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## **EUROPEAN GREEN DEAL: ACCOUNTING CHALLENGES OF BIOFUEL IN UKRAINE**

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Біла Ю. Європейський зелений курс: проблемні питання обліку біопалива в Україні. *Вісник економіки*. 2023. Вип. 4. С. 171-180. DOI: <https://doi.org/10.35774/visnyk2023.04.171>

### **Abstract**

**Introduction.** *Climate neutrality is a global goal of the modern world, the achievement of which can be a key moment in ensuring the existence of humanity. This is confirmed by international agreements that are actively discussed and implemented on a global scale. The use of biofuels as an alternative energy source enables the realization of decarbonization strategy as one of the goals of the European Green Deal. Therefore, addressing the issues related to its implementation in accounting requires special attention.*

**The aim of the study.** *The aim of the article is to improve biofuel accounting as a tool for ensuring climate neutrality and implementing the approaches of the European Green Deal.*

**Methods.** *The methodological basis of the research involves the application of scientific and specialized methods of cognition. To develop and provide a clear example of the dynamics of CO<sub>2</sub> emissions and biofuel production volumes in Europe and the world, economic-mathematical, graphical, and historical methods were used. Deduction and analysis contributed to identifying the advantages and disadvantages of using biofuels as an alternative energy source. Synthesis and induction were applied to enhance the analytical accounting of biofuels.*

**The results.** *The research substantiates that biofuel is a tool for positive changes in the global climate scenario, particularly in terms of atmospheric decarbonization. The advantages and disadvantages of using biofuels instead of traditional fuels on a global scale have been examined to assess their significance for the European Green Deal. Analytical accounts have been highlighted based on types of biofuels (solid, liquid, and gaseous) to enhance the informational function of accounting and systematize data on this important asset.*

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**Prospects for further research.** Future scientific inquiries will be directed towards selecting an optimal methodology for determining the cost of biofuels as a tool for achieving the goals of the European Green Deal.

**Keywords:** accounting, bioenergy, bioenergy assets, biofuels, decarbonization, European Green Deal, climate, ecology.

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**JEL classification: M41.**

**Introduction.** Achieving climate neutrality has become the main goal of the European Union and the whole world. This is evidenced by international agreements that are actively discussed and implemented in the world ranges. In particular, on November 4, 2016, the Paris Climate Agreement came into force, which stipulates that all states, regardless of the degree of their economic development, assume obligations to reduce harmful emissions into the atmosphere [1]. On December 11, 2019, the European Commission officially presented the European Green Deal (EGD) [2]. This is a document containing a set of measures aimed at transforming Europe into a climate-neutral continent by 2050. The largest international agreement concluded on December 13, 2023 at the United Nations Climate Summit, provides a direct call to abandon fossil fuels such as gas, coal and oil, the use of which dangerously heats the planet [3].

Over the past 50 years, the scale of CO<sub>2</sub> emissions has been increasing in all countries of the world (Fig. 1). First of all, this applies to countries where there are large volumes of industrial production: China, Asia, the USA. The replacement of traditional fuels with alternative types of energy is one of the priority areas in the fight against climate change and dependence on countries that position themselves as oil and gas magnates.

