LEGAL REGULATION OF ALTERNATIVE ENERGY IN UKRAINE: PROBLEMS AND PROSPECTS

Scientific monograph

Львів – Торунь
Liha-Pres
2024

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Legal regulation of alternative energy in Ukraine: problems and prospects : Scientific monograph. Львів – Торунь : Liha-Pres, 2024. 252 p.

ISBN 978-966-397-417-0

CONTENTS

DOI https://doi.org/10.36059/978-966-397-417-0-1

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CHAPTER 1. USE OF ALTERNATIVE ENERGY SOURCES IN UKRAINE: THEORETICAL, LEGAL AND LEGISLATIVE FRAMEWORK

1.1. Alternative energy law as a legal institution, science and academic discipline

Saving energy resources and improving the use of alternative energy sources are the most relevant and promising global trends of our time. Today, energy security is one of the main components of national security, and Ukraine's energy sector is an economic guarantee of state sovereignty and independence, an element of good governance, a reliable basis for sustainable development of a competitive economy and an integral part of the European energy space. A definitive understanding of the need to switch to renewable energy sources has become a new slogan in recent years. While back in the 1990s it seemed like a distant future, in the early 2000s international political and business circles began to understand the prospects of this trend for the coming decades. Nowadays, it is a reality for many European countries, and Ukraine is trying to join it, sometimes quite successfully.

Since 24 February 2022, after the start of Russia's full-scale war against Ukraine, the national power system has faced perhaps the most serious test: disconnection from the aggressor's power system and ensuring stable operation in the face of hostilities. The country's energy infrastructure has suffered significantly due to the actions of the Russian army, including renewable energy facilities. While before the war, Ukraine's energy system was tending towards "green" indicators, with about 70% of its generation coming from carbon-free sources, and very ambitious plans to gradually replace a certain part of coal and even gas generation with renewable sources, today the country's energy security is a top priority. The martial law has made adjustments to the regulation of social relations in this area, but has not destroyed the desire to make the Ukrainian energy sector less dependent on fossil fuels and more sustainable. Even today, amid the war, green generation continues to develop, but at a slightly slower pace.

Therefore, the introduction and widespread use of renewable energy in Ukraine as a guarantee of national security and sustainable environmental development of the country directly depends on the state of the relevant energy sector, its modernization and integration of the Ukrainian infrastructure and regulatory and legislative framework with the EU.

Today, alternative energy is a rapidly developing area of social relations that requires timely and adequate evolution of this category as a legal institution, science and academic discipline.

As an independent legal institution, alternative energy law is a set of legal norms enshrined in energy legislation and regulating social relations regarding the use of non-fossil (renewable) energy sources, namely solar, wind, aerothermal, geothermal, hydrothermal, wave and tidal energy, hydropower, biomass energy, gas from organic waste, gas from sewage treatment plants, biogas for electricity production, compliance with the principles of sustainable development and the protection of the environment.

The issue of legal regulation of alternative energy does not belong to traditional, well-studied areas of social relations. On the contrary, the rapid development of technology, which has made it possible to generate energy from renewable sources on a completely competitive basis, has raised the question for scientists, lawmakers and practitioners about the need to quickly choose a legal model and specific legal mechanisms for regulating these relations. Fifteen years ago, Ukraine was only talking about the need to start using energy from alternative sources, and initial, basic legal provisions were being created that would form the basis of a protectionist legal model for regulating these relations. Ukraine is already in the process of actively developing and building a network of alternative energy facilities.

As an independent legal institution, alternative energy law is characterized by certain features inherent in it due to the specifics of social relations regulated by its provisions. Thus, the following features can be distinguished:

– *ensuring rational use of natural resources,* which is manifested in the reduction of the use of fossil fuels in electricity generation and production. This feature of the legal institution helps to prevent the depletion of natural resources such as coal, gas and oil, and also helps to stop the process of their complete exhaustion. In addition, those natural resources that are directly used in the location of alternative energy facilities, such as land, water bodies, etc., are also subject to rational use;

– *guaranteeing sustainable environmental development,* as a result of which legal norms on the use of alternative energy sources ensure compliance with international and national criteria for a harmonious combination of social,

economic and environmental aspects of society. Sustainable development is the key to the existence of the ecosystem as a whole;

– *ensuring decarbonization of production* through the use of environmentally friendly energy sources, reducing the share of fossil fuels in the total energy supply. Decarbonization is the number one goal in implementing the strategy of transforming Europe into a climate-neutral continent;

– *ensuring energy security as a component of national security*, the relevance of which has been once again emphasized by the ongoing war in the country. The need to have a strategic reserve of energy carriers and electricity ready for consumption is a guarantee of Ukraine's energy independence, the issues of which have become particularly acute after the full-scale invasion of Russia;

– *promoting the development of the energy sector on a market basis*, which is manifested in the adoption of a special Law of Ukraine "On the Electricity Market", the introduction of a "green" tariff, and the procedure for auctioning alternative energy produced.

To perform its functions, science must be ahead of the actual course of social relations. Its task should be to develop optimal legal models so that when social relations are in dire need of proper legal regulation, the lawmaker can use scientifically sound conceptual developments. If a scientific doctrine is built in parallel with the development of social relations, it is more difficult for it to fulfil its predictive functions. The worst case is when the scientific community does not anticipate but rather catches up with the needs of society for research. In this case, there is no adequate scientific response to the public demand, and the legal framework for new relations is built without a conceptual basis. Unfortunately, there are many examples of this scenario, and the consequences are predictable. For the most part, such legal regulation is doomed to permanent changes in order to correct the legal defects.

Alternative energy is a rapidly developing area of social relations that requires timely and adequate evolution of not only legal regulation, but also scientific thought, which takes into account the changing actual conditions, needs and problems of the industry. A characteristic feature is that only the period of Ukraine's independence should be recognized as the period of scientific study of legal relations in the field of alternative energy. Such a relatively short period of time is also heterogeneous, since scientific attention to alternative energy legal issues became noticeable only in the 2000s. The short history of the development of legal doctrine in the field of alternative energy regulation explains many of its current problems. In particular, due to the youth of this legal institution, scientific research in the field of legal regulation of alternative energy has such an imperfect and

almost non-existent scientific and methodological basis. At the same time, there is an increase in the number of scholarly references to various issues of legal support for alternative energy. We can predict a further increase in the number of studies in this area, given the rapid development of relevant social relations.

The content aspect is complex and is represented by several characteristic features of the development of research in the field of alternative energy:

a) an important leitmotif of modern research is *the fulfilment of international legal obligations and harmonization with EU legislation in the field of alternative energy*. Indeed, the signing of the Association Agreement with the EU has had a large-scale, long-term impact on the development of modern Ukrainian legislation, including in the field of alternative energy regulation. Thus, the Agreement stipulates that the parties are committed to "promoting energy efficiency and the use of renewable energy sources" and "shall make efforts to facilitate and encourage trade and foreign direct investment in ... the use of balanced sources of renewable energy and energy-saving products"[1]. The agreement provides for mutual cooperation in the development and "support of renewable energy, taking into account the principles of economic feasibility and environmental protection, as well as alternative fuels, including sustainable biofuel production and cooperation in the field of regulatory issues, certification and standardization, as well as technological and commercial development"[2].

Given the fact that the EU is rapidly moving towards the implementation of the proclaimed Green Deal, the implementation of the Fourth Energy Package entitled "Clean Energy for All Europeans" is of particular interest, one of the objectives of which is to create a modern design for the European energy market adapted to the new realities – more flexible and adapted to integrate a larger share of renewable energy sources. In other words, the EU is confidently moving towards further modification of the regulatory environment in order to adequately regulate the relations of alternative energy, which already account for 30% of the energy market in the Union. Ukraine also demonstrates the growth of the alternative energy sector,

[1] Про ратифікацію Угоди про асоціацію між Україною, з однієї сторони, та Європейським Союзом, Європейським співтовариством з атомної енергії та їхніми державами-членами, з іншої сторони: Закон України від 16 вересня 2014 року. *Відомості Верховної Ради України*. 2014. № 40. Ст. 2021.

[2] Про ратифікацію Угоди про асоціацію між Україною, з однієї сторони, та Європейським Союзом, Європейським співтовариством з атомної енергії та їхніми державами-членами, з іншої сторони: Закон України від 16 вересня 2014 року. *Відомості Верховної Ради України*. 2014. № 40. Ст. 2021.

namely: according to the Ministry of Energy of Ukraine, the share of renewable energy production in Ukraine in January-August 2020 doubled compared to the same period last year and amounts to 13.3% in the country's overall energy balance (information on the operation of the electricity sector in August 2020).

It should be acknowledged that the demonstrated growth is not identical to the European one, nor is the level achieved. That is why the expediency of legal research aimed at analyzing EU legislation and ways to harmonize national legislation is not in doubt, but the following should be taken into account. Blind, scientifically unsupported copying of European legislation without elaboration of scientific and methodological principles may lead to problems of conflict of this legal body in the national legal system of Ukraine. This is not only a theoretical problem – it is a problem of compliance of law with the real state of social relations;

b) *a large proportion of research is devoted to the argumentation of the need to switch to alternative energy*. The arguments provided are of different nature: economic (feasibility, profitability, payback periods, profitability, etc.), environmental (level of negative impact on the environment, reduction of the required use of traditional fuels, conservation of non-renewable natural resources, etc.), technological (use of new technical solutions, emergence of the latest scientific and technical developments, etc.). Of course, lawyers must rely on objective data from other sciences (natural, environmental, economic, technical, etc.). This basis firmly ties legal research to real processes in social practice and prevents legal research from losing its social benefit. However, it should not be forgotten that legal analysis cannot be limited to stating these facts and recounting them. A significant part of the research on alternative energy, which is positioned as legal, is not so in its content, since it does not analyze legal issues, but rather issues of a completely different sectoral nature. The use of the achievements of other sciences should be used by lawyers as a basis for the relevance of the topic, as an important argument for the growing social importance of the relevant relations and the need for their adequate legal regulation. From this perspective, legal research is only enriched with factual data, gains the necessary relevance and confirms its timeliness. At the same time, the results of other sciences cannot replace legal research, including in the field of alternative energy regulation;

c) since alternative energy relations are a relatively new subject of legal research, *comparative legal studies make up a significant proportion of research in this area*. Much attention is paid to the analysis of foreign experience in legislative support for alternative energy. Particular emphasis is placed on legislative incentives for alternative energy in the EU (Germany, Denmark, Czech Republic, etc.), the USA and other countries.

While generally praising the intensification of such research, it should be emphasized that it is of a supplementary nature. It should not be forgotten that even within the EU, different countries have chosen their own legislative tactics to stimulate alternative energy, taking into account their own resources, local conditions and legal traditions. Comparative legal studies are extremely interesting for understanding the variety of ways of possible legislative stimulation of alternative energy development, identifying the most successful and unsuccessful legal strategies in this area. The results of such studies can be actively used as an important tool in the development of our own national doctrine of legal regulation of alternative energy, but cannot replace this doctrine;

d) *sectoral fragmentation*. This is manifested in the fact that alternative energy relations are studied in different branches of legal science. The reform of the energy sector in Ukraine, which is heavily influenced by the Association Agreement with the EU, is increasingly defining the framework of a fully formed branch of legislation – the energy legislation of Ukraine. These processes are not fully reflected in the scientific literature, as energy relations are mostly studied in a fragmented manner – from the perspective of certain branch legal sciences. In particular, representatives of commercial law are quite active in studying energy relations. For example, research was conducted on the legal issues of alternative energy, and G. D. Dzhumageldieva defended her dissertation on "Legal Support of Energy Saving"[3], O. I. Kulyk on "Economic and legal support of stimulation of energy production using alternative sources"[4], E. Rybnikova on "Economic and legal incentives for the use of renewable energy sources in Ukraine"[5]. All of these studies naturally focus on the economic and legal aspects of alternative energy activities. This directly explains the neglect of the environmental and legal component of these relations. That is why economic and legal studies cannot claim to exhaust the topic of legal regulation in the field of alternative energy.

The doctrine of legal support for alternative energy is also complemented by international legal studies, in particular, the dissertations of S. D. Bilotskyi on "International Legal Regulation in the Field of

[3] Джумагельдієва Г. Д. Правове забезпечення енергозбереження: автореф. дис. … докт. юрид. наук 12.00.04. Донецьк, 2012. 32 с.

[4] Кулик О. І. Господарсько-правове забезпечення стимулювання виробництва енергії з використанням альтернативних джерел: автореф. дис. … канд. юрид. наук 12.00.04. Вінниця, 2019. 19 с.

[5] Рибнікова Е. Ю. Господарсько-правове стимулювання використання відновлюваних джерел енергії в Україні: автореф. дис. … канд. юрид. наук 12.00.04. Одеса, 2018. 20 с.

Environmentally Oriented Energy”[6], M.V. Chipko “International Legal Regulation of Cooperation of States in the Field of Renewable Energy Use”[7] and Y. S. Benedyk on the topic “Organizational and legal mechanism of international cooperation in the field of renewable energy sources”[8]. In their research, scholars focus primarily on the international legal regulation of alternative energy relations and Ukraine’s commitments in this area.

It is necessary to emphasize the significant achievements of scientists – representatives of land, agrarian, environmental and natural resource law. An interesting study, which was one of the first in the field of legal support for alternative energy in Ukraine, should be recognized as the thesis of O. B. Kishko-Yerli on “Legal regulation of the use of renewable energy sources”[9]. The research has a natural resource law bias. The author has thoroughly researched the issues of terminology, ownership and use of renewable energy sources, promotion of their use and public administration in this area. The author concludes that there is an institution of renewable energy sources in the natural resource law of Ukraine, and formulates proposals for improving Ukrainian legislation.

In recent years, interesting dissertations on agrarian law have been defended, in particular: Y. Rud on “Legal regulation of energy saving in agriculture of Ukraine”[10], C.A. Obolenska on “Legal regulation of biofuel production by agricultural producers in Ukraine”[11] and A. V. Pastukh on “Legal regulation of cultivation and processing of agricultural raw materials for biofuel production”[12].

In addition, there is a large body of administrative and legal research on energy relations, which in some way affect the relations of alternative

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[6] Білоцький С. Д. Міжнародно-правове регулювання у сфері екологічно орієнтованої енергетики: автореф. дис. ... докт. юрид. наук : 12.00.11. Київ, 2016. 40 с.

[7] Чіпко М. В. Міжнародно-правове регулювання співробітництва держав у сфері використання відновлюваної енергетики : автореф. дис. ... канд. юрид. наук : 12.00.11. Одеса, 2017. 23 с.

[8] Бенедик Я.С. Організаційно-правовий механізм міжнародного співробітництва у сфері використання відновлюваних джерел енергії:автореф. дис. … канд. юрид. наук: 12.00.11. Харків, 2016. 21 с.

[9] Кишко-Єрлі О. Б. Правове регулювання використання відновлюваних джерел енергії : автореф. дис. ... канд. юрид. наук : 12.00.06. Київ, 2010. 16 с.

[10] Рудь Ю. М. Правове регулювання енергозбереження у сільському господарстві України : автореф. дис. … канд. юрид. наук : 12.00.06. Київ, 2015. 17 с.

[11] Оболєнська С. А. Правове регулювання виробництва біопалива сільськогосподарськими товаровиробниками в Україні : автореф. дис. ... канд. юрид. наук : 12.00.06. Харків, 2017. 20 с.

[12] Пастух А. В. Правове регулювання вирощування та перероблення сільськогосподарської сировини для виробництва біопалива: автореф. дис. ... канд. юрид. наук : 12.00.06. Київ, 2017. 18 с.

energy. These include, in particular, dissertations by Y. V. Vashchenko[13](2015), O. M. Gubrienko[14] (2006), N. M. Kovalko[15] (2007), V. V. Korobkin[16] (2015), O. E. Kostrubitska[17] (2009), V. M. Kostiukhina[18] (2010), R. I. Kramar[19] (2011), N. V. Maidanevych[20] (2015), A. M. Novytskyi[21] (2005), R. I. Raimov[22] (2019), R. S. Serhiiev[23] (2010), O. V. Serdiuchenko[24] (2009) and others.

On the one hand, such a wide range of sectoral studies is a positive factor, as it allows us to consider various aspects of alternative energy relations. However, the fragmentation of such studies should be recognized as a negative consequence. The legal regulation of alternative energy as a structural part of energy law adopts its characteristic feature – complexity.

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[13] Ващенко Ю. В. Державне регулювання у сфері енергетики України: адміністративно-правовий аспект: автореф. дис. … докт. юрид. наук 12.00.07. Київ, 2015. 36 с.

[14] Губрієнко О.М. Організаційно-правові засади державного управління в галузі електроенергетики в Україні: автореф. дис... канд. юрид. наук: 12.00.07. Ірпінь, 2006. 20 с.

[15] Ковалко Н.М. Фінансово-правове регулювання спеціальних режимів розрахункових відносин (на прикладі паливно-енергетичного комплексу України): автореф. дис... канд. юрид. наук: 12.00.07. К., 2007. 20 с.

[16] Коробкін В. В. Адміністративно-правове регулювання енергопостачання в Україні: автореф. дис. ... канд. юрид. наук : 12.00.07. Запоріжжя, 2015. 18 с.

[17] Коструб'ицька О.Є. Адміністративна відповідальність за правопорушення в паливно-енергетичному комплексі України: автореф. дис. ... канд. юрид. наук: 12.00.07. Київ, 2009. 19 с.

[18] Костюхіна В. М. Організаційно-правові засади галузевого управління: на прикладі електроенергетики: автореф. дис. ... канд. юрид. наук : 12.00.07. Київ, 2010. 20 с.

[19] Крамар Р. І. Адміністративно-правова протидія марнотратному витрачанню паливно-енергетичних ресурсів в Україні: автореф. дис. ... канд. юрид. наук : 12.00.07. Львів, 2011. 19 с.

[20] Майданевич Н. В. Адміністративно-правове регулювання відносин у сфері електроенергетики: автореф. дис. ... канд. юрид. наук : 12.00.07. Київ, 2015. 19 с.

[21] Новицький А. М. Організаційно-правові засади державного управління у паливно-енергетичному комплексі України: автореф. дис... канд. юрид. наук: 12.00.07. Ірпінь, 2005. 19 с.

[22] Раімов Р. І. Адміністративно-правове регулювання діяльності суб'єктів природних монополій у сферах енергетики та комунальних послуг: автореф. дис. ... канд. юрид. наук : 12.00.07. Суми, 2019. 20 с.

[23] Сергєєв Р. С. Засоби забезпечення раціонального використання і збереження електричної енергії в Україні (адміністративно-правовий аспект) : автореф. дис. ... канд. юрид. наук : 12.00.07. Дніпропетровськ, 2010. 20 с.

[24] Сердюченко О. В. Адміністративно-правові засади забезпечення енергетичної безпеки України: автореф. дис... канд. юрид. наук: 12.00.07. Київ, 2009. 20 с.

Based on the analyzed features of the development of scientific thought in the area of legal regulation of alternative energy relations, several characteristic trends in the development of legal science in this area can be identified.

– The first trend is *the rapid intensification of scientific research*. The pattern of the scientific community's attention to the legal problems of alternative energy is quite clear: a) in the 1990s, sporadic scientific research was devoted to alternative energy issues; b) in the 2000s, a significant number of publications appeared, mainly articles and reports on the legal regulation of alternative energy; c) in the 2010s, scientific research was supplemented by a number of dissertations in various branches of legal knowledge. We believe that the next step will be to study the relevant complex legal relations as a whole.

– The next trend is *the intensification of European integration processes*, which is manifested in the Europeanisation of domestic energy legislation and doctrine. If the chosen political course is maintained, Ukrainian legal science will quite predictably deepen the study of European legislation in the field of alternative energy with a view to imitating it in the domestic legal realities. However, in our opinion, in the interests of preserving the Ukrainian legal culture, this perspective should be analyzed critically. On the positive side, science has a certain idealistic model to which it constantly refers and looks up to. However, a negative consequence may be a certain atrophy of domestic science as a result of abandoning its own legal developments, reducing scientific research to blind copying of foreign (even if positive) experience. The fact that this negative process has already started is confirmed by the concentration of domestic scholars solely on legislation and comparative legal studies, combined with almost complete disregard for the need to build the theoretical and methodological foundations of legal regulation of alternative energy relations. It is the absence of a unified methodological framework for the regulation of these relations that is the most significant evidence that the national scientific doctrine of legal regulation of alternative energy has not yet been formed. This conclusion is reinforced by the revealed sectoral fragmentation of studies that do not cover the subject as a whole, but analyze only certain parts of it [25].

In view of the above, the following interim conclusions can be drawn. Firstly, the development of scientific thought in the field of legal regulation of alternative energy in Ukraine demonstrates several characteristic

[25] Харитонова Т. Є., Григор'єва Х. А. Доктрина правового регулювання альтернативної енергетики в Україні: сучасні тенденції розвитку. *KELM (Knowledge, Education, Law, Management).* 2020. № 3 (31). С. 238–245.

features, including: 1) in the methodological aspect – an acute shortage of scientific and methodological developments; 2) in the terminological aspect – a rather short period of research in this area (limited to the period of Ukraine's independence); 3) in the substantive aspect – a) focus on harmonization with EU legislation b) a significant proportion of comparative legal research; c) a significant number of essentially non-legal studies aimed at proving the need and feasibility of transition to alternative energy; d) sectoral fragmentation.

Secondly, the identification of these features makes it possible to identify the main trends in the development of modern legal science dealing with alternative energy, namely: a) the tendency to intensify scientific research in this area; b) the tendency towards European integration.

Thirdly, based on the results of the analysis, it can be stated that the national doctrine of legal regulation of alternative energy in Ukraine is at the stage of formation.

Fourthly, the reform of the energy sector in Ukraine, which is heavily influenced by the Association Agreement with the EU, is increasingly clearly defining the framework of a fully formed area of legislation – the energy legislation of Ukraine. These processes are not fully reflected in the scientific literature, as energy relations are mostly studied in a fragmented manner – from the perspective of certain branch legal sciences. Legal regulation of alternative energy should be considered as a component of the energy law system of Ukraine.

The system of alternative energy law as an academic discipline is a body of knowledge, generalizations and information about the main provisions and content of the energy sector in terms of the use of renewable energy sources, which are taught for the purpose of training professional legal scholars. Guided by the curriculum, the academic discipline taught may differ in the amount of information from the information about the legal institution of alternative energy law. At the same time, the discipline under study is closely related to the system of science.

The main provisions studied in the general part of alternative energy law are the historical aspects and periodization of the formation and development of the renewable energy industry, the main stages and trends in the functioning of energy legislation. The special part deals with the issues of legal regulation of production and use of energy derived from alternative sources (solar, wind, aerothermal, geothermal, hydrothermal, wave and tidal energy, hydropower, biomass energy, gas from organic waste, gas from sewage treatment plants, biogas).

1.2. Development of legislation in the field of alternative energy sources in Ukraine

The formation of a system of effective legislation on the use of alternative energy sources in Ukraine is a long-term, step-by-step process which reflects, first of all, the nature of development of social relations in the State, the level of development of its economy, and important international events. Based on the analysis of the historical experience of regulating these energy relations and an objective assessment of the regulatory framework of previous years, the author has made a chronology of the development of legislation in the field of alternative energy sources in Ukraine, according to which five main stages have been identified.

The stage of emergence and development of legislation on the use of alternative energy sources (1994 – 1999). It is characterized by the adoption of the basic Laws of Ukraine "On Energy Saving" and "On Electricity", which laid the foundations for the legislative support of the energy system, including its integral component – alternative energy. Thus, the Law of Ukraine "On Energy Saving", adopted by the Verkhovna Rada of Ukraine on 1 July 1994, was one of the first major regulatory acts to define the system of legal, economic, social and environmental foundations for energy saving for all business entities located in Ukraine, as well as for citizens[26]. The value of this Law was that it was the first to define non-traditional and renewable energy sources at the legislative level and to set out measures to encourage energy saving (including for the development of alternative energy).

To achieve the goals set out in the Law of Ukraine "On Energy Saving", the State Committee of Ukraine for Energy Saving was established by a Presidential Decree on 6 October 1995, with one of its tasks being to coordinate the development and use of non-traditional and renewable energy sources.

The foundations for the development of alternative energy generation in Ukraine were also laid by the adoption of the Law of Ukraine "On Electricity" of 16 October 1997[27]. Its provisions provide for measures to stimulate the production of electricity from alternative sources, including the establishment of a "green" tariff for business entities, i.e. a special tariff at which electricity produced at electricity facilities from alternative energy sources is purchased. Currently, this regulatory act has ceased to be effective pursuant to clause 23 of Section XVII "Final and Transitional Provisions" of the Law of Ukraine "On the Electricity Market" of 13 April 2017.

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[26] Про енергозбереження: Закон України від 1 липня 1994 року. *Відомості Верховної Ради України*. 1994. № 30. Ст. 283 *(втратив чинність 13.11.2021 року)*

[27] Про електроенергетику: Закон Україна від 16 жовтня 1997 року. *Відомості Верховної Ради України*. 1998. № 1. Ст. 1 *(втратив чинність 01.07 2019 року)*

A significant step in the development of relations for the rational use of energy resources was the adoption of the Resolution of the Cabinet of Ministers of Ukraine "On the State Programme "Environmentally Friendly Geothermal Energy of Ukraine" dated 17 January 1996[28]. In order to meet the needs of the national economy in electricity, introduce non-traditional and renewable energy and fuel sources, and make more efficient use of the production capacities of machine-building and military-industrial enterprises, the Government of Ukraine adopted a resolution of 3 February 1997 approving a comprehensive programme for the construction of wind power plants[29].

The increase in electricity and heat resources through the use of non-traditional and renewable energy and fuel sources was envisaged by the Comprehensive State Programme for Energy Saving of Ukraine, which was approved by the Cabinet of Ministers of Ukraine on 5 February 1997[30].

In view of the above, since 1994, the first stage of the emergence and development of legislation on the use of alternative energy sources has been launched in our country. A characteristic feature of the regulatory acts of this stage was a high degree of generalization of their provisions and the absence of special legislation that would regulate relations in the field of alternative energy sources[31].

The next *stage of formation of legislation on the use of alternative energy sources* (2000-2011) is characterized by the adoption of special legislation in the field of alternative energy. Adoption of the Law of Ukraine "On Alternative Fuels" of 14 January 2000[32] allowed to define the legal, social, economic, environmental and organizational principles of production (extraction) and use of alternative fuels and to provide for an economic incentive mechanism in the field of alternative fuels. In pursuance

[28] Про Державну програму "Екологічно чиста геотермальна енергетика України": Постанова Кабінету Міністрів України від 17 січня 1996 р. № 100. URL: https://zakon.rada.gov.ua/laws/show/100-96-п#Text

[29] Про Комплексну програму будівництва вітрових електростанцій: Постанова Кабінету Міністрів України від 3 лютого 1997 р. № 137. Офіційний вісник України. 1997. № 8. код акта 228/1997

[30] Про Комплексну державну програму енергозбереження України: Постанова Кабінету Міністрів України від 5 лютого 1997 року № 148. *Офіційний вісник України*. 1997. № 6. Ст. 945.

[31] Платонова Є.О. Розвиток законодавчого регулювання альтернативної енергетики в Україні. *Актуальні проблеми юридичної науки*: збірник тез Міжнародної науково-практичної конференції "Дев'ятнадцяті осінні юридичні читання" (м. Хмельницький, 23 жовтня 2020 року). Хмельницький: Хмельницький університет управління та права імені Леоніда Юзькова, 2020. С.324-327.

[32] Про альтернативні види палива: Закон України від 14 січня 2000 року: *Відомості Верховної Ради України*. 2000. № 12. Ст. 94.

of this Law, the Cabinet of Ministers of Ukraine adopted the Resolution "On the Procedure for Issuing Certificates of Alternative Fuels" of 5 October 2004[33] and the Order of the State Committee for Energy Saving of Ukraine "On Approval of the Procedure for Conducting Expert Evaluation to Confirm the Fuel as an Alternative" of 10 December 2004[34], which established the mechanism for conducting an expert examination to determine the characteristics of fuel to confirm its classification as an alternative fuel and the procedure for obtaining and form of a certificate of classification as an alternative fuel.

A significant event was the adoption of the Law of Ukraine "On Alternative Energy Sources" of 20 February 2003, which defines the legal, economic, environmental and organizational aspects of using alternative energy sources and promoting their use in the fuel and energy complex[35]. According to the current legislation, the concept of "alternative energy sources" is broader than "renewable energy sources", as it includes not only environmentally friendly renewable sources, but also secondary energy resources.

Despite the importance of their functioning, the Laws of Ukraine "On Alternative Energy Sources" and "On Alternative Fuels" were basically declarative, did not provide for financial support and competitive mechanisms for the development of alternative energy sources, and established unreasonable bureaucratic obstacles[36].

The following laws were adopted to improve the legal framework for alternative energy: "On Amendments to Certain Legislative Acts of Ukraine on Stimulation of Energy Saving Measures" of 16 March 2007[37]; "On Amendments to Certain Laws of Ukraine on Establishment of the Green

[33] Про порядок видачі свідоцтва про належність палива до альтернативного: Постанова Кабінету Міністрів України від 5 жовтня 2004 р. № 1307. *Офіційний вісник України*. 2004. № 40. Ст. 2633.

[34] Про затвердження Порядку проведення експертизи для підтвердження належності палива до альтернативного: Наказ Державного Комітету України з енергозбереження від 10 грудня 2004 року № 183. *Офіційний вісник України*. 2004. № 52. Ст. 3474.

[35] Про альтернативні джерела енергії: Закон України від 20 лютого 2003 року. *Офіційний вісник України*. 2003. № 12. Ст. 522.

[36] Балюк Г. І., Сушик О. В. Відновлювальна енергетика в Україні: правові питання. *Конституційні засади аграрного, земельного та екологічного права: 20 років розвитку*: Матер. "круглого столу" (м. Київ, 27 трав. 2016 р.). Чернівці: Вид. Кондратьєв А. В., 2016. С. 247–251.

[37] Про внесення змін до деяких законодавчих актів України щодо стимулювання заходів з енергозбереження: Закон України від 16 березня 2007 року. *Відомості Верховної Ради України*. 2007. № 23. Ст. 301.

Tariff" of 25 September 2008[38]; "On Amendments to Certain Laws of Ukraine on Promotion of Production and Use of Biological Fuels of 21 May 2009[39]. Improvement of organizational and technical measures and creation of conditions for electricity transmission was facilitated by the adoption of the Cabinet of Ministers of Ukraine Resolution "On peculiarities of connection to the electricity grid of electricity generating facilities using alternative sources" of 19 February 2009[40].

One of the characteristic features of this stage is the development of sectoral legislation regulating the functioning of alternative energy. Thus, tariff and fiscal policy is an important element of the mechanism of state regulation of alternative energy. That is why the system of legal support for the use of alternative energy sources is supplemented by the provisions of the Tax and Customs Codes of Ukraine. The organizational and legal framework for the allocation and use of land plots for energy facilities is set out in the Law of Ukraine "On Energy Lands and the Legal Regime of Special Zones of Energy Facilities" of 09 July 2010[41].

At this stage, there is a quantitative and qualitative development of the policy framework for stimulating alternative energy. In particular, during this period, the following were adopted: The Ethanol Programme, approved by the Cabinet of Ministers of Ukraine on 04 July 2000 (expired on 13 January 2011)[42]; The Concept of the Programme for Development of Diesel Biofuel Production until 2010, approved by the Cabinet of Ministers of Ukraine on 28 December 2005[43], Programme for the Development of Diesel Biofuel Production, approved by the Cabinet of Ministers of Ukraine on 22

[38] Про внесення змін до деяких законів України щодо встановлення "зеленого" тарифу: Закон України від 25 вересня 2008 року: *Відомості Верховної Ради України*. 2009. № 13. Ст. 155.

[39] Про внесення змін до деяких законів України щодо сприяння виробництву та використанню біологічних видів палива: Закон України від 21 травня 2009 року: *Відомості Верховної Ради України*. 2009. № 40. Ст. 577.

[40] Про особливості приєднання до електричних мереж об'єктів електроенергетики, що виробляють електричну енергію з використанням альтернативних джерел": постанова Кабінету Міністрів України від 19 лютого 2009 року. *Офіційний вісник України*. 2009. № 14. Ст. 422.

[41] Про землі енергетики та правовий режим спеціальних зон енергетичних об'єктів: Закон України від 09 липня 2010 року. *Відомості Верховної Ради України*. 2011. № 1. Ст. 1.

[42] Про затвердження Програми "Етанол": постанова Кабінету Міністрів України від 04 липня 2000 року № 1044. *Офіційний вісник України*. 2000. № 27. Ст. 1126 (втратила чинність)

[43] Про схвалення Концепції Програми розвитку виробництва дизельного біопалива на період до 2010 року: розпорядження Кабінету Міністрів України від 28 грудня 2005 року № 576-р. *Офіційний вісник України.* 2008. № 89. Ст. 3357.

December 2006[44], The State Target Economic Programme for Energy Efficiency and Development of Energy Production from Renewable Energy Sources and Alternative Fuels for 2010-2021, approved by the Cabinet of Ministers of Ukraine on 1 March 2010[45].

New goals in the policy of development of energy production from alternative sources required institutional changes at the state level. Thus, by the Decree of the President of Ukraine of 20 April 2005, the State Committee for Energy Saving of Ukraine was liquidated and its functions were transferred to the Ministry of Fuel and Energy of Ukraine. Soon after, on 31 December 2005, in order to improve the efficiency of the state policy in the field of energy use and energy saving, the President issued a decree establishing the National Agency of Ukraine for Ensuring Efficient Use of Energy Resources as a central executive body with a special status[46]. One of the tasks of this agency was to ensure an increase in the share of non-conventional and alternative fuels in the balance of energy supply and demand.

The second stage of the formation of legislation on the use of alternative energy sources is characterized by the adoption of basic regulatory legal acts in the field of alternative energy, state support for the latter, and the introduction of appropriate tariff and fiscal policies. However, despite a significant number of legal acts adopted in the area under study, the legal regulation of relations in the use of alternative energy sources was sometimes fragmented and inconsistent[47].

With the adoption of the Law of Ukraine "On Ratification of the Protocol on Ukraine's Accession to the Treaty Establishing the Energy Community" of 15 December 2010[48], Ukraine has committed itself to implementing a number of EU directives, including Directive 2001/77/EC

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[44] Про затвердження Програмирозвитку виробництва дизельного біопалива: Постанова Кабінету Міністрів України від 22 грудня 2006 року № 1774. *Офіційний вісник України*. 2006. № 52. Ст. 3497.

[45] Про затвердження Державної цільової економічної програми енергоефективності і розвитку сфери виробництва енергоносіїв з відновлюваних джерел енергії та альтернативних видів палива на 2010-2021 роки: Постанова Кабінету Міністрів України від 1 березня 2010 року № 243. *Офіційний вісник України*. 2010. № 16. Ст. 762.

[46] Про утворення Національного агентства України з питань забезпечення ефективного використання енергетичних ресурсів: Указ Президента України від 31 грудня 2005 року № 1900/2005. *Офіційний вісник України*. 2006. № 1. Ст. 22.

[47] Платонова Є.О. Етапи розвитку законодавства у сфері використання альтернативних джерел енергії в Україні. *Юридичний науковий електронний журнал.* № 8. 2020. С. 251–255.

[48] Про ратифікацію Протоколу про приєднання України до Договору про заснування Енергетичного Співтовариства: Закон України від 15 грудня 2010 року. *Відомості Верховної Ради України*. 2011. № 24. Ст. 170.

on the promotion of the use of electricity from renewable energy sources in the internal electricity market.

Ukraine's accession to the Energy Community Treaty marked the beginning of *the third integration phase of the development of legislation on the use of alternative energy sources (2011–2017).* It is characterized by the transformation of legislation under the influence of expanding international cooperation to stimulate the energy transition, as well as the adaptation of the national legal framework in the field of alternative energy to the relevant EU legislation.

The priority of alternative energy development for Ukraine stems from its European integration course and international commitments undertaken by the state under the Association Agreement with the EU and a number of ratified international documents regulating modern energy policy. Thus, on 16 September 2014, the Verkhovna Rada of Ukraine ratified the Association Agreement between Ukraine, on the one hand, and the European Union, the European Atomic Energy Community and their Member States, on the other hand[49]. Section 5, Economic and Sectoral Cooperation, of the Association Agreement provides for cooperation between Ukraine and the EU in the energy sector, in particular, in the development and support of renewable energy, taking into account the principles of economic feasibility and environmental protection, as well as in the use of alternative fuels, sustainable biofuel production, and cooperation in the field of regulatory issues, certification and standardization, technological and commercial development.

In addition, Ukraine, as a party to the UN Framework Convention on Climate Change and its Kyoto Protocol, ensures the fulfilment of its obligations under these international agreements. The Paris Agreement, ratified by the Law of Ukraine of 14 July 2016, also provides for the development of Ukraine's economy with due regard to the reduction of greenhouse gas emissions[50].

In order to further improve the existing legislative mechanisms for introducing a new model of the electricity market and regulating alternative energy, the following laws were adopted "On Amendments to the Law of Ukraine "On Electricity" to Guarantee the State's Obligations to Stimulate

[49] Про ратифікацію Угоди про асоціацію між Україною, з однієї сторони, та Європейським Союзом, Європейським співтовариством з атомної енергії та їхніми державами-членами, з іншої сторони: Закон України від 16 вересня 2014 року. *Відомості Верховної Ради України*. 2014. № 40. Ст. 2021.

[50] Про ратифікацію Паризької угоди: Закон України від 14 липня 2016 року. *Відомості Верховної Ради України*. 2016. № 35. Ст. 595.

the Use of Alternative Energy Sources" of 03 June 2011[51] and the Law of Ukraine "On the Principles of Functioning of the Electricity Market of Ukraine" of 24 October 2013[52]. However, with the adoption of the Law "On the Electricity Market", these legislative acts became invalid.

To implement structural reforms and ensure sustainable development of the fuel and energy sector, the National Commission for State Regulation of Energy was established by a Presidential Decree of 23 November 2011[53]. The said body carried out state regulation of natural monopolies and business entities operating, inter alia, using non-conventional or renewable energy sources from November 2011 to August 2014. Based on the Presidential Decree of 27 August 2014, the said National Commission was liquidated and the National Commission for State Regulation of Energy and Public Utilities was established instead. Its legal status was enshrined in the Law of Ukraine "On the National Energy and Utilities Regulatory Commission" of 22 September 2016[54].

Thus, at the third stage, there is a tendency to move from sectoral programmes to strategic programming of alternative energy development. For example, the Cabinet of Ministers of Ukraine approved the Energy Strategy of Ukraine for the period up to 2030 by its Resolution of 24 July 2013[55]. It noted that the development of renewable energy sources in the country in the long term should take into account their potential advantages on the basis of economic competition with traditional sources. The strategy emphasized the need to use support and incentive mechanisms ("green tariff") in the development of renewable energy sources, as well as to ensure favorable conditions for investment at the legislative level. Despite the importance of these provisions, the Energy Strategy of Ukraine until

[51] Про внесення змін до Закону України "Про електроенергетику" щодо гарантування зобов'язань держави щодо стимулювання використання альтернативних джерел енергії: Закон Україна від 3 червня 2011 року. *Відомості Верховної Ради України*. 2012. № 4. Ст. 12 (втратив чинність)

[52] Про засади функціонування ринку електричної енергії України: Закон Україна від 24 жовтня 2013 року: *Відомості Верховної Ради України*. 2014. № 22. Ст. 781 (втратив чинність)

[53] Про Національну комісію, що здійснює державне регулювання у сфері енергетики: Указ Президента України від 23 листопада 2011 року № 1059/2011. *Офіційний вісник України*. 2011. № 94. Ст. 3413 (втратив чинність)

[54] Про Національну комісію, що здійснює державне регулювання у сферах енергетики та комунальних послуг: Закон Україна від 22 вересня 2016 року. *Відомості Верховної Ради України*. 2016. № 51. Ст. 833.

[55] Енергетична стратегія України на період до 2030 року, схвалена розпорядження Кабінету Міністрів України від 24 липня 2013 року № 1071-р. (втратила чинність 18.08 2017 року)

2030 was more like a market assessment than a clear national strategy, including for the development of renewable energy sources.

The Sustainable Development Strategy "Ukraine-2020", approved by the Presidential Decree of 12 January 2015[56], established that the main goals of the state policy in the field of energy independence are, in particular, the implementation of projects using alternative energy sources.

The need to further develop the legal regulation of relations in the field of alternative energy, introduce competitive mechanisms for the production of electricity from alternative energy sources, improve the conditions for supporting such production, and increase the investment attractiveness of the construction of renewable energy facilities, led to the allocation of *the fourth – innovative stage of development of legislation in this area (2017-2022).*

The adoption of the Law of Ukraine "On the Electricity Market" of 13 April 2017 became a prerequisite for the latest structural changes in the Ukrainian electricity sector and the basis for the modernization of the alternative energy sector during this period[57]. In particular, it provided for the possibility of entering into long-term contracts for the purchase of electricity produced under the feed-in tariff until 2030, as well as the conclusion of a power purchase agreement between a guaranteed buyer and a business entity that produces electricity from alternative energy sources and has been eligible for support based on the results of an auction.

In accordance with the Law of Ukraine "On the Electricity Market", the structural transformation of the Ukrainian electricity market began in 2019, in line with the principles and principles of organizing electricity markets in the EU, adapted for the Contracting Parties to the Energy Community. Of particular importance at this stage was the adoption of the Law of Ukraine "On Amendments to Certain Laws of Ukraine on Ensuring Competitive Conditions for the Production of Electricity from Alternative Energy Sources" of 25 April 2019[58]. In accordance with its provisions, the Law changed the protective conditions for the functioning of alternative energy, namely: it provides for a transition from the feed-in tariff support system to a competitive model of stimulating the development of renewable energy through auctions for the distribution of support ("green" auctions). The procedure for preparing and conducting an auction for the allocation of the

[56] Про Стратегію сталого розвитку "Україна – 2020": Указ президента України від 12 січня 2015 року № 5/2015. *Офіційний вісник України*. 2015. № 4. Ст. 67.

[57] Про ринок електричної енергії: Закон України від 13 квітня 2017 року. *Офіційний вісник України*. 2017. № 49. Ст. 1506.

[58] Про внесення змін до деяких законів України щодо забезпечення конкурентних умов виробництва електричної енергії з альтернативних джерел енергії: Закон України від 25 квітня 2019 року. *Відомості Верховної Ради України*. 2019. № 23. Ст. 89.

support quota to stimulate electricity producers from alternative sources is determined by the Procedure for conducting auctions for the allocation of the support quota, approved by the Resolution of the Cabinet of Ministers of Ukraine as of 2 August 2022[59].

Further development of renewable energy was ensured by the adoption of the Law of Ukraine "On Amendments to Certain Laws of Ukraine on Improving the Conditions for Supporting the Production of Electricity from Alternative Energy Sources" of 21 July 2020[60]. Its adoption at the legislative level resolved the urgent problems of the functioning of "green" electricity generation, reducing the financial burden on the final price of electricity by optimizing the level of the "green" tariff, and achieving a balance of interests of society, consumers and electricity market participants.

A significant event for the development of alternative energy, which marked the transition to a new ideological basis for energy production and use, was the adoption of the Law of Ukraine "On Energy Efficiency" on 21 October 2021[61]. The provisions of the Law are aimed at regulating relations arising in the field of energy efficiency and are aimed at strengthening energy security, reducing energy poverty, sustainable economic development, conservation of primary energy resources and reduction of greenhouse gas emissions.

The adoption by the Parliament of Ukraine of the Law "On Amendments to Certain Laws of Ukraine on the Development of Biomethane Production" of 21 October 2021 was important for the development of the biomethane industry in Ukraine[62], which establishes the legal framework for the development of the biomethane market in Ukraine and its export through the use of a biomethane register.

The fourth stage is characterized by a change in the strategic guidelines for the development of alternative energy based on the adoption of a number of important policy documents. In particular, the long-term Energy Strategy of Ukraine for the period up to 2035 "Security, Energy Efficiency,

[59] Про запровадження конкурентних умов стимулювання виробництва електричної енергії з альтернативних джерел енергії: постанова Кабінету Міністрів України від 27 грудня 2019 року № 1175 (в ред. постанови Кабінету Міністрів України від 2 серпня 2022 р. № 889). *Офіційний вісник України*. 2022. № 66. Ст. 3967.

[60] Про внесення змін до деяких законів України щодо удосконалення умов підтримки виробництва електричної енергії з альтернативних джерел енергії: Закон України від 21 липня 2020 року. *Офіційний вісник України*. 2020. № 63. Ст. 2027.

[61] Про енергетичну ефективність: Закону України від 21 жовтня 2021 року. Офіційний вісник України. 2021. № 89. Ст. 5745.

[62] Про внесення змін до деяких законів України щодо розвитку виробництва біометану: Закон України від 21 жовтня 2021 року. *Офіційний вісник України*. 2021. № 88. Ст. 5604.

Competitiveness," approved by the Government of Ukraine on 18 August 2017[63]. At the same time, the previous Energy Strategy of Ukraine until 2030 was repealed. A positive milestone of the newest strategy was the consideration of the prospects for growth in electricity production from renewable energy sources based on solid biomass and biogas, solar and wind energy. Important programme acts of the fourth stage also include the Concept for the Implementation of the State Policy in the Field of Heat Supply, approved by the Government of Ukraine on 18 August 2017[64].

Comprehensive development of renewable energy sources, improvement of energy efficiency, implementation with the European Green Deal initiative are among the key guidelines in Ukraine's economic policy and strategic goals of ensuring the country's energy security, in accordance with the National Economic Strategy of Ukraine for the period up to 2030, approved by the Government of Ukraine on 3 March 2021[65] and the Energy Security Strategy approved by the Government of Ukraine on 4 August 2021[66].

At the end of 2021, Ukraine, within the framework of the Treaty establishing the Energy Community (by the decision of the Energy Community Ministerial Council of 30.11. 2021 No. 2021/14/MS-EPS), Ukraine committed to implement the fourth energy package "Clean Energy for Europeans" (covering EU legislation on energy efficiency, renewable energy sources, governance, electricity market design, and security of electricity supply rules), which includes Directive (EC) 2018/2001 of 11 December 2018 on the promotion of the use of energy from renewable sources.

The adoption of the Law of Ukraine "On Amendments to Certain Laws of Ukraine on the Development of Energy Storage Facilities" dated 15 February 2022 should be considered positive for the further development

[63] Про схвалення Енергетичної стратегії України на період до 2035 року "Безпека, енергоефективність, конкурентоспроможність": Розпорядження Кабінету Міністрів України від 18 серпня 2017 року № 605-р. *Урядовий кур'єр* від 08 вересня 2017 року № 167. (втратила чинність 21.04.2023 року)

[64] Про схвалення Концепції реалізації державної політики у сфері теплопостачання: Розпорядження Кабінету Міністрів України від 18 серпня 2017 року № 569-р. *Офіційний вісник України*. 2017. № 70. Ст. 2127.

[65] Про затвердження Національної економічної стратегії на період до 2030 року: Постанова Кабінету Міністрів України від 3 березня 2021 року № 179. *Офіційний вісник України*. 2021. № 22. Ст. 1015.

[66] Про схвалення Стратегії енергетичної безпеки: Розпорядження Кабінету Міністрів України від 4 серпня 2021 року № 907-р. *Офіційний вісник України*. 2021. № 64. Ст. 4071.

of the renewable energy sector[67]. Its provisions are aimed at ensuring the use of energy storage systems, balancing the operation of the power system, and increasing the stability of electricity supply to consumers. The law provides for the creation of a new participant in the electricity market – an energy storage operator. It regulates the licensing of energy storage activities, the possibility of using energy storage systems by consumers and electricity producers, including those from renewable energy sources.

The implementation of all the above decisions aimed at significantly improving the business climate in the alternative energy sector and creating new opportunities to increase the sector's capacity was suspended and slowed down on 24 February 2022 due to the full-scale invasion of Ukraine by the Russian Federation. The introduction of a special legal regime of martial law throughout the country has undoubtedly affected the legislation in the field of alternative energy. Therefore, it is appropriate to highlight *the fifth stage of development of legislation on the use of alternative energy sources under martial law (from 2022 to the present time).*

The permanent damage to a large part of the country's energy infrastructure as a result of hostilities has led to a reduction in renewable generation, a deepening financial crisis in the alternative energy market, the suspension of wind farm construction, and a limitation of payments under the feed-in tariff for the period of martial law.

Important political and legal decisions made during the war that were significant for the development of renewable energy sources in Ukraine include connection of the energy systems of Ukraine and Moldova with the energy system of Continental Europe (ENTSO-E) (16 March 2022); approval by the European Commission plan (18 May 2022); granting Ukraine the status of an EU candidate country (23 June 2022); signing of the Joint Declaration of Association between Ukraine and the International Energy Agency (IEA) (19 July 2022); ratification of the Agreement between Ukraine and the European Union on Ukraine's participation in the EU LIFE Programme – Environment and Climate Action Programme (20 September 2022); accession of the State Agency on Energy Efficiency and Energy Saving of Ukraine to the European Clean Hydrogen Alliance (23 September 2022); presentation of the National Recovery Plan of Ukraine prepared by the Government of Ukraine and presented at the Ukraine Recovery Conference (Lugano, Switzerland, 4-5 July 2022), etc [68].

[67] Про внесення змін до деяких законів України щодо розвитку установок зберігання енергії: Закон України від 15 лютого 2022 року. *Офіційний вісник України*. 2022. № 33. Ст. 1716.

[68] Україна та Європейський зелений курс. Річний моніторинговий звіт. 2022 рік. URL: https://dixigroup.org/analytic-cat/zvity/

Extremely important events were the conclusion of a Memorandum of Understanding on the establishment of a partnership in the field of energy transition and renewable energy sources between the Ministry of Energy of Ukraine and the Federal Ministry for Climate, Environment, Energy, Mobility, Innovation and Technology of the Republic of Austria (01 February 2023) and the signing of a Memorandum between the Government of Ukraine and the European Commission on a strategic partnership in the fields of biomethane, hydrogen and other synthetic gases (03 February 2023)[69]. It is the agreed and coordinated work with the EU that is the driving force for carrying out effective reforms in the field of energy and on the way to the full integration of the energy markets of Ukraine with the EU markets.

In connection with the need for further development of legal regulation of relations in the field of alternative energy under martial law, in particular, sale of alternative energy on free markets, resolution of the situation with high bills for imbalances of producers of energy from alternative sources, adoption of licensing conditions for carrying out storage business activities energy, the development of the biomethane market, the improvement of the procedure for conducting auctions in alternative energy, a number of regulatory and legal acts were adopted[70].

In particular, on July 29, 2022, the Laws of Ukraine were adopted: "On the peculiarities of regulating relations on the natural gas market and in the field of heat supply during the period of martial law and the subsequent restoration of their functioning"[71] and "On Amendments to Chapter XX "Transitional Provisions" of the Tax Code of Ukraine on Ensuring Stable Functioning of the Natural Gas Market During Martial Law and Subsequent Recovery"[72].

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[69] Україна та Європейський зелений курс. Квартальний огляд № 5 (січень-березень 2023 року). URL: https://dixigroup.org/wp-content/uploads/2023/04/2023_q5_egdmonitor_ua.pdf

[70] Платонова Є. О. Тенденції правового регулювання альтернативної енергетики України в умовах війни. *Приватне право в умовах війни* : матеріали всеукр. наук. конф. (Одеса, 15 листоп. 2022 р.) / за заг. ред.: д.ю.н., проф. Є. Харитонова, д.ю.н., проф. І. Давидової; НУ "Одеська юридична академія. – Одеса, 2022. С. 873-876.

[71] Про особливості регулювання відносин на ринку природного газу та у сфері теплопостачання під час дії воєнного стану та подальшого відновлення їх функціонування: Закон України від 29 липня 2022 року. *Офіційний вісник України*. 2022. № 68. Ст. 4070.

[72] Про внесення змін до розділу XX "Перехідні положення" Податкового кодексу України щодо забезпечення стабільного функціонування ринку природного газу протягом дії воєнного стану та подальшого відновлення: Закон України від 29 липня 2022 року. *Офіційний вісник України*. 2022. № 68. Ст. 4071.

A significant step for the development of the biomethane market was the adoption by the Government of Ukraine of the resolution "On approving the operation of the biomethane register" dated July 22, 2022[73]. With the aim of approving the licensing conditions for conducting energy storage business activities and to resolve the situation with high bills for imbalances of energy producers from alternative sources, a number of resolutions of the NCRECP were adopted: "On Approval of the Licensing Conditions for Conducting Energy Storage Business Activities"[74] and "On approval of changes to the Procedure for purchase by a guaranteed buyer of electric energy produced from alternative energy sources"[75].

On April 21, 2023, the Government of Ukraine decided to approve the Energy Strategy of Ukraine for the period until 2050[76], which should reflect the goals of the European Green Deal (Green Deal) and be based on the principles of an integrated approach to the formation and implementation of energy policy, creating conditions for the sustainable development of Ukraine's economy. The corresponding goals will be achieved through the development of comprehensive use of renewable energy sources, modern and safe nuclear generation, modernization and automation of transmission and distribution systems. The strategy envisages Ukraine achieving carbon neutrality in the energy sector by 2050. At the same time, the previous Energy Strategy of Ukraine for the period until 2035 "Security, Energy Efficiency, Competitiveness" from 2017 became invalid.

In addition, Ukraine and the EU began discussing the National Energy and Climate Plan (NECP), which will be necessary to implement for the integration of our country into the EU. The Ministry of Energy of Ukraine, with the involvement of international experts, prepared a draft of the National Energy and Climate Plan of Ukraine until 2030. Currently, the Action Plan for post-war reconstruction and development of Ukraine for the implementation of the Energy Strategy until 2050 is being finalized. It is

[73] Про затвердження функціонування реєстру біометану: постанова Кабінетом Міністрів України від 22 липня 2022 року № 823. *Офіційний вісник України*. 2022. № 61. Ст. 3652.

[74] Про затвердження Ліцензійних умов провадження господарської діяльності зі зберігання енергії: постанова НКРЕКП від 22 липня 2022 року № 798. URL: https://zakon.rada.gov.ua/rada/main/b209

[75] Про затвердження змін до Порядку купівлі гарантованим покупцем електричної енергії, виробленої з альтернативних джерел енергії: постанова НКРЕКП від 26 липня 2022 року № 821. URL: https://zakon.rada.gov.ua/rada/main/b209

[76] Про схвалення Енергетичної стратегії України на період до 2050 року: Розпорядження Кабінету Міністрів України від 21 квітня 2023 року № 373-р. *Офіційний вісник України*. 2023. № 47. Ст. 2575.

these two documents that should become part of the country's post-war reconstruction[77].

On May 3, 2023, the President of Ukraine signed the Law, which provides for changes to the Budget Code of Ukraine and the introduction of the State Fund for Decarbonization and Energy-Efficient Transformation[78]. In connection with the understanding of the need to reform the energy legislation, increase its protection and ensure the stable operation of the domestic energy system in the conditions of war and post-war reconstruction, the Parliament of Ukraine on June 30, 2023 adopted in the second reading the draft Law of Ukraine on Amendments to Certain Laws of Ukraine on the Restoration and green transformation of the energy system of Ukraine [79].

In modern conditions, the legislation in the field of alternative energy in Ukraine is at the stage of reform, the path of which is chosen taking into account the importance of ensuring the sustainable development of energy production from alternative sources, as a key tool for guaranteeing the energy independence of the state, taking into account all the challenges of the war and post-war times, international obligations and environmental transformations in the world.

1.3. The current state of legislative support for the use of alternative energy sources in Ukraine

According to the above-mentioned periodization of the development of national legislation in the field of alternative energy, it is possible to trace a pronounced tendency to speed up and deepen rule-making. This directly affects the state of both general energy legislation and individual components of the latter (such as legal support for alternative energy).

The following are characteristic features of modern legislative support for the functioning of alternative energy in Ukraine:

1) *reforming energy legislation.* This process, initiated by the adoption of the new Law of Ukraine "On the Electricity Market"[80], directly related to the development of alternative energy in the state. Already at the integration stage (2011-2017) of the development of the legislation, the critical

[77] Офіційний сайт Міністерства економіки України. URL: https://www.me.gov.ua/?lang=uk-UA

[78] Урядовий портал. Єдиний веб-портал органів виконавчої влади України. URL: https://www.kmu.gov.ua/timeline?&type=posts&from=03.05.2023&till=03.05.2023

[79] Офіційний веб-портал Верховної Ради України. URL: http://w1.c1.rada.gov.ua/pls/zweb2/webproc4_1?pf3511=76021

[80] Про ринок електричної енергії: Закон України від 13 квітня 2017 року. *Відомості Верховної Ради.* 2017. № 27-28. Ст. 312.

inconsistency of the previous legislation, which preserved the traditional model of the energy market, with the needs of alternative energy became evident. On the one hand, the rapid development of "green" generation served as one of the main factors that catalyzed the restructuring of the old energy system, whose centralized and monopolized model did not meet modern requirements and was not able to meet the needs of alternative energy. On the other hand, the change in the model of the energy market stimulated even more rapid development of alternative energy in Ukraine;

2) combination of both economic and environmental aspects. Economic growth largely depends on the level of development of the country's energy sector, which is the basis for the functioning of all sectors of the economy. One of the most effective ways is the development of alternative types of energy, which will make it possible to ensure energy independence from external economic and political factors. In turn, alternative energy is exactly that type of energy, which is characterized by inexhaustibility, autonomy, economy and safety for the environment;

3) the combination of the imperative-dispositive character of legal acts. The imperative character is manifested, first of all, in the clearly established competences and duties of the subjects of legal prescriptions, both state authorities and legal entities. Despite the importance of state regulation in the field of alternative energy, contractual regulation is gaining importance as an independent legal method of organizing specific individual relationships of economic entities, which exists alongside their regulatory and legal regulation, which justifies their dispositive nature;

4) the absence of a clear system of legislation in the field of alternative energy. This is an extremely negative factor, since the absence of a well-thought-out and scientifically based system of legislation reduces the effectiveness and quality of legal regulation of relevant social relations. In addition, the majority of normative legal acts in the field of alternative energy are constantly changing and are purely declarative in nature, and in some cases even worsen the situation of producers of alternative energy. It should be noted that the rule-maker misses a rather convenient moment for systematization actions, since it was during the changes experienced by modern energy legislation that systematization would take place in the easiest and relatively painless way. At the same time, the systematization of legislation in the field of alternative energy should take place taking into account the system of general energy legislation. In addition, the lack of a coordinated, theoretically grounded and holistic approach to the process of improving the legislation does not make it possible to establish an orderly, consistent and balanced state policy;

5) significant degree of dynamism of legislation. During 2017–2023, both general energy legislation and special legislation in the field of

alternative energy are in a state of permanent change. Changes are made to the main energy laws on average every six months, which modify the regulatory environment. Sub-legislative legal regulation is especially actively changing. All these manifestations are a fairly typical consequence of the energy reform, which entails the ongoing turbulence of the regulatory environment. However, at the same time, a characteristic feature of such dynamic legislation should be the fact that the lawmaker makes the relevant changes not as a result of strategic foresight, but as a hasty and, as a rule, belated reaction to events and changes in social relations that have already taken place;

6) reduction of the protectionism of the legislation, which had two main waves associated with the state-financial collapse and martial law.

The first wave occurred during 2020, when legislation in the field of alternative energy experienced a significant decline in its protectionism. First of all, the legal basis for setting the "green" tariff was drastically changed, which was the result of the inability of the state, in the person of the Guaranteed Buyer, to settle with producers of energy from alternative sources in time and in full. The main problem with this step is that the rules regarding "green" tariffs were changed not only prospectively, but also retrospectively – that is, "green" tariffs were also reduced for those manufacturers already operating in the market. Secondly, constitutional submission No. 3/332(20) dated July 17, 2020, was a significant blow to the protectionism of legislation in the field of alternative energy. In accordance with it, a group of Deputies asks to recognize as unconstitutional the provisions of the first – fourth paragraphs of the second part, the third part, the sixth – ninth parts, the twelfth – twenty-second parts, the twenty-sixth part, the twenty-eighth part – the thirty-third article 9-1, the provisions of article 9-2 of the Law of Ukraine "On Alternative Energy Sources" dated February 20, 2003, the provisions of parts two, four, paragraph 3 of part nine of Article 65 of the Law of Ukraine "On the Electric Energy Market" dated April 13, 2017. In this submission, it is noted that the provisions of the first – fourth paragraphs of the second part, the third part, the sixth – ninth parts, the twentieth – twenty-second parts, the twenty-sixth part, the twenty-eighth – thirty-third parts of Article 9-1 and the provisions of Article 9-2 The content of Part 3 of Article 42 of the Constitution of Ukraine regarding the state's duty to ensure competition in business activity does not correspond to the law. Unequal conditions are established for all subjects that produce electricity in Ukraine, in particular, for those that produce electricity from alternative sources, the introduction of the "green" tariff establishes advantages that producers of other types of electricity do not have. In addition, the provisions of part two – thirty-three of Article 9-1 also establish unequal conditions for obtaining a "green" tariff among the

entities themselves that produce electricity from alternative sources (depending on the type of electricity facility, the date of its commissioning, etc. set different amounts and terms of compensation under the "green" tariff).

Although the decision on this issue has not yet been made, the very fact of the existence of this submission undermines the policy of protectionism in the field of alternative energy. Recognizing the relevant provisions of the legislation in the field of alternative energy as unconstitutional will entail a whole series of negative consequences for Ukraine (even more image losses, a decrease in investment attractiveness, a significant number of lawsuits before international commercial arbitrations, a decline in the development of the industry, loss of assets acquired as a result of the energy reform, stopping energy transition and implementation of sustainable development goals, etc.).

7) "programmatic" character of legislation in the field of alternative energy. Nowadays, Ukraine is on the way to choosing the next vector of development of the national energy system. In recent years, there has been an awareness of the significant importance of alternative energy sources for social life and the functioning of the state. This is particularly well illustrated by statistical data on the amount of destruction caused by military actions: in general, about 30% of solar generation and more than 90% of wind generation have been destroyed or are in the occupied territories[81]. Certainly, these losses cause a forced regression in the development of the country's energy system, especially in the direction of achieving sustainability. Currently, there are attempts to compensate for these losses to some extent due to the intensity of rulemaking. This creates a state of increased "programmatic" legislation. This feature of modern legislation in the field of alternative energy is confirmed by the analysis of the nature of rule-making in the last two years. In particular, the National Economic Strategy of Ukraine for the period until 2030, approved by the resolution of the Government of Ukraine dated March 3, 2021, defines one of the key guidelines in the economic policy of Ukraine to be the decarbonization of the economy (increasing energy efficiency, development of renewable energy sources, development of the circular economy and synchronization with the initiative "European Green Course")[82]. The Energy Security Strategy of Ukraine, approved by the order of the Government of Ukraine

[81] Проект Плану відновлення України. Матеріали робочої групи "Енергетична безпека". 2022. URL: https://www.kmu.gov.ua/storage/app/sites/1/recoveryrada/ua/energy-security.pdf

[82] Про затвердження Національної економічної стратегії на період до 2030 року: постанова Кабінету Міністрів України від 3 березня 2021 р. № 179.*Офіційний вісник України*. 2021. № 22. Ст. 1015.

dated August 4, 2021, defines the strategic goals of ensuring the energy security of the state and the tasks to achieve them: stimulation of import substitution, in particular through the development of bioenergy, wind energy, justified increase in the production of energy resources; implementation of a set of measures to expand the use of local alternative fuels; development of a set of measures for the integration of consumers using renewable energy sources for their own consumption into the work of the United Energy System of Ukraine; implementing a justified increase in the share of renewable energy sources, taking into account the requirements for ensuring the operational security of energy supply systems and the impact on the price parameters of the energy market, etc.[83].

The draft order of the Government of Ukraine "On the National Action Plan for the Development of Renewable Energy for the Period Until 2030" is posted on the official website of the State Agency for Energy Efficiency and Energy Saving of Ukraine[84]. It contains indicative goals for the development of renewable energy and measures of a legal and organizational nature are determined, the implementation of which will create the basis for achieving the specified goals. Another example: the order of the Government dated April 21, 2023 "On the approval of the Energy Strategy of Ukraine for the period until 2050"[85], that cancels the decree dated August 18, 2017 "On the approval of the Energy Strategy of Ukraine for the period until 2035 "Safety, energy efficiency, competitiveness" and establishes the need for the Ministry of Energy, together with other central bodies of the executive power, to ensure, within a three-month period, the development of a plan of measures for implementation Energy strategy of Ukraine for the period until 2050.

The main feature of these regulatory and legal acts of a program nature is the desire to reform the energy sector, further development of the use of alternative energy sources, and adaptation of Ukrainian legislation to EU legislation. A key element of successful European integration is achieving a certain level of consistency of Ukrainian legislation with the modern European legal system or bringing Ukrainian legislation into line with EU law standards. This can be possible by improving the existing legislation,

[83] Про схвалення Стратегії енергетичної безпеки: розпорядження Кабінету Міністрів України від 04 серпня 2021 р. № 907-р.*Офіційний вісник України*. 2021. № 64. Ст. 4071.

[84] Проект розпорядження Кабінету Міністрів України "Про Національний план дій з розвитку відновлюваної енергетики на період до 2030 року". URL: https://saee.gov.ua/uk/content/elektronni-consultatsii.

[85] Про схвалення Енергетичної стратегії України на період до 2050 року: розпорядження Кабінету Міністрів України від 21 квітня 2023 року. *Офіційний вісник України.* 2023. № 47. ст. 2575.

developing projects and adopting normative legal acts and fulfilling Ukraine's international legal obligations in the field of European integration;

8) unregulated use of certain types of alternative energy sources. The main alternative sources of energy in Ukraine are wind energy, solar energy and water energy. However, there are other types of alternative energy sources that are very widely used in the world, but have not yet found proper application and legal regulation in the legislation of Ukraine. In particular, it is told about such types of energy as aerothermal, geothermal, hydrothermal. The legal regulation of these types of energy is fragmentarily contained in the Law of Ukraine "On Alternative Energy Sources" dated February 20, 2003, which provides their definition and some provisions on the peculiarities of the legal regulation of their use, but this is not sufficient for the proper introduction of these types of energy into the country's energy sector.

DOI https://doi.org/10.36059/978-966-397-417-0-2

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CHAPTER 2. LEGAL REGULATION OF BIOENERGY IN UKRAINE

2.1. Legislative support of bioenergy in Ukraine

In general, bioenergy is an electric power industry based on the use of biofuel produced from biomass. This is a non-fossil biologically renewable substance of organic origin, capable of biological decomposition, in the form of products, waste, and residues of forestry and agriculture (crop and animal husbandry), fisheries, and technologically related industries, as well as a component of industrial or household waste, capable of biological decomposition[1].

Bioenergy, as well as other areas of alternative energy, was in the phase of active development and modernization until 2022. At the same time, even in the context of the ongoing war, this sector was able to continue moving forward, realizing the need for energy independence of the country and sharing European values in the field of green energy. At the same time, it should be noted that on the one hand, the use of biomass is an affordable and convenient way to reduce greenhouse gas emissions, on the other hand, bioenergy has serious downsides: expanding agricultural land use, increasing agricultural burden on the environment, exacerbating food security problems, etc. Balancing these important issues is a difficult task for all countries that have favorable bioenergy prerequisites, particularly, for states with a developed agricultural sector.

That is why the issue of whether the legislation is ready for this fast and rapid development of social relations is urgent[2]. Undoubtedly, Ukraine needs strong conceptual foundations for the development of such a legal and regulatory framework. Consequently, the domestic legislative ensuring of bioenergy as a component of alternative energy is heterogeneous,

[1] Про альтернативні види палива : Закон України від 14 січня 2000 року: *Відомості Верховної Ради України*. 2000. № 12. Ст. 94.

[2] Харитонова Т. Є., Григор'єва Х. А. Доктрина правового регулювання альтернативної енергетики в Україні : сучасні тенденції розвитку. *KELM (Knowledge, Education, Law, Management).* 2020. № 3 (31). С. 295–296. (С. 295).

characterized primarily by numerous by-laws, general declarative legislative norms, as well as some inconsistency in legal regulation.

Due to the constant development of bioenergy, there is no universal model for building bioenergy legislation in Ukraine. There is also no rigidly defined periodization of its development. In particular, agreeing in whole with the general periodization of the formation of the legislation of Ukraine in the field of alternative energy[3], it should be noted that bioenergy legislation has certain features in its development that cause sometimes a different partition into periods depending on the content of the stage.

The first is the implementation stage (1993–2002), at which amendments to the current and adoption of new regulatory acts in the use of renewable energy sources begin. The purpose of this stage was to legislate the basic concepts, ideas, and principles of alternative energy. The main laws of this stage were the Law of Ukraine "On Energy-Saving" of July 1, 1994[4], which has now lost its effect, and the Law of Ukraine "On Alternative Types of Fuel" of January 14, 2000[5]. It contains mainly definitions of the concepts of "alternative fuels", "biomass", "biogas", "biofuels", etc.

The second stage of formation and development (2003–2010) is characterized by the development and reform of the energy complex and the expansion of the network of alternative energy facilities and renewable sources. The basic legislative act in the studied sphere is the Law of Ukraine "On Alternative Energy Sources" of February 20, 2003, which defines the legal, economic, ecological, and organizational basis for the use of alternative energy sources and helps to expand their use in the fuel and energy complex. The main regulatory act regulating the use of biomass and biogas at this stage is the Law of Ukraine "On Amendments to Certain Laws of Ukraine on Promoting the Production and Use of Biological Fuels" of May 21, 2009[6]. This act is aimed at stimulating the production and use of biological fuels, the development of the national fuel market in Ukraine based on biomass attraction, as renewable raw materials for the manufacture of biological fuels.

