remained in Ukraine. With the adoption of the Doha amendment for the second period of the Kyoto Protocol [34] situation has changed drastically — international emissions trading was excluded and transition countries have obliged to take a real commitment to cut emissions. Within two years after the adoption of the Doha amendment, Ukraine took a tough stance: to have the right to use free emission quotas from the first period of the Kyoto Protocol without further conditions. This is contrary to the accepted rules, that's why the countries do not agree to such a position of Ukraine. Finally, in Lima, Ukraine was offered a consensus: the quotas from the first period of the Kyoto Protocol can be used for implementation of international commitments to reduce emissions in the second period regardless of commitments [35].

Being a signatory to the Kyoto Protocol, Ukraine, as one of the parties in implementing their commitments quantified emission limitation and reduction, to promote sustainable development, faces tasks under Art. 2 KP [36, Art. 2], which provide for the implementation of policies and measures to protect and improve the quality of absorbers and storage of greenhouse gases; improving energy efficiency in the relevant sectors of the national economy; encouraging forms of sustainable and rational agriculture in the context of taking into account the peculiarities of climate change; conducting research, developing, promoting the widespread use and implementation of new and renewable energy sources and advanced modern environmentally friendly technologies; gradual reduction and elimination of market imbalances, fiscal incentives, encouragement of appropriate reforms in relevant areas in order to facilitate the implementation of policies and measures to limit or reduce GHG emissions; measures to limit and / or reduce GHG emissions. Tasks according to Art. 2 of the KP also provide for cooperation with other parties to the KP in order to increase the individual and overall effectiveness of their policies and the measures they take under the KP. To this end, Art. 2 of the KP provides for the implementation of measures to share their experience and information on such measures and policies, including the development of methods to increase their compatibility, transparency and efficiency.

In order to ensure its fulfillment of its obligations, the Kyoto Protocol provides for three economic mechanisms, namely [36]:

- mechanism of joint implementation, which according to Art. 6 of the KP, provides for the implementation of projects for the transfer of any of the parties listed in Annex 1[5], the other party or receiving from it a unit of emission reductions determined as a result of projects aimed at reducing anthropogenic emissions by sources or increasing the absorption of greenhouse gases by sinks in any sector of the economy under certain conditions provided for in Art. 6 KP;
- mechanism of clean development, the purpose of which, according to Art. 12 of the KP, is to assist the parties not listed in Annex 1 in achieving their sustainable development and to promote the ultimate goal of the Convention, as well as to assist the parties listed

[4] URL : http://necu.org.ua/druhoyy-period-kiotskoho-protokolu/ http://necu.org.ua/try-stsenariyi-pozytsiyi-ukrainy-kioto.

[5] Ukraine refers to Annex 1 of the Convention HCC UN [30] (adopted in the list in 1992) with industrialized countries historical emissions of which lead to climate change. These include rich countries that are members of the Organization for Economic Co-operation and Development in 1992, and countries with transition economies such as RF and Central and Eastern European countries. In other words the inclusion of Ukraine to Appendix 1 of the Convention does not make it automatically developed country and, accordingly, a donor [31].

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in Annex 1 in ensuring that they comply with their obligations regarding quantitative restrictions and emission reductions in accordance with Article 3[6];

- mechanism of direct trade in quotas, which according to Art. 17 of the KP stipulates that the parties listed in Annex B may participate in emissions trading in order to fulfill their obligations under Art. 3. Any such trade shall complement internal actions aimed at achieving the objectives of meeting certain quantitative commitments to limit and reduce emissions[7].

It should also be noted that for Ukraine using direct emission trading mechanism lacks credibility in the international community, because quotas on carbon dioxide emissions reduction surplus is not caused by reductions resulting from the implementation of programs of renewable energy, «green» or energy saving measures or absorption of greenhouse gases in the atmosphere. In Ukraine, this situation evolved historically as a result of the economic recession in 1990th of the twentieth century. Moreover, given the presence of quotassurplus, no measures to reduce existing emissions compared to previous years were carried out.

According to the text of the decision of the 21 th Conference of the Parties and the Paris Agreement [32] for keeping the global temperature within 2 °C, countries must achieve greenhouse gas emissions peak as soon as possible and soon after start a radical reduction in order to achieve a balance between anthropogenic emissions and natural sinksin the second half of the century. Essentially this means the need to complete abandonment of fossil fuels until 2050 and the transition to 100% renewable energy [31]. Thus, with the entry into force of the Paris Agreement Ukraine, among other countries should begin the process of preparing low-carbon development strategies, which should be long-term (2050), integrated into all sectors of the economy include measures for maintaining temperature within 1.5 / 2 °C, and, in fact, lead to the abandonment of fossil fuels by mid-century [31].