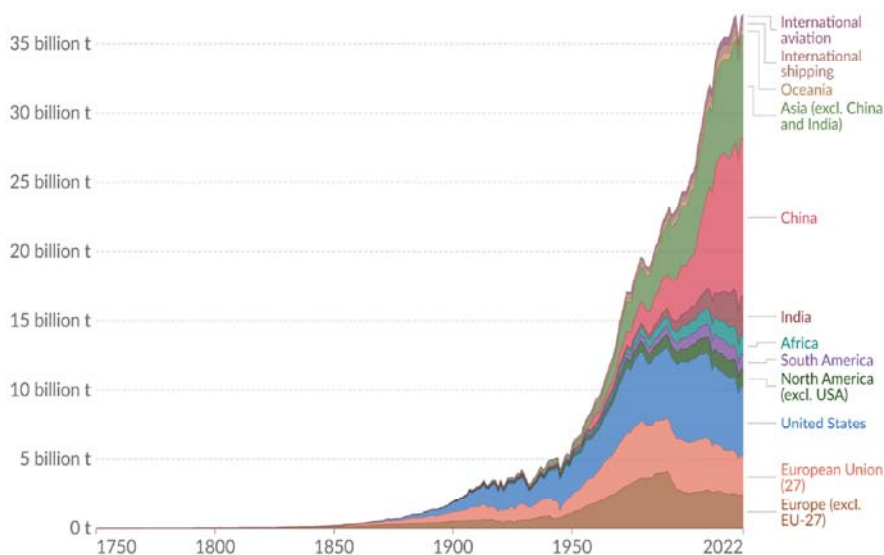


Fig. 1. Dynamics of CO<sub>2</sub> emissions on a global scale.

Source: [4]

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Every branch of science must contribute to the achievement of climate neutrality and the development of renewable energy sources. Accounting is no exception. In the bioenergy sector, where the central objects are biofuel and biomass, accounting as an information system should ensure the correct reflection of their production processes and cost calculation, since indicators at the micro level form the price of an alternative type of energy (biofuel) at the macro level.

**Analysis of research and publications.** The question of atmospheric decarbonization through the use of alternative energy sources is currently relevant in the research of both foreign and domestic scientists. I. Tsiropoulos et al. [5] explore the consequences of the widespread development of bioenergy in the EU in the context of decarbonization and present alternative pathways for climate mitigation based on various emission reduction targets. H. Cantarella et al. [6] investigate the potential of biofuels to promote its market supply with the aim of replacing fossil fuels and mitigating global warming. H. Tripol'ska [7] examines the potential for the production of liquid motor biofuel in Ukraine, as well as the driving forces determining the need for its production in the future.

Issues related to the accounting representation of biofuels are studied by Ukrainian researchers such as: V. Deriy [8], L. Hutsalenko, V. Fabiyanska [9], I. Kochut [10], I. Zamula, V. Travin, V. Zuzanska [11]. However, the intensification of bioenergy development in Ukraine and globally necessitates the expansion of research in this direction and the search for optimal methods for accounting biofuels as one of the renewable energy sources.

**The purpose of the article is** to improve biofuel accounting as a tool for ensuring climate neutrality and implementing the approaches of the European Green Deal.

To achieve the goal, the following tasks must be solved:

- determine the advantages and disadvantages of using biofuel as an alternative source of energy;
- select biofuel as an accounting object;
- identify problematic issues of biofuel accounting and propose ways to solve them.

**Results.** Biofuel production as an alternative source of energy is gaining more and more popularity in all countries of the world (Fig. 2). The absolute leader is the USA with an indicator of 1,626.60 PJ, which is almost twice as much as Brazil (914.5 PJ), which ranks second in the ranking of biofuel producers, and four times more than Indonesia (389.6 PJ), which occupies the third position. China (148.4 PJ) and Germany (137.7 PJ) rank lower on the list, but are steadily increasing production, allowing them to remain in the top five biofuel producers.

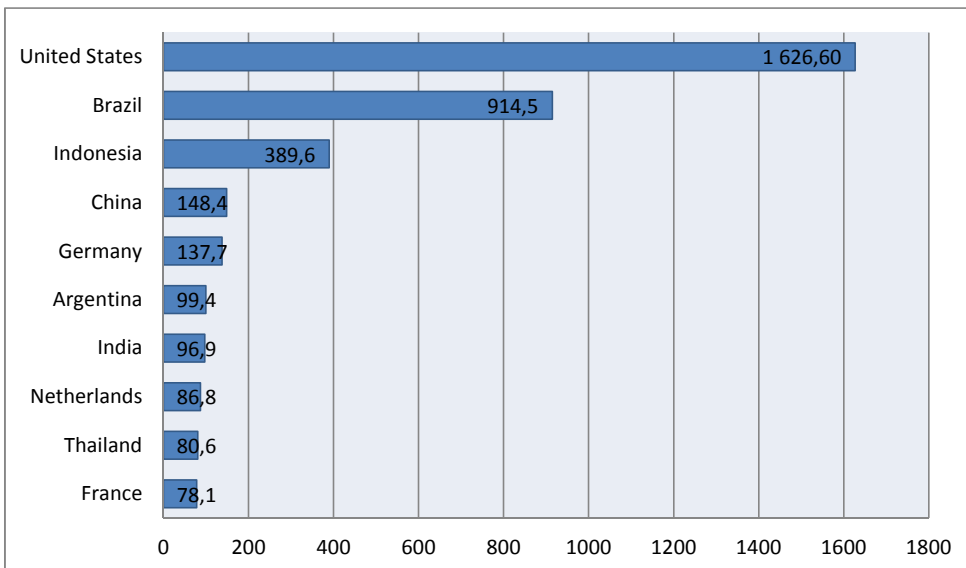


Fig. 2. Leading countries based on biofuel production worldwide in 2022 (in petajoules).  
Source: [12].