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[3] Платонова Є. О. Етапи розвитку законодавства у сфері використання альтернативних джерел енергії в Україні. *Юридичний науковий електронний* журнал. 2020. № 8. С. 251–255.

[4] Про енергозбереження : Закон України від 01 липня 1994 року. *Відомості Верховної Ради України*. 1994. № 30. Ст. 283 *(втратив чинність 13.11.2021 року).*

[5] Про альтернативні види палива : Закон України від 14 січня 2000 року: *Відомості Верховної Ради України*. 2000. № 12. Ст. 94.

[6] Про внесення змін до деяких законів України щодо сприяння виробництву та використанню біологічних видів палива : Закон України від 21 травня 2009 року. *Відомості Верховної Ради України*. 2009. № 40. Ст. 577.

In addition, at the stage of formation and development, several by-laws were adopted detailing the provisions of the laws and regulating the functioning of bioenergy in more detail. Such by-laws are: The program for the development of the production of diesel biofuels, approved by The Resolution of the Cabinet of Ministers of Ukraine of December 22, 2006[7]; The concept of the state specific scientific and technical program for the development of the production and use of biological fuels, approved by the order of the Cabinet of Ministers of Ukraine of February 12, 2009 [8].

A feature of this period is that the legislation gradually turns from declarative to more detailed and specific, including provisions for the use of various biological fuels, rules for the production of biological energy, as well as requirements for activities and subjects involved in bioenergy.

Unlike the first and second stages, the third *stage of cooperation and partnership (2010–2017)* is aimed at creating a favorable investment climate in the energy sector, as well as Ukraine's accession to the European Energy Community and adopting international experience in bioenergy. In this regard, the Law of Ukraine "On Electricity Market" of April 13, 2017[9] introduced a number of significant innovations.

One of the priority directions for the development of legislation in the field of alternative energy at the third stage is international cooperation. Thus, the Law of Ukraine "On Ratification of the Protocol on the Accession of Ukraine to the Agreement on the Establishment of the Energy Community" of December 15, 2010 imposed an obligation on Ukraine to implement a number of EU directives, including the Directive 2001/77/EC on the promotion of electricity produced from renewable energy sources in the internal electricity market[10]. In addition, Ukraine, as a party to the United Nations Framework Convention on Climate Change[11] and the Kyoto Protocol, ensures the fulfillment of obligations under these international agreements. The development of the Ukrainian economy, taking into

[7] Про затвердження Програми розвитку виробництва дизельного біопалива : постанова Кабінету Міністрів України від 22 грудня 2006 року. *Офіційний вісник України*. 2006 р. № 52. Ст. 3497.

[8] Про затвердження Концепції Державної цільової науково-технічної програми розвитку виробництва та використання біологічних видів палива : розпорядження Кабінету Міністрів України від 12 лютого 2009 року. *Офіційний вісник України*. 2009 р. № 21. Ст. 682.

[9] Про ринок електричної енергії : Закон України від 13 квітня 2017 року. *Відомості Верховної Ради України*. 2017. № 27-28. Ст. 312.

[10] Про ратифікацію Протоколу про приєднання України до Договору про заснування Енергетичного Співтовариства : Закон України від 15 грудня 2010 року. *Відомості Верховної Ради України*. 2011. № 24. Ст. 170.

[11] Про ратифікацію Рамкової конвенції ООН про зміну клімату : Закон України від 29 жовтня 1996 року. *Відомості Верховної Ради України.* 1996. № 50. Ст. 277.

account the reduction of greenhouse gas emissions, also provides for the Paris Agreement, ratified by the Law of Ukraine of July 14, 2016[12].

Among the by-laws of this stage, it is worth paying attention to the resolution of the Cabinet of Ministers of Ukraine "On approval of the Regulation on the State Agency for Energy Efficiency and Energy Saving of Ukraine" of November 26, 2014[13], which announced the creation of a new state authority with special competence in the field of energy.

The fourth stage of modernization (2017 – February 24, 2022) provided for reforming the legislative support of the industry, as well as improving the electricity generation sector itself from renewable sources of energy, including biomass. On August 18, 2017, the Cabinet of Ministers of Ukraine issued an order to approve the integrated Energy Strategy of Ukraine for the period up to 2035 "Safety, energy efficiency, competitiveness", which determined that "the main measures for the implementation of strategic goals in the renewable energy sector are an increase in the use of biomass in the generation of electric and thermal energy by: promoting the use of biomass as a fuel in enterprises where biomass is a residual product; informing about the possibility of using biomass as a fuel in individual heat supply; promoting the creation of competitive biomass markets"[14].

The Energy Strategy was to contribute to the growth of the share of the energy sector, which uses solid biomass and biogas as an energy resource. At the same time, not all planned tasks were completed in full before the start of the full-scale war in Ukraine, and in the future the effective implementation of this act became impossible. On April 21, 2023, the Cabinet of Ministers of Ukraine determined the need to approve the Energy Strategy of Ukraine for the period up to 2050 and entrusted the Ministry of Energy of Ukraine, together with other central executive bodies, to ensure the development of an action plan for the implementation of this Strategy within three months. The new document should contain a set of legal norms that will overcome existing problems in the field of alternative energy in general and bioenergy in particular, as well as bring the industry to a qualitatively new stage of development.

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[12] Про ратифікацію Паризької угоди : Закон України від 14 липня 2016 року. *Відомості Верховної Ради України.* 2016. № 35. Ст. 595.

[13] Про затвердження Положення про Державне агентство з енергоефективності та енергозбереження України : постанова Кабінету Міністрів України від 26 листопада 2014 року. *Офіційний вісник України.* 2014. № 97. Ст. 2801.

[14] Про схвалення Енергетичної стратегії України на період до 2035 року "Безпека, енергоефективність, конкурентоспроможність" : розпорядження Кабінету Міністрів України від 18 серпня 2017 року № 605-р. *Урядовий кур'єр* від 08 вересня 2017 року № 167 *(втратила чинність 21.04.2023 року).*

The stage of bioenergy development under martial law and post-war reconstruction (February 24, 2022 – post-war time) is the fifth, ongoing stage. The development of legislation during the war and after its end cannot be divided, since the post-war reconstruction of the industry is directly connected with the war and the devastating consequences that it has already brought and, unfortunately, can lead to in the future. The second factor in the continuity of the stage is the fact that despite martial law, the bioenergy industry, although slowly but developing, accelerates the achievement of the main goal of using renewable energy sources – decarbonization of the country's economy and the "green" transition.

The need to guarantee the energy independence of the country, the numerous destructions of critical infrastructure, and the ruining of renewable energy facilities or their placement in temporarily uncontrolled territories are all factors that determine the need for the further development of the alternative energy industry and the development of the latest legislation that should ensure legal regulation of issues in this area taking into account the realities of today. An example of such regulatory acts should be the above-mentioned Energy Strategy of Ukraine for the period up to 2050, as well as the Plan for the Restoration of Ukraine until 2032, presented by the Cabinet of Ministers of Ukraine in July 2022 at an international donor conference in Lugano, Switzerland. The last of these documents will become a road map according to which the post-war development of Ukraine will take place.

As noted on the official website of the Cabinet of Ministers of Ukraine, the Recovery Plan of Ukraine is based on five basic principles, namely: immediate beginning and gradual development; building fair welfare; integration into the EU; rebuilding better than it was on a national and regional scale; stimulating private investment. One of the programs under which the revival of the state should take place is energy independence and the Green Deal. Important is the fact that according to the rulemaker, the development of the production of biofuels (bioethanol, biodiesel, biomethane, biomass) from agricultural products, residues and waste – acts as a priority direction for the implementation of this course.

In addition, on June 30, 2023, the Verkhovna Rada of Ukraine adopted the Law "On Amendments to Certain Laws of Ukraine on the Restoration and "Green" Transformation of Ukraine's Energy System"[15], which is aimed at strengthening Ukraine's energy independence due to the development of decentralized generation of electricity from renewable

[15] Про внесення змін до деяких законів України щодо відновлення та "зеленої" трансформації енергетичної системи України : Закон України від 30 червня 2023 року. *Голос України* від 26.07.2023. № 18.

sources. The adoption of this law will contribute to the development of renewable electricity on a competitive basis and create prerequisites for deeper integration of green generation into the power system and the electricity market.

2.2. Environmental and legal protection of lands and soils during biomass production

Despite all the advantages of bioenergy, it is impossible to ignore the problem of soil deterioration due to an excessive increase in sown areas for energy crops, which negatively affects the quality of land. That is why increasing demand for biomass as an energy source can generate a risk of depletion of land resources.

The need for special legal regulation of the use and protection of land and soils is justified in regulatory acts of a program nature. The Law of Ukraine "On the Key Principles (Strategy) of the State Environmental Policy of Ukraine for the Period till 2030" of February 28, 2019[16] provides that the modern use of land resources of Ukraine does not comply with the requirements of rational environmental management. The state of land resources of Ukraine is close to critical, the reasons for which are violation of the ecologically balanced ratio between categories of land, reduction of the territory of unique steppe areas, excessive ploughness of the territory, and disruption of the natural process of soil formation, the use of inappropriate technologies in agriculture, industry, energy, transport and other branches of economy, focus on achieving short– and medium-term economic benefits, ignoring the environmental component and negative consequences in the long term. One of the main strategic goals, according to this Act, is to ensure the sustainable use and protection of land, improve the condition of affected ecosystems and promote the achievement of a neutral level of land degradation, increase the level of awareness of the population, landowners and land users regarding the problems of land degradation. However, an example of ignoring the principle of rational use and protection of land is the Program for the Development of the production of diesel biofuels, approved by the Resolution of the Cabinet of Ministers of Ukraine of December 22, 2006 No. 1774[17], noting the need to increase crops for biofuel production, in particular, the expansion of rapeseed

[16] Про Основні засади (стратегію) державної екологічної політики України на період до 2030 року : Закон України від 28 лютого 2019 року. *Відомості Верховної Ради України*. 2019. № 16. ст. 70.

[17] Програма розвитку виробництва дизельного біопалива : затверджена постановою Кабінету Міністрів України від 22 грудня 2006 року № 1774. *Офіційний вісник України*. 2006. № 52. ст. 3497.

growing areas, increasing its yield, but measures are not provided for the rational use and protection of land in the process of such activities.

In this regard, there is a problem of legal protection of lands that are used for the production of biomass. General legal requirements for land protection are provided for by the Land Code of Ukraine[18] and a number of laws of Ukraine: "On Land Protection" of June 19, 2003[19], "On State Control Over the Use and Protection of Land" of June 19, 2003[20], "On Land Reclamation" of January 14, 2000[21], "On Pesticides and Agrochemicals" of March 2, 1995[22], etc. However, there is no regulatory act that provides for special measures for the protection of land and soils in the production of biomass[23].

In general, biomass production is associated with the use of agricultural land. Thus, Article 36 of the Law of Ukraine "On Land Protection" of June 19, 2003 provides that the protection of land during economic activities on agricultural lands is provided on the basis of the implementation of a set of measures to preserve the productivity of agricultural lands, increase their environmental sustainability and fertility of soils, as well as limit their withdrawal (redemption) for non-agricultural needs. Land protection in the carrying out of economic activities, which refers to the bioenergy sector of the economy to a certain extent, is devoted to Section VI of the Law of Ukraine "On Land Protection". However, these norms are generalizing in nature and do not reflect the specifics of biomass production and the peculiarities of its impact on land resources.

To prevent environmental damage, ensure environmental safety, environmental protection, rational use and reproduction of natural resources, in the process of making decisions on economic activity, which can have a significant impact on the environment, taking into account state, public and private interests, the Law of Ukraine "On Environmental Impact

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[18] Земельний кодекс України : прийнятий 25 жовтня 2001 року. *Відомості Верховної Ради України*. 2002. № 3-4. ст. 27.

[19] Про охорону земель : Закон України від 19 червня 2003 року. *Відомості Верховної Ради України*. 2003. № 39. ст. 349.

[20] Про державний контроль за використанням та охороною земель : Закон України від 19 червня 2003 року. *Відомості Верховної Ради України*. 2003. № 39. ст. 349.

[21] Про меліорацію земель: Закон України від 14 січня 2000 року. *Відомості Верховної Ради України*. 2000. № 11. ст. 90.

[22] Про пестициди і агрохімікати : Закон України від 02 березня 1995 року. *Відомості Верховної Ради України*. 1995. № 14. ст. 91.

[23] Чумаченко І. Є. Еколого-правові вимоги та запобіжники, що забезпечують охорону земель та ґрунтів під час виробництва біомаси. *Юридичний науковий електронний журнал.* 2021. № 5. С. 122–125.

Assessment" of May 23, 2017[24] was adopted. The impact on the environment is recognized as any consequences of the planned activity on the environment, including consequences for the safety and health of people, flora, fauna, biodiversity, soil, air, water, climate, landscape, natural areas and objects, historical monuments and other material objects or for the totality of these factors, as well as the consequences for objects of cultural heritage or socio-economic conditions, which are the result of changes in these factors. Article 3 of this Law defines the scope of environmental impact assessment, in which bioenergy, biomass production in agriculture are not included. Taking into account all the environmental risks of biomass production activities, it is necessary to eliminate such a legislative gap[25]. However, this view remains controversial, because it can become a factor of arbitrary inhibition of industry development.

Some environmental standards that apply to subjects of electric and thermal energy production from biomass are also included in the Law of Ukraine "On Electricity Market" of April 13, 2017[26]. Thus, according to Part 1 of Article 14 of this Law, electric power enterprises must comply with the requirements of the legislation on environmental protection, carry out technical and organizational measures aimed at reducing the harmful impact of electric power facilities on the environment, and are also responsible for violating the requirements of the legislation on environmental protection. However, such a norm is distinct and has no independent regulatory value. The criteria for assessing the environmental safety of the activities of individuals and legal entities are environmental standards. The system of standards in the field of environmental protection is defined by Article 33 of the Law of Ukraine "On Environmental Protection" of June 25, 1991[27]. However, several special standards in the field of land protection and soil fertility reproduction are defined in Article 165 of the Land Code of Ukraine. Failure to comply with the established environmental standards and norms for the protection of land and soils leads to the loss of soil fertile properties, so there is a need for more intensive use of fertilizers.

[24] Про оцінку впливу на довкілля : Закон України від 23 травня 2017 року. *Відомості Верховної Ради України.* 2017. № 29. ст. 315.

[25] Чумаченко І. Є. Еколого-правові вимоги та запобіжники, що забезпечують охорону земель та ґрунтів під час виробництва біомаси. *Юридичний науковий електронний журнал.* 2021. № 5. С. 122–125.

[26] Про ринок електричної енергії : Закон України від 13 квітня 2017 року. *Відомості Верховної Ради України.* 2017. № 27-28. ст. 312.

[27] Про охорону навколишнього природного середовища : Закон України від 25 червня 1991 року. *Відомості Верховної Ради України*. 1991. № 41. ст. 546.

The question of the possibility of growing energy crops on lands with low fertility remains controversial in the doctrine. In particular, such lands include degraded and low-productive land plots. The use of unproductive land for the cultivation of bioenergy crops can become one of the priorities of the state agricultural policy of Ukraine. Planting plantations of perennial bioenergy plants on unproductive and erosion-prone lands will help restore their fertility and ensure a steady supply of high-quality raw materials for the production of various types of biofuels[28]. Considering this, experts recommend choosing land for these crops, useless (or not very useful) for agriculture[29]. That is, those that usually have to be mothballed. According to the State Agency on Energy Efficiency and Energy Saving of Ukraine, when using, for example, 4 million hectares of such poor lands for growing energy willow, poplar, miscanthus, etc., their further processing for combustion in boilers, about 20 billion m^3 of gas can be replaced annually. The Agency supports their full-scale use for appropriate purposes to increase the volume of biomass substitution of natural gas[30]. In addition, it is proposed to recognize the cultivation of energy crops on degraded and unproductive lands, the economic use of which is environmentally dangerous and economically inefficient, as a measure to preserve them[31]. However, it is worth noting that the goals of plant biomass production may not coincide with the goals of land conservation, which, under certain conditions, are a priority for sustainable development, so when using low-productivity or degraded land plots, you should, first of all, ensure that their use does not cause even more damage to the lands, and their conservation time has not become even longer.

Modern environmental and legal provision of land protection in biomass production is a symbiosis of environmental, land, agrarian and energy legislation. The study of these legal norms indicates that they do not fully reflect modern trends and environmental requirements for the protection of land resources in the context of active search and application of innovative methods in the energy sector of the economy, namely in the production of

[28] Роїк М. В., Ганженко О. М. Агроекологічні аспекти сталого розвитку біоенергетики. *Біоенергетика.* 2020. № 1. С. 4–7.

[29] Гелетуха Г., Драгнєв С., Кучерук П., Матвєєв Ю. Практичний посібник з використання біомаси в якості палива у муніципальному секторі України (для представників агропромислового комплексу). Київ : Програма розвитку ООН, 2017. С. 49.

[30] Вирощування енергетичних культур в Україні є важливою складовою у напрямку заміщення газу. URL: https://www.saee.gov.ua/uk/news/1209 (дата звернення: 10.06.2023 року).

[31] Пастух А.В. Правове регулювання вирощування та перероблення сільськогосподарської сировини для виробництва біопалива : автореф. дис. … канд. юрид. наук : 12.00.06. Київ, 2017. 18 с.

biomass. The current state of environmental and legal requirements for the protection of land and soils for the needs of bioenergy is provided by general standards, without taking into account the peculiarities of such activities. In Ukraine, there is no special legal regulation aimed at preserving the quality, and fertility and preventing depletion of land and soils during biomass production. Therefore, it should be timely to introduce special focused relevant norms into the current legislation. In addition, it is necessary to take into account the obligations of Ukraine as a member of the Energy Community and the party to the Association Agreement with the EU and introduce into national legislation the imperative of biomass sustainability, which means the introduction of restrictions for the cultivation of biomass on lands that are of increased importance for the preservation of biological diversity, as well as the application of environmental requirements for the cultivation of agricultural raw materials for the production of biofuels. In addition, at the legislative level, it is necessary to solve the issue of the possibility of growing energy crops on degraded and unproductive land plots and make appropriate changes to the regulatory acts, where it is necessary to determine which land plots can be used and which energy crops will contribute to the restoration of their fertility and ensure the steady supply of high-quality raw materials for the production of various types of biomass.

2.3. Legal regulation of biomass processing for energy production

Despite the extensive and multidimensionality of the national legal regulation in the studied sphere, one can see the separate non-system of the relevant norms, the low level of their mutual coherence, and the general declarative nature. This approach, given the importance of further progressive development of alternative energy and bioenergy, is not effective in modern realities, so it is important to find new and update existing views on the issue of legislative support of bioenergy, in order to overcome the problematic aspects existing in this area.

Today, Ukraine, even under the conditions of the ongoing martial law, is one of the largest exporters of a number of energy-containing crops, in particular rapeseed, which, among other things, is used for the production of biodiesel and rapeseed oil. Thus, according to preliminary estimates, the production and export of rapeseed in 2022/2023 became record, which leads to the possibility of shipping about 3.4 million tons of this oil to foreign markets. This is 26% higher than last year's season[32].

[32] Україна експортує рекордний обсяг ріпаку. *АПК-Інформ*. URL: https://www.apk-inform.com/uk/news/1534439 (дата звернення: 10.06.2023 року).

Without minimizing the importance of Ukraine's export activities abroad, it is reasonable to draw attention to the fact that such actions lead to a situation where the added value of products exported from Ukraine is formed on the territory of other states, which, among other things, in the future can import electricity and other final product at significantly higher prices than biomass was sold for their production.

The conclusion about some indifference of the legislator to the settlement of the issue of establishing biomass processing on the territory of our state can be traced to the establishment of minimum or zero rates of export duties for the sale of biomass abroad. For some types of oilseeds (flax, sunflower, and redhead seeds), this rate is set at 10% of the customs value[33], and the export of the already mentioned rapeseed seeds is now taxed at a zero rate.

Such conditions do not stimulate, but may even demotivate the Ukrainian energy sector to process biomass and produce finished products, do not increase the level of energy independence of the state and only create foundations for further increase in the level of exported biomass abroad. In this regard, the legislator should pay attention to the establishment of a biomass processing mechanism, and not only on its production, introducing a number of protection and stimulating mechanisms.

The dual-track legal mechanism of state support provided by the Law of Ukraine "On Alternative Energy Sources", aimed not only at stimulating electricity producers from biomass but also at supporting modern domestic engineering, deserves unconditional positive recognition in this aspect[34]. It is about the mechanism of increase to the "green" tariff for compliance with the level of use of Ukrainian-made equipment at electric power facilities producing electric energy from biomass or biogas put into operation from 01.07.2015 by 31.12.2024[35].

The continuation of the functioning of the existing and introduction of new similar mechanisms will allow exporting for the needs of other states not only biomass itself but a more valuable product, while creating added value in the form of a higher price for the products themselves, jobs, taxes paid, etc. In addition, this would allow to meet Ukraine's own needs in biofuels and other biomass processing products.

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[33] Про ставки вивізного (експортного) мита на насіння деяких видів олійних культур : Закон України від 10 вересня 1999 року. *Відомості Верховної Ради України*. 1999. № 44. Ст. 389.

[34] Платонова Є. О. Правові особливості державного стимулювання біоенергетики в Україні : ретроспектива, сучасність і перспектива. *Юридичний науковий електронний журнал*. 2021. № 5. С. 118.

[35] Про альтернативні джерела енергії : Закон України від 20 лютого 2003 року. *Офіційний вісник України*. 2003. № 12. Ст. 522.

This is especially relevant in the context of the ban (which, nevertheless, is temporary) of the European Commission on the import of Ukrainian agricultural products to individual states of the European Union, given the significantly lower purchase price along with the national market price of the relevant crops[36]. In this context, the creation, development and scaling of a network of capacities that would ensure the processing of biomass on the territory of Ukraine, as an alternative option for the use of products that cannot be widely exported, would make it possible to create both a specified added value and minimize the risk of loss of consumer properties due to the impossibility of any use for needs other than export.

Ignoring the need to establish the process of processing biomass, and not only its production, can in the future lead to deterioration of agricultural potential, in particular, depletion of agricultural land, and the ability of Ukraine to grow any products for its own national needs or export, creating an imbalance of technical crops as opposed to food. After all, although the growing international demand for bioenergy is of particular interest to developing countries and looking for opportunities for economic growth and trade[37], the investment interest of other states in the purchase of Ukrainian products multiplied by state support for growing agricultural products for biomass may have a negative consequence in the form of freezing of Ukrainian bioenergy potential at the raw material level[38].

The issue of preventing deterioration of the land used to obtain biomass, and in general, non-degradation of the ecology level, is a separate problem, which also requires constant attention. This is because the advantages of using and developing bioenergy and biomass processing are in unbroken unity not only with the possibility of reducing greenhouse gas emissions but also with many potentially possible consequences, not less dangerous than from traditional (fossil) energy sources.

Especially critical is the state of land resources of Ukraine, which are widely used in bioenergy. The reasons for this are the violation of the environmentally balanced ratio between the categories of land, the reduction of the territory of unique steppe plots, excessive ploughness of territory and

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[36] Commission adopts exceptional and temporary preventive measures on limited imports from Ukraine. *European Commission.* Brussels, 02 May 2023. URL: https://ec.europa.eu/commission/presscorner/detail/en/ip_23_2562 (дата звернення: 10.06.2023 року).

[37] Павлига А. В. Переробка біомаси для виробництва енергії : законодавче забезпечення та проблемні аспекти. *International scientific journal : "Internauka".* Series : "Juridical sciences". 2021. № 6 (40). С. 13.

[38] Григор'єва Х. А. Державна підтримка сільського господарства України : проблеми правового забезпечення : монографія. Херсон : Видавничий дім "Гельветика", 2019. С. 330.

disturbance of the natural process of soil formation, the use of imperfect technologies in agriculture, industry, energy, transport and other sectors of the economy, the focus on achieving short– and medium-term economic benefits, ignoring the environmental component and negative consequences in the long term[39]. In addition, often the cultivation of energy plants is carried out based on monocultural agriculture, where plants are concentrated in one place, almost without crop rotation[40].

In addition, it should be noted that along with the positive impact on the environment due to the CO_2-neutrality of biofuels, the energy use of biomass can also harm atmospheric air, soils and water bodies. In particular, this is due to excessive consumption of energy resources in the process of biomass production or excessive emissions of pollutants and waste from its burning[41].

The analysis of the scope of legislation regulating the environmental aspects of environmental management gives some hope for the importance of environmental protection and resources. This list includes, among others, the United Nations Framework Convention on Climate Change of 11.06.1992 ratified by Ukraine[42] and the Paris Climate Agreement of 12.12.2015[43], Land Code of Ukraine of 25.10.2001[44], laws of Ukraine "On Environmental Protection" of 25.06.1991[45], "On Land Protection" of 19.06.2003[46], "On State Control over Land Use and Protection" of 19.06.2003[47], "On Environmental Network of Ukraine" of 24.06.2004[48],

[39] Чумаченко І. Є. Еколого-правові вимоги та запобіжники, що забезпечують охорону земель і ґрунтів під час виробництва біомаси. *Юридичний науковий електронний журнал*. 2021. № 5. С. 123.

[40] Трегуб О. А. Модернізація правового регулювання виробництва і використання біомаси на засадах сталого розвитку. *Економіка та право*. 2019. № 3. С. 51.

[41] Виробництво енергії з біомаси в Україні : технології, розвиток, перспективи / за ред. Г. Гелетухи. Київ : Академперіодика, 2022. С. 270.

[42] Рамкова конвенція ООН про зміну клімату (Ріо-де-Жанейро, 11 червня 1992 року), ратифікована Законом України від 29 жовтня 1996 року. *Відомості Верховної Ради України*. 1996. №50. Ст. 277.

[43] Про ратифікацію Паризької угоди : Закон України від 14 липня 2016 року. *Відомості Верховної Ради України*. 2016. № 35. Ст. 595.

[44] Земельний кодекс України від 25 жовтня 2001 року. *Відомості Верховної Ради України*. 2002. № 3-4. Ст. 27.

[45] Про охорону навколишнього природного середовища : Закон України від 25 червня 1991 року. *Відомості Верховної Ради України*. 1991. № 41. Ст. 546.

[46] Про охорону земель : Закон України від 19 червня 2003 року. *Відомості Верховної Ради України*. 2003. № 39. Ст. 350.

[47] Про державний контроль за використанням та охороною земель : Закон України від 19 червня 2003 року. *Відомості Верховної Ради України*. 2003. № 39. Ст. 350.

"On Environmental Impact Assessment" of 23.05.2017[49], "On the Key Principles (Strategy) of the State Environmental Policy of Ukraine for the Period till 2030" of 28.02.2019[50], "On the Principles of Monitoring, Reporting, and Verification of Greenhouse Gas Emissions" of 12.12.2019[51], The Concept of State Climate Change Policy for the Period till 2030, approved by the order of the Cabinet of Ministers of Ukraine of 07.12.2016[52] and other acts. Despite a significant number of norms and scope of legislation, now none of the above or other laws or by-laws does not address this issue.

Special attention should be paid to the laws of Ukraine adopted in recent years "On the Key Principles (Strategy) of the State Environmental Policy of Ukraine for the Period till 2030", which stated the presence of serious environmental problems, in particular the non-compliance of the use of land resources of Ukraine with the requirements of rational nature management[53], and proposed separate, but in some cases still declarative, ways to solve them, and "On Environmental Impact Assessment", which establishes the legal and organizational basis for environmental impact assessment, in particular, it defines the most important and most invasive areas of activity for which such an assessment is carried out[54]. At the same time, although such attention to environmental legislation is generally positive, the latest legislative act does not provide for the dissemination of the need to carry out an appropriate assessment when using natural resources for bioenergy needs, which is rather illogical.

In terms of the conservation of land resources, it is worth paying attention to the 2009/28/ЄС Directive's prohibition on the production of biofuels from raw materials grown on lands of increased importance for the conservation of

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[48] Про екологічну мережу : Закон України від 24 червня 2004 року. *Відомості Верховної Ради України*. 2004. № 45. Ст. 502.

[49] Про оцінку впливу на довкілля : Закон України від 23 травня 2017 року. *Відомості Верховної Ради України.* 2017. № 29. Ст. 315.

[50] Про Основні засади (стратегію) державної екологічної політики України на період до 2030 року : Закон України від 28 лютого 2019 року. *Відомості Верховної Ради України*. 2019. № 16. Ст.70.

[51] Про засади моніторингу, звітності та верифікації викидів парникових газів : Закон України від 12 грудня 2019 року. *Відомості Верховної Ради України.* 2020. № 22. Ст. 150.

[52] Про схвалення Концепції реалізації державної політики у сфері зміни клімату на період до 2030 року : розпорядження Кабінету Міністрів України від 07 грудня 2016 року № 932-р. *Офіційний вісник України*. 2016. № 99. Стор. 269. Ст. 3236.

[53] Про Основні засади (стратегію) державної екологічної політики України на період до 2030 року : Закон України від 28 лютого 2019 року. *Відомості Верховної Ради України*. 2019. № 16. Ст. 70.

[54] Про оцінку впливу на довкілля : Закон України від 23 травня 2017 року. *Відомості Верховної Ради України.* 2017. № 29. Ст. 315.

biological diversity[55], the provisions of which also correspond to the Convention on the Protection of Biological Diversity of 05.06.1992[56]. Although national legislation does not provide for such a ban, however, the adoption of such provisions is quite promising in terms of the rational use of natural resources and the need to preserve land of increased value.

These examples are only one of many possible negative consequences of inconsistent construction of bioenergy relations, which is not provided by proper legal mechanisms and restrictions. Because of this, for Ukraine, it is updated the necessity of building a stable and effective model of bioenergy legislation, which would become a strong support for the further possibility of obtaining energy and other final products by biomass processing, without creating a threat of depletion of natural resources or the onset of other environmentally threatening conditions.

It should be noted that the international obligations of Ukraine, especially on the adaptation of the current legislation to EU standards and rules, have become a very powerful driver of the development of legislation in Ukraine, particularly in the area of alternative and bioenergy. Most of the legislative amendments and rules adopted before 2000 were quite declarative and ineffective. It was a confident course for the EU that led to a more consistent and systematic policy on the development of bioenergy legislation, taking into account the world practice and dynamics of alternative energy.

Nevertheless, Ukraine now needs to find its own theoretically and practically proved way of developing and constructing bioenergy legislation, since neither simple mimicry of European legislation nor blind copying of foreign experience can form such a legislative framework that would take into account all the peculiarities of the development of our state and could ideally integrate into the national legal system. Using other approaches can lead to the transformation of bioenergy from a "green" activity to another heavy burden on the environment and society[57].

It is worth paying attention to the need for constant legislative improvement of relations in the area of alternative energy and bioenergy

[55] Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 "On the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC". *Official Journal of the European Communities*. 2009. L 140/16. URL: https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:140:0016:0062:en:PDF (дата звернення: 10.06.2023 року).

[56] Конвенція про охорону біологічного різноманіття (Ріо-де-Жанейро, 05 червня 1992 року), ратифікована Законом України від 29 листопада 1994 року. *Відомості Верховної Ради України*. 1994. № 49. Ст. 433.

[57] Харитонова Т. Є., Григор'єва Х. А. Біоенергетичне законодавство в Україні – перспектива бути. *П'яте зібрання фахівців споріднених кафедр з проблем аграрного, земельного, екологічного, природоресурсного права та альтернативної енергетики* : матеріали Всеукраїнської наукової конференції (м. Одеса, 10–13 червня 2021 року) / відп. ред. Т. Є. Харитонова, Х. А. Григор'єва. Одеса : Видавничий дім "Гельветика", 2021. С. 103.

since the economic, social, environmental, and energy challenges facing modern society are constantly transformed by demanding new ideas, ambitious goals, and constant attention. That is why it is critical to develop new approaches that can become a strong support for the development of bioenergy legislation and create prospects for the energy independence of Ukraine and the civilized world. Modern legislation preserves the raw material type of bioenergy development in Ukraine. That is why the priority is the further development of effective legal mechanisms aimed at effectively stimulating the processing of biomass in Ukraine into biofuels.

2.4. Legal peculiarities of state support for bioenergy in Ukraine

Ukraine has little use of its agricultural potential for the development of bioenergy – in the structure of renewable generation bioenergy is much inferior to solar and even wind. There are several reasons for this.

First, bioenergy is not as attractive for investment: a) due to a significant dependence on unstable raw materials supply; b) often requires the involvement of many partners and counterparties (biomass manufacturers and suppliers, etc.); c) has a multi-stage internal structure (biomass production, its processing, fuel or energy production). In Ukraine, all these stages are unevenly developed: the raw material component dominates significantly. Therefore, biomass is produced in Ukraine, but its further bioenergy processing is carried out abroad. This practice, when scaled, is negative, since Ukraine loses added value.

Secondly, the general turbulence of the legislative field is very negatively reflected in such conservative relations as agrarian. This statement applies to both unstable legislation in the area of alternative energy in general and special protection mechanisms in particular[58].

Social relations in the area of bioenergy, which arose as a result of the objective need to find ways to replace traditional energy sources with more environmentally acceptable ones, needed proper program legal regulation and implementation of measures to ensure state support for their development.

In Ukraine, attention to bioenergy began to be paid in the middle of the 1990s. At the same time, the first steps were taken to develop it and the first legislative legal acts appeared, and some conceptual and programmatic documents were adopted, the implementation of which was supposed to contribute to the spread of the use and stimulation of biological fuels. Thus,

[58] Звіт про науково-дослідну роботу за договором від 28 квітня 2021 року № 30/02/0360 “Альтернативна енергетика в Україні : шляхи системного законодавчого стимулювання”. Одеса, 2021. 185 с.

the Comprehensive State Energy Saving Program of Ukraine No. 148, which the Cabinet Ministers of Ukraine approved on February 5, 1997[59], contains separate instructions regarding the use of biomass and other types of non-conventional fuels, which can provide a significant part of the needs for thermal and electric energy. However, taking into account the programmatic nature of this document, most of its provisions were general and did not contain clear mechanisms for their implementation.

An important segment of bioenergy in Ukraine is the production and consumption of liquid biofuels for the needs of agriculture, industry, and transport. Despite this, over the past 20 years, only a few relevant programs have been developed and approved by the Cabinet of Ministers of Ukraine, including the Ethanol Program of July 4, 2000, No. 1044 (has expired on January 13, 2011) and the Diesel Biofuels Development Program of December 22, 2006, № 1774. However, their implementation was not successful in terms of achieving their goals[60].

Thus, the Ethanol Program provided for the expansion of the use of ethyl alcohol as an energy carrier and raw materials for industry. For its implementation, the production of bioethanol was organized at the state alcohol plants of the Ukrspyrt concern, and several regulatory and technical documents for mixed motor fuels with a certain content of bioethanol were developed. However, due to the absence of a legislative settlement of the mandatory use of bioethanol for the production of mixed motor fuels, a significant rise in the price of raw materials (molasses) and because of the discovery of a significant number of fakes on the fuel market, the production of bioethanol was stopped on January 1, 2005. Unfortunately, the production of bioethanol and biodiesel has not yet become widespread in Ukraine.

In turn, the main emphasis of the Program for the Development of the Production of Diesel Biofuels was placed on the creation of a raw material base for the production of biodiesel from rape, namely: expanding the area of rapeseed cultivation, increasing its yield, creating areas of concentrated rapeseed cultivation to bring raw materials closer to the places of production of diesel biofuels. At the time of the adoption of this program, the Cabinet of Ministers of Ukraine was not concerned with the need to achieve a balance of environmental, economic, and social interests in the targeted production of biomass for biofuels. In addition, the vector was not

[59]Про Комплексну державну програму енергозбереження України : постанова Кабінету Міністрів України від 05 лютого 1997 р. № 148. *Офіційний вісник України*. 1997. № 6. Ст. 945.

[60]Гелетуха Г. Г. Основні тенденції та перспективи розвитку ринку моторних біопалив в ЄС та в Україні. *Теплофізика та теплоенергетика*. 2020. Т. 42, № 1. С. 69–75.

taken into account for the need to work out the tasks of creating mechanisms to stimulate not only the cultivation of energy crops to increase the production of biofuels but also the subsequent processing of biomass[61].

The significant program documents for the further development of the relations of production and use of biofuels, as well as attempts to take measures of state support for bioenergy were the following: The Concept of the State target scientific and technical program for the development of the production and use of biological fuels, approved by the Order of the Cabinet of Ministers of Ukraine of February 12, 2009 No. 276-p (however, the Program itself was not adopted) and the State Targeted Economic Program for Energy Efficiency and the Development of Energy Production from Renewable Energy Sources and Alternative Fuels for 2010–2021, approved by Resolution of the Cabinet of Ministers of Ukraine of March 1, 2010 No. 243.

The main tasks of this State target economic program include measures to implement plant construction projects: for the production of biodiesel and fuel bioethanol, as well as solid biofuels and biogas; implementation of pilot projects for the construction of power generation plants using biomass energy; development of feasibility study and construction project of a typical modern mini-CHP, powered by biomass and other alternative fuels[62].

Ukraine's accession to the Agreement on the Establishment of the Energy Community and subsequent ratification of the Association Agreement between our state and the EU required slightly different approaches to energy regulation, founded on the basic principles adopted by the EU countries, to develop documents of strategic planning and practical activities on the implementation of state policy in the energy sector, in particular, the introduction of conceptual approaches to stimulate the development of bioenergy.

The most striking program documents aimed at the further development of bioenergy include: the State Program for the Development of Domestic Production, approved by the Resolution of the Cabinet of Ministers of Ukraine of September 12, 2011 No. 1130; The National Renewable Energy Action Plan for the period up to 2020, approved by the Order of the Cabinet of Ministers of Ukraine of October 1, 2014 No. 902-p and the Energy Strategy of Ukraine for the period up to 2035 "Security, energy efficiency,

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[61] Григор'єва Х. А. Державна підтримка сільського господарства України : проблеми правового забезпечення : монографія. Херсон : Видавничий дім "Гельветика", 2019. 596 с.

[62] Про затвердження Державної цільової економічної програми енергоефективності і розвитку сфери виробництва енергоносіїв з відновлюваних джерел енергії та альтернативних видів палива на 2010-2021 роки : постанова Кабінету Міністрів України від 01 березня 2010 року № 243. *Офіційний вісник України*. 2010. № 16. Ст. 762.

competitiveness", approved by the Order of Cabinet of Ministers of Ukraine of August 18, 2017 No. 605-p. The peculiarities of these documents were that despite the recognition of bioenergy by the industry, which has one of the largest development potentials, due to the peculiarities of the climate, the potential of the agricultural sector, and the availability of the necessary labor force, they did not provide for specific mechanisms for implementing the strategic measures that are provided for in them, did not contain an integrated approach to solving the issue of providing state support for the development of bioenergy.

The above analysis of conceptual, program, and strategic documents, which act as a legal form of implementation of the energy policy of the state in the area of development of production and use of biological fuels, makes it possible to conclude that they are declarative and, as a result, have rather low efficiency. It is due to the high degree of generalization of their provisions, sometimes fragmentary and inconsistent nature of measures aimed at stimulating the development of bioenergy relations, lack of clear mechanisms, and timing of their implementation. A significant miscalculation is ignoring the problems of the ratio of environmental, energy, and social interests during the production of biofuels, which significantly complicates the introduction of European regulations and standards of sustainable development to the domestic bioenergy industry. To ensure state support for the development of the bioenergy industry and to determine the sources of its financing, it is possible to adopt the State target program for the development of the production and use of biological fuels, as well as to develop a mechanism for the implementation of the measures that will be provided for in it. The condition for the successful development of bioenergy is the formation of a holistic strategic vision for the use of the bioenergy potential available in the country, taking into account possible financial, economic, environmental, and other risks and threats, the introduction of a systematic and consistent state policy to stimulate the development of bioenergy relations[63].

The specifics of legal mechanisms to stimulate the use of biofuels among other types of alternative fuels will be influenced to some extent by the fact that the regulation of its production is carried out mainly by agricultural legislation as an agricultural activity. The production of other types of alternative fuels is successfully regulated by economic, natural

[63] Платонова Є. О. Особливості програмного забезпечення державної підтримки біоенергетики в Україні. *Наука та суспільне життя України в епоху глобальних викликів людства у цифрову еру* (з нагоди 30-річчя проголошення незалежності України та 25-річчя прийняття Конституції України) : у 2 т. : матеріали Міжнар. наук.-практ. конф. (м. Одеса, 21 травня 2021 року) / за загальною редакцією С. В. Ківалова. Одеса : Видавничий дім "Гельветика", 2021. Т. 1. С. 553–556.

resource, environmental legislation. That is why there are common protection mechanisms that apply to all types of alternative energy, as well as special ones that reflect the peculiarities of bioenergy production.

Today, the main stimulating tool of public policy aimed at generating electricity from biomass is the application of the *"green" tariff*. Undoubtedly, a significant drawback of the "green" tariff is the establishment of a coefficient for energy from biogas and biomass without its differentiation by species. More expedient is the need to differentiate the value of the "green" tariff coefficient and establish a higher amount of electricity obtained from those types of biomass in which the state is more interested. For example, to establish the highest coefficient of the "green" tariff for electricity obtained from biomass of agricultural origin (crop waste, animal husbandry, recycling waste, energy crops). Set lower coefficients for electricity obtained from municipal and industrial waste, as well as waste from the wood industry[64].

In addition, the current mechanism for stimulating the production of electric energy from biomass on the basis of the "green" tariff is still almost insensitive to the features of the sustainable development of this area. For example, the size of the "green" tariff for economic entities that produce electric energy from biomass or biogas differs in terms of the time of commissioning of objects or their queues and the level of use of Ukrainian-made equipment, but does not depend on the place of origin of energy raw materials, its generation, etc.

Currently, European legislation uses a legal mechanism aimed at solving the problems of the ratio of environmental, energy, and social interests during the production of biofuels. Thus, under Directive 2009/28/ЄС, the following criteria were established that were to be met: indicators of greenhouse gas emissions reduction, indicators of biomass sustainability, and social sustainability of biofuels.

The adoption of Directive 2018/2001 in December 2018[65], which was key to the field of alternative energy sources, marked the emergence of a new generation of sustainability criteria that meet the challenges of time. Some novelties of this Directive in ensuring the sustainability of biofuels are in demand today and correspond to the peculiarities of the situation in

[64] Рудь Ю. М. Правове регулювання енергозбереження у сільському господарстві України : автореф. дис. на здобуття наук. ступеня канд. юрид. наук : 12.00.06. Київ, 2015. 18 с.

[65] Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources (recast). *Official Journal of the European Union*. 2018. L 328. P. 82-209. URL: https://eurlex.europa.eu/legalcontent/EN/TXT/?uri=uriserv:OJ.L_.2018.328.01.0082.01.ENG (дата звернення: 10.06.2023 року).

Ukraine. These are progressive solutions such as extending sustainability criteria to solid biofuels and introducing special criteria for biofuels derived from forest biomass. It seems that the introduction of sustainability criteria in our country will create prerequisites for improving the mechanism for stimulating the production of electric energy from biomass based on the "green" tariff[66].

The inconsistent state policy and the unapproved position of the legislator are also evidenced by certain provisions of the current legislation that restrict the rights to receive a "green" tariff of new electricity producers from biomass and biogas, which will begin work from January 01, 2023. After all, for manufacturers of electric energy from biomass and/or biogas, the main incentive so far remains the "green" tariff, and not the right to participate in the auction on the distribution of support.

We should perceive positively the dual-track legal mechanism of state support, aimed not only at stimulating producers of electricity from biomass but also at supporting modern domestic engineering provided by the Law of Ukraine "On Alternative Energy Sources". We are talking about the *mechanism of an increase in the "green" tariff*, the auction price for compliance with the level of use of Ukrainian-made equipment at electric power facilities producing electric energy from biomass or biogas, put into operation from July 1, 2015 to December 31, 2024. The surcharge is fixed as a percentage of the surcharge to the "green" tariff, the auction price is proportional to the level of use of Ukrainian-made equipment at the relevant power industry facility (in the amount of 5 – 20%)[67].

Code and Customs Code of Ukraine), which allows us to approve the development of the current legal mechanism for state support for bioenergy, the elements of which are the provision of tax and customs benefits. Thus, according to paragraph 197.16 of Article 197 of Section V of the Tax Code of Ukraine[68], is an *exemption from value-added tax for transactions on import* into the customs territory of Ukraine, as well as paragraphs 14 and

[66] Платонова Є. О. Тенденції стимулювання розвитку біоенергетики в Україні на засадах сталого розвитку. *Актуальні питання стратегії державної екологічної політики України на період до 2030 року* : матеріали "круглого столу" (Харків, 21 трав. 2021 р.) / за заг. ред. А. П . Гетьмана та М. В . Шульги ; М-во освіти і науки; Нац. акад. прав. наук України; Нац. юрид. ун-т ім. Ярослава Мудрого, Каф. екол. права, Каф. земел. та аграр. права. Харків : Право, 2021. С. 258–262

[67] Про альтернативні джерела енергії : Закон України від 20 лютого 2003 року. *Офіційний вісник України*. 2003. № 12. Ст. 522.

[68] Податковий кодекс України від 02 грудня 2010 року. *Відомості Верховної Ради України*. 2011. № 13-14, № 15-16, № 17. Ст. 112.

16 of Part 1 of Article 282 of the Tax Code of Ukraine[69] *exemption when importing* into the customs territory of Ukraine or exporting outside its borders:

a) energy-saving equipment and materials, means of measuring, monitoring and managing the consumption of fuel and energy resources, equipment and materials for the production of alternative fuels or for the production of energy from renewable energy sources; b) materials, equipment, components used for the production of materials, raw materials, equipment and components that will be used in the production of alternative fuels or energy production from renewable energy sources. The condition of exemption from taxation of these goods is that they are used by the taxpayer for their own production and if identical goods with similar quality indicators are not produced in Ukraine.

The list of goods under consideration contains the resolution of the Cabinet of Ministers of Ukraine "Issues of import into the customs territory of Ukraine of energy-saving materials, equipment, facilities, and components according to projects of demonstration of Japanese technologies" of March 30, 2016 No. 293[70]. However, this List does not indicate energy-saving equipment and materials, equipment, and materials for the production of alternative fuels or for the production of energy from renewable sources, which complicates its implementation.

However, along with the generally positive direction of fiscal policy in the bioenergy industry, it has certain disadvantages. This applies to the abolition or urgent restriction of many tax and customs benefits in the area of bioenergy. Thus, in retrospect, some legal support mechanisms that were provided for by the previously existing legislation have the potential. Thus, in paragraph 158.1 of Article 158 of the Tax Code of Ukraine it was established that 80% of the profits of enterprises obtained from the sale of goods of their own production on the customs territory of Ukraine were exempt from taxation according to the list established by the Cabinet of Ministers of Ukraine, in particular: equipment running on renewable energy sources; materials, raw materials, equipment and components that will be used in the production of energy from renewable energy sources; equipment for the production of alternative fuels. Undoubtedly, such an order had a significant stimulating effect on the development of the bioenergy industry. However, the Law of Ukraine "On Amendments to the Tax Code of Ukraine and Certain Legislative Acts of Ukraine on Tax Reform" of

[69] Митний кодекс України від 13 березня 2012 року. *Відомості Верховної Ради України*. 2012. № 44-45, № 46-47, № 48. Ст. 552.

[70] Питання ввезення на митну територію України енергозберігаючих матеріалів, обладнання, устаткування та комплектувальних виробів за проектами демонстрації японських технологій : постанова Кабінету Міністрів України від 30 березня 2016 року № 293. *Урядовий кур'єр*. 2016. № 72.

December 28, 2014, excluded the specified norm from the Tax Code of Ukraine.

A significant support was the exemption of biofuels producers from taxation of profits received from the sale of biofuels (this direction of support was provided for in paragraph 15 Section 4 p. XX Tax Code of Ukraine and was supposed to act until January 1, 2020, but these benefits were prematurely canceled by the Law of December 28, 2014)[71].

In addition, temporarily until January 1, 2019, import operations were exempted from VAT and import duty when imported into the customs territory of Ukraine and placed in the customs mode of import – machinery, equipment, and facilities used for reconstruction of existing and construction of new enterprises for the production of biofuels, which are classified according to the UCC FEA codes defined by Article 7 of the Law of Ukraine "On Alternative Fuels", if such goods are not produced and have no analogs in Ukraine. The specified term limit is generally assessed negatively, in connection with which it is proposed to consolidate the above-mentioned tax and customs benefits without limiting their validity[72].

Given the existing state of bioenergy development in the country, the abolition or urgent restriction of these benefits contradicts the general direction of the state policy to stimulate the transition to alternative energy sources, including biological fuels[73].

Considering the problems of stimulating the bioenergy complex, the issues of organizational and legal support for the production, processing and sale of biofuels also remain extremely important. Currently, it is extremely necessary to fully use the powerful potential of the cooperative organizational and legal form for the effective functioning of energy relations. Thus, the most successful and optimal organizational and legal form of biofuels production and supply is the introduction of active creation of energy cooperatives in the country[74]. The first attempt to start the

[71] Про внесення змін до Податкового кодексу України та деяких законодавчих актів України щодо податкової реформи : Закон України від 28 грудня 2014 року. *Відомості Верховної Ради*. 2015. № 7-8, № 9. Ст. 55.

[72] Оболєнська С. А. Про державну підтримку виробництва біопалива сільськогосподарськими товаровиробниками: організаційно-правові питання. *Юридичний науковий електронний журнал.* 2017. № 1. С. 69–72.

[73] Платонова Є. О. Правові особливості державного стимулювання біоенергетики в Україні : ретроспектива, сучасність та перспектива. *Юридичний науковий електронний журнал.* № 5. 2021. С. 116–121.

[74] Григор'єва Х. А. Енергетична кооперація як організаційно-правове втілення концепції енергетичного переходу. *Філософські, методологічні та психологічні проблеми права :* збірник матеріалів VIII Всеукр. наук.-теорет. конф. (м. Київ, 26 листопада 2020 року). Київ : Нац. акад. внутр. справ, 2020. С. 88–91.

development of legal foundations of energy cooperation in Ukraine was the introduction in 2019 of amendments and additions to the Law of Ukraine "On Alternative Energy Sources" on the definition of the concept of an energy cooperative and the inclusion of such cooperatives in the list of subjects of stimulating the production of electric energy from alternative sources based on the "green" tariff. It appears that the organizational and legal model of creating energy cooperatives is the most adequate and flexible for servicing bioenergy relations because it allows individual producers of biofuels to maintain economic autonomy and, at the same time, take advantage of those opportunities that are available only in large associations.

Promising directions of modernization of organizational state support of bioenergy in Ukraine are: formation and provision of activities of electronic markets of biofuels, and biomass; introduction of a competitive thermal energy market; providing state support to economic entities growing energy plants; exemption from tax for emissions CO_2 biofuel burning plants[75]. In addition, the proposal on the need to adopt the Law of Ukraine "On the Production and Sale of Biofuels", which should determine the basic principles of biomass production (formation), its processing into biofuels and electricity, and their implementation[76], deserves support. It appears that the central element of this Law should be the regulation of providing systemic state support to biofuel producers and summarizing the list of types of their stimulation. At the same time, the manifestations of the production and use of biomass as an energy source in terms of environmental, social, energy, and other interests of society should be taken into account in the area of introducing legal mechanisms for their stimulation.

2.5. Legal criteria for sustainability of biofuels

The non-linear development of bioenergy in the world and the ambiguous attitude toward it are due to several main factors. Firstly, this is facilitated by the significant differentiation of the industry depending on the specific energy source (vegetable biomass, waste vegetable oils, agricultural or forestry waste, etc.). Secondly, as a result of relentless scientific progress, new knowledge in this area is constantly generated. "Initial enthusiasm" for

[75] Пастух А. Правове регулювання державної підтримки вирощування енергетичних рослин в Україні. *Підприємництво, господарство і право.* 2020. № 6. С. 91–96.

[76] Григор'єва Х. А. Концептуальні засади правового регулювання державної підтримки сільського господарства в України : автореф. дис. на здобуття наук. ступеня докт. юрид. наук: 12.00.06. Одеса, 2020. 39 с.

biofuels quickly subsided in the context of its significant environmental and social costs[77]. In particular, due to many studies, it has been proved that the effectiveness of bioenergy in combating climate change is ambiguous and has very significant conditions. This situation is most clearly illustrated by the legal experience of the EU.

The adoption of the Directive 2009/28/ЄС of the European Parliament and the Council of April 23, 2009, on promoting the use of energy from renewable sources (Renewable Energy *Directive* – RED I)[78] provided a powerful impetus for the development of bioenergy not only in the EU itself but also in many other countries – exporters of biofuels or raw materials necessary for its manufacture. Established by the legislation renewable energy targets in the transport sector have made Europe a significant producer and consumer of biofuels[79]. This gave reason to talk about the extraterritoriality of the consequences of EU legislation[80]. In many parts of the planet, the EU's legal decisions to activate bioenergy have attracted a rapid increase in the production of the necessary raw materials – palm oil, soybeans, rape, etc. Very indicative of this is the example of Ukraine: if before the publication of RED I – by 2009, about 600 thousand tons of rapeseed were grown in our country annually, then already in the first season of the European resolution, the harvest of this crop in Ukraine grew five times and amounted to about 3 million tons.

However, such a rapid increase in demand and supply for biomass quickly caused negative environmental consequences, concentrated in the concept of indirect land use changes (Indirect Land Use Changes – ILUC). It took a decade to identify, analyze and understand this specific bioenergy problem.

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[77] Mignolli A. The European Union and Sustainable Development : A Study on Unilateral Trade Measures. Edizioni Nuova Cultura, 2018. P. 230.

[78] Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC. URL: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32009L0028&qid=1687423459680 (дата звернення: 10.06.2023 року).

[79] Tyson A., Meganingtyas E. The Status of Palm Oil under the European Union's Renewable Energy Directive : Sustainability or Protectionism? *Bulletin of Indonesian Economic Studies*. 2022. Vol. 58. Issue 1.

[80] Elisabeth V. Henn. Protecting forests or saving trees? The EU's regulatory approach to global deforestation. *Review of European, Comparative & International Environmental Law.* 2021. Vol. 30. Issue 3.; Emily Webster. Transnational legal processes, the EU and RED II: Strengthening the global governance of bioenergy. *Review of European, Comparative & International Environmental Law.* 2020. Vol. 29. Issue 1. Special Issue : Water Protection and Armed Conflicts in International Law. P. 86–94.

Based on the conclusions made, the legislation was adjusted. In particular, in 2018, a Directive (ЄС) 2018/2001 was adopted by the European Parliament and the Council on December 11, 2018, on promoting the use of energy from renewable sources (RED II)[81], which established criteria for the sustainability of biomass aimed at minimizing negative manifestations of bioenergy. The new Directive marked a fundamental revision of the basic principles of the further development of bioenergy – not only in the EU but also in the countries – donors of raw materials. Such countries include Ukraine (about 80 – 90% of the domestic rapeseed crop is exported to the EU countries annually). If the previous RED I set two main sustainability criteria for biofuels (reducing greenhouse gas emissions and *direct changes* in land use), then the current RED II added *indirect changes* in land use to the sustainability criteria. Direct land use changes occur when new agricultural land use is observed and "raw materials produced on this land are used for bioenergy", whereas indirect land use changes that RED II focuses on, occur when "the system must adapt to meet the increased demand for bioenergy raw materials", which also increases emissions[82]. It was the latter criterion that caused the most discussions because by 2030 the EU will gradually abandon raw biofuels, the production of which is associated with a high risk of ILUC.

The RED II found that *"biofuels, liquid biofuels and biofuels with a low indirect risk of land use change are biofuels, liquid biofuels and fuel from biomass, for which raw materials were produced as part of the schemes, avoiding the effect of displacement of biofuels based on food and feed crops, liquid biofuels and fuels from biomass through improvements in agricultural practices, as well as by growing crops in areas not previously used for growing crops, and which were produced according to the sustainability criteria for biofuels, biofuels and fuels from biomass set out in Article 29 of the Directive*"[83]. That is, three characteristics of biofuel with

[81] Directive (EU) 2018/2001 of the European Parliament and of the Councilof 11 December 2018on the promotion of the use of energy from renewable sources. URL: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32018L2001&qid=1687294958920 (дата звернення: 10.06.2023 року).

[82] El Takriti, Sammy, Chris Malins and Stephanie Searle. Understanding Options for ILUC Mitigation. Working Paper 2016–23, International Council on Clean Transportation, November. URL: https://www.theicct.org/sites/default/files/ publications/ILUC-Mitigation-Options_ICCT_nov2016.pdf (дата звернення: 10.06.2023 року).

[83] Directive (EU) 2018/2001 of the European Parliament and of the Councilof 11 December 2018on the promotion of the use of energy from renewable sources. URL: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32018L2001&qid=1687294958920 (дата звернення: 10.06.2023 року).

low-risk ILUC were identified: a) avoiding competition with food and feed crops, b) growing biomass on land not used in agricultural production, c) meeting many sustainability criteria provided for in the expanded Article 29 of the Directive.

European integration processes require Ukraine to adapt to the relevant norms on the sustainability of biofuels. However, this adaptation should not be reduced to mechanical dubbing. That is why there is an urgent need to investigate the modern criteria for the sustainability of biomass not only theoretically, but through the prism of the peculiarities of national land relations.

Avoiding competition with food and feed crops. The European Commission stated the ILUC arises *when "pastures or agricultural land formerly reserved for food and feed markets are diverted to biomass fuel production"*[84]. The creation of plantations for the cultivation of energy crops may involve the attraction of land previously allocated for the production of food and feed. Therefore, planting in high-carbon areas such as forests, peatlands, and wetlands may be required to meet food demand. This releases more carbon dioxide, which can negate the saving of greenhouse gas emissions from biofuels[85]. Compliance with this criterion is reflected in the dynamics of expansion of areas, changes in the structure and ratio of crops. However, the analysis of this criterion demonstrates several specific features inherent in Ukrainian realities.

First, if the European legislator is concerned primarily about avoiding or reducing territorial competition between energy and agricultural crops, then in Ukraine, within the framework of this criterion, it is appropriate to shift the emphasis towards preserving soil fertility during bioenergy production. This is due to the slow and still unresolved problem of observing rotations. Regular crop alternation in the fields is a necessary condition for sustainable farming. However, domestic legislation left this issue practically at the discretion of the owner or land user.

Thus, in 2009, the Law of Ukraine "On Amendments to Certain Legislative Acts of Ukraine on the Preservation of Soil Fertility" was adopted, which attempted to strengthen the ecological and economic foundations of agricultural land use. In particular, this Law introduced, firstly, the obligatory use of agricultural land plots for commercial agricultural production *"in accordance with land management projects*

[84] European Commission. 2019b. 'Sustainability Criteria for Biofuels Specified'. Memo. 13 March. URL: https://ec.europa.eu/commission/presscorner/detail/en/MEMO_19_1656 (дата звернення: 10.06.2023 року).

[85] Tyson A., Meganingtyas E. The Status of Palm Oil under the European Union's Renewable Energy Directive : Sustainability or Protectionism? *Bulletin of Indonesian Economic Studies*. 2022. Vol. 58. Issue 1.

developed and approved in accordance with the established procedure, providing for ecological and economic justification of crop rotation and landscaping of land and providing for land protection measures"[86]*;* secondly, the standards for the optimal ratio of crops in crop rotation were established, which determined the *"structure of sown areas for various natural and agricultural regions and the list of established crops for cultivation in these regions"*[87]. In order to implement these legislative provisions, Resolutions of the Cabinet of Ministers of Ukraine "On Approval of the Standards for the Optimal Ratio of Crops in Crop Rotation in Different Natural-Agricultural Regions" of February 11, 2010 No. 164[88] and "On Approval of the Procedure for the Development of Land Management Projects Providing Ecological and Economic Justification for Crop Rotation and Land Landscaping" of November 2, 2011 No. 1134[89].

The analysis of the judicial practice of those years (2009 – 2016) demonstrates the peculiarities of the application of the relevant provisions, namely, the ambiguity of legal consequences. In particular, the violation of the percentage of crops was recognized as a sufficient basis for the termination of rental relations. That is, the formal violation of certain numerical indicators had an automatic legal result.

However, on the other hand, Part 4 of Article 22 of the Law of Ukraine provided for the *obligation* to use land plots for commercial agricultural production based on land management projects that provide an ecological and economic justification for *crop rotation* and streamline land. However, violation of this obligation – the absence of such a project did not become the basis for termination of the lease agreement, because the court considered it necessary to prove *"what are the rights of the plaintiff violated by the lack of land management projects rotation"*[90].

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[86] Про внесення змін до деяких законодавчих актів України щодо збереження родючості ґрунтів : Закон України від 04.06.2009 року. *Відомості Верховної Ради України. 2009. № 47-48. Ст. 719.*

[87] Про внесення змін до деяких законодавчих актів України щодо збереження родючості ґрунтів : Закон України від 04.06.2009 року. *Відомості Верховної Ради України. 2009. № 47-48. Ст. 719.*

[88] Про затвердження нормативів оптимального співвідношення культур у сівозмінах в різних природно-сільськогосподарських регіонах : постанова Кабінету Міністрів України від 11 лютого 2010 року № 164. *Урядовий кур'єр*. 2010. № 44.

[89] Про затвердження Порядку розроблення проектів землеустрою, що забезпечують еколого-економічне обґрунтування сівозміни та впорядкування угідь : постанова Кабінету Міністрів України від 02 листопада 2011 року № 1134. *Урядовий кур'єр*. 2011. № 214 *(втратила чинність).*

[90] Рішення Білоцерківського міськрайонного суду Київської області від 12 квітня 2017 року у справі № 357/478/17. URL: https://zakononline.com.ua/court-decisions/show/65956525 (дата звернення: 10.06.2023 року).

Of course, this variability in understanding the environmental-oriented norms of land legislation did not contribute to the establishment of relevant farming practices. Moreover, such duties were perceived as negative "ways for agribusiness", and therefore the Law of Ukraine "On Amendments to Certain Legislative Acts on Facilitation of Business (Deregulation)" of February 12, 2015, abolished the obligation to comply with the standards of the optimal ratio of crops in crop rotation and develop land management projects that provide an ecological and economic justification for crop rotation and streamline land. This made the provisions of the Law of Ukraine "On Land Management" and the Resolution of the Cabinet of Ministers of Ukraine "harmless", that is, advisory.

Changes in legislation were immediately reflected in judicial practice. Analysis of court decisions for the period from 2016 to date indicates the dominance of other approaches, namely: the violation of crop rotation is not a self-sufficient basis for the identification of an offense – there should be a fact of damage to the owner or land user due to a decrease in the fertility of the land plot caused by the violation of crop rotation[91].

For modern Ukraine, compliance with crop rotations is more of an actual, not a legal problem. That is, it is assumed that the owners and land users themselves are interested in carrying out crop rotation, because this keeps the fertility of their lands at the proper level. For modern Ukraine, compliance with crop rotations is more of an actual, not a legal problem. That is, it is assumed that the owners and land users themselves are interested in carrying out crop rotation, because this keeps the fertility of their lands at the proper level. However, in conditions of prevailing rental land use, such logical fuses do not always work. Therefore, in Ukraine, the violation of crop rotation and optimal ratios of crops is a common phenomenon. Given this objective background, it should be realized that the stimulation of bioenergy (through special programs, legal mechanisms, or due to market levers such as demand growth) will entail an additional burden on the environmental component of domestic land use. In this regard, for Ukraine, any protective legal initiatives on bioenergy should be carefully evaluated through the prism of national protective features of the agrarian-land system.

War has no less impact on this relationship. Such an effect is also manifested in relation to the cultivation of the main energy crop, which is rapeseed. Rapeseed is used annually in about 1 million hectares of arable land in Ukraine. At the same time, the optimal order of crop rotation for

[91] Постанова Верховного Суду від 12 серпня 2020 року у справі № 636/5001/18. URL: https://zakononline.com.ua/court-decisions/show/91063497 (дата звернення: 10.06.2023 року).

rapeseed is no more than once every four years. In the conditions of warfare on the territory of Ukraine, crop rotation violations are much more frequent, because the issues of profitability, cost of seeds, plant protection, cultivation, logistics, etc. come to the fore. Agribusiness is trying to survive under difficult conditions of military instability, but this pushes environmental requirements for soil conservation to the background. This problem is already escalating and requires an adequate response. In particular, during the 2022–2023 military season, the crops of rapeseed have already increased.

That is, in Ukraine, the first criterion for the sustainability of biofuels risks remaining a declarative norm due to the lack of necessary legal and institutional mechanisms for organizing crop rotation and the ratios of food, feed and energy crops.

Use of land that was not involved in agricultural production. Cultivation on degraded lands can reduce the ecological burden that bioenergy exerts, but there is no consensus on which lands are considered degraded, and this creates uncertainty about which lands can be cultivated[92]. First of all, we are talking about lands that have dropped out of agricultural use due to the loss of their fertile properties. For Ukraine, such phenomena, unfortunately, are very relevant. During the last decade in our country, there have been active processes of soil degradation, instead, the solution to this problem is weak and ineffective. Research and practical experience indicate that one of the effective and beneficial ways to restore degraded soils can be the use of such land in bioenergy production. At the same time, the resulting biomass satisfies the sustainability criteria, because it does not "take away" land from agriculture. In parallel, the most important thing is the restoration and recovery of degraded soils.

This idea looks very attractive, but questions arise with a more detailed study of domestic experience. First of all, according to the current legislation, land degradation refers to "natural or anthropogenic simplification of the landscape, deterioration of the state, composition, useful properties and functions of land and other organically related natural components", and under soil degradation – "deterioration of useful properties and soil fertility due to the influence of natural or anthropogenic factors"[93]. According to Article 171 of the Land Code of Ukraine *"degraded lands include: a) land plots, the surface of which is disturbed as a result of earthquakes, landslides, karstification, floods, mining, etc.; b) land plots with eroded, waterlogged,*

[92] Obidzinski Krystof, Rubeta Andriani, Heru Komarudin and Agus Andriant. Environmental and Social Impacts of Oil Palm Plantations and Their Implications for Biofuel Production in Indonesia. *Ecology and Society.* 2012. Vol. 17. Issue 1. P. 25.

[93] Про охорону земель: Закон України від 19.06.2003 року. *Відомості Верховної Ради України.* 2003. № 39. Ст. 349.

chemically contaminated soils with high acidity or salinity, etc"[94]. The restoration of degraded land is carried out in particular by their conservation – "the cessation of economic use for a certain period and the planting or afforestation of degraded and low-productive land, the economic use of which is environmentally and economically inefficient..."[95]. Conservation procedure is regulated at the by-law level[96].

However, despite the necessary regulatory framework, the real process of restoring degraded land by conservation demonstrates difficulties. For example, quite indicative is the situation that has become the basis for a number of such court cases. They have a fairly relief view of the domestic problem of critical inconsistency of law, legislation, and legal implementation. Thus, on the basis of the conclusions of the research institute, the orders of the Main Department of the State Service for Geodesy, Cartography and Cadastre approved working land management projects for the preservation of degraded and low-productive land of state property. However, the relevant orders did not entail the necessary legal consequences: information about the conservation of land was not entered into the State Land Cadastre, and no real measures were taken to restore these lands. Such ambiguity created prerequisites for further offenses, namely: "conservated on paper" lands were transferred to private individuals a few years later (for example, for personal peasant farming). Despite the fact that such land plots were not subject to any real restoration measures, the preliminary approval of their conservation projects became the basis for the recognition of subsequent agreements and acts of management bodies in relation to such land plots as invalid[97].

Such situations highlight two problems specific to domestic land relations: the declarativeness of land restoration measures and the low

[94] Земельний кодекс України : Закон України від 25.10.2001 р. № 2768-III. URL: https://zakon.rada.gov.ua/laws/show/2768-14#Text (дата звернення: 10.06.2023 року).

[95] Про охорону земель: Закон України від 19.06.2003 року. *Відомості Верховної Ради України.* 2003. № 39. Ст. 349.

[96] Про Порядок консервації земель : наказ Держкозему від 17 жовтня 2002 року № 175. URL: https://zakon.rada.gov.ua/laws/show/z0117-03#Text *(втратив чинність);* Про затвердження Порядку консервації земель : наказ Мінагрополітики від 26.04.2013 року № 283. *Офіційний вісник України*. 2013. № 42. Стор. 150. Ст. 1525 *(втратив чинність);* Про затвердження Порядку консервації земель : постанова Кабінету Міністрів України від 19 січня 2022 року № 35. *Урядовий кур'єр*. 2022. № 13.

[97] Постанова Верховного Суду від 20 березня 2023 року у справі № 822/1861/18. URL: https://zakononline.com.ua/court-decisions/show/109661237?linked=zo&did=224977___564120___171 (дата звернення: 10.06.2023 року); Постанова Верховного Суду від 09 липня 2020 року у справі № 681/820/17. URL: https://zakononline.com.ua/court-decisions/show/90329576?linked=zo&did=224977___564120___171 (дата звернення: 10.06.2023 року); Постанова Хмельницького апеляційного суду від 13 грудня 2018 року у справі № 686/4423/18. URL: https://zakononline.com.ua/court-decisions/show/78610012?linked=zo&did=224977___564120___171 (дата звернення: 10.06.2023 року).

efficiency of land rights guarantees. Of course, the question arises as to why such a complex of problems appeared. On the one hand, the process of land and soil degradation is rapidly progressing, and on the other hand, the restoration of these natural resources as part of conservation requires funds, and this burden falls on the owner. In particular, the afforestation, care of plantations, and carrying out other technical works on conservated lands are fairly financially costly. It is not surprising that owners are not interested in voluntarily imposing such duties on themselves. The possibility of planting conservated land with some energy plants can increase the attractiveness of such lands in terms of their restoration.