These long-term goals set out in the Paris Agreement, entitle to assert the necessity of establishing a mechanism of transition to renewable energy and phasing out of fossil fuel use. An important issue to resolve is the development and effective mechanism for funding the country's transition to renewable technologies, principles of economical energy consumption and environmental preservation of the environment. In order to establish the mechanism of financing an appropriate measures to implement Ukraine's obligations as a party to the UN Framework Convention, the primary is separation a possible ways of fundsraising. In particular, they should include the following.

Firstly, one of the ways of financing is international cooperation. In particular, Article 6 of the Paris Agreement [32] is devoted to the international cooperation of countries to reduce greenhouse gas emissions. Such cooperation involves inheritance of basic market principles of the Kyoto Protocol, but does not allow projects that do not have a significant environmental component, do not meet the criteria of sustainable development and are not transparent in execution. Much attention is paid to proper accounting of units in order to avoid double-counting of emission for both parties of a mechanism [31]. Currently Ukraine can establish international cooperation within the use of market mechanisms of the Kyoto Protocol — Joint Implementation. Unlike the emission trading mechanism, in Joint Implementation projects can take part only enterprises regardless of ownership. One reason that restrained companies from setting up this type of cooperation was that under the terms of the agreement, during the project funds come only after the reduction of carbon dioxide emissions. In other words company must first implement the project and reimbursement of expenses will only be confirmed in case of achieving the expected result. It should be noted that during the period of maximum exploitation and the growth of greenhouse gas emissions it was probability of failure to reach such a result, even with the success of the project, since the growth of carbon dioxide emissions could occur with higher rates than the reduction of

[6] As sellers of achieved reduction units, or receiving parties of projects can be countries classified as developing ones, and as buyers — countries from the Appendix B of KP. Thus, as the country where it can be implemented projects under this scheme can be all post-Soviet countries, except Russia, Ukraine and Belarus [20].

[7] The mechanism of direct emission trading was expelled by the Doha amendment to the Kyoto Protocol.

emissions due to the project. But today, due to decommissioning of coal basinsin relation to the conduct of military operations in the country, it is apparent a significant reduce of emissions to the atmosphere. So, given the situation, it is advisable to carry out commissioning of such projects and establishing international cooperation.

In addition, Ukraine should also consider entering into bilateral agreements with the EU for getting assistance to implement their commitments to reduce GHG emissions. This assistance could be provided, for example in the form of technology transfer to ensure the short-term measures for modernization and energy efficiency of the national economy [17].

Secondly, in addition to the abovementioned flexible mechanisms of the Kyoto Protocol, there is also a scheme of «green» investments (GIS), which is a voluntary mechanism established by the country of the seller to ensure customers of targeted use of funds from carbon credits trading to finance environmental projects and «greening» programs. The main difference between GIS and JI projects is that the performance of GIS does not require additionality testand carbon credits can be sold before achieving greenhouse gas emission reductions. It should be noted that the GIS is not subject to the rules of the Kyoto Protocol, the amount and terms of revenues use are approved on a bilateral basis. Currently in the world the GIS market establishment is at an early stage and the experience of their use is negligible [27].

Fourthly, in addition to given above ways of financing of sustainable economic development it is worth mentioning that although neither by the Convention nor by the Kyoto protocol Ukraine is not spelled out as a payee, in fact Ukraine is given a varied climate aid from donor countries by the World Bank channels (project ofClean Technology Fund of Climate Investment Fund), through UNDP[8] projects and technical assistance projects of individual countries (USAID, EU, GIZ, etc.) [31].

Conclusions. Ukraine's transition to sustainable economic development model involves a set of reasonable and informed management decisions to build a national environmental strategy. First of all, it is necessary to take measures to improve the environmental situation in the country and to fulfill our commitments by the international community under the Kyoto Protocol and the future introduction of the Paris Agreement. Such measures should include the revitalization process of country's transition to the use of renewable energies. Important is the reorientation of the countryfrom the raw-focused to the innovative economy and the refusal from its passive position when greenhouse gas emissions are reduced not because of the measures taken to reduce them, but because of current circumstances. Another important issue is to establish an effective mechanism for financing the implementation of sustainable economic development, which would be based on the principles of transparency and targeted nature. Only such a policy and avoiding mistakes made in previous periods, can promote effective economic and natural reproduction of the country and establishment of cooperation with the international community.

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