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Regulatory Aspects of Ensuring the Development of Competitive Biofuels Production in Ukraine

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Abstract

The purpose of the article is to determine the strategy of development and effective principles of regulation of biofuels production in Ukraine at the competitive level.

To systematize historical trends in the development of world and domestic energy, a dialectical method has been used. Using the monographic method, the priority principles of formation and mechanisms of regulation of energy policy and biofuels production are investigated. The forecasting method is used to formulate conceptual foundations of regulation and strategy for the development of competitive production of biofuels, and abstract-logical – for the theoretical generalization and formulation of conclusions. To ensure a solution to raised the problem, the well-known strategic planning tool – SWOT-analysis was used.

Based on the SWOT-analysis and the results of the study, a comprehensive mechanism for increasing the rate of industrial production of biofuels in Ukraine at a competitive level has been formed, containing the following priority regulatory measures: technology transfer and innovation; harmonization of the legal framework with the European Union; introduction of energy-saving and energy-efficient technologies; proper consulting and audit; attraction of highly skilled personnel; cluster approaches; provision of principles of nature conservation; development of foreign economic activity in the biofuels industry. The state regulatory strategy for the development of competitive biofuels production involves the comprehensive application of economic, legal and administrative regulatory methods.

For the first time, the principles of regulatory policy (consistency, flexibility, homeostaticity, synergy, competence) that are based on system-wide properties (system unity, development, complexity, compatibility, invariance, information unity) are developed in the field of stimulation of

production and consumption of biofuels. The direct process of their implementation in the fuel and energy complex of our country should be carried out on three main levels of management: macro-, meso- and micro-levels.

Adherence to the developed strategic principles of state regulatory policy will transfer the state to the energy saving type of economy and reduce energy intensity of production, increase the share of renewable energy resources in the national structure of energy consumption, ensure the formation of competitive production of biofuels in Ukraine, create favorable conditions for attracting to the agro-industrial complex external and internal investment inflows, the introduction of the latest innovative technologies and modern experience of effective work of the agricultural sector on the basis of diversification and clustering of production.

Keywords*:* Management, Fossil Fuel, Energy Dependence, Biofuels Industry, Competitiveness, SWOT-Analysis, Principles of Regulation, System Properties.

Introduction

The advanced countries of the world in the current economic environment are intensively developing rational ways of balancing their own structure of consumption of energy resources to ensure the independent functioning of the national economy by reducing the supply of imported energy. The complex of practical questions on significant reduction of energy consumption will be effectively solved only if the identified problem is clearly delineated in a structured system, localized on a territorial principle, comprehensive study of relationships with environmental factors, identified sources and causes of energy leakage. Constant exacerbations and conflicts at the state level in the supply of fossil energy are forcing the national economies of developed countries to constantly focus their research on shaping the competitiveness of biofuels. The development and implementation of diversified programs aimed at supporting domestic and international biofuels production seek to find effective and sustainable ways to overcome obstacles in bioenergy development, to create a balanced management system for scientific knowledge and research to promote innovation in this field. This process will lead to rational and efficient use of energy resources to sell produced products at national and world markets, as well as to stabilize the growth of demand for different types of biofuels, which should become a necessary component in the overall structure of needs of different categories of consumers.

The current conditions indicate that Ukraine has an irrational structure of energy resources use, so the problem of improving the management efficiency in energy consumption and reducing the energy consumption of produced products is quite relevant in theoretical and practical terms. The very volatile and unpredictable situation in the gas and natural gas markets and the possible negative changes in their further appreciation, as well as the need to dramatically improve the environmental status of cities and rural areas, require accelerated development of industrial production and consumption of biofuels, in particular for motor transport , agricultural machinery, housing and communal services, etc. Therefore, it is relevant to study and use the world experience in the development of the biofuels industry, as well as to put into practice state mechanisms of regulation and facilitate cooperation with developed countries in the field of development and implementation of highly efficient technologies of competitive production of biofuels in our country, bringing their technical and economic levels world standards.

The global demand for energy and related services to meet social, economic and human development, well-being and health is increasing. Energy is a central requirement in our daily lives to improve human development, leading to economic growth and productivity. Returning to renewable energy sources to help mitigate climate change is a great approach to sustainable development and meeting the energy needs of future generations [1]. Reducing energy demand and improving energy efficiency are two of the main goals sought in many national and international programs (such as EU 20-20-20 goals) in the transformation of energy systems [2].