It should be noted that recently a step towards institutional improvement of these relations has been taken. So, since the conservation of land is inherently a restriction on the use of such land, information about such conservation (boundaries, area, conditions of restoration, foundation, term, etc.) should be entered into the State Land Cadastre. The corresponding norm appeared in the Law of Ukraine "On the State Land Cadastre" only in 2022. This should be a legal precaution for the occurrence of situations described above.

Nevertheless, it should be recognized that modern land legislation is not adapted to the "bioenergy" method of restoring degraded land. That is why it may be very real to recognize the carried out afforestation with energy plants as a violation of the "termination of economic use" of the conserved land plot.

Non-use of land with high carbon content (land of former forests, swamps, etc). In the world, the main bioenergy battles over the past few years have unfolded around those lands that are characterized by a high carbon content. The use of such areas in the cultivation of energy plants does not contribute to the fight against greenhouse gas emissions, but at the same time carries significant negative ecological potential (deforestation, draining of swamps, reducing biodiversity, etc.). This problem is very acute in Brazil, where the Amazon forests are cut down to expand soybean plantations, in Indonesia and Malaysia, where forest areas for palm plantations are released, etc. For Ukraine, this criterion of biomass persistence is not critical or priority, since the reduction of forest area and drainage of wetlands in our country are mostly not related to the needs of bioenergy.

The need to fulfill Ukraine's European integration obligations requires adapting domestic legislation to the provisions of RED II, and therefore to the criteria for the sustainability of biofuels. The analysis of the main criteria for sustainability through the prism of domestic legal features (regarding the violation of crop rotation and optimal crop ratios, the low efficiency of restoring degraded lands and soils by conservation, regarding

the use of lands with high carbon content) demonstrated a number of nuances that can significantly affect or even considerably distort the relevant provisions of European norms in the case of their mechanical transfer to Ukrainian legislation. Firstly, the legislation of Ukraine does not contain norms on mandatory standards for the ratio of food, feed and energy crops, does not provide for the obligations of landowners and land users to comply with crop rotation, does not consolidate institutional and functional mechanisms for tracking and official confirmation of relevant processes. Secondly, the use of degraded and unproductive land for the cultivation of energy crops can come across the problems of legal provision of conservation of land, the most significant of which are declarative (lack or insufficiency of real measures for the restoration of land and soils) and formalism (predominance of positivist approach over content).

Taking into account the national context during the formation of the bioenergy legislation of Ukraine is an extremely important prerequisite for effective legal regulation and transformation of the economy into carbon neutral.

DOI https://doi.org/10.36059/978-966-397-417-0-3

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CHAPTER 3. LEGAL SUPPORT FOR HYDROPOWER IN UKRAINE

3.1. The state of legislative support for small hydropower in Ukraine

Human is constantly using various natural resources as a source of food, materials for the construction of residential and industrial buildings, fuel and, among other things, energy. Of particular importance in this context are inexhaustible, self-renewing and easily accessible sources of energy production, among which water resources occupy a prominent place.

The use of water as a source of energy has many obvious advantages, primarily related to the peculiarity of rivers as a natural resource. Thus, compared to solar or wind power, for example, hydropower generally does not depend on the time of day or season. In addition, the energy produced in this way has a relatively low cost compared to the efficiency achieved. For this reason, hydropower has long been one of the most widely recognized and proven ways of using water not only as a natural resource, but also as a tool for meeting the energy and economic needs of people and society.

Hydropower, being one of the oldest sources of low-carbon energy[1], today provides almost half of its global output. The contribution of hydropower is 55% higher than nuclear power and greater than all other renewables combined, including wind, solar, bio– and geothermal. Over the past 20 years, total hydropower capacity has increased by 70% globally, but its share of total generation has remained stable due to the growth of wind, solar and other types of energy[2].

Ukraine, as a modern European country that is confidently moving towards building its own energy-independent system and the global transition to renewable energy sources, has significant potential for the development of hydropower relations. At the same time, it is worth considering the fact that not all hydropower installations and facilities are considered by Ukrainian legislation to be capable of generating renewable

[1] Ritchie H., Roser M., Rosado P. Renewable Energy. *Our World in Data.* 2022. URL: https://ourworldindata.org/renewable-energy#citation (дата звернення: 01.07.2023 року)

[2] Hydropower Special Market Report. *IEA.* 2021. URL: https://www.iea.org/reports/hydropower-special-market-report/executive-summary(дата звернення: 01.07.2023 року)

energy. These include only micro, mini– and small hydropower plants[3] *(Note – for ease of presentation, the general unifying category of "small hydropower" will be used).*

The rapid development of small-scale hydropower in Ukraine began in the early twentieth century, with the first hydroelectric power plant built in 1912 on the Southern Bug River in the town of Tyvriv. Subsequently, in the 1920s, due to large-scale electrification, in particular in the industrial and agricultural sectors, there was a significant increase in the capacity of small hydropower, the number of which by the end of 1929 was more than 150. This trend continued until the early 1950s, when the number of small hydropower plants reached 956. Later, with the development of powerful hydropower construction of large hydropower plants, small hydropower began to decline and a significant number of small hydropower plants were abandoned, dam structures were destroyed, dams were draining, shields were deformed, and lifting mechanisms became unusable. Derivation channels were overgrown with forests, filled in or built up, reservoirs were silted up, and dams were used only as bridge crossings[4]. Currently, there are approximately 170 small hydropower facilities in Ukraine[5], which indicates a gradual renewal of interest in the development of this important renewable energy sector.

The prospects of small hydropower as part of the modern renewable energy complex are natural given the volume of water resources available in Ukraine. There are more than 63 thousand small rivers and watercourses in Ukraine with a total length of 135.8 thousand km, of which about 60 thousand (95%) are very small (less than 10 km long), with a total length of 112 thousand km[6], about 3 thousand – more than 10 km long[7].

The largest technical potential of hydropower resources of small rivers is concentrated in the Carpathian region (76%). The second largest hydropower potential is in the Right Bank Dnipro hydrological zone (13%).

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[3] Про альтернативні джерела енергії: Закон України від 20 лютого 2003 року. *Відомості Верховної Ради України*. 2003. № 24. Ст. 155.

[4] Гідроенергетика: курс лекцій: навчальний посібник для студентів спеціальності 141 "Електроенергетика, електротехніка та електромеханіка" / уклад. : В. І. Будько, П. Ф. Васько, С. Т. Пазич. Київ : КПІ ім Ігоря Сікорського, 2023. С. 16, 18, 19.

[5] Об'єкти ВДЕ. *Energo.ua.* URL: https://www.energo.ua/ua/assets (дата звернення: 01.07.2023 року)

[6] Мала гідроенергетика України: у 2-х томах. Том І. Аналітичний огляд / В. Вовчак, О. Тесленко, О. Самченко. Київ: Інститут проблем екології та енергозбереження, 2018. С. 23.

[7] Екологи, науковці та управлінці шукають шляхи для збереження природних ландшафтів і екологізації гідроенергетики. *ПрАТ "Укргідроенерго"*. URL: https://uhe.gov.ua/filiyi (дата звернення: 01.07.2023 року)

On the left bank of the country, the potential is 7%, and the Western and Polissya hydrological zones are considered to be unpromising areas for small hydropower development (4% in total)[8]. At the same time, despite the natural wealth of the water sector, it should be noted that not all rivers and watercourses can be used for hydropower (for example, water bodies subject to special state protection, including those of the nature reserve fund, cannot be used for such purposes)[9].

The abundance of water resources outlined above and, among other things, the technical capabilities already available, put hydropower at the forefront of the renewable energy system and lay a solid foundation for the development of this sector. Thus, hydropower is a relatively environmentally friendly source, given the minimal greenhouse gas emissions from its production, and one of the safest ways to generate energy[10]. In addition, the use of small river energy helps to save fuel and energy resources, decentralize the overall energy system and solve a number of problems in the energy supply of remote and hard-to-reach rural areas[11].

At the same time, as with any interference with the natural order of river functioning, the construction of hydropower plants to generate energy from water resources is inextricably linked to a number of risks and abuses arising, among other things, from the imperfect legislative framework for alternative energy and hydropower relations. This can lead to water level fluctuations, a decrease in the number of fish and other living organisms, flooding and erosion of large areas of land, and blocking of migration routes to spawning grounds[12], that causes destroying of fauna of water pond[13].

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[8] Бриль А. О., Васько П. Ф., Мороз А. В. Технічний потенціал гідроенергетичних ресурсів малих річок України з урахуванням природоохоронних обмежень. *Гідроенергетика України*. 2019. № 3-4. С. 50.

[9] Чумаченко І. Є. Особливості правового режиму водних об'єктів, що використовуються для потреб гідроенергетики. *Актуальніп роблеми вітчизняної юриспруденції.* 2021. № 3. С. 105.

[10] Ritchie H. What are the safest and cleanest sources of energy? *Our World in Data.* 2020. URL: https://ourworldindata.org/safest-sources-of-energy (дата звернення: 01.07.2023 року)

[11] Платонова Є. О. Правові аспекти розвитку малої гідроенергетики України в контексті програмного забезпечення. *Правове регулювання суспільних відносин: актуальні проблеми та вимоги сьогодення* : матеріали Міжнародної науково-практичної конференції (Запоріжжя, 23-24.07.2021 р.). Запоріжжя: Запорізька міська громадська організація "Істина", 2021. С. 48–51.

[12] Караханян К. М. Історія становлення та розвитку гідроенергетики: еколого-економічний аспект. А*ктуальні проблеми розвитку науки, освіти та суспільства*: збірник тез доповідей міжнар. наук.-практ. конф. (Полтава, 23.07.2021 р.). Полтава: ЦФЕНД, 2021. С. 24–25.

Thus, there is a clear need to improve the existing one and develop a new comprehensive legal mechanism for the functioning and development of hydropower relations, which would take into account, on the one hand, the possible energy and economic potential of water energy as a renewable resource, and, on the other hand, environmental requirements and the need to preserve and protect the natural biodiversity of rivers.

One of the first legislative acts related to hydropower was the Law of Ukraine "On Environmental Protection" of 25 June 1991, which not only established the legal and social framework for environmental protection, but also provided for the provision of tax, credit and other benefits to enterprises, institutions and organizations, as well as individuals, when they implement low-waste, energy and resource-saving technologies and non-traditional energy sources, among other economic measures to ensure its protection[14]. Similar benefits were provided for by the Law of Ukraine "On Energy Saving" of 01 July 1994 (expired on 13.11.2021), which encouraged energy production using renewable and non-traditional sources[15]. Thus, these legislative acts have laid the foundation for a more global development and legal incentives for alternative energy as an environmentally friendly way of generating energy.

The Water Code of Ukraine of 6 June 1995 is a comprehensive legislative act regulating social relations in the field of water resources use. Among other things, the Code defines the basic concepts and rules in the field of water use and protection, and establishes the specifics of using water bodies for industrial and hydropower needs[16]. It was the Water Code of Ukraine that became the basis for further development of specialized hydropower legislation and laid down guidelines for further development of hydropower relations, taking into account energy, environmental, economic, social and other factors.

Legislative acts adopted in the period 1991-1999 demonstrate the growing interest in the field of non-traditional energy sources, in particular hydropower, and the state's attempts to stimulate the development of hydropower relations as a promising sector of alternative energy. At the same time, the relevant legislation was characterized by a high degree of

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[13] Караханян К. М. Правові засади розвитку гідроенергетики в контексті сталого розвитку України. *International scientific journal:"Internauka".* Series: "Juridical sciences". 2021. № 7 (41). С. 38.

[14] Про охорону навколишнього природного середовища: Закон України від 25 червня 1991 року. *Відомості Верховної Ради України*. 1991. № 41. Ст. 546.

[15] Про енергозбереження: Закон України від 1 липня 1994 року. *Відомості Верховної Ради України*. 1994. № 30. Ст. 283 *(втратив чинність)*

[16] Водний кодекс України від 6 червня 1995 року. *Відомості Верховної Ради України*. 1995. № 24. Ст. 189.

abstraction and generalization, and the declarative nature of its individual provisions, which also slowed down the development of hydropower and the renewable energy sector.

At the stage of forming legislation on the use of alternative energy sources (2000-2011), there was a gradual increase in legislative attention to the issue of small hydropower and the renewable energy sector in general. Thus, the Verkhovna Rada of Ukraine approved the Concept for the Development of the Water Sector of Ukraine dated 14 January 2000, which stipulates the need to rationalize the use of water resources through, inter alia, modernization and reconstruction of existing hydroelectric power plants, introduction of new water-saving technologies, commissioning of new highly maneuverable capacities, restoration and development of small hydropower[17]. Separate provisions on the status and uses of the water fund were envisaged in the Land Code of Ukraine of 25 October 2001, which included in the lands of this purpose those occupied by hydrotechnical and other water management structures and canals, as well as lands allocated for their right-of-way[18].

Another international act relating to the rational use of natural resources, including water, and enshrining the need for comprehensive compliance with environmental standards was the Framework Convention on the Protection and Sustainable Development of the Carpathians (signed on 22 May 2003 in Kyiv and ratified by the Law of Ukraine of 7 April 2004)[19]. The provisions of this Convention, to which Ukraine is also a party, are aimed at protecting the Carpathians as a unique natural treasure, including in terms of sustainable use of water resources, implementation of policies and plans based on an integrated approach to river basin management to prevent, manage and control pollution and floods, reduce fragmentation of aquatic habitats, etc.

An important step for the development of the national renewable energy sector was the adoption of the specialized Law of Ukraine "On Alternative Energy Sources", which provides, among other things, for the categories of hydropower facilities that can be used to generate renewable energy and incentives for its producers. Such legislative attention to the issue under study clearly indicates a certain interest of the state in strengthening the

[17] Про Концепцію розвитку водного господарства України: постанова Верховної Ради України від 14 січня.2000 року № 1390-XIV. URL: https://zakon.rada.gov.ua/laws/show/1390-14#Text (дата звернення: 01.07.2023 року)

[18] Земельний кодекс України від 25 жовтня 2001 року. *Відомості Верховної Ради України*. 2002. № 3-4. Ст. 27.

[19] Про ратифікацію Рамкової конвенції про охорону та сталий розвиток Карпат: Закон України від 07.04.2004 р. № 1672-IV. URL: https://zakon.rada.gov.ua/laws/show/1672-15#Text (дата звернення: 01.07.2023 року)

alternative energy sector, including by stimulating the development of small hydropower.

During the period under review, a number of environmental regulations aimed at protecting the environment were adopted at the national level, including the Laws of Ukraine "On Land Protection"[20], "On State Control over the Use and Protection of Land"[21], "On the Environmental Network of Ukraine"[22]. These regulations establish the limits of interference with the environment, impose obligations to ensure compliance with regulations in the field of land protection and use, prevent land pollution and soil fertility, deterioration of flora and fauna, water and other natural resources, including in the location, design, construction, reconstruction and operation of water management facilities. Similar provisions were reflected in the National Programme for the Development of the Fishery Industry of Ukraine for the period up to 2010, approved by the Law of Ukraine of 19 February 2004[23], which states the need to protect fish and other aquatic living resources, including from the harmful effects of using the water fund for hydropower needs.

Certain provisions relating to the possibility of using alternative energy for heat generation are also contained in the Law of Ukraine "On Heat Supply" dated 02 June 2005, which sets out the priority development of the technology of combined heat and power generation (cogeneration) and the use of alternative energy sources, non-traditional and renewable energy sources as the main principles of state policy in the field of heat supply. In addition, it is envisaged to establish a reduced tariff for business entities that produce heat energy at facilities using alternative sources[24].

In order to further develop legislation on small hydropower, the Law of Ukraine "On Energy Lands and the Legal Regime of Special Zones of Energy Facilities" was adopted, which details the provisions of previously adopted regulations on the use of land and other natural resources for energy needs and includes land plots provided for the location, construction and operation of facilities for the production of electricity and heat,

[20] Про охорону земель: Закон України від 19 червня 2003 року. *Відомості Верховної Ради України*. 2003. № 39. Ст. 349.

[21] Про державний контроль за використанням та охороною земель: Закон України від 19 червня 2003 року. *Відомості Верховної Ради України*. 2003. № 39. Ст. 349.

[22] Про екологічну мережу України: Закон України від 24 червня 2004 року. *Відомості Верховної Ради України.* 2004. № 45. Ст. 502.

[23] Про Загальнодержавну програму розвитку рибного господарства України на період до 2010 року: Закон України від 19 лютого.2004 року. Відомості Верховної Ради України. 2004. № 22. Ст. 313.

[24] Про теплопостачання: Закон України від 2 червня 2005 року. *Офіційний вісник України*. 2005. № 27. Ст. 1532.

including hydroelectric power plants and pumped storage facilities, as well as land plots for them[25].

The period of 2011–2017 was characterized by a certain reassessment of the content and trends of legislation directly or indirectly related to alternative and hydropower issues in terms of the need not only to increase energy production from renewable sources, but also to establish the obligation to comply with environmental requirements by providing for restrictions and prohibitions on unjustified anthropogenic impact on natural resources. In addition, at this stage of alternative energy development, a large number of programme and strategic legislative acts have been adopted to address global strategic issues in the energy sector, including through the development of hydropower relations.

The Resolution of the Cabinet of Ministers of Ukraine of 12 September 2011 approved the State Programme for the Development of National Production, which defines hydropower as the most technologically advanced method of electricity generation, which has a guaranteed and predictable energy resource, and one of the objectives of the programme is to reconstruct and develop hydropower, including small hydropower on small rivers to meet local energy needs and protect adjacent areas from floods[26]. Similar goals were envisaged by the National Target Programme for the Development of Water Management and Environmental Rehabilitation of the Dnipro River Basin for the period up to 2021, which includes the construction, reconstruction and overhaul of hydraulic structures as one of the measures to be implemented[27].

Provisions aimed at protecting the water fund of Ukraine and its biological diversity from harmful external influences were also contained in the State Target Economic Programme for Fisheries Development for 2012–2016, approved by the Cabinet of Ministers of Ukraine on 23 November 2011[28], and the List of Activities and Objects of Increased Environmental Hazard approved by the Cabinet of Ministers of Ukraine

[25] Про землі енергетики та правовий режим спеціальних зон енергетичних об'єктів: Закон України від 09 липня 2010 року. *Відомості Верховної Ради України*. 2011. № 1. Ст. 1.

[26] Про затвердження Державної програми розвитку внутрішнього виробництва: постанова Кабінету Міністрів України від 12 вересня 2011 року № 1130. *Офіційний вісник України*. 2011. № 86. Ст. 3139.

[27] Про затвердження Загальнодержавної цільової програми розвитку водного господарства та екологічного оздоровлення басейну річки Дніпро на період до 2021 року: Закон України від 24 травня 2012 року. *Відомості Верховної Ради.* 2013. № 17. Ст.146.

[28] Про затвердження Державної цільової економічної програми розвитку рибного господарства на 2012-2016 роки: постанова Кабінету Міністрів України від 23 листопада 2011 року № 1245. *Урядовий кур'єр*. 2011. № 243.

dated 28 August 2013 (expired on 28.02.2019)[29]. Thus, in accordance with the provisions of the said list, the operation of hydropower plants on rivers, regardless of their capacity (including small hydropower plants) and new construction, reconstruction of major hydraulic structures of all types posed an increased environmental hazard to the environment, which demonstrates the legislator's attention not only to the issues of increasing the volume of energy produced by renewable energy sources, but also to the need to comply with environmental standards in the implementation of these activities.

One of the strategic regulatory acts related to the development of alternative energy sources, including small hydropower, is the National Renewable Energy Action Plan for the period up to 2020, approved by the Cabinet of Ministers of Ukraine on 1 October 2014. The provisions of this plan state the great potential for the use of small rivers, in particular in the western regions, which can become the basis for saving fuel and energy resources, decentralization of the overall energy system, and, in general, the production of a significant amount of energy through the modernization of existing facilities, restoration of previously operating small hydropower plants, construction and commissioning of new hydropower generating facilities[30]. The task of increasing Ukraine's energy independence was also enshrined in the Sustainable Development Strategy "Ukraine – 2020", which set the main task in this area as ensuring energy security and transition to energy efficient and energy-saving use and consumption of energy resources with the introduction of innovative technologies, in particular through the implementation of projects using alternative energy sources[31].

Approximation to European standards also required the adoption of a number of environmental and environmental regulations, in particular the provisions of the Paris Climate Agreement of 12 December 2015 [32]. That is why the Law of Ukraine of 14 July 2016 [33] ratified this agreement and the Concept of Implementation of the State Policy on Climate Change for the

[29] Про затвердження переліку видів діяльності та об'єктів, що становлять підвищену екологічну небезпеку: постанова Кабінету Міністрів України від 28 серпня 2013 року № 808. *Урядовий кур'єр*. 2013. № 215. *(втратила чинність)*

[30] Про Національний план дій з відновлюваної енергетики на період до 202 року: розпорядження Кабінету Міністрів України від 1 жовтня 2014 року № 902-р.*Офіційний вісник України*. 2014. № 81. Ст. 2298.

[31] Про Стратегію сталого розвитку "Україна – 2020": Указ Президента України від 12 січня 2015 року № 5/2015. *Офіційний вісник України*. 2015. № 4. Ст. 67.

[32] Паризька угода від 12.12.2015 р. URL: https://zakon.rada.gov.ua/laws/show/995_l61#Text (дата звернення: 01.07.2023 року)

[33] Про ратифікацію Паризької угоди: Закон України від 14 липня 2016 року. *Відомості Верховної Ради.* 2016. № 35. Ст. 595.

period up to 2030 was approved to implement its provisions, as well as other commitments to protect the environment and prevent negative climate change[34].

Another programme document specialized in hydropower is the Hydropower Development Programme for the period up to 2026, approved by the Cabinet of Ministers of Ukraine on 13 July 2016. The programme sets a rather ambitious goal – to ensure the energy security of the state through the effective development of hydropower with maximum use of cost-effective hydropower potential, improvement of management of hydropower facilities, enhancement of their safety, increase of regulatory maneuvering capacities of hydropower plants and pumped storage power plants to improve the stability and reliability of the integrated power system of Ukraine and its integration into the European energy system, reduction of the consumption of fossil fuels and the anthropogenic impact on the environment[35]. At the same time, the analysis of the regulatory act allows us to state that its provisions mainly relate to the development of only "large hydropower", and the small hydropower sector is mentioned indirectly, in the context of the analysis of existing hydropower capacities. The need to develop small hydropower is also not mentioned in the section "Action Plan for the Implementation of the Programme". Given that small hydropower is an integral component of hydropower in general and has significant potential, such legislative gaps seem rather strange and need to be further developed and addressed.

The environmental legislation introduced and currently in force, in particular the Law of Ukraine "On Environmental Impact Assessment", which places hydropower plants on rivers, regardless of capacity, in the second category of planned activities and facilities that may have a significant impact on the environment and are therefore subject to environmental impact assessment, also has a significant impact on the further development of hydropower[36]. At the same time, despite the promise of such binding norms and their positive impact in terms of improving the level of environmental protection, practical experience shows that official environmental conclusions obtained in accordance with the legislative procedure do not guarantee the exhaustion of environmental issues. This is

[34] Про схвалення Концепції реалізації державної політики у сфері зміни клімату на період до 2030 року: розпорядження Кабінету Міністрів України від 7 грудня 2016 року № 932-р. *Офіційний вісник України*. 2016. № 99. Стор. 269. Ст. 3236.

[35] Про схвалення Програми розвитку гідроенергетики на період до 2026 року: розпорядження Кабінету Міністрів України від 13 липня 2016 року № 552-р. *Офіційний вісник України*. 2016. № 60. Ст. 2065.

[36] Про оцінку впливу на довкілля: Закон України від 23 травня 2017 року. *Офіційний вісник України*. 2017. № 50. Ст. 1549.

proved, in particular, by numerous court cases in which the results of the assessment are questioned. A certain devaluation of the importance of the environmental impact assessment mandatory for hydropower leads to a situation where the operation of existing and construction of new hydropower facilities is carried out in violation of a number of regulatory rules and obligations, which can lead to adverse environmental consequences.

One of the main strategic documents that currently determines the course of development of the entire national energy sector is the Energy Strategy of Ukraine until 2050, approved by the Cabinet of Ministers of Ukraine on 21 April 2023[37]. According to the strategy, the main areas of development of the Ukrainian energy sector are, inter alia, the development of alternative energy sources (including increasing the hydropower potential to 9 GW), new products and innovative solutions in the energy sector, achieving the maximum level of climate neutrality, comprehensive integration with EU markets and efficient functioning of domestic markets[38].

At the same time, it should be noted that despite the legislative attention to the hydropower sector, the regulatory framework often has a high degree of generalization and inconsistency, and therefore even some promising mechanisms, without being supported by other stable and mutually consistent legislation, are not properly implemented, which may lead to demotivation of the hydropower sector and its gradual decline. Thus, the legislator approaches the issue of stimulating the development of small hydropower in a rather limited way, indirectly mentioning or not mentioning this promising alternative energy sector in programme and strategic documents.

At the same time, the experience of the early twentieth century proves the significant potential and attractiveness of the small hydropower sector, and thus it is important to simplify cumbersome and bureaucratic licensing procedures that increase and cause corruption risks in order to increase investment attractiveness, prevent capital outflows, and the oppression and decline of the small hydropower sector and alternative energy in general.

Small hydropower currently has one of the greatest prospects for development, as in the face of national security challenges and constant attacks on energy infrastructure, the construction and commissioning of

[37] Про схвалення Енергетичної стратегії України на період до 2050 року: розпорядження Кабінету Міністрів України від 21 квітня 2023 року № 373-р. *Офіційний вісник України*. 2023. № 47. Ст. 2575

[38] Енергетична стратегія. *Міністерство енергетики України*. URL: https://www.mev.gov.ua/reforma/enerhetychna-stratehiya(дата звернення: 01.07.2023 року)

large facilities, such as those of the damaged Kakhovka HPP, is obviously too complicated and time-consuming, and therefore irrelevant at this time.

3.2. Use of water bodies and land for hydropower purposes: legal features

Specifics of the legal regime of water bodies. The legal regime of water bodies used for hydropower purposes is characterized by a number of important elements.

1) *Ownership of water bodies*. All waters (water bodies) on the territory of Ukraine constitute its water fund. Thus, Article 6 of the Water Code of Ukraine stipulates that waters (water bodies) are exclusively the property of the Ukrainian people and are provided for use only. The Ukrainian people exercise ownership of water (water bodies) through the Verkhovna Rada of Ukraine, the Verkhovna Rada of the Autonomous Republic of Crimea and local councils. In view of the specifics of the hydropower sector of the economy, it should be noted that not all water bodies that make up the water fund of Ukraine can be used for hydropower purposes. Such water bodies may include surface waters (water bodies) of natural or artificial origin of both national and local significance. However, water bodies subject to special state protection, namely water bodies of the nature reserve fund, etc., cannot be used for hydropower purposes[39].

Water bodies used for hydropower are publicly owned (i.e., state or municipal). Although enclosed natural reservoirs (with a total area of up to 3 hectares) may be owned by individuals and legal entities, it is premature to talk about the possibility of building hydropower plants on them, in our opinion, given the current technology.

2) The right to use water bodies for hydropower purposes. The use of water bodies for hydropower purposes is carried out on the basis of special water use.

3) Obligations of hydropower enterprises. Hydropower enterprises are obliged to comply with the regimes of accumulation and use of water reserves, regimes of fluctuations in the level in the upper and lower reaches and water passage through hydraulic structures, taking into account the maintenance of the water level necessary to maintain the guaranteed dimensions of the ship's passage, uninterrupted navigation and passage of vessels through the navigation locks, as well as passage of fish to spawning areas in accordance with the designs of fish passage facilities in accordance

[39] Чумаченко І. Є. Особливості правового режиму водних об'єктів, що використовуються для потреб гідроенергетики. *Актуальні проблеми вітчизняної юриспруденції.* 2021. № 3. С. 103–108.

with the operating modes of artificial water bodies and water management systems established in accordance with the law, taking into account the water availability forecast, environmental requirements and interests of all water users. Hydropower enterprises operating hydroelectric power plants are obliged to inform the central executive body implementing the state policy in the field of inland water transport (the State Service of Maritime and Inland Water Transport and Shipping of Ukraine) in advance of the predicted temporary impossibility of ensuring the required water level[40]. The main organizational and technical requirements for the operation of shipping hydraulic structures, the strict implementation of which ensures the uninterrupted and safe passage of the transport fleet and the reliable and safe operation of shipping locks, are established by the order of the Ministry of Transport "On approval of the Rules for the technical operation of shipping hydraulic structures" dated June 13, 2007[41].

4) The protection of water used for hydropower needs is ensured by: rules and norms of protection, use or restriction of water use if necessary; a special regime for the use of water fund lands; water protection measures against pollution, clogging and depletion; measures to prevent violation of the hydrological and hydrogeological regime of waters; measures to prevent the harmful effects of water and accidents on water bodies and eliminate their consequences; measures to prevent the reduction of fish stocks and other objects of water fishing, the deterioration of the living conditions of wild animals[42].

5) A close interaction between the legal regime of water bodies used for hydropower needs and the legal regime of water fund lands. Works related to the construction of hydrotechnical structures may be carried out on the lands of the water fund. Water protection zones are established along reservoirs with the aim of creating a favorable regime for water bodies, preventing their pollution, clogging and depletion, destruction of aquatic plants and animals, as well as reducing flow fluctuations. For the needs of operation and protection against pollution, damage and destruction of hydrotechnical and hydrometric structures, as well as reservoirs and dams on rivers, diversion lanes with a special mode of use are established.

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[40] Водний кодекс України від 6 червня 1995 року. *Відомості Верховної Ради України*. 1995. № 24. Ст. 189.

[41] Про затвердження Правил технічної експлуатації судноплавних гідротехнічних споруд: наказ Міністерства транспорту та зв'язку України від 13 червня 2007 року № 492. *Офіційний вісник України.* 2007. № 52. Ст. 2135.

[42] Чумаченко І.Є. Особливості правового режиму водних об'єктів, що використовуються для потреб гідроенергетики. *Актуальні проблеми вітчизняної юриспруденції.* 2021. № 3. С. 103–108.

6) Conducting of the principle of transboundary cooperation in the use of watercourses for the needs of hydropower is extremely important to prevent the unsystematic and unlimited withdrawal of water, which leads not only to the depletion of water resources in general in the water basin, but also to their serious redistribution in space and time, directly or indirectly affecting interests of all states located in the international water basin.

7) State administration in the field of use of water objects for hydropower. The water legislation provides for the implementation of integrated management of water bodies in compliance with the basin principle on the basis of state, target, interstate and regional programs for the use and protection of water and reproduction of water resources, as well as river basin management plans.

8) Legal responsibility. Violation of water legislation entails disciplinary, administrative, civil or criminal liability. Water legislation provides for exemption from liability for violations of water legislation as a result of force majeure or military operations. Bringing offenders to justice does not release them from the obligation to compensate for damages caused by them as a result of violating water legislation, in the amounts and in the manner established by the legislation of Ukraine.

The formed legal regime of water bodies used for hydropower needs is quite balanced. However, at the same time, the institution of compensation for damage caused to water bodies as a result of accidents at hydropower enterprises needs improvement. The current Methodology for calculating the amount of compensation for damages caused to the state as a result of violation of the legislation on the protection and rational use of water resources, approved by the order of the Ministry of Natural Resources of Ukraine dated July 20, 2009[43], does not apply to such cases.

Specifics of the legal regime of lands under hydropower facilities. Peculiarities of the legal regime of lands on which hydropower facilities are located are formed under the influence of the legal regime of such immovable objects. Although the hydrotechnical structure and the land plot are, as a general rule, independent real estate objects, they remain connected by the principle of the unity of the fate of the real estate object, and also affect each other's legal regimes.

In view of this, the key features of the legal regime of hydropower lands include their connection with the legal status of hydrotechnical structures,

[43] Про затвердження Методики розрахунку розмірів відшкодування збитків, заподіяних державі внаслідок порушення законодавства про охорону і раціональне використання водних ресурсів: наказ Міністерства охорони навколишнього природного середовища України від 20 липня 2009 року. *Офіційний вісник України*. 2009. № 63. Ст. 2242.

some restrictions on turnover, the close connection of the hydropower facility not only with the land plot on which it is located, but also with the corresponding water object, the peculiarities of choosing a land plot for the subsequent placement of a hydropower facility on it.

Researching the specifics of the legal regime of lands under hydropower facilities, the doctrine operates on the idea of the so-called "dual legal regime". However, with a more detailed analysis of the actual relations in this area, it can be found that in reality such a legal regime is more complex. It combines at least four legal elements:

1) *general* (the legal regime of the land plot as such – first of all, it is formed by land legislation). According to Art. 79 of the Land Code of Ukraine, a land plot is a part of the earth's surface with established boundaries, a certain location, with defined rights in relation to it[44];

2) *special "water"* (legal regime of the land plot of the water fund – may include a number of requirements and restrictions aimed at protecting the water object. It is mainly provided by water legislation). According to Art. 4 of the Water Code of Ukraine, lands of the water fund include lands occupied, including hydrotechnical, other water management structures and canals, as well as lands allocated for diversion lanes for them[45];

3) *special "energy"* (the legal regime of the land plot under the energy facility – may provide for a number of requirements and restrictions aimed at the safe operation of the energy facility for people and the environment. It is mainly formed by land and environmental legislation). The special features of the energy sector include: a) orientation – ensuring the sustainable development of the energy sector of the national economy of Ukraine in combination with guaranteeing the state's energy security and environmental protection; b) special object composition, i.e. objects for the placement or operation of which land is provided – energy objects; c) a non-exhaustive list of energy facilities; d) regulatory certainty in the special branch (energy) legislation of the procedure for acquiring rights to energy land; e) special procedure for the use and protection of energy lands[46].

The analyzed relations are regulated by the Law of Ukraine "On Energy Lands and the Legal Regime of Special Zones of Energy Objects", but such regulation is not perfect. Thus, the land of energy-generating enterprises includes land plots provided for the location, construction and operation of

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[44] Земельний кодекс України: прийнятий 25 жовтня 2001 року. *Відомості Верховної Ради України*. 2002. № 3–4. Ст. 27.

[45] Водний кодекс України від 6 червня 1995 року. *Відомості Верховної Ради України*. 1995. № 24. Ст. 189.

[46] Шматько Г. І. Специфіка правового режиму земель під об'єктами гідроенергетики в Україні. *Міжнародний науковий журнал "Інтернаука". Серія: "Юридичні науки"*. 2021. № 7. С. 48–54.

facilities for the production of electric and thermal energy, in particular hydroelectric power plants and hydroaccumulation power plants. According to Art. 12 of the Law establishes regulatory zones for the protection of particularly important energy facilities – the prohibited zone of hydroelectric facilities and the controlled zone of hydroelectric facilities[47]. The legal regime of these zones is regulated by the resolution of the Cabinet of Ministers of Ukraine "On approval of the Procedure for establishing a special protection regime in the territory of the prohibited zone and the controlled zone of hydroelectric facilities" dated March 31, 2004[48]. This procedure defines the mechanism for establishing a special protection regime in the territory of the prohibited zone and the controlled zone of hydroelectric facilities, the conditions for access and movement of employees, outsiders, all types of transport in these zones, the import (export) of material values and cargo into the territory of these zones or beyond them , as well as the rights and duties of officials of ministries, other central and local executive bodies, who are responsible for establishing and ensuring the proper regime in the respective zones;

4) *special "alternative energy"* (legal regime of the land plot under the object of alternative energy). According to the Law of Ukraine "On Energy Lands and the Legal Regime of Special Zones of Energy Objects", energy lands include land granted in accordance with the procedure established by law for ownership and use for the location, construction and operation of facilities for the production and transmission of electric and thermal energy, including alternative energy facilities. In this legislative act in Art. 14, it is determined that on the lands assigned to the category of lands defined by point "i" of Part 1 of Art. 19 of the Land Code of Ukraine (land for industry, transport, electronic communications, energy, defense and other purposes), alternative energy facilities that use renewable energy sources (including hydropower) can be located, regardless of the purpose of such land plots. The layering of legal regimes, which is observed during the formation of the legal regime of the land plot under hydropower facilities, has not yet been realized by the rule-maker and has not been crystallized in the legislation. That is why there are significant gaps in the legal regime of the respective land plots in practice. In this regard, there is a need for further doctrinal and

[47] Про землі енергетики та правовий режим спеціальних зон енергетичних об'єктів: Закон України від 09 липня 2010 року. *Відомості Верховної Ради України.* 2011. № 1. Ст. 1.

[48] Про затвердження Порядку встановлення особливого режиму охорони на території забороненої зони та контрольованої зони гідроелектротехнічних споруд: постанова Кабінету Міністрів України від 31 березня 2004 року. *Офіційний вісник України.* 2004. № 13. Ст. 900.

legislative elaboration of the proposed idea of the "hydropower quadriptych"[49].

3.3. Environmental and legal requirements for the safety of hydropower facilities

Acting as one of the most ecological and economical sources of obtaining electricity, hydropower nevertheless leads to negative changes in the surrounding natural environment, in particular, causes damage to agriculture, contributes to constant drops in water levels, a decrease in the number of fish and other living organisms, flooding and erosion of large areas, in including of agricultural lands, increases the regulation of river flow, as a result of which there is an overlap of migration routes to spawning grounds, which contributes to the partial or complete loss of biodiversity of the ichthyofauna of the regulated natural reservoir.

Taking into account the above, we note that the current legislation pays attention to the issue of environmentally friendly industries and comprehensive development of hydropower. However, a critical analysis of modern legislation, which is designed to ensure the environmental friendliness of hydropower, shows its fragmentary nature and the superiority of general norms that regulate the development of alternative energy as a whole. However, the study of the above-mentioned normative legal acts allows to develop a classification of environmental legal mechanisms, compliance with which will ensure safety for people and the environment when using hydropower facilities.

The first group includes **imperative prohibitions**, such as:

1. It is prohibited to build reservoirs in the river basin with a total volume that exceeds the flow of the given river in an estimated low-water year, which is observed once every twenty years.

2. Prohibition to change the topography of the river basin;

3. Prohibition to destroy the beds of drying rivers, streams and watercourses;

4. Prohibition of straightening riverbeds and deepening their bottoms below the natural level or blocking them without arranging drains, overpasses or aqueducts;

5. Prohibition to reduce the natural vegetation and forest cover of the river basin;

[49] Шматько Г. І. Специфіка правового режиму земель під об'єктами гідроенергетики в Україні *Міжнародний науковий журнал "Інтернаука". Серія "Юридичні науки"*. 2021. № 7. https://doi.org/10.25313/2520-2308-2021-7-7433

6. Prohibition to carry out other works that may negatively affect or affect the water content of the river and the quality of water in it.

Environmental and legal methods of environmental protection during the construction and use of industrial facilities, including hydroelectric plants, contained in Art. 80 of the Water Code of Ukraine and aimed at the preservation of small rivers and natural resources that together with them form single natural complexes. It is small rivers that are used for the construction of mini hydroelectric power stations, which use natural water pressures without the necessary construction of large-scale hydrotechnical structures, which allows to avoid negative environmental phenomena that may be accompanied by the creation of large hydroelectric power plants[50]. Small power plants make it possible to preserve the natural landscape and the environment not only at the stage of operation, but also during the construction process. During further operation, there is no negative impact on water quality: it completely preserves its original natural properties. Fish are stored in the rivers, and the water can be used for water supply to the population. Unlike other ecologically safe renewable sources of electricity – such as the sun, wind – small hydropower is practically independent of weather conditions and is able to provide a stable supply of cheap electricity to the consumer.

The second group of ecological and legal methods of protecting the environment and people during the operation of hydropower facilities is a **group of obligations**:

1. Compliance with the established norms and standards of environmental protection during the design, construction and reconstruction of capital facilities.

Thus, Art. 10 of the Law of Ukraine "On Protection of the Natural Environment" among the guarantees of the environmental rights of citizens singles out the obligation of central executive bodies, enterprises, institutions, organizations to implement technical and other measures to prevent the harmful impact of economic and other activities on the natural environment, to fulfill environmental requirements in planning, placement of productive forces, construction and operation of economic objects. According to Art. 51 of the specified Law, when carrying out such activities, the environmental safety of people, the rational use of natural resources, compliance with the standards of harmful effects on the environment must be ensured[51];

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[50] Платонова Є. О. Правові проблеми та перспективи використання енергії малих річок в Україні.*Юридичний науковий електронний журнал.* 2021. № 7. С. 135–139.

[51] Про охорону навколишнього природного середовища: Закон України від 25 червня 1991 року. *Відомості Верховної Ради України*. 1991. № 41. Ст. 546.

2. Carrying out an environmental impact assessment of existing and future hydropower facilities, taking into account the results of a strategic environmental assessment.

The Laws of Ukraine "On Environmental Impact Assessment" dated May 23, 2017 and "On Strategic Environmental Assessment" dated March 20, 2018 establish the legal and organizational principles of environmental impact assessment aimed at preventing environmental damage, ensuring environmental safety, environmental protection, rational the use and reproduction of natural resources, in the process of making decisions about the implementation of economic activities that may have a significant impact on the environment, taking into account state, public and private interests, as well as the obligation to conduct an assessment of state planning documents related to agriculture, forestry, fisheries, energy, industry, transport and other spheres of life. Article 3 of the first of these Laws stipulates "the obligation to carry out an environmental impact assessment of energy industry facilities, in particular, hydroelectric power plants on rivers regardless of capacity and hydro accumulating power plants".[52] Such a planned activity is subject to assessment before making a decision on the implementation of the planned activity (Part 1, Article 3 of the Law of Ukraine "On Environmental Impact Assessment").

In accordance with Part 2 of Art. 2 of the Law of Ukraine "On Environmental Impact Assessment", the environmental impact assessment is carried out in compliance with the requirements of the legislation on environmental protection, taking into account the state of the environment in the place where the planned activity is planned, environmental risks and forecasts, prospects for socio-economic development of the region, capacity and types of cumulative impact (direct and indirect) on the environment, including taking into account the impact of existing facilities, planned activities and facilities for which a decision has been made to carry out the planned activity or the issue of making such decisions is being considered.

In addition, according to Part 1 of Art. 2 of the Law of Ukraine "On Strategic Environmental Assessment", relations in the field of assessment of the consequences for the environment, including for the health of the population, the implementation of state planning documents extends to state planning documents that relate, in particular, to energy, the use of water resources, protection environment, urban planning or land management (schemes) and the implementation of which will involve the implementation of activities (or which include activities and objects) for which the legislation provides for the implementation of the environmental impact

[52] Про оцінку впливу на довкілля: Закон України від 23 травня 2017 року. *Офіційний вісник України*. 2017. № 50. Ст. 1549.

assessment procedure, or which require an assessment, taking into account the likely consequences for the territories and objects of the nature reserve fund and eco-network[53]. The purpose of this activity is to promote sustainable development by ensuring the protection of the environment, the safety of the population's life and health, the integration of environmental requirements during the development and approval of state planning documents (Part 1, Article 3 of the Law of Ukraine "On Strategic Environmental Assessment");

3. Localization of discharges followed by their neutralization, storage and disposal.

According to Art. 44 of the Water Code of Ukraine, enterprises in the field of hydropower are obliged to comply with the established norms of the maximum allowable discharge of pollutants and limits of the discharge of pollutants, as well as sanitary and other requirements for the regulation of their territory. Such standards are established to assess the environmental safety of production and prevent harmful effects on the surrounding natural environment;

4. Compliance with environmental obligations by special water users:

a) compliance with the established rules of operation of reservoirs, regimes of accumulation and operation of water reserves, regimes of level fluctuations in the upper and lower reservoirs and the passage of water through hydraulic nodes;

b) ensuring in the prescribed manner uninterrupted passage of fish to spawning grounds in accordance with the projects of fish passage facilities (Article 66 of the Water Code of Ukraine).

5. *Compliance with environmental protection requirements when allocating land for the needs of hydropower*.

According to Art. 96 of the Water Code of Ukraine during the placement, design, construction, reconstruction and commissioning of enterprises, structures and other hydropower facilities, rational use of land must be ensured. At the same time, technologies are provided that provide protection of lands from salinization, flooding or over-drying, as well as contribute to the preservation of natural conditions and landscapes both directly in the area of their placement and on the catchment area of water bodies;

6. *Equipping water intakes and other structures with fish protection devices in accordance with approved projects, construction of fish nurseries, artificial spawning grounds, fish passage structures, preparation of the reservoir bed, etc.* – the main measures for the preservation and

[53] Про стратегічну екологічну оцінку: Закон України від 20 березня 2018 року. *Відомості Верховної Ради.* 2018. № 16. Ст. 138.

protection of fish, other aquatic animals and plants and their reproduction, carried out during placement, design , construction, reconstruction and commissioning of enterprises, buildings and other objects (Article 97 of the Water Code of Ukraine);

7. Cooperation with nature protection organizations;

8. Involvement of the public in making decisions about the construction of new facilities, as well as other decisions that may affect people's health and the state of the environment.

Water legislation provides for the right of citizens, their associations, and other public formations to participate in consideration by local councils and state bodies of issues related to the use and protection of water and reproduction of water resources; to participate in the conduct by the central body of the executive power that implements the state policy of state supervision (control) in the field of environmental protection, rational use, reproduction and protection of natural resources, inspections of water users' implementation of water protection rules and measures and to make proposals on these issues; provide public control over the use and protection of water and reproduction of water resources. It should be noted the fairly active participation of environmental organizations in solving issues of small hydropower development in Ukraine. However, such participation is accompanied by purely legal problems, which will be discussed below.

A group of **management mechanisms** is the third type of environmental principles aimed at preserving human life and health and the environment from the negative impact of hydropower enterprises. It consists of active and background activities.

Active measures are represented by protection of waters from pollution, clogging and depletion, prevention of their harmful effects, as well as protection of lands from salinization, flooding or over-drying and promotion of the preservation of natural conditions and landscapes both directly in the area of their placement and on the catchment area of water bodies. They are carried out at the stage of placement, design, construction, reconstruction and commissioning of enterprises, buildings and other objects and during the implementation of new technological processes in production. In addition to the water legislation, a similar provision is also contained in Art. 42 of the Law of Ukraine "On Land Protection"[54].

Background management mechanisms are presented as follows:

1. *monitoring the state of water and water resources.* For the purpose of rational use and protection of water and reproduction of water resources, Art. 21 of the Water Code of Ukraine provides for the implementation of

[54] Про охорону земель: Закон України від 19 червня 2003 року. *Відомості Верховної Ради України*. 2003. № 39. Ст. 349.

state water monitoring, which is a system of observation, collection, processing, preservation and analysis of information about the state of water bodies, forecasting its changes and developing scientifically based recommendations for making appropriate decisions. The components of state water monitoring are the study of biological, hydromorphological, chemical and physicochemical indicators. Note that state water monitoring is an integral part of the state system of environmental monitoring of Ukraine and is carried out in accordance with the procedure approved by the resolution of the Cabinet of Ministers of Ukraine dated September 19, 2018;

2. *application of the principle of basin management in order to obtain a general description of the state of surface and underground waters in the river basin area, as well as to determine the main anthropogenic influences on the quantitative and qualitative state of surface and underground waters, including from point and diffuse sources.*

Water legislation establishes the legal basis for the creation and functioning of basin councils, which are a consultative and advisory body within the territory of the river basin, formed under the central executive authority, which implements state policy in the field of water management development, with the aim of ensuring the rational use and protection of water and reproduction of water resources, their integrated management. Such Councils make proposals and ensure the coordination of the interests of enterprises, institutions and organizations in the field of water use and protection and reproduction of water resources within the basin. Basin councils include representatives of central and local executive bodies, local self-government bodies, other interested organizations, institutions, enterprises and representatives of the public;

3. *maintenance of the state water cadaster*. The state water cadaster includes data from the state accounting of surface and underground waters, the state accounting of artesian wells and the state accounting of water use, which are systematized by hydrographic and water management zoning, groundwater basins, types of economic activity, administrative and territorial units and in Ukraine as a whole. It is compiled for the purpose of systematizing the data of the state water record and determining the water resources available for use, designing water management, transport, industrial and other enterprises and structures related to the use of water. According to Art. 28 of the Water Code of Ukraine The State Water Cadaster is maintained by the central body of the executive power implementing the state policy in the field of water management development, by the central body of the executive power implementing the state policy in the field of geological study and rational use of the subsoil, and by the central body of the executive power implementing the state

policy in the field of hydrometeorological activity, in accordance with the procedure determined by the Cabinet of Ministers of Ukraine;

4. increase in environmental culture and the level of responsibility in the field of environmental protection, which aims to increase the level of environmental awareness and understanding by the entity operating in the energy sector of its involvement in the decarbonization of production and the development of a climate-neutral environment.

Along with the Laws that regulate the issue of greening activities in the field of hydropower, there are numerous subordinate legal acts in Ukraine that contain provisions on the design, placement and operation of the specified facilities. For example, the Decree of the President of Ukraine dated October 9, 2009 "On additional measures to increase the level of safety of energy facilities and the development of hydropower in Ukraine"[55] emphasizes the priority of environmental safety in the energy sector as a key component of the country's national security.

In order to comprehensively ensure the energy security of the state through effective development of hydropower with maximum use of economically effective hydropower potential, improvement of management of hydropower facilities, increase of their safety level, increase of regulatory maneuvering capacity of hydroelectric power plants and hydroelectric storage power plants to increase the stability and reliability of the combined energy system of Ukraine and its integration into the European energy system, reducing the consumption of organic fuel resources and human-made load on the environment on July 13, 2016, the Cabinet of Ministers of Ukraine adopted the Hydropower Development Program for the period until 2026. The implementation of the program's tasks is characterized by the presence of positive and negative consequences regarding the impact on the environment. However, as the scientists note, "the Program specifies the amount of electricity production without polluting the air space with emissions, an assessment of the increase in the maneuverability of the electric power system of Ukraine due to the implementation of hydroelectric power plants and hydroelectric power plants is made, but there is no information about the environmental consequences of its implementation." This additionally proves the need to strengthen environmental and legal regulation of small hydropower in Ukraine.

[55] Про додаткові заходи щодо підвищення рівня безпеки енергетичних об'єктів та розвитку гідроенергетики України: Указ Президента України від 9 жовтня 2009 року. *Офіційний вісник Президента України.* 2009. № 31. Стор. 54. Ст. 1042.

3.4. Legal problems of the development of national small hydropower (based on the materials of court practice)

The Law of Ukraine "On Alternative Energy Sources" emphasizes that the development of small hydropower is subject to state stimulation. However, despite some positive trends in the revival of small hydropower, rapid development (such as solar power) is not observed. Therefore, for almost twenty years, despite the declared state support, this process has been slow. Such a situation requires a scientific analysis in order to identify its main legal causes.

The formation of Ukrainian small hydropower has its own characteristics: a) a rather long history of existence compared to some other types of alternative energy; b) wave-like development (rise, decline, recovery of interest); c) simultaneous combination and opposition of economic, ecological and social interests. The declaration of state interest in the development of alternative energy, the long-term offer of a high "green" tariff led to a steady increase in business interest in such an investment direction as small hydropower. This entailed many conflicts in which public and private interests collided; positions of government, business and public representatives; needs and priorities of economic, ecological and social development. Many of these conflicts have turned into litigation.

That is why the legal difficulties faced by the small hydropower industry in Ukraine are best seen in the materials of the accumulated court practice. The analysis of many court cases that have been considered by the courts during the last fifteen years makes it possible to single out some typical legal problems and group them as follows: subject, object and implementation.

Subject problems – this group of legal complications, primarily related to the legal status and actions of subjects – participants in hydropower relations. This group includes, in particular, the following legal problems:

1) institutional-legal systemic inconsistency as a collective category that has many specific typical manifestations. First, the indicated inconsistency is clearly visible in the unfortunate multi-vector actions of local public authorities. This is extremely acutely manifested in cases where there is opposition between local councils and state administrations at different levels. As an example, we can cite a case in which the investor – LLC "Ukrtransrail" suffered due to a fundamental inconsistency in the positions of public authorities. Thus, since 2011, the Zhytomyr regional state administration has been actively working to attract investors who would build and start up small hydropower facilities as part of the energy efficiency improvement program. As a result of the events, several memoranda of cooperation with "Ukrtransrail" LLC were signed, according

to which the regional state administration undertook to comprehensively support the investment activities of this entity, in particular, regarding its acquisition of a land plot. A few years later, ignoring all legal and factual actions taken by Ukrtransrail LLC in the direction of hydroelectric power plant construction, the Zhytomyr City Council announced a competition to determine the best investment projects for the construction of hydroelectric power plants on the Teteriv River in the city of Zhytomyr and the village of Denishy, Zhytomyr District, Zhytomyr Region (decision of the executive committee Zhytomyr City Council No. 888 dated 16.12.2015). As a result, a situation has arisen where two entities can potentially obtain permits for the construction of a hydroelectric power plant at the same place. It is interesting that despite several years of disputes and going through all court instances, Ukrtransrail LLC did not manage to defend its interests[56]. This example clearly shows how the inconsistency of the actions of the regional administration and the city council – even under the conditions of formal legality – caused losses to the investor.

A similar problem arose in Transcarpathia, where "Alternative Electric" LLC received the appropriate permits and began construction of a small hydroelectric power station based on the orders of the head of the Rakhiv district state administration "On the development of a detailed plan of the territory for the construction of a hydroelectric power station, outside the settlement" No. 138 dated May 22, 2017, "On the approval of a detailed plan of the territory for the construction of a hydroelectric power plant, outside the settlement" No. 243 dated September 14, 2017. However, according to the order of the head of the Transcarpathian regional state administration "On preventing violations of the rights and interests of territorial communities and citizens, impact on the natural environment during the resolution of issues related to the placement of small hydroelectric power stations" No. 35 of January 24, 2019, the above orders of the head of the Rakhiv district of the state administration were abolished. After long court proceedings, it was recognized that the order of the head of the regional administration in this part was illegal, given that the disputed order of the head of the district administration had the characteristics of an individual act, the effect of which was completely exhausted from the moment of its execution[57]. Similar situations of confrontation between public authorities became prerequisites for the emergence of other disputes.

[56] Постанова Верховного Суду від 18 березня 2021 року у справі № 296/3836/16-а. URL: https://reyestr.court.gov.ua/Review/95616289 (дата звернення 25.07.2021 року)

[57] Рішення Закарпатського окружного адміністративного суду від 12 травня 2021 року у справі № 260/1082/19. URL: https://reyestr.court.gov.ua/Review/97136818 (дата звернення 25.07.2021 року)

First of all, representatives of business and residents of the territorial community become hostages of such uncoordinated actions of the public authorities.

Similar situations of confrontation between public authorities became prerequisites for the emergence of other disputes. First of all, representatives of business and residents of the territorial community become hostages of such uncoordinated actions of the public authorities[58]. The outlined trend shows the growth of mistrust in authorities in general and in the institutional and functional system of environmental protection in particular. In the conditions of imperfect and ineffective regulatory, organizational and technical regulation of small hydropower relations, the construction of new and the operation of existing small hydropower plants is carried out with numerous violations of environmental legislation. This leads to the emergence of social conflicts, destruction of rivers, degradation of biological resources and water ecosystems[59];

2) the problem of ensuring public participation *also accumulates several typical manifestations that deserve attention.*

First of all, there is a significant number of cases of falsification of the results of public hearings. The participation of residents of the territorial community in the direct resolution of issues of local importance is also discredited. On the one hand, negative decisions regarding the location of hydroelectric power plants on the territory are easily "broken" due to procedural violations and inaccuracies. For example, the decision of the general meeting of residents of the village of Velikiy Bychkiv, Rakhiv district, Zakarpattia region, according to which the community expressed its opposition to the construction of a hydroelectric power station on the Shopurka river, was invalidated[60]. On the other hand, there are cases of fabricating positive decisions of local councils, despite the reluctance of the citizens.

Secondly, the participation of public organizations should be recognized as an important component of this problem. It should be noted the rather active participation of environmental organizations in solving issues of small hydropower development in Ukraine. In particular, they actively act

[58] Рішення Закарпатського окружного адміністративного суду від 12 травня 2021 року у справі № 260/1082/19. URL: https://reyestr.court.gov.ua/Review/97136818 (дата звернення 25.07.2021 року)

[59] Платонова Є. О. Правові проблеми та перспективи використання енергії малих річок в Україні. *Юридичний науковий електронний журнал.* 2021. № 7. С. 135–139.

[60] Рішення Закарпатського окружного адміністративного суду від 03 вересня 2019 року у справі № 260/219/19. URL: https://reyestr.court.gov.ua/Review/84260581 (дата звернення 25.07.2021 року)

as third parties during the consideration and resolution of legal disputes regarding the specified issues. However, the participation of environmental organizations in the role of initiators of such disputes turned out to be rather problematic. As a good example can be the case of the lawsuit filed by the International Charity Organization "Ecology-Pravo-Lyudyna" against the Bystretsk Village Council, private entrepreneur V.V. Myronyuk, LLC "Hydropower", the main claim of which was the invalidation of the lease agreement for the land plot that was transferred for use for the construction and maintenance of a small hydroelectric power station in the Ivano-Frankivsk region. It is interesting that the judicial review of the appeal of the environmental organization was largely reduced to the resolution of the question of the legality of such an appeal, and not to the resolution of the legal problem with the concluded land lease agreement[61].

Since the legal mechanisms provided for by the legislation do not work properly, the interests of the territorial community in matters of the location of small hydropower facilities remain unprotected. A quite natural consequence was the holding of a number of public protest events in different parts of Ukraine, which aimed to draw attention to the categorically negative position of the local population regarding the placement of some small hydroelectric power plants.

Object problems – this group brings together problematic issues that concern the objects of hydropower relations. The biggest problem in this aspect should be recognized as a kind of *"splitting" of the legal regime of a hydropower facility*, namely: in practice, there is no single legal regime of a hydroelectric power plant as a complete object – there is a complex of heterogeneous legal regimes of individual parts that make up such a hydropower plant. This phenomenon occurs as a result of the fact that the legislation does not provide for the formation of a single legal regime for a hydropower facility – instead, a mechanical set of legal regimes is provided for: a) land plots on which the power plant is located, b) structures, c) hydrotechnical facilities, d) equipment, etc. All these integral components of a single complex object – a hydroelectric power plant – can be in different forms of ownership, on different legal titles, on the balance sheet of different entities, etc.

This problem is very well illustrated by the example of the dispute between Ukratransrail LLC and Zhytomyr City Council. The planned construction of a small hydroelectric power station on the Teteriv River became the subject of long and complicated court proceedings, because:

[61] Постанова Львівського апеляційного господарського суду від 17 червня 2015 року у справі № 909/1421/14. URL:https://reyestr.court.gov.ua/Review/45367600# (дата звернення 25.07.2021 року)

a) the investor, having signed memorandums of cooperation with the regional administration, leased a plot of land from the district state administration for the construction of a hydroelectric power station; b) the plot of land on which the hydrotechnical structure (reservoir with spillway dam) is located, is under the right of permanent land use in KP "Zhytomyrvodokanal"; c) the hydrotechnical structure is part of the municipal property of the city of Zhytomyr, although it is located on the territory of the village of Denishi. That is, the future hydroelectric power station is a kind of puzzle in which the elements have different owners and different legal regimes.

Additionally, the identified problem of "splitting" of the legal regime of the hydropower facility is illustrated by the case of the claim of SGC "Gubynskyi" to the Ladigiv village council of Khmelnytskyi region. According to the circumstances of this case, the cooperative, considering itself the owner of a small hydroelectric plant, sold it as a complete property complex to ResursEcoEnergo LLC. However, after that, the executive committee of the Ladigiv village council made a decision to register the right of communal ownership of an earthen dam with a spillway and a water intake for a hydroelectric power plant. That is, the construction of the hydroelectric power station was successfully expropriated, but the hydrotechnical structures necessary for its intended functioning were not. The courts emphasized that the presence of property on the company's balance sheet is not sufficient proof of the acquisition of ownership of such property[62]. The breakdown of the legal regime of the hydropower facility provoked a long-term dispute, delayed the operation of the power plant and highlighted the insecurity of the investor in this area.

Another problem, which is included in the group of object problems, should be indicated the problem of restoration of abandoned small hydroelectric power plants. In this connection, there are cases when such an object goes through the procedure of recognition as ownerless property and becomes communal property. Often this happens as a preparatory stage for the next privatization or transfer to a private investor.

The problems of implementation are united by those legal complications that accompany the direct process of implementing hydropower projects:

1) choosing the optimal contractual structure for the registration of relations regarding the construction or reconstruction of hydroelectric power plants. Analysis of practice demonstrates a significant range of options used

[62] Постанова Вищого господарського суду України від 30 листопада 2016 року у справі № 924/1319/14. URL: https://reyestr.court.gov.ua/Review/63318491 (дата звернення 25.07.2021 року)

in Ukraine for this purpose: for example, superficies, leases, easements, etc. The ambiguity of the use of the servitude contractual construction even caused a legal dispute. The Zhytomyr City Council transferred the hydrotechnical facility, which it is the owner of (at the same time, this facility is on the balance sheet of the utility company "Operation of Artificial Structures"), to the use of Free Energy LLC by establishing an easement for the use of this facility for the purpose of construction and operation of a small hydroelectric power station. Indeed, the expediency of such a choice raises questions. The prosecutor appealed to the court with a lawsuit, believing that the Zhytomyr City Council and Free Energy LLC violated the requirements of the law and entered into a sham transaction – an easement agreement, which by its very nature is actually a concession agreement, and this leads to the illegal use of communal property and water resources, and is therefore subject to invalidation. The courts recognized that although the disputed contract contains a discrepancy between the name and its content, however, taking into account the provisions of Part 2 of Art. 628 of the Civil Code of Ukraine, contains elements of different contracts and is a mixed contract, which is not a violation[63];

2) bureaucratic complications, administrative and procedural red tape as a typical problem has both regulatory and subjective prerequisites, often demonstrates a high corruption factor. To illustrate, we can give an example of a dispute between LLC "Hydroenergoresurs" and Shcherbaniv village council of Poltava region. Having received all the necessary permits for the construction of a mini-hydroelectric power station, having successfully issued the right to use a plot of land to carry out the relevant activity, the company received technical conditions for ensuring connection to power lines, namely: the route of laying (construction) of a 10-kW transmission line on a plot of land with an approximate area of 0.6960 ha in the village of Nizhny Mlyny on the territory of Shcherbanivska village council. In order to fulfill these technical conditions, "Hydroenergoresurs" LLC appealed to the village council with the question of making a decision on the formation of land plots, granting permission for the production of technical documentation on land management and its state registration in the State Land Cadaster of Ukraine, as well as making a decision on recognizing the right of communal ownership on registered land plots in the Shcherbanivska community in the person of the Shcherbanivska village council with the granting of the right of paid easement on these land plots in favor of Hydroenergoresurs LLC. That is why in order to fulfill the technical conditions for connection to the power transmission lines of the

[63] Постанова Північно-західного апеляційного господарського суду від 16 березня 2021 року у справі № 906/494/20. URL: https://reyestr.court.gov.ua/Review/95672902 (дата звернення 25.07.2021 року)

hydroelectric plant, it was necessary to first issue an easement on land plots that had not even been formed yet. Despite the fact that the investor offered to bear all the expenses related to the formation and registration of land plots, consideration of his issue was postponed several times, and later he was refused. This forced the company to propose to the village council a draft agreement on participation in the complex economic and social development of the territory of the Shcherbanivska rural united territorial community, according to which it was proposed to allocate 20,000 UAH for the development of the social sphere of the village. However, this proposal was also rejected. Having exhausted all possibilities for a peaceful settlement of the conflict, the investor appealed to the court. As a result of the court proceedings, the refusal of the village council was recognized as illegal, and the council was also obliged to re-consider the merits of the petition of Hydroenergoresurs LLC, taking into account the conclusions formulated by the court[64]. However, the unjustified prolongation of the procedure caused forced delays in the normal operation of the power plant.

Against the background of the identified domestic legal problems of the development of small hydropower, it is interesting to pay attention to the fact that the experience of foreign countries demonstrates both similar and completely different problems. For example, similar difficulties with overcoming bureaucratic obstacles are recorded in Serbia, Italy, Slovenia, and Spain. Protection of landscapes and mountain areas creates obstacles for the development of small hydropower in Croatia and Greece. Developed EU countries also have their own difficulties. For example, the implementation of the EU Water Framework Directive reduces the potential of European small hydropower, because it significantly increases environmental requirements for water protection. In Austria, Belgium and Germany, there is significant opposition to the development of hydropower from powerful administrations, non-governmental organizations and the fishing lobby, mainly due to environmental and fishing problems. Significant opposition to small hydropower is recorded in Poland, where a memorandum was submitted in 2009 demanding a moratorium on the construction of small hydropower plants; however, although the memorandum was supported by a number of institutions and mass media, the ban on small hydropower was not implemented[65].

Thus, both in Ukraine and in the world, small hydropower is a difficult and conflict-filled sphere of alternative energy. The main legal paradox that

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[64] Постанова Другого апеляційного адміністративного суду від 02 червня 2020 року у справі № 440/4827/19. URL: https://reyestr.court.gov.ua/Review/89683053 (дата звернення 25.07.2021 року)

[65] Liu H., Masera D., Esser L., eds. World Small Hydropower Development Report 2013. United Nations Industrial Development Organization; International Center on Small Hydro Power. URL: https://www.academia.edu/40392672/World_Small_Hydropower_Development_Report_2013 (дата звернення 25.07.2021 року)

can be discovered during its research is that the higher public administration bodies (at the level of international organizations, national states, regional authorities) in the process of their rule-making stimulate the development of small hydropower as a component of alternative energy (this finds its manifestation in favorable legislation, state support, regional development programs, etc.), while territorial communities, representatives of environmental organizations, local authorities – more often demonstrate opposition to the placement of small hydropower facilities. In the conditions of Ukraine, this fundamental conflict is fueled by many additional legal factors, which were mentioned above.

When examining all the identified problems in more detail, it can be claimed that they have a common denominator in poly subjectivity and poly objectivity of legal relations in the field of small hydropower. The first component of this problem, in our opinion, can be solved by concluding multilateral agreements between all the main participants of such relations at the preparatory stage of the formation (restoration) of small hydropower facilities. The increase in time for the preparation and signing of such contracts is justified by the reduction of the risk of protracted disputes at the next stages of the development of hydropower relations. The second component of the problem, in our opinion, should be solved by enshrining in the legislation a single legal regime of the hydroelectric power plant as a complex object. This will make it possible to use a productive methodological approach to the integrity of the hydroelectric power plant, in contrast to the current legal "splitting" of its legal regime into the regimes of its separate component parts[66].

[66] Григор'єва Х. А. Мала гідроенергетика в Україні: юридичні проблеми розвитку (на матеріалах судової практики). *Часопис Київського університету права.* 2021. № 2. С. 241–246.

DOI https://doi.org/10.36059/978-966-397-417-0-4

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CHAPTER 4. FEATURES OF THE LEGISLATIVE PROVISION OF WIND ENERGY IN UKRAINE

4.1. State of legislation in the field of wind energy

The beginning of domestic wind energy creation can be called 1994, when the resolution of the Cabinet of Ministers of Ukraine " On the construction of wind power plants " dated June 15, 1994 No. 415 was issued. This regulatory act stipulated that the Ministry of Economy, the Ministry of Energy and Electrification should provide electricity tariffs, and funds in the amount of 0.5 percent of the volume of commodity electricity production, which must be accumulated in the Ministry of Energy and Electrification in a separate account and directed in a targeted manner to the construction of wind power plants in various regions of the country and the expansion of wind power equipment production capacities[1]. The first mass-produced Ukrainian wind turbine production was carried out by enterprises of the military-industrial complex headed by Pivdenmash. These installations with a capacity of 107 kW each in the amount of 550 pieces represent the basis of the industrial park at the Donuzlavska, Sakska, Novoazovska, Tarkhankutska, and Truskavetska wind power stations[2]. However, this direction of alternative energy did not develop, due to low tariffs for energy from traditional sources.

The Law of Ukraine "On Energy-Saving" dated July 1, 1994, for the first time, defined the term "unconventional and renewable energy sources", which meant sources that constantly exist or periodically appear in the surrounding natural environment in the form of energy flows from the Sun, wind, and Earth's heat, the energy of seas, oceans, rivers, biomass. The law defined the legal regulation applicable to legal entities and individuals who carry out the construction and reconstruction of renewable energy facilities. In accordance with the Decree of the President of Ukraine " On the construction of wind power plants " dated March 2, 1996, the target fee was

[1] Про будівництво вітрових електростанцій: постанова Кабінету Міністрів України від 15 червня 1994 року. URL: https://zakon.rada.gov.ua/laws/show/415-94/ (дата звернення 16.08.2023 року)

[2] Мандрик О. М. Аналіз використання потенціалу вітрової і сонячної енергії в Карпатському регіоні. *Науково-технічний журнал*. 2016. № 1 (13). С. 158–166.

increased from 0.5 to 0.75% of the total electricity production. This Decree also instructed the Cabinet of Ministers of Ukraine to approve the State program for the construction of wind power plants by December 31, 1996[3]. The comprehensive program for the construction of wind power plants was approved by the resolution of the Cabinet of Ministers of Ukraine dated February 3, 1997[4]. This resolution provided for the creation of an inter-sectoral coordination council for the construction of wind power plants and the approval of regulations on it, as well as the development of measures to attract investments for the construction of power plants and the production of modern wind energy equipment.