The positive dynamics of biofuel production demonstrates a number of advantages of using it instead of traditional fuels. In particular, the following can be highlighted:

1) Implementation of the decarbonization strategy. The use of biofuel contributes to the reduction of CO<sub>2</sub> emissions into the atmosphere, compared to traditional types of fuel. During the combustion of biofuel produced from bioenergy crops at power stations, only the volume of CO<sub>2</sub> that was obtained by the plant during its growth is released.

2) Prevention of soil erosion. Energy crops are both a raw material for biofuel and a means of soil rehabilitation.

3) Waste disposal and cyclic use of organic substances. The raw material for the production of second-generation biofuel is organic industrial and household waste, the processing of which ensures cyclical and waste-free production.

4) Energy independence from countries that own fossil fuels. States can independently increase the production of biofuels and not depend on the economic and price policy of countries with fossil fuel reserves.

5) Development of agricultural production. The main raw material for the production of biofuel is agrobiomass, the use of which stimulates the development of agriculture and the use of land as the main asset.

The disadvantages of using biofuels as traditional fuels include the following:

1. Production crisis. Growing bioenergy crops requires a certain area of agricultural land that could be used for food production. Given the increase in the number of people on Earth, this deficiency can be large-scale.

2. The threat of the death of forest plantations. The use of solid wood biofuel stimulates tree cutting, which negatively affects decarbonization and the environment in general.

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3. Lower calorific value compared to coal and natural gas. To obtain the same amount of energy as from fossil fuels, a larger volume of biofuel is required, which can affect the longevity of equipment operation and the price of fuel.

4. Dependence on natural conditions. Not every country has land suitable for growing bioenergy.

Despite these disadvantages, biofuel production remains one of the priority ways of overcoming the climate crisis by realizing Ukraine's agricultural potential. In addition, the use of biofuels can be an important area of post-war economic and energy recovery.

The Law of Ukraine "On Alternative Fuels" states that biofuel producers are obliged to keep records of the biofuels and biocomponents they produce in accordance with the procedure established by law [13]. According to the Instruction on the Application of the Plan of Accounts for Accounting of Assets, Capital, Liabilities and Business Transactions of Enterprises and Organizations No. 291 (Instruction No. 291): "Sub-account 203 "Fuel" (petroleum products, solid fuels, lubricants) accounts for the availability and movement of fuel purchased or prepared for the technological needs of production, operation of vehicles, as well as for energy generation and heating of buildings" [14]. There is no information on biofuel accounting in Instruction No. 291, which indicates a gap in the standardized accounting system for a strategically important asset of an enterprise.

It is necessary to determine the sub-account where information on the availability and movement of biofuels at an enterprise can be displayed. As for the position of scientists, this topic has been thoroughly studied by L. Hutsalenko and Y. Fabiyanska. The authors propose an integrated approach to biofuels accounting with the allocation of a separate sub-account 200 "Biofuels" in account 20 "Production stocks", as well as analytical accounts in terms of classification of biofuels by their types: No. 2001 "Liquid biofuels", No. 2002 "Solid biofuels", No. 2003 "Biogas" [9]. We believe that analytics will strengthen the information function of accounting, but the allocation of a separate sub-account for biofuels, in the presence of the existing 203 "Fuel" will complicate the processes of displaying and distributing data on available fuels at an enterprise.

I. Zamula et al. [11] in the article provide a working plan of the company's accounts, according to which firewood (solid biofuel) is proposed to be accounted for on subaccount 201 "Raw materials and materials". In our opinion, such a position is justified under the condition of exploitation of firewood as a raw material for the production of products. In the case of using them as an energy resource, it is advisable to display them in the composition of fuel in order to avoid distortions of information about the structure of production stocks in the company's financial statements.