Materials and Methods

Since the oil crisis of 1973, biofuels have been used extensively for many years to increase energy independence, reduce the cost of importing fossil fuels, and strengthen the agrarian sector of the economy [3]. Biofuels have the potential to change the transport and agricultural sectors of decarbonized societies. However, the stability of these fuels has been questioned in recent years due to the compromise of food against fuel, carbon accounting and land use [4].

However, the IEA estimates that bioenergy is one of the most effective and promising alternative energy destinations. The technologies for the production and use of bioenergy resources meet the requirements of the Paris Climate Agreement (COP 21) on environmental protection. The rapid and steady pace of development of the bioenergy industry over the last decades is due to a number of factors, the key ones being the widespread use of state programs to limit greenhouse gas emissions and environmental protection, reducing traditional energy resources while accompanying rising energy prices, improving the competitiveness of energy and energy. . The successful development of the biofuels industry abroad is driven by stable and diverse support from the state. Forms of support vary from country to country, but generally boil down to tax breaks and vacations; providing interest-free loans; setting a fixed tariff for green electricity; public financing of research and development works and pilot projects, etc. [5].

It should be noted that in the world, Ukraine is one of the most energy-intensive industries, so the competitiveness of production is directly dependent on the prices of fossil fuels, whose value is constantly increasing. The rise in prices over the last decade for fossil fuels has led to an increase in the competitiveness of renewable energy resources, in particular biofuels.

In agricultural enterprises, the cost of production is increasing annually, which is largely due to the constant appreciation of used energy materials produced from natural resources, such as fuel and lubricants, fertilizers, and natural gas. It is possible to reduce these resources at the expense of their alternative production from agricultural products, the technologies of which have been elaborated by world and national science, practically applied in many countries of the world and experimentally tested in Ukraine [6]. In spite of this, there is an extremely unsatisfactory rate of development of the biofuels market today, despite the adoption of a number of legislative acts aimed at solving this problem. The lack of consistency and consistency in the organizational and economic mechanisms for the development of the biofuel industry is conditioned by the lack of political will for their full implementation, as well as economic and political interests that have emerged in the energy market of Ukraine and other countries [7].

The wide range of urgent problems of pursuing a rigid state government policy in the field of bioenergy and the lack of incentive measures for biofuels producers have led to a slowdown in investment in the industry and the curtailment of the biofuels market in Ukraine in recent years. In order to create favorable investment climate for the development of bioenergy in Ukraine and to develop the market of biofuels, the state policy should be aimed at introducing an effective mechanism for supporting the production and use of biological fuels. The effectiveness of this mechanism is based on the optimal correlation between the administrative and market instruments of regulation of the bioenergy segment of the fuel and energy complex. The decisive role in shaping the state policy of bioenergy development in Ukraine belongs to the processes of development and adoption of legislation aimed at introducing tax, credit and price instruments, which will be more directed to the sphere of regulation of demand for biofuels [8].

The scarcity of its own energy sources compels the government to decide on increasing their imports. However, in the context of reducing fossil fuels in the world and the rapid increase in prices for them, solving energy problems through imports alone is not sufficient, which requires the introduction of effective regulatory instruments aimed at developing national biofuels. The current processes of European integration and the low level of consumption of renewable energy resources, in particular biofuels, in the structure of energy consumption requires the development of perfect regulatory principles and a coherent strategy for the sustainable development of national energy policy and

independence, which are now one of the weakest links in state regulation in Ukraine. [9].

The creation of a new environmentally friendly energy sector will facilitate the deployment of rational diversification processes for energy resources and the strengthening of Ukraine's energy and economic security. Along with the market mechanism of self-regulation, the state should also be the main regulating subject of a market economy. Especially versatile and purposeful should be the functions of public authorities in the context of economic reform, especially where the rights of private property are not clearly defined, as a result of which private owners lack the motivation to use their capital for the benefit of society as a whole, including the development of a sustainable energy sector. This is forcing the state regulatory bodies of Ukraine to pay greater attention to energy efficiency and energy conservation policies while respecting the environmentally friendly use of energy resources. Among the unresolved tasks of the state policy in the regulation of the fuel and energy complex is the urgent solution of the problem of reforming the national energy supply through the introduction of effective mechanisms of state regulation in accordance with world practice and EU requirements.