The priority of the development of the wind energy industry was also confirmed at the level of the Law of Ukraine dated June 8, 2000 "On Amendments and Additions to Certain Laws of Ukraine on Promoting the Development of the Wind Energy Industry of Ukraine", which was amended for the period until January 1, 2011, in particular to the Law of Ukraine "On Energy Industry":

– regarding the mandatory purchase by the Wholesale Electricity Market of Ukraine of the entire amount of electrical energy produced at the wind farm;

– regarding the establishment of a target surcharge of 0.75% to the existing electricity tariff for financing the construction of wind power plants by the Comprehensive Program.

"The development of alternative energy in Ukraine began in 2009 when the "green" tariff was established in the Law of Ukraine "On Energy Industry". Wind power began to actively scale only in 2011-2012. This is because at least one year of wind monitoring is required for wind turbines, which is required by banks to grant a loan. At the same time, the migration routes of birds are also monitored, and builders need to solve complex engineering tasks, ensure the construction of roads (to deliver windmill blades), etc. It is because of this that wind energy projects take longer than other alternative energy projects[5]. At the end of 2012, the capacity of wind power plants in Ukraine amounted to almost 263 MW, and seven years

[3] Про будівництво вітрових електростанцій: указ Президента України від 2 березня 1996 року. URL: https://zakon.rada.gov.ua/laws/show/159/96 (дата звернення 16.08.2023 року)

[4] Про Комплексну програму будівництва вітрових електростанцій: постанова Кабінету Міністрів України від 3 лютого 1997 року. *Офіційний вісник України.* 1997. № 8. Ст. 139.

[5] Кузьміна М. Вітроенергетика в Україні: законодавче регулювання. *Підприємство, господарство і право.* № 11. 2014. С. 35–38.

later, Ukraine joined the "Gigawatt Club": it unites countries with installed wind energy capacity exceeding 1,000 MW[6].

Throughout the existence of independent Ukraine, there have been constant changes in the legal regulation of relations in this area, but a comprehensive legal framework that would be able to regulate all types of alternative energy in our country has not yet been built. The use of wind energy instead of traditional energy sources requires a legal analysis of what kind of energy can be obtained to determine the prospects for its use. The Basic Law of Ukraine "On Alternative Energy Sources" [7] does not define wind energy, but only refers to wind energy as renewable energy sources as one of the types of alternative energy sources. The definition of this type of energy is contained in DSTU 2275-93 "Energy Saving. Non-traditional and renewable energy sources. Terms and definitions", according to which wind energy is "the energy of the natural movement of air relative to the surface of the Earth". However, as we can see, the last document does not define the type of energy, but rather its source.

With the adoption of the Law of Ukraine "On the Electric Energy Market" dated April 13, 2017,[8] new legislative terms appeared in the current legislation on alternative energy sources: " wind power plant" and "wind power installation", the purpose of which is the production of electrical energy by converting kinetic energy wind into electrical energy. The difference between them is that a wind power plant is a single electric plant, and a wind power plant is a group of wind power plants or individual wind power plants, equipment, and structures located in a certain territory, which are functionally connected and constitute a single complex.

However, according to Art. 1 of the Law of Ukraine "On Alternative Energy Sources", the energy produced from alternative sources can be not only electrical but also thermal and mechanical energy. This is also true for energy derived from wind energy. However, at present, the main attention is paid to only one type of energy that can be obtained from the conversion of wind energy – electrical energy. Although both in our country and in the world, other directions are actively developing. For example, regarding the conversion of wind energy into mechanical energy for the direct mechanical drive of machines and mechanisms for various purposes: raising water, irrigating land, harvesting wood, ventilating warehousei and basements, etc. There are also developments regarding the direct conversion of wind energy

[6] Вітрова енергетика в Україні та світі. URL: https://hmarochos.kiev.ua/2022/01/18/vitrova-energetyka-v-ukrayini-ta-sviti/ (дата звернення 01.07.2023 року)

[7] Про альтернативні джерела енергії: Закон України від 20 лютого 2003 року. *Офіційний вісник України*. 2003. № 12. Ст. 522.

[8] Про ринок електричної енергії: Закон України від 13 квітня 2017 року. *Офіційний вісник України*. 2017. № 49. Ст. 1506.

into thermal energy for obtaining hot water and heating (greenhouses)[9]. In connection with the improvement of technologies, the task is now to increase the penetration and optimize the design, construction, and performance of wind energy systems.

An analysis of the legislation regulating wind energy in Ukraine demonstrates some features of its formation and development. The following signs of legal regulation of the specified industry can be singled out.

1. *Mainly the general non-specialized character of the legislative framework.* In accordance with international standards and priorities, several normative legal acts aimed at the development of the modern energy industry were adopted in Ukraine. The main legislative act in the researched area is the Law of Ukraine "On Alternative Energy Sources"[10], which established the legal, organizational, technical, and socio-economic principles of electricity production from renewable sources. Wind energy is regulated by general legal mechanisms common to all types of alternative energy. However, at the same time, it is possible to trace some special norms that reflect the specifics of wind energy. For example, the rulemaker needs to emphasize the ecological importance of wind energy and the possible negative impact on the environment. Relevant aspects are reflected in the norms of the laws of Ukraine "On Environmental Impact Assessment"[11] and "On Strategic Environmental Assessment"[12], which will be mentioned below.

2. *A significant part of program norms.* Taking into account the traditional division of wind energy into "large" and "small" according to the criterion of the power of wind turbines, some program documents pay attention to the need for the development of "small", and "non-commercial" wind energy. In the special literature, it is also called "rural", "farm", and "for the yard", referring to its wind energy installations of low power (up to 30 kW), which can work both independently and in combined wind-diesel, wind-hydro or wind-helio installations using energy accumulators[13].

Certain measures for the development and support of "small" wind energy were provided for by the Program of State Support for the

[9] Рудь Ю. М. Правове регулювання енергозбереження у сільському господарстві України: автореф. дис. … канд. юрид. наук 12.00.06. Київ, 2015. 18 с.

[10] Про альтернативні джерела енергії: Закон України від 20 лютого 2003 року. *Відомості Верховної Ради України.* 2003. № 24. Ст. 155.

[11] П ро оцінку впливу на довкілля: Закон України від 23 травня 2017 року. *Відомості Верховної Ради України.* 2017. № 29. Ст. 315.

[12] Про стратегічну екологічну оцінку: Закон України від 20 березня 2018 року. *Відомості Верховної Ради України.* 2018. № 16. Ст. 138.

[13] Носенко Ю. Вітроенергетика – практичні аспекти і перспективи. *Агробізнес сьогодні*. 2012. № 1/2. С. 42–44. С. 43.

Development of Non-Traditional and Renewable Energy Sources and Small Hydro– and Thermal Energy, approved by the Cabinet of Ministers of Ukraine resolution of December 31, 1997. Thus, point 4.1 of the Program, dedicated to wind energy, among others, determined priority measures for the development of autonomous wind energy for the period up to 2010. Scientific and technical support was to be concentrated on the development and introduction into serial production of wind pump installations, autonomous wind electric installations, autonomous wind, and wind-diesel power plants, the main consumer of which was to become agriculture[14]. At the same time, the Program did not envisage any other mechanisms of state support for "small" wind energy, as well as stimulating the interest of investors and consumers in it.

The attraction of wind energy legislation to program norms is evidenced by the content of the Energy Strategy of Ukraine for the period until 2035 "Safety, energy efficiency, competitiveness", which became invalid due to the adoption of the decree by the Cabinet of Ministers of Ukraine dated April 21, 2023 " On the approval of the Energy Strategy of Ukraine for the period until the 2050 year". Thus, among the main measures in the field of renewable energy sources at the stage of optimization and innovative development of the energy infrastructure until 2025, the specified legal act provided for the need to stimulate the construction of wind farms and the generation of electricity by low-power installations of renewable energy sources, to ensure the implementation of projects on the decentralization of energy supply at the local level, including based on the use of renewable energy. It was determined that the priorities for Ukraine are, in particular, the development of a competitive fuel and energy complex, the development of the infrastructure of renewable energy sources, and the increase of their share in the total volume of energy consumption to the level of 12% by 2025 and 25% by 2035. The document also stated that wind energy should contribute to the reduction of the carbon footprint in the context of combating climate change[15]. As the analysis of the pre-war indicators of the development of the wind energy sector shows, not all the tasks foreseen by the Strategy were fulfilled in full.

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[14] Про Програму державної підтримки розвитку нетрадиційних та відновлюваних джерел енергії та малої гідро– і теплоенергетики: постанова Кабінету Міністрів України від 31 грудня 1997 року. URL: https://zakon.rada.gov.ua/laws/show/1505-97-п#Text (дата звернення 16.08.2023 року)

[15] Про схвалення Енергетичної стратегії України на період до 2035 року "Безпека, енергоефективність, конкурентоспроможність": розпорядження Кабінету Міністрів України від 18 серпня 2017 року. *Урядовий кур'єр.* 08.09.2017. № 167. *(втратило чинність)*

The analyzed strategic program documents indicate a declarative and ineffective state policy in the field of wind generation development. It was due to the high generalization of the provisions of the legislation; the fragmented, inconsistent nature of measures aimed at placing wind power plants on the territory of the country; and the lack of legal mechanisms for stimulating the development of the domestic wind energy industry. The specified miscalculations subsequently negatively affected the provision of integral and systemic legal regulation of the construction of wind power plants.

3. *A significant specific weight of norms of a procedural and technical nature.* In order to further reform and develop the energy industry, a number of secondary legal acts were adopted, which, on the one hand, detail the provisions of the adopted energy laws, and on the other hand, specify the issue of calculating "green" tariffs, establishing quotas for producers of alternative energy and the procedure for carrying out auctions regarding their distribution, regulate the technical nature of the operation of renewable energy facilities. Among the normative acts that establish the technical provisions and procedures for making calculations for "green" energy, the following can be noted: the resolution of the Cabinet of Ministers of Ukraine " On the determination of authorized banks of the electric energy market" dated February 27, 2019[16], the resolution of the Cabinet of Ministers of Ukraine "On the formation of state-owned enterprise "Guaranteed buyer" and "Market operator" dated April 17, 2019[17], the resolution of the Cabinet of Ministers of Ukraine "On the introduction of competitive conditions for stimulating the production of electricity from alternative energy sources" dated December 27, 2019[18], numerous resolutions and orders of the NCSEPU, etc. Common to these normative legal acts is that they are general and apply to all areas of alternative energy[19].

4. *Tendency to the market model of regulation of social relations.* This characteristic was manifested, in particular, during the introduction of further changes to the legislation in 2019. Thus, the legal category

[16] Про визначення уповноважених банків ринку електричної енергії: постанова Кабінету Міністрів України від 27 лютого 2019 року. *Урядовий кур'єр.* 28.02.2019. № 41.

[17] Про утворення державних підприємств "Гарантований покупець" та "Оператор ринку": постанова Кабінету Міністрів України від 17 квітня 2019 року. *Урядовий кур'єр.* 20.04.2019. № 77.

[18] Про запровадження конкурентних умов стимулювання виробництва електричної енергії з альтернативних джерел енергії: постанова Кабінету Міністрів України від 27 грудня 2019 року. *Урядовий кур'єр.* 31.01.2020. № 19.

[19] Караханян К. М. Становлення та сучасний стан законодавчого забезпечення вітроенергетики в Україні. *Міжнародний науковий журнал "Інтернаука". Серія: "Юридичні науки".* 2021. № 11. С. 25–32. С. 31–32.

"combined wind-solar generating systems" was introduced with a tariff of 16.37 cents per kWh. The changes were supposed to stimulate the development of more balanced "sun + wind" systems that generate electricity throughout the year regardless of the season[20]. However, the innovations were adopted only in August 2019, and this tariff was valid for four months. This is explained by the fact that in 2020 the Cabinet of Ministers of Ukraine signed a memorandum with producers of alternative energy, which provided that the authorities undertake to determine and approve annual quotas for the support of "green" energy and ensure the holding of auctions for the distribution of such quotas. Instead, the manufacturers agreed to adjust the terms of putting new facilities into operation at the "green" tariff[21]. On July 21, 2020, the Law of Ukraine "On Amendments to Certain Laws of Ukraine on Improving the Conditions for Supporting the Production of Electricity from Alternative Energy Sources " was adopted[22], which enshrines the key provisions of the government's memorandum with producers of "green" energy and allows reducing energy tariffs for wind power plants – to 7.5%, which enables the state to save almost UAH 7 billion annually.

5. *Relative protection of legislation.* In order to adhere to the course of decarbonization of production and to achieve climate neutrality in the country, a number of norms were established in the current legislation, which contribute to the development of the energy sector and the increase of wind energy facilities, as well as provide additional guarantees to entities carrying out their activities in the field under study. So, for example, Art. 208 of the Land Code of Ukraine establishes that citizens and legal entities are exempted from compensation for forestry production loss in case of land plots being used for the construction and maintenance of energy facilities that produce electricity from alternative energy sources[23].

The Law of Ukraine "On Amendments to Certain Legislative Acts of Ukraine Regarding the Peculiarities of Regulating Land Relations in Martial

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[20] Дороніна І. І. Інструменти державної підтримки використання енергії з відновлюваних джерел. *Збірник наукових праць НАДУ.* 2020. Вип. 2. С. 47–55. С. 54.

[21] Караханян К.М. Законодавчі засади економічного стимулювання розвитку вітроенергетики в Україні. *Актуальні проблеми земельного, аграрного, екологічного та природоресурсного права*: матеріали круглого столу (Харків, 10 грудня 2021 року). Харків, 2021. С. 98–101.

[22] Про внесення змін до деяких законів України щодо удосконалення умов підтримки виробництва електричної енергії з альтернативних джерел енергії: Закон України від 21 липня 2020 року. *Відомості Верховної Ради України*. 2020. № 50. Ст. 456.

[23] Земельний кодекс України від 25 жовтня 2001 року. *Відомості Верховної Ради України*. 2002. № 3. Ст. 27.

Law" of May 12, 2022, [24]added paragraphs 21 p. 27 of the Transitional Provisions of the Land Code of Ukraine by the norm that the terms of payment by the land user (except for land users of state, communal property) of rent, sublease fees for land plots, fees for the establishment of a land easement, fees for the use of a land plot on the conditions of superficies, if appropriate the right to use a land plot granted for the placement of energy infrastructure facilities, which occurred during martial law, is transferred for a period of up to six months from the date of termination or cancellation of martial law.

The Law of Ukraine "On the Electric Energy Market" [25]gives certain groups of consumers the right to install generating units intended to produce electric energy. For example, domestic consumers in their private households may place generating units with an installed capacity of no more than 50 kW, intended for the production of electrical energy from the energy of solar radiation and/or wind energy. As for energy cooperatives, the capacity of their generating units must not exceed 150 kW. In addition, an additional stimulating factor is the fact that the production of electrical energy by consumers from the energy of solar radiation and/or wind energy is carried out without a corresponding license.

6. *Combination of economic and environmental aspects in legislation.* Wind energy is one of the most environmentally friendly types of energy because carbon emissions during the production of electricity by a wind turbine are zero. However, despite this, it must be completely safe for all components of the natural environment, which is why additional environmental measures must be taken to avoid possible risks. Legislative acts that regulate the purely ecological component of the development of renewable energy and its impact on the natural environment are promulgated by the Government of Ukraine "On Environmental Impact Assessment" of May 23, 2017, and [26]"On Strategic Environmental Assessment" of March 20, 2018[27]. The specified normative legal acts establish the legal and organizational principles of environmental impact assessment, aimed at preventing environmental damage, ensuring environmental safety, environmental protection, and rational use and

[24] Про внесення змін до деяких законодавчих актів України щодо особливостей регулювання земельних відносин в умовах воєнного стану: Закон України від 12 травня 2022 року. *Офіційний вісник України*. 2022. № 47. Ст. 2556.

[25] Про ринок електричної енергії: Закон України від 13 квітня 2017 року. *Офіційний вісник України*. 2017. № 49. Ст. 1506.

[26] Про оцінку впливу на довкілля: Закон України від 23 травня 2017 року. *Відомості Верховної Ради України.* 2017. № 29. Ст. 315.

[27] Про стратегічну екологічну оцінку: Закон України від 20 березня 2018 року. *Відомості Верховної Ради України.* 2018. № 16. Ст. 138.

reproduction of natural resources, in the process of making decisions about the implementation of economic activities that may have a significant impact on environment, taking into account state, public and private interests, as well as the obligation to evaluate state planning documents that relate to agriculture, forestry, fisheries, energy, industry, transport and other spheres of life.

The assessment of the impact on the environment as part of the preparation of the wind energy project must be comprehensive. As in the case of the construction of any energy facility, the possible impact of the wind power plant on such natural resources as air, soil, surface, and underground water resources is considered. In order to study and evaluate the impact of the wind power plant on biodiversity and the habitat, for at least one year, studies of existing natural environmental complexes in the area of the planned construction are conducted **with a focus on avian fauna** (birds, bats). It is worth noting that this list of studied environmental components is not exhaustive, because there are also **studies specific to wind energy.** In particular, aspects unique to a wind energy project can be studied, such as acoustic impact, shadow flickering effect, possible scattering of ice from frozen wind turbine blades, and visual impact on the landscape[28].

The above-mentioned laws contain detailed regulations on the issue of assessment and preparation of conclusions regarding such assessment, and post-project monitoring. Yes, holding a positive conclusion does not mean the end of the environmental impact assessment process. During construction works, and then during the operation phase of wind power plants, environmental impacts are monitored, and plans for managing environmental components are developed. In case of inconsistency with the results predicted as part of the assessment, additional measures are implemented to reduce the impacts.

4.2. Legal conditions and peculiarities of placement of wind energy facilities

Legal regulation of wind energy is carried out by numerous legal acts common to all RES[29]. The legal conditions and features of land-legal,

[28] Шмідт Галина. Оцінка впливу на довкілля – складова успіху кожного вітроенергетичного проєкту. URL: https://ecolog-ua.com/news/ocinka-vplyvu-na-dovkillya-skladova-uspihu-kozhnogo-vitroenergetychnogo-proyektu (дата звернення 01.07.2023 року)

[29] Платонова Є. О. Правові умови та особливості розміщення і функціонування вітрових електростанцій в Україні. *Юридичний науковий електронний журнал.* 2021. № 9. С. 122–129.

ecological-legal, urban-planning legal, organizational-legal, and economic-legal aspects that require mandatory consideration during the placement and operation of wind turbines and the development of balanced mechanisms for stimulating their development are highlighted.

Land legal aspect. The specifics of the use of wind energy for the production of electricity lies in the close relationship with land plots, which are the territorial basis for the production of electricity. By the regulatory requirements of the Land Code of Ukraine and the Law of Ukraine "On Energy Lands and the Legal Regime of Special Zones of Energy Objects", the relocation, construction, and operation of wind power plants, wind power installations as objects of alternative energy are allowed to be carried out on a separate category of land "industry, transport, communication, energy, defense, and other purposes".

Within this general category of land, according to Part 1 of Article 76 of the Land Code of Ukraine, the lands of the energy system are recognized as the lands allocated for electricity-generating facilities, including wind power plants, except in cases defined by law where such facilities are located on lands of other designated purposes[30]. The Law of Ukraine " On the Power Engineering Lands and the Legal Status of Special Zones of the Power Engineering Objects " (Article 7) specifies that *energy land includes* land plots granted for the location, construction, and operation of facilities for the production of electric and thermal energy, namely wind power plants, belong to the lands of energy-generating enterprises[31].

Positive developments in the direction of simplifying access to land plots for the placement of alternative energy facilities, including wind energy, took place as a result of the adoption of the Law of Ukraine "On Amendments to the Tax Code of Ukraine and some other legislative acts of Ukraine on improving the administration and revision of the rates of individual taxes and fees" dated November 23, 2018 (entered into force on January 1, 2019)[32]. According to the legislative amendments, it is allowed to place alternative energy facilities that use wind energy not only on land designated as "energy land", but also on other land included in the general

[30] Земельний кодекс України від 25 жовтня 2001 року. *Відомості Верховної Ради України.* 2002. № 3. Ст. 27.

[31] Про землі енергетики та правовий режим спеціальних зон енергетичних об'єктів: Закон України від 09 липня 2010 року. Відомості Верховної Ради України. 2011. № 1. Ст. 1.

[32] Про внесення змін до Податкового кодексу України та деяких інших законодавчих актів України щодо покращення адміністрування та перегляду ставок окремих податків і зборів: Закон України від 23 листопада 2018 року. *Офіційний вісник України*. 2018. № 98. Ст. 3220.

category of “land of industry, transport, communication, energy, defense, and other purposes” without the need to change their intended purpose.

Given the specific dependence of wind power plants(WPP) on natural conditions, restrictions on the territorial location of wind energy facilities undoubtedly hinder the development of the industry. In addition, according to Art. 18 of the Law of Ukraine “On Energy Lands and the Legal Regime of Special Zones of Energy Facilities” to ensure the reliable operation and protection of energy-generating facilities and facilities for the transmission of electric and thermal energy, as well as the safety of the population and environmental protection, sanitary and protective zones of power plants. The requirement to establish such zones significantly increases the amount of land required for the construction of wind energy facilities[33].

At the same time, it should not be assumed that the lands used for the production of electricity belong exclusively to the lands of the energy industry. Land used for electricity generation, including wind power, belongs to different land categories.

Legislation on alternative energy allows for land rezoning before ownership or lease, if necessary, for wind energy needs. Features of establishing and changing the purpose of land plots are provided for in Art. 20 of the Land Code of Ukraine. Most often, the plots of land allocated for wind turbines are agricultural. Practice shows that quite often the change of purpose of land plots is carried out in violation of the requirements of the legislation.

During the implementation of projects related to the creation of wind power plants, the most common ways of acquiring rights to land plots, along with acquiring the right of ownership of the corresponding land plots, are the conclusion of lease agreements and agreements on establishing the right of land easement. At the same time, the indisputable advantage of land easements is that the legislation does not contain restrictions on the form of ownership and purpose of land plots for which a land easement is established. Therefore, to place wind turbines on agricultural lands, it is not necessary to change the purpose of the land plot, unlike a lease agreement. That is why it is not surprising that there is an established legal practice, according to which, if the land plot belongs to an individual, preference is given to the conclusion of an agreement on the establishment of an easement; and if the plot is owned by the state or territorial community, as a

[33] Харитонова Т. Є. Деякі проблеми використання об’єктів альтернативної енергетики на землях сільськогосподарського призначення. *Актуальні правові проблеми інноваційного розвитку агросфери:* матеріали наук.-практ. конф. (Харків, 20 листопада 2020 року). Харків, 2020. С. 273–276.

rule, a lease agreement is concluded, less often – an easement is established[34].

Therefore, a necessary condition for the realization of the right to build a WPP is the acquisition of the corresponding rights to the land plot. At the same time, the transfer (granting) of land plots from state or communal property to the ownership or use of natural or legal persons for urban planning purposes is allowed, provided that the corresponding land plots are located within the territory for which at least one of the following types of urban planning documentation has been approved at the local level: a comprehensive plan, a component of which is the territory zoning plan; the general plan of the settlement, a component of which is the territory zoning plan; the territory zoning plan as a separate type of urban planning documentation at the local level (approved before the entry into force of the Law of Ukraine "On Amendments to Certain Legislative Acts of Ukraine Regarding Land Use Planning"); detailed plan of the territory. However, the mentioned restriction does not apply to the case of providing a land plot for placing linear objects of transport and energy infrastructure (roads, bridges, overpasses, power transmission lines, communication), which significantly simplifies access to land plots for placing wind turbines.

Environmental and legal aspect. The system of normative legal acts devoted to environmental and legal requirements for the construction and operation of wind power plants is extensive, as it includes a considerable number of regulatory acts, including codes, special laws, government orders, orders of relevant ministries, and state standards[35].

Even though wind energy is traditionally considered a standard of energy generation, which has a minimal impact on the environment, such an impact still exists. When designing and building wind turbines and their infrastructure facilities, negative effects on the environment are not always taken into account. A significant achievement in the implementation of environmental criteria for alternative energy sources was the adoption of the Law of Ukraine "On Environmental Impact Assessment", which became an important step in the direction of solving the problems of ensuring the environmental and social safety of the functioning of wind energy facilities.

The procedure for determining the types of activities subject to environmental impact assessment is the initial stage of the environmental

[34] Мілімко Л. В., Остринський В. О. Проблеми правового регулювання договору оренди та встановлення права земельного сервітуту для потреб альтернативної (відновлюваної) енергетики. *Юридичний електронний науковий журнал*. 2017. № 6. С. 180–183.

[35] Павлига А. В., Дубінін Ю. С. Еколого-правові вимоги до розміщення та функціонування об'єктів вітрової енергетики в Україні. *Юридичний науковий електронний журнал.* 2021. № 11. С. 341–345.

impact assessment (EIA) procedure. The latter allows persons who will or may be negatively affected by the planned activity to take part in the decision-making, to whom the state gives permission to carry out the planned activity and establishes the conditions for its implementation. Traditionally, in Ukraine, the legal regulation of the EIA procedure is part of the procedure for designing construction objects and obtaining a permit for construction works[36].

According to the Law of Ukraine "On Objects of Increased Danger", wind turbines do not belong to potentially dangerous objects. Currently, at the legislative level, objects that produce electricity from wind energy can be classified as objects with minor consequences (CC1), subject to a positive conclusion of the authorized body for environmental impact assessment.

At the same time, according to the Law of Ukraine "On Environmental Impact Assessment", wind power plants with two or more turbines or a height of which is 50 meters or more are classified in the second category of types of planned activities and objects that can have a significant impact on the environment and are subject to EIA[37]. Therefore, these facilities are prohibited from starting any planned activity without carrying out an environmental impact assessment and, subsequently, without receiving a positive opinion from the Environmental Protection Agency. It is the conclusion of the EIA that is the basis for the authorized body both to grant permission for the planned activity and to refuse it. The environmental conditions for carrying out such activities, specified in the conclusion of the WPP, are mandatory. Public discussion is an integral part of the EIA procedure.

A significant modern problem is that the placement and construction of wind power plants are carried out in violation of environmental legislation, ignoring the criteria of sustainability: technical reliability and environmental safety. This leads to increased levels of noise, vibration, damage to soil and plant cover, death of birds and bats, and changes in landscapes[38]. As a result, one of the most valuable environmental rights of citizens is violated – the right to an environment safe for life and health. There are also violations of the rights of citizens to participate in the discussion and to submit proposals to the materials regarding the placement and construction

[36] Третяк Т. О. Процедура визначення видів діяльності та об'єктів, що підлягають оцінці впливу на довкілля в Україні. *Право і громадянське суспільство.* 2016. № 1. С. 112–127.

[37] Про оцінку впливу на довкілля: Закон України від 23 травня 2017 року. *Офіційний вісник України*. 2017. № 50. Ст. 1549.

[38] Вітряні електростанції та зміни клімату / Василюк О., Кривохижа М., Прекрасна Є., Норенко К. Київ: UNCG, 2015. 32 с.

of objects that may negatively affect the state of the environment, as well as the rights to participate in public discussions on the impact of planned activities on the environment[39]. As a result, there are social conflicts and opposition from public environmental organizations, as well as numerous lawsuits regarding the construction of wind power plants. In the conditions of the modern European integration process, the role of the social factor in solving issues of wind energy development is increasing.

Urban planning legal aspect. In accordance with the Law of Ukraine "On the Electric Energy Market", design and construction (new construction, reconstruction, overhaul), technical re-equipment of generating capacities are carried out following the legislation in the field of urban planning activities (Article 28). A positive achievement of modern legislation on the regulation of urban planning activities is the tendency to introduce legal mechanisms aimed at harmonizing public and private interests at various stages of WPP construction, taking into account their possible negative impact on the state of the environment, the level of danger to people, as well as causing material and social damage. The development of wind energy is inextricably linked with the need to take into account environmental requirements when carrying out activities related to the construction and operation of wind turbines.

The Law of Ukraine " On Amendments to Certain Legislative Acts of Ukraine Regarding the Improvement of Urban Development " of January 17, 2017, provided for the transition from categories of complexity of construction objects to class of consequences (responsibility) and introduced a simplified procedure for examining construction projects, obtaining construction permits and acceptance into operation of objects completed by construction[40]. Thus, it is legally established that the class of responsibility is influenced by three factors: the level of danger to people, material damage, and social loss. Currently, all objects are divided by a class of consequences (responsibility): minor consequences – CC1; medium consequences – CC2; significant consequences – CC3. It should be noted that the class of consequences is determined in accordance with the requirements of DSTU 8855:2019 "Buildings and structures. Determination

[39] Платонова Є. О. Правові аспекти забезпечення екологічних прав громадян при будівництві вітрових електростанцій в Україні. *Актуальні проблеми юридичної науки*: збірник тез Міжнародної науково-практичної конференції Двадцяті осінні юридичні читання "Права людини в сучасному світі проблеми теорії та практики" (м. Хмельницький, 1–2 жовтня 2021 року). Хмельницький: Хмельницький університет управління та права імені Леоніда Юзькова, 2021. С. 110–111.

[40] Про внесення змін до деяких законодавчих актів України щодо удосконалення містобудівної діяльності: Закон України від 17 січня 2017 року. *Офіційний вісник України*. 2017. № 15. Ст. 425.

of the class of consequences (responsibility)"[41]. The complexity, the amount of necessary documentation, and the order of construction depend on the class of consequences. Undoubtedly, these short stories directly affected the construction of the wind farm.

Simplification of the procedure for obtaining permits for starting the construction of facilities producing energy from wind energy and creating favorable conditions for investment and development of wind energy in Ukraine was introduced by the Law of Ukraine "On Amendments to Certain Laws of Ukraine Regarding the Investment Attractiveness of the Construction of Renewable Energy Facilities" of energy" dated September 4, 2018,[42] The innovations made to the Law of Ukraine "On Regulation of Urban Planning" were as follows.

Firstly, objects that produce electrical energy from wind energy were classified as objects with insignificant consequences (CC1), subject to a positive conclusion of the authorized body for environmental impact assessment (paragraph 14, part 5, article 32).

Secondly, WPP construction projects, which according to the class of consequences (responsibility) belong to objects with minor consequences (CC1), are not subject to mandatory examination of construction projects (Part 3 of Article 31). Instead, a mandatory examination is provided for those wind power construction projects that, according to the class of consequences (responsibility), belong to objects with medium (CC2) and significant (CC3) consequences or are subject to environmental impact assessment in accordance with the Law of Ukraine "On Impact Assessment on the environment" in terms of taking into account the results of EIA (Part 4 of Article 31).

According to the urban planning legislation, the construction of wind turbines, which according to the class of consequences (responsibility) belongs to objects with minor consequences (CC1), is carried out after the customer submits *a notice of the start of construction work* to the relevant state architectural and construction control body. The acceptance into operation of the completed wind power plant is carried out on the basis of *the declaration of readiness of the object for operation.*

On the other hand, in the case of the construction of a wind park, a wind power plant having two or more turbines or the height of which is 50 meters or more, which are classified in the second category of types of planned

[41] ДСТУ 8855:2019 Будівлі та споруди. Визначення класу наслідків (відповідальності). Київ ДП "УкрНДНЦ", 2019. 13 с.

[42] Про внесення змін до деяких законів України щодо інвестиційної привабливості будівництва об'єктів відновлюваної енергетики: Закон України від 4 вересня 2018 року. *Офіційний вісник України*. 2018. № 78. Ст. 2585.

activities and objects, may have a significant impact on the environment and are subject to EIA, – construction works can be performed after the customer is issued *with a construction work permit.* Acceptance into the operation of completed objects by issuing *a certificate to the developer* is provided only for objects that, according to the class of consequences, belong to objects with medium (CC2) and significant (CC3) consequences.

Organizational and legal aspect. The connection of wind energy installations to electrical networks requires the settlement of some organizational and legal issues.

At the initial stage of the implementation of the wind energy facility construction project, the main task is to obtain technical conditions – a set of conditions and requirements for the engineering supply of the customer's facility with electrical energy, which must correspond to its calculated parameters for electricity supply and is an integral appendix to the contract on joining the electrical networks. The technical conditions are valid until the construction of the object is completed, regardless of the change of the customer or the enterprise, institution, and organization that provided such technical conditions. Changes to the technical conditions can be made only with the consent of the customer.

The Law of Ukraine "On Amendments to Certain Laws of Ukraine Regarding Ensuring Competitive Conditions for the Production of Electricity from Alternative Energy Sources" dated April 25, 2019, provided that for objects that produce electricity from wind energy, the technical conditions are valid no more than three years from the date of their issue, regardless of the change of the customer.

If the customer is a business entity that acquired the right to support as a result of the auction, the technical conditions for this wind energy facility are valid for the period of fulfillment of obligations regarding its construction and commissioning in accordance with Art. 9 [3] of the Law "On Alternative Energy Sources"[43].

It should be noted that for a long time, the special legal regulation of connection of wind power plants to electric networks was carried out in accordance with the Rules of connection of wind power plants to electric networks, approved by order of the Ministry of Fuel and Energy of Ukraine dated October 28, 2009 No. 570 (expired on May 7, 2019). Currently, the connection of electrical installations intended for the production of electric energy or the combined production of electric and thermal energy to the

[43] Про внесення змін до деяких законів України щодо забезпечення конкурентних умов виробництва електричної енергії з альтернативних джерел енергії: Закон України від 25 квітня 2019 року. *Відомості Верховної Ради України*. 2019. № 23. Ст. 89.

transmission system or the distribution system is carried out following the procedure established by Art. 21 of the Law of Ukraine "On the Electricity Market".

At the same time, the condition for connecting the customer's electrical installations to the transmission system or the distribution system is the customer's compliance with the connection procedure defined in the code of the transmission system [44]and the code of distribution systems[45]. In the future, the presence of such a connection is one of the special conditions for establishing a "green" tariff of a business entity: one of the documents that a business entity submits to the National Energy Regulatory Commission for the establishment of a "green" tariff are copies of the agreement on connection to electric networks and technical conditions for connection to electrical networks of an electrical installation that produces electrical energy using wind energy.

Economic and legal aspect. The existing economic and legal incentives for the use of wind energy contributed to the intensification of the growth of the construction of wind power plants in Ukraine. In general, the introduction of the "green" tariff creates favorable conditions for the development of the wind energy industry, but, unlike European countries, significant fluctuations in its size are observed in Ukraine. If we analyze the latest changes in the legislation, we can see a trend towards a significant reduction in the size of the "green" tariff, which until now has been the only effective means of stimulating the development of wind energy in Ukraine. Non-compliance with state guarantees regarding the revision of the size of the "green" tariff creates unstable conditions for conducting business in the field of wind energy[46].

On the path of reforming the energy legislation in Ukraine, there is a change in the protective conditions for the functioning of wind energy, namely: the transition from a support system based on a "green" tariff to a competitive model of stimulating the development of wind energy by holding *auctions for the distribution of support* ("green" auctions).

Thus, Article 9^3 of the Law of Ukraine "On Alternative Energy Sources" stipulates the obligation to participate in auctions for business entities that intend to produce electrical energy from wind energy if they intend to produce electrical energy at electric power facilities or queues (start-up complexes) of

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[44] Про затвердження Кодексу системи передачі: постанова НКРЕКП від 14 березня 2018 року № 309. *Урядовий кур'єр*. 2018. № 75.

[45] Про затвердження Кодексу систем розподілу: постанова НКРЕКП від 14 березня 2018 року № 310. *Урядовий кур'єр*. 2018. № 75.

[46] Рибнікова Е. Ю. Економіко-правовий механізм стимулювання виробництва та використання альтернативної енергії в Україні. *Південноукраїнський правничий часопис*. 2017. № 3. С. 62–65.

electric power facilities, the installed capacity of which is more than 5 MW. At the same time, the condition for participation in the auction is the absence of an established "green" tariff for the object of alternative energy and/or the absence of a previously obtained right to support based on the results of the auction for this object.

It is necessary to note the legislator's positive desire to support distributed, seasonally and during the day generation for private households, small and medium-sized businesses. Thus, a minor revival of the small wind energy market took place after the adoption of the Law "On Amendments to Certain Laws of Ukraine on Ensuring Competitive Conditions for the Production of Electricity from Alternative Energy Sources", according to which private households have the right to install generating units intended for the production of electricity without a corresponding license from wind energy, the amount of installed power of which does not exceed 30 kW, and sell the surplus of generated electricity to the network at the "green" tariff.

Unfortunately, the adoption of this Law did not affect the development of small wind energy due to the presence of some legislative barriers. The biggest obstacle was the difference in the amount of "green" tariffs for electricity produced by private households using solar energy and electricity using wind energy. With the parallel use of solar and wind generation, the difference in tariffs required households to install two electricity accounting systems, which led to double costs. Therefore, in 2016, only two small wind power plants were installed in the country under the "green" tariff[47].

In 2019, there were significant changes in the legislative sphere that directly affected the segment of small wind energy. First, for households that planned to use wind energy, the capacity of power generating units was increased to 50 kW, and for other consumers, including energy cooperatives – up to 150 kW. Secondly, a new category was introduced – "combined wind-solar generating systems" with a fairly good tariff. Thirdly, a simplified procedure for setting a "green" tariff for such electricity consumers was introduced. These legislative changes were supposed to stimulate the development of more balanced systems that generate electricity throughout the year regardless of the season. However, the reduction of the size of the "green" tariff for combined wind-solar generating systems by 25% already in January 2020 made the use of wind generators in such systems economically unattractive, and plans for the development of combined systems of distributed generation – are declarative. This fact is confirmed by disappointing statistics regarding the production and installation of small Ukrainian-made wind turbines in 2019 – only 24 kW[48].

[47] Вітроенергетичний сектор України 2016 (УВЕА, 2017). 44 с. URL: http://uwea.com.ua/ru/library/reviews/ (дата звернення 01.07.2023 року

[48]Вітроенергетичний сектор України 2019 (УВЕА, 2020). 87 с. URL: http://uwea.com.ua/ru/library/reviews/(дата звернення 01.07.2023 року)

4.3. Practical legal problems of wind energy development in Ukraine

The last few years have been marked by the rapid development of wind energy in Ukraine. The rapid appearance of wind energy facilities throughout the territory of our country has caused the need for a special study of the complex legal relations accompanying the relevant process. Their detailed analysis shows that land relations are the central basis. This is caused, in particular, by the fact that a feature of the development and scaling of wind energy is the expansion of the corresponding land use. At the same time, both relatively small areas of land (several tenths of a hectare) and quite impressive territories may be needed for wind energy purposes (for example, the construction project of the Tyligul wind power plant in the Mykolaiv region covers 35,000 hectares).

At the same time, it should be emphasized that, despite its environmental friendliness, climate friendliness, and encouragement from the state, wind energy experiences various types of legal opposition. This is especially clear when studying court practice, the analysis of which allows us to outline several main legal strategies for combating “unwanted” wind power plants (WPP) in Ukraine. Against the background of the aggravation of the problems of forming and maintaining the energy security of Ukraine during the conduct of military operations and at the stage of prospective post-war recovery, the identification of those real problems faced by the wind energy industry in Ukraine is especially relevant. Awareness of such legal problems will allow us to form effective and scientifically based ways of solving them to optimize the process of further development of “green” energy in general and wind energy in particular.

On the wave of the flourishing of “green” energy in Ukraine, wind energy facilities have appeared in many corners of our country. Most often, obtaining land plots for their construction takes place by concluding lease agreements with public authorities. However, this does not always cover all the practical issues that accompany the process of construction and operation of such alternative energy facilities. For example, Prymorska Wind Power Plant – 2 LLC was forced to conclude more than 100 agreements on the establishment of paid temporary easements with private owners of land plots to ensure the ability to build a power plant, lay underground cables, lay the necessary access roads, maintain equipment, etc.

However, modern legal practice demonstrates not only examples of a harmonious combination of interests and contractual settlement of land use issues in the field of wind energy. In many ca, the planning, construction, and operation of wind power plants cause considerable resistance and

desperate opposition[49]. If we analyze such ca, we can group them into four categories depending on the interested subjects.

Resistance from environmentalists and the public. The clearest, most frequent, and loudest example of such a case is the case of the planned construction of a wind farm in the Carpathian plain of Borzhava. In 2017, a Turkish investor in the person of Atlas Volovets Energy LLC began collecting all the necessary documents for the construction of the Borzhava wind farm with a total capacity of 120 MW. According to the project, it was planned to install 34 windmills 150 meters high together with mountain connecting roads and underground cables for tens of kilometers along the Borzhava River. Such a large-scale project threatens to destroy the valuable polony's ecosystem. The legal confrontation between the investor and the active public has been going on for several years. From a legal point of view, the main way of counteraction was to declare it illegal and cancel the opinion on environmental impact assessment (EIA). The argumentation and the chosen strategy of struggle mostly have an environmental-legal context, which is atypical for this kind of case, but it takes place entirely in the context of the general trend of the spread of the practice of judicial appeal of the violation of environmental rights in Ukraine. An equally interesting highlight of this case is the experience of applying to the Standing Committee of the Berne Convention in connection with the fact that Borzhava's captivity is included in the Emerald Network.

The plaintiff was the non-governmental organization "International Institute of Man and Global Studies "Noosphere", which demanded the annulment of the conclusion of the EIA of the planned activity "Construction of a 120 MW wind power plant on the territory of the Volovetska settlement council of the Volovetska district and the territory of the Berezniki, Dusynska, Nelipinska, and Tybavska village councils (outside settlements) of Svalyavsky district of Transcarpathian region", issued by the Department of Ecology and Natural Resources of the Transcarpathian Regional State Administration of Atlas Volovets Energy LLC. The lawsuit was based on a violation of the EIA procedure, in particular, *"violation of the public discussion procedure as a result of the unjustified disregard of the results of public participation and comments in the* EIA *assessment procedure; not taking into account the impact of the planned activity on the adjacent territories of the Mizhhirsky district and the territory of the nature reserve fund; lack of measures to protect and*

[49] Харитонова Т. Є., Григор'єва Х. А. Протидія розвитку вітроенергетики в Україні: правовий аналіз практики. *На сторожі земельного ладу: до 20-річчя Земельного кодексу України:* матеріали Міжнарод. наук.-практ. онлайн конф. (Київ, 26 листопада 2021 року). Київ: ФОП Гуляєва В.М., 2021. С. 77–80.

prevent the destruction of plant and animal species listed in the Red Book of Ukraine in the conclusion; disregarding the status of the territory of the planned activity as an object of the Emerald Network"[50]. In the first instance, the claim was satisfied[51], in the appellate court, the claims were rejected[52]. An important milestone in the consideration of this complex case was the adoption of the Resolution of the Supreme Court as part of the panel of judges of the Cassation Administrative Court dated April 13, 2022[53], according to which the conclusion of the Department of Internal Affairs was recognized as valid and the construction of the Borzhava wind farm was unblocked.

Interestingly, the problem of the development of the Carpathian region became the intersection of several defense strategies at once. In addition to the main environmental one, which was analyzed above, the administrative and legal one was additionally applied. Thus, in parallel, the issuing of a permit for the construction of a wind farm, carried out by the State Architectural and Building Inspection, was contested too hastily – until the moment of resolution of the main dispute regarding the legality of the conclusion of the State Inspection[54].

Another example of the application of an environmental and legal strategy to oppose the construction of wind power plants was the case regarding the construction of such a power plant in Odesa. Thus, the Public Organization "Mighty Kyivans" filed a lawsuit against Ovid Wind II LLC and the Ovidiopol District State Administration with a lawsuit to declare it illegal to cancel the order and invalidate the land lease agreement for the wind farm. Among the arguments of the lawsuit, the main ones can be singled out: a) violation of land legislation in terms of changing the purpose of land plots in the absence of a conclusion of the EIA, although such an assessment should have been carried out in view of the fact that there are

[50] Постанова Верховного Суду від 13 квітня 2022 року у справі № 260/771/19. URL: https://zakononline.com.ua/court-decisions/show/103944039 (дата звернення: 20.06.2023 року)

[51] Рішення Закарпатського окружного адміністративного суду від 18 березня 2020 року у справі № 260/771/19. URL: https://zakononline.com.ua/court-decisions/show/88498315 (дата звернення: 20.06.2023 року)

[52] Постанова Восьмого апеляційного адміністративного суду від03 листопада 2020 року у справі № 260/771/19. URL: https://zakononline.com.ua/court-decisions/show/92787005 (дата звернення: 20.06.2023 року)

[53] Постанова Верховного Суду від 13 квітня 2022 року у справі № 260/771/19. URL: https://zakononline.com.ua/court-decisions/show/103944039 (дата звернення: 20.06.2023 року)

[54] Постанова Восьмого апеляційного адміністративного суду від 02 вересня 2020 року у справі № 260/1058/19. URL: https://zakononline.com.ua/court-decisions/show/91353681 (дата звернення: 20.06.2023 року)

especially valuable soils in these territories (Part 3 of Article 3 of the Law of Ukraine "On Environmental Impact Assessment"); b) contrary to Art. 150 of the Land Code of Ukraine, the purchase of land plots were carried out precisely by the Ovidiopol District State Administration, although in accordance with part 2 of Art. 151 of the Land Code of Ukraine, approval of materials for locations of facilities on particularly valuable lands is carried out by the Verkhovna Rada of Ukraine. The decision of the Economic Court of the Odesa region rejected the claim on the following main grounds: a) the plaintiff did not prove the presence of particularly valuable soils on the land plots on which the construction of the wind farm is planned; b) violation of the common interest of the "interested public", whose representative the public organization – the plaintiff, considers itself to be – has not been proven; c) it has not been proven that the state authorities or local self-government bodies did not provide adequate protection of environmental legislation, and the filed lawsuit aims to exercise the powers of the state law enforcement agency, which does not meet the requirements of national legislation[55].

In general, it should be recognized that the environmental-legal strategy of opposing the construction of wind power plants does not seem to be quite successful within the framework of the existing judicial practice. In particular, the courts still have questions about the plaintiff's eligibility in the case of appeals by environmental organizations. At the same time, the only legal leverage that plaintiffs try to use in ca of this category is the search for procedural errors and omissions during the conduct of the EIA. That is, a huge layer of meaningful arguments regarding the negative impact on ecosystems in such ca is not considered and does not have proper legal significance. This approach generally corresponds to international practice and has its arguments. For example, N.R. Malysheva is convinced that *"the obligation to take into account the suggestions and comments of the public when making ecologically important decisions, which is recorded somewhat in different wordings in international treaties of Ukraine and its laws, including in the Law of Ukraine "On environmental impact assessment" should be interpreted in such a way that all public proposals must be studied, taken into account (that is, they cannot be ignored or unreasonably rejected) in the conclusion of the Environmental Impact Assessment, the public must be informed about the consideration its proposals or about the*

[55] Рішення Господарського суду Одеської області від 28 січня 2019 року у справі № 916/2272/18. URL: https://zakononline.com.ua/court-decisions/show/79687325 (дата звернення: 20.06.2023 року)

reasons for deviation"[56]. However, using the example of the development of wind energy, it can be seen that the implementation of modern legislation on EIA is often reduced to the ritual execution of a certain sequence of procedural actions, and not to a real analysis of the environmental impact of the planned activity. In this regard, the only thing that can be effectively challenged in court in such ca is the violation of the procedure for conducting the EIA.

Resistance from private individuals. The current structure of land use is not always ready for reformatting caused by the need to deploy investment energy projects. That is why wind energy sometimes becomes a field of collision between public and private interests, finding the balance of which is quite difficult. In the practice of recent years, there are examples of similar ca. Thus, during the construction of a wind power plant in the Mykolaiv region, one of the landowners of the adjacent plot refused to enter into a paid-term easement contract. Since the user of the plot of land provided for the construction of the wind farm could not use it for its intended purpose, the easement was established in court[57].

Analysis of practice shows that private individuals most often choose urban planning or land legal strategies to oppose the placement of wind turbines. The first illustration can be the appeal by a group of landowners of the urban planning documentation, which served as the basis for the deployment of the construction of the large-scale Tyligul wind farm in the Mykolaiv region. Thus, the landowners tried to recognize it as illegal and canceled the orders of the district state administration, which gave permission to develop a detailed plan of the territory and approved such a detailed plan. They are convinced that such a detailed plan is illegal, as it extends to their land plots. That is, the main strategy of the court appeal, in this case, was "town planning".

In the first instance, the claim was satisfied[58], but the appeal court changed the decision[59]. After the cassation review[60], the return of the case

[56] Малишева Н. Р. Від довкілля Землі до космічного простору. Київ: Норма права, 2023. 340 с. С. 128 – 129.

[57] Постанова Верховного Суду від 22 вересня 2021 року у справі № 325/329/19. URL: https://zakononline.com.ua/court-decisions/show/100179027 (дата звернення: 20.06.2023 року)

[58] Рішення Миколаївського окружного адміністративного суду від 16 вересня 2020 року № 400/3396/19.URL: https://zakononline.com.ua/court-decisions/show/100179027 (дата звернення: 20.06.2023 року)

[59] Постанова П'ятого апеляційного адміністративного суду від 02 грудня 2020 року у справі № 400/3396/19. URL: https://zakononline.com.ua/court-decisions/show/93503290 (дата звернення: 20.06.2023 року)

for reconsideration in the appellate court, [61]and review in the Supreme Court, the final decision was issued in favor of the WPP[62]. Analysis of this decision allows us to single out several important aspects. First, the court emphasized that the rights of the owners of land plots are not violated, since the detailed plan of the territory does not decide the question of ownership or disposal of the land. Secondly, within the scope of our research, it is important to note one of the arguments given by the plaintiffs in this case, namely: the absence, according to the data of the State Land Cadastre, of free land plots with an area of 35 thousand hectares in the specified area. At the same time, the Supreme Court emphasized that 35,000 hectares is a general area for design and research works, and directly under the placement of structures and the construction of wind turbines is provided 304 hectares. The need to develop a detailed plan of the territory for an area of 35,000 hectares is determined by the design features of the future wind power plant, and the point placement of wind turbines, which does not mean the construction of the entire territory[63]. Thirdly, the mere references of the plaintiffs to the violation of the procedure for public discussion of the detailed plan of the territory do not prove the illegality of the act contested by the plaintiffs and do not independently form an object of judicial protection. That is, procedural violations by themselves do not become grounds for recognition as illegal and annulment of the decision of a state body – it must be established how such procedural defects violate the rights of interested persons.

This category of ca of opposition to the construction of wind power plants can also include ca whose main strategy can be defined as land-legal. An illustration can serve as a dispute between LLC "Atlas Volovets Energy" and LLC "Taurus Property" in Transcarpathia. Thus, in order to build the already known wind farm on Borzhava, Atlas Volovets Energy LLC applied to the State Geocadastre Department in Zakarpattia Oblast for permission to develop a project for the allocation of a plot of land for long-term use (lease) with an approximate area 1 hectare state-owned agricultural

[60] Постанова Верховного Суду від 05 жовтня 2021 року у справі № 400/3396/19. URL: https://zakononline.com.ua/court-decisions/show/100155698 (дата звернення: 20.06.2023 року)

[61] Постанова П'ятого апеляційного адміністративного суду від 09 листопада 2022 року у справі № 400/3396/19. URL: https://zakononline.com.ua/court-decisions/show/107245028 (дата звернення: 20.06.2023 року)

[62] Постанова Верховного Суду від 23 лютого 2023 року у справі № 400/3396/19. URL: https://zakononline.com.ua/court-decisions/show/109161554 (дата звернення: 20.06.2023 року)

[63] Постанова Верховного Суду від 23 лютого 2023 року у справі № 400/3396/19. URL: https://zakononline.com.ua/court-decisions/show/109161554 (дата звернення: 20.06.2023 року)

land to change the target destination on the land of energy. Subsequently, a detailed plan of the territory was approved, according to which the predominant, accompanying, and permissible of territory, urban planning conditions and restrictions were established, and a sanitary and protective zone was defined. According to the data of the State Land Cadastre, the land plot of "Taurus Property" LLC is included in the sanitary protection zone of the planned wind farm. In this connection, the provisions of Part 5 of Art. 17 of the Law of Ukraine "On Energy Lands and the Legal Regime of Special Zones of Energy Objects", according to which *"the land management project regarding the allocation of a land plot for the location of an energy object, for which a special zone is established, is agreed only with the owners or permanent users of land plots located within the specified zone"*. Unlike the detailed plan of the territory, no protection zones or sanitary protection zones are shown in the land management documentation regarding the allocation of this land plot, and no approval was received from Taurus Property LLC. In this connection, the lease agreement for the land plot for the construction of the wind power plant was declared invalid[64].

Resistance from competitors. An objective feature of wind energy is the dependence on specific weather, climate and geographical conditions, which determine the expediency and profitability of the placement of the corresponding energy facilities. That is why it is not surprising that in Ukraine there are a lot of wind power plants competing for the right to produce "green" energy in a certain area. However, of course, disputed claims are "clothed" in completely different legal formulations. For example, in the Kherson region, the owner of an operating wind power plant, worried about the possible appearance of a competitor in the neighborhood, contested the order of the district state administration, which approved the detailed plan of the territory, indicating that this violated his interests as a land user of adjacent land plots. That is, an urban planning strategy was also chosen to resist the appearance of a new wind power plant.

Resistance from public bodies. There is practically no opposition to wind power from state authorities – on the contrary, most often they fully support and facilitate the investor. However, this mostly happens with a clear imbalance in the direction of economic priorities.

However, there are still ca when the construction of wind turbines is hindered by individual state bodies. For example, we can analyze the case regarding the Dolynskaya wind power plant in the Ivano-Frankivsk region. Thus, according to the case materials, in 2019 "Alternativa Energetica

[64] Постанова Верховного Суду від 17 вересня 2019 року у справі № 907/283/18. URL: https://zakononline.com.ua/court-decisions/show/84350356 (дата звернення: 20.06.2023 року)

Prykarpattia" LLC submitted to the Department of the State Architectural and Building Inspection in the Ivano-Frankivsk Oblast (DABI) a notice of the start of construction work on objects that, according to the class of consequences (responsibility), belong to objects with minor consequences. However, as a result of an unscheduled inspection of the DABI, a violation of the legislation was revealed, namely: the calculation of the definition of the class of consequences in the explanatory note to the project documentation was developed with violations and the class of consequences was underestimated to SS1. In this connection, DABI considered "Alternativa Energetika Prykarpattia" LLC to be guilty of the offense provided for in Clause 2, Part 2 of Article 2 of the Law of Ukraine "On Responsibility of Enterprises, their Unions, Establishments and Organizations for Violations in the Sphere of Town Planning" and imposed a fine for more than UAH 75,000. According to the results of the court proceedings, the compliance of the prepared project documentation with the current legislation was established, and the developer of the Dolyna WPP avoided fines[65].

In addition to opposition from ecologists, the public, private individuals, competitors, and some state bodies, wind energy sometimes encounters obstacles that are not specific, directed specifically against the construction of wind turbines. We are talking about such legal barriers, which are manifestations of separate general legal problems, which to a certain extent can inhibit the development of not only wind energy but also other industries.

A vivid example can be the situation in which "Ovid Wind II" LLC got into during the design and construction of a wind farm in Odesa. According to the concluded lease agreement, the investor received land plots for the construction of wind turbines. However, in order to start construction, he needed to additionally issue the right to use land plots under access roads. To its appeal, the LLC received a refusal and an explanation: since the plots of land in which the investor is interested still belong to the collective property of the collective agricultural enterprise (KAE) "Roksolana", no state bodies or local self-government bodies have the right to dispose of them. However, the problem was that the Roksolana KAE ceased its activities more than 10 years ago, and the State Act on the right of collective ownership of the land of this JSC was lost. In fact, as a result of this legal "trap", the construction of the wind farm was blocked. By the decision of the Economic Court of Odesa Region, the State Act (which does

[65] Постанова Восьмого апеляційного адміністративного суду від15 квітня 2021 року у справі № 300/555/20. URL: https://zakononline.com.ua/court-decisions/show/96508963 (дата звернення: 20.06.2023 року)

not physically exist, but the data about it has been preserved) was recognized as having lost its validity in connection with the liquidation of a legal entity[66]. This made it possible to start the necessary procedures for registration of the right to land plots of access roads to the future wind farm.

Thus, the WPP faced a general land-legal problem, when " *de jure remains collective ownership of part of the shared and unclaimed lands of former KAEs, although this is not provided for in the Land Code of Ukraine*[67]. "Although the problem of collective ownership is not directly related to the construction of wind turbines; it can still create legal obstacles for the construction of the relevant facilities. This example is just one illustration of the large array of similar general legal problems that prevent the normal development of wind energy relations.

Thus, several important conclusions can be drawn. First, the spread of wind energy in Ukraine objectively faces opposition from many subjects whose rights or interests may be violated as a result of the placement, construction, and operation of wind power plants. Such opposition, embodied in legal disputes, well illuminates the existence and, in some ca, the aggravation of the conflict of various public and private interests (ecological, economic, social). The relevant practice in Ukraine is still being developed, and in its structuring, understanding, and improvement, legal science should play a significant role.

Secondly, it is possible to highlight the following main legal strategies that are used in Ukraine to oppose the placement of wind turbines: land (based on violations of land legislation), urban planning (based on violations of urban planning requirements), environmental (based on violations of environmental norms), administrative (based on a violation of the administrative order, the procedure for carrying out certain actions, etc.). It should be emphasized that the environmental legal strategy demonstrates low efficiency. One of the reasons for this situation can be the methodology used during the development of legislation in the field of environmental impact assessment. As a result, the environmental-legal strategy of combating wind turbines is reduced to finding and proving the presence of formal violations in the conduct of the appropriate assessment, while the existence of a real environmental threat, i.e. the real content of the environmental impact assessment, remains outside of judicial review.

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[66] Рішення Господарського суду Одеської області від 12 жовтня 2018 року у справі № 916/1155/18. URL: https://zakononline.com.ua/court-decisions/show/77251860 (дата звернення: 20.06.2023 року)

[67] Носік В. В. Проблеми законодавчого забезпечення правових форм використання земель сільськогосподарського призначення колективної власності в Україні. *Вісник Національної академії правових наук України*. 2018. Т. 25. № 2. С. 72–82. С. 73.

Thirdly, ca of opposition to wind energy installations are classified depending on the interested parties: resistance from ecologists and the public; resistance from private individuals; resistance from competitors; and resistance from state authorities. At the same time, the analysis of practice showed that local state authorities and local self-government bodies practically do not oppose the development of wind energy, but on the contrary – often take the side of the investor[68].

4.4. Offshore wind farms: legal perspectives

Offshore wind energy, which occupies an increasingly important position in the world, is an important component of the energy transition and reducing dependence on traditional energy sources. As a country with a great potential for wind resources, sooner or later Ukraine will face the question of choosing its strategy for the development of offshore wind power plants – wind energy installations located in sea waters.

Offshore wind farms have a number of *advantages* that make them attractive for development:

– *great potential of wind resources*. Oceans and seas offer great potential for stable energy supply, as wind at sea is usually more stable and stronger, allowing for more efficient electricity generation;

– *less resistance.* The absence of obstacles in the form of buildings, forests, or mountains at sea allows the wind to move at an unlimited speed, which ensures greater productivity of the turbines;

– *environmental cleanliness*. Offshore wind farms do not emit harmful emissions into the atmosphere and do not pollute the environment, which makes them an environmentally safe source of energy.

Despite the positive features, offshore wind power plants also have their *drawbacks*:

– *high costs.* The construction and operation of offshore wind farms require significant costs related to engineering and technical works, transportation, installation and maintenance;

– *complex infrastructure*. The location of wind farms in open waters requires special infrastructure, such as offshore platforms, power transmission cables and cooling systems, which can be difficult to maintain;

– *lack of qualified specialists*. Despite the experience of wind equipment manufacturers, at the initial stage of market development, there

[68] Григор'єва Х. А. Протидія розвитку вітроенергетики в Україні: правовий аналіз практики (земельні, екологічні, містобудівні, кадастрові аспекти). *Юридичний науковий електронний журнал*. 2023. № 6. С. 246–250.

were problems with insufficient qualifications of companies and personnel for project development and transportation of installations to the open sea.

Currently, offshore wind energy is developing significantly in various countries of the world. Countries such as Denmark, Germany, Great Britain, the Netherlands and China are taking active measures to develop offshore wind energy. They develop special strategies, programs and regulatory mechanisms aimed at stimulating investment and supporting research in this field.

For example, Denmark has extensive experience in the development of offshore wind farms and is the world leader in the volume of offshore wind energy production. This has been achieved thanks to long-term support programs, a transparent regulatory framework and effective financing mechanisms. The development of wind energy is handled by the Danish Energy Agency, which closely cooperates with other authorities. Denmark also adopted the Energy Charter for the period until 2024, which provides for an increase in the share of renewable energy sources in total consumption to 55%. To achieve this goal, it is planned to build three offshore wind power plants with a total capacity of 2400 MW[69].

Great Britain is also successfully developing offshore wind energy and setting new records for connecting offshore wind farms to the electricity grid. The country actively promotes the development of infrastructure, provides support for energy projects and attracts investments in the field of offshore wind energy[70]. In the UK, the Department for Business, Energy & Industrial Strategy is responsible for implementing the offshore energy strategy, the Marine Management Organization (MMO) is responsible for developing plans for offshore construction, and the Crown Estate, which is part of this division, issues permits for offshore wind farms[71]. A Memorandum of Understanding exists between various government

[69] Norsk IndustriAS. Regulators and legislation for offshore wind in selected countries. URL: https://www.norskindustri.no/siteassets/dokumenter/rapporter-og-brosjyrer/leveransemodeller-havvind/leveransemodeller-havvind_hovedrapport_vedlegg-regulators-and-legislation-for-offshore-wind-in-selected-countries_dnv_2021-06-02.pdf (дата звернення: 06.07.2023).

[70] Українська вітроенергетична асоціація. Світовий прорив офшорної вітроенергетики. URL: http://uwea.com.ua/ua/article/mirovoj-proryv-offshornoj-vetroenergetiki/ (дата звернення: 04.07.2023).

[71] Norsk IndustriAS. Regulators and legislation for offshore wind in selected countries. URL: https://www.norskindustri.no/siteassets/dokumenter/rapporter-og-brosjyrer/leveransemodeller-havvind/leveransemodeller-havvind_hovedrapport_vedlegg-regulators-and-legislation-for-offshore-wind-in-selected-countries_dnv_2021-06-02.pdf (дата звернення: 06.07.2023).

agencies and organizations responsible for health, environmental, coastguard and marine casualty investigations[72].

On January 14, 2021, Poland adopted its first law on offshore wind energy in order to achieve the goal of the state program for the development of offshore wind energy – to achieve 28 GW of capacity by 2050. The first objects are planned to be commissioned by 2025[73]. The Polish Law: a) simplifies the procedure for obtaining permits for the construction of offshore wind power plants; b) installs a fuse to ensure the continuation of the project in case of non-compliance of some construction stages with the requirements; c) provides significant investments of 29 billion euros and the creation of up to 10,000 jobs according to expert assessments[74].

The domestic regulatory framework for the regulation of offshore wind energy should be divided into acts of international law and national legislation.

For example, one of the fundamental international legal acts is the UN Convention on the Law of the Sea of December 10, 1982[75,76], which gives the right to build offshore wind power plants in the exclusive economic zone and on the continental shelf. The exclusive economic zone (EEZ), in terms of the law of the sea, is a maritime zone extending from 12 to 200 nautical miles from the baselines of a country's coast. An EEZ is defined as an internal maritime zone where a state has special rights and jurisdiction over natural resources and economic activities such as fishing, oil and gas extraction, wind energy, research and environmental protection. Countries have sovereign rights over the resources within their EEZs, but they also have an obligation to preserve and protect the marine environment and ecological resources in these areas.

EEZs in two seas – Black and Azov – are important for Ukraine. Ukrainian territorial waters in the Black Sea are equal to 12 nautical miles, and the exclusive economic zone is 200 nautical miles from the coastline[77].

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[72] Memorandum of understanding between HSE, MCA and MAIB. 22.09.2021. URL: https://www.gov.uk/government/publications/memorandum-of-understanding-between-hse-mca-and-maib (дата звернення: 06.07.2023).

[73] Poland adopts historic Offshore Wind Act. 14.01.2021. Wind Europe. https://windeurope.org/newsroom/news/poland-adopts-historic-offshore-wind-act/ (датазвернення: 04.07.2023).

[74] Павлига А. В. Правові перспективи розвитку офшорних вітроелектростанцій в Україні. *Юридичний науковий електронний журнал.* 2022. № 6. С. 210 – 214.

[75] Конвенція ООН з морського права від 10.12.1982. URL: https://zakon.rada.gov.ua/laws/show/995_057#Text (дата звернення: 06.07.2023).

[77] Білоцький С. Д. Міжнародно-правове регулювання відновлюваної енергетики в рамках міжнародного морського права. *Актуальні проблеми міжнародних відносин*. 2012. № 108. С. 197–205.

The difference in their legal status is that the territorial waters fall under the full sovereignty of Ukraine, while the exclusive economic zone has limited sovereign rights, such as economic activities and fishing[78]. Therefore, subjects (legal entities, other states, and international organizations) who want to build wind power plants in the exclusive economic zone of Ukraine must obtain the appropriate permission.

The fate of the Treaty of December 24, 2003 between Ukraine and the Russian Federation on the legal regime of the Sea of Azov and the Kerch Strait is quite logical. Since this agreement did not contribute to the modern realities of the development of Ukrainian statehood, on February 24, 2023, the Verkhovna Rada of Ukraine denounced all agreements with the Russian Federation regarding the Sea of Azov.

The national legislation is a system of acts consisting of laws, resolutions of the Cabinet of Ministers of Ukraine, decisions of the National Committee of the National Committee of the National People's Republic of Ukraine, etc. Since offshore wind power plants are renewable energy sources, the main regulatory act in this area will be the Law of Ukraine "On Alternative Energy Sources" dated February 20, 2003[79].

However, an equally important legal act that establishes general environmental requirements for any activity, including and offshore wind energy, is the Law of Ukraine "On Environmental Protection" dated June 25, 1991[80]. It is this act that establishes requirements for environmental impact assessment and procedures for obtaining environmental permits for the construction and operation of offshore wind farms. Of course, the development of offshore wind energy in Ukraine has a significant potential to reduce greenhouse gas emissions and reduce dependence on fossil fuels, but potential negative impacts on the environment and biodiversity must be taken into account. It is important to carry out proper environmental assessments before construction, take into account the impact on marine flora and fauna, and ensure control over the efficient use of water resources.

A significant body of domestic legislation, that regulates the current issues of the functioning of alternative energy facilities, is made up of the decisions of the NCSEPU (National Commission for State Regulation of Energy and Public Utilities), which establishes tariffs for the production of electricity using wind energy and other economic conditions for wind power plants.

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[78] Павлига А. В. Правові перспективи розвитку офшорних вітроелектростанцій в Україні. *Юридичний науковий електронний журнал.* 2022. № 6. С. 210–214.

[79] Про альтернативні джерела енергії: Закон України від 20 лютого 2003 року. *Відомості Верховної Ради України.* 2003. № 24. Ст. 155.

[80] Про охорону навколишнього природного середовища: Закон України від 25 червня 1991 року. *Відомості Верховної Ради України.* 1991. № 41. Ст. 546.

The analysis of maritime practice also reveals the problem of the need to inform sea vessels during the laying and maintenance of power cables. In order to prevent incidents related to cable layers/maintenance fleet being hampered, as well as the need to adhere to the accuracy of charting of cables so that marine vessels do not damage the cable when anchoring, these conditions should be clearly spelled out and regulated in legislation.

Today, the offshore wind energy sector in Ukraine faces a number of strategic goals and challenges, such as the development of scientific and technological potential and the creation of a stable legal environment. At the same time, challenges related to the procedures for obtaining permits and licenses, financing and infrastructure require effective cooperation of government bodies, development of relevant legislation and support of investment potential. According to I. I. Doronina, the creation of a legal mechanism that simplifies and implements the work of the EU in this field is one of the key directions of development[81]. In general, offshore wind power plants have great potential for ensuring sustainable energy development in Ukraine, reducing dependence on fossil fuels and negative impact on the environment.

[81] Дороніна І. І. Нормативно-правове забезпечення розвитку відновлюваної енергетики в Україні. *Державне управління та місцеве самоврядування*. 2020. № 1. С. 31–43. URL: http://www.dridu.dp.ua/zbirnik_dums/2020/2020_01(44)/07.pdf (дата звернення: 06.07.2023).

DOI https://doi.org/10.36059/978-966-397-417-0-5

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CHAPTER 5. SPECIFIC FEATURES OF LEGISLATIVE REGULATION OF SOLAR ENERGY IN UKRAINE

5.1. Legislation in the field of solar energy

Solar energy relations are relatively new for Ukraine, which is why the legal regulation of the use of solar energy as an alternative source has been actively developed during the last two decades of the last century and demonstrates the change in the energy development paradigm. The relatively higher environmental friendliness of solar energy was one of the factors that determined the special interest of the state in the priority legal stimulation of solar energy.

The foundations for the development of alternative energy generation in Ukraine, including solar, were laid by the adoption of two basic Laws of Ukraine: "On Energy-Saving" and "On Energy Industry". To support the development of solar energy and ensure energy conservation in general, government decrees approved the Comprehensive State Energy Saving Program of Ukraine dated February 5, 1997[1], as well as the Program of State Support for the Development of Non-Traditional and Renewable Energy Sources and Small Hydro– and Thermal Power Generation dated December 31, 1997[2]. However, these documents did not play a significant role in the development of solar energy due to their general nature and lack of clear mechanisms for their implementation. A special role in the development of solar energy belongs to the Law of Ukraine "On Alternative Energy Sources" dated February 20, 2003 and the legal mechanism of the "green" tariff.