The Law of Ukraine "On Alternative Fuels" states that "biofuel is a solid, liquid and gaseous fuel made from biologically renewable raw materials (biomass), which can be used as fuel or a component of other types of fuel" [13]. That is, biofuel is a type of fuel (such as petroleum products), so it is advisable to display information about its availability and movement as part of production stocks on sub-account 203 "Fuel" (analytical account 2031 "Biofuel"). For structured information, we offer a working plan of accounts for enterprises, which contains analytical accounts according to the type of biofuel (20311 "Solid biofuel", 20312 "Liquid biofuel", 20313 "Gaseous biofuel") (Fig. 1).

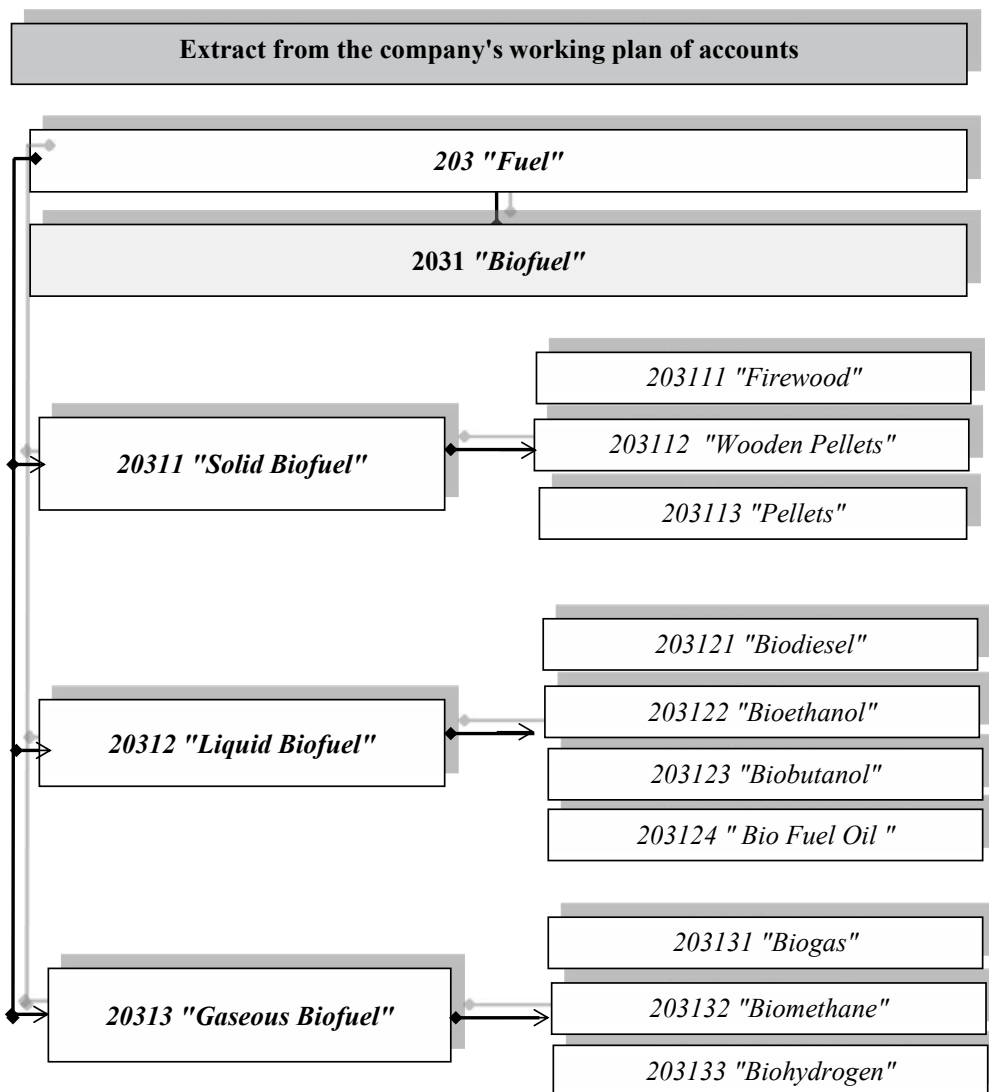


Fig. 3. Extract from the working plan of accounts for biofuel accounting.  
 Source: developed by the author.