This process requires that, a set of priority measures will be implemented as soon as possible that will allow: to make the transition to competitive internal and external energy markets; to create an efficient internal infrastructure; introduce transparent market rules for energy activities; increase the level of financial discipline and responsibility and introduce mechanisms of insurance of non-payment risks for the used energy resources; to provide systematic control over pricing processes in the energy sector; introduce a system of mixed state and market regulation of the activities of energy market entities; to carry out systematic regulatory control over the activity of natural monopolies; increase the share of renewable energy resources in the national energy mix, giving priority to biofuels. The dynamic development of bioenergy requires a comprehensive optimization of this process, taking into account the needs of the energy and food sectors of the economy, as well as state regulation of export of biofuels.

The purpose of the research is to identify a strategy for the development and regulation of biofuels in Ukraine at the competitive level.

The conducted research is based on fundamental principles of economic theory, scientific developments of domestic and foreign scientists on the issues of state and market regulation of the development of competitive biofuel production, as well as the current legislative base of Ukraine. The study used general and specific scientific methods and techniques. In particular, a dialectical method was applied to systematize the historical trends of world and domestic energy development. Priority principles of formation and mechanisms of regulation of energy policy and biofuel production were investigated using the monographic method. The prediction method is used to formulate conceptual bases for regulation and strategy for the development of competitive biofuel production, and abstract-logical - for the implementation of theoretical generalization and formulation of conclusions. The well-known strategic planning tool - SWOT-analysis was used to solve the problem. The methodological underpinnings of SWOT analysis are a comprehensive assessment based on a matrix of interrelationships of the strengths and weaknesses of the industry, as well as a consideration of a range of factors of available opportunities and threats to the environment.

Results and Discussion

The system of urgent problems of rational use of energy resources under conditions of intensive increase of production of foodstuffs, improvement of their qualitative characteristics and formation of food security are among the priority tasks of the world economy. Today, however, an energy crisis that has swept almost the entire world has combined food and energy issues into an interconnected scenario for the continued sustainable development of the planet's future existence. Thus, an increasing number of countries are declaring their interest in accelerating the production of various types of energy from renewable energy sources, and the biofuels industry is now one of the fundamental positions in the economy of any energy-dependent country and in the development of

consumer services and materials markets.

Effective solution of the problem of energy supply is a key, paramount task of a sustainable, ie harmonious with nature and society, development of each state, implementation of its independent foreign policy, internal political and social stability, raising the economic and cultural standard of living of the population. As a consequence, the role of energy in solving sustainable development challenges is growing. The steady rise in world prices for traditional energy and energy produced in recent years has been exacerbated by the impact of the problem of energy supply on these factors, especially in countries with fragile economic status to which Ukraine belongs.

Changes in approaches to the formulation of states' energy policy are taking place in the world: the transition from the outdated model of functioning of the energy sector, dominated by large producers, fossil fuels, inefficient networks, imperfect competition in the markets of natural gas, electricity, coal - to a new model in which creates a competitive environment, equalizes opportunities for development and minimizes the dominance of one of the types of energy production or sources and / or routes of fuel supply. At the same time, it is preferable to increase energy efficiency and use of energy from renewable and alternative sources. This poses new economic and technological challenges for Ukraine, opens new opportunities for finding and implementing innovative developments in the field of fossil fuel production and transformation, transformation, supply and consumption, necessitating the formation of a new state energy policy [10].

The inevitable process of liberalization of prices for energy resources should take place in stages, but in the current unstable economic and political situation, our country is not immune to the trigger effect - a sharp increase in prices, which can lead to shock therapy for the whole economy. At the present stage of development, the disparity in prices for energy, industrial and agricultural products in Ukraine determines the prospect of introducing innovative technologies for the use of plant products. Industrial biofuel production process makes agricultural products analogous to industrial or energy. Given the rather strong potential of the scientific, technical and industrial base in the agricultural sector of Ukraine regarding the cultivation of agricultural biomass, the biofuel industry has a high level of economic efficiency, which gives every reason to allocate it to a separate branch of energy.

The Law of Ukraine “On Alternative Fuels” aims at supporting and developing the production of biofuels. In particular, in Art. 9 of this law states that the organizational and economic measure to increase production (production) and consumption of alternative fuels is to stimulate investment and the introduction of new technologies. The growth of investments aimed at the production of biofuels will be a decisive factor in adjusting the production process, the transition of agricultural enterprises to their consumption and the creation of an economic mechanism to regulate market relations in the field of alternative fuels [11]. Therefore, the regulation of the biofuels industry should be viewed through the prism of optimizing production, finding the most profitable areas of entrepreneurship and rational maneuvering of financial flows. In order to achieve sustainable biofuel production, it is necessary to develop an effective development strategy based on which the high economic efficiency of the bioenergy industry will be achieved and optimal ratios will be created in the domestic and foreign markets. However, the biofuel production process is currently under conditions that are not specific to global market trends and relationships. Regulatory decisions should be avoided in returning to the old framework of the planning and administrative system, with its almost comprehensive planning and tight regulation of the established limits. Addressing the problematic aspects of biofuel production will depend on the coordination of joint action, that is, on political and administrative consolidation in government.

Properly developed managerial strategic decisions on the implementation of energy conversion of biological raw materials contribute to the development of diversification processes in the production activities of the agro-industrial complex, ensure the entry into the market of production of new types of basic and by-products, reduce the negative impact on the environment at the regional and national levels, which results economic and financial condition of the agro-industrial industry and the country as a whole [12].

Therefore, in order to formulate an effective strategy for managing and regulating the processes of bioenergy conversion, a selection of appropriate effective analytical tools has been made, among which SWOT analysis is at the forefront. This kind of analysis is one of the necessary elements of scientific research to create sound prerequisites for the development of different levels of strategic and marketing plans, in particular for the formation of competitive biofuels production in Ukraine. The results of the SWOT analysis (Table 1) make it possible to objectively evaluate the internal forces and resource potential of the industry to realize the potential of the existing external capabilities and to confront the various threats that are constantly emerging in the changing market conditions. As a result of a comprehensive justification of the weaknesses, a system of internal deficiencies is identified that needs immediate elimination or minimization.

Table 1: Matrix of SWOT-analysis of strategy for development and regulation of biofuels production in Ukraine

Indicators of the matrix		Environment	
		Opportunities 1. Energy independence of agro-industrial complex and expansion of consumption of biofuels. 2. Inflow of internal and external investments and development of national production of biofuels. 3. Increasing employment and reducing the negative manifestations of seasonality of production.	**Threats** 1. Traditional energy subsidies and low biofuels consumption. 2. Lack of state support and legal nihilism in the field of bioenergy. 3. Increased competition and higher standards in biofuel production.
Internal environment	**Strengths** 1. Energy dependence and unregulated prices for traditional energy sources. 2. High biomass potential for biofuel production. 3. Reduction of waste accumulation and improvement of environmental situation.	Field of SO 1. Reduction of energy dependence and sustainable development of the agricultural sector of the country's economy. 2. Development of national production of biofuels on the basis of favorable investment climate. 3. Improvement of conditions of agricultural production and ecological situation in the country.	Field of ST 1. Development of the state program of development of biofuel production. 2. Stop the government's lobbying for traditional energy and adopt effective laws on the development of biofuels production. 3. Formation of ecologically clean production on the basis of development of competitive biofuel production.
	Weak sides 1. High energy intensity and cost of agricultural products and seasonality of production. 2. Low level of innovation and investment development. 3. Export of plant products for processing into different types of biofuels.	Field of WO 1. Bringing energy production indices of national production to the world level based on biofuel consumption. 2. Formation of competitive biofuel production on the basis of innovation and investment development. 3. Decrease of export of plant products abroad and increase of employment of the population in the country, especially in the agrarian sector of economy.	Field of WT 1. Low production of competitive agro-industrial products and rising unemployment. 2. Development of Ukraine as a raw material appendage of Europe. 3. Use of fertile lands of Ukraine for biomass cultivation and food security problems.

Source: created by the authors

Thus, at the intersection of the Sectors Strengths - Opportunities sectors, the most effective areas of strategic activity are formed, which provide the comparative advantages of the industry. As we can see, due to the considerable energy dependence of the Ukrainian economy on the import of traditional energy sources, it is strategically necessary to develop national production of biofuels based on the high economically viable biomass potential.

This process will ensure, first and foremost, the energy independence of the country's agro-industrial complex, expanding further the consumption of biofuels in other sectors of the national economy. Secondly, based on the creation of a favorable investment climate, there will be an inflow into the agricultural sector of domestic and foreign investment economies, which will allow the export of biofuels to the European energy market in the future. Thirdly, the formation of a competitive biofuel industry will help increase the employment rate of rural population and reduce the seasonality of agricultural production, as well as create real prerequisites for reducing waste accumulation and improving the environmental situation in the regions and in Ukraine as a whole.

An assessment of the Strengths - Threats sector indicates the feasibility or refusal of the further development of the area of activity or industry in question. The process of forming a competitive national biofuel production requires the development of a state support program to increase the pace of development of the biofuels industry, to end the government's lobbying of traditional energy in the form of subsidies and to minimize the problem of food security in Ukraine.

A study of the Weaknesses - Opportunities sector creates the prerequisites for identifying key challenges that need to be effectively addressed, as unfulfilled opportunities can translate into potential threats. As a result, the development of competitive biofuel production in Ukraine needs to be carried out on the basis of innovation and investment development, which will allow to reduce or stop the export of vegetable raw materials for processing to biofuels abroad and will provide a rational process of energy use with bringing the energy production indicators to the level of energy intensity. .

It also requires a thorough analysis of the Weaknesses - Threats sector, where emerging relationships create various risks that can halt the industry's development and lead to a loss of production and subsequently to bankruptcy. In this case, the main risks are related to the low level of production of competitive agro-industrial products, the further development of Ukraine as a raw material appendage of the European Union, the increasing risk of using fertile land of Ukraine for biomass production.

In the process of becoming biofuel production in market conditions, its financing should be made on the basis of internal and external resources. Internal resources include active savings of the owner, which are directed to the creation and development of the biofuel business; current receipts to support existing production and further depreciation. External resources include received funds from various financial institutions (banks, credit and investment companies), as well as funds that may come from business colleagues, stakeholders, sponsors, etc.

According to the Law of Ukraine “On the Principles of State Regulatory Policy in the Field of Economic Activity”, six basic principles of state regulatory policy have been established: 1) expediency; 2) adequacy; 3) efficiency; 4) balance; 5) predictability; 6) transparency and consideration of public opinion [13]. In order to form and develop competitive biofuel production in Ukraine, we are offered to use, in addition to the above-mentioned principles of state regulatory policy, principles based on system-wide properties (Table 2).

Table 2: Characterization of proposed regulatory principles and system-wide properties for competitive biofuel production

The essence of the proposed principles of regulation	The essence of system-wide properties
1. Funnels - the persistence of accounting policies used to compare reporting information. 2. Flexibility - the ability to change their directions in the process of business planning due to the emergence of unforeseen circumstances and adaptation to market requirements. 3. Homeostatic - the creation of economic and organizational mechanisms of self-regulation and stabilization in the production system, so that it is able to perform its functions in a stable manner within the tolerances and withstand dysfunctional influences. 4. Synergism - the use of several mutually agreed methods (strategies) has a greater effect than the sum of the effects of the isolated application of each method (strategy). 5. Competencies - the presence of special professional knowledge, skills and professional experience acquired as a result of professional training and professional activity.	1. System unity - is ensured by close links between technological processes of biofuel production (from the formation of raw materials to the sale of finished energy products to consumers); 2. Development - based on the expansion and improvement of the production of various types of biofuels and the formation of their competitive production in the long term in both the internal and external markets for energy. 3. Complexity - due to the integrated use of raw materials for the introduction of waste-free technologies in the production of biofuels. 4. Compatibility - is ensured by the joint operation of production systems on the basis of traditional energy carriers, biofuels analogues and their mixtures in different ratios. 5. Invariance - creation of universal or typical energy systems that provide a continuous process of increasing the share of biofuels consumption in the structure of national energy consumption. 6. Information unity - providing objective information on the economic, energy and socio-environmental characteristics of consumption of traditional and biological fuels.

Source: created by the authors

The direct implementation of these principles and system-wide properties in the fuel and energy complex of our country must be carried out at three main levels of management: macro-, meso- and micro-levels. At the macro level, it is necessary to ensure a system-wide change in national energy consumption, increasing the share of the use of renewable energy sources, in particular biofuels. On the mezzanine level, the consumption of biofuels is increased in the context of natural and economic regions, taking into account the regional structure of consumption of traditional energy sources (principles of behavioral economy). At the micro level there is a thorough analysis of the indices of local energy supply in each region and the possibilities of realizing economically feasible biofuel production potential.

Indirect stimulation of competitiveness in the field of biofuel production will be achieved on the basis of tax rebates on investments in the active part of fixed capital, reduction of the term of depreciation, introduction of tax incentives in financing scientific works of research institutes, insurance of risks and insurance of risks. An important role in the structural changes of the economy will be played by the introduction of the contract system, whose functions and methods in a market economy are gaining new meaning. Government institutions order the required products (services), at market prices. Instead, private capital may lease to the state factories, factories, equipment, research centers, etc.

One of the main directions of improvement of domestic biofuel production is a balanced process of its transfer to the path of intensification and innovation-investment development, ensuring optimization of acreage for the formation of raw materials base. By developing a sound and scientifically sound economic support system, the cost of producing biofuels can be reduced. The use of agricultural products for the production of biological energy will increase the consumption of

cheap renewable energy, thereby increasing national competitiveness.

Therefore, increasing the energy efficiency of the national economy requires that in the shortest possible time a set of priority measures will be implemented that will allow: to make the transition to competitive internal and external energy markets by forming an efficient internal infrastructure; to use transparent market rules of activity in the field of energy; increase the level of financial discipline and responsibility for ensuring timely calculations for the use of energy resources, as well as preventing barterization; introduce mechanisms of insurance of non-payment risks; ensure systematic control over pricing processes in the energy sector; introduce a system of mixed state and market regulation of the activity of the subjects of energy markets; apply systematic control over the activity of natural monopolies by the regulatory body; to increase the share of renewable energy sources in the national energy consumption structure, giving priority to biological fuels.

Conclusions

Thus, based on the conducted SWOT-analysis and the results of the research, a comprehensive mechanism for increasing the rate of industrial production of biofuels in Ukraine at a competitive level was formed, which contains the following priority regulatory measures: 1) technology transfer and innovation; 2) harmonization of the legal framework with the European Union; 3) implementation of energy saving and energy efficient technologies; 4) proper consulting and audit; 5) attracting highly qualified personnel; 6) cluster approaches; 7) ensuring the principles of nature protection; 8) development of foreign economic activity in the biofuel sector, etc. Adherence to the existing and developed strategic principles of the state regulatory policy will ensure intensive development and development of competitive biofuel production in Ukraine, create favorable conditions for attraction to the agro-industrial complex of external and internal investment revenues, introduction of the latest innovative technologies and modern economic activities production.

The strategy of state regulation of the development of competitive biofuel production in Ukraine envisages the process of complex application of the basic methods of regulation. The main economic will include: the cessation of subsidizing traditional energy sources; reduction of bank lending rates for producers and consumers of biofuels; exemption from taxation of part (at least 50%) of the profit received from the consumption of biofuels; introduction of innovations and attraction of investments). Legal methods will include: the adoption of an environmental tax on emissions of harmful substances from the consumption of traditional energy sources; creation of central and regional bodies of state executive power for production and consumption of biofuels; adopting a differentiated approach in increasing the addition of bioethanol and biodiesel to gasoline and diesel, giving priority to bioethanol. Administrative methods should ensure: the introduction of a state duty or limits on the export of bioenergy raw materials; development of European Union harmonized state standards and certification in the biofuels industry; licensing of consulting and auditing firms; adopting differentiated standards for production and consumption of biofuels in the context of regions and natural and economic areas of Ukraine.

The development of biofuel production is essential for the restructuring of the fuel and energy complex and the further integration of Ukraine into the EU. It is necessary to develop a set of measures for implementing economic policy in the field of bioenergy in order to achieve a radical revival in the implementation of innovations and to create effective incentives for spreading the innovative model of economic behavior of Ukrainian business. Increasing the rate of development of the bioenergy industry in our country makes it possible to comprehensively solve a number of energy, economic and environmental problems.

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