The dynamic development of industry legislation regulating the functioning of alternative energy has had a significant impact on the effectiveness of legal regulation of the development and stimulation of solar

[1] Про Комплексну державну програму енергозбереження України: постанова Кабінету Міністрів України від 5 лютого 1997 року № 148. *Офіційний вісник України*. 1997. № 6. Ст. 945.

[2] Про Програму державної підтримки розвитку нетрадиційних та відновлюваних джерел енергії та малої гідро– і теплоенергетики: постанова Кабінету Міністрів України від 31 грудня 1997 року № 1505. URL: https://zakon.rada.gov.ua/laws/show/1505-97-п#Text

energy. Thus, an important element of the mechanism of state regulation of solar energy is the tariff and fiscal policy. That is why the system of legal protection of solar energy is complemented by the provisions of the Tax and Customs Codes of Ukraine[3], the norms of which contain provisions on the reduction of land tax for solar energy enterprise, exemption from taxation of profit from the main activity of economic entities in the field of energy, which produce energy from solar radiation, exemption from value-added tax on the importation into the customs territory of Ukraine of equipment that works on solar energy, equipment and materials for the production of energy from solar radiation, as well as exemption from payment of import duty on the specified equipment, equipment and materials.

The provisions of the Law of Ukraine "On Amendments to the Tax Code of Ukraine and Some Other Legislative Acts of Ukraine Regarding Improvement of Administration and Revision of Rates of Individual Taxes and Fees" of November 23, 2018 (entered into force on January 1, 2019) were aimed at further promoting the development of the solar energy sector[4]. In particular, the Tax Code of Ukraine states that until December 31, 2022, solar photoelectric panels, inverters and transformers of the appropriate capacities are exempted from tax on the added value of the operation.

The specificity of solar energy generation lies in the close relationship with land plots, which are the territorial basis for placing solar panels and other necessary solar energy installations. The adoption of the Law of Ukraine "On the Power Engineering Lands and the Legal Status of Special Zones of the Power Engineering Objects" dated July 9, 2010 [5] became a positive milestone in the development of industry legislation and contributed to the improvement of the organizational and legal basis for the provision and use of land plots for the location of energy facilities, in particular power plants using the energy of the sun. According to the legislative amendments, it is allowed to place alternative energy facilities that use solar energy not only on land designated as "energy land", but also on other land included in the general category of "industry, transport, communication, energy land, defense and other purposes" without the need

[3] Кузьміна М. Систематизація законодавства у сфері відновлювальної енергетики. *Економічна теорія та право.* 2016. № 2. С. 122–132.

[4] Про внесення змін до Податкового кодексу України та деяких інших законодавчих актів України щодо покращення адміністрування та перегляду ставок окремих податків і зборів: Закон України від 23 листопада 2018 року. *Офіційний вісник України*. 2018. № 98. Ст. 3220.

[5] Про землі енергетики та правовий режим спеціальних зон енергетичних об'єктів: Закон України від 09 липня 2010 року. *Відомості Верховної Ради України*. 2011. № 1. Ст. 1.

to change their intended purpose. Undoubtedly, this legislative provision greatly simplified access to land plots for placing solar energy facilities.

In the legal literature, attention is reasonably drawn to the fact that to ensure the production of energy in a quantity sufficient for the effective implementation of the solar power plant construction project, not only the legislative basis is necessary, but also a thorough study of the natural conditions of the area on which the land plot is located[6]. Thus, it is more economically advantageous to place solar energy facilities on land plots that are most exposed to sunlight, mainly with a slope to the south and located in regions with the maximum number of sunny days during the year. In order to maximize the efficiency of solar energy production, one should also take into account the proximity of such land plots to electrical grids or the presence of appropriate energy infrastructure, primarily transformer substations. In the opposite case, the costs of connecting a power plant on such a plot of land either significantly reduce the effect of investments in such a project, or make it unprofitable altogether. At the same time, in the case of placing solar installations on surfaces and objects other than the ground itself – for example, on the roofs and walls of buildings, land legal relations may not arise[7]. Therefore, despite the existence of specific features related to land use for solar energy facilities, these features are not yet reflected in current legislation."

Attention is also drawn to the technical nature of most of the legislation on alternative energy, which regulates procedural issues in the production of electricity from the energy of solar radiation. For example, in 2015, by the Law of Ukraine "On Amendments to Certain Laws of Ukraine Regarding Ensuring Competitive Conditions for the Production of Electricity from Alternative Energy Sources", the rights of household users regarding the installation of a generating plant operating on an alternative energy source in private farms were specified. In particular, concerning solar energy, the installed capacity should not exceed 30 kW. The production of electricity from the energy of solar radiation by private households is carried out without an appropriate license[8].

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[6] Чумаченко І. Є. Еволюція законодавства про сонячну енергетику в Україні. *Юридичний науковий електронний журнал.* 2021. № 11. С. 352–356.

[7] Харитонова Т. Є., Григор'єва Х. А. Особливості геліоенергетичних правовідносин в Україні (на матеріалах практики). *Часопис Київського університету права.* 2021. Вип. 3. С. 224–230.

[8] Про внесення змін до деяких законів України щодо забезпечення конкурентних умов виробництва електроенергії з альтернативних джерел енергії: Закон України від 04 червня 2015 року. *Відомості Верховної Ради України.* 2015. № 33. Ст. 324.

The impetus for the modernization of the field of alternative energy, including solar energy, was the adoption of the Law of Ukraine "On Electricity Market" dated April 13, 2017[9]. In particular, it provided for the possibility of concluding long-term contracts for the purchase of electricity produced under the "green" tariff, as well as agreeing to the purchase and sale of electricity between a guaranteed buyer and a business entity that produces electricity from alternative energy sources, and based on the results the auction acquired the right to support.

In April 2019, a number of legislative changes were adopted aimed at changing the protective conditions for the functioning of alternative energy, which directly affected the field of solar energy, namely: the planned transition from the support system based on the "green" tariff to the competitive model of stimulating the development of renewable energy by conducting auctions with distribution of support ("green" auctions). The justification for the proposed legislative changes was the high level of the "green" tariff (especially for solar power plants), which created an excessive price burden for consumers, which subsequently tended to rapidly increase with the commissioning of new power plants[10].

Of particular importance was the adoption of the Law of Ukraine "On Amendments to Certain Laws of Ukraine on Ensuring Competitive Conditions for Electricity Production from Alternative Energy Sources" dated April 25, 2019 [11]and the Procedure for Conducting Auctions for Allocation of Support Quota, approved by the Resolution of the Cabinet of Ministers of Ukraine dated December 27, 2019 No. 1175 (as amended by Resolution No. 889 of the Cabinet of Ministers of Ukraine dated August 2, 2022)[12], which determined the procedure for preparing and conducting an auction for the distribution of support quotas to stimulate producers of electricity from alternative energy sources. In particular, those business entities intending to produce electricity from solar energy, whose installed capacity is more than 1 MW, must participate in the auction. At the same

[9] Про ринок електричної енергії: Закон України від 13 квітня 2017 року. *Офіційний вісник України*. 2017. № 49. Ст. 1506.

[10] Дороніна І. І. Нормативно-правове забезпечення розвитку відновлюваної енергетики в Україні. *Державне управління та місцеве самоврядування.* 2020. Вип. 1 (44). С. 31–43.

[11]Про внесення змін до деяких законів України щодо забезпечення конкурентних умов виробництва електричної енергії з альтернативних джерел енергії: Закон України від 25 квітня 2019 року. *Відомості Верховної Ради України*. 2019. № 23. Ст. 89.

[12] Про запровадження конкурентних умов стимулювання виробництва електричної енергії з альтернативних джерел енергії: постанова Кабінету Міністрів України від 27 грудня 2019 року № 1175. *Офіційний вісник України*. 2022. № 66. Ст. 3967.

time, the condition for participation in the auction is the absence of an established "green" tariff for the object of solar energy and/or the absence of a previously obtained right to support based on the results of the auction for this object.

In July 2019, in order to eliminate inconsistencies in the procedure for setting the level of the "green" tariff for private households that produce electricity from the energy of solar radiation and whose generating units are located on land plots with a capacity of no more than 30 kW, amendments were made to Article 9-1 of the Law of Ukraine "On Alternative Energy Sources"[13].

Legislative changes regarding the stimulation of the development of alternative energy, including solar energy, which is aimed at reducing the size of the "green" tariff, which was the only effective means of stimulating the development of the use of renewable sources in Ukraine, deserve attention. Thus, according to the Law of Ukraine "On Amendments to Certain Laws of Ukraine on Improving the Conditions for Supporting the Production of Electric Energy from Alternative Energy Sources" from July 21, 2020, [14] the tariff for solar power plants that were put into operation before 2020 was reduced in the field of solar energy, with a capacity of more than 1 MW by 15%, with a capacity of up to 1 MW – by 10%; for solar power plants commissioned in 2020 and later, the reduction will be an additional 2.5%; in 2022, producers of "green" energy undertake to bear financial responsibility for the imbalance of their actual and accepted (forecast) electricity production schedules. The size of the permissible forecasting error will be 5% for SPP(solar power plant); from August 1, 2020, new solar power plants with a capacity of more than 1 MW will be able to be put into operation and count on state support only by participating in auctions. Undoubtedly, such unforeseen changes in legislation threaten to slow down the development of solar energy.

The permanent damage to a large part of the state's energy infrastructure as a result of military operations on the territory of Ukraine affected the *reduction of solar generation volumes, the deepening of the financial crisis in the market of alternative energy sources, and the limitation of* payments under the "green" tariff for the period of martial law. According to the estimates of the Secretariat of the Energy Charter (Energy Charter) dated

[13] Про внесення змін до статті 9-1 Закону України "Про альтернативні джерела енергії" щодо врегулювання питання генерації електричної енергії приватними домогосподарствами: Закон України від 11 липня 2019 року. *Офіційний вісник України*. 2019. № 63. Ст. 2193.

[14] Про внесення змін до деяких законів України щодо удосконалення умов підтримки виробництва електричної енергії з альтернативних джерел енергії: Закон України від 21 липня 2020 року. *Офіційний вісник України*. 2020. № 63. Ст. 2027.

January 27, 2023, approximately 20% of commissioned Ukrainian solar energy facilities have been destroyed, destroyed or are under occupation. These are mostly industrial power plants of Zaporizhzhya, Kherson regions and the Mykolaiv power plant, but numerous home solar plants were also affected[15]. Currently, about 60% of industrial solar power plants are concentrated in the southern and southeastern regions of Ukraine, where active hostilities are taking place.

With the introduction of martial law in the country, there are forced changes in the protection and legal mechanisms for supporting alternative energy, including solar energy. Thus, with the adoption of the Law of Ukraine "On the State Budget for 2023" the effect of the provisions of Part 3 of Article 8 of the Law of Ukraine "On Alternative Energy Sources", according to which the Cabinet of Ministers of Ukraine had to provide in the state budget for expenses for financial support of the guaranteed buyer for the payment of electric energy produced from alternative sources, in accordance with the budget requests of the Ministry of Energy of Ukraine, based on the calculations provided NCSEPU, in the amount of at least 20% of the forecast production of commodity electricity from alternative sources for the corresponding year[16].

A rather problematic issue of the wartime period should be considered the fact that the debt repayment to producers from alternative sources of energy, including solar, was temporarily postponed, and the percentage of payments for electricity supplied in 2022 was limited for the duration of martial law (up to 18% of weighted average size of the "green" tariff for 2021 for producers of electricity from solar radiation)[17].

In addition, since the introduction of martial law in Ukraine, the NCSREPU adopted a number of changes to regulatory acts, which significantly violated the rights of entities of decentralized private energy. In particular, with its latest resolutions, the National Energy Regulatory Commission of Ukraine completely changes the rules of the "green" tariff for private solar power plants, despite the guarantees provided by the state. The most criticized were the resolutions of the NCSEPU "On Approval of Amendments to the Rules of the Retail Electricity Market" dated October 5,

[15] Керівники АСЕУ: правові підсумки 2022 року для галузі ВДЕ та перспективи 2023. URL: http://reform.energy/news/kerivniki-aseu-pravovi-pidsumki-2022-roku-dlya-galuzi-vde-ta-perspektivi-2023-21255(дата звернення: 01.07.2023 року)

[16] Про Державний бюджет України на 2023 рік: Закон України від 03 листопада 2022 року. *Офіційний вісник України.* 2022. № 94. Ст. 5847.

[17] Про розрахунки з виробниками за "зеленим" тарифом: наказ Міністерства енергетики України від 15 червня 2022 року № 206. *Офіційний вісник України*. 2022. № 52. Ст. 3021.

2022 No. 1272, which amended the Rules of the Retail Electricity Market[18], as well as "On the peculiarities of determining the amount and carrying out calculations for the electricity produced by generators installations of private households during martial law in Ukraine" dated April 26, 2022 No. 396, according to which the owners of generating capacities of households for the wartime period were limited in calculations with payment of 1/3 of the cost of supplied electricity, provided for by law[19].

The result of a series of official appeals and a public information campaign launched by representatives of the sector of renewable energy sources was the restoration of the rights of the owners of home solar power plants, namely: the full payment of the "green" tariff was restored from January 30, 2023. In particular, the NCSEPU recognized Resolution No. 396 of April 26, 2022 "On the peculiarities of determining the amount and carrying out calculations for the electric energy produced by the generating units of private households during the martial law in Ukraine" as invalid from February 1, 2023, and determined the terms making full payment for the cost of electric energy produced by the generating units of private households in an amount that exceeds the monthly consumption of electric energy by such private households, purchased by universal service providers under contracts for the purchase and sale of electric energy at a "green" tariff by a private household[20].

Undoubtedly, this timely decision taken by the NCSEPU helped to relieve social tension and restore the rights of owners of private solar power plants. Given that there are currently about 45,000 private solar power plants with a total capacity of 1.2 GW in Ukraine, state bodies must take the necessary organizational and legal actions to maintain and stimulate solar generation. On the contrary, the current trends of the deepening of the financial crisis in the field of solar energy testify to the inefficiency and inconsistency of the state's energy policy regarding the order of calculations and the amount of payments under the "green" tariff in wartime conditions.

It is believed that for the stable functioning of the solar energy sector, it is necessary to ensure the immutability of the legislation regarding the

[18] Про затвердження Змін до Правил роздрібного ринку електричної енергії: постанова НКРЕКП від 05 жовтня 2022 року № 1272. URL: https://zakon.rada.gov.ua/rada/show/v1272874-22#Text (дата звернення: 01.07.2023 року)

[19] Про особливості визначення обсягу та проведення розрахунків за вироблену електричну енергію генеруючими установками приватних домогосподарств під час дії в Україні воєнного стану: постанова НКРЕКПвід 26 квітня 2022 року № 396. URL: https://ips.ligazakon.net/document/GK51432 *(втратила чинність)*

[20] Про визнання такою, що втратила чинність постанови НКРЕКП від 26 квітня 2022 року № 396: постанова НКРЕКП від 30 січня 2023 року № 153. URL: https://zakon.rada.gov.ua/rada/show/v0153874-23#Text

system of support for producers of electricity from solar radiation, the gradual repayment of debts, as well as compliance with the existing guarantees provided to investors at the legislative level.

At the beginning of 2022, in order to implement the provisions of the RED II Directive, the Government of Ukraine developed a draft of the National Action Plan for the Development of Renewable Energy for the period until 2030, which will determine the development of the industry for ten years and will be an integral part of the integrated National Plan for Energy and Climate. According to the project, taking into account the fact that the indicators of the National Plan of Action for the Development of Renewable Energy for the period until 2020 in terms of solar energy have been exceeded by more than three times, further stimulation by the state of the development of this sector of renewable energy will take place in minimal volumes. At the same time, implementation of solar energy projects can be carried out on market terms.

A moderate increase in the installed capacity of solar energy facilities, which produce electrical energy for supply to the network, is expected. At the same time, the growth of the installed capacity of solar energy is planned due to the installation of generating units by consumers, including energy cooperatives and private households, in order to cover their consumption[21].

An extremely important decision made during the war, which directly affects the further development of solar energy in Ukraine, is the approval by the European Commission on May 18, 2022 of the REPowerEU plan, which defines the development of renewable energy sources as a primary public interest and provides for an increase in the EU goal of achieving the share of RES in electricity balance in 2030 from 40% to 45%. As for the further development of solar energy, under the current market realities in Ukraine and in accordance with the goals set in the RePowerEU Plan, the sector of small solar generation will gain active development, namely the installation of photovoltaic systems on roofs of buildings and households. In particular, RePowerEU envisages the mandatory installation of solar panels on the roofs of buildings (new commercial and public) by 2025, as well as on the roofs of new residential buildings – by 2029. The goal of the Plan is

[21] Проект розпорядження Кабінету Міністрів України "Про Національний план дій з розвитку відновлюваної енергетики на період до 2030 року" від 20 січня 2022 року. URL: https://saee.gov.ua/uk/content/elektronni-consultatsii (дата звернення: 01.07.2023 року)

to increase the share of solar photovoltaic energy by 2025 and to reach a total of 600 GW by 2030[22].

Based on the analysis of the regulatory and legal basics of the operation of solar energy, it is possible to identify some of the most important features of legislative support in this area: 1) instability and declarative nature of the legislation; 2) non-specialized nature of legislation; 3) the procedural and technical nature of most norms, 4) a more significant decrease in protection compared to other types of alternative energy.

Legislation on solar energy was formed in the system of legislation on alternative energy. Despite a significant number of legal acts regulating the use of alternative energy sources, the regulation of relations in the field of solar energy is fragmentary and contradictory in some places. Given the established guidelines for the development of solar energy, support from the state can be traced, but for the most part, it is declarative and inconsistent, and in some places it has, on the contrary, a retrospective orientation[23].

The trend of dynamic development of industry legislation regulating the functioning of alternative energy allows us to note that the legal foundations of solar energy are mostly non-specialized, i.e. universal for all areas of energy production from alternative sources. That is, currently the legislative provision of alternative energy is based on the principle of maximum universality. However, if in some issues general norms are a priority way of regulating relations and establishing a unified legal regime, then the presence of objective features of solar energy relations requires their special regulation[24].

5.2. Legal features of solar energy relations

During the last decade, there has been a definite tendency in Ukraine towards the rapid development of solar energy – a type of renewable energy based on the use of the inexhaustible energy of the Sun. Among all types of

[22] Омельченко В. Сектор відновлюваної енергетики України до, під час та після війни. Razumkov, 2022. URL: https://razumkov.org.ua/statti/sektor-vidnovlyuvanoyi-energetyky-ukrayiny-do-pid-chas-ta-pislya-viyny (дата звернення: 01.07.2023 року).

[23] Чумаченко І. Є. Еволюція законодавства про сонячну енергетику в Україні. *Юридичний науковий електронний журнал.* 2021. № 11.

[24] Харитонова Т. Є., Григор'єва Х. А. Особливості правового регулювання сонячної та вітрової енергетики в Україні. *Європейський вибір України, розвиток науки та національна безпека в реаліях масштабної військової агресії та глобальних викликів XXI століття" (до 25-річчя Національного університету "Одеська юридична академія" та 175-річчя Одеської школи права):* матеріали Міжнарод. наук.-практ. конф. (Одеса, 17 червня 2022 року). Одеса: Видавничий дім "Гельветика", 2022. С. 626–628.

alternative energy in Ukraine, it is solar that has received the most powerful development, far ahead of all others. A fruitful synthesis of theoretical and practical materials, in particular court practice in this area, made it possible to highlight the main legal features of solar energy relations.

1) ***The complex nature of solar energy legal relations*** i.e. a combination of disparate relations, which have a different legal nature, but are strongly connected by a common goal – the production of electricity by transforming the energy of the sun. The peculiarity is that in each specific case, the set of constituent solar energy legal relations may be different. For example, in the case of the construction of a large solar power plant outside the settlement, such components as land, administrative, economic legal relations will be most actively manifested. However, the arrangement of a small solar energy facility on the territory of one's estate for private use will demonstrate a slightly different set of components: in particular, land, civil, urban planning, etc. Depending on the location of the solar power plant, ecological, water, etc. may also be added to the composition of emerging solar energy relations. Thus, the complexity of solar energy legal relations shows an interesting feature – its variable nature.

2) ***Specific land use in the field of solar energy*** has its characteristics that are worth studying in more detail:

a) in the field of solar energy, land *is used as a territorial-spatial basis*. The doctrine of land law has long supported the main thesis that land as a special object of law should be considered in three possible ways: as an object of nature, as a means of production, and as a territorial-spatial basis. To place solar panels and other necessary solar energy installations, the territory is needed: a) for these purposes, it is of little interest to the natural properties of the land and its quality; b) the territory must be unshaded, with free access to insolation (solar radiation); c) preferably flat or with slight relief. Depending on the scale and power of the planned solar energy facility, the area can be used: from a few tenths of a hectare to hundreds of hectares.

Practice proves that currently land relations claim the role of the central component of the appropriate complex of solar energy relations, and this will be visible in the further presentation of our research. However, it is difficult to make such a definite conclusion, since land legal relations may potentially not arise – which means that they may not be part of the analyzed variable complex. This happens in the case of placing solar installations on other surfaces and objects other than the ground itself – for example, on the roofs and walls of buildings;

b) *the frequent need to change the purpose of land plots.* The development of solar energy in the domestic version requires space. This directly entails the need to change the existing structure of land use in order to "cut out" land areas for the construction of new solar power plants. The

specificity of solar energy is that it requires land plots to be occupied by stationary installations and equipment, which makes parallel use of such land for other purposes practically impossible. It should be noted that scientific and technological work in the direction of solving this problem is actively being carried out, namely: agrovoltaic technologies have been developed, which are currently being tested, improved and adapted to industrial use, and in some places, they are already fully applied. Their essence consists in dual parallel use of land for agricultural production and generation of solar electricity[25]. For Ukraine, this is still a prospect, although the technology has already been implemented in Germany, Italy, and Asian countries.

Today, in the conditions of Ukraine, in the vast majority of ca, the placement of solar power plants requires a change in the purpose of the land plot. Based on materials of practice, it can be indicated that most often land plots are provided to place solar power plants: a) outside settlements; b) agricultural purposes; c) classified as pastures[26].

It is interesting that some decisions on changing the purpose of land plots for the purpose of placing solar power plants on them were contested in court with reference to the priority of agricultural land. Thus, during the preparatory procedures preceding the construction of a solar power plant in the Mykolayiv region, the purpose of the land plot was changed from agricultural to industrial land. At the same time, the plaintiffs considered the corresponding order of the State Geocadastre to be illegal, since "the case materials did not contain any evidence of the need to change the purpose of agricultural land and transfer it for the placement of a power plant, in particular, no evidence was provided of the absence of poor quality land unsuitable for agricultural use." However, the court's position was different: it is the State Geocadastre that determines the suitability of land for agriculture because it belongs to its discretionary powers – which means that the court should not interfere with the free discretion of this powerful entity[27]. It should be recognized that in this way the content of the articles of

[25] For more details, see: Павлига А. В. Щодо використання агровольтаїки в Україні: проблематика питання. *Верховенство права у процесі державотворення та захисту прав людини в Україні:* матеріали міжнар.наук.-практ. конф. (м. Одеса, 12–13 лютого 2021 року) Одеса: ГО "Причорноморська фундація права", 2021. С. 44–45.

[26]Харитонова Т. Є. Правові особливості використання земель для потреб сонячної енергетики. *Актуальні проблеми земельного, аграрного, екологічного та природоресурсного права*: матеріали круглого столу (Харків, 10 грудня 2021 року). Харків, 2021.

[27] Постанова Миколаївського апеляційного суду від 26 травня 2021 року у справі № 489/3874/20. URL: https://reyestr.court.gov.ua/Review/97192480 (дата звернення: 01.07.2023 року)

the land legislation and its principle regarding the priority of agricultural use was leveled.

No less important, but less discussed, is the question of the future ("post-energy") fate of such lands: for example, after the liquidation of the solar power plant. The automatic return of such a plot of land to the legal regime of agricultural land raises legal and practical doubts. First, the current legislation does not provide for a corresponding legal mechanism. Secondly, during its use for energy purposes, such land is exposed to influences, the consequences of which can irreversibly change its properties. That is, a plot of land after the termination of use for energy needs can be returned to agricultural use only in the case of carrying out the necessary analyses and studies, the results of which must confirm its suitable state for such use.

In addition, there is a question about making analogies with construction. For example, regarding the expediency of removing the upper soil layer before the construction of the corresponding solar power plant. However, it is difficult to evaluate such a step: on the one hand, it preventively protects the soil and allows it to be actively used for its main purpose in another territory; however, on the other hand, in the case of the liquidation of the solar power plant, the problem of restoration of such land emerges acutely. In particular, lease agreements for land plots for the construction of solar power plants specify the lessee's obligation to return such a land plot in a condition "no worse than the one in which the tenant received it for use";

c) *mainly leased land use*. The practice in Ukraine followed the path of concluding lease agreements, according to which land plots of state and communal property are transferred to investors for use for the placement of solar power plants for a long period (there are contracts for a term of 10, 30, but most often – for 49 years). Land lease contracts for the needs of solar energy are legally vulnerable, most often not because of their shortcomings, but because of the potential recognition of illegality and cancellation of decisions of public authorities, according to which such contracts are concluded. However, there are ca of land lease agreements for the placement of solar power plants being declared invalid based on violation of the requirements of land legislation at the time of their conclusion. For illustration, we can mention the case of invalidation of the land lease agreement between REN ENERGO LLC and the Main Department of the State Land Agency in the Odesa Region. The contested land lease agreement was concluded without carrying out a normative monetary assessment of the land plot, which by virtue of the provisions of Art. 13 of the Law of Ukraine "On Land Valuation" (as amended at the time of the conclusion of the disputed contract) was mandatory in the case of

determining the amount of rent for land plots of state and communal property[28].

In addition, it is possible to point to some regularity that can be traced in relation to the legal titles of solar energy land use: large solar power plants mainly operate on leased land use rights, while less significant facilities in terms of capacity tend to be located on privately owned lands;

d) *dependence on land use planning (town planning documentation)*. Within this feature, the following main aspects should be highlighted. First, the location of solar power plants can be foreseen in the urban planning documentation of the regional and local levels. Such a practice may indicate a thorough comprehensive approach to territory planning. In such ca, the investor and the local public authority, objectively assessing the interests of the state, community and business, weighing geographic, physical, weather and climate indicators, reach a joint conclusion about the feasibility of placing a solar power plant in a certain area.

Secondly, despite the instructions of the legislation, there are a of conflict of different public interests. For example, during the construction of a solar power plant near the city of Voznesensk in the Mykolaiv region, a dispute arose regarding the legality of the use of the land plot. According to the city council, the construction of this solar power plant occupied the plot together with the road, which means it violated the interests of the city community since this road is traditionally used for the removal of garbage to the landfill. That is, the satisfaction of the city's energy needs interfered with the satisfaction of cleanliness needs. According to the results of the trial, it was established that the construction of the solar power plant does not violate the interests of the Voznesensk community[29].

Thirdly, in some ca, the existing urban planning documentation acts as an obstacle for placing a solar power plant. This thesis is well illustrated by the case of a claim by an individual – the owner of land plots with an area close 38 hectares of the Poltava District State Administration, in which the land owner contested the refusal of the District State Administration to grant a permit for the development of a detailed plan of the territory for the purpose of locating the Shcherbanivsk solar power plant "Poltavaenergopark". The refusal was motivated by the fact that the planning scheme of the territory of the Poltava region shows the promising direction of the construction of the M-03 Kyiv-Kharkiv-Dovzhansky bypass

[28] Постанова Вищого господарського суду України 28 січня 2016 року у справі № 916/3036/14. URL: https://reyestr.court.gov.ua/Review/55340617 (дата звернення: 01.07.2023 року)

[29] Рішення Господарського суду Миколаївської області 24 вересня 2019 року у справі № 915/1298/19. URL: https://reyestr.court.gov.ua/Review/84728083(дата звернення: 01.07.2023 року)

road of the city of Poltava, which will pass through the land plots planned by the owner for the placement of a solar power plant. However, after studying the circumstances of the case, the court came to the conclusion that the refusal is illegal since the construction of the road is planned, but not started, moreover, the vector of its course is tentatively outlined and will be further specified[30].

Fourthly, persons interested in preventing the construction of a solar power plant or stopping its operation often base their arguments precisely on violations of urban planning legislation, especially on violations of procedural rules (approval of detailed plans, provision of public discussion, posting of timely announcements, etc.). That is why urban planning documentation can act as a tool to protect solar power plants from excessive pressure, and it also contains many opportunities for contesting the legal basis for the creation of the corresponding alternative energy facilities.

3) ***Specific interaction of solar energy facilities with the environment (environmental, legal and natural resource aspect).*** In his studies, M.A. Deinega rightly emphasizes that natural resources can be considered not only from the standpoint of "traditional" classification into land, water, forest resources, subsoil, plant and animal resources, but also divided into exhaustible and inexhaustible. Inexhaustible natural resources include, in particular, climatic (energy, thermal and other) resources[31]. That is, solar energy is an important natural resource. Although it is not valued as highly by society and policymakers as traditional fossil fuel resources, its importance is increasing, especially given the relentless expansion of humanity's technological capabilities.

We are used to the fact that the use of natural resources has an anthropogenic impact on the environment and has negative consequences: pollution, depletion, erosion, degradation, etc. The use of solar energy for the production of electricity is qualitatively different from the depicted traditional vision of modern nature management. Thus, the placement of solar panels and equipment, as a general rule, does not carry significant risks for the environment. In particular, this opinion is also held by the legislator, who did not foresee in the Law of Ukraine "On environmental impact assessment" the need to carry out such an assessment during the planning and construction of solar power plants (unlike, for example, wind or hydropower plants). It is fair to note that despite the fact that solar energy

[30] Рішення Полтавського окружного адміністративного суду 12 квітня 2021 року у справі № 440/7905/20. URL:https://reyestr.court.gov.ua/Review/97141464 (дата звернення: 01.07.2023 року)

[31] Дейнега М. А. Природоресурсне право: проблеми формування і розвитку: монографія / за заг. ред. В. М. Єрмоленка. Київ: НУБіП України, 2019. 340 с.

plants almost no direct threats to the natural environment, there is still the possibility of a side negative impact – in particular, during the production of individual parts and equipment, as well as through the generation of waste (for example, broken or old solar panels). This issue still needs its own legal regulation, taking into account the peculiarities of solar energy.

At the same time, the friendliness of solar energy to nature determines the revealed peculiarity of domestic judicial practice, namely: the rarity of contesting the formation or operation of solar power plants on the basis of their violation of environmental legislation or the assignment of environmental damage. Individual identified attempts of such argumentation were assessed by the court as insufficiently substantiated, since no evidence of negative impact on people and the environment was provided[32].

Despite the apparent simplicity of the identification of the natural resource component of solar energy legal relations, some interesting questions arise upon deeper investigation.

First, about *the complex nature of nature management*. So, in fact, during the operation of a solar power plant, two natural resources are used simultaneously: land and solar energy. However, due to the lack of special theoretical and methodological developments aimed at regulating the use of solar energy as a special natural resource, this component of solar energy natural resource relations is ignored. All the burden falls on the traditional, well-studied land legal component and in fact is completely reduced to the legal regulation of land use. However, this cannot be considered satisfactory, since the earth's surface is not always used directly for the placement of solar energy facilities (increasingly, roofs and walls of buildings, surfaces of vehicles, etc. are used for these purposes). That is, in the case of placing solar panels, for example, on the roof of a certain building, the legislation does not talk about nature use at all.

Secondly, the issue *of identifying the use of solar energy as a type of nature management*. In the science of environmental and natural resource law, much attention is paid to the traditional division of nature use into general and special (G.V. Anisimova[33], M.A. Deinega[34],

[32] Постанова Миколаївського апеляційного суду від 26 травня 2021 року у справі № 489/3874/20. URL: https://reyestr.court.gov.ua/Review/97192480 (дата звернення: 01.07.2023 року)

[33] Анісімова Г. В. Законодавчі проблеми забезпечення права загального природокористування. *Теорія і практика правознавства*. 2013. Вип. 1. URL: http://nauka.jur-academy.kharkov.ua/download/el_zbirnik/1.2013/Anis.pdf(дата звернення: 01.07.2023 року)

[34] Дейнега М. А. Предмет і система природоресурсного права: автореф. дис. … докт. юрид. наук 12.00.06. Київ, 2020. 38 с.

A.S. Yevstigneev[35], N.R. Kobetska, V.M. Komarnytskyi[36], I.O. Kostiashkin[37], O. G. Kotenyov[38], M. K. Cherkashina[39]and others), which emphasizes the importance of this issue. A person u solar energy throughout his life as a biological being, because the proper level of insolation is necessary for the body to function normally. Such nature use is unequivocally identified as general. From these positions, N.R. Kobetska's conclusion about the expediency of assigning the right of general nature use to the system of environmental rights of citizens and its regulation within the framework of the Institute of Environmental Rights seems very appropriate[40]. The right to general use of nature is characterized by general availability, free of charge, does not require any special permission and consolidation of these resources and serves to satisfy vital needs[41]. However, if a person begins to use the energy of the Sun to produce electricity, does this use of nature remain within the general limits?

The theory identifies several characteristic features of special nature management.

First, permission-based implementation. Yes, solar energy entities are required to obtain a special license for the production of electricity. However, the legal nature of such a license cannot be unequivocally identified as a natural resource permit. The fact is that in solar energy it is not the direct use of a natural resource – solar energy – but the production of the final product (electricity) that is subject to regulation. The license is aimed at regulating the special conditions of such production. This methodological approach can be explained by the different purpose of permits in "traditional" and "non-traditional" nature use: if in the first the main goal is to ensure the rational use and preservation of natural resources,

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[35] Євстігнєєв А. С. Проблеми правового забезпечення екологічної безпеки у сфері спеціального природокористування в Україні: автореф. дис. … докт. юрид. наук 12.00.06. Київ, 2019. 32 с.

[36] Комарницький В. М. Право спеціального природокористування: автореф. дис. ... докт. юрид. наук: 12.00.06. Київ, 2012. 36 с.

[37] Костяшкін І. О. Право загального землекористування громадян: автореф. дис. … канд. юрид. наук 12.00.06. Київ, 2005. 19 с.

[38] Котеньов О. Г. Принципи права природокористування: автореф. дис. … канд. юрид. наук 12.00.06. Харків, 2017. 22 с.

[39] Черкашина М. К. Юридичні гарантії права природокористування: автореф. дис. ... канд. юрид. наук: 12.00.06. Харків, 2008. 20 с.

[40] Кобецька Н. Р. Дозвільне та договірне регулювання використання природних ресурсів в Україні: автореф. дис. … докт. юрид. наук 12.00.06. Київ, 2016. 36 с.

[41] Анісімова Г. В. Законодавчі проблеми забезпечення права загального природокористування. *Теорія і практика правознавства*. 2013. Вип. 1. URL: http://nauka.jur-academy.kharkov.ua/download/el_zbirnik/1.2013/Anis.pdf(дата звернення: 01.07.2023 року)

then in the second – to ensure the proper production of electricity. Thus, in solar energy there are no direct permitting procedures for the use of solar energy as a natural resource.

Secondly, a certain part of natural resources is provided for special nature management. There is no direct allocation of solar energy as a natural resource, this happens only through territorial binding (location of the power plant) and the permitted capacity of the corresponding plant (the amount of solar energy use).

Thirdly, special nature management is subject to payment (in ca stipulated by the legislation of Ukraine, special nature management can be carried out free of charge (for example, placement of apiaries)[42]). According to this criterion, the analyzed nature use is also atypical, because in fact the user does not pay for the use of solar energy, on the contrary, the state creates special conditions so that it is profitable for the user to engage in such activities, to use the appropriate natural resource for the purpose of electricity production.

Therefore, even a schematic analysis indicates that the use of solar energy is a rather specific type of nature use, which does not easily fit into the existing division into general and special nature use and, in general, into the universal canons of natural resource law[43]. In our opinion, this is a concrete confirmation of the words of N. R. Kobetska that the legal regime for the use of natural resources is undergoing changes today and needs to be updated in accordance with changes in the socio-economic, political and legal system, including in terms of identifying new types of use natural resources, the use of new, unconventional means and forms of regulation for natural resource law[44]. That is, solar-energy nature use fully corresponds to the latest trends in the development of natural resource law and deserves further study in this direction.

4) ***Subject peculiarities of solar energy legal relations.*** The subjective component of the analyzed legal relations also shows interesting specific features, because during the last twenty years, a full-fledged sector of the economy – solar energy – has been formed in Ukraine. It is necessary to warn against a simplified view of its subject composition. Yes, it unites not

[42] Заверюха М. М. До питання правового регулювання використання земель лісогосподарського призначення в Україні. *Вісник Чернівецького факультету Національного університету "Одеська юридична академія"*. 2015. № 3. С. 119.

[43] Григор'єва Х. А. Сонячна енергетика і довкілля: правові грані взаємодії. *Актуальні проблеми земельного, аграрного, екологічного та природоресурсного права:* матеріали наук.-практ. конф. (Харків, 10 грудня 2021 року) / за заг. ред. А. П. Гетьмана, М. В. Шульги. Харків: Юрайт, 2021. С. 56–60.

[44] Кобецька Н. Р. Дозвільне та договірне регулювання використання природних ресурсів в Україні: автореф. дис. … докт. юрид. наук 12.00.06. Київ, 2016. 36 с.

only directly companies – owners of solar power plants – it forms a whole system of different participants, each of which performs its own functions. Thus, it is possible to single out three groups of specialized subjects of solar energy: a) energy producers; b) manufacturers of equipment; c) subjects of service provision (installation and assembly, repair, etc.).

At the same time, the system also includes numerous non-specialized, but no less important institutions. In particular, financial institutions create special credit products for investors in the field of solar energy. Thus, in Ukraine, some large banks offer special lending conditions for the creation of their solar power plant (for example, Ukrgasbank, the "ECO-Leasing" program from Oschadbank, [45]etc.).

Public administration bodies also play an important role in the development of solar energy. The analysis of numerous practices makes it possible to state a generally significant degree of support for the creation of solar power plants on the part of state authorities and local self-government bodies.

A characteristic feature of modern solar energy in Ukraine that should be noted is the significant specific weight of small installations owned by individual private persons-household owners focused primarily on the consumption of self-produced energy. That is, the heterogeneity of the solar energy sector is also increased due to the existence of different types of subjects – energy producers.

5) ***Support for the development of solar energy.*** In general, this type of alternative energy is covered by the general mechanisms of state support provided for the stimulation of relevant relations. At the same time, along with national support mechanisms, there are regional support mechanisms specialized in solar energy. For example, the compensatory support mechanism found, in particular, in the Program of Incentives for the Population, Condominiums, and Residential Buildings of the Zhytomyr Region regarding the effective use of energy resources and energy saving for 2015-2020, approved by the decision of the Zhytomyr Regional Council dated September 10, 2015 No. 1576, can be considered quite progressive. According to this program, private individuals who built a solar power plant were reimbursed for part of the money spent on such construction.

If the protection policy of Ukraine in the field of solar energy is to be characterized as a whole, it should be recognized as one-vector and regressive. They consist in the fact that the support system is designed in such a way that it stimulates, first of all, the construction of large

[45] Кредит від Ощадбанк на сонячні електростанції. URL: https://eco-tech.com.ua/cp71383-kredit-vid-oschadbank-na-sonyachni-elektrostantsiyi.html (дата звернення: 01.07.2023 року)

commercial solar energy facilities. At the same time, it provokes risks that inevitably accompany such projects: a) occupation of large areas of land; b) loss of agricultural land; c) change of landscapes, etc.

In our opinion, the main vector of support should be aimed at stimulating "household" solar energy, which closely borders on the concepts of energy efficiency and energy saving. As of the end of 2020, almost 30,000 Ukrainian families have installed SPP at home with a total capacity of 780 MW, and the amount of investment was 600 million euros[46]. However, the average cost of such a project is still quite significant.

That is why, understanding the progressiveness and prospects of consumer solar energy, developed countries are implementing interesting support programs. For example, the first project was launched back in 1991 in Germany "Thousand Solar Roofs" (later renamed "Two Thousand Solar Roofs"). A similar project – "100,000 solar roofs" – was adopted for all EU member states. In Japan, the development of solar energy is provided by the program "70,000 solar roofs", in the USA – "1 million solar roofs"[47].

Taking into account foreign experience and domestic realities, in our opinion, the center of gravity of solar energy in Ukraine should be shifted: from commercial industrial production for the purpose of obtaining profit – towards the reduction of energy consumption at the level of specific households (hou, enterprise, transport, etc.). Instead, the model of protection of solar energy built in domestic legislation stimulated the formation of commercial solar power plants, placed in an arbitrary order under the influence of investment plans, primarily oriented to state support[48].

5.3. Land legal and environmental issues of placement of solar power plants: a scientific and practical view

The rapid development of solar energy in Ukraine over the past ten years has been impressive: in 2019, our state entered the TOP-10 countries in the world in terms of the pace of development of green energy, and in 2020 – in the TOP-5 European countries in terms of the pace of

[46] Кострюков С. В. Історико-правові засади становлення сучасної сонячної енергетики. *Правові новели*. 2021. № 13. С. 75–82.

[47] Кузьміна М. М. Розвиток сонячної енергетики в Україні. *Науковий вісник Ужгородського національного університету. Серія "Право"*. 2014. Вип. 29. Т. 1. С. 183–186.

[48] Харитонова Т. Є., Григор'єва Х. А. Особливості геліоенергетичних правовідносин в Україні (на матеріалах практики). *Часопис Київського університету права.* 2021. Вип. 3. С. 224–230.

development of solar energy[49]. However, such an increase encountered some problems, both internal and external: ill-conceived evolution of legislation, difficulties in fulfilling obligations under the "green" tariff, loss of many capacities due to the conduct of military operations, etc. At the same time, the experience of the formation of solar energy in Ukraine in the second half of the 2010s – the beginning of the 2020s provides many grounds for scientific reflection on the readiness of domestic legislation for further scaling up of "green" generation. The fact is that the appearance of such non-traditional objects as solar power plants generates a whole set of consequences for the environment, society, the state, etc. However, the specifics of such consequences are not fully taken into account by the legislation. The impact of solar power plants on the surrounding natural environment and the negative impact of the environment on these alternative energy facilities are insufficiently comprehensively regulated. Corresponding inconsistencies and gaps are revealed in the process of active law enforcement.

The construction of solar power plants (SPP) in Ukraine entails a number of different consequences. In addition to definitely positive – in particular, increasing the production of "green" energy, reducing emissions into the atmosphere, contributing to the fight against climate change – some side effects of the rapid development of solar generation can also be traced. Such non-obvious consequences are clearly manifested, first of all, in practice. In this regard, the analysis of the court practice accumulated in recent years demonstrates some "bottlenecks" of the current legislation, which shows signs of adaptation to the appearance of new alternative energy facilities in Ukraine.

In order to find out how to ensure the optimal existence of a solar power plant in the environment, one should focus on the scientific and practical analysis of two interrelated issues: legal mechanisms for protecting the environment from the potential negative impact of solar power plants and legal means of protecting such power plants from external possible negative impacts. For this purpose, it is advisable to distinguish two logical blocks: protection of the environment from the influence of SPPs and protection of SPPs from the influence of the environment.

Protection of the environment from the influence of. Although solar energy is considered one of the safest for the natural environment, it is still not in an isolated hermetic space, and therefore has a certain impact on the environment. It so happened that in Ukraine the legality of the construction and operation of SPPs is sometimes contested with reference to violations

[49]Ігнатьєв С. Зелена енергетика в Україні на межі банкрутства. Що далі? URL: https://www.epravda.com.ua/columns/2022/04/10/685513/

of environmental and legal requirements. In this respect, the cycle of ca related to the construction of three SPPs in the Mykolaiv region became indicative. In these ca, the plaintiffs were natural persons – residents of the village and an agricultural enterprise. Their demands were legally differentiated: a) separately in relation to the three owners of ("PIVI PROGRESIVKA-BETA" LLC, "PIVI PROGRESIVKA-ALPHA" LLC, "PIVI PROGRESIVKA-GAMA" LLC); b) in relation to the subject of the lawsuit (according to civil lawsuits, the applicants demanded to cancel the orders of the Main Department of the State Geocadastre on approving land management documentation and providing land plots for lease with a change of purpose, as well as to declare land lease contracts invalid[50]; according to administrative lawsuits, they demanded to declare them illegal and cancel permits for performance of construction works, issued by the State Architectural and Construction Inspection Office [51]). Despite the legal "equilibrium" and formal differentiation, the main argument of these lawsuits was as follows.

The plots of land under the disputed solar power plants were state-owned and classified as agricultural lands. After the change in the purpose of the energy land, these land plots were leased for the placement of SPPs. However, the corresponding land plots are territorially located near the Tyligul estuary and are partially included in its coastal protective strip. The plaintiffs insisted that this objective fact is key, because, in their opinion, it means the need to conduct an environmental impact assessment (EIA), which was not carried out during the planning and design of the three SPPs. In their opinion, the coastal protective strip is a component of the water

[50] Рішення Березанського районного суду Миколаївської області від 18 березня 2021 року у справі № 489/3873/20. URL: https://zakononline.com.ua/court-decisions/show/95927631; Постанова Миколаївського апеляційного суду від 26 травня 2021 року у справі № 489/3873/20. URL: https://zakononline.com.ua/court-decisions/show/97295566; Постанова Верховного Суду від 24 грудня 2021 року у справі № 489/3873/20. URL: https://zakononline.com.ua/court-decisions/show/102221697; Рішення Березанського районного суду Миколаївської області від 18 березня 2021 року у справі № 489/3874/20. URL: https://zakononline.com.ua/court-decisions/show/95927634; Постанова Миколаївського апеляційного суду від 25 травня 2021 року у справі№ 489/3874/20. URL: https://zakononline.com.ua/court-decisions/show/97192480; Постанова Верховного Суду від 23 грудня 2021 року у справі № 489/3874/20. URL: https://zakononline.com.ua/court-decisions/show/102221692

[51] Рішення Миколаївського окружного адміністративного суду від 11 березня 2021 року № 400/2932/20. URL: https://zakononline.com.ua/court-decisions/show/95714554; Постанова П`ятого апеляційного адміністративного суду від 01 липня 2021 року у справі № 400/2932/20. URL: https://zakononline.com.ua/court-decisions/show/98009418; Постанова Верховного Суду від 01 листопада 2021 року у справі № 400/2932/20. URL: https://zakononline.com.ua/court-decisions/show/100722971

fund lands, and in accordance with Part 3 of Art. 3 of the Law of Ukraine "On environmental impact assessment" can have a significant impact on the environment and is subject to an environmental impact assessment of *"laying of cables,... on the lands of the water fund"*[52].

Considering this legal situation concerning three neighboring SPPs, the courts concluded the legality of the construction and operation of power plants without carrying out EIA. The main argumentation regarding this controversial issue boils down to the fact that: a) a coastal protective strip can be established on land of any category, and not exclusively on the lands of the water fund; b) according to the data of the State Land Cadastre, the relevant land plots are classified as energy lands and use restrictions have been established on them in the form of a coastal protective strip; c) the relevant department – the State Water Agency in its letter recognized the specified land plots as not belonging to the water fund, and therefore, the approval of any legal actions regarding them is not within its competence.

Protection of from the influence of other objects. The judicial practice of recent years has revealed not only those legal situations in which is a source of potential danger. The analysis of the materials of court ca and the decisions made on them demonstrates the insecurity of in situations where their proper optimal functioning is threatened by other objects. A vivid example can be the case in which the plaintiff was the owner of the solar (photovoltaic) power plant LLC "Ekotechnik Mynkivtsi" in Khmelnytskyi. According to the circumstances of the case, the LLC received the right to lease a plot of land for the construction of the SPP. However, a year later, at a distance 126 мfrom the power plant, LLC "Lifecell" began to build a base station. The owner of the appealed to the court because he considered his rights violated: the communication tower will overshadow the solar panels and thus creates obstacles in using the leased land for its intended purpose. As a result of the court proceedings, the legality of the construction of the base station was confirmed, despite the opposition of the owner[53].

This situation reveals another problem that accompanies the rapid development of alternative energy in Ukraine. Yes, the current legislation does not provide that there may be a certain objective need for a special security zone in the power plant.

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[52] Про оцінку впливу на довкілля: Закон України від 23.05.2017 року. *Відомості Верховної Ради*. 2017. № 29. Ст. 315.

[53] Рішення Господарського суду Хмельницької області від 27 липня 2021 року у справі № 924/354/21. URL: https://zakononline.com.ua/court-decisions/show/98606681; Постанова Північно-західного апеляційного господарського суду від 09 листопада 2021 року у справі № 924/354/21.URL:https://zakononline.com.ua/court-decisions/show/101237897; Постанова Верховного Суду від 15 лютого 2022 року у справі № 924/354/21.URL: https://zakononline.com.ua/court-decisions/show/103371144

Thus, the Law of Ukraine " On the Power Engineering Lands and the Legal Status of Special Zones of the Power Engineering Objects" stipulates that *"protection zones are established ... around power plants ... to ensure normal operating conditions of energy facilities, prevent damage, and reduce their negative impact on people and the environment, adjacent lands and other natural objects*[54]. At the same time, the dimensions of such security zones are established by the Cabinet of Ministers of Ukraine. Additionally, in Art. 25 of the Law stipulates that *" the boundaries of special zones of energy facilities are indicated in the land management documentation from the time of granting the land plot for the construction of the corresponding facility"*[55]. Owners and users of land plots within the special zones of energy facilities are not deprived of their rights to such lands, but they are issued *"a cadastral plan of their land plots with the boundaries of the special zones, as well as a written list of restrictions and encumbrances regarding the use of land in these zones"*[56]. In our opinion, such general legal requirements are quite logical, but are they sufficient to protect such a specific object and satisfy its legitimate interests?

An analysis of court decisions in the case of shading solar panels demonstrates the insufficient degree of such protection. First, restrictions on the use of land plots within the protection zones do not provide for regulation of the height of buildings. Secondly, the Law of Ukraine " On the Power Engineering Lands and the Legal Status of Special Zones of the Power Engineering Objects " stipulates that *"the boundaries of security and sanitary protection zones of energy facilities are indicated in urban planning documentation, land management documentation, and cadastral plans*[57]. " In our opinion, it would be appropriate to directly indicate in the Law that information on the specific content of restrictions on the use of land plots within the protection zones of energy facilities should be entered in the State Land Cadastre. This would contribute to the prevention of violations of the rights and legitimate interests of owners.

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[54] Про землі енергетики та правовий режим спеціальних зон енергетичних об'єктів: Закон України від 09 липня 2010 року. *Відомості Верховної Ради.* 2011. № 1. Ст. 1.

[55] Про землі енергетики та правовий режим спеціальних зон енергетичних об'єктів: Закон України від 09 липня 2010 року. *Відомості Верховної Ради.* 2011. № 1. Ст. 1.

[56] Про землі енергетики та правовий режим спеціальних зон енергетичних об'єктів: Закон України від 09 липня 2010 року. *Відомості Верховної Ради.* 2011. № 1. Ст. 1.

[57] Про землі енергетики та правовий режим спеціальних зон енергетичних об'єктів: Закон України від 09 липня 2010 року. *Відомості Верховної Ради.* 2011. № 1. Ст. 1.

Therefore, the scientific and practical analysis of some relevant court cases, in which the solar power plants themselves were subject to external influence and, conversely, became a factor influencing the environment, allowed us to: firstly, identify inconsistencies between land, water, and environmental legislation in terms of conducting environmental impact assessments during the planning and placement of solar power plants within the coastal protection zones of seas, bays, and estuaries; secondly, establish the low degree of consideration given to the specific needs of solar power plants regarding the limited height of surrounding objects within the protection zone[58].

5.4. State support for the development of solar energy in Ukraine

The modern world is imbued with ideas of greening, decarbonization, halting climate change, etc. All these ideas intersect in the issue of the development of solar energy, which is friendly to nature and contributes to the reduction of anthropogenic pollution of the environment. It should be noted that this direction of alternative energy is actively developing in Ukraine and the world. At the same time, in some countries (the USA, Germany, Japan, etc.), this process began a long time ago, several decades ago. For Ukraine, solar energy relations are relatively new, since they began to scale and began to have a significant impact on public life only during the last decade. Longer foreign experience in the development of solar energy allows us to draw from it an understanding of the process, regularities and perspectives that are important for Ukraine. This issue is especially topical due to the fact that currently in Ukraine it is possible to record a crisis of the legal model of support for alternative energy in general and solar energy in particular. It manifests itself primarily in the fact that the old protection model, built on a high "green" tariff, is recognized as burdensome, and the new protection model – based on "green" auctions – has not yet been introduced.

What to expect as a result of the development of the current situation and in which direction to develop solar energy in the future – these questions are currently one of the most timely and fateful in terms of the future energy security of Ukraine. The relevance of this problem is enhanced by the parallel promotion of the European Green Deal, which envisages the total decarbonization of social life and the economy in the EU by 2050. This external process for Ukraine will be accompanied by the introduction of additional trade requirements for domestic goods for its

[58] Григор'єва Х. А. Земельно-правові, екологічні та кадастрові питання розміщення сонячних електростанцій: науково-практичний погляд. *Правові новели*. 2023. № 20. С. 30–38.

producers – in particular, we are talking about confirming a certain degree of carbon neutrality. Of course, such a perspective indicates that it is impossible to lose the developed growth rates of alternative energy – they must be supported in the future, as a wide range of Ukrainian exporters will soon be interested in this.

Solar energy has already become an integral part of the energy supply in the modern world. Efforts made by governments, businesses, science and society in the direction of expansion of ecologically safe use of solar energy contributed to the fact that solar energy already has own niche in the world energy market. This, of course, was facilitated by the permanent decrease in the price of equipment, which makes solar energy more and more affordable.

However, the success of countries on this path varies, and this is not surprising, since some countries started their solar energy progress many years ago. Their legal experience, accumulated during all this time, is important for a deep understanding of the process taking place in Ukraine today.

A large-scale analysis of domestic and foreign scientific literature, legislation and law enforcement practice allows us to identify some main trends in the development of solar energy, extrapolate them to the current legal realities of Ukraine, and predict future development.

The first trend is ***a sudden interest in solar energy***. Indeed, the emergence and constant improvement, and now also the cheapening of solar energy technologies, ensured a formed public demand for clean and affordable energy. Under the influence of certain global (oil and coal prices) and local factors (discovery of natural gas deposits in a certain area, etc.), interest in the use of solar energy has weakened and strengthened. However, since its inception, technological growth in this direction has not stopped – it has only changed its pace.

At the same time, the corresponding trend is currently showing active growth. The need for solar energy became especially relevant against the background of the implementation of the Green Deal – an ideological and conceptual response to rapid climate change. It is not surprising that solving the problem of humanity's access to clean, cheap energy was brought to the level of one of the sustainable development goals (SDG 7).

It is important to note that solar energy is one of the most democratic, that is, accessible to the general public, and suitable for any level of scaling (from a pocket calculator to a full-fledged powerful power plant). Therefore, its development depends to a greater extent on the political will in one or another country, as well as on the price situation on the energy market – but not on the presence of significant geographical and climatic prerequisites. This thesis is proved, among other things, by the fact that the

level of insolation in Germany – the undisputed leader in the development of solar energy in the world – is objectively fixed at a level close to the indicators of Alaska. At the same time, countries that are endowed with much more significant climatic and geographical potential in the field of solar energy do not use it, remaining in a situation of energy dependence. The last statement is true, for example, for Turkey, which has the second largest solar energy potential among European countries, second only to Spain, but remains a stable importer of energy resources. Similar accusations are also directed at Malaysia, which has a serious potential for the development of ecologically safe solar energy[59], but prefers bioenergy production, causing international disputes due to the questionable sustainability of palm oil production[60].

The war in Ukraine, which became another factor in increasing the interest of governments and society in the quantitative and qualitative growth of solar energy, should be recognized as the last significant example illustrating this trend.

The second trend is ***the use of democratic and authoritarian methods of solar energy development***. Modern society is under constant informational pressure. Even though it creates many problems, such information availability contributes to environmental education, increasing environmental culture and awareness of the general population about the climate problems of mankind. All these processes led to the formation of an active public, which exerts influence on the governments of countries, promoting regulatory support for environmentally important decisions. In Western liberal democracies, political participation was originally conceived as actions that influence the choices of politicians or their programs of action[61]. Acts of resistance, for example in the form of demonstrations and protests, were eventually incorporated into the concept itself[62]. Against the background of the decline of traditional forms of participation in the Western world in the 2000s, political scientists have

[59] Malaysia's Solar Energy Potential Solar Energy Potential. URL: https://www.academia.edu/34670416/Malaysias_Solar_Energy_Potential_Solar_Energy_Potential

[60] Григор'єва Х. А. Непряма зміна землекористування (ILUC) внаслідок розвитку біоенергетики: правовий розріз проблеми. *Право і суспільство*. 2021. № 4. С. 97–104; Григор'єва Х. А. Готовність законодавства до світового розвитку біоенергетики (на матеріалах України, ЄС та Малайзії). *Актуальні питання стратегії державної екологічної політики України на період до 2030 року*: матер. кругл. столу (Харків, 21 травня 2021 року). Харків, 2021. С. 41–45.

[61] Verba S., Nie NH , Kim J.-O. Participation and political equality: A seven-nation comparison . Chicago: Chicago UniversityPress , 1972.

[62] Barnes S., Kaase M. Political action: Mass participation in five Western democracies . London& Beverly Hills: Sage, 1979.

documented a surge in new forms of political expression, such as political consumption and the involvement of civic groups, which have also come to be seen as political participation[63]. Public participation has always been perceived as a function of democracy, and therefore absent in authoritarian contexts[64].

At the same time, despite the active public of Western countries, which embodied the idea of democratic influence on solving environmental and energy issues, foreign experience shows that this is not the only possible way of developing solar energy. The example of China proves that the opposite way can be quite viable: when it is the government that pushes society to make economic decisions in the energy sector. Thus, since the early 2000s, the municipal government of the Chinese city of Shenzhen has voluntarily committed to increase the share of natural gas, solar PV, biomass and wind energy to at least 60% of total primary energy use in 2020[65]. For this purpose, renewable energy sources are implemented on a large scale and in a mandatory manner in the construction sector. Back in 2006, the Shenzhen municipal government announced the mandatory installation of solar water heating (SWH) systems in newly built houses. In the same year, the design of a rooftop SWH system was initiated in the suburb of Qiaoxiang to make the area a national example for energy conservation in buildings[66]. However, due to practical and organizational problems that arose during the operation of the corresponding equipment, this project faced criticism from the residents of the area.

In addition, the described example well illustrates the interesting phenomenon of "defense participation", which some foreign scientists write about. It consists in such ca when a person participates in something only in order to prevent other people from harming his own interests. The authors describe situations in which people perceive that the interests of others conflict with their own, and where participation provides no benefit to either

[63] Dalton RJ Citizen politics: Public opinion and political parties in advanced industrial democracies. Washington: CQ Press, 2014.; Norris P. Democratic Phoenix: Reinventing political activism. Cambridge: Cambridge University Press, 2002.

[64] Ping Huang, Vanessa Castán Broto, Linda Katrin Westman. Emerging dynamics of public participation in climate governance: A case study of solar energy application in Shenzhen, China. *Environmental Policy and Governance*. 2020. Vol. 30, Issue 6. P. 306–318.

[65] KhannaN., Fridley D., Hong L. China's pilot low-carbon city initiative: A comparative assessment of national goals and local plans. *Sustainable Cities and Societies*. 2014. Vol. 12. R. 110–121.

[66] Shenzhen Evening News., 2006 Shenzhen has applied to be the demonstration city for solar building integration. URL: http://news.sina.com.cn/c/2006-01-14/15567983726s.shtml

party[67]. In particular, defensive participation occurs when climate management affects everyday life and causes discomfort. Then citizens mobilize and resist such ecologically determined changes. We believe that this phenomenon can manifest itself in Ukraine as well, since there are several prerequisites for this: a) a permanent increase in the cost of electricity; b) a prospective increase in prices for consumer goods, which will naturally occur as a result of the implementation of decarbonization tasks in production, which will ultimately be paid for by the consumer. The above can become a solid foundation for the formation of a persistent negative public attitude towards alternative energy as a whim of the West and yet another ecological flirtation. It can be noted that similar problems arise even in developed countries. In particular, in Germany, residents of high-rise buildings have repeatedly expressed dissatisfaction with the fact that the owners of residential buildings are able to install solar panels, but they only receive payments with increased electricity prices[68].

Indeed, one cannot ignore the objective fact that greening in the economy is an increase in prices. In the conditions of the modern world, greening proces are becoming a new factor in the stratification of countries, deepening their inequality. This is already actively happening, because green protectionism is gaining a strong position in establishing environmental barriers and trade restrictions. For Ukraine, this is a new challenge, and the strategy of actions during its adoption should be well balanced.

The third trend is ***the direct dependence of the development of solar energy on the protection of the state.*** One cannot ignore the objective fact that solar energy is developing, first of all, in rich countries. The analysis of the historical and legal features of the formation of solar energy in Western and Eastern countries allowed foreign scientists to conclude that the development of solar energy in the world depends on two external factors: the price of traditional types of fuel and state support. Shifts in national solar support policies have led to regular cycles of ups and downs[69]. Indeed, a sharp change in the political attitude to solar energy, occurred as a result of the change of power in the USA in the early 80s of the XX century. ("the Reagan decade"), marked a loss of support, a decrease in investment interest, and ultimately a deep crisis in the industry. Instead, solar energy support programs were launched in the EU at this time.

[67] Weale A. Participation and representation. In Democracy. London: Palgrave, 1999. R. 84–105.

[68] Vahrenholt F., Lüning S. Die kalte Sonne: Warum die Klimakatastrophe nichtstattfindet. Hoffmann U Campe Vlg: Hamburg, 2012.

[69] Jones G., Bouamane L. "Power from Sunshine": A Business History of Solar Energy. Harvard Business SchoolWorking Paper, No. 12–105, May 2012.

Among European countries, Germany has achieved the greatest success in this field. This state became the founder of those important legal mechanisms supporting alternative energy, which later became reference and universal throughout the world due to their effectiveness. In particular, Germany in the early 90s of the 20th century. launched the program of effective support for individual solar energy "Thousand Solar Roofs"[70]. This idea was picked up by many other countries, quickly evolved and is still used today.

Also, one cannot ignore the fact that it was the German experience of introducing and paying for the "green" tariff that was adopted almost all over the world: almost all states, starting to stimulate alternative energy, followed the example of the German "green" tariff. The German scheme is characterized by a long contract term (20 years), guaranteed network priority, technology-specific tariffs on a sliding scale combined with a direct sales option (market premium) and, more recently, provisions for tariff evolution in response to deployment trends ("flexible ceiling"). These legal elements have created a stable investment environment and, therefore, a strong willingness of capital markets to finance renewable energy projects at relatively low interest rates[71]. This mechanism became a kind of symbol of alternative energy at the initial stages of its development. It is not surprising that Ukraine also used this experience, introducing a domestic "green" tariff.

However, it is important that Germany was the first to face the problems created by its own "model" protectionist policy. So, in this country more than ten years ago (when there were only isolated solar energy facilities of individual enthusiasts in Ukraine), the attractive "green" tariff, which played a positive role at the initial stage of the development of solar energy, began to turn into a problem. The high "green" tariff stimulated a large number of subjects to take advantage of the offered benefits – to receive state-guaranteed money for electricity produced from alternative sources. However, the more manufacturers there were, the more clearly the difficulties of such scaling became apparent. First, the tariff support mechanism indirectly contributed to maintaining a certain level of electricity production efficiency, because the producers had no incentive to make the process of generating this energy cheaper – they already had a guaranteed non-competitive income at the expense of state support. Second, at a certain point, the growth in the number of solar power producers reached such a specific weight that it highlighted the problem of overproduction. The fact is that the instability of electricity generation is currently the main technical problem of alternative energy. That is, at certain

[70] Кузьміна М. М. Розвиток сонячної енергетики в Україні. *Науковий вісник Ужгородського національного університету. Серія "Право"*. 2014. Вип. 29. Т. 1. С. 183–186.

[71] Lu¨tkenhorst , W ., Pegels , A . Stable Policies Turbulent Markets. Germany's Green Industrial Policy: The Costs and Benefits of Promoting Solar PV and Wind Energy. International Institute for Sustainable Development Research Report , 2014. https://doi.org/10.2139/SSRN.2396803

moments, a large (often excessive) amount of electricity is produced, which is not fully consumed, but the state pays for it according to the "green" tariff, regardless of whether such energy is consumed or not.

When such overproduction became critical, Germany reacted by changing regulatory requirements and protection policies: a) the pace and volume of commissioning of new solar energy facilities was limited; b) the "green" tariff began to gradually (and not suddenly!) decrease; c) the system of "green" auctions was improved; d) directed state support to the development, acquisition and use of energy storage, which will solve the problem of excess production and interruptions in energy supply[72].

It is very important that the corresponding decrease in the protectionism of German legislation was immediately reflected in real social relations: in particular, a number of bankruptcies and closures of solar energy enterprises were observed [73]. The study of this part of the German experience is often either ignored or used in a refined form – to justify the rule-making actions of 2020, when the system of state support in Ukraine, which guaranteed the established level of the "green" tariff for a long time, was rudely and seriously changed[74]. Indeed, the situation in Ukraine at that time was critical – the Guaranteed Buyer's debts to alternative energy producers were growing exponentially, and disaster was inevitable. However, this did not happen "suddenly", as the authorized bodies tried to present it – given the analyzed experience of Germany, such a trajectory of development was quite predictable, but the short-sightedness of public management in the energy sector led to the triggering of the situation and the need for emergency "manual" regulation.

In general, in the light of the comparative analysis, additional characteristic features of the Ukrainian version of the protection policy in the field of solar energy are revealed. In Germany, government support was aimed primarily at introducing solar energy into household consumption. This approach made it possible to form those impressive indicators that make this country a leader in the development of solar energy. In Ukraine, the protective legal model, "tailored" from German models, had the opposite effect: it stimulated the creation of hundreds of commercial solar power plants throughout the country. The main motivation for their construction and the business case was based on generous government support in the form of a guaranteed "green" tariff. At the same time, support for individual solar energy is ignored at the state level in Ukraine. Although it is not for nothing that this direction of solar energy was actively stimulated in developed countries (not only in Germany, but also in the

[72] Sireen Khemesh. Solar energy in Germany and USA. URL: https://www.academia.edu/31541378/SOLAR_ENERGY_IN_GERMANY_AND_USA

[73] Jones G., Bouamane L. "Power from Sunshine": A Business History of Solar Energy. Harvard Business SchoolWorking Paper, No. 12–105, May 2012.

[74] Харитонова Т.Є., Григор'єва Х.А. Енергетичний складник українського Green Deal: аналіз правових передумов. *Юридичний науковий електронний журнал*. № 2. С. 149–154.

USA, Japan, etc.). This is due to the relatively high cost of solar energy equipment. Although its cost shows a decrease (prices for solar panels in 2017 were 81% lower compared to 2009[75]), it remains quite significant for the Ukrainian population.

Based on the analyzed experience of Germany, it is possible to predict some consequences of the reduction of state support for solar energy in Ukraine and the transformation of its protection and legal model. So, a reduction in the pace of the appearance of new solar energy facilities in Ukraine will be a completely natural phenomenon. It should be emphasized that precisely because of this, Ukraine demonstrated good indicators of the development of alternative energy in recent years.

In addition, it is quite possible to close a certain part of the functioning solar energy facilities. For example, the judicial practice of 2020–2021 indicates a rapid increase in the number of ca of termination of land lease agreements for the placement of solar power plants based on systematic non-payment of lease payments (for example, in the Kherson region "Sonyachna Ferma Plus" LLC[76], "Energy Company "SMART ENERGY" LLC [77], in Kirovohrad Oblast Razdolna 1 LLC[78], in Transcarpathia Green Energy LTD LLC,[79]etc.). First of all, these trends indicate a high dependence of the successful operation of the specified projects on the previous level of state support. There are ca when the started investment project was stopped due to the "green" tariff crisis. For example, "Belz Solar" LLC in the Lviv region justified its non-payment of rent by the fact that due to the formation in 2020 of the multibillion-dollar debt of SE "Guaranteed Buyer" to producers of alternative energy, investors canceled the financing of the project for the construction of a solar power plant, for the location of which a plot of land was leased[80]. That is, the corresponding consequences of the change in the protection model are already felt.

The promised and "idealized" introduction of "green" auctions also raises questions. Although the relevant legal basis was formed several years ago, the procedure has not yet started.

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[75] IRENA (2018), Renewable Power Generation Costs in 2017, International Renewable Energy Agency, Abu Dhabi. URL: http :// www. irenaorg /-/ media / Files / IRENA / Agency / Publication /2018/ Jan / IRENA _2017_ Power _ Costs _2018. pdf

[76] Рішення Господарського судуХерсонської області від 17 березня 2020 року у справі № 923/68/20. URL: https://reyestr.court.gov.ua/Review/88407240#

[77] Постанова Південно-західного апеляційного господарського суду від 25 листопада 2021 року у справі № 923/614/21. URL: https://reyestr.court.gov.ua/Review/101421624

[78] Рішення Господарського суду Кіровоградської області від 27 травня 2021 року у справі № 912/748/21. URL: https://reyestr.court.gov.ua/Review/97349478#

[79] Рішення Господарського суду Закарпатської області від 20.05.2021 року у справі № 907/831/19. URL: https://reyestr.court.gov.ua/Review/97515954#

[80] Рішення Господарського суду Львівської області від 07.07.2021 у справі № 914/227/21. URL: https://reyestr.court.gov.ua/Review/98169640#

The conducted analysis of three main trends that can be observed on a global scale in the development of solar energy allows us to outline some directions for further improvement of the legal support of solar energy relations in Ukraine.

First, more and more serious challenges are facing Ukraine. Since during the times of the most favorable support, it was solar energy that developed the best, so it is currently becoming the objective pillar of our country's energy transition. As the experience of other countries has shown, alternative energy does not like sudden changes in protectionist policies, but, unfortunately, this is exactly what happened in Ukraine in 2020. Tactically, it was a step to save from financial collapse, but strategically, it was a serious failure of the state as a regulator of energy relations. That is why the state is now required to carry out a well-thought-out sequence of actions aimed, first, at stabilizing the situation on the energy market; secondly, to restore the confidence of investors; thirdly, to create favorable conditions for the further development of solar energy as the main asset in this field at the moment. In other words, the state must take responsibility for what is happening in alternative energy in general and solar energy in particular.

Secondly, it is important to change the vector of state regulation in the field of solar energy as soon as possible: if until 2020 state support for solar energy could be called commercially oriented, from 2020 to today it is stagnant, then from 2023 onwards, non-commercially oriented support should be implemented support Its essence is to focus state incentives on supporting the development of solar energy at the level of individual farms. For households, this is aimed at energy saving and the economy, for business entities – at greening and cost reduction.

To implement a new vector of state support for non-commercial solar energy, it is worth introducing compensation mechanisms at the state and regional levels. The development of cooperation with banks, the formation of energy cooperation deserves separate stimulation.

In our opinion, when deciding on the location of a certain solar energy facility, three important criteria should be evaluated in their entirety: a) the need for additional local energy supply; b) economic and ecological feasibility (combination of physical and economic indicators); c) feasibility of the solar energy project compared to alternative options for the use of the territory[81].

[81] Григор'єва Х. А. Правове забезпечення сонячної енергетики в Україні: між протекцією, конкуренцією та байдужістю. *Юридичний вісник.* 2021. № 6. С. 41–51.

DOI https://doi.org/10.36059/978-966-397-417-0-6

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CHAPTER 6. LEGAL FRAMEWORK FOR THE USE OF HYDROGEN, GEOTHERMAL AND ENVIRONMENTAL ENERGY IN UKRAINE

6.1. Legal regulation of using of geothermal energy

The use of earth heat or geothermal energy in Ukraine is one of the most promising types of alternative energy, the further development of which will help to solve significant energy problems related to the replacement of traditional fossil fuels and the supply of mineral resources to the industry. The undoubted advantages of geothermal energy include environmental friendliness, economic attractiveness, practical inexhaustibility of the energy source, and, unlike other alternative sources, independence from weather conditions.

The experience gained over the past decades in the development of thermal energy from the Earth's interior shows that geothermal resources are successfully used in more than 90 countries to generate electricity and heat, while meeting various needs of human economic activity. The total capacity of operating geothermal power plants (thermal) and geothermal power plants (electric) in the world is about 85 GW, of which approximately 15% is used for electricity generation and the rest for heat generation. The leaders in the production of geothermal electricity and heat are the USA, Indonesia, the Philippines, Turkey, New Zealand, Mexico, Kenya, Italy, Iceland and Japan[1].

According to the State Agency on Energy Efficiency and Energy Saving of Ukraine, due to the thermo-geological features of the relief and geothermal resources, our country has a significant geothermal energy potential. The geothermal resources suitable for use in Ukraine include thermal waters, heat from heated dry rocks, and heated groundwater resources produced with oil and gas by operating wells in oil and gas fields.

However, at present, scientific, exploration and practical work in Ukraine is focused only on geothermal resources represented by thermal

[1] Долінський А. А., Халатов А. А. Геотермальна енергетика: виробництво електричної і теплової енергії. *Вісник НАН України*. 2016. № 11. С. 76–86.

waters. In particular, the economically feasible energy resource of thermal waters is up to 8.4 million tons of oil equivalent per year[2].

Large reserves of thermal water have been discovered in Chernihiv, Poltava, Kharkiv, Luhansk and Sumy regions. However, the thermal water wells that were in operation (hundreds of wells) in the country are now mothballed. However, in the future, they can be restored for further use as geothermal heat extraction systems. Currently, the most developed area in Ukraine is the use of heat from the upper layers of the Earth using heat pumping units. The country has enough geothermal deposits with a high temperature potential (120–180°C), which makes it possible to use geothermal heat for electricity generation.

Unlike other alternative energy sources, the rate of expansion of geothermal energy production capacities in Ukraine is much slower. Since the late 90s of the twentieth century, despite the availability of a strong scientific and technical base for the development of geothermal energy, work on its development has been drastically reduced. The state has made virtually no investment in the creation of technologies and equipment for its development. And this is despite the fact that the country has geothermal resources almost throughout its territory.

The Geothermal Energy Department of the Institute of Renewable Energy of the National Academy of Sciences of Ukraine is currently conducting successful research in the field of geothermal energy to provide scientific support and practical implementation of technologies for the production of heat and electricity based on the use of geothermal resources. In particular, in 2020, the Atlas of the Energy Potential of Renewable Energy Sources of Ukraine was published, which provides data on the distribution of electric geothermal potential in certain administrative regions of Ukraine and an electronic database of geothermal facilities in Ukraine[3]. It is believed that these achievements and experience in the development of methods in the field of geothermal energy extraction and use should be taken into account when developing the state policy for the development of the industry and legal support for its development. After all, despite all the advantages and great potential, geothermal energy can only develop if there is an appropriate state policy and support, including through the mechanism of legal regulation[4].

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[2] Геотермальна енергія / Державне агентство з енергоефективності та енергозбереження України. URL: https://saee.gov.ua/uk/ae/geoenergy (дата звернення: 01.07.2023 року)

[3] Відновлювані джерела енергії / За заг. ред. С.О. Кудрі. Київ: Інститут відновлюваної енергетики НАНУ, 2020. 392 с.

[4] Платонова Є. О., Дубінін Ю. С. Правові засади використання геотермальної енергії в Україні. *Juris Europensis Scientia*. 2023. № 2. С. 51–58.

A significant step in the development of relations in the use of geothermal energy resources was the adoption of the State Programme "Environmentally Friendly Geothermal Energy of Ukraine", approved by the Cabinet of Ministers of Ukraine on 17 January 1996 № 100[5]. In accordance with the goals declared in the programme, it was planned to increase the actual capacity of geothermal energy used to 250 MW by 2010, but this figure was not achieved due to the current state of development of the industry. By the way, under this programme, the Institute of Technical Thermophysics of the National Academy of Sciences of Ukraine developed 6 projects and business plans for geothermal power plants for Zakarpattia, Poltava, Chernihiv regions and the Autonomous Republic of Crimea, designed and built 12 geothermal power plants on the Crimean Peninsula, and constructed a plant in the village of Medvedivka. Medvedivka (AR of Crimea), the station in Yantarne (AR of Crimea) was modernized, and geothermal plants were built in Berehove and Kosyno (Zakarpattia region). After the programme was closed, all geothermal energy use in Ukraine ceased.

Subsequently, in order to implement the state energy policy in the field of alternative energy sources development, various state programmes, strategies, national action plans/action plans were adopted in the country, which were supposed to reflect, among other things, the current state and prospects of geothermal energy development, and provide for the means and timing of their implementation. Instead, their common feature in terms of setting programme benchmarks for the use of alternative energy sources in the country was that the issues of geothermal energy development were considered indirectly by identifying the need to increase the use of geothermal energy, construction of pilot geothermal power plants, etc.[6]

Among the most important policy documents in this area is the Comprehensive State Energy Saving Programme of Ukraine, approved by the Cabinet of Ministers of Ukraine on 5 February 1997 No. 148[7]; Programme of State Support for the Development of Non-Traditional and

[5] Про Державну програму "Екологічно чиста геотермальна енергетика" України: постанова Кабінету Міністрів України від 17 січня 1996 року № 100. URL: https://zakon.rada.gov.ua/laws/show/100-96-п#Text (дата звернення: 17.08.2023 року)

[6] Платонова Є., Дубінін Ю. Сучасний стан та перспективи програмного забезпечення геотермальної енергетики в Україні. *Сучасна державна екологічна політика і безпека суверенної України: проблеми та перспективи правового забезпечення* (до 30-ї річниці Закону України "Про охорону навколишнього природного середовища" та до 20-ї річниці Закону України "Про нафту і газ"): матеріали Всеукр. наук.-практ. конф. (м. Київ, 28 січня 2022 року). Наук. ред. В. Устименко. Чернігів: Десна Поліграф, 2022. С. 164–169.

[7] Про Комплексну державну програму енергозбереження України: постанова Кабінету Міністрів України від 5 лютого 1997 року № 148. *Офіційний вісник України*. 1997. № 6.

Renewable Energy Sources and Small Hydro and Heat Power, approved by the Cabinet of Ministers of Ukraine on 31 December 1997, No. 1505[8]; The State Target Economic Programme for Energy Efficiency and Development of Energy Production from Renewable Energy Sources and Alternative Fuels for 2010-2021, approved by the Cabinet of Ministers of Ukraine on 1 March 2010, No. 243[9]; The State Programme for the Development of Domestic Production, approved by the Resolution of the Cabinet of Ministers of Ukraine dated 12 September 2011 No. 1130[10]; Energy Strategy of Ukraine for the period up to 2035 "Security, Energy Efficiency, Competitiveness", approved by the Cabinet of Ministers of Ukraine on 18 August 2017 No. 605-r (expired on 21.04.2023)[11].

However, given the programme nature of these documents, most of their provisions were declarative. General slogans about the need to increase the use of geothermal energy in the generation of electricity and heat were not supported by specific measures and mechanisms for their implementation.

The first state strategic document on the territory of independent Ukraine on the development of alternative energy sources, including geothermal energy, is the National Renewable Energy Action Plan for the period up to 2020, approved by the Cabinet of Ministers of Ukraine on 1 October 2014, No. 902-p[12]. Unfortunately, despite the plan's goal of "ensuring electricity generation by geothermal installations by commissioning new capacities of 20 MW in 2020", geothermal energy is currently absent from the installed capacity of renewable energy facilities. No information on state funding of geothermal energy projects was found in open sources.

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[8] Про Програму державної підтримки розвитку нетрадиційних та відновлюваних джерел енергії та малої гідро– і теплоенергетики: постанова Кабінету Міністрів України від 31 грудня 1997 р. № 1505. URL: https://zakon.rada.gov.ua/laws/show/1505-97-п#Text (дата звернення: 17.08.2023 року)

[9] Про затвердження Державної цільової економічної програми енергоефективності і розвитку сфери виробництва енергоносіїв з відновлюваних джерел енергії та альтернативних видів палива на 2010-2021 роки: постанова Кабінету Міністрів України від 01 березня 2010 року № 243. *Офіційний вісник України*. 2010. № 16. Ст. 762.

[10] Про затвердження Державної програми розвитку внутрішнього виробництва: постанова Кабінету Міністрів України від 12 вересня 2011 року № 1130. *Офіційний вісник України*. 2011. № 86. Ст. 3139.

[11] Про схвалення Енергетичної стратегії України на період до 2035 року "Безпека, енергоефективність, конкурентоспроможність": розпорядження Кабінету Міністрів України від 18 серпня 2017 року № 605-р. *Урядовий кур'єр* від 08 вересня 2017 року № 167. *(втратила чинність 21.04.2023 року)*

[12] Про Національний план дій з відновлюваної енергетики на період до 2020 року: розпорядження Кабінету Міністрів України від 01 жовтня 2014 року № 902-р. *Офіційний вісник України*. 2014. № 81. Ст. 2298.

On 20 January 2022, the draft resolution of the Cabinet of Ministers of Ukraine "On the National Renewable Energy Development Action Plan for the period up to 2030", approved by the Ministry of Energy of Ukraine, was published for public discussion on the official website of the State Agency on Energy Efficiency and Energy Saving. It states that Ukraine has a sufficient resource base and developed geothermal technologies to extract and develop the following types of geothermal energy sources sub-geothermal – heat from the upper layers of the Earth up to a depth of 500 m, which is used by heat pumping units; hydrothermal – heat from deep underground thermal waters and parahydrothermal waters, which is used by heat and power generating units; petrothermal – heat from overheated "dry" rocks, which is used by borehole heat exchangers or by creating artificial underground permeable collectors. However, the most widespread and currently suitable source of geothermal energy in Ukraine for technical use is hydrothermal resources. It is noted that, given the current situation, conditions and available potential, Ukraine can ensure the production of electricity by geothermal installations by commissioning new capacities in the amount of 100 (with a total capacity of 20 MW)[13].

At present, the legal framework for the use of geothermal resources is established by numerous legal acts regulating relations in the field of natural resources use, environmental protection, payment of rent, development of alternative energy sources, etc. In such circumstances, it is difficult for ordinary developers and investors to navigate the existing array of ambiguous and sometimes contradictory legal requirements for their use, especially given the current dynamism of energy, natural resources and environmental legislation[14].

First of all, it should be noted that the current state of legal regulation of the use of groundwater, which is a key resource for geothermal energy, is characterized by the dual legal nature of groundwater. Both water and subsoil legislation consider them as their own object of regulation: water – as part of the water fund (Article 3 of the Water Code of Ukraine), subsoil – as a mineral resource, a component of the subsoil (Article 5 of the Subsoil Code of Ukraine). According to the Resolution of the Cabinet of Ministers of Ukraine "On Approval of Lists of Mineral Resources of National and

[13] Проект розпорядження Кабінету Міністрів України "Про Національний план дій з розвитку відновлюваної енергетики на період до 2030 року" від 20 січня 2022 року / URL: https://saee.gov.ua/uk/content/elektronni-consultatsii(дата звернення: 01.07.2023 року)

[14] Платонова Є. О., Дубінін Ю. С. Правові засади використання геотермальної енергії в Україні. *Juris Europensis Scientia*. 2023. № 2. С. 51–58.

Local Importance", groundwater as a mineral resource of national importance is divided into mineral, drinking, industrial, heat and power[15].

Separate legal norms on the protection and use of natural therapeutic resources are found in Articles 15-19 of the Law of Ukraine "On Resorts"[16]. According to these regulations, thermal waters are classified as "natural medicinal resources", as their use is primarily based on their medicinal properties. At the same time, Ukraine does not have a single state standard for medicinal waters, which can also be classified into medicinal mineral waters, drinking mineral waters, and thermal waters. At the same time, thermal waters are a type of groundwater and at the same time, in terms of their geological structure, are minerals. Therefore, the use of these natural resources, given their dual legal regime, should be governed by both water and subsoil legislation. The complex legal nature of groundwater leads to complications in the implementation of legal norms in the field of geothermal resources use and difficulties in law enforcement, in particular in court practice[17].

Geothermal energy uses the heat (thermal energy) of groundwater obtained by taking water from a water body (including groundwater) and generating electricity or heat from it. Heat extraction from geothermal sources usually requires the construction of geothermal power plants: Geothermal power plants (thermal) or Geopower plants (electric). According to experts, in general, in Ukraine, geothermal power generation can be developed in the following directions: 1) medium-sized geothermal power plants with a unit capacity of 10-20 MW based on deposits with a temperature above 120°C; 2) small geothermal power plants with a unit capacity of 0.05-5 MW with a temperature of 90-120°C; 3) combined power plants using geothermal energy and organic fuels (coal, gas, peat, biomass); 4) combined energy units for the production of electricity, heat and valuable products from geothermal waters. By the way, state national standards have been adopted in this area, namely: SSTU 7498:2014 "Geothermal Energy. Terms and Definitions", SSTU 7955:2015 "Geothermal Energy. Geothermal thermal power plants. General technical requirements", SSTU

[15] Про затвердження переліків корисних копалин загальнодержавного та місцевого значення: постанова Кабінету Міністрів України від 28 грудня 2011 року № 1370. URL: https://zakon.rada.gov.ua/laws/show/827-94-п#Text (дата звернення: 18.08.2023 року)

[16] Про курорти: Закон України від 5 жовтня 2000 року. *Відомості Верховної Ради України*. 2000. № 50. Ст. 435.

[17] Обіюх Н. М. Правове регулювання використання термальних вод за законодавством країн Європейського Союзу та України. *Науковийвісник Ужгородського національного університету*. СеріяПРАВО. 2015. Вип. 35. Ч. II. Т. 2. С. 50–54.

8300:2015 “Geothermal energy. Electric geothermal power plants. General technical requirements”[18].

According to the regulatory requirements of Articles 48 and 49 of the Water Code of Ukraine[19] These activities, which are carried out by legal entities and individuals to meet energy needs, *are classified as special water use*, are paid for and require a special water use permit.

At the same time, groundwater is a type of mineral resource of national importance. In accordance with Articles 16 and 21 of the Subsoil Code of Ukraine [20] stipulates that the use of subsoil for the extraction of groundwater (except for mineral water) is carried out on the basis of a special permit for the use of subsoil without the provision of a mining allotment. Currently, these special permits are granted to the winners of auctions for the sale of special permits for subsoil use in accordance with the procedure approved by the Resolution of the Cabinet of Ministers of Ukraine dated 23 September 2020[21].

The specificity of groundwater use in this case is actually the implementation of special water use and special subsoil use. Thus, the acquisition of the right to use groundwater requires the simultaneous receipt of two documents: a) a special water use permit and b) a special subsoil use permit. The special subsoil use permit gives the right to extract groundwater, while the special water use permit gives the right to use it.

At the same time, the Subsoil Code of Ukraine provides for cases in which business entities have the right to extract groundwater without a special permit for subsoil use. Such cases are envisaged by Article 23 of the Subsoil Code of Ukraine, which establishes the right of landowners and land users to extract groundwater (except for mineral water) for all purposes, except for the production of packaged drinking water, within the boundaries of their land plots without special permits and mining allotments, provided that the volume of groundwater extraction from each water intake does not exceed 300 cubic meters per day. Thus, a land user or land owner, legal entity or individual shall withdraw groundwater by means of a well (structure, technical device), provided that the water intake

[18] Відновлювані джерела енергії / За заг. ред. С.О. Кудрі. Київ: Інститут відновлюваної енергетики НАНУ, 2020. 392 с.

[19] Водний кодекс України від 6 червня 1995 року. *Відомості Верховної Ради України*. 1995. № 24. Ст. 189.

[20] Кодекс України про надра від 27 липня 1994 року. *Відомості Верховної Ради України*. 1994. № 36. Ст. 340.

[21] Про затвердження Порядку проведення аукціонів з продажу спеціальних дозволів на користування надрами: постанова Кабінету Міністрів України від 23 вересня 2020 року № 993. *Офіційний вісник України*. 2020. № 88. Ст. 2825.

capacity does not exceed 300 cubic meters per day and it does not produce packaged drinking water[22].

The specificity of groundwater use in this case is actually the implementation of general subsoil use and special water use. Thus, the acquisition of the right to use groundwater requires obtaining only one document – a special water use permit.

For the use of groundwater, the Tax Code of Ukraine provides for a rent payment for special use of water (Article 255) and for the use of subsoil for the extraction of minerals[23]. In other words, the legislation has created a situation where potential geothermal energy producers pay twice for the same natural resource – groundwater – as for water and as for a mineral resource. It is believed that the second payment is not for groundwater (as a mineral resource), but for the use of subsoil during its extraction.

The analysis of the current energy legislation gives grounds to note that currently the basis for legal regulation of the use and promotion of alternative energy sources, including geothermal energy, is contained in the laws of Ukraine: "On Alternative Energy Sources" of 20 February 2003, "On Heat Supply" of 2 June 2005, "On Amendments to Certain Laws of Ukraine on Establishing a Green Tariff" of 25 September 2008. The first versions of these laws only set national goals in the field of alternative energy, but did not define specific mechanisms to encourage the use of geothermal energy sources. In addition, until 2016, the Law of Ukraine "On Alternative Energy Sources" did not contain a definition of geothermal energy, but only referred to geothermal energy as one of the types of alternative energy sources. The Law of Ukraine "On Energy Saving" did not define this concept either, although it also referred to the Earth's heat as one of the non-conventional and renewable energy sources.

Certain positive changes in the direction of simplifying the conditions for conducting business in the field of geothermal energy occurred in connection with the adoption of the Law of Ukraine "On Amendments to the Law of Ukraine "On Alternative Energy Sources" regarding the classification of heat pumps as equipment that uses renewable energy sources" of 1 November 2016[24]. The adoption of this Law was necessitated by the need to ensure the fulfilment of Ukraine's obligations to adapt its

[22] Сердюк О. В. Актуальніправовіпроблемивикористання підземнихвод. *Проблеми законності*. 2011. Вип. 116. С. 160 – 167.

[23] Податковий кодекс України від 02 грудня 2010 року. *Відомості Верховної Ради України*. 2011. № 13-14, № 15-16, № 17. Ст. 112.

[24] Про внесення змін до Закону України "Про альтернативні джерела енергії" щодо віднесення теплових насосів до обладнання, яке використовує відновлювані джерела енергії: Закон України від 01 листопада 2016 року. *Офіційний вісник України*. 2016. № 98. Ст. 3179.

national legislation to the Energy Community legislation, in particular Directive 2009/28/EC of the European Parliament and of the Council on the promotion of the use of energy from renewable energy sources, namely the regulation of the issue of the classification of energy used by heat pumps as energy from renewable sources.

It should be noted that in many countries of the world, along with the construction of geothermal thermal power plants (Geothermal Power Plants), geothermal heat supply systems based on heat pumps have been actively developing in recent years. According to estimates, heat pump systems account for 70.95% of the total capacity of geothermal heat systems in the world. These technologies are most developed in the USA, China, Sweden, Germany and France. These systems use low-potential (up to 55°C) thermal water and petrothermal energy from the upper layers of the Earth's crust as the primary heat source[25].

Almost all regions of Ukraine have significant reserves of low-potential thermal waters that can be used in heat supply systems with heat pumps. Uniform requirements for geological exploration, geological and economic assessment of heat and power groundwater deposits and conditions for determining their readiness for industrial development are set out in the Instruction on the Application of the Classification of Mineral Reserves and Resources of the State Fund of Subsoil to Heat and Power Groundwater Deposits, approved by Order No. 182 of the State Commission of Ukraine for Mineral Reserves of 07 June 2007.

According to scientist Platonova, in order to improve the legal regulation of relations in the field of environmental energy use in Ukraine, it is necessary to develop a state strategy for the development and use of environmental energy, as well as an effective mechanism for legal support for the development of thermal energy production from natural energy sources of the environment[26].

Let us consider the most common fundamental legal mechanisms for stimulating the development of geothermal energy in Ukraine.

At present, the main incentive instrument of the state policy aimed at the production of electricity from geothermal sources is the application of the

[25] Долінський А. А., Ободович О. М. Світовий досвід використання геотермальної енергії та перспективи її розвитку в Україні. *Вісник НАН України*. 2016. № 3. С. 62–69.

[26] Платонова Є. О. Правові аспекти використання енергії довкілля України в умовах євроінтеграції. Європейський вибір України, розвиток науки та національна безпека в реаліях масштабної військової агресії та глобальних викликів XXI століття (до 25-річчя Національного університету "Одеська юридична академія" та 175-річчя Одеської школи права): у 2 т.: матеріали Міжнар. наук.-практ. конф. (м. Одеса, 17 червня 2022 року) / за заг. ред. С. В. Ківалова. Одеса: Видавничий дім "Гельветика", 2022. Т. 1. С. 644–647.

feed-in tariff, as participation in auctions for the distribution of support quotas for energy producers from geothermal sources is voluntary. Thus, according to the Law of Ukraine "On Alternative Energy Sources", the feed-in tariff for business entities producing electricity from geothermal energy is set at the level of the retail tariff for consumers of the second voltage class as of January 2009 multiplied by the feed-in tariff coefficient for electricity produced from geothermal energy. The amounts of such coefficients are given in part 22 of Article 91 of the Law, according to which, for electricity produced from geothermal energy, they are as follows for facilities or its start-up complexes commissioned: a) from 1 July 2015 to 31 December 2019 – 2.79; b) from 1 January 2020 to 31 December 2024 – 2.51; c) from 1 January 2025 to 31 December 2029 – 2.23. It is easy to see that there are no such coefficients for facilities commissioned before 30 June 2015.

In the case of electricity generation by consumers, including energy cooperatives, from geothermal energy by generating facilities with an installed capacity of less than 150 kW, the feed-in tariff is set at the level of the retail tariff for consumers of the second voltage class as of January 2009, multiplied by the feed-in tariff coefficient for electricity generated by consumers.

In accordance with part 24 of Article 91 of the Law "On Alternative Energy Sources", the coefficients are set at the following levels: a) from 1 January 2019 to 31 December 2019 – 2.79; b) from 1 January 2020 to 31 December 2024 – 2.51; c) from 1 January 2025 to 31 December 2029 – 2.23. Thus, such coefficients were introduced only in 2019.

This provision can undoubtedly be considered one of the significant attempts to stimulate the development of small and medium-sized enterprises in Ukraine, in particular, by including energy cooperatives in the list of entities that are encouraged to produce electricity from geothermal sources on the basis of a feed-in tariff. However, the absence of special systemic state support for the geothermal sector of alternative energy negates all positive developments in this area.

It is believed that the lack of effective economic incentives for the construction and operation of geothermal thermal and power plants necessitates the legislative establishment of economically attractive feed-in tariff coefficients for geothermal energy, comparable to those for electricity generated from solar energy by ground-based power facilities[27].

[27] Платонова Є. О., Дубінін Ю. С. Правові засади використання геотермальної енергії в Україні. *Juris Europensis Scientia*. 2023. № 2. С. 51–58.

According to Article 7 of the Law of Ukraine "On Heat Supply[28]", one of the main directions of development of heat supply systems is use of geothermal water as a type of alternative energy source. The implementation of this provision is manifested in the use of such an economic and legal means of stimulating the production of heat energy from alternative sources as an incentive tariff for heat energy. Its essence lies in the fact that tariffs for heat energy for business entities that produce it at facilities using alternative energy sources, including thermal power plants, thermal power plants and cogeneration plants, for the needs of institutions and organizations financed from the state or local budget, as well as for the needs of the population, are set at 90% of the tariff for heat energy produced using natural gas for the needs of the relevant category of consumers (part 4 of the Law).

The establishment of such a tariff should have a positive impact on the generation of heat from geothermal energy sources, as it allows to reduce the cost of heat energy, which may have a favorable impact on the formation of tariffs for end consumers. However, insufficient state funding for geothermal energy projects creates risks that such projects will not be profitable. In addition, the establishment of incentive tariffs for heat energy "not from gas" without differentiation of RES used for its production creates unequal conditions for producers of heat energy from geothermal sources[29].

These legal mechanisms for stimulating the development of geothermal energy are supplemented by tax benefits (exemption from value added tax) and customs benefits (exemption from customs duties) for the importation into the customs territory of Ukraine or exportation outside of it of materials, equipment, components for construction that are not produced in the country.

In her research, scientist Platonova E. O. concludes that the state policy in the field of geothermal energy development in the country is declarative and extremely ineffective, and that the legal mechanisms for its development and stimulation are imperfect. This is due to shortcomings and strategic miscalculations in the legal regulation of geothermal energy relations. It is established that geothermal resources are not only a significant energy resource that is currently successfully used for electricity and heat production, but also a mineral resource and part of water resources. In the process of exercising the right to use underground thermal waters, as the most developed

[28] Про теплопостачання: Закон України від 2 червня 2005 року. *Офіційний вісник України*. 2005. № 27. Ст. 1532.

[29] Платонова Є. О., Дубінін Ю.С. Правові засади використання геотермальної енергії в Україні. *Juris Europensis Scientia*. 2023. № 2. С. 51–58.

type of geothermal resources, there is a complex use of several natural objects, namely: a water body, a subsoil area and a plot of land.

Thus, relations in the field of groundwater use are heterogeneous by their legal nature, since such a natural object as thermal waters determines different types of their use: subsoil use, water use and land use, which are interrelated, but regulated by different regulatory legal acts of natural resource and land legislation. For example, the right to extract underground thermal waters is regulated by subsoil legislation; the right to use them is regulated by water legislation; and the provision of land plots for geothermal installations is regulated by land legislation. The legal, economic, environmental and organizational framework for the use of geothermal energy is determined by energy legislation. The payment of rents for the use of subsoil for mining and special water use is regulated by tax legislation.

Under the influence of current energy trends, Ukraine has already laid the groundwork for legal regulation of geothermal energy use. However, these positive developments in the direction of stimulating the production and consumption of geothermal energy cannot yet ensure the competitiveness and investment attractiveness of geothermal thermal and power plant construction projects in Ukraine. As a result, there are currently no operating geothermal power plants in the country. Therefore, there is no doubt that the existing economic and legal incentives for the use of geothermal energy need to be improved and refined.

6.2. Environmental energy as a source of renewable energy: legal section of the issue

Energy of the environment, in particular, surface sources of thermal waters, as well as layered thermal waters lying in the sedimentary shell of the earth's crust, was used by mankind even before the beginning of our era. It is known that thermal waters from springs and wells were used in ancient Rome to heat artificial pools and baths of noble patricians. And nowadays, in some regions of Italy, thermal reservoir waters are used for domestic and, even, industrial purposes. A vivid example can be the exploitation of the Larderello high-temperature water deposit in the Toscano region, where even in the last century steam was extracted, which operated a built power plant with a capacity of 200,000 kW per year. In California (USA) in the area of the development of geysers, the electric generators-built produce electricity with a total capacity of more than 400 thousand kW per year. Examples of industrial use of thermal water energy in New Zealand and other countries can also be given. Despite the fact that Ukraine has a significant energy potential of underground thermal waters, as evidenced by

direct measurements of temperatures in drilled wells in all three oil and gas-bearing regions (Western, Eastern and Southern), the problem of using hydrothermal resources as a priority task has not been considered so far[30]. The current global energy crisis brings both new opportunities and new challenges for renewable energy. The natural energy sources of the environment include the heat of atmospheric air, water of rivers, seas, topsoil and groundwater.

The use of geothermal, hydrothermal and aerothermal energy in Ukraine are promising directions for the development of alternative energy sources, since our country is a member of the Energy Community, and in accordance with the accepted obligations in 2020, the mandatory share of renewable energy in the total structure of energy consumption should have been 11%. Such obligations are dictated by the provisions of Directive 2009/28/EU on the promotion of the use of energy produced from renewable sources, the plan of measures for the implementation of which was approved by the order of the Cabinet of Ministers of Ukraine in 2014[31]. However, the process of development of renewable energy is very slow, because the share of energy produced from renewable sources in the total amount of energy as of the beginning of 2020 was 8.1%, and at the end of 2020, it was only about 9.2%. The main indicators of the development of renewable energy are the volume of electricity generation and the annual indicator of the introduction of new capacities.

Geothermal energy is energy stored in the form of thermal energy under the solid layer of the Earth's surface. Speaking about hydrothermal energy, some scientists define it as a type of geothermal energy, which is produced due to the heat of water and steam that are deep underground. This heat is produced by the Earth's internal heat sources, including the decay of radioactive elements and the heat of the Earth's molten core, and is harnessed by special power plants and other technologies. One of the main advantages of hydrothermal energy is its reliability and predictability. Like other forms of renewable energy, such as solar and wind energy, hydrothermal energy is constant and reliable, making it an important base-load energy source. In addition, hydrothermal energy is a clean and

[30] Орлов О. О., Омельченко В. Г. Проблема використання гідротермальної енергії землі як альтернативи вуглеводневим джерелам енергоносіїв в Україні. *Розвідка та розробка нафтових і газових родовищ.* 2010. № 1 (34). С. 121–131.

[31] Про Національний план дій з відновлюваної енергетики на період до 2020 року: розпорядження Кабінету Міністрів України від 01 жовтня 2014 року № 902-р. *Офіційний вісник України*. 2014. № 81. Ст. 2298.

renewable energy source with little or no greenhouse gas emissions, making it a greener alternative to fossil fuels[32].

There are several challenges in the development and use of hydrothermal energy. One major challenge is the high upfront costs of building hydroelectric power plants and other infrastructure, which can make it difficult for energy providers to justify the investment. In addition, there are also concerns about the potential environmental impact of hydrothermal energy development, such as possible air and water pollution, and potential disruption of local ecosystems.

Aerothermal energy is based on the transportation of thermal energy from one space to another, thanks to a device called a heat pump, whose function is to transfer heat from the environment by reversing the natural flow of heat. Its main advantages are: it is a natural and inexhaustible energy that does not use fossil fuels; high level of energy efficiency and productivity; return of investments mostly occurs in a short time; no smoke or other waste is produced in the production process, since there is no combustion. Disadvantages of aerothermal energy are: high initial investment in equipment; low performance in very cold climates[33].

The need to comply with and fulfill international obligations in the energy sector, technological development, existing in the civilized world mechanisms for stimulating the development of thermal energy production from natural low-potential sources require the introduction of effective legal regulation in the field of environmental energy use in our country as well[34].

According to the State Agency for Energy Efficiency and Energy Saving of Ukraine, the annual technically achievable energy potential of environmental energy in Ukraine is 12.6 million kW per year, and its use will save about 15.6 billion cubic meters natural gas[35].

The expediency of using aerothermal, hydrothermal and geothermal energy for the production of thermal energy from renewable energy sources in the conditions of Ukraine is emphasized in the draft order of the Cabinet of Ministers of Ukraine "On the National Action Plan for the Development

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[32] Hydrothermal energy URL: https://www.daviddarling.info/encyclopedia/H/AE_hydrothermal_energy.html (дата звернення: 01.07.2023 року)

[33] What is aerothermal energy and what are its advantages and disadvantages? URL: https://www.ketier.com/en/blog/what-is-aerothermal-energy-and-what-are-its-advantages-and-disadvantages/ (дата звернення: 01.07.2023 року)

[34] Заверюха М. М. Енергія довкілля як джерело відновлюваної енергетики: правовий розріз питання. *Юридичний науковий електронний журнал.* 2023. № 7. С. 206-209.

[35] Енергія довкілля / Державне агентство з енергоефективності та енергозбереження України. URL: https://saee.gov.ua/uk/ae/termo-energy (дата звернення: 01.07.2023 року)

of Renewable Energy for the Period Until 2030"[36]. It states that in 2020, the gross final volume of energy consumption from renewable sources in heating and cooling systems was 52,000 tons of the Earth's thermal energy due to heat pumps, including aerothermal – 36,000 tons, geothermal – 10,000 tons, hydrothermal – 6,000 tons. Also, in the draft of this order, it is established that the assessment of the total contribution (final volume of energy consumption) expected for each source of renewable energy to achieve mandatory indicative goals and an indicative intermediate trajectory of achieving the share of energy from renewable sources in heating and cooling systems by 2030 should make up: aerothermal – 460,000 metric tons; geothermal – 160,000 tons per year; hydrothermal – 80 thousand tons per year.

In addition, the National Economic Strategy of Ukraine for the period until 2030, approved by Resolution No. 17 of the Cabinet of Ministers of Ukraine dated March 3, 2021[37], defines as one of the key guidelines in the economic policy of Ukraine the decarbonization of the economy (increasing energy efficiency, development of renewable energy sources, development of circular economy and synchronization with the "European Green Course" initiative). Considering the Economic Development Strategy of Donetsk and Luhansk Regions for the period until 2030, approved by the decree of the Cabinet of Ministers of Ukraine dated August 18, 2021 No. 1078-r[38]. Special attention will be paid to the development of renewable electricity in the Donetsk and Luhansk regions. A favorable area for the development of renewable energy is the exclusion zone of the Chernobyl NPP, which has a developed electric power infrastructure and is located in an energy deficit region.

The analysis of modern energy legislation provides reasons to note that the foundations of legal regulation of environmental energy use are fragmentarily contained in the Law of Ukraine "On Alternative Energy Sources" of February 20, 2003[39], by which aerothermal, geothermal, hydrothermal are classified as renewable energy sources. Certain positive

[36] Проект розпорядження Кабінету Міністрів України "Про Національний план дій з розвитку відновлюваної енергетики на період до 2030 року". URL: https://saee.gov.ua/uk/content/elektronni-consultatsii (дата звернення: 01.07.2023 року)

[37] Про затвердження Національної економічної стратегії на період до 2030 року: постанова Кабінету Міністрів України від 03 березня 2021 р. № 179.*Офіційний вісник України*. 2021. № 22. Ст. 1015.

[38] Про затвердження Стратегії економічного розвитку Донецької та Луганської областей на період до 2030 року: розпорядження Кабінету Міністрів України від 18 серпня 2021 року № 1078-р. *Офіційний вісник України*. 2021. № 75. Ст. 4720.

[39] Про альтернативні джерела енергії: Закон України від 20 лютого 2003 року. *Офіційний вісник України*. 2003. № 12. Ст. 522.

developments in the direction of establishing legal basic principles in this area took place in connection with the adoption of the Law of Ukraine "On Amendments to the Law of Ukraine "On Alternative Energy Sources" regarding classification of heat pumps as equipment that uses renewable energy sources" dated November 1, 2016[40]. The adoption of this Law was conditioned by the need to ensure the fulfillment of the obligations assumed by Ukraine regarding the adaptation of national legislation to the legislation of the Energy Community, in particular Directive 2009/28/EU of the European Parliament and of the Council on the promotion of the use of energy produced from renewable energy sources, namely the regulation the question of whether the energy used by heat pumps belongs to energy from renewable sources.

The innovations made to the Law of Ukraine "On Alternative Energy Sources" were as follows. First, the definitions of the terms: geothermal energy, hydrothermal energy and aerothermal energy were provided (Article 1). All the listed types of energy are energy stored in the form of thermal energy: geothermal energy – under the solid layer of the earth's surface; hydrothermal energy – in surface waters; aerothermal energy – in the air environment. Secondly, aerothermal, hydrothermal or geothermal thermal energy obtained with the help of heat pumps refers to that extracted from renewable energy sources, provided that the final energy output significantly exceeds the primary energy consumption required to operate the heat pumps (article 10).

The calculation of the share of energy produced by heat pumps, with the aim of forming a report for the Energy Community on the progress achieved in the promotion and use of energy from renewable sources, is carried out in accordance with the methodology approved by the order of the Ministry of Regional Development, Construction and Housing of Ukraine dated March 12, 2018 No 52[41]. Heat pumps, depending on the type of heat transfer medium for extracting/returning heat, are divided into classes: "soil-air", "soil-water", "water-air", "water-water", "air-air", "air-water". Directive of the European Parliament and Council 2010/31/EC of May 19, 2010 on the energy performance of buildings (new edition) in clause 18 of Art. 2 defines a "heat pump" as a machine, device or installation that

[40] Про внесення змін до Закону України "Про альтернативні джерела енергії" щодо віднесення теплових насосів до обладнання, яке використовує відновлювані джерела енергії": Закон України від 01 листопада 2016 року. *Офіційний вісник України*. 2016. № 98. Ст. 3179.

[41] Про затвердження Методики обчислення частки енергії, виробленої тепловими насосами з відновлюваних джерел: наказ Міністерства регіонального розвитку, будівництва та житлово-комунального господарства України від 12 березня 2018 року. № 52. *Офіційний вісник України*. 2018. № 34. Ст. 1210.

transfers heat from a natural medium such as air, water or soil to buildings or for industrial applications by changing the direction of the natural flow of heat so that it flows from a lower temperature to higher[42]. Thus, aerothermal heat pumps use air as a low-potential source (the most common in Europe), water heat pumps use the water energy of natural and artificial reservoirs, and geothermal heat pumps are based on the use of soil and groundwater energy. At the same time, despite the obvious advantages, heat pump technologies have not yet found proper distribution in Ukraine[43].

Clause 31 of Directive 2009/28/EC of the European Parliament and of the Council of April 23, 2009 on the promotion of the use of energy produced from renewable sources and which amends and subsequently repeals Directives 2001/77/EC and 2003/30/EC, it is informed that heat pumps that allow the use of aerothermal, geothermal or hydrothermal thermal energy at the appropriate temperature level require electricity or any other auxiliary energy for their operation. Therefore, the energy used to operate heat pumps must be deducted from the total heat energy used. Only heat pumps should be taken into account, the performance of which significantly exceeds the amount of primary energy resources required for their operation[44].

Regarding the Law of Ukraine "On the Electric Energy Market" dated April 13, 2017[45], there are certain inconsistencies with the Law of Ukraine "On Alternative Energy Sources". The fact is that the Law of Ukraine "On the Electric Energy Market" does not include such types of energy as hydrothermal and aerothermal, which creates a certain legal conflict. In the Law of Ukraine "On Energy Lands and the Legal Regime of Special Zones

[42] Директива Європейського Парламенту і Ради 2010/31/ЄС від 19 травня 2010 р.про енергетичні характеристики будівель (нова редакція). *Офіційний вісник Європейського Союзу.* 2010. L 153. стор. 13.

[43] Платонова Є. О. Правові аспекти використання енергії довкілля України в умовах євроінтеграції. *Європейський вибір України, розвиток науки та національна безпека в реаліях масштабної військової агресії та глобальних викликів XXI століття (до 25-річчя Національного університету "Одеська юридична академія" та 175-річчя Одеської школи права):* у 2 т.: матеріали Міжнар. наук.-практ. конф. (м. Одеса, 17 червня 2022 р.) / за заг. ред. С. В. Ківалова. Одеса: Видавничий дім "Гельветика", 2022. Т. 1. С. 644 – 647.

[44] Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/ EC. *Official Journal*. 05.06.2009. L 140.

[45] Про ринок електричної енергії: Закон України від 13 квітня 2017 року. *Офіційний вісник України*. 2017. № 49. Ст. 1506.

of Energy Facilities" dated July 9, 2010[46] there is a mention of geothermal, hydrothermal and aerothermal energy, in particular in Art. 14 provides that alternative energy facilities using renewable energy sources (solar, wind, aerothermal, geothermal, hydrothermal, energy waves and tides, hydropower, biomass energy, gas from organic waste, gas from sewage treatment plants, biogas), regardless of the purpose of such land plots. In addition, in Art. 7 established that the land of energy-generating enterprises includes land plots provided for the location, construction and operation of facilities for the production of electric and thermal energy – nuclear installations and facilities intended for the management of radioactive waste, thermal power plants, thermal power plants, hydroelectric power plants, hydroelectric power plants, wind power plants, power plants using solar energy, geothermal power plants, bioelectric power plants and power plants using other renewable sources of electricity. It can be determined that the legislator includes aerothermal and hydrothermal energy as other renewable sources of electricity generation.

As the scientist M. M. Zaveriukha defines, despite these problems, hydrothermal, geothermal and aerothermal energy has the potential to play a significant role in the transition to a more sustainable and low-carbon energy system. Thanks to the development of technology and a better understanding of the environmental impact of the development of these types of energy, the importance of these renewable energy sources is likely to continue to increase in the coming years[47].

6.3. Legal regulation of hydrogen energy

Climate security is a rather complex category that depends on many factors, in particular, the achievement of climate neutrality throughout the world. Most of the leading countries declared their intentions in this direction, and the most successful in turning the slogan into reality were such leaders as the USA, EU countries, Latin America, China, Japan, and South Korea. The economic activity of these countries is already today characterized by the introduction of new methods and technologies, re-equipment and modernization of production, reduction of negative emissions into the atmosphere in order to prevent its pollution and the occurrence of inevitable consequences. This is largely facilitated by the

[46] Про землі енергетики та правовий режим спеціальних зон енергетичних об'єктів : Закон України від 09 липня 2010 року. *Відомості Верховної Ради України.* 2011. № 1. Ст. 1.

[47] Заверюха М. М. Енергія довкілля як джерело відновлюваної енергетики: правовий розріз питання. *Юридичний науковий електронний журнал.* 2023. № 7. С. 206–209.

transition and comprehensive use of alternative energy sources, in particular, hydrogen in various spheres of social life.

The process of decarbonization of industry, transport, utilities and construction in many developed countries has become possible thanks to the use of hydrogen as an energy source. Experts of the Council on hydrogen technologies (Hydrogen Council) in their recent report claim that "by 2050, hydrogen will be needed for 18% of all energy needs of the world. According to other forecasts, by this time world hydrogen consumption will grow to 370 million tons per year (by 2100 – up to 800 million tons)"[48].

Depending on the variety, hydrogen is characterized by different degrees of environmental friendliness. There are the following types of hydrogen:

– "green" hydrogen is seen as the biggest contributor to global decarbonization. It is obtained from completely ecologically neutral sources: water transformed thanks to alternative energy sources. The main lobbyist for green hydrogen in Europe is considered to be Germany, which has already abandoned nuclear energy and plans to abandon fossil fuels by 2045;

– "black" or "brown" hydrogen – produced on coal, that is, a fossil fuel that harms the environment, accelerates inevitable changes in the surrounding natural environment and gradually recedes into the past;

– "pink" hydrogen, which is produced from nuclear electricity;

– "grey" hydrogen is obtained from natural gas. It is used in more than 90% of the world's production, but it leads to significant emissions of carbon dioxide, which is considered responsible for global warming. Such hydrogen is relatively cheap compared to "green";

– "blue" hydrogen is produced from gas, but CO2 emissions are disposed of. The production of "blue" hydrogen is supported by Norway and the Netherlands[49].

By the end of 2019, the world consumed 75 million tons of hydrogen, mainly in oil refining and ammonia production. More than 3/4 of them are produced from natural gas, for which more than 205 billion cubic meters of blue fuel were consumed. Almost all other hydrogen was obtained from coal. And only 0.1% (100,000 tons) was produced without the use of fossil hydrocarbons. However, in 2020, the total capacity of newly launched electrolyzes for the production of hydrogen on the planet immediately increased several times, although it still amounts to a still insignificant 120 MW of capacity worldwide. However, a real breakthrough may occur in the

[48] Перспективи використання водню та роль України в Європейській водневій енергетичній революції. URL: http://www.atomforum.org.ua/publications/articles/2020/perspektivi_vikoristannya_vodnyu_ta_rol_ukrayini_v_yevropejskij_vodnevij_energetichnij_revolyuciyi (дата звернення: 01.07.2023 року)

[49] Воднева енергетика в Україні : веб-сайт. URL:https://saee.gov.ua/sites/default/files/3_Repkin_24_11_2020.pdf (дата звернення: 01.07.2023 року)

coming years. For comparison: Germany alone plans to build 3 to 10 GW of electrolyzes by 2030. It is planned that this will reduce Europe's dependence on fossil energy sources, reduce the level of carbon dioxide emissions into the atmosphere by 50% and significantly reduce the cost of fuel and energy carriers[50].

The advantages of hydrogen energy on the global energy market today include the following factors:

– hydrogen can be produced from ordinary water by electrolysis, electricity for which is also taken from alternative sources: wind, sun, biomass. This makes such an energy resource completely ecologically neutral;

– hydrogen can be used as a means of storing excess electricity produced from renewable media when its availability exceeds demand. For example, with the help of hydrogen, energy is accumulated and stored, which due to certain circumstances is not consumed in full. Instead, it is processed into hydrogen, which can be stored for years in salt caves or gas storage, just as natural gas is currently stored. And when energy from renewable sources is not enough, this hydrogen is used either to produce electricity or as gas.

The use of hydrogen, in addition to its positive aspects, also has its drawbacks:

– hydrogen is much more explosive than natural gas. In addition, it very easily penetrates metals, destroying them. Hence the problems associated with transportation, and hence the additional costs of the infrastructure, which must be in perfect condition to be used for such purposes;

– the cost of hydrogen is the second problem of this alternative energy source. Experts point out that even the cheapest hydrogen produced in the standard way using the cheapest electrolysis technology will still be more expensive than current market prices for fossil sources. However, over time, technologies will not only develop, but also become cheaper, reducing the cost of alternative energy sources.

With the aim of turning Europe into a climate-neutral continent, improving the welfare of citizens, protecting biological diversity, and greening the economy, on December 11, 2019, the European Green Deal was announced in the EU, which is a set of political initiatives put forward by the European Commission. This document envisages reducing

[50] Перспективи використання водню та роль України в Європейській водневій енергетичній революції. URL: http://www.atomforum.org.ua/publications/articles/2020/perspektivi_vikoristannya_vodnyu_ta_rol_ukrayini_v_yevropejskij_vodnevij_energetichnij_revolyuciyi (дата звернення: 01.07.2023 року)

greenhouse gas emissions by at least 50% by 2030 and up to 55% compared to 1990 levels. The plan is to review each existing law regarding its climate benefits, as well as to introduce new legislation that would facilitate and stimulate the implementation of these transformations and innovations. Unlike a similar set of initiatives introduced in the US and designed to last 10 years, the EU intends to reach net zero within three decades. However, in scientist K.M. Karakhanian opinion, the European Green Deal is not so much about climate policy as it is about the green concept of economic modernization and economic growth, stimulation to ensure human life in harmony with the planet and its resources[51].

This concept of "green" transition was reflected in the adoption of national hydrogen strategies in many leading countries of the world, and on July 8, 2020, a single document was adopted at the EU level. *The European hydrogen strategy* for a climate-neutral Europe is designed to ensure energy efficiency in production and consumption, as well as to contribute to the decarbonization of the latter. An important part of the European energy policy is international cooperation. The EU intends to develop cooperation on renewable electricity and clean hydrogen with neighboring countries and regions to support their clean energy transition and sustainable development. Taking into account the natural resources, interconnectedness of the infrastructure and technological development, the countries of the Eastern and Southern Partnership are named as priority partners of the EU in this case, and Ukraine is named separately. According to the estimates of the European Commission, by 2030 it will be possible to install electrolyzes for the production of hydrogen with a total capacity of 40 GW in the countries of the Eastern and Southern Partnership. It is important that this hydrogen must be produced from renewable energy sources, that is, it must be "green".

The development of hydrogen technologies in Ukraine is an integral component of energy independence, which acts as a guarantee of the state's national security. First of all, Ukraine joins the efforts of the EU regarding this initiative by implementing the principles of sustainable development, reducing greenhouse gas emissions, increasing the use of alternative energy sources, preserving natural ecosystems, protecting the health and well-being of citizens from the consequences of climate change, reducing the production and consumption of energy-intensive products, ensuring the competitiveness of Ukrainian manufacturers and enterprises.

[51] Караханян К. М., Заверюха М. М. Міжнародно-правові аспекти розвитку водневої енергетики та місце України в цьому процесі. *Дніпровський науковий часопис публічного управління, психології, права". 2*022. № 5. С. 72–76.

The European Hydrogen Strategy envisages that every fourth hydrogen generation outside the EU will be produced by Ukraine. At the same time, the European Commission clearly stated that our country is not going to be turned into a commodity appendage as a producer and supplier of "green" hydrogen. The EU is ready to contribute financially and organizationally to the creation of the internal market so that innovative technologies are integrated into the national economy and industry. Thus, in order to enter the European market, Ukraine must provide conditions for the use of hydrogen in transport, in the metallurgical and chemical industries. Germany should provide key assistance in this direction. The two countries signed the "Joint Statement on the Start of Energy Partnership", which will include, in particular, cooperation in the field of hydrogen supplies from Ukraine to Germany, as well as the construction of hydrogen production capacities at Ukrainian hydroelectric power stations.

The main directions of such production are three colors of hydrogen: "blue" from natural gas, "green" from renewable energy sources, and "pink" from nuclear energy. In addition, the export of hydrogen is possible thanks to the use of the national gas transportation system for its transportation to Europe. Therefore, the conversion of the gas transportation network and hydrogen storage facilities will allow Ukraine to maintain its importance as a transit country of energy resources in the 21st century.

The European Green Course creates a wide space for mutually beneficial synchronization of Ukrainian policy and legislation with relevant EU legislation, as well as cooperation between Ukraine and the EU in key areas of the energy complex. "Hydrogen, as an ecologically clean source of energy, has a chance to achieve not only climate neutrality, but also to ensure the growth of our country's economy, get rid of energy dependence and be a worthy player on the international stage. As experts note, hydrogen energy in the world is a large competitive market with a geopolitical component[52].

Since 2020, the Government of Ukraine, with the support of the United Nations Economic Commission for Europe, has been working on the Road map for the development of the domestic hydrogen market, as well as the preparation of the Concept of Hydrogen Energy and legislation for the effective functioning of the latter. Our country actively participated in the use of alternative energy and began to modernize its own industries, paying significant attention to hydrogen energy. In 2021, the Ministry of Energy of

[52] Воднева енергетика – можливість для України стати потужним гравцем на міжнародній енергетичній арені. URL: https://www.kmu.gov.ua/news/vodneva-energetika-mozhlivist-dlya-ukrayini-stati-potuzhnim-gravcem-namizhnarodnij-energetichnij-areni. (дата звернення: 01.07.2023 року)

Ukraine developed a project of the Road map for the production and use of hydrogen in Ukraine, which was intended to become the basis for the development of the Hydrogen Strategy of Ukraine and to promote the creation of hydrogen energy as a new energy subsector of the country. The latter, through the implementation of the latest technologies, the creation of domestic scientific, scientific and technical, technological and production infrastructure, will gradually provide a significant share of the needs of the energy and transport industries of Ukraine in environmentally clean energy.

The road map for the production and use of hydrogen envisages the concept of using hydrogen in the energy, transport, and industrial sectors of the economy. In addition, three stages of formation of the specified industry are defined. In the short term, it is predicted to transport hydrogen in a gaseous state in tanks – with the help of trucks. In the medium-term "horizon" – the transportation of liquid hydrogen by railways and water transport (in particular, along the Danube River, which can be a source of fresh water for electrolysis). And in the long term, the use of gas pipeline infrastructure for transporting synthetic gas in large volumes, including for export [53].

A detailed analysis of the document shows that, despite all its positive and progressive achievements, the Road map does not contain a specific plan, detailed budget and investment calculations, technological documentation, or even more technical standards and regulations. It is more like a "declaration of cooperation", which should be detailed both in regulations and in technical and estimate documents. Another shortcoming of this act is that it does not take into account a complex set of negative factors that may make it impossible to implement hydrogen energy in our country within the next 10 (if not 20) years. Among the latter, the following can be named:

– the high cost of production, which is that while emphasizing the positive environmental effect of hydrogen, at the same time, we should not forget that from an economic point of view, this segment is currently too expensive. Hydrogen energy requires significant financial infusions and currently appears to be a loss-making sector compared to other alternative energy carriers, not to mention fossil sources;

– in order for hydrogen to truly be an ecological energy resource, it must be produced by electrolysis using renewable energy sources. However, the most important problem in this context is the lack of large capacities of renewable energy and places for the accumulation and storage of hydrogen

[53] Граждан О. Воднева енергетика: чому про неї так багато говорять і до чого тут Україна. URL: https://ucap.io/vodneva-energetyka-chomu-pro-neyi-tak-bagato-govoryat-i-do-chogo-tut-ukrayina/ (дата звернення: 01.07.2023 року)

energy. In Ukraine, the role of maneuverable capacities is performed by coal-fired thermal power plants, which, according to statistics, are the biggest polluters of the environment. Therefore, under such circumstances, the production of "green" hydrogen is hardly justified and realistic;

– even "environmentally clean" electrolysis technology for energy hydrogen production is associated with significant emissions of carbon dioxide, which will only worsen the environmental situation. Thus, the development of hydrogen energy is impossible without the introduction of effective carbon utilization or processing technologies. At present, methods of injecting carbon dioxide "underground" are used abroad (so far on a limited scale) – in particular, to wells left over from oil and gas extraction, saline and coal layers that have lost their industrial value. There is another way: using carbon dioxide as a raw material for obtaining useful oxygen-containing compounds. However, the widespread use of this technology, again, requires strong investments, which are currently insufficient;

– the unsatisfactory condition of the gas transportation system, which should be used for the transportation of energetic hydrogen. European experience shows that such objects can function normally only if they are in proper technical condition, because due to volatility and low atomic mass, hydrogen slips through the smallest cracks and is explosive[54].

With the aim of developing hydrogen energy on a par with EU countries, using the existing gas transportation system, determining the logistics capabilities of the country, as well as supplying energy produced from hydrogen to industrial and household consumers in 2021, the process of preparing the Hydrogen Strategy of Ukraine was started. This document was supposed to become the basis for achieving energy independence of the country and international cooperation, especially with the USA.

In December 2021, the presentation of the country's Hydrogen Strategy project took place: "Hydrogen Country. Energy revolution", the authors of which were the Ukrainian Hydrogen Council and the Institute of Renewable Energy of the National Academy of Sciences of Ukraine. This document contains a complete list of measures that are necessary for the green transformation of the country. In addition, it is emphasized that the production and export of hydrogen will contribute to the attraction of investments in the national energy, industry and transport sector. At the same time, the State budget will be able to receive considerable revenues, and Ukrainians – thousands of new jobs. The immediate goal of the

[54] Тітамир О. Воднева енергетика в Україні: лише на рівні розмов, а чи реально? URL : https://www.ukrinform.ua/rubric-economy/3315760-vodneva-energetika-v-ukraini-lise-na-rivni-rozmov-a-ci-realno.html (дата звернення: 01.07.2023 року)

Hydrogen Strategy of Ukraine should also be the development of a regulatory framework for the regulation of the hydrogen energy sector, as well as the transformation of Ukraine into a leader in hydrogen technologies by 2030, and into a hydrogen hub of Europe by 2050[55].

From February 24, 2022, due to the military aggression of the Russian Federation against Ukraine, the implementation of the specified projects and plans was temporarily suspended. The primary task of the post-war reconstruction of the country should be energy security, where "green" transformation will be a priority direction. In addition, the energy sector should develop on European principles and values, priority among which is the preservation of the natural environment and sustainable development of society, including through the use of hydrogen technologies. The final revision and adoption of the Hydrogen Strategy of Ukraine should determine the ways of development of hydrogen technologies and the corresponding infrastructure in all spheres of the economy, outline plans and sources of financing in the following directions. According to scientists, the mandatory components of the Strategy should be:

1) the issue of the volume of hydrogen production in Ukraine for the needs of the domestic market and export;

2) criteria for the development of hydrogen energy infrastructure (production of own electrolyzers and other equipment);

3) development of the hydrogen accumulation, storage and transportation system (use of the gas transportation system, construction of gas holders, etc.);

4) conversion of municipal transport to hydrogen (production of fuel cells);

5) application of hydrogen technologies in the field of heavy industry.

An important aspect of the development of the national hydrogen market is the inclusion of this area in the list of National programs of the project of the Recovery Plan of Ukraine, on which the post-war reconstruction process will be based. The volume of future investments in the national program "Energy Independence and Green Course" is currently estimated at 130 billion dollars. In particular, it envisages increasing the power of "green" energy by 3 times – up to 30 GW. In addition, 15 GW of electrolysis

[55] До 2050 року Україна стане водневим хабом Європи: презентовано Водневу стратегію України. URL: https://hydrogen.ua/ua/novyny/1519-do-2050-roku-ukrajina-stane-vodnevim-khabom-evropi-prezentovano-vodnevu-strategiyu-ukrajini#:~:text=Найближчою%20метою%20Водневої%20стратегії%20України,початок%(дата звернення: 01.07.2023 року)

capacity for the production of "green" hydrogen will be built, and hydrogen transport infrastructure will be tested and expanded[56].

Ukraine's participation in the transition to hydrogen technologies will give the country a chance to rebuild the destroyed energy system, for which renewable generation and the attraction of new investments are important. In January 2023, the Vice-President of the European Commission, Frans Timmermans, together with the country's top political leadership, discussed the energy sustainability of Ukraine and agreed that its post-war reconstruction should be based on the principles of the European Green Deal, as it has high indicators of alternative energy that can be used to reduce European dependence from Russian fossil fuels. During the meeting, clear rules for the production of hydrogen as a leading "green" energy carrier were discussed. Together with representatives of the hydrogen and energy sectors of Europe, the "Timmermans Recovery Plan" was developed[57]. This Plan will help rebuild Ukraine with an emphasis on its renewable energy sources and ability to become a major player in the hydrogen sector. The plan includes the following issues:

a) post-war restoration of Ukraine's energy infrastructure;

b) production of hydrogen from alternative sources and ammonia, the reserves of which are available on the territory of the state;

c) storage and transportation of hydrogen intended to meet EU needs;

d) development of national sectors of the economy, in particular, transport, industry, which are adjacent to the energy sector;

e) involvement of Ukraine in large investment "green" projects as an equal player.

In February 2023, Ukraine and the EU signed a Memorandum of Strategic Partnership in the field of renewable gases. The last ones are hydrogen and biomethane. Thanks to the Memorandum, Ukraine can become a key supplier of hydrogen for Europe and thereby improve its economic situation and ensure its energy independence. As experts note, "the great war and the lack of a legislative basis should have completely stopped the introduction of hydrogen technologies in Ukraine. Instead, Ukrainian business continues to persistently put hydrogen facilities on the country's energy map"[58].

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[56] Проєкти нацпрограми. URL: https://recovery.gov.ua/project/program/energy-independence-and-green-deal (дата звернення: 01.07.2023 року)

[57] План Тіммерманса по відбудові України. URL: https://hydrogen.ua/ua/novyny/1646-plan-timmermansa-po-vidbudovi-ukrajini (дата звернення: 01.07.2023 року)

[58] Рєпкін О. Україна увійшла до світової системи водневих долин. URL: https://www.epravda.com.ua/columns/2023/06/8/700973/(дата звернення: 01.07.2023 року)

6.4. European hydrogen strategy: definition, tasks, institutions for implementation

The use of fossil fuels causes up to 73% of all greenhouse gases in the world to enter the atmosphere. The energy and transport sectors, which operate mainly on coal, gas and oil, are priorities for reform. Therefore, the fulfillment of the objectives of the European Green Course will be facilitated by an increase in the share of renewable energy sources, as well as the production of new generation energy carriers with their help, in particular, hydrogen. Hydrogen is expected to transform the economy in four major application areas: transportation, industry, energy, and utilities. This includes industrial hydrogen production, storage, transportation and power supply, clean energy for buildings, and heating and cooling.

This concept was reflected in the adoption of national hydrogen strategies: in Japan (2017), South Korea (2019), New Zealand (2019), Australia (2019), the Netherlands (2020), Norway (2020), Portugal (2020), Germany (2020), France (2020), and on July 8, 2020, a single document was adopted for the entire EU – the European Hydrogen Strategy or, as it is also called, the Hydrogen Strategy for a Climate Neutral Europe.

The purpose of this document is to initiate a new technological revolution in Europe. The main priority of the Strategy is promoting the use of "green" renewable hydrogen, decarbonization of production, as well as supporting the European industry in the construction of capacities for the production of the latter. It is planned to replace carbon-based energy carriers and by 2050 to turn Europe into the first continent where emissions of greenhouse gases into the atmosphere will not exceed the volume absorbed by the ecosystem.

The strategy contains a road map that provides for three phases of the transition to full-scale production and use of pure hydrogen:

– 2020-2024: it is planned to install pure hydrogen electrolyzes with a capacity of 6 GW and produce 1 million tons of hydrogen; carry out decarbonization of existing hydrogen production from fossil sources;

– 2025-2030: hydrogen should become an integral part of the integrated energy system, there will be a need for its long-distance transmission; the installed capacity of pure hydrogen electrolyzes should reach 40 GW, and its production should reach 10 million tons;

– 2030-2050: pure hydrogen should become a self-sufficient and widespread energy carrier, which should be combined with significant development of renewable sources of electricity.

At the first stage of the implementation of the Strategy in the EU, the European Clean Hydrogen Alliance was created, which includes government bodies, public agencies, research centers, financial institutions,

leading European energy and industrial companies, and public organizations. The purpose of the Alliance's action is the implementation of the European Hydrogen Strategy, as well as the discussion of investments in the infrastructure of the hydrogen economy throughout Europe, the volume of which may reach 430 billion euros by 2030. In 2021, Ukraine joined the European Pure Hydrogen Alliance.

In addition to the road map, the Strategy contains the following tasks:

– promoting investments in the hydrogen sphere, in particular, through the use of funds from the EU and the European Clean Hydrogen Alliance (only in the field of hydrogen production, the expected need for investments is 180-470 billion euros by 2050);

– support for the production and consumption of pure hydrogen, including transportation and final consumption (oil refining, steel, ammonia, truck and rail transport, synthetic fuels);

– standardization and certification;

– development of infrastructure (networks) and market rules for pure hydrogen;

– promotion of research and innovation;

– international energy cooperation, in particular, with Ukraine.

It is international cooperation that is designed to ensure the implementation of the Strategy, since the production of only half of the required volume of hydrogen is planned in the EU countries, the rest must be imported to Europe, including from Ukraine. According to the estimates of the same Institute of Renewable Energy of the National Academy of Sciences, our state has the potential to produce more than 500 billion cubic meters of "green" hydrogen per year. This should be enough for both domestic needs and exports.

DOI https://doi.org/10.36059/978-966-397-417-0-7

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CHAPTER 7. USE OF ALTERNATIVE ENERGY SOURCES IN INTERNATIONAL LEGAL PROCESSES

7.1. Global prerequisites of the energy transition

The modern world is engulfed by a number of complex crises, of which the climate crisis is of existential importance, and therefore the most threatening. The active search for ways to counter the rapidly approaching ecological catastrophe has led developed countries to realize that it is time to change the usual trajectory of human civilization development. Today, society is on the verge of fundamental changes in its usual way of life, and this did not happen unexpectedly. Over the course of several decades, two fundamental currents were formed in the doctrine, which completely oppositely portrays the exit of civilization from the climate crisis: the concept of green growth (green growth) and the concept of anti-growth (degrowth).

The discourse on *green growth* was initiated by international organizations, mainly the UN, the OECD and the World Bank. The concept of green growth was officially proposed during the Fifth Ministerial Conference on Environment and Development, held in March 2005 in Seoul, when 52 governments of Asia and the Pacific agreed to follow the "Green Growth" path [1]. Since then, green growth has been considered the most acceptable solution to stop the degradation of the natural environment [2]. In 2008, the UN Environment Green Economy Initiative was launched[3]. The EU followed this path at one time, because ten years ago in a number of program documents (Strategy "Europe 2020", Biodiversity Strategy to 2020, Roadmap to an energy-efficient Europe) the European Commission

[1] D'Souza R. Green growth: Ideology, political economy and the alternatives. *Strategic Analysis.* 2017. Vol. 41. P. 204–206.

[2] Sandberg M., Klockars K., Wilén K. Green growth or degrowth? Assing the normative justifications for environmental sustainability and economic growth through critical social theory. *Journal of Cleaner Production.* 2018. Vol. 206. P. 133–141; Loiseau, E., Saikku L., Antikainen R., Droste N., Hansjürgens B., Pitkanen K., Leskinen P., Kuikman P., Thomsen M. Green economy and related concepts: An overview. *Journal of Cleaner Production.* 2016. Vol. 139. R. 361–371.

[3] Ossewaarde M., Ossewaarde-Lowtoo R. The EU's Green Deal: A Third Alternative to Green Growth and Degrowth? *Sustainability.* 2020 Vol. 12. R. 9825.

presented its green growth strategy as a way to overcome the financial crisis with the help of green incentives , environmental policy and green innovations. The appeal of the idea of green growth is that environmental protection is seen as a high-return investment opportunity rather than a costly constraint[4]. Green growth strategies consist of the coordination of economic activity and environmental problems[5]. That is why the concept of green growth was very liked and actively accepted by the existing political institutions, since it did not require a change in the state system and political and economic structures, which are mostly strongly connected with "brown" production. The discourse of green growth is based on the belief that economic growth can be "decoupled" from violence against the natural environment, and that it is possible without excessive exploitation of natural resources[6]. These have not been confirmed in practice, as empirical scientific studies prove that economic development in the direction of increasing GDP and real income per capita inevitably leads to an increase in the consumption of energy and natural resources[7]. That is, the concept of green growth has demonstrated its inability to solve the deep crisis facing

[4] Loiseau, E., Saikku L., Antikainen R., Droste N., Hansjürgens B., Pitkanen K., Leskinen P., Kuikman P., Thomsen M. Green economy and related concepts: An overview. *Journal of Cleaner Production.* 2016. Vol. 139. R. 361–371; Bowen A., Frankhauser S. The green growth narrative: Paradigm shift or just spin? *Global Environmental Change.* 2011 . Vol. 21. R. 1157–1159; MacArthur JL , Hoicka CE , Castleden H. , Das R., Lieu J. Canada's Green New Deal: Forging the socio-political foundations of climate resilient infrastructure? *Energy Research & Social Science* . 2020. Vol. 65 . URL: https://www.sciencedirect.com/science/article/pii/ S2214629620300190 ?via%3Dihub (access date: 02/10/2021); Rosenbaum E. Green growth – Magic bullet or damp squib? *Sustainability.* 2017. Vol. 9. R. 1092; Vazquez-Brust D., Smith AM, Sarkis J. Managing the transition to critical green growth: The green growth state. *Futures.* 2014. Vol. 64. R. 38–50.

[5] Bowen A., Hepburn C. Green growth: An assment. *OxfordReview of Economic Policy*. 2014. Vol. 30. Issue 3. R. 407–422; Wanner T. The new "passive revolution" of the green economy and growth discourse: Maintaining the "sustainable development" of neoliberal capitalism. *New Political Economy.* 2015. Vol. 20. R. 21–41.

[6] Machin A. Changing the story? The discourse of ecological modernization in the European Union. *Environmental Politics.* 2019. Vol. 28. R. 208–227; Sandberg M., Klockars K., Wilén K. Green growth or degrowth? Assing the normative justifications for environmental sustainability and economic growth through critical social theory. *Journal of Cleaner Production.* 2018. Vol. 206. P. 133–141; Loiseau, E., Saikku L., Antikainen R., Droste N., Hansjürgens B., Pitkanen K., Leskinen P., Kuikman P., Thomsen M. Green economy and related concepts: An overview. *Journal of Cleaner Production.* 2016. Vol. 139. R. 361–371.

[7] Simionescu M., Pauna Carmen Beatrice, Diaconescu T. Renewable Energy and Economic Performance in the Context of the European Green Deal. *Energies.* 2020. Vol. 13. R. 6440.

humanity. Green capitalism can be compared to cosmetic repairs, while human activity on the planet requires capital repairs.

The antagonistic concept, the idea *of anti-growth (degrowth),* is much more radical, and therein lies the reason that it still remains untested. While the discourse on green growth assumes an economy that, developing upward, should become more ecological, the discourse on anti-growth questions the very model of growth and perceives it as ecologically irresponsible[8]. The main idea of this ideological trend is that without a deep correction of the chosen course, industrial societies will suffer more and more from growing environmental crises[9]. Apologists of the concept of degrowth call for abandoning the growth of the economy, from the current level of consumption – that is, their main idea is the need for a total reduction of human activity on the planet, a conscious reduction of the needs of humanity, the satisfaction of which pushes the economy to constantly increase production volumes. For example, a group of scientists calculated that " the growth of economic activity leads to an increase in emissions and at the same time cancels out the positive impact of green energy." These results prove the need for significant changes in legislation aimed at reducing emissions, as green energy alone is not enough to achieve this goal[10]. " There are interesting studies that support the thesis about the need to establish strict growth limits, without which greening initiatives will be completely ineffective and ineffective[11].

In our opinion, despite serious scientific arguments, the concept of anti-growth is known to be a loser and doomed to opposition. This is explained by the fact that, having adopted it, the government of any state will inevitably face: a) "Resistance from its own society (or at least part of it), because the implementation of the ideas of degrowth directly entails a decrease in the standard of living and comfort; b) business resistance, as artificial inhibition of economic development is perceived as hostile behavior. In today's world, which is imbued with ideas of competition, national protectionism, non-tariff barriers, trade ties, etc., retarding the

[8] Ossewaarde M., Ossewaarde-Lowtoo R. The EU's Green Deal: A Third Alternative to Green Growth and Degrowth? *Sustainability.* 2020 Vol. 12. R. 9825.

[9] Rowe JK The Green New Deal, Decolonization, and/as Ecocritique. *New Political Science.* 2020. Vol. 42. Issue 4. P. 624–630.

[10] Pilatowska M., Geise A., Wlodarczyk A. The Effect of Renewable and Nuclear Energy Consumption on Decoupling Economic Growth from CO2 Emissions in Spain. *Energies.* 2020. Vol. 13. Issue 9.

[11] Cox S. That green growth at the heart of the Green New Deal? It's malignant. *Counterpunch.* 2019. URL: https://www.counterpunch.org/2019/01/17/that-green-growth-at-the-heart-of-the-green-new-deal-its-malignant/ (access date: 12.02.2021)

development of a certain single country will be politically considered as treason. Of course, no political force will commit such suicide.

However, climate problems await their solution, and therefore a third alternative concept appeared, which was called *the Green Deal* (by analogy with Theodore Roosevelt's New Deal, which brought the USA out of the Great Depression of the 1930s). The main idea of the Green Deal is a large-scale structural restructuring of the economy on ecological grounds. In contrast to the concept of green growth, the Green Deal does not simply involve the introduction of innovative green technologies at enterprise – it involves a structural change and a complete renewal of the energy industry, significant quantitative changes in the management of agriculture and industry, the withdrawal of significant areas from economic use and their active afforestation and /or transformation into nature reserves. That is, the scale and depth of transformations proposed by the concept of the Green Deal are much greater than those proposed by its predecessor, the concept of green growth.

At the same time, it has some similar features to the ideological basis of the concept of degrowth – they can be traced in strict limits on emissions, the prospective cessation of the use of fossil fuels, etc. However, there are two fundamental differences between the Green Deal and degrowth concepts:

1) *social* – an integral component of the Green Deal is not only the preservation of the standard of living and comfort of the middle class during all environmental transformations but also the improvement of the standard of living of the poor and the reduction of social inequality in society. The ideas of the Green Deal are aimed at realizing a double goal: on the one hand, prosperity for all members of society, and on the other hand, overcoming negative manifestations of anthropogenic influence (including floods, droughts, desertification, heat waves, diseased environment, mass extinction, habitat degradation and destruction of food supply systems)[12]. If the concept of degrowth puts irresponsible behavior and the consumerist model of the existence of the middle class at the center of environmental problems, the concept of the Green Deal tries to establish the priority of ecology without loss of well-being. It is because of this that critics believe that the Green Deal is simply "another vision of citizen apathy, which is combined with expert activity to keep things as usual[13]. " Nevertheless, the

[12] Ossewaarde M., Ossewaarde-Lowtoo R. The EU's Green Deal: A Third Alternative to Green Growth and Degrowth? *Sustainability.* 2020 Vol. 12. R. 9825.

[13] Timothy WL A Green New Deal: Why Green, How New, and What is the Deal? *Critical Policy Studies.* 2009. Vol. 3. Issue 1. R. 14–28.

social component of the Green Deal is extremely important, as it is declared that "citizens are and must remain the driving force of the transition" [14];

2) *economic* – if the concept of degrowth insists on the need to curtail human economic activity, then the concept of the Green Deal aims at the further development of the economy and even its growth, but already on other, climate-neutral, stable conditions. Foreign researchers conclude that the Green Deal is based on the belief that the environmental crisis can be overcome with the help of green technologies without any reduction in growth, that is, without harming prosperity and a stable standard of living of the middle class[15].

So, based on the approbation of the concept of green growth in some developed countries of the world over the last decade, its half-hearted, and therefore insufficient, impact on solving the problems of sustainable development was clearly demonstrated. Based on the results obtained (including the progression of climate change and increasing climate injustice), it became clear that green growth is not capable of solving the existing problems. That is why this idea was replaced by the latest Green Deal concept, which is currently at various stages of implementation in some countries of the world. Analyzing this process, it should be recognized as not just another ecological flirtation – the Green Deal concept is the embodiment of a new global trend that will only gain momentum and further spread. In this connection, domestic science faces an important question about the impact of this trend on Ukraine and the place of our state in this process, which will be discussed in the following subsections.

Based on the results of the research, some conclusions can be drawn. First, the Green Deal concept is quickly becoming a global environmental trend, which implies a fundamental change in the paradigm of civilizational development. Ukraine will not be able to avoid this process or only simulate joining it. In addition to its obligations to the world community, Ukraine will be pushed to take appropriate real actions by specific states, whose costs for greening will force them to closely monitor similar actions on the part of Ukraine.

Secondly, the Green Deal concept must be perceived as an ideological basis, the embodiment of the general goal of saving the planet from a climate catastrophe. It is necessary to avoid a simplified understanding of this concept as a certain universal plan of actions, tasks and indicators,

[14] European Commission. The European Green Deal. URL: https :// ec . Europe. eu / info / sites / info / files / european – green – deal – communication _ en . pdf (date of application: 12.02.2021)

[15] Ossewaarde M., Ossewaarde-Lowtoo R. The EU's Green Deal: A Third Alternative to Green Growth and Degrowth? *Sustainability*. 2020 Vol. 12. R. 9825.

which are mandatory for absolutely all countries from Germany to Zimbabwe. In fact, the idea of the Green Deal, refracted through the prism of each country, takes on a unique appearance, forms the individual, most optimal path of each state to the global goal[16].

7.2. International legal regulation of alternative energy

The modern stage of the development of civilization is connected with the satisfaction of the ever-increasing needs of society and the level of the quality of life of the population. This leads to a rapid increase in the consumption of resources on the planet, including energy. The exhaustion and impossibility of reproduction in full of the latter, their use in such a way that negatively affects the surrounding natural environment and worsens the global ecological situation, forces humanity to look for new opportunities to satisfy their needs.

In this regard, the issue of encouraging states to reduce or abandon the use of traditional energy sources and increase the specific weight of energy obtained from alternative (renewable) sources appears on the agenda of the world community[17]. Globalization of the world economy has led to the so-called fourth industrial revolution (or green environmental revolution or energy revolution). All these phenomena are a consequence of the widespread use of alternative energy in the world. It has become not only a popular trend, but also in some places aims to completely replace traditional energy to ensure a balanced development of the economy, energy and ecology. As H. A. Hryhorievar'eva rightly points out, "the active development of alternative energy is more than just another innovation. This is a new way of functioning of the energy system, which has its own characteristics, and potential threats and requires the development of appropriate legal approaches to its regulation[18]".

It is the ecological component and its preservation that is of primary importance, since the disturbance of the climatic balance caused by the emission of greenhouse gas leads to climate change, which is accompanied by powerful hurricanes, dust storms, drought, or, conversely, large-scale

[16] Григор'єва Х. А. Green Deal та Україна: роздуми про правові перспективи. *Екологічне право*. 2021. № 1–4. С. 25–32.

[17] Чумаченко І. Є. Міжнародно-правове регулювання альтернативної енергетики. *Юридичний науковий електронний журнал.* 2021. № 1. С. 143–146.

[18] Григор'єва Х. А. Розвиток альтернативної енергетики як фактор перегляду методологічних засад регулювання аграрних, земельних та екологічних правовідносин. *Актуальні правові проблеми інноваційного розвитку агросфери:* збірник матеріалів наук.-практ. конф. (м. Харків, 20 листопада 2020 р.) / за ред. А. П. Гетьмана, М. В. Шульги, Т. В. Курман. Харків: Юрайт, 2020. С. 130–135.

floods. In this case, it is absolutely necessary to reduce the pressure on ecology and switch to energy sources offered by nature: energy from the sun, wind, water, use of biofuel or biogas,[19]etc.

The energy issue threatens to grow into a major world problem, much more complex and vital than all other "world" problems, including economic, political, social, ecological, food and others, because the basis of real ways to solve them is the question of having sufficient energy resources. The energy sphere is actually recognized as one of the most complex in the modern world, and energy problems require a comprehensive solution in the focus of sustainable development[20].

The world community has decided that there is currently no alternative to the development of renewable energy. In addition, the introduction and use of alternative energy not only reduces greenhouse gas emissions into the atmosphere but also ensures stability in the energy complex by reducing the consumption of traditional minerals (gas, oil, coal, etc.).

At present, it is obvious that the solution of global energy problems is not possible with the help of unilateral efforts of individual countries – the collective efforts of the world community are needed here. At the same time, such joint activity should not prevent the implementation of the principle of state sovereignty over its natural resources[21]. Therefore, a stable mechanism of international legal regulation of the studied relations should contribute to the achievement of the specified goals of ensuring the world's energy security and sustainable ecological development. The national legislation of Ukraine is not isolated from the legal process that takes place at the international level, on the contrary: Ukraine is actively involved in the international legal development of alternative energy. Taking into account the above, it is advisable to single out two main areas of regulation of renewable energy: international contractual and institutional.

International contractual regulation is characterized by the fact that currently there is a large number of international legal acts in the energy sector, in the field of environmental protection, which directly or indirectly

[19] Харитонова Т. Є. Альтернативні джерела енергії в Україні: проблеми та переваги використання. *Актуальні проблеми юридичної науки*: збірник тез Міжнар.наук.-практ. конф. "Дев'ятнадцяті осінні юридичні читання" (м. Хмельницький, 23 жовтня 2020 року). Хмельницький: Хмельницький університет управління та права імені Леоніда Юзькова, 2020. С. 294–295.

[20] Караханян К. М. Особливості правового регулювання альтернативної енергетики в країнах Америки (США, Канада, країни Латинської Америки). *Міжнародний науковий журнал "ІНТЕРНАУКА". Серія: "Юридичні науки"*. 2021. № 1 (35). С. 68–75.

[21] Білоцький С. Д. Міжнародно-правове регулювання у сфері екологічно орієнтованої енергетики: автореф. дис. … докт. юрид. наук: 12.00.11. Київ, 2016. 40 с.

regulate relations in the field of alternative energy. In recently adopted acts at the international level, such as the Rio+20 Declaration of the United Nations (UN) Conference on Sustainable Development (2012), the resolution of the Parliamentary Assembly of the Organization for Security and Cooperation in Europe (OSCE PA) on environmental security (2013), the International Energy Charter (2015), the declaration of the Sustainable Development Summit "Transforming our world: Agenda for sustainable development until 2030" (2015), the Association Agreement of Ukraine with the EU and its member states (2014), the common thread is the idea that activities in the field of energy must meet the needs of sustainable development and the requirements of environmental protection[22].

Many international conferences and programs on environmental protection were devoted to the issue of climate change and possible ways to prevent this process, decarbonization of production. Thus, the UN Conference on the Environment on June 16, 1972 in Stockholm [23]recognized the global nature of environmental problems in the modern world and emphasized the need to create effective international mechanisms for improving the environmental condition. As a result, the Stockholm Declaration on the Environment was adopted, which indicates a close connection between the need to protect the environment and the socio-economic development of mankind[24]. It also defined the main directions and principles of international environmental protection in such areas as rational use of natural resources, preservation of flora and fauna, prevention of environmental pollution (including seas), and management of environmental protection. In addition, the Stockholm Declaration for the first time in the world established some international legal principles, namely: recognition of the human right to live in a favorable environment and the duty to protect it (Principle 1); the principle of the sovereign right of states to develop their natural resources and responsibility for causing damage to the environment of other states (Principle 21); the principle of cooperation in solving environmental problems (Principle 24).

[22] Чумаченко І. Є. Міжнародно-правові аспекти забезпечення розвитку альтернативної енергетики. *Пріоритетні напрямки розвитку правової системи України:* матеріали міжнар.наук.-практ. конф. (м. Львів, 29–30 січня 2021 р.). Львів: Західноукраїнська організація "Центр правничих ініціатив", 2021. Ч. 2. С. 110–113.

[23] Конференція ООН з проблем середовища, оточуючого людину. URL: https://uk.wikipedia.org/wiki (дата звернення: 01.07.2023 року)

[24] Декларація Конференції Організації Об'єднаних Націй з проблем оточуючого людину середовища. Принята Конференцией Организации Объединенных Наций по проблемам окружающей человека среды, Стокгольм, 1972 год. URL: http://zakon3.rada.gov.ua/laws/show/995_454

For the first time, sustainable development and its connection with renewable energy was announced during the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro in June 1992. The result of the event was the adoption of the Declaration, which established the fundamental principles of international cooperation on environmental protection and emphasized the inextricable connection between environmental protection and the vital activities of society[25]. The Rio Declaration on Environment and Development states that, working to preserve, protect and restore the integrity of Earth's ecosystems, states must adopt effective national environmental laws. Another principle of this document is that developed countries recognize the responsibility they bear in the context of international efforts to ensure sustainable development, taking into account their impact on the state of the global environment. The above shows that the problems of energy saving and energy efficiency are a common challenge for all countries of the world, which must jointly develop and implement measures aimed at achieving climate neutrality, including thanks to the use of alternative energy sources.

Another source of international law, directly related to the use of renewable energy resources, is the Resolution of the UN General Assembly "UN Conference on New and Renewable Energy Sources" of 1978. In particular, according to this document, such sources include solar energy, geothermal energy, wind energy, light energy, tidal energy, wave energy and the thermal gradient of the sea, biomass conversion energy, energy obtained by burning fuel wood, charcoal, peat, oil shale, bituminous sandstones, energy from the use of draft animals and hydropower. UN General Assembly Resolution 67/215 of January 21, 2012 is aimed at regulating the issue of increasing the share of alternative energy sources in the global energy balance.

It is worth noting that the sources of international law, including international environmental law, are usually divided into sources of binding "hard law" and "soft law" of a recommendatory nature. Sources of "firm law" include international conventions (international treaties); international customs; general principles of law; binding resolutions; and mandatory standards. The sources of "soft law" are resolutions issued by international institutions and international conferences, court decisions and doctrines of qualified specialists in international law; standards; and recommendations[26].

[25] Декларація Ріо-де-Жанейро щодо навколишнього середовища та розвитку ООН; Декларація, Міжнародний документ від 14.06.1992. URL: http://zakon2.rada.gov.ua/laws/show/995_455

[26] Екологічне право України: навчальний посібник / за ред. проф. І.І. Каракаша, д.ю.н. Т.Є. Харитонової, к.ю.н. А.І. Черемнової, вид. 1-е. Одеса: Гельветика, 2018. 408 с.

"Soft law" is more moral and political, which is why it does not have such a feature as normativity. Therefore, the norms of "soft law" are a specific regulator of social relations between subjects of international law, which, on the one hand, are rules of conduct that do not give rise to legal obligations, and therefore legal responsibility for their violation, and on the other hand – create the basis for the formation of customary law in this area. Note that the majority of international sources in the field of alternative energy consist of the norms of "soft law".

Examples of such acts are the UN Framework Convention on Climate Change[27] and the Kyoto Protocol[28]. The first of these international legal documents emphasizes that all countries, and especially developing countries, need access to the resources necessary to achieve sustainable socio-economic development, and that for developing countries to move towards this goal, their energy consumption should increase taking into account the possibilities of achieving higher energy efficiency and combating greenhouse gas emissions in general, including by using new technologies under conditions that make such use profitable from an economic and social point of view. In addition, the Convention declares the cooperation of countries in many areas, in particular, energy, as well as the possibility of assistance and support to countries whose economies are largely dependent on the consumption or export of fossil fuels and may suffer as a result of reducing the consumption of such energy carriers.

The Kyoto Protocol of 1997 is one of the first treaties that provides for the joint activity of states in the field of alternative energy. The Kyoto Protocol provides for a clean development mechanism, which, according to M.V. Chipko, can be considered as one of the ways to implement renewable energy projects[29]. Note that the protocol contains only one mention of alternative energy sources, namely: clause 1 of Art. 2 (a) provides tasks, including increasing the efficiency of energy use in the relevant sectors of the national economy, conducting research, promoting the implementation, development and dissemination of the use of new and renewable types of energy, carbon dioxide absorption technologies and innovative environmentally safe technologies. However, as noted by I. E. Chumachenko, the absence of mandatory norms for the use of

[27] Рамкова конвенція Організації Об'єднаних Націй про зміну клімату від 09.05.1992 р. *Офіційний вісник України*. 2012. №83. Стор. 198. Ст. 3381.

[28] Кіотський протокол до Рамкової конвенції Організації Об'єднаних Націй про зміну клімату від 11.12.1997. URL: http://zakon2.rada.gov.ua/laws/show/995_801 (дата звернення: 01.07.2023 року)

[29] Чіпко М.В. Міжнародно-правове регулювання співробітництва держав у сфері використання відновлюваної енергетики: дис. … канд. юрид. наук: 12.00.11. Одеса, 2017. 237 с.

alternative energy sources did not prevent the reduction of 45 million tons of carbon dioxide in practice in favor of the use of "clean" technologies[30].

The European Energy Charter of 1991, ratified by Ukraine, was adopted with the aim of unifying the states of Eastern and Western Europe. However, in accordance with the modern realities of the world energy market, it was modernized into the International Energy Charter, since the boundaries of cooperation between countries have long been no longer limited to the Eurasian market. One of the main international legal documents in the field of energy is the Energy Charter Treaty and its Protocol[31].

The issues of energy efficiency and the use of alternative energy sources are enshrined in Art. 19 of the Protocol, according to which the parties to the Treaty pay special attention to increasing energy efficiency, development and use of renewable energy sources, encouraging the use of cleaner types of fuel and the use of technologies and technological means that reduce pollution. Further cooperation between the states within the framework of the Treaty will contribute to the gradual integration of their energy systems, and will also unite their efforts on the way to the faster introduction of the use of "green" energy. One of the principles of achieving climate neutrality contained in the Protocol is the creation of framework conditions that encourage producers and consumers to use energy as economically, efficiently and ecologically as possible, especially by organizing efficient energy markets and more fully reflecting environmental costs and benefits.

The legal analysis of the specified documents shows that despite the non-specialized nature of the norms of the Energy Charter Treaty and the Protocol to it, their general focus on improving energy efficiency and environmental cleanliness of energy resources stimulates the use of renewable energy sources.

It is worth noting that despite the existence of numerous normative acts of an international legal nature in the field of alternative energy, there is still no single comprehensive document on energy issues. Analysis of the actual prerequisites allows us to state that such a situation is completely natural. This is explained by the synergistic effect of several important factors: a) *a significant economic gap between countries* (greening, including in the form of alternative energy, requires quite significant capital investments, which not all countries can afford); b) *different starting conditions of the energy*

[30] Чумаченко І. Є. Міжнародно-правове регулювання альтернативної енергетики. *Юридичний науковий електронний журнал.* 2021. № 1. С. 143–146.

[31] Договір до Енергетичної Хартії та Заключний акт до неї. URL: https://zakon.rada.gov.ua/laws/show/995_056 (дата звернення: 01.07.2023 року)

transition (the interests of countries differ significantly depending on their possion of energy resource reserves – in particular, fossil fuel-poor countries carry out legal incentives for alternative energy much more easily and more actively; and also depending on the level of greenhouse gas emissions that these countries produce); c) *significant cultural and socio-economic differences between countries* (energy transition is impossible without mass support of society, while awareness of climate changes and their dangers, awareness of the need for decarbonization as soon as possible strongly depends on the level of education of society, the level of its environmental and legal culture).

The institutional direction in the mechanism of international cooperation in the alternative energy sector is manifested in the functioning of international and regional intergovernmental organizations.

Thus, *the International Energy Agency (IEA),* which is an intergovernmental organization established in Paris in 1974 by a decision of the Organization for Economic Cooperation and Development (OECD), makes a significant contribution to stimulating the use of renewable energy sources in the world. Within the framework of the IEA, a department of alternative energy was created, which promotes the cooperation of participating countries in this field by exchanging experiences between them. Working agreements on renewable energy sources, under which IEA platforms aimed at the development of alternative energy have been created, include: bioenergy (Bioenergy IA), solar energy and chemical energy systems (SolarPACES IA), dissemination of renewable energy technologies (RETD IA), research geothermal energy and technologies (Geothermal IA), research and development of hydrogen production and use (Hydrogen IA), hydropower technologies and programs (Hydropower IA), ocean energy systems (OES IA), photovoltaic energy systems (PVPS IA), research and development of solar heating and cooling (SHC IA) and wind energy systems (Wind IA).

The International Renewable Energy Agency (IRENA), which began functioning in 2011, occupies a key place among international organizations whose activities are aimed at stimulating the development of alternative energy. According to Art. Art. II and III of the Charter, the goals of IRENA include promoting the spread, active implementation and continuous use of all types of renewable energy obtained on a sustainable basis from renewable energy sources. Achieving these goals is possible by promoting information exchange, scientific and technological cooperation, financial support for renewable technologies, and coordination of cooperation between member states and other organizations in the field of renewable energy.

Currently, IRENA acts as a center for the improvement of technologies in the field of renewable energy, promotes mutual exchange of knowledge, transfer of relevant technologies, dissemination of practical tools and recommendations aimed at accelerating the implementation of environmentally clean, sustainable energy for the growing needs of the population. IRENA decisions are advisory in nature and do not have legal force, but this does not diminish their importance for sustainable development. IRENA became not only a center of global experience in the use of renewable energy sources, but also an incentive to build strong partnerships in the field of alternative energy. On December 5, 2017, the Law of Ukraine "On Ukraine's Accession to the Charter of the International Renewable Energy Agency (IRENA)" was adopted [32].

of the Energy Community (hereinafter referred to as EC) cannot be overlooked. The Treaty on the Establishment of the EU was signed on October 1, 2005 in Athens (Greece), which entered into force in July 2006. The purpose of the creation of the EU was to spread the rules and principles of the EU internal energy market to South-Eastern Europe, the Black Sea region and other countries. The goals of the EU are to create a stable market structure capable of attracting investments in the production of electricity and networks, the creation of an integrated energy market that will allow for cross-border energy trade, ensuring a stable and continuous energy supply, which is necessary for the economic development and social stability of countries, improving the environmental situation in relation to energy supply in the region and promoting the use of renewable energy sources. The EU considers the use of renewable energy sources as one of the ways to achieve energy security [33].

On February 1, 2011, Ukraine became a full member of the EU and undertook to implement the main acts of EU energy legislation into national legislation. The Protocol on the Accession of Ukraine to the Treaty on the Establishment of the EU was signed in September 2010 and ratified by the Law of Ukraine dated December 15, 2010 "On the Ratification of the Protocol on the Accession of Ukraine to the Treaty on the Establishment of the Energy Community"[34]. Ukraine's accession to the EU provided

[32] Про приєднання України до Статуту Міжнародного агентства з відновлювальних джерел енергії (IRENA): Закон України від 5 грудня 2017 року. *Відомості Верховної Ради України*. 2018. № 2. Ст. 6.

[33] Чумаченко І. Є. Роль міжнародних організацій у сфері розвитку альтернативної енергетики. *Інтеграція освіти, науки та бізнесу в сучасному середовищі: зимові диспути:* тези доп. II Міжнар.наук.-практ. інтернет-конф. (Дніпро, 4–5 лютого 2021 р.). Дніпро, 2021. Т.2. С. 427–429.

[34] Договір про заснування Енергетичного Співтовариства від 25.10.2005 р. *Офіційний вісник України*. 2011. № 32. Ст. 1.

opportunities and tools for carrying out structural reform in the field of national energy, including through the introduction of renewable energy sources[35].

7.3. Development of legal regulation of the use of alternative energy sources in the European Union

Currently, the EU countries are leading countries in the world in terms of energy production based on alternative energy sources, and the intensification of their use is a key element of the European energy strategy. The EU has a two-fold goal in this area: increasing energy security and reducing the negative man-made impact on the environment. One of the means of achieving this goal is the EU legal acts, which determine the development and support of various types of alternative energy. The study of the legal regulation of the development of alternative energy and its support has its own tradition within the framework of EU law, the legislation of which is being actively approached by Ukraine[36].

It is worth noting that an important historical event was the adoption by the European Council on June 23, 2022 of the decision to grant Ukraine the official status of a candidate for EU membership. At the Twenty-fourth Ukraine-EU Summit, which took place on February 3, 2023 in Kyiv, the Ukrainian side announced an initiative to start the process of self-screening of the compliance of Ukrainian legislation with EU law based on the Analytical Report on Ukraine's implementation of EU law submitted by the European Commission. In order to ensure Ukraine's preparation for negotiations on joining the EU, on February 28, 2023, the Cabinet of Ministers of Ukraine approved the Procedure for conducting an initial assessment of the state of implementation of the EU acquis[37]. The chosen European integration course of our country forces us to update not only the economy, technologies, and management system, but also to fundamentally

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[35] Чумаченко І. Є. Міжнародно-правове регулювання альтернативної енергетики. *Юридичний науковий електронний журнал.* 2021. № 1. С. 143–146.

[36] Платонова Є. О. Правові механізми стимулювання використання альтернативних джерел енергії в Європейському Союзі. *Шості Таврійські юридичні наукові читання:* матеріалиМіжнар. наук.-практ.конф. (м. Київ, 5–6 лютого 2021 р.). Київ: Таврійський національний університет імені В. І. Вернадського, 2021. С. 71–75.

[37] Про затвердження Порядку проведення первинної оцінки стану імплементації актів права Європейського Союзу (acquis ЄС): постанова Кабінету Міністрів України від 28 лютого 2023 р. № 189. *Офіційний вісник України.* 2023. № 28. Ст. 1558.

revise the legislation and traditional legal approaches to its development, interpretation, and improvement[38].

The policy of the EU countries in the field of the use of alternative energy sources is characterized by extensive legal support, the use of various tools and initiatives, the functioning of an effective system of monitoring and control over their use, a complex combination with other areas of state regulation, which indicates its success. Undoubtedly, the EU u a comprehensive approach to the formation of a regulatory framework in the field of alternative energy[39].

The system of energy legislation of the EU is characterized by a single legal framework formed by several strategic directives and road maps developed by the European Commission. At the national level, with the aim of developing renewable energy sources in EU countries, a number of regulatory documents are adopted, such as: national strategies ("National Energy Strategy of Hungary until 2030" dated February 14, 2012, "Energy Strategy of Denmark until 2050" dated February 24, 2011 2000) and national energy laws (Germany's Law "On Renewable Energy Sources **"** from 2000 , Bulgaria's Law "On Energy" from 2011).

National state programs contain differences in approaches to the implementation of EU energy policy, caused by different levels of energy infrastructure of countries, availability of energy carriers, priorities in ensuring energy security. In most European countries, the strategy of energy efficiency and the use of alternative energy sources has acquired the character of a national idea. According to the new EU Energy Strategy until 2050 (EU 2050 Energy Strategy), it is planned to provide more than half of all energy consumption with electricity, 80% of which should be produced from alternative sources. Leaders in the field of energy production from alternative sources are Germany, Austria, Denmark, Italy, and France. Solar energy, wind energy, and biomass energy production have gained the greatest development[40]

The development of legal regulation of relations in the sphere of the use of alternative energy sources in the EU is connected with the oil cri of the

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[38] Григор'єва Х. А. Розвиток альтернативної енергетики як фактор перегляду методологічних засад регулювання аграрних, земельних та екологічних правовідносин. *Актуальні правові проблеми інноваційного розвитку агросфери:* матер. наук.-практ. конф. (Харків, 20 листопада 2020 р.). Харків, 2020. С. 130–135.

[39] Платонова Є. О. Стимулювання розвитку альтернативної енергетики за законодавством Європейського Союзу. *Юридичний науковий електронний журнал.* 2021. № 1. С. 137–142.

[40] Кузьміна М.М. Європейський досвід забезпечення розвитку альтернативної енергетики. *Вісник Національного університету "Юридична академія України імені Ярослава Мудрого". Сер. Економічна теорія та право.* 2012. № 4 (11). С. 120–127.

70s of the 20th century. The legislation provided for taking measures aimed at energy conservation, diversification of energy supply sources and orientation of energy policy towards more efficient use of available energy reserves. Subsequently, the issue of diversification gave way to environmental considerations related to the danger of the greenhouse effect and environmental pollution with carbon dioxide emissions, so the EU began to introduce comprehensive measures in this area.

The EU began to take practical measures in the direction of harmonization in the field of renewable energy sources by developing conceptual political documents – acts of "soft law" in the form of White and Green Papers. They were supposed to outline the problem and outline promising ways to solve it based on a joint strategy. Thus, one of the first EU acts dedicated to the legal regulation of relations related to renewable energy sources was the Green Book of the European Commission dated November 20, 1996. Based on the results of the discussion of the Green Paper, the White Paper "Energy for the Future: Renewable Energy Sources" was adopted in 1997, which defined the EU strategy and action plan. These documents established a strategic guideline for achieving by 2010 the minimum volume of energy obtained from renewable sources, 12%. This was supposed to contribute to increasing jobs in the EU, reducing dependence on energy imports and improving the situation with CO2 emissions.

To achieve the intended goals, it was considered to develop an action plan, which was supposed to encourage the development of renewable energy sources in the EU without excessive financial burden by implementing the following priority measures: non-discriminatory access to the electricity market; tax and financial measures; new initiatives on bioenergy for transport, heat and electricity and, in particular, specific measures to increase the market share of biofuels, encourage the use of biogas and develop solid biomass markets; promoting the use of renewable energy sources (such as solar energy) in the modernization and construction of new buildings[41].

The main directions of EU energy development, including renewable energy, in the coming years are also defined in such EU documents as the EU Green Paper 2005/265 on energy efficiency and the EU Green Paper 2006/105 on the European strategy for sustainable, competitive and secure energy. The implementation of their provisions contributed to the growth of renewable electricity in the EU compared to other new technologies.

[41] Білоцький С.Д. Еволюція правового регулювання альтернативних (відновлюваних) джерел енергії в праві ЕС. *Наукові записки Інституту законодавства Верховної Ради України.* 2015. № 6. С. 87–93.

However, the main regulatory acts on the use and development of renewable energy sources are EU Directives, which contain common goals for participating countries in the field of renewable energy[42].

Directive 2001/77/EC of the European Parliament and the Council of September 27, 2001 "On the creation of favorable conditions for the sale of electricity produced from renewable sources on the domestic electricity market"[43]. Given the leading position of the EU among the countries of the world in the development of technologies related to renewable energy sources, the Directive aimed to support the increase in the value of such energy while respecting the general principles of the internal market. As its specific goal, a general increase in the share of renewable energy sources in the production of electricity in the internal EU electricity market was determined (for 2010 – 22%, in contrast to the 12% provided in the White Book). The Directive covered electricity produced from non-extractable renewable energy sources such as wind, solar, geothermal, wave and tidal energy, hydropower, biomass, organic waste gas, waste water gas and biogas.

Helpfully, the Directive provided for a system to guarantee the originality of energy produced from renewable sources in order to facilitate its exchange and increase transparency when consumers make their choices. The guarantee of the originality of the energy produced from renewable sources must specify the energy source from which it was produced, the date and place of its production, and in the case of hydropower – additionally, the state of capacity. The directive expired on January 1, 2012.

Subsequently, on May 8, 2003, *Directive 2003/30/EC* of the European Parliament and the Council "On promoting the use of biofuels or other renewable fuels for transport" was adopted[44]. This document became one of the first international acts in which emphasis was placed on the need to encourage the use of renewable energy sources specifically in the field of transport. The directive was aimed at promoting the use of biofuels or other renewable fuels to replace diesel or petrol for transport purposes in each

[42] Бенедик Я. С. Організаційно-правовий механізм міжнародного співробітництва у сфері використання відновлюваних джерел енергії:автореф. дис. … канд. юрид. наук: 12.00.11. Харків, 2016. 21 с.

[43] Directive 2001/77/EC of the European Parliament and of the Council of 27 September 2001 on the promotion of electricity from renewable energy sources in the internal electricity market. *Official Journal of the European Union*. 2001. L283. R. 33–40. URL: https://eur-lex.europa.eu/legal-content EN/ TXT /? uri =CELEX: 320032001L0077 *(expired*)

[44] Directive 2003/30/EC of the European Parliament and of the Council of 8 May 2003 on the promotion of the use of biofuels or other renewable fuels for transport. *Official Journal of the European Union*. 2003. L123. R. 42–46. URL: https://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX:32003L0030 *(copyright lost).*

member state, with the aim of fulfilling obligations on climate change, environmental security of supply and encouraging the use of renewable energy sources. The Directive became invalid on January 1, 2012 due to the adoption of a new Directive.

The following changes in the EU's energy policy necessitated the harmonization of schemes for stimulating the use of renewable energy sources and their improvement. The most significant contribution to the development of the legal regulation of the use of renewable energy sources and the stimulation of their development belongs to the key *Directive 2009/28/EC* of the European Parliament and the Council "On the promotion of the use of energy produced from renewable sources and which amends and subsequently repeals the 2001 Directive /77/EC and 2003/30/EC" dated April 23, 2009 [45], or as it is also called "RED I". It is seen that it can be defined as the main EU directive on the use of alternative energy, a kind of codification act in this field [46].

As the name implies, Directive 2009/28/EC repealed (finally from January 1, 2012) the first EU directives in the field of renewable energy sources: Directives 2001/77/EC and 2003/30/EC, which separately regulated the issue of electricity production from renewable sources and biofuels in transport.

The production and use of renewable energy sources is supported by the provisions of Directive 2009/28/EC to reduce greenhouse gas emissions and promote the development of clean transport. It aimed at the participation of all EU members in increasing the share of renewable energy sources in total energy consumption, with the determination of specific volumes for each EU member. EU member states set their national targets to achieve a common goal by 2020 of 20% of energy from renewable sources in the gross final energy consumption of EU countries and a mandatory minimum of 10% for all member states in biofuel consumption by the transport sector.

According to Directive 2009/28/EU, EU countries had to develop and adopt National Plans for the development of renewable energy sources, defining the main goals they should achieve by 2020 and support mechanisms for their achievement. Mandatory national targets in the field of renewable energy are established primarily in order to provide certain

[45] Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC . *Official Journal of the European Union.* 2009. L140. P. 16–62. URL: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX: 32009L0028 (date of application: 07/01/2023)

[46] Білоцький С.Д. Правове регулювання використання відновлюваних джерел енергії в рамках Європейського Союзу. *Актуальні проблеми міжнародних відносин.* 2012. Вип. 105 (1). С. 58–66.

guarantees to investors and to encourage the development of the latest technologies and innovations in this field.

To achieve the established national goals of the member states regarding the use of renewable energy sources, Directive 2009/28/EU proposed to apply appropriate measures to stimulate and support the development of energy from renewable sources. Measures to achieve the respective goals are: firstly, aid regimes (support tools), secondly, measures of cooperation between various member states , as well as cooperation with third countries to achieve their national global goals[47].

Support instruments are provided in the following forms (but are not limited to): investment aid, tax reductions or tax exemptions, tax refunds, aid schemes related to the obligation to use energy produced from renewable sources, including those that using green certificates and direct price support regimes, including special purchase prices and premium payments. At the same time, EU member states remain free to choose approaches and tools to achieve the goals, taking into account national characteristics. As a result , a situation has arisen when various EU member states apply different types of state development stimulation, mixed mechanisms of stimulation of energy production from renewable sources on their territory. Currently, such Plans have been adopted and are being implemented in Germany, France, Italy and other EU member states. The legislation of each of the EU member states defines the legal mechanisms using which such stimulation is carried out[48].

It can be stated with certainty that Directive 2009/28/EU became a comprehensive legal act of the EU in the field of alternative energy, the norms of which regulated the use of alternative energy sources both in the field of electricity and in the field of transport. Unlike the previous directives, it contained not only the goals and principles of the participating countries regarding the use of renewable energy sources but also provided for a specific mechanism for their implementation [49]. It should be noted that until December 2018, Directive 2009/28/EC on the promotion of the use of energy produced from renewable sources remained the main regulatory act

[47] Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC . *Official Journal of the European Union*. 2009. L140. P. 16–62. URL: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX: 32009L0028 (date of application: July 1, 2023)

[48] Стоян О. Ю. Міжнародний досвід державного регулювання та стимулювання розвитку відновлювальної енергетики. *Вісник Чернігівського державного технологічного університету.* 2014. № 4 (76). С. 320–326.

[49] Дороніна І. І. Інструменти державної підтримки використання енергії з відновлюваних джерел. *Збірник наукових праць НАДУ*. 2020. Вип. 2. С.47–55.

of the EU on the use and development of renewable energy sources. On December 11, 2018, *Directive 2018/2001* with a similar name was adopted to replace it. However, the previous directive was valid until July 1, 2021.

In order to further promote the development of renewable energy within the framework of the Fourth EU energy package of documents "Clean energy for all Europeans", on December 11, 2018, Directive *2018/2001* of the European Parliament and the Council of the EU on the promotion of the use of energy produced from renewable sources , the so-called "RED II" . The new Directive set the main mandatory targets: by 2030, the share of energy obtained from renewable sources in the gross final energy consumption of the EU should be at least 32% and 14% of renewable energy in the transport sector. The main areas of work to achieve them are as follows: improving market design and increasing the stability of schemes for supporting renewable energy sources; acceleration and shortening of administrative procedures; establishment of a clear and stable regulatory framework for self-consumption; penetration of renewable energy sources into the spheres of transport, heating and cooling; improving the sustainability of biofuel use[50].

According to the provisions of RED II, state support instruments are an effective way to promote the implementation of renewable electricity, but such support should be provided in a form that is as unobtrusive as possible to the functioning of electricity markets (energy sector) . Special attention in the Directive is devoted to the importance of state support for small producers of electricity from renewable sources: small enterprises, households, energy cooperatives to activate the creation of their own sources of renewable energy. A number of opportunities were provided for EU member states to ease the administrative and procedural burden on small producers of energy from renewable sources (exempting small generation from participating in tender procedures; limiting the duration of permitting procedures for small generation facilities, etc.)[51].

It should be noted that during 2022 in the EU countries there was an increase in measures to introduce renewable energy sources against the background of the energy crisis caused by the full-scale invasion of the

[50] Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources (recast). *Official Journal of the European Union.* 2018. L328. R. 82–209. URL: https://eurlex.europa.eu / legalcontent/EN/TXT/?uri=uriserv: OJ.L_.2018.328.01.0082.01.ENG (access date: 07/01/2023)

[51] Платонова Є. О. Правове регулювання використання альтернативних джерел енергії в Європейському Союзі. *Держава і право в умовах глобалізації: реалії та перспективи*: матеріали міжнар. наук.-практ. конф. (м. Дніпро, 5-6 лютого 2021 р.). Дніпро: ГО "Правовий світ", 2021. С. 18–23.

Russian Federation on the territory of Ukraine. High and unstable energy prices have stimulated attention to increase the consumption of energy from renewable sources, in particular, the replacement of fossil fuels with hydrogen technologies.

So, on May 18, 2022, the European Commission approved the REPowerEU plan to abandon Russian energy carriers[52], one of the tasks of which is to accelerate the introduction of renewable energy sources in electricity production, industry, construction and transport. As part of the REPowerEU plan, the European Commission has published Recommendations on speeding up permitting procedures for renewable energy projects and facilitating the conclusion of electricity purchase and sale agreements. According to these recommendations, EU member states can create special zones for the deployment of RES capacities under a shortened and simplified procedure for obtaining permits in areas with a lower environmental risk[53].

The deterioration of the situation in the energy markets prompted the European Commission on November 9, 2022 to propose a draft Regulation to accelerate the implementation of renewable energy sources[54]. Under the proposal, renewable energy installations would be deemed to be of the highest public interest, and this would allow the new permitting procedures to benefit with immediate effect from a simplified environmental assessment. On December 15, 2022, the European Parliament supported the European Commission's plans to stimulate the use of renewable energy.

The study of European alternative energy markets showed that these markets are affected by special legal mechanisms of state support. Methods of stimulating the use of alternative energy sources in EU countries constitute a complex and extensive system. At the same time, different EU countries choose their own legislative tactics to stimulate alternative energy, taking into account their own resources, local conditions and legal traditions.

Today, most EU countries use *"green" tariffs* ("feed-in tariffs", FIT) as the main and effective legislative mechanism for encouraging and compensating costs in the form of establishing a long-term fixed tariff for

[52] REPowerEUPlan . Brussels, 18.5.2022. URL: https :// eur – lex . Europe. eu / legal – content / EN / TXT /? uri = COM %3 A 2022%3 A 230%3 AFIN & qid =1653033742483 (date of application: 07/01/2023)

[53] Commission Recommendation on speeding up permit-granting procedures for renewable energy projects and facilitating Power Purchase Agreements of 18.5.2022. URL: https :// eur – lex . Europe. eu / legal – content / EN / TXT /? uri = PI _ COM %3 AC %282022%293219& qid =1653033569832 (date of application: 07/01/2023)

[54] Proposal for a Council Regulation laying down a framework to accelerate the deployment of renewable energy. Brussels, 9.11.2022. url. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52022PC0591&qid=1669020920010 (access date: 07/01/2023)

electricity produced based on the use of alternative energy sources. Currently, France, Austria, Latvia, Lithuania, Bulgaria, Ireland, Luxembourg, Greece, Hungary, and Slovakia actively use it. With its help, the state guarantees producers the purchase at a fixed price of energy produced on the basis of alternative sources, during a certain period, regardless of market fluctuations. At the same time, the energy produced by them will be purchased at higher prices than from producers of traditional energy, and the quantitative result of this type of stimulation directly depends on the size of the tariff set by the government[55].

In general, the introduction of the "green" tariff helps to increase the investment attractiveness of alternative electricity projects. However, setting inflated tariffs puts pressure on the country's economy due to the high risk of depletion of the state budget, and also cause a problem with "non-transparent" attempts to obtain state funding.

It should be noted that "green" tariffs have already played a positive role in the markets of many countries, such as Germany, Italy, Spain, and as the competitiveness of alternative energy sources grows, such countries are gradually abandoning them, reducing the amount of payments or switching to other instruments incentives that help reduce network volatility. Such decisions are inevitable, but risky because they increase regulatory uncertainty for investors in this area.

, a premium "green" tariff (feed-in premium s, FIP) is used in EU countries, which provides for an additional payment to the market price of electricity. Currently, "green" allowances have been introduced in such countries as Spain, Italy, France, the Czech Republic, Greece, Denmark, Poland, Finland, the Netherlands, Slovakia, and Estonia.

The essence of the system of "green" allowances is that alternative electricity is sold at market prices, and the state, to mitigate the financial risks of electricity generation based on alternative sources, separately pays its producers a "green" allowance, which compensates for their higher costs compared to producers of traditional electricity. The "green" allowance is a kind of bonus for the environmental friendliness of the energy produced. It can be fixed (expressed in a certain amount that does not depend on fluctuations in market prices) or flexible (its size depends on the dynamics of market prices)[56].

A positive feature of "green" surcharges is definitely that, firstly, they fit more into market mechanisms in the field of electricity than a "green" tariff, as they respond to market prices. Secondly, this mechanism creates

[55] Бабина О. М. Світовий досвід розвитку альтернативних джерел енергії. *Держава та регіони. Сер. Економіка та підприємництво.* 2019. № 6 (111). С. 15–19.

[56] Зарубіжна практика стимулювання розвитку поновлюваних джерел енергії та їх приєднання до електромереж енергосистем / Звіт. Київ: НЕК "Укренерго" Науково-технічний центр електроенергетики, 2012. 75 с.

incentives for the production of electricity in times of high demand for it. Thirdly, it can provide a reduction in government costs for the payment of "green" tariffs in case of high market prices. Fourth, it is suitable for supporting large-scale electricity generation based on biomass and small hydropower, which can quickly respond to changes in electricity market demand.

A negative feature of the mechanism of "green" surcharges compared to "green" tariffs is the creation of uncertainty for investors, causing risks associated with fluctuations in market prices. In addition, exposure to wind and solar power generation is limited, making it impossible to adapt such production to market signals. E. Yu. Rybnikova believes that at the current stage of development of alternative energy in Ukraine, the introduction of this progressive mechanism of support for its producers is premature[57].

Another widespread incentive mechanism is *the quota obligation with trading "green" certificates*, which operates in Sweden, Italy, Poland, Romania and Belgium. According to this mechanism, the government sets mandatory quotas for electricity market participants for the volume of production or consumption of alternative electricity in the total volume of production. As a sign of fulfillment of the obligation, the participant of the electricity market must submit "green" certificates that correspond to the amount of electricity that he was supposed to produce or consume. If a producer (consumer) of electricity cannot fulfill this quota, he must buy "green" certificates on the market or pay a fine, the amount of which is higher than the value of "green" certificates[58].

Under favorable market conditions, the introduction of this incentive mechanism on the territory of Ukraine will allow effective accounting and forecasting of alternative electricity to obtain reliable information about its share in the overall energy balance and promote competitive pricing. It is appropriate to establish mandatory quotas for the consumption of "green" electricity for heavy industries, which are the main sources of emissions of harmful compounds into the environment. The introduction of quotas is quite relevant in the conditions of the competitive electricity market in Ukraine, because with their help, the possibility of selling electricity under bilateral contracts directly to consumers will be not just a formality, but a real deal. It should be emphasized that despite the possibility of obtaining

[57] Рибнікова Е. Ю. Господарсько-правове стимулювання використання відновлюваних джерел енергії в Україні: автореф. дис. … канд. юрид. наук: 12.00.04. Одеса, 2018. 20 с.

[58] Гелетуха Г.Г. Аналіз механізмів стимулювання розвитку "зеленої" електроенергетики у Європейському Союзі. *Пром. теплотехніка*. 2011. Т. 33. № 5. С. 35–41.

many benefits from the introduction of the quota system in Ukraine, its implementation must be preceded by a certain transitional stage[59].

of tenders and auctions is a progressive mechanism for supporting alternative energy sources . It was used to develop wind energy in Ireland, France, and Denmark. Its essence is that a competition is announced in the country for the right to receive the most economically advantageous contract for the construction of "green" electricity facilities, and its winner receives full or partial state financing of the construction. The disadvantage of the system is that investors can offer an economically unreasonable low price to win the tender, and then not implement the project. Currently, more than 80 countries of the world use the auction procedure as a means of stimulating the production of energy from alternative sources. In Ukraine, auctions for the distribution of support quotas in the production of electric energy from alternative energy sources are being implemented from July 1, 2019 and will be held until December 31, 2029 in accordance with the auction schedule for the corresponding year [60]. So, the support auctions could start working at the end of 2019, as it was directly foreseen by the amendments to the Law of Ukraine "On Alternative Energy Sources". However, for more than three years, the auction mechanism defined by the law and by-laws has not been working, and no new regional, multi-technological, or "RES + energy storage systems" projects have appeared in Ukraine. A legal obstacle is the absence of annual quotas determined by the Cabinet of Ministers of Ukraine for the possibility of holding auctions, provided for by legislation[61].

Another legal incentive mechanism, that is used in many EU countries, is the provision of *investment grants*. As foreign experience shows, these grants are issued to stimulate the production of electricity of alternative origin obtained with the help of new, innovative technologies. In particular, in the Republic of Finland, investment grants and subsidies are the only types of incentives for the use of alternative energy sources. Undoubtedly, targeted financing of scientific developments in the field of alternative energy sources, as well as their implementation, is one of the most effective ways to stimulate the development of alternative energy. This means of stimulation can be considered useful for Ukraine.

In European countries, *tax and customs incentives* remain an important and flexible means of incentives and often complement the main types of

[59] Платонова Є. О. Стимулювання розвитку альтернативної енергетики за законодавством Європейського Союзу. *Юридичний науковий електронний журнал.* 2021. № 1. С. 137–142.

[60] Про альтернативні джерела енергії: Закон України від 20 лютого 2003 року. *Офіційний вісник України*. 2003. № 12. Ст. 522.

[61] Керівники АСЕУ: правові підсумки 2022 року для галузі ВДЕ та перспективи 2023. URL: http://reform.energy/news/kerivniki-aseu-pravovi-pidsumki-2022-roku-dlya-galuzi-vde-ta-perspektivi-2023-21255 (дата звернення: 01.07.2023 року)

incentives. Thus, in the Netherlands, the production of electricity from alternative sources is stimulated by directing income tax to invest in alternative energy projects.

Some legal incentive mechanisms are widely used in the EU countries but have not been separately enshrined in domestic legislation. Among them, it is worth mentioning *low-interest loans* with longer repayment periods for producers of electricity from alternative energy sources, which are used by some EU countries, including Germany and the Netherlands[62]. Energy saving programs in Ukraine are mostly financed by banks on general terms, since there are no reliable economic incentives that would contribute to cheaper financing, both on the part of credit institutions and on the part of potential borrowers. That is why Ukraine has great potential for the use of preferential lending.

An important modern mechanism for stimulating the use of alternative energy sources is the involvement of citizens in the development of the field of renewable energy, a common form of which is the creation of *energy cooperatives* in Germany, Austria, Denmark, the Netherlands, and Sweden. The rapid development of energy cooperatives in foreign countries is due to the combination of initiatives of citizens who seek "decentralization of energy services", which are mainly concentrated in the hands of large businesses, and support from the state, which solves the energy problem by stimulating the introduction of alternative energy sources. At the same time, there are no special laws on energy cooperation, for example, in Germany and Austria. Instead, the legal status of energy cooperatives is governed by general cooperative laws and energy legislation. Compared to other organizational and legal forms of conducting economic activity in the energy sector, energy cooperatives have a number of advantages: relative simplicity of establishment and registration, democratic nature of internal procedures, wide autonomy in the formation of statutory documents, and regular control by cooperative unions. The experience of European countries in creating energy cooperatives should be applied in the legislation of Ukraine, using adaptive and flexible legal structures[63].

In the EU countries, in order to increase the efficiency of application, mechanisms for stimulating the use of alternative energy sources are often combined. It can be seen that the key to the success of a number of European countries in the field of alternative energy was precisely the

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[62] Кулик О.І. Способи стимулювання використання альтернативних джерел енергії за законодавством України та Європейського Союзу. *Підприємництво, господарство і право*. 2018. № 4. С. 86–91.

[63] Григор'єва Х.А. Аналіз законодавчого визначення енергетичного кооперативу. *Альтернативна енергетика: співпраця юридичної науки та бізнесу на шляху інноваційного розвитку*: зб. матеріалів круг. столу (Одеса, 4 груд. 2020 р.). Одеса: Видавничий дім "Гельветика", 2020. С. 6–9.

combination of various state support tools and their change in accordance with the conditions of development and use of alternative energy sources[64].

7.4. Green Deal and Ukraine: legal support of the energy transition

In December 2019, the EU announced the start of a new stage of its development based on the Green Deal. This strategic plan is not just another environmental slogan – its implementation is designed to achieve extremely ambitious goals, which are primarily a response to acute climate challenges. That is why the central element of the Green Deal is decarbonization, i.e. achieving zero carbon emissions. The decision to transform into a climate-neutral Europe by 2050 will entail a whole series of profound transformational measures, radical legislative changes, the introduction of essential protection mechanisms, etc. Such tectonic changes that will take place in the EU will directly affect Ukraine as well.

In our opinion, it is possible to single out several main types of influence of the Green Deal on Ukraine:

1) *ideological* – gaining more and more popularity in the world, the greening trend strengthens its influence on the transformation of the worldview, increasing the ecological culture of the population. This dimension of the impact of the Green Deal should be reflected in the educational environment, including in the direction of activation of environmental and legal education;

2) *political* – approval and further implementation of the Green Deal concept, in particular in the EU, will have a powerful impact on the development and implementation of domestic policy, primarily its energy, agricultural, industrial and environmental components. Currently, the political influence is already quite noticeable, it is accompanied by political statements about the readiness of Ukraine to cooperate with the EU in the direction of the implementation of the Green Deal, the formation of relevant coordinating institutions. However, Ukraine's political response to the EU's greening choice lacks the main thing: a clear conceptual basis and a strategic vision of Ukraine in the process that are being initiated in Europe;

3) *economic* – this influence will grow, because the most tangible changes are still ahead, when the EU, as part of the implementation of the Green Deal, will begin to introduce specific requirements for products that can be imported into its territory. A completely logical expectation, which is

[64] Платонова Є.О. Державна підтримка альтернативної енергетики за законодавством Європейського Союзу та України. *Аграрне, земельне, екологічне, трудове право та право соціального забезпечення: здобутки та перспективи розвитку в Україні:* тези доповідей учасників всеукр. дист.наук.-практ. конф. до 10-річчя створення однойменних кафедр (м. Київ, 12 березня 2021 р.) / за заг.ред. проф. М.І. Іншина, за редакцією проф. В.В. Носіка, доц. Т.Г. Ковальчук, ас. М.Б. Мельник. Київ: Освіта України, 2021. С. 272–275.

quite lively discussed in foreign and domestic scientific literature, is the introduction of mechanisms for searching for the "carbon footprint". This will be a natural decision since the limitation in own carbon emissions cannot be accompanied by the import of cheaper products that are produced without such limitations. Unless every country in the world has a "carbon cost", it is illogical to apply this to products produced in the EU[65]. Such inconsistency, firstly, will lead to a decrease in the competitiveness of European producers, and secondly, it will nullify the EU's efforts to overcome climate problems. Therefore, the prospective search for the "carbon footprint" can become a difficult barrier for domestic products, and therefore this issue should be actively resolved today. One should especially take into account the fact that it will be even more difficult for Ukrainian businesses to adapt to new environmental conditions since it does not benefit from the European level of protectionism, which means it will be forced to either meet the corresponding internal EU requirements on its own or lose this market;

4) *social* influence has two dimensions: strategic and tactical. The strategic impact that will occur due to increasing environmental requirements is certainly positive, as it meets the goals of sustainable development, and ensures the realization of the human right to a favorable environment. However, the tactical dimension of social influence requires considerable attention, control and elaboration. Such a short-term impact will primarily be manifested through how the economy will respond to greening. The first inevitable consequence is an increase in the price of products since innovations and modernization of enterprise are paid, as a rule, by the end consumer. Against the background of the falling standard of living and the impoverishment of the population of Ukraine, the outflow of young people abroad, the short-term social consequences of greening can be quite tangible and ambiguously perceived in society;

5) *the legal influence* will certainly occur, and its degree will depend on whether Ukraine will undertake certain official obligations regarding the implementation of the European Green Deal. Currently, Ukraine already has legal developments in the field of climate protection. In particular, the Law of Ukraine "On Principles of Monitoring, Reporting and Verification of Greenhouse Gas Emissions" was adopted[66], as well as the Concept of State Policy Implementation in the Field of Climate Change until 2030 was

[65] Şahin G., Yitgin B. Effects of the European Green Deal on Turkey's electricity market. *The Journal of Business, Economic and Management Research.* 2021. Vol. 4 (1). R. 40–58.

[66] Про засади моніторингу, звітності та верифікації викидів парникових газів: Закон України від 12.12.2019 року. *Відомості Верховної Ради України.* 2020. № 22. Ст. 150.

approved[67]. However, in the light of the political steps taken, the involvement of Ukraine in the European Green Deal involves new obligations of Ukraine, which will require not only the review and coordination of national and regional strategies for the development of economic sectors in terms of their climate ambition but also significant work on the development, adoption and provision an effective legal framework in the field of climate change[68].

In our opinion, first of all, the greening trend will be reflected in the energy and agrarian legislation. This is explained by the fact that, firstly, the most radical transformations [69]planned by the Green Deal are aimed at energy and agriculture, and secondly, it is precisely these branches of our state's economy that form the material product.

Based on the analyzed impacts of the European version of the Green Deal on our country, it can be concluded that there are two main scenarios of such an impact: controlled and uncontrolled. In the event that Ukraine takes a passive position, i.e. does not adopt any organizational, institutional and legal changes, does not purposefully prepare legislation and does not build a plan of its actions, primarily of a protective nature, aimed at

[67] Про схвалення Концепції реалізації державної політики у сфері зміни клімату на період до 2030 року: розпорядження Кабінету Міністрів України від 7 грудня 2016 р. № 932-р. *Офіційний вісник України*. 2016. № 99. Стор. 269. Ст. 3236.

[68] Копиця Є. М. Екологічне нормування у сфері зміни клімату в контексті імплементації Європейського зеленого курсу в Україні. *Збірник наукових праць ЛОГОΣ*. 2020. P. 48–50. URL: https://ojs.ukrlogos.in.ua/index.php/logos/article/view/6061 (дата звернення: 10.02.2021 року)

[69] Харитонова Т. Є., Григор'єва Х. А. Енергетичний складник українського Green Deal: аналіз правових передумов. *Юридичний науковий електронний журнал.* № 2. С. 149–154; Харитонова Т. Є. Green Deal та його реалізація в аграрному секторі України. *Аграрне, земельне, екологічне, трудове та право соціального забезпечення: здобутки та перспективи розвитку в Україні (до 10-річчя створення однойменних кафедр):* матеріали Всеукр. дистанц. наук.-практ. конф. (Київ, 12 березня 2021 року). Київ, 2021. С. 116–119; Григор'єва Х. А. Вплив європейського курсу Green Deal на Україну: завдання для юридичної науки. *Організація юридичної науки та освіти в Україні й світі: історичний досвід, сучасний стан та майбутні перспективи:* матеріали XI Міжнар. наук.-практ. конф. (Київ, 22 грудня 2020 року) до 85-ліття від дня народження та 55-ліття від початку наукової діяльності академіка НАН України Ю. С. Шемшученка. Київ: Ін-т держави і права імені В. М. Корецького НАН України, 2021. С. 156–159; Григор'єва Х. А. Вплив європейського GreenDeal на агробізнес України: цунамі еколого-правових вимог чи еволюційний трамплін? *Аграрне, земельне, екологічне, трудове та право соціального забезпечення: здобутки та перспективи розвитку в Україні (до 10-річчя створення однойменних кафедр):* матеріали Всеукр. дистанційної наук.-практ. конф. (Київ, 12 березня 2021 року). Київ, 2021. С. 25–28; Григор'єва Х. А. Перспективи енергетичного права: в орбіті екологізації. *До 60-річчя набуття чинності Закону "Про охорону природи Української РСР": екологічне законодавство України через призму його історичного розвитку:* матеріали Міжнар. дистанц. наук.-практ. конф. (Київ, 12 квітня 2021 року). Київ, 2021. С. 52–56.

mitigating the negative consequences of the adaptive period – in this case the impact of the European Green Deal will be chaotic, painful, and have uncontrollable consequences.

We believe that one should not be deceived by the fact that in the case of mimicry under European legislation, Ukraine will bypass the uncontrolled path of influence of the Green Deal. In our opinion, the mechanical adoption of the legal mechanisms of the EU into the legal system of Ukraine also exposes our state to the loss of control over the relevant social relations and their qualitative, optimal development. It is necessary to understand that the European Green Deal is not a certain universal panacea for climate change, it is " a product of compromise that reflects the diversity (and disagreements) between EU member states regarding the content of the ecological transition[70]. " That is, it is a certain individual plan of the EU, which primarily takes into account the problems, starting conditions and opportunities of the EU itself, and not of any other country.

The controlled influence of the European Green Deal on Ukraine can be achieved only in the case of the development and adoption of a non-politicized, real and scientifically based domestic Green Deal. This will make it possible to take into account, on the one hand, the main vectors of the influence of the European green course on social relations in Ukraine, the main goals and tasks on the way to fight against climate change, and on the other hand, it will make it possible to take into account the national features with which our state is on its way environmentalization.

the idea of adequate synchronization should be the conceptual idea that should form the basis of further improvement of domestic law in light of the implementation of the European Green Deal. The main essence of this conceptual idea is to develop the optimal pace, scope, set of legal mechanisms, and principles of further improvement of Ukrainian legislation, taking into account the general green course of the EU, but with a clear vision of national guidelines, national tasks and peculiarities. That is, the implementation of the idea of synchronization involves focusing on the ambitious goals of the EU, taking into account its experience and the chosen path, but not mimicking European law when developing one's balanced path to achieving sustainable development. This is important, because as part of the general implementation of the idea of sustainable development, the world's leading countries are developing their strategies for greening the economy, based on national priorities and problems, taking into account the starting conditions and opportunities of the state, business and society. That is, the world shows gradual progress towards environmental changes, but each state must choose its own pace and direction, so as not to lose equally important components of social life due to hasty environmental decisions. It is indicative that even within the EU countries have different potentials for

[70] Ossewaarde M., Ossewaarde-Lowtoo R. The EU's Green Deal: A Third Alternative to Green Growth and Degrowth? *Sustainability*. 2020 Vol. 12. R. 9825.

greening, and " the degree of this challenge will not be the same for all member states"[71].

We cannot ignore the fact that green transformations are expensive. As the researchers note, "substantial funds are needed for the global transition to a socially and ecologically just economy of renewable energy sources[72]". That is why the opinion is expressed that the Green Deal is available only to rich countries. We believe that this only further confirms our thesis about the need for adequate synchronization based on the development of the national Green Deal-Ukraine. Indeed, the implementation of such ambitious projects that are planned in the EU (budget for greening – according to various estimates, about 3 trillion euros), China (3.4 trillion yuan New Green Infrastructure of China), the United States (Biden's pre-election plan to direct 2 trillion dollars to Green New Deal), South Korea (US$ 142.62 billion), etc., are completely unattainable for Ukraine at the moment. However, this cannot become a political justification for further inaction in the direction of making a significant contribution to the common cause of combating climate change. The economic gap between countries, the presence of their own "pain points" and specific growth points in each country – all these aspects prove the need to adopt not a single, universal Green Deal, but the necessary number of its variations, united by a single conceptual goal – the stabilization of the climate on the planet. This opinion is illustrated by the analysis of existing ecological and climatic strategies, which have their specific features.

For example, in South Korea, the Green New Deal is one of the two components of the "New Deal" (Digital New Deal and Green New Deal). The social component of the strategy is significant, as Korea's New Deal has set a short-term goal of creating 340,000 jobs within two years to boost production by KRW 49 trillion and reduce social costs by KRW 40 trillion[73]. To attract broad sections of society to the side of greening changes, the majority of which is always conservative and wary of significant changes in the usual way of life, social perspectives find their place in other strategies as well. For example, the American version of the Green New Deal proposes to "create millions of good, high-wage jobs in the United States" through a series of national programs, including "making public investments in research and development of new clean and renewable energy technologies and industries". That is, one of the main differences of the Green Deal from previous political measures is that it not

[71] Zlaugotne B., Ievina L., Azis R., Baranenko D., Blumberga D. GHG Performance Evaluation in Green Deal Context. *Environmental and Climate Technologies.* 2020. Vol. 24. Issue 1 . R. 431–441.

[72] Slatin C. Workers in the Twenty-First Century: Green New Deal or More of the Same? *New Solutions-A Journal of Environmental and Occupational Health Policy.* 2020. Vol. 29 . Issue 4. R. 8 – 484 .

[73] Jae-Hyup L., Jisuk W. Green New Deal Policy of South Korea: Policy Innovation for a Sustainability Transition. *Sustainability.* 2020. Vol. 12.

only responds to the climate crisis but also tries to eradicate social inequality and poverty[74]. The environmental movement in Canada also received a social color, albeit of a slightly different nature. In May 2019, a coalition of civil society representatives – academics, trade union representatives, indigenous peoples and youth – launched the Pact Green New Deal in Canada[75]. That is, Canada demonstrated the birth of a national Green Deal "from the bottom up", as a result of which the environmental strategy became a demand of an active society, rather than a product of government policy. However, at the same time, Canada has its internal contradictions of a social nature, in particular the tangible opposition of workers in the traditional energy industry, which is built on the extraction of oil sands.

For a comprehensive analysis of such an ambitious project as the Green Deal, it should be noted that it has quite serious criticism. For example, in the authoritative publication Nature, the results of a study were published, according to which the reverse side of the European environmental policy was demonstrated. Thus, scientists believe that EU member states transfer environmental damage to other countries by taking credit for green policies at home. For example, between 1990 and 2014, European forests expanded by 9%, i.e. to an area roughly equivalent to the size of Greece (13 million hectares), but elsewhere about 11 million hectares of forests were cut down to grow crops consumed within the EU. Three-quarters of this deforestation was linked to oilseed production in Brazil and Indonesia, regions of unparalleled biodiversity, home to the world's largest carbon sinks, critical to mitigating climate change[76].

Other studies critically analyze the European Green Deal, pointing out some of its shortcomings, for example: it lacks a vision of a fair, low-carbon European economy; available resources are insufficient to achieve the stated goals; and implementation tools are limited[77]. In addition, there were frequent fears in the literature that the coronavirus pandemic could prevent the full implementation of the Green Deal[78].

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[74] Jae-Hyup L., Jisuk W. Green New Deal Policy of South Korea: Policy Innovation for a Sustainability Transition. *Sustainability.* 2020. Vol. 12.

[75] MacArthur JL , Hoicka CE , Castleden H. , Das R., Lieu J. Canada's Green New Deal: Forging the socio-political foundations of climate resilient infrastructure? *Energy Research & Social Science* . 2020. Vol. 65 . URL: https://www.sciencedirect.com/science/article/pii/S2214629620300190?via%3Dihub (access date: February 10, 2021)

[76] Fuchs R., Brown C., Rounsevell M. Europe's Green Deal offshores environmental damage to other nations. *Nature.* 2020. Vol. 586. R. 671–674.

[77] Pianta M., Lucchese M. Rethinking the European Green Deal An Industrial Policy for a Just Transition in Europe. *Review of Radical Political Economics.* 2020. Vol. 52. Issue4 . P. 641 – 633.

[78] De Gatta Sanchez, Fernandez D. The ambitious Green European Pact (European Green Deal). *Actualidad Juridica Ambiental.* 2020. Vol. 101. R. 78–109; Martin Pascual E. The European Green Deal: a possible green exit from the COVID-19 crisis? *Revista General De Derecho Europeo* . 2020. Vol. 51.

So, both the very concept of the Green Deal and its specific European implementation have both supporters and critics. For Ukraine, this should become an additional argument for the need to develop its greening project on the ideological basis of the Green Deal. The analysis of foreign practice and doctrine indicates that since the Green Deal concept is at the stage of dynamic development and is experiencing its formation, no unambiguous, proven, universal legal mechanisms have yet been developed – each country is currently looking for optimal legal solutions based on its national conditions. It is extremely important to decide how to implement relevant ideas in domestic legislation. However, we are convinced that any political and legal commitments of Ukraine regarding the Green Deal must be preceded by full, thorough and independent preparation. In particular, in the direction of conducting proper economic calculations. In relation to this issue, it should be noted that in the foreign doctrine, especially the American one, a wide debate has unfolded during the last two years, which can be figuratively summarized as follows: "Who will pay for the Green New Deal?". This issue is extremely important and relevant not only for the USA – it is also key for Ukraine. The cost of the Green Deal is usually estimated in financial terms, as a result of adding up the projected costs of various programs, which leads to the conclusion that paying for greening requires a significant increase in taxes. However, recent studies prove that a more complex approach is more adequate, namely: the value of the Green Deal should be measured in real resources, not in financial costs[79]. To implement such a strategic calculation, teams of the best specialists from various spheres of the economy should be involved. Active rule-making work should take place only after appropriate economic preparation[80].

In order for the influence of the Green Deal on our country to be controlled and not turn into a "natural disaster", we see the only possible way – the development and adoption of the national Green Deal – i.e. a strategic plan of change adequate for Ukraine, which will become a national contribution to the fight against change climate The core of such a national Green Deal should predictably be the energy component, the development of which should primarily take into account national features and needs, and not foreign legal decisions in this area.

[79] Nersisyan Y., Wray RL Can we afford the Green New Deal? *Journal of Post Keynesian Economics.* 2020. DOI: 10.1080/01603477.2020.1835499

[80] Григор'єва Х. А. Green Deal та Україна: роздуми про правові перспективи. *Екологічне право*. 2021. № 1–4. С. 25–32.

DOI https://doi.org/10.36059/978-966-397-417-0-8

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CHAPTER 8. ALTERNATIVE ENERGY IN THE LEGISLATION OF CERTAIN COUNTRIES

8.1. Alternative energy in the context of transition to carbon neutrality: modern and prospective legal mechanisms

As part of the implementation of large-scale transformational strategies in the world (among which the most striking should be called the European GreenDeal), ambitious goals of states to achieve carbon neutrality were stated. First of all, this provided for a gradual systematic transition to the use of renewable energy sources. However, when the world had not yet fully recovered from the fight against the pandemic recession of the economy, military actions began in Ukraine, which changed political, economic and social conditions, forcing the adaptation of GreenDeal and relevant legislation to these new circumstances. Given the rapid change in actual conditions, events, activation of rulemaking, conducting new related studies, there is a need to analyze the energy component of GreenDeal in response to the challenges posed by the war in Ukraine.

In a few years after the announcement of the European GreenDeal, domestic legal science has accumulated some progress, which analyzes the significance of this strategy and the ways of adapting Ukrainian legislation to its tasks. However, at the same time, the objective circumstances of the implementation of GreenDeal are rapidly changing, new legislation appears in response to military circumstances.

Fighting climate change is a process far from linear. If the main focus is on achieving carbon neutrality, then several interesting trends can be traced against the background of dynamic circumstances and active rulemaking.

So, the experience of the last decades shows that the world periodically experiences systemic crises. An interesting trend that combines the financial crisis of 2008 – 2009 and the pandemic crisis of 2020 – 2023 was the election of such a way to "disperse" the economy – the use of environmental ("green") stimulation. This trend is well traced to the developed countries of the world. For example, in the United States after the global financial crisis, a 2009 economic stimulus package called the American Recovery and Reinvestment Act included green elements. South Korea has acted even more powerfully to support its own economy, which

was hit hard during the financial crisis, and allocate an astonishing 95% of its $38.1 billion in fiscal stimulus to environmental initiatives, equating to nearly 3% of its GDP (no other country except China has made this level of green investment in response to the crisis)[1]. South Korea reused its experience and maximized its ambition when it applied environmental ("green") stimulus as a policy of recovery from the COVID-19 crisis.

The total economic downturn, which swept the entire planet during the pandemic, caught European countries during the rollout of the largest long-term initiatives. For example, the UK was the first in June 2019 to adopt the law that pledged to become the zero producer of greenhouse gases into the atmosphere by 2050: the British program to achieve the relevant climate goals embodied in the "NetZeroStrategy". Six months later, at the end of 2019, the EU announced its own ambitious plan to transform all public life called GreenDeal. However, loud discussions around such serious transformational plans of developed European states did not have time to subside as the world entered a period of severe economic crisis due to the pandemic. This was the first difficult test of idea strategies like GreenDeal, but it was not abandoned, on the contrary, they tried to use it to stimulate the economy.

This trend was picked up by other key states, in particular, in 2020 the South Korean GreenDeal was approved, which had three dimensions: green urban development, innovative green industry and, of course, low-carbon decentralized energy.

Although each country spelled out its own GreenDeal scenario, they have something fundamentally in common. Thus, the goal of GreenDeal environmental stimulus *"is not simply to use these policies as a short-term economic stimulus and recovery package; rather, it is to make a structural transition to a more ecological economy and society to address a variety of environmental imperatives, including climate change"*[2]. A clear trend towards restarting the economy and public life under the new realities of climate change, environmental crises, and depletion of resources has become a powerful mainstream in the legislation of not only a limited number of developed countries – it has become a catalyst for similar transformations in many related states.

An example of Turkey can serve as a vivid illustration. Thus, the European GreenDeal provides for several fairly sensitive legal mechanisms

[1] Barbier E. B. How is the global green new deal going? *Nature*. 2010. Vol. 464 (7290). P. 832–833.

[2] Han H., Lee T. Varieties of green stimulus policies: comparative analysis of the green growth and Green New Deal policies in South Korea. *The Journal of Environment & Development*. 2023. Vol. 32 (1). P. 61–82.

within the framework of decarbonization (the mechanism of borderline carbon regulation – CBAM and the action plan for the cyclical economy – CEAP). Anticipating future difficulties in trade, the business began to press the government in advance to demand an adequate response to the predicted problems for Turkish exports. The appropriate reaction was the adoption of the Action Plan for Turkey's adaptation to the European GreenDeal in 2021[3]. That is, there is a qualitatively different document, which is not so much generated by ambitious climate or environmental goals as it is intended to "slow down" the blow that awaits the Turkish economy as a result of the implementation of GreenDeal in the main trading partner of the state – in the EU.

The picture we see demonstrates the ubiquitous intensification of the energy transition – the qualitative transformation of the economy by increasing the production and use of energy from renewable sources and reducing the use of energy from fossil fuels. It is alternative energy that is an integral part of the state that humanity seeks, achieving sustainable development. However, it is important to emphasize that it is about the *process* – that is, the energy transition is not a one-time action. It is impossible just to abandon traditional energy without losing the level of economic development and the standard of living of society. Such a refusal should happen gradually, with the phased preparation of the economy, society, and infrastructure. Each state, making its energy transition, should be aware of and take into account its own starting conditions, national features, burdensome circumstances, and vice versa points of growth. In this regard, the energy transition initiated as part of the implementation of GreenDeal highlighted the need for differentiation. Yes, EU member states are heterogeneous in their economic indicators, energy resources, consumer and industrial energy needs, etc. Therefore, studies to prove the need to develop their ways and rates of energy transition within the framework of a single strategy to counter climate change are increasingly appearing[4]. This gave rise to the idea of a "just transition", which, among other things, tries

[3] Aşici Ahmet Atıl, Acar Sevil. Channels of cooperation between the EU and Turkey on green transformation. *Ankara Avrupa Çalışmaları Dergisi.* 2022. Vol. 21. Issue 1. P. 43–67.

[4] Ciot M-G. Implementation Perspectives for the European Green Deal in Central and Eastern Europe. *Sustainability*. 2022. Vol. 14. Issue 7. P. 3947; Gallop P. A Green Agenda for the Western Balkans: Where are the teeth? 2020. URL: https://bankwatch.org/blog/a-green-agenda-for-the-western-balkans-where-are-the-teeth (дата звернення: 01.07.2023 р.); Błaszczuk-Zawiła M. Poland and the European Green Deal amidst the pandemic. *The Economic and Legal Impact of Covid-19 : The Case of Poland. Edited By Jerzy Menkes* / Magdalena Suska. Routledge, 2021.

to substantiate theoretically the differences in the options for energy transformations of different states.

However, this situation received a new round and significantly worsened during 2022 – 2023, when European countries experienced energy problems provoked by the war in Ukraine. In response to the new military circumstances in 2022, the EU, trying not only to maintain the course under the auspices of GreenDeal but also to update it due to the new conditions, adopted "REPowerEU: a plan to quickly reduce dependence on Russian fossil fuels and accelerate the green transition" (***REPowerEU)***[5] – a new action plan to strengthen energy security and accelerate of energy transition. REPowerEU's plan updates GreenDeal's goals and aims to replace an annual 155 billion cubic meters of imported Russian natural gas with a combination of energy conservation, diversified fossil fuel supply, and expansion of low-carbon energy sources. The estimated cost of REPowerEU is €300 billion by 2030 (in addition to €1 trillion under GreenDeal). This amount will mainly be aimed at energy efficiency and savings (€97 billion), as well as solar photovoltaic energy (€86 billion). Thanks to REPowerEU, the EU expects the total installed capacity of photovoltaic solar panels to grow by almost 5-fold by 2030[6].

The main tasks of REPowerEU can be specified as follows: a) refusal to use Russian fossil energy sources; b) energy savings (increase from 9% to 13% of the mandatory indicator of reduction of final energy consumption by 2030); c) increase the EU's mandatory renewable energy target from 40% to 45% in 2030; d) increasing the use of hydrogen in industry.

As a tool to save the idea of GreenDeal and a way to take into account geopolitical circumstances, the adoption of REPowerEU is an important step, but it exposed a number of important issues and revealed at least three complex problems.

1) ***An existential problem,*** the essence of which can be reduced to one question: "Is it even possible to combine further economic progress with climate and environmental measures?". Against the background of the adoption of REPowerEU, opinions have increased about the need for a critical reassessment of the idea of green growth – the conceptual basis of GreenDeal. The fundamental possibility of implementing long-term and

[5] Communication from the European Commission to the European Parliament, the Council, the Economic and Social Committee and the Committee of the Regions COM (2022) 230 final REPowerEU Plan. 2022. (Communication REPowerEU).

[6] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: EU solar energy strategy European Commission, Brussels. 2022. URL: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2022%3A221%3A FIN (дата звернення: 01.07.2023 р.).

value strategies like GreenDeal is questioned. Researchers are reaching conclusions about the deceptiveness of green growth. In particular, solar energy is often used as a prime example.

So, REPowerEU involves an increase in the solar power capacity in the EU between now and 2030 of five times. On the one hand, this will achieve energy decarbonization goals, but on the other hand, it will demonstrate the failure of the natural resource tasks proclaimed under GreenDeal. This will happen because producing so much additional solar energy scaling equipment provided by the plan will require a significant increase in the extraction and use of the necessary natural resources: gallium, germanium, indium, and silicon. This contradicts one of GreenDeal's main postulates on economic growth without the burden on natural resources because the Agreement notes that it is a *"new growth strategy that aims to transform the EU into... resource-efficient... an economy where there are no net greenhouse gas emissions in 2050 and where economic growth is not linked to resource use"*[7].

In addition, by reducing dependence on fossil fuels of one state (in particular, natural gas of the Russian Federation), REPowerEU will increase dependence on the supply of necessary equipment from other states (first of all, China as the world leader in the production of such equipment)[8].

Thinking in this way and conducting relevant industry studies, scientists question the realism of the idea of green growth[9], more and more often, because endless economic growth is impossible on a limited planet with a limited amount of resources. The argument of scientists can be reduced to the fact that economic progress still needs to be paid for. A change in one price (for example, the volume of greenhouse gas emissions in traditional energy) does not mean the complete absence of such a price – it will simply

[7] Communication The European Green Deal (n 3) 2. URL: https://commission.europa.eu/publications/communication-european-green-deal_en (дата звернення: 01.07.2023 року).

[8] Vezzoni R. Green growth for whom, how and why? The REPowerEU Plan and the inconsistencies of European Union energy policy. *Energy Research & Social Science.* 2023. Vol. 101. URL: https://www.sciencedirect.com/science/article/pii/S2214629623001949?via%3Dihub (дата звернення: 01.07.2023 року).

[9] Hickel J., Kallis G. Is green growth possible? *New Political Economy*. 2020. Vol. 25. P. 469 – 486; Wiedmann T., Lenzen M., Keyßer L.T., Steinberger J.K. Scientists' warning on affluence. *Nature Communication*. 2020. Vol. 11. P. 3107; Parrique T., Barth J., Briens F., Kerschner C., Kraus-Polk A., Kuokkanen A., Spangenberg J.H. Decoupling debunked. Evidence and arguments against green growth as a sole strategy for sustainability. *European Environmental Bureau*. 2019. URL: https://eeb.org/wp-content/uploads/2019/07/Decoupling-Debunked.pdf (дата звернення: 01.07.2023 року).

be replaced by the exhaustion of natural resources necessary for the functioning of alternative energy.

As one study notes, *"empirical data on resource use and carbon emissions do not support the green growth theory"*[10]. In other words, the justification for criticizing green growth is simple: it is difficult to decarbonize an economy by transferring it to renewable (or at least decarbonized) energy sources if energy consumption is constantly increasing. From 2009 to 2019, there was an increase in energy consumption worldwide, and it absorbed double-digit growth in modern renewable energy production technologies, and the share of fossil fuels in total final energy consumption decreased from only 80.3 to 80.2%[11].

At the same time, the "natural resource cost" of the new equipment cannot be ignored. For example, *"an electric car needs six times more mineral resources than a regular car, and an onshore wind farm needs nine times more mineral resources than a gas-fired power plant"*[12]. As a result, demand for lithium, cobalt, nickel, rare earth elements, and copper is expected to grow rapidly in the next few decades – to such a level that *"raises huge questions about the availability and reliability of supply"*[13].

2) ***The problem of regress*** is that the EU climate ambitions, seasoned with the political component in the latest REPowerEU, give tangible side effects (for example, episodic reanimation of coal use, revision of attitude towards nuclear energy, investment in new liquefied natural gas terminals and gas pipelines, etc.). European countries at risk of energy security loss due to the abandonment of Russian gas consumption were forced to solve their own energy problems by methods that are not always climate-friendly. For example, in January 2023, Bulgaria announced the abolition of its climate goals and the postponement of the closure of coal mines on its territory in order to cope with the high cost of energy and ensure energy stability[14]. A similar situation that questions the justification for the

[10] Hickel J., Kallis G. Is green growth possible? *New Political Economy*. 2020. Vol. 25. P. 469–486.

[11] Renewables 2021 Global Status Report. 2021. URL: www.ren21.net/gsr-2021/ (дата звернення: 01.07.2023 року).

[12] IEA, 'The Role of Critical Minerals in Clean Energy Transitions'. 2021. URL: www.iea.org/reports/the-role-of-critical-minerals-in-clean-energy-transitions (дата звернення: 01.07.2023 року).

[13] Mauger R.Finding a needle in a haystack? Identifying degrowth-compatible provisions in EU energy law for a just transition to net-zero by 2050.*Journal of Energy & Natural Resources Law*. 2023. Vol. 41. Issue 2. P. 175 – 193

[14] Bulgarian Lawmakers Back Coal Plants with Vote to Roll Back Green Targets. 2023. URL: https://www.reuters.com/markets/commodities/bulgarian-lawmakers-back-coal-plants-with-vote-roll-back-green-targets-2023-01-12/ (дата звернення: 01.07.2023 року).

galloping pace of the energy transition has emerged outside the EU, namely: in December 2022, the UK Secretary of State approved a planning application for a mine that could be the first coal mine in this country in 30 years[15].

A separate difficult issue was the need to resuscitate the idea of nuclear power as a kind of component of green generation. In this area, a whole range of problems was formed:

a) a significant share of atomic energy in the modern European market (almost 25% of the total balance of EU energy resources is nuclear, and more than 50% is produced in France. A total of 13 of the 27 EU member states have more than a hundred reactors, and in 2019 they provided about 50% of low-carbon electricity);

b) although nuclear power is considered low-carbon because nuclear reactors produce no direct CO_2 emissions, it nevertheless relies on uranium as a fuel whose extraction and processing is extremely energy-intensive;

c) contradictory views of European States: some countries led by Germany insist that nuclear power is not part of the goals of renewable sources; at the same time, the rest, led by France, are considering laws to accelerate the construction of new nuclear reactors and simplify the process of approving and building new stations.

In our opinion, the problem of regress illuminates two important theses. First, it became side evidence of the existence of an existential problem, that is, it confirmed the fact that accelerating the energy transition, despite its good intentions, inevitably entails increasing the burden on natural resources. Secondly, the problem of regress demonstrates the unwillingness of alternative energy at this stage of development to meet the needs of modern European society to the necessary extent.

3) ***The problem of energy solidarity***, which may be classified as an internal matter of the EU, but its manifestations have an impact on Ukraine because this principle is extended to our state through the Association Agreement (Article 338). The principle of energy solidarity enshrined in Article 194 of the Lisbon Treaty has long been considered just declarative, but in the case of "Germany v Poland", the EU Court in 2021 adopted a decision according to which the principle of energy solidarity received a reasoning content. It means, in particular, that EU institutions, in implementing measures in the context of EU energy policy, should take into account the interests of all stakeholders who may suffer, given, among other things, *"supply security, their economic and political viability and*

[15] Bogojević S. Legal Dilemmas of Climate Action. *Journal of Environmental Law*. 2023. Vol. 35. Issue 1. P. 1–9.

diversification of sources of supply"[16]. This approach opened the door to many potential controversies amid the complex implementation of REPowerEU. In the current climate of abandoning Russian gas and intensifying alternative energy, the principle of energy solidarity actually requires ceding certain national interests to satisfy the interests of other states of the Union. At the same time, according to foreign scientists, the war in Ukraine can prevent the use of this principle in favor of local energy supplies, even if this means an increase in coal dependence[17].

Despite these complex problems, REPowerEU requires its legal implementation. Indicative of the stated considerations will be the announced adoption of REDIII – the updated Renewable Energy Directive, the revision of which is due to the implementation of REPowerEU. According to the updated version, REDIII should increase a number of targets for the production and consumption of energy from renewable sources by 2030. The EU's mandatory 2030 renewable energy target is expected to rise to a minimum of 42.5% from the current target of 32% and almost doubles the existing share of renewable energy in the EU[18]. Currently, it is difficult to predict how this updated REDIII will be combined with solving the identified energy transition problems, since there are many poorly controlled factors for the impact on this relationship.

However, it can be concluded that the war in Ukraine provoked the second serious test of the European GreenDeal for viability. It was the energy component that came under the greatest pressure. Despite these new crises, *"the European Green Deal has not been sacrificed on the altar of energy security"*[19]. In general, it can be stated that Green Deal withstood, but had to adapt to the new conditions and retreat in a number of previously won positions.

The world is currently experiencing a period of kind of turbulence: on the one hand, the vast majority of countries agree with the need for decarbonization and the importance of the development of alternative energy, but on the other hand, the alternative energy itself undergoes many tests for sustainability (reducing resource capacity, strengthening

[16] C-848/19P *Germany v Poland*, ECLI : EU:C:2021:598. URL: https://curia.europa.eu/juris/liste.jsf?num=C-848/19 (дата звернення: 01.07.2023 року).

[17] Bogojević S. Legal Dilemmas of Climate Action. *Journal of Environmental Law*. 2023. Vol. 35. Issue 1. P. 1–9.

[18] Political agreement reached on RED III. URL: https://www.eraa.org/political-agreement-reached-red-iii (дата звернення: 01.07.2023 року).

[19] Rybski R. Energy in the European Green Deal: impacts and recommendations for MENA countries**.** *The Journal of World Energy Law & Business*. 2023. Vol. 16. Issue 2. P. 127–142.

environmental friendliness, reducing cost, avoiding or reducing competitive confrontation with agriculture, biodiversity, etc.).

According to the results of the study, several intermediate conclusions can be drawn. Firstly, the phenomena provoked by the war in Ukraine did not lead to the rejection of the energy transition within the framework of GreenDeal, but on the contrary – are considered as incentives for its additional acceleration.

Secondly, the retrospective analysis demonstrates a change in approaches to the importance of alternative energy: in the second half of the 2000s, state assistance to the development of green generation was considered only as one of the levers for stimulating the economic growth of developed countries; a decade later, the scaling of alternative energy has formed the basis of fundamental transformation strategies.

Thirdly, the war in Ukraine has further strengthened the importance of alternative energy as a necessary substitute for unwanted fossil energy sources. At the same time, the "acceleration" of the energy transition, which is forced due to geopolitical processes, highlights a number of complex problems of the development of alternative energy: the existential problem, the problem of regression and the problem of energy solidarity. The legal difficulties identified on the example of other countries should be thoroughly studied and taken into account during the legislative support of the energy transition in Ukraine.

8.2. Peculiarities of state regulation and support for the development of alternative energy in the USA, Canada, and Latin American countries

Regarding the regulatory support for the functioning of the American market of alternative energy carriers, it is worth noting that the first attempts to regulate and support the development of renewable energy in the United States were made in the 1970s. Under the 1977 United States Congress Act "On the organization of the Department of Energy Organization Act", a federal department was created – the Department of Energy (DOE), which was entrusted with all the functions related to energy previously implemented by various bodies. The specified entity is responsible for coordinating the activities of all federal executive bodies in the area of energy, and the implementation of a unified energy policy. In 2010, the DOE Office of Energy Efficiency and Renewable Energy was established as part of the ministry. Also, in the system of the Ministry of Energy functions the Federal Energy Regulatory Commission (FERC) which is an independent federal agency that distributes electricity, natural gas, and oil to the states. It adopts regulatory acts on pricing, tariff

implementation, as well as investment in the energy sector. Energy issues are also part of the competence of other federal agencies, in particular, the Environmental Protection Agency (EPA)".

In 1978, due to the rapid spread of the global energy crisis, the federal Public Utility Regulatory Policies Act (PURPA) was adopted. Due to the situation, as well as the prospects for rising oil prices, the US Congress established a policy of reducing the country's dependence on external fuel supplies, diversifying the energy market, and supporting the development of alternative energy sources. One of the most important achievements of this Act was the beginning and gradual growth of energy production by independent companies that are not connected with the state or utilities. By the mid-2010s, the share of the latter had grown to 7% of the total electricity produced in the country. Note that before the implementation of the above Act, only utility companies had the right to own and manage generating power plants, and then, on the contrary, there was a requirement that the percentage of energy purchases from independent electricity producers be increased. So, thanks to the Public Energy Policy Act, the US renewable energy market has significantly increased due to solar and hydroelectric power plants.

The leading stage in the development of the US energy sector was the adoption of the Energy Policy Act in August 2005, which is basic for the development of alternative energy and energy efficiency, establishes tax incentives to encourage energy saving measures, as well as aimed at improving energy security, economic growth and meeting energy needs, etc. Despite these positive aspects of this regulatory act, its main achievement was an increase in budget financing of energy in the period 2005 – 2010, as well as 2010–2015.

In addition, a tax reduction system was provided. It is a measure of economic stimulus for energy producers, which is that they are provided with solar tax credit. They may reduce the amount of federal taxes paid by costs related to installation of equipment or other activities related to the production of alternative energy. So, the amount of the indicated loan in 2019 amounted to 30% of the costs of installing solar panels, in 2020 it decreased to 26%, and for 2021 it is 22%. The amount of tax credits is determined by the legislation of each individual state. At the same time, federal and state laws are very specific and are norms of direct action. They usually set the percentage of increase in the share of renewable energy sources in the energy sector for a certain period.

It must be noted that in the energy legislation of the United States, there is a tendency for state support and promotion of the development of the alternative energy industry. In 2007, the Energy Independence and Security Act (EISA) enshrined the provision that the production of energy from

renewable sources is one of the most important and effective means to solve not only energy but also environmental problems facing humanity. According to the American Recovery and Reinvestment Act, a number of federal projects and programs in this direction were financed from the federal budget in the form of grants, in particular, the production of biofuels (Biomass Program); Geothermal Technologies Program; production of new battery generation, as well as software for electric vehicles and hybrids; providing energy from renewable sources of buildings and structures of federal property during their design, construction, and modernization[20].

Currently, the US Congress is considering a draft of the Clean Energy Standard Act. Its goal is to ensure the generation of electricity at zero emissions into the atmospheric air of greenhouse gases (net-zero emissions) by 2050. The provisions of the project are based on the international legal principles of environmental protection, primarily on the prevention of climate change. Thus, one of the main directions of the proposed mechanism is the creation of an energy market, as well as the sale of loans for the development of alternative energy sources.

So, renewable energy in the United States has reached a high level and continues to develop rapidly [21].

The state structure of *Canada* and the huge size of the country create a very diverse picture of the energy market. Overall, Canada's energy consumption per unit of population is among the highest in the world. Interesting is the fact that despite the existence of significant energy resources, they are distributed unevenly throughout the state, so some provinces export energy, and others import it from abroad. Due to the size of the territory and the peculiarities of the population (most Canadians live in the south of the country along the border with the United States, although the largest energy producers are hundreds and thousands of kilometers to the north), the Canadian electricity market is closer to the United States than between the provinces. However, it is this integration that the energy sector owes its success.

The development of Canadian legislation in the energy sector is characterized by the fact that the constitution gives the provinces and territories the right to regulate the energy market – each of the 13 regions of

[20] Караханян К. М. Правові засади розвитку альтернативної енергетики в США. *Шості Таврійські юридичні наукові читання :* матеріали міжнар. наук.-практ. конф. (м. Київ, 05-06 лютого 2021 р.). Київ : Таврійський національний університет імені В.І. Вернадського, 2021. С. 68–71.

[21] Караханян К. М. Особливості правового регулювання альтернативної енергетики в країнах Америки (США, Канада, країни Латинської Америки). *Міжнародний науковий журнал "ІНТЕРНАУКА". Серія : "Юридичні науки"*. 2021. № 1(35). С. 68–75.

the country has a unique situation. Federal authorities are responsible only for the development of minimum environmental standards and rules for international trade in resources and energy. Currently, the state is implementing a number of federal projects aimed at the use of renewable energy sources: in particular, it provides significant subsidies to companies that introduce alternative energy, encourages producers of "clean" energy to increase generating capacity, sets some of the highest "green" tariffs in the world in order to attract additional investment.

In 2008, Canada adopted the Federal Sustainable Development Act, which officially announced support for renewable energy. In order to develop the provisions and support this Act, the Federal Sustainable Development Strategy (FSDS) for the period 2016 – 2019 was in force. The main areas of action of the strategy were measures aimed at preserving the environment and preventing climate change, including the production of energy from alternative sources. A plan for the production of so-called "clean energy" was introduced, which provided for the production of energy from renewable sources at the level of 90% of the total volume by 2030[22].

The specified task of the strategy already has certain positive developments. So, in particular, by 2017, federal and local governments in the energy sector, which agreed to a joint action plan, took important steps to expand the circle of participants using clean energy, and also provided significant investments in the construction of new alternative energy facilities. In order to accelerate the growth of companies using "clean" technologies, $14 billion was provided from the state budget. In addition, the government is going to invest $21.9 billion over 11 years to support green infrastructure, which will create a clean economy in Canada due to the development of renewable energy sources[23].

The leaders of energy production from alternative sources are also Latin American countries, in particular, Brazil, Argentina, Uruguay, Chile, Bolivia. In the 70s of the last century, during the first wave of the oil crisis, the Brazilian government introduced a program for the use of alcohol as a fuel (National Fuel Alcohol Program). The implementation of the program did not cause significant complications, since Brazil is one of the world's largest producers of sugar and sugarcane. However, the government helps private businesses implement this program by providing additional tax incentives and preferences. For example, these incentive measures to

[22] The official website of the Government of Canada. URL: https://www.canada.ca/en.html (дата звернення: 01.07.2023 року).

[23] Караханян К. М. Особливості правового регулювання альтернативної енергетики в країнах Америки (США, Канада, країни Латинської Америки). *Міжнародний науковий журнал "ІНТЕРНАУКА". Серія : "Юридичні науки"*. 2021. № 1 (35). С. 68 – 75.

support manufacturers of bioethanol, which is made of sugar, include the provisions of the legislation on the mandatory content of the latter in the fuel at the level of 20 – 25%. Thus, the state ensures the existence of a market for manufactured products. For consumers, meanwhile, subsidies are set in the form of a low price for such fuel, which makes it available for consumption.

In recent years, Latin American countries have made significant advances in the use of wind, solar, geothermal energy resources, as well as biofuels. If ten years ago it was about the energy revolution, then today we can safely say that the countries of Latin America are one of the world leaders in the development of alternative energy. For example, Brazil is the first major industrial power to achieve a record share of renewable energy. According to the National Report on the Energy Balance, 88.8% of the country's electricity is generated from renewable sources. Argentina recently entered the top ten of Ernst & Young's Global Renewable Energy Investment Attractiveness Index for the first time in history and with the help of the World Bank plans to produce 20% of its electricity from alternative sources. Such plans are very real, since Argentina includes a unique natural region of Patagonia, characterized by such resources of the sun and wind, which have no analogues in the world. The heyday of Argentina's alternative energy comes from 2017, when the Year of Renewable Energy was proclaimed. The most developed areas are wind, solar, hydro and bioenergy.

As for regulatory support for the development of alternative energy in Latin American countries, the national laws of the latter enshrine similar provisions of energy policy, the main of which are: economic and energy security guarantees, environmental protection policy, and environmental security, ensuring the use of stimulus measures, in particular, government donations and subsidies, investments in the energy sector, tax incentives, state support for renewable energy producers[24].

8.3. Specifics of Australia's alternative energy legal regulation

This country combines incompatible seemingly signs: on the one hand, it demonstrates impressive examples of the successful development of alternative energy, and on the other – rather modest overall indicators of

[24] Караханян К. М. Глобальні тенденції розвитку альтернативної енергетики на прикладі країн Латинської Америки. *Наукові дослідження : парадигма інноваційного розвитку :* збірник тез VI Міжнар. наук. конф. (Прага, Чехія, 15 лютого 2021 року). ГО "Міжнародний науковий центр розвитку науки і технологій", 2021. С. 57–59.

decarbonization of one of the world's well-developed economies (according to the Climate Change Efficiency Index in 2020, Australia was recognized as one of the countries showing the worst performance). This phenomenon is revealed through the characterization of Australia's alternative energy legal regulation, which has some key features.

1. *An internal political and legal confrontation over the development of renewable energy*, which unfolded against the background of several important prerequisites: a) the federal structure of Australia, which consists of six states, two territories and the federal government; b) the country's high dependence on fossil fuels (in 2018 coal accounted for 15% ($60 billion) and gas 8% ($38 billion) of Australia's export income); c) the federal government, coal states and the industrial lobby have an active and quite aggressive policy, opposing the development of alternative energy.

Against the background of these prerequisites, the crisis was inevitable, since in 2006 one of the states – South Australia decided to develop according to a different energy scenario. South Australia has shown absolutely impressive indicators of the evolution of renewable energy: in the 14 years from 2004 to 2018, there was a rapid transition from 100% of fossil fuel production and consumption to half of self-sufficiency through alternative sources – 50% of energy is generated by wind and sun[25]. From an electricity importer, the state became an exporter. Total renewable energy production is expected to reach at least 75% by 2025 and the state government's target level to 100% by 2030[26]. South Australia's growing success has attracted increasing opposition from the federal government. This led to a violent political struggle, when in 2016 – 2017 technical problems with blackouts were cynically used by federal politicians in public speeches to intimidate the population: "due to unreliable alternative energy, you may have the same as in South Australia".

The general outlines of the long internal political and legal conflict in Australia have some parallels with Ukrainian realities. For example, representatives of "brown" energy used the increase in electricity prices and the collapse of payments under the "green" tariff as a way to discriminate against alternative energy and delay its development in Ukraine. The same goal was pursued by the constitutional representation of people's deputies, according to which the question of compliance with the Constitution of

[25] McGreevy M., MacDougall C., Fisher M. Expediting a renewable energy transition in a privatised market via public policy : The case of south Australia 2004-18. *Energy Policy*. 2021. Vol. 148.

[26] Parkinson G. South Australia's Stunning Aim to Be "Net" 100 Per Cent Renewables by 2030. *Renew Economy*. 2019. URL: https://reneweconomy.com.au/south-australias-stunning-aim-to-be-net-100-per-cent-renewables-by-2030/ (дата звернення: 01.07.2023 року).

Ukraine with a number of provisions of the laws of Ukraine "On Alternative Energy Sources" and "On the Electricity Market". It should be understood that resistance to traditional energy will grow. This should be taken into account during regulatory and strategic planning, as well as in the development of long-term regional development strategies.

2. *Weak direct government management of the energy sector*. Back in the 1990s, Australia's energy network was privatized under the influence of neoliberal economic ideology. In a privatized market system, integration of environmental goals is even more complex[27], since there are practically no imperative levers for public administration. Instead, Ukraine still has quite significant regulatory influence, and this is most likely justified, taking into account Ukrainian conditions and experience.

3. *Legal enforcement of alternative energy support* in Australia is embodied in the dominant green certificate legal mechanism. Under the legislation, alternative energy is encouraged through federally issued trade certificates that electricity retailers are required to purchase[28]. Australia is also one of the first countries in the world to introduce a carbon tax. However, in the absence of proper political will, these positive rule-making actions did not create an effective engine for the transformation of the energy system, which is confirmed by the preservation of high rates of fossil fuel use.

Scientists criticize the regulatory provision of alternative energy in Australia. In particular, it is claimed that the adopted energy law – the "White Paper" of 2015 – focused only on the economy, completely ignoring the energy security policy and not paying enough attention to environmental protection issues[29]. In particular, the Australian federal renewable energy law would have to be expanded to address important issues that currently receive little legislative or political attention [30]. Modern Ukrainian legislation in the field of alternative energy also has a number of serious defects and requires scientifically justified improvement. In particular, the support system is waiting for its full launch. The Ukrainian protection

[27] Warren B., Christoff P., Green D. Australia's sustainable energy transition : the disjointed politics of decarbonisation. *Environmental Innovation and Societal Transitions*. 2016. Vol. 21. P. 1–12.

[28] Hua Y., Oliphant M., Hu E. J. Development of renewable energy in Australia and China : a comparison of policies and status. *Renew. Energy*. 2016. Vol. 85. P. 1044–1051.

[29] Marsden S. The "Triangle" of Australian Energy Law and Policy: Omissions, Connections and Evaluating Environmental Effects. *Journal Of Environmental Law*. 2017. Vol. 29. Issue 3. P. 475–503.

[30] Prest J., Soutter G. The Future of Australia's Federal Renewable Energy Law. *Australian Law Journal*. 2018. Vol. 92. Issue 10. P. 799–813.

model was originally implemented in the "green" tariff, which for several years they have been trying to replace with green auctions.

4. *Active role of state (regional) government.* Despite the combination of positive natural conditions, widespread access to solar radiation and powerful winds, the success of the state of South Australia would not have been possible without the consistent and active policies of the regional government. First, this manifests itself in the alternative energy stimulus available in the liberal economy. In particular, the purchasing capabilities of the government are used as efficiently as possible to attract new players to the energy market and thus create pressure on prices. Secondly, work is constantly underway to create a favorable regulatory framework. For example, a state law was passed in 2011 to support wind farms. When the construction of wind power plants for aesthetic reasons was challenged on its basis in the same year, the government showed consistency by promptly making the necessary editorial changes in order to eliminate such obstacles in the functioning of wind generation. Thirdly, the South Australian government is carrying out the necessary adaptation work, because the energy transition is not only an economic or ecological phenomenon – it is a system restructuring that has a strong impact on society. In particular, when a coal plant was closed in a small city, the state government gave this territorial community a grant of $6 million to build a tomato greenhouse equipped with solar panels – the enterprise formed 200 jobs.

The Ukrainian legislator cannot boast of such care and consistency. This is well illustrated by the declarative restructuring of coal regions and the high-profile scandal of 2020, associated with a sharp turn in the policy of supporting alternative energy.

5. *Work on the mistakes*. The outages, which occurred at peak times, did not force the South Australian government to abandon the chosen course – on the contrary, the difficulties contributed to the organization of additional measures to strengthen energy security. In particular, backup power was created (the largest battery for energy storage was designed and a state gas power plant was built). Instead, the total strategic and tactical miscalculations of the Ukrainian rulemaker in recent years did not entail a thorough work on the mistakes made.

The presented political and legal experience of Australia well illustrates the problem of the energy transition, which covers the modern world. The difficulties faced by modern Ukrainian society are not unique – they have similar analogues in more developed countries. However, the main thing that the experience of Australia proves is: a) the detrimental effect of the internal political and legal confrontation regarding the development of alternative energy; b) the need to determine policy priorities and ideological foundations to which energy legislation should comply. This is critically

important for Ukraine, because we constantly urgently and chaotically solve some tactical tasks without a clear vision of the strategic goal[31].

8.4. Legal experience of China, India and Japan in the field of alternative energy development

This country is impressive for its achievements in the field of alternative energy. China's economy has made extraordinary strides since the introduction of reform and openness policies in 1978; the next 30 years of rapid growth are known as the "Chinese miracle". However, the mechanism of extensive economic growth, which is characterized by high levels of costs, emissions, pollution and energy consumption, has caused intense pressure on resources and the environment. At the same time, mass consumption of energy resources caused a large amount of greenhouse gas emissions[32]. In 2013, China's carbon dioxide emissions reached 10 billion tons, which is 28% of total global emissions and exceeds total carbon emissions in the United States and the EU. As the world's largest producer of carbon dioxide, China is also the world's largest energy consumer[33]. At the same time, energy demand in China tends to grow. Amid these objective prerequisites, the government promises that China will peak carbon emissions by 2030 and carbon neutrality by 2060.

Awareness of the need for energy ecology was embodied, in particular, in the purposeful creation of legislation to stimulate the use of renewable energy sources. In 2005, the Renewable Energy Act of the People's Republic of China was adopted, which actually laid the legal foundations for the active development of alternative energy. The main support mechanisms were provided by the following:

1) *Providing priority network access*. This technical and legal aspect is central to the specifics of China's energy system since the construction and launch of new energy facilities are not sufficiently synchronized with less developed network infrastructure. In this regard, it has become common for China to idle built renewable energy facilities that are not connected to the

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[31] Харитонова Т. Є. Правове регулювання альтернативної енергетики в Австралії: досвід для України. *До 60-річчя набуття чинності Закону "Про охорону природи Української РСР" : екологічне законодавство України через призму його історичного розвитку :* матеріали Міжнар. дистанц. наук.-практ. конф. (м. Київ, 12 квітня 2021 року). Київ : Видавництво *"Наукова столиця"*, 2021. С. 106 – 110.

[32] Kun Zhang, Zong-Yong Zhang, Qiao-Mei Liang. An empirical analysis of the green paradox in China : From the perspective of fiscal decentralization. *Energy Policy.* 2017. Vol. 103. P. 203–211.

[33] Chenxi Zhang, Dequn Zhou, Qunwei Wang, Hao Ding, Siqi Zhao. Will fiscal decentralization stimulate renewable energy development? Evidence from *China*. *Energy Policy*. 2022. Vol. 164.

network. However, despite the direct indication of the law, network enterprises, using a monopoly position, did not connect alternative energy facilities in the proper priority order.

A similar problem is manifested here and there in Ukraine. An illustration can be the case of the Botiiv wind farm. The owner of this wind farm signed an agreement on connecting the power plant to the network with the only possible entity capable of doing this – Zaporizhzhiaoblenergo OJSC, but due to many circumstances, such a connection occurred with a significant delay. In contrast to the "silent inaction" in such cases in China, in Ukraine, a similar situation entailed penalties imposed by the Antimonopoly Committee of Ukraine on Zaporizhzhiaoblenergo for abuse of monopoly position[34].

In the same aspect, the problem of planning the use of territories is also manifested. Thus, most wind power plants are located in the north of China, while high energy consumption is concentrated mainly in the south and east of the country. This further exacerbates the problems of compliance with the legislation on the priority of connecting alternative energy facilities to the network, because in the north there is an excess of such energy, and in the south, there is a shortage.

2) Guaranteeing the full purchase of energy produced from renewable energy sources. The importance of this mechanism can not be overestimated, since it is designed to guarantee investors the profitability of their deposits in the business. However, despite legislative consolidation, this mechanism also did not work to the fullest due to the lack of the following normative detail. To unlock this main protective mechanism, the rule-maker introduced changes in 2009, according to which network enterprises pledged to conclude contracts for the purchase of energy produced at renewable energy facilities. However, the legal "gap" remained: the network enterprise was relieved of its duty in the case of a threat to energy security. Due to the lack of clear definition of understanding the threats to energy security, in fact, this provision negated the legal obligation of network enterprises and the protection mechanism as a whole.

3) "Green" tariff – a protection mechanism typical of alternative energy, approved in most countries of the world, which sought to stimulate the use of the renewable energy industry. In China, it also had its features, in particular, its size was not guaranteed. Thus, in practice, producers are forced to agree to a lower tariff to be connected to the network, thereby

[34] Постанова Вищого господарського суду Українивід 15 березня 2017 року у справі № 908/1864/16. URL: https://zakononline.com.ua/court-decisions/show/65436767 (дата звернення: 01.07.2023 року).

“ensuring access to the network comes at the cost of sacrificing the financial viability of renewable energy producers”[35].

As a result of these mechanisms, a paradoxical situation developed in China: on the one hand, an impressive number of renewable energy facilities were built, but on the other hand, there was a rapid tendency to leave these combined capacities. Then the central leadership faced the task of modifying the system of state support to stop the negative regressive phenomena in alternative energy. To this end, other mechanisms of state support of research interest were additionally tested in China. We are talking about such interesting mechanisms as:

а) *environmental production control*, which aims to establish a dispatch sequence based on the energy efficiency level of each unit and the amount of pollutant emissions[36]. However, this idea has not shown its effectiveness in practice, instead demonstrating favorable conditions for abuse by local authorities;

б) *“green” certificates* (REC) – a mechanism whereby renewable energy producers are issued certificates for each megawatt-hour they produce. Under Chinese law, certain electricity market participants (including network businesses, electricity retail companies, and large end-users involved in direct trading of electricity) are required to purchase a set number of certificates to prove that a percentage of their electricity comes from renewable sources;

в) *establishment a “target share”*. This mechanism implies that the relevant authorities that manage the electricity sector are required to determine the expected contribution of electricity generated from renewable sources to the total amount of electricity generated in the country over a certain period (“target share”). At the same time, the relevant authorities should develop specific measures to ensure that the target amount of electricity generated from renewable energy sources receives priority access to the network and is fully purchased by network enterprises[37].

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[35] Hao Zhang. Prioritizing Access of Renewable Energy to the Grid in China: Regulatory Mechanisms and Challenges for Implementation. *Chinese Journal of Environmental Law*. 2019. Vol. 3. Issue 2. P. 167–202.

[36] NDRC, State Environmental Protection Agency, SERC and Office of National Energy Leading Group (dissolved), ‘Workplan for the Pilot Programs on Energy Efficiency Dispatching’ (节能发电调度试点工作方案). 2007. № 53. URL: http://www.gov.cn/zwgk/2007-08/07/content_708486.htm (дата звернення: 01.07.2023 року).

[37] Hao Zhang. Prioritizing Access of Renewable Energy to the Grid in China: Regulatory Mechanisms and Challenges for Implementation. *Chinese Journal of Environmental Law*. 2019. Vol. 3. Issue 2. P. 167–202.

Analysis of professional foreign literature allows to distinguish three important problems faced by the development of alternative energy in China:

1) *local (regional) protectionism of coal generation.* China's impressive economic gains have been built on fossil fuels – mostly coal, which the country is rich in. The flip side of the situation was the growth of pollution (especially air), the specialization of the regions, the problems of unemployment. These phenomena and processes dealt an insidious blow to alternative energy, which began to develop in the country. Thus, despite the violation of the requirements of the law on priority access to the network and the guaranteed full redemption of "green" energy, state authorities do not want to fine network enterprises, worrying about the security of energy supply. In addition, contrary to the tasks of the central government, regional authorities can restrain the development of "green" generation by their actions. For example, based on local interests, the local government will buy its own coal energy rather than "green" energy produced in the neighboring province. Thus, the decentralization reform of the energy system carried out in China demonstrates its side effects, which are not obvious, but very significantly affect the development of alternative energy;

2) difficult access to justice. In cases where there is any dispute between the network enterprise and the power-generating enterprise regarding priority access, they may apply for mediation by a public authority. If both parties refuse to settle the dispute through mediation, the dispute may be settled through civil proceedings. However, a feature of Chinese legal proceedings is the need to present sufficiently convincing evidence of a violation of the plaintiff's rights so that the case is generally accepted for consideration in court. However, this is actually very difficult to implement, since network enterprises, due to their monopoly status, often force renewable energy producers to agree on various exceptional circumstances in contracts. In this regard, most often renewable energy producers cannot sue a network enterprise on the basis of a contract. The result of such limited access to justice, in particular, was the lack of cases in which the rights of alternative energy producers would be upheld;

3) institutional deficiencies. This problem is quite complex because of its versatility. It is the result of a number of processes and circumstances, namely: a) a specific model of decentralization (when local authorities are granted autonomy in regional economic development and distribution of resources, but the central government retains strong levers of governance[38]);

[38] Chenxi Zhang, Dequn Zhou, Qunwei Wang, Hao Ding, Siqi Zhao. Will fiscal decentralization stimulate renewable energy development? Evidence from China. *Energy Policy*. 2022. Vol. 164.

b) pluralism of regulatory actors (central government agencies and provincial governments, which often have different programs and priorities[39]); c) imperfection of the legal status of special bodies in the field of energy regulation (studies indicate that such bodies did not receive appropriate powers and resources to be effective regulators[40]).

The analysis of China's problems in developing its own alternative energy is of particular interest to Ukraine, as it allows us to draw some important conclusions. There are no absolute (ideal) legal solutions that would guarantee unconditional success in stimulating alternative energy. China for almost twenty years has tested most of the common legal mechanisms developed in the world to support the use of RES, but they all worked with varying degrees of efficiency due to the specific domestic legal, organizational, institutional, economic, and political context.

India. The Indian experience is an interesting example of the active formation of alternative energy in a developing country. Showing significant economic growth and a rapid increase in the population, India is constantly experiencing an acute shortage of energy, because it is very dependent on imports, especially crude oil (80%) and natural gas (40%)[41]. Own traditional resources – mostly coal – are exhaustive and climatically unfriendly. This has become a serious motivator for finding political and legal ways to ensure the current and future energy security of the country.

The climatic and weather conditions of India form an extremely powerful potential for the development of various types of "green" generation, but such resources are geographically dispersed[42] and not fully developed. At the same time, India has already become a recognized global player in the area of alternative energy, because, since 2010, the size of investments in the development of alternative energy in this country has varied from 5.11 to 11.9 billion euros per year[43]. This is paying off: in 2021,

[39] Edward A CUNNINGHAM. The state and the firm : China's energy governance in context. Boston University GEGI Working Paper 1, 2015. URL: http://ash.harvard.edu/files/chinas-energy-working-paper.pdf (дата звернення: 01.07.2023 року).

[40] Ngan H.W. Electricity regulation and electricity market reforms in China. *Energy Policy*. 2010. Vol. 38 (5). P. 2142–2148.

[41] Kar S. K.,Gopakumar K. Progress of renewable energy in India. *Advances in Energy Research.* 2015. Vol. 3 (2). P. 97–115.

[42] Shyam B., Kanakasabapathy P. Renewable Energy Utilization in India – Policies, opportunities and challenges. *Proceedings of 2017 International Conference on Technological Advancements in Power and Energy (Tap Energy) : Exploring Energy Solutions for an Intelligent Power Grid. 2017.* URL: https://www.webofscience.com/wos/woscc/full-record/WOS:000463856000109 (дата звернення: 01.07.2023 року).

[43] Топ-5 країн, які вкладають у ВДЕ більше всіх. URL: https://cern.com.ua/2018/09/29/top-5-krayin-yaki-vkladayut-u-vde-bilshe-vsih/ (дата звернення: 01.07.2023 року).

India ranked third in the world in terms of renewable energy capacity growth (15.4 GW) after China (136 GW) and the United States (43 GW).

Such indicators are not an accident – they have become a natural result of long-term purposeful work. The state actively promotes climate, economic, and environmental ambitions in the field of alternative energy, having formed its own unique legal space that contributes to this. For the purposes of our study, we can point out some special features of stimulating the use of RES in India.

1) *Institutional provision*. India is the first country in the world to establish a special agency in the early 1980s focused on promoting green generation – Ministry of New and Renewable Energy of Ukraine[44]. Its forty-year functioning is justified, in particular, by the achieved actual indicators of the development of alternative energy in the state. The analyzed institutional solution is particularly interesting in comparative terms against the background of new initiatives on the potential merger of the Ministry of Energy and the Ministry of Environment in Ukraine. If India follows the path of specialization of institutional and functional support for "green" energy, then Ukraine demonstrates a reverse movement that will not contribute to achieving successful results in this area.

2) *Legislative support*. In India, electricity reforms have been taking place since the early 1990s, but this process remains incomplete given the constant increase in energy needs amid new challenges[45]. Nevertheless, India has developed special energy legislation, which regulates the electricity market and provides for the main legal mechanisms in this area. At the same time, the legislation for a long time (until 2003) did not contain specific provisions that would contribute to renewable or unconventional energy sources. Despite this shortcoming, in 1994 – 1995 the Ministry of New and Renewable Energy tried to give impetus to this sector through political guidance, which had mixed results. However, the Electricity Act adopted in 2003 changed the regulatory basis for the functioning of renewable energy. The Act provides for nationwide policy-making by the Government of India and obliges State Electricity Regulatory Commissions (SERC) to take action to promote renewable and unconventional energy sources within their jurisdiction[46].

[44] Jadhav O. H, Jadav S. M. Aspects of renewable energy potential in India and Future scope. *International Conference on Nascent Technologies in Engineering* (ICNTE-2017). 2017.

[45] Kaushal N. An. Insight into Energy Crisis in India. Proceedings of 2012. *International Conference on Public Administration (8TH).* 2012. Vol. I. P. 76–92.

[46] Vikas Khare, Savita Nema, Prashant Baredar. Status of solar wind renewable energy in India. *Renewable and Sustainable Energy Reviews.* 2013. Vol. 27. P. 1–10.

3) *Software*. The experience of India is characterized by the active use of software tools to stimulate the use of RES. The most prominent example should be a large-scale program called the National Solar Mission named after Jawaharlal Nehru, initiated by the Government of India in early 2010. This program provides for the conclusion of long-term (25 years) contracts between energy producers from alternative sources and enterprises controlled by the government at fixed favorable tariffs. Next, state-owned enterprises supply purchased energy to distribution utilities, which, in turn, sell electricity to consumers[47].

The use of the country's powerful solar potential is also stimulated at the level of household production and consumption. An example is the program on "solar roofs". There are inherent advantages of using building roofs for energy purposes: fewer land requirements, economic advantage, accelerating the achievement of targets for renewable energy procurement obligations, and targeted delivery of reliable electricity to micro, small, and medium enterprises[48]. Thanks to the support of the government of India, almost all states and union territories have developed policies to stimulate "roof" energy, however, despite this, its implementation is still relatively low (about 17%)[49]. India's government has adopted an unprecedented and ambitious goal to deploy 40 GW of rooftop solar by 2022 but has reached just 7.7 GW by June 2021[50].

Programmability is quite a defining feature of India's alternative energy incentive. It can be further noted that the National Energy Efficiency Mission, the National Green India Mission, the National Hydrogen Mission, etc. have also been adopted in this country. Unlike domestic program documents, mostly suffering from declarative and inefficient, the Indian

[47]Marianna Karttunen, Michael O. Moore. India – Solar Cells : Trade Rules, Climate Policy, and Sustainable Development Goals. *EUI Working Paper RSCAS*. 2017. № 64. URL: https://cadmus.eui.eu/bitstream/handle/1814/49745/RSCAS_2017_64.pdf?sequence=1 (дата звернення: 01.07.2023 року).

[48] Sarangi Gopal K., Taghizadeh-Hesary Farhad. *Rooftop Solar Development in India: Measuring Policies and Mapping Business Models*. 2021. ADBI Working Paper 1256. Tokyo: Asian Development Bank Institute. URL: https://www.adb.org/publications/rooftop-solar-development-india-policies-mapping-business-models (дата звернення: 01.07.2023 року).

[49] Nuvvula Ramakrishna S.S., Devaraj Elangovan, Rajvikram Madurai Elavarasan, Seyed Iman Taheri, Muhammad Irfan, Kishore Srinivasa Teegala. Multi-objective mutation-enabled adaptive local attractor quantum behaved particle swarm optimisation based optimal sizing of hybrid renewable energy system for smart cities in India. Sustainable Energy Technologies and Assessments. 2022. Vol. 49.

[50] Tarun Dhingra, Anita Sengar, Shambhu Sajith. Identifying, analyzing, and prioritizing barriers in the Indian industrial and commercial rooftop solar sector. *Solar Energy*. 2023. Vol. 254. P. 15–26.

"analogs" of the latter are quite effective, detailed, and therefore viable normative regulation of energy legal relations.

4) *Financial support*. Not limited to multi-billion dollar budget investments, India is trying to arrange additional financial flows to the alternative energy industry, for example, by:

a) establishment of national development banks, that lend, including energy projects. In general, in this aspect, India is of particular interest, since in 1980 – 1990 it had an essentially large-scale experiment with the creation of development institutions, which included state-owned banks and financial and investment corporations to support the energy and shipbuilding industries[51]. National development banks play a special coordination role through three main mechanisms: 1) providing expertise and directing market information that optimizes regulatory and management support for RES; 2) easing political gaps or barriers; 3) providing a coherent and holistic set of financial services to concentrate resources on national priorities[52];

b) creation of a clean energy fund, whose funds are accumulated by a tax on environmental friendliness. The latter took the form of a tax on coal of $1 per metric ton of domestic and imported coal, which is used to produce electricity[53]. For the practical implementation of this mechanism and the disposal of foundation funds, an interdepartmental group was created in the Ministry to approve projects and requirements for access to funds [54];

c) active policy on attracting domestic and foreign investments in the field of alternative energy. In particular, 59 projects of solar parks – large specialized centers of "green" energy – have been approved in India. Investors from all over the world are invited to join the financing of these projects, and for convenience and accessibility, electronic platforms have been formed for this purpose. At the same time, the right to build a solar park is sold by the state at auction, and the winners are those applicants who offer the lowest prices for electricity. This stimulates cheaper electricity by constantly updating technology;

[51] Свистун А. О. Порівняльний аналіз державних банків розвитку Індії та Китаю. *Економіка, управління та адміністрування*. 2020. № 2 (92). С. 126–129.

[52] Fang Zhang. The policy coordinator role of national development banks in scaling climate finance: Evidence from the renewable energy sector. *Climate Policy*. 2021. Vol. 22. Issue 6. P. 754–769.

[53]Vikas Khare, Savita Nema, Prashant Baredar. Status of solar wind renewable energy in India. *Renewable and Sustainable Energy Reviews*. 2013. Vol. 27. P. 1–10.

[54]Vikas Khare, Savita Nema, Prashant Baredar. Status of solar wind renewable energy in India. *Renewable and Sustainable Energy Reviews*. 2013. Vol. 27. P. 1–10.

d) *use of green or renewable energy certificates (REC).* The state uses the mechanism of obligations to purchase energy from RES, thereby forming a new object of law – a "green" certificate. This document is legally separated from the electricity itself, so they are sold/purchased separately. In India, trading of certificates through electricity exchanges began in 2011[55];

e) *fixing "green" tariffs*. The specificity of this mechanism in Indian law lies in the variability of "green" tariffs, in particular, they vary by state depending on the resources of the region, the cost of the project, and, more importantly, the tariff provisions established by the authorized body[56].

5) *Technical support*. For the development of alternative energy, the necessary condition is the use of the necessary equipment. Taking into account the active research work that is being carried out in this direction, energy equipment is regularly obsolete and constantly updated. India is making significant efforts to develop domestic production of relevant equipment. In this way, it uses such legal mechanisms that, under international trade law (in particular, WTO law), are considered discriminatory and distorting competition and trade. We are talking about the requirements for the use of domestic goods in preference over imported. This was the subject of an international trade dispute *"India – solar panels"*, which was initiated by the United States[57]. Under the terms of the Jawaharlal Nehru National Solar Mission, potential recipients of support were required to use a certain percentage of Indian-made technical equipment. Thus, India tried to support its young industry – the production of equipment for alternative energy. Of course, we must agree that Indian measures are not only about environmental goals – they relate to the development of domestic industry, entrepreneurship, and job creation. India, as a densely populated developing country with a significant amount of population living below the poverty line, just cannot ignore such goals. From this perspective, measures to use domestic equipment serve a dual purpose: economic progress and environmental protection through sustainable energy production[58].

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[55] Girish G. P., Singhania K.,Vincent EN. Solar REC Trading in India. *International Journal of Renewable Energy Research*. 2017. Vol. 7 (4). P. 1529–1534.

[56] Vikas Khare, Savita Nema, Prashant Baredar. Status of solar wind renewable energy in India. *Renewable and Sustainable Energy Reviews*. 2013. Vol. 27. P. 1–10.

[57] India – Certain Measures Relating to Solar Cells and Solar Modules (DS456). URL: https://www.wto.org/english/tratop_e/dispu_e/cases_e/ds456_e.htm (дата звернення: 01.07.2023 року).

[58] Ghori U. "Reverse Permissibility" in the Renewable Energy Sector : Going Beyond the US-India Solar Cells Dispute. *Asian Journal of International Law*. 2018. Vol. 8 (2). P. 322–349.

Using the example of legislative regulation of India, scientists draw conclusions about the optimization of such a protective mechanism. So, in order for the requirements for domestic content to be effective, they must be: (1) limited in duration and include planned evaluation steps, (2) focus on technologies and components for which technical expertise is available and barriers to entry into the global market are available, and (3) relate to training and facilitating business connections, and relate to supporting other stages of the value chain and broader services integral to the success of renewable energy industries[59].

5) *International legal support*. India is committed to regional leadership in solar energy development. She embodies her aspirations, in particular, in the initiative to create the International Solar Alliance. The framework agreement on its creation was signed by 83 states (including Australia, Japan, Great Britain, the Netherlands, Egypt, 31 African states, 7 Pacific states, 9 countries of Latin America and the Caribbean and 3 countries of South Asia).

Despite such strong and multi-vector support for the development of "green" generation, India faces problems along the way that are generally typical for a developing country:

a) *bureaucracy and administrative* in the implementation of energy projects. Lack of coordination and cooperation within and between various ministries, departments, institutions, and other stakeholders delays and limits progress in the use of RES. An example was when the Indian Renewable Energy Development Agency (IREDA) began accepting applications for state support for wind energy shortly after the announcement of this scheme, ignoring procedural requirements regarding the need to publish an official printed notice. As a result, the Government of India rejected applications that had been submitted before such notification and considered only applications submitted after its official publication[60];

b) *difficulties with acquiring land rights*. According to Indian law provides for the existence of such categories of land that cannot be acquired for the needs of placing "green" power plants. However, given the growing number of solar and wind power plants in the country and the progressive shortage of permitted areas with the necessary energy potential, the Ministry asked state governments in 2012 to revise their land policy on

[59] Johnson O. Promoting green industrial development through local content requirements : *India's National Solar Mission. Climate Policy*. 2016. Vol. 16. Issue 2. P. 178–195.

[60] Vikas Khare, Savita Nema, Prashant Baredar. Status of solar wind renewable energy in India. *Renewable and Sustainable Energy Reviews*. 2013. Vol. 27. P. 1–10.

wind power plants[61]. A side result of land and legal problems was the development of offshore alternative energy (creation of floating solar parks, water wind power plants, etc.);

c) *lack of transparency in the regulatory environment, low degree of guaranteed rights of investors*. The inconsistency of normative actions aimed at the development of alternative energy was a problem for India. As a result, the independent policies of many states only created uncertainty for investment in RES[62]. In some cases, regional authorities to some extent discredit energy projects, because their price is environmental and social problems. Thus, the government of the Indian state of Uttarakhand has developed and introduced laws for the development of hydropower, abandoning environmental considerations and violating the rights of communities to water[63]. Of course, this approach grossly violates the principles of sustainable development, which rejects such extremes, requires compromise and finding a balance between economic, environmental and social needs.

So, having survived two powerful energy crises of the 1970s, India identified energy "self-sufficiency" as the main development priority[64]. The legislation built for this purpose, aimed at stimulating alternative energy, is yielding abundant fruits. India's experience is important for Ukraine both in terms of using positive developments and in terms of analyzing ineffective legal decisions.

Japan. Japan's legal experience in the development of alternative energy has some interesting and instructive milestones that are useful for Ukraine in comparative legal analysis. Currently, Japan boasts a stable entry into the top five states – leaders in the production of energy from renewable sources. However, this is not an easy victory, but the result of a long and complex political and legal process. The main objective prerequisites for such a result can be indicated by the following:

1) *Energy-resource poverty amid rapid industrial development*. Japan is poor in traditional fossil fuel resources. This, on the one hand, makes it vulnerable and import-dependent in the energy sector, and on the other – eliminates the need to make a difficult choice between economic benefits and environmental needs. In addition, the lack of proper own resource

[61] Vikas Khare, Savita Nema, Prashant Baredar. Status of solar wind renewable energy in India. *Renewable and Sustainable Energy Reviews*. 2013. Vol. 27. P. 1–10.

[62] Vikas Khare, Savita Nema, Prashant Baredar. Status of solar wind renewable energy in India. *Renewable and Sustainable Energy Reviews*. 2013. Vol. 27. P. 1–10.

[63] Karambelkar S. Hydropower development in India: the legal-economic design to fuel growth? *Natural Resources Journal*. 2017. Vol. 75. Issue 2. P. 361–394.

[64] Пришляк Н. В. Відновлювальна енергетика в Індії : сучасний стан та перспективи розвитку. *Інвестиції : практика та досвід*. 2018. № 21. С. 15–20.

provision frees Japan from the need to solve typical problems faced by other states – owners of traditional energy resources (for example, regarding the retraining of coal regions, etc.).

2) *Failure of the nuclear direction of energy.* Realizing the need to meet the growing needs of the developed economy in stable energy supply, Japan in the early 90s of the twentieth century chose the path of becoming a powerful nuclear power industry. Such a vector was recognized by the state strategy for the formation of Japan's energy security. In order to achieve the stated national emission reduction target, Japan has established the Kyoto Protocol Target Achievement Plan[65], which addresses measures to be taken to reduce energy-related greenhouse gases, with a major focus on voluntary activities[66] and the significant role of the nuclear sector[67], which is seen as an important technology related to global warming[68]. As part of the implementation of this strategy, the Third Strategic Energy Plan was approved, which set the task of achieving the production of 70% of electricity from zero-emission energy sources, mainly nuclear (supplemented by RES) in 2030[69]. However, this direction of development could not withstand a strict test of stability and constancy. Thus, the accident at the nuclear power plant "Fukusima – 1" in 2011, which occurred as a result of the tsunami generated by a strong earthquake, forced the government to urgently and thoroughly review Japan's energy development strategies. The consequences of this accident, in particular, were: a) the shutdown of almost all nuclear power plants in the country and the decision to close all 54 such power plants by 2040[70]; b) changing the legislative basis for the functioning of energy facilities; c) changing the priorities of state incentives, in particular, the introduction of mechanisms to support alternative energy.

[65] Kyoto Protocol Target Achievement Plan (Tokyo, 28 May 2005, partially revised 11 July 2006, totally revised 28 March 2008).

[66] Schreurs M. Multi-Level Governance and Global Climate Change in East Asia. *Asian Economic Policy Review* 2010. Vol. 5 (1). P. 88–105.

[67] Tiberghien Y., Schreurs MA. Climate Leadership, Japanese Style : Embedded Symbolism and Post-2001 Kyoto Protocol Politics / K. Harrison and L. McIntosh Sundstrom (eds). *Global Commons, Domestic Decisions : The Comparative Politics of Climate Change*. MIT Press, 2010. P. 145.

[68] Kyoto Protocol Target Achievement Plan (n 22) 53.

[69] Vance R., Henderson D., Moore L. *Impacts of the Fukushima Daiichi Accident on Nuclear Development Policies* (Organization for Economic Co-Operation and Development 2017).

[70] "Блакитні батареї" Японії : історія та сьогодення. URL: https://uhe.gov.ua/media_tsentr/novyny/blakitni-batarei-yaponii-istoriya-ta-sogodennya (дата звернення: 01.07.2023 року).

Interestingly, the accident at the Fukushima nuclear power plant has prolonged legal consequences that affect the development of state energy policy. In particular, the efforts of pro-nuclear organizations to restore the operation of nuclear power plants, which temporarily closed after March 2011, led to a large number of lawsuits in the district courts of Japan: against commercial nuclear power plants in the period from 2011 to 2020, 30 lawsuits were filed[71]. These lawsuits challenged, among other things, the government's actions to grant permits to launch nuclear power plants, the level of safety of which did not meet the current high requirements of our time.

3) *Suboptimal consideration of regional weather-climatic and geographical features* during the development of alternative energy. So, in Japan, hydropower is very well developed, and it is believed that almost all the existing natural potential has been mastered in this area. Solar energy also developed quite actively but faced with an objective problem – the lack of free territories to accommodate power plants. For some time, the so-called "solar lobby" promoted the interest in solar energy, but the objective conditions of a densely populated country with limited free space still established a kind of "glass barrier" for the further scaling of solar energy. However, even in this situation, according to economists, due to the higher cost of solar photovoltaic energy than wind electricity, Japan spends more economic resources than other countries on the use of renewable energy[72]. That is, due to the non-consideration of certain regional features, the active stimulation of solar energy has become a dubious state decision.

After the failure of nuclear energy strategies and stabilization of solar energy, the government began to actively stimulate wind energy projects. Despite the fact that wind energy has much greater potential than other renewable energy sources in Japan[73], there were legal obstacles to the large-scale deployment of wind energy in the market. Thus, the limited network capacity, the structure of the electricity market and the practice of operating the network by existing electricity companies limited the access of wind projects to the network. The passage of administrative permitting procedures increased the uncertainty, risk and time of the project. The difficulties of social perception were also quite high due to some past

[71] Koppenborg F. Nuclear Restart Politics: How the "Nuclear Village" Lost Policy Implementation Power. *Social Science Japan Journal.* 2021. Vol. 24. P. 115, 123.

[72] Aitong Li, Yuan Xu, Hideaki Shiroyama. Solar lobby and energy transition in Japan. *Energy Policy.* 2019. Vol. 134. URL: https://www.sciencedirect.com/science/article/abs/pii/S0301421519305373?via%3Dihub (дата звернення: 01.07.2023 року).

[73] Farhad Taghizadeh-Hesary, Han Phoumin, Ehsan Rasoulinezhad. Assessment of role of green bond in renewable energy resource development in Japan. *Resources Policy.* 2023. Vol. 80.

mistakes – especially regarding the violation of the interests of individual local communities[74].

Offshore wind energy projects currently have the greatest potential in Japan. However, the lack of legislation regarding the long-term private use of specific marine areas and opposition from fishing communities has hindered the development of offshore wind power. To eliminate these legal obstacles, on April 1, 2019, the Act on Promoting the Utilization of Sea Areas for the Development of Marine Renewable Energy Power Generation Facilities entered into force in Japan[75]. The law allows private use of certain areas of Japan's inland waters and territorial sea for the development and production of offshore marine renewable energy for a maximum period of 30 years[76]. At the same time, although the Act aims to allow relatively independent use of marine areas by commercial entities engaged in the production of marine renewable energy, it does not allow energy producers to exclude any fishing activities in a certain zone. Such a decision aims to prevent violation of the balance of interests of different groups of the population, business, and the state in such complex legal relations as special water use. It is important to note such an institutional flaw in the development of offshore wind energy in Japan as "deeply rooted traditional sectionalism, which can slow down the progress of the energy transition". It is primarily about the existing interdepartmental competition and the lack of cooperation between government agencies[77].

4) *Use of legal mechanisms to stimulate alternative energy.* The main protective mechanism aimed at state support for the development of alternative energy in Japan has become the well-known "green" tariff. At the same time, a feature of the Japanese experience was the long and complex adoption of the law by which such a tariff was introduced. The Act on Special Measures Concerning Procurement of Electricity from Renewable Energy Sources by Electricity Utilities (FIT Act), adopted in July 2012 and amended in April 2017 in Japan, gave rapid results, stimulating the expansion of alternative energy capacities within the first three years of its effect[78]. However, due to its shortcomings (in particular,

[74] Mizuno E. Overview of wind energy policy and development in Japan. *Renewable & Sustainable Energy Reviews.* 2014. Vol. 40. P. 999–1018.

[75] Chie Kojima. Japan Legislation on Marine Renewable Energy. *Asia-Pacific Journal of Ocean Law and Policy.* 2020. Vol. 5. Issue 2. P. 383–386.

[76] Chie Kojima. Japan Legislation on Marine Renewable Energy. *Asia-Pacific Journal of Ocean Law and Policy.* 2020. Vol. 5. Issue 2. P. 383–386.

[77] Aitong Li, Yuan Xu. The governance for offshore wind in Japan. *Energy Procedia.* 2019. Vol. 158. P. 297–301.

[78] Kenji Asano. Enactment and Enforcing Processes of the Japanese Feed in Tariff Law: Difficulties for Maximizing Renewable's Diffusion while Minimizing National Burden. Journal of East Asia and International Law. 2017. Vol. 10 (2). P. 357–378.

the non-transparent mechanism for determining the purchase price for energy from RES, the lack of a fixed upper limit of the “green” tariff, etc.), there was some bias, namely: alternative energy began to develop much faster, but the national financial burden of paying the “green” tariff also increased. In this regard, a typical consequence appeared: the “green” tariff, which, according to its plan, was aimed at expanding new renewable energy facilities, deviated from its original goal and became the main commercial source of income for existing producers of such energy. This leads to increased financial burden on society and the economy as the main consumers of “green” energy.

At the same time, such a financial burden is not temporary, judging by the recently adopted program documents. So, in October 2021, the Sixth Strategic Energy Plan was approved, which offers a basis for action aimed at achieving carbon neutrality by 2050. Japan’s ambitious climate goals should be achieved in a relatively short time, which implies further state stimulation of “green” generation.

The study of Japan’s legal experience gained during the generally effective development of alternative energy allows us to draw several important conclusions. In particular, Japan has become a great example of how a country with poor traditional energy resources can persistently build its own energy security and move towards energy independence through the use of renewable energy sources.

The history of Japan clearly illustrates the situation when significant flaws were identified in strategic plans, but this did not become an occasion to abandon ambitious environmental goals – it became an occasion to quickly reformat the legislative principles and state policy, taking into account new conditions and challenges. Ukraine, which is in the new harsh realities of warfare and the need for the next post-war recovery, faces the task of rethinking its energy security and making decisions adequate to dynamic external circumstances. The example of Japan proves that this path can be passed, relying, among other things, on the development of alternative energy.

LEGAL REGULATION OF ALTERNATIVE ENERGY IN UKRAINE: PROBLEMS AND PROSPECTS

Scientific monograph

Підписано до друку 30.09.2024. Формат 60×84/16.
Папір офсетний. Гарнітура Times New Roman. Цