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ASSESSING THE CLIMATE-NEUTRAL INVESTMENT PROJECTS IN THE CONTEXT OF ENVIRONMENTAL PROTECTION AND ENERGY SECURITY

Abstract

The paper is aimed at studying the methodological aspects of assessing the features and advantages of implementing climate-neutral investment projects

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in the context of environmental protection and energy security. For this purpose, investigation is focused on the performance of investment projects in nature resource sectors (agriculture, forestry, etc.) that provide renewable resources (biomass) for the generation of green energy. The paper identifies the peculiarities of the transition to low-carbon economy and creation of carbon markets as platforms for the development of a system for managing climate-neutral investment projects. The scientific novelty of this research lies in the improvement of approaches to substantiating the economic feasibility of investments in nature resource sectors in view of the climate change. Namely, a comprehensive approach to comparing alternative variants of investment project solutions in climate-neutral projects is suggested. Moreover, the developed methodological recommendations account for the variable meteorological factors in calculating economic indicators. The paper's practical value can be seen in the determination of the benefits from the implementation of climate-neutral projects using the example of production and processing of the agro-biomass for the development of renewable energy based on the circular use of resources.

Key Words:

climate; environmental management; green energy; investments; low-carbon economy; carbon markets; environmentally friendly processes; climate-neutral innovations; renewable energy sources; meteorological conditions.

JEL: F21, O13, Q20, Q21, Q41, Q42.

3 tables, 10 formulae, 21 references.

Problem Statement and Literature Review

Economic development is closely linked to the existence of environmental problems, at both the global and regional levels, caused by large-scale climate change and the problems of man-made impact on the natural environment. In particular, the energy sector, as a component of critical infrastructure, is one of the industries that has been generating a carbon footprint in recent decades. This stimulates the energy companies to continuously improve the forms and methods of climate-neutral activities, expand the areas of environmentally friendly processes, and improve the organization of their activities in order to optimize the use of natural resources and achieve maximum environmental results. Therefore, ensuring low-carbon development of the energy sector based on the principles of balanced environmental management is of particular importance.

The transition to a low-carbon economy, which involves the development of green energy through the use of renewable energy resources, requires the creation of an investment strategy and the implementation of climate-neutral projects. This encompasses the selection of key areas of investment activity, assessment of the investment attractiveness of real projects and financial instruments, selection of the most effective ones, and the creation of real investment programs. In the context of developing low-carbon markets, it is particularly important to assess the economic and environmental feasibility of designing and managing climate-neutral investment projects in the field of natural resources management that provide renewable resources (biomass) for green energy production.

The threat and impacts of climate change (understanding the current state of the climate, including how it is changing and the role of human impacts, the current knowledge of possible future climate, climate information relevant to regions and sectors, and the limits of human-induced climate change) are evidenced by the following facts:

- in 2019, CO2 concentrations in the atmosphere were higher than at any time in the last 2 million years, and CH4 and N2O concentrations were higher than at any time in at least 800,000 years;
- since 1970, global surface temperatures have risen faster than in any other 50-year period for at least the last 2000 years. Temperatures during the last decade (2011-2020) have been higher than those of the last multi-century warm period, approximately 6500 years ago (0.2°C to 1°C relative to 1850-1900);
- in 2011-2020, the average annual area of Arctic Sea ice reached its lowest level since at least 1850. In late summer of 2020, the area of Arctic Sea ice was smaller than at any time in the last 1000 years;
- global average sea level has risen faster since 1900 than in any previous century for at least the last 3000 years (Masson-Delmotte et al., 2021; Andrusevych et al., 2020; Yaroshevych et al., 2021).

Zhu et al. (2021) conducted a scientometric analysis and noted the growing research interest in studying the impact of externalities such as infrastructure development of airports, road transport, and energy systems on economic growth. As a result, one of the elements of adapting the energy sector to climate change is the so-called *green transition*, when the state begins to receive the bulk of its energy from renewable sources (Ivaniuta et al., 2020). In addition, in the context of climate change accompanied by limited natural resources, it is of particular importance to implement measures that strengthen energy security by developing environmentally friendly processes through the transition to green energy, sustainable and smart city mobility, and optimization of agro-biomass supply chains that include the production, promotion and consumption of environmentally friendly products and services.