The proposed analytical accounts are relevant for enterprises that use and manufacture this type of alternative energy source. The classification of biofuel shown in Fig. 1, can be used to develop analytics for account 23 “Production”, which will display information on the production of biofuel by its types. Also, the proposed systematization will allow creating analytics for account 26 “Finished products”, to which an enterprise posts ready-to-use biofuel.

**Conclusions.** Biofuel is one of the tools for achieving climate neutrality and meeting the goals of the European Green Deal. The advantages of using biofuel on a global scale include: the implementation of decarbonization strategies; prevention of soil erosion;

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utilization of waste and cyclic use of organic substances; energy independence from fossil fuel-owning countries; the development of agricultural production. Drawbacks of biofuel use include: production crises; the threat to forest plantations; lower heat efficiency compared to coal and natural gas; dependence on natural conditions.

For Ukraine, the use of biofuel is a crucial direction for post-war economic and energy recovery as it allows the realization of the country's agrarian potential. However, there is a gap in the standardized accounting system regarding the reflection of biofuel. Therefore, it is proposed to record information about its presence and movement within the production stocks on subaccount 203 "Fuel" (analytical account 2031 "Biofuel"). To enhance the analytical accounting of biofuel, it is suggested to develop a chart of accounts for enterprises, including analytical accounts according to the type of biofuel: 20311 "Solid biofuel", 20312 "Liquid biofuel", 20313 "Gaseous biofuel". This proposal facilitates the structuring of information about biofuel for further use in making management decisions regarding this strategically important asset.

**Prospects for further research.** Future scientific inquiries will be directed towards selecting an optimal methodology for determining the cost of biofuels as a tool for achieving the goals of the European Green Deal.

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**ЄВРОПЕЙСЬКИЙ ЗЕЛЕНИЙ КУРС: ПРОБЛЕМНІ ПИТАННЯ ОБЛІКУ  
БІОПАЛИВА В УКРАЇНІ**

**Анотація**

**Вступ.** Кліматична нейтральність – глобальна ціль сучасного світу, досягнення якої може бути ключовим моментом у забезпеченні існування людства. Це підтверджується міжнародними домовленостями, які активно обговорюються та впроваджуються на глобальному рівні. Використання біопалива як альтернативного джерела енергії уможливіє реалізацію стратегії декарбонізації як однієї з цілей Європейського зеленого курсу. Тому вирішення проблемних питань відображення його в обліку потребують особливої уваги.

**Мета дослідження.** Мета статті – удосконалення обліку біопалива як інструменту забезпечення кліматичної нейтральності та реалізації підходів Європейського зеленого курсу.



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**Методи.** *Методологічною основою дослідження є застосування наукових та спеціальних методів пізнання. Для розробки та наочного прикладу динаміки викидів CO<sub>2</sub> і обсягів виробництва біопалива у Європі та світі використано економіко-математичний, графічний та історичний методи. Дедуція та аналіз сприяли визначенню переваг та недоліків під час використання біопалива як альтернативного джерела енергії. Синтез та індукцію застосовано для удосконалення аналітичного обліку біопалива.*

**Результати.** *У дослідженні обґрунтовано, що біопаливо є інструментом позитивних змін у глобальному кліматичному сценарії у частині декарбонізації атмосфери. Досліджено переваги та недоліки використання біопалива замість традиційного у глобальних масштабах з метою оцінювання значення для реалізації Європейського зеленого курсу. Виокремлено аналітичні рахунки відповідно до видів біопалива (тверде, рідке та газоподібне) для підсилення інформаційної функції бухгалтерського обліку та систематизації даних про важливий вид активу.*

**Перспективи подальших досліджень.** *Подальші наукові пошуки будуть спрямовані на вибір оптимальної методики формування собівартості біопалива як інструмента реалізації цілей Європейського зеленого курсу.*

**Ключові слова:** *бухгалтерський облік, біоенергетика, біоенергетичні активи, біопаливо, декарбонізація, Європейський зелений курс, клімат, екологія.*

**Формули: 0, рис.: 3, табл.0, бібл.: 14.**

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