Creation of a system for managing climate-neutral investment projects is considered through the lens of developing and implementing eco-innovations with an environmental and economic effect, for instance, the impact of environmental innovations on the operation, organization, marketing, financing, and environmental performance of the company (Barriga Medina et al., 2022). It is therefore important to ensure investment support for the innovative development of municipal transport infrastructure on the basis of climate neutrality and energy efficiency, namely building a network of charging stations for electric vehicles, bicycle paths, and amassing a fleet of ecological public transport. The innovative environmentally friendly investment solutions include the use of piezoelectric sensors that convert deformations and vibrations in the layers of pavements subjected to mechanical stress from vehicles into electrical energy – piezoelectricity as a source of renewable energy (Mota et al., 2022). In addition, attracting investment for the development of smart cities through the development of environmentally friendly programs based on the Internet of Things is also of value. (Gurani et al., 2019).

In turn, Halchynska (2019) studied the development of the bioenergy market and alternative energy sources. She presented a scientific and methodological approach to assessing the economic potential of waste and energy crops in the market, basing it on the calculation of optimal volumes of waste processing into biofuels by individual types. The approach provides for setting restrictive criteria in terms of the minimum acceptable sowing areas and livestock to ensure the effective operation of existing facilities for processing biological raw materials (Halchynska, 2019). Other scholars emphasize the importance of transforming the energy sector by implementing investment projects aimed at introducing energy-efficient technologies and building smart energy networks (Dzhedzhula & Yepifanova, 2021; Bashir et al., 2021).

One way to reduce the anthropogenic impact on the environment and prevent climate change is to introduce a system of environmental taxation (tax on the use of energy resources, transport, and environmental pollution), in part by setting and changing the rates of various types of environmental taxes (Koziuk et al., 2020). Other innovative solutions to ensure the transition of enterprises to a climate-neutral energy market include the integration of renewable resources into the energy supply chain, monitoring and verification of carbon dioxide emissions, circular use of agro-biomass resources, and climate change impact assessment (Borysiak et al., 2022), reverse logistics in waste management (Zielińska, 2020) and others.

Summarizing the review of scientific works, we note the growing scientific interest to and practical value of developing and implementing climate-neutral investment projects in various fields. At the same time, when considering the specifics of implementing climate innovations at enterprises and in households, innovations are usually viewed through the prism of obtaining environmental effects through the implementation of such activities: transition to alternative fuels (innovative development of energy enterprises); decarbonization of transport; use of smart technologies in environmental impact assessment; implementation of energy management and generation of demand for energy service technologies at industrial enterprises and households; energy audit in construction; assessment of agricultural raw materials (biomass) processing management. Instead, there is a need to develop flexible and comprehensive environmental and economic methodological approaches to justify the economic benefits of implementing such climate-neutral investment projects.

In view of this, the **aim of the article** is to highlight the methodological aspects of assessing the peculiarities and advantages of implementing climate-neutral investment projects in the context of environmental protection and energy security.

Methodology

The study hypothesis is that the main conditions for the implementation of climate-neutral investment projects are the circular use of natural resources (water, land, forests, etc.) and minimization of negative environmental impacts. Investment projects in the natural resource sectors (agriculture, forestry, etc.) that provide renewable resources (biomass) for green energy production have a number of features that need to be taken into account when planning and implementing them on the basis of inter-sectoral cooperation and circular resource use. With this in mind, the following conceptual components of the climate-neutral investment project management system have been outlined:

- defining the concept of a climate-neutral investment projects in accordance with the overall strategy of the enterprise on the basis of environmental protection;
- planning the resource capabilities and their options for the project;
- securing marketing support for project implementation;
- substantiating the criteria used when assessing goal attainment, in particular the implementation of environmentally friendly processes;
- developing indicators for calculating the feasibility and efficiency of investments using modern investment analysis methods;

- managing the project's cash flows, implementing a system for the generation and accounting of incoming and outgoing flows, financial planning and forecasting;
- managing risks in the natural resources sector.

The study employed the methods of statistical analysis, synthesis, matrix modeling, systematic approach, economic and mathematical modeling, and simulation. The proposed developments are supported with the use of project, financial and investment management tools, mathematical analysis and forecasting, as well as the basic principles of comprehensive investment analysis of environmental projects as formulated by the authors.

An analysis of the features, scope, advantages and disadvantages of the main indicators used in modern investment analysis suggests that Net Present Value (NPV) and the Profitability Index (PI) should be considered the main indicators for analyzing the effectiveness of investments in all projects, including environmental ones. They can be used as criteria for choosing among alternative project solutions. The discounted payback period (DPP) can be used as a constraint and as a simple method of assessing investment risk. As for the quite popular internal rate of return (IRR), it can also be used as a constraint in terms of borrowing to finance a project in order to determine the optimal interest rate for a loan at which the project will break even, or to determine the safety margin of a project.

Quite often, the NPV and PI indicators provide a similar ranking of projects by their degree of attractiveness, but there may be situations where these criteria may conflict. In such cases, preference should be given to the project with the greatest integral effect, if there are no restrictions on its application. However, the main criterion for the effectiveness of any expenditure is the ratio of the result obtained to the costs incurred to achieve it. At the same time, any relative values are more informative and allow us to characterize the output per unit of cost and performance indicators in analyzing trend dynamics. In view of the above, we believe that the PI index should be used as the main criterion for assessing the effectiveness of investments in climate-neutral projects.

Thus, the general model for choosing the optimal project solution will look like this:

$$\mathbf{PI} = max(\mathrm{PI}_i) \quad \text{where} \tag{1}$$

$$\begin{cases} \mathrm{PI}_i \geq 1; \\ \mathrm{NPV}_i \geq 0; \\ \mathrm{IRR}_i \geq d; \\ \mathrm{DPP}_i \geq T. \end{cases} \qquad i = \overline{1,n} \tag{2}$$

where *d* – discount rate;

T – normative or acceptable payback period for investments.

The resource or monetary approach is used to determine the methods of investment analysis. Given that it is difficult to predict real future cash flows at the design stage, the study focuses on the use of resource and monetary approaches.

Research Results

Prevention, mitigation, and adaptation to climate change requires a comprehensive approach to optimizing the production, supply, and consumption chains of goods, which in turn lays the foundation for the development of a low-carbon economy. Along these lines, Costantino (2022) distinguishes between enterprises that seek to achieve carbon neutrality (minimizing carbon dioxide emissions) and enterprises that use carbon credits to offset emissions that they cannot otherwise reduce. Thus, a carbon market is formed, «regulated through international, regional and sub-national carbon reduction schemes, such as the Clean Development Mechanism under the Kyoto Protocol, the European Union Emissions Trading Scheme (EU-ETS) and the California Carbon Market» (Costantino, 2022, p. 7).

In particular, the European Union Emissions Trading System (ETS-EU) is a «cap-and-trade system» for greenhouse gas (GHG) emissions that operates in the EU member states and the three EFTA member states (Iceland, Liechtenstein and Norway). The ETS-EU sets limits on the total amount of carbon dioxide (CO_2) and other greenhouse gases emitted by power plants, industrial installations and aircraft operators. Under the system, companies can buy and sell emission quotas as needed. They can also use a limited number of international credits generated by greenhouse gas emission reduction projects. Each quota entitles its holder to emit 1 ton (t) of CO_2 or, depending on their permitted activity, an equivalent amount of nitrous oxide (N_2O) or perfluorocarbons (Costantino, 2022).

The establishment of such a legal and regulatory system for carbon markets sets the stage for the development and management of climate-neutral investment projects, in particular in the energy sector as it has a negative impact on the environment. Each ton of CO_2 emissions is measured in carbon credits or certified emission reductions (CERs). Carbon credits or CERs are generated during project implementation and issued after emission reductions are credited (Costantino, 2022).

On the path to European integration, the implementation of the European Union's provisions on decarbonization of the economy is of particular importance for Ukraine (the new EU strategy on climate change adaptation, June 2021). The Law of Ukraine on the Principles of Monitoring, Reporting and Verification of

Greenhouse Gas Emissions (Law of Ukraine of December 12, 2019, No. 377-IX) is of great relevance in addressing this issue at the national level. In addition to monitoring and preparation of operators' reports on their greenhouse gas emissions, it also provides for verification of the operator's report, and subsequent preparation and issuance of a verification report by the verifier (a verifying legal entity accredited in accordance with the Law of Ukraine on Accreditation of Conformity Assessment Bodies).

In general, depending on the sources of funding, a distinction is made between the effectiveness of the project as a whole (overall effectiveness; commercial effectiveness) and the effectiveness of participation in the project. Procedures for calculating the economic efficiency of a project vary depending on the types and sources of funding.

Let us consider the process of forming the total economic effect (E) from the implementation of a project in the field of natural resources management that provides renewable resources for the production of green energy, trying to combine resource and monetary approaches. The purpose of implementing climate-neutral investment projects in the field of environmental management in the context of strengthening energy security is to more efficiently use natural resources or reduce environmental damage. Given this, the effect of the investment may be judged by the increase in the value of the natural resource(s) or by the amount of prevented environmental damage.

In addition, in accordance with the monetary approach, the revenue side includes an incremental depreciation charge related to the commissioning of new production assets.

Summarizing the above, the total annual economic effect (E) from the implementation of an environmental project will generally be as follows

$$E = \Delta NR + \Delta R + \Delta PED + \Delta D - I \tag{3}$$

where ΔNR – increase in the annual projected net revenue of the enterprise as a result of the investment project implementation;

ΔR – increase in the value of natural resources as a result of the investment project implementation;

ΔPED – amount of prevented environmental damage as a result of the investment project implementation;

ΔD – increase in annual depreciation charges related to the commissioning of new production assets;

I – annual amount of investment.

Consideration of climate and meteorological (weather) factors in the calculation of economic indicators is also important when assessing the management of climate-neutral investment projects aimed at improving energy security by diversifying the use of renewable resources and strengthening cooperation with environmental management companies. For example, agricultural production involves natural factors and agricultural productivity also depends on meteorological factors. However, such natural phenomena as precipitation, light, solar radiation intensity, temperature, and wind speed are uncertain and variable and, thus, difficult to predict. That is why agricultural production is subject to cyclical and variable weather conditions of a given year that have a decisive impact on the amount of economic gain from the implementation of such projects. Similarly, weather conditions can affect performance in other sectors of natural resources management: water management, forestry, recreation, water transport, fisheries, etc.

In this regard, the consideration of the meteorological factors in economic calculations is becoming extremely important. After all, the introduction of scientifically sound and effective methods of using environmental information in economic calculations will help to significantly reduce losses caused by natural conditions and to obtain a greater effect through the implementation of an optimal production strategy.

When it comes to classifying weather conditions, traditionally they are divided into groups of years based on the set of meteorological components (e.g., very dry, dry, moderate, wet, very wet). The distribution of year groups within the project life cycle is uneven and can be expressed as the share (probability of occurrence) of the respective year group in the total project life cycle (Rokochynskiy et al., 2021).

Based on this, the economic result of managing a climate-neutral investment project will depend on three main factors:

1. Meteorological conditions in the respective typical years of the series P=$\{p_j\}$, $j = \overline{1,m}$.

2. Frequency (probability) or share of occurrence of the relevant year group in the project life of the facility – $\{\alpha_{p_j}\}$, $j = \overline{1,m}$.

3. Alternative version of the project solution (type, design, technology, scheme, process, etc.) of the set S=$\{s_i\}$, $i = \overline{1,n}$.

Thus, in general, the utility function from the implementation of a project solution variant can be represented as:

$$E_{ps} = E(P, \alpha_p, S), \quad j = \overline{1,m}; \quad i = \overline{1,n}. \qquad (4)$$

For greater clarity, this function can be written in the form of a payment matrix (Table 1).

Table 1

Matrix of relationship between economic effect and changes in natural and climatic conditions

P=$\{p_j\}$	α_{p_j}	S=$\{s_i\}$			
		s_1	s_2	…	s_n
p_1	α_{p_1}	E_{11}	E_{12}	…	E_{1n}
p_2	α_{p_2}	E_{21}	E_{22}	…	E_{2n}
…	…	…	…	…	…
p_m	α_{pm}	E_{m1}	E_{m2}	…	E_{mn}

Due to the uneven distribution of year groups with different weather conditions over the project life, the weighted average of the year groups should be used as the average annual expected effect of the project, determined through the mathematical expectation formula. In economic statistics, it is the most important characteristic of a random variable that serves as the center of its probability distribution. It shows the most plausible expected value of the factor being studied or evaluated. In this case, the average annual effect of the alternative project solution will be calculated as follows:

$$E_i = \sum_{j=1}^{m} E_{ij} \cdot \alpha_{pj}, \quad j = \overline{1,m} \quad i = \overline{1,n}. \tag{5}$$

or

$$E_i = \sum_{j=1}^{m} (\Delta NR_{ij} + \Delta R_{ij} + \Delta PED_{ij} + \Delta D_i) \cdot \alpha_{pj} - I_i \; j = \overline{1,m} \; i = \overline{1,n}. \tag{6}$$

Then, the main indicators of the general model (1), (2) for the variants of project solutions are calculated as follows:

$$\mathrm{PI}_i = \left[\sum_{t=0}^{T} \frac{E_{i_t}}{(1+d_{i_t})^t} \Big/ \sum_{t=0}^{T} \frac{I_{i_t}}{(1+d_{i_t})^t}\right] + 1, \quad i = \overline{1,n}; \tag{7}$$

$$\mathrm{NPV_i} = \sum_{t=0}^{T} \left[E_{i_t} / (1 + d_{i_t})^t\right], \quad i = \overline{1,n}; \tag{8}$$

$$\sum_{t=0}^{\mathrm{DPP_i}} \frac{E_{i_t}}{(1+d_{i_t})^t} = \sum_{t=0}^{T} \frac{I_{i_t}}{(1+d_{i_t})^t}, \quad i = \overline{1,n}; \tag{9}$$

$$\sum_{t=0}^{T} \left[E_{i_t} / (1 + \mathrm{IRR_i})^t\right] = 0, \quad i = \overline{1,n} \tag{10}$$

where T – project implementation period, years.

The proposed approaches to improving the methodological aspects of assessing the management of climate-neutral investment projects in the field of agricultural environmental management will increase the validity of management decisions, taking into account the specifics of creating and operating environmental facilities as complex natural, technical, ecological and economic systems in the context of strengthening energy security.

The implementation of climate-neutral investment projects is based on the principle of resource conservation and efficient use of available resources, namely the possibility of re-consumption of such resources as a result of their recycling. Fostering a culture of renewable energy and recycling plays an important role in improving energy efficiency and energy conservation. In particular, in the context of strengthening energy security, it is especially important to determine the optimal share of own investments in the portfolio of institutional investors for the implementation of investment projects that integrate balanced agricultural environmental management into the management of the renewable energy supply chains by ensuring the interaction of all actors in this chain from biomass production to household consumption of secondary energy.

The use of biomass is considered a source of green energy in terms of supporting environmental management, balanced and rational use of natural resources. It serves as a basis for the development of green energy in general and bioenergy based on the circularity of natural resources. The imperatives to improve the energy efficiency of the economy include the development and optimization of technologies for growing energy (photosynthetic) plants that are specifically used as biofuels or energy production. Biomass is a carbon-neutral fuel, and its use does not increase the global greenhouse effect. Today, the main suppliers of biomass used for biofuels are agriculture and forestry, energy plantations, and the microbiological industry.

For instance, one of the most promising areas for agricultural enterprises is the production of green electricity and heat from biogas. In particular, according to the data in Table 2, in Ukraine there is a trend of increasing electricity production from biogas. Among the environmental effects of biogas projects, Top Lead and Latifundist.com (2020) identify the following: efficient use of agricultural waste, including by-products of animal origin (manure and litter; fermentation residues are a high-quality fertilizer that can be sold or used instead of mineral fertilizer); no adaptation period for biofertilizers saves time and storage space; power generation; reduction of waste storage space or complete elimination of manure and litter storage; reduction of greenhouse gas emissions.

In addition, transition to the use of energy crops as biomass for solid biofuels production has the advantage as they are available and easy to produce compared to the alternative of replacing biomass from forestry-approved wood, the cost of which is increasing. Moreover, energy crops can be grown on degraded land and help prevent soil erosion (Vorobei et al., 2018).

Table 2

Implementation of biogas projects for power generation in Ukraine, 2018-2020 (as of January)

	2018	2019	2020	Deviation between 2020 and 2018
Installed capacity of biogas projects (total), MW	34	46	86	+52
Power generation by biogas projects, million kWh	9	16	30	+21

Source: Top Lead, & Latifundist.com. (2020). Infographic guide 2019-2020 «Agribusiness of Ukraine» [in Ukrainian]. Baker Tilly & Credit Agricole. https://agribusinessinukraine.com/get_file/id/agro-2020_1.pdf

At the same time, the transition to the production of energy crops as an alternative resource for replacing gas for energy production in Ukraine requires regulatory improvements, namely consideration and approval of draft laws 5227 and 5228 of March 12, 2021 by the Verkhovna Rada of Ukraine and definition of the term *energy crops*, extension of the land lease term for growing energy crops, etc. This will lay the foundation for the development of the energy crops sector in Ukraine (Table 3) (Agroportal, 2022).

Table 3

Revenue from different alternatives of agricultural land use

No.	Method of land use	Average yield, tons per hectare	Average selling price on the domestic market, EUR/t	Revenue, EUR/ha
1.	Cultivation of wheat	4,65	160	744
2.	Cultivation of corn for grain	6	160	960
3.	Cultivation of corn silage for biomethane production	24,3	40	972
4.	Cultivation of energy plants (willow, poplar)	18	60	1080

Source: Agroportal. (2022). Ukraine needs a program for growing and using energy crops [in Ukrainian]. https://agroportal.ua/news/rastenievodstvo/ukrajina-potrebuye-programi-viroshchuvannya-i-vikoristannya-energetichnih-kultur

The use of plant biomass for bioenergy production aimed at ensuring the competitiveness of rural areas and agrarian communities requires that certain fundamental conditions be taken into account. First, biogenic sources of this type of industrial raw materials should be well adapted to specific soil and climatic conditions of cultivation to ensure high yields and production of marketable commodities. Second, production and processing of plant products should be regionally connected to eliminate excessive costs for transportation and storage of products. Third, the cultivation of raw plant materials must be backed by a reliable seed production system. the system for the production and processing of raw plant materials should enable its multipurpose industrial use and utilization of commercially valuable by-products to ensure the waste-free nature of this process (Sydoruk, 2015).

At the same time, the climatic and economic challenge in ensuring sustainable development of the agricultural sector through the establishment of energy plantations (energy poplar, energy willow, paulownia, switchgrass, miscanthus, eucalyptus, hemp, reeds, cane, etc.) lies in the determination of individual hydro metrological characteristics of energy crops in terms of perenniality (avoiding yearly soil depletion helps to preserve soil moisture), the timing of harvesting, and moisture resistance. Therefore, an intersectoral approach to the implementation of a climate-neutral investment projects focused on the creation of climate energy clusters that involve agricultural, bioprocessing and energy enterprises in the green energy production chain may be a good compromise. It would optimize the planning of energy crop plantations by allowing adaptation to climatic factors (seasonal volume and frequency of precipitation, changes in temperature regimes, etc.) in different regions of Ukraine.

In view of this, the development and implementation of an action plan for the transition to alternative energy sources for energy companies is of key importance in managing climate-neutral investment projects in the energy sector. In particular, one important investment component of such a plan is to determine the potential of renewable raw materials in the product range (wood, grain straw, sugar beets, corn, sunflower, rapeseed, energy crops, biowaste, etc.) for green energy production.

Taking this into account, ensuring effective interaction between agricultural enterprises and green energy production enterprises by developing an optimized biomass supply and processing chain is of particular importance. In this regard, measures to secure biofuels could include the implementation of a climate-neutral investment projects aimed at creating agro-energy clusters for the circular use of agrobiomass based on smart management and the involvement of local governments.

Conclusions

Implementation of climate-neutral investment projects and transition to a diversified renewable energy resource mix are among the priorities of the European Union's climate-neutral economic development. Climate-neutral investment projects are of scientific and practical value in this regard, so it is important to highlight the methodological aspects of assessing the features and benefits of their implementation in the context of environmental protection and energy security.

In particular, the scientific value lies in improving approaches to substantiating the economic feasibility of investments in environmental projects. This envisions an application of a comprehensive approach to comparing alternative project solutions in climate-neutral investment projects and developing methodological proposals for taking into account factors of variable meteorological conditions in the calculation of economic indicators. In addition, for the development of renewable energy based on the circular use of resources, it is practical to determine the benefits of implementing climate-neutral investment projects on the example of agro-biomass production and processing. In turn, the peculiarities of the investment projects in natural resource sectors (agriculture, forestry, etc.) that provide renewable resources (biomass) are considered in the paper as they are a springboard for the development of climate-neutral intersectoral partnerships (for example, the creation of agro-energy clusters), as well as the transition to a low-carbon economy.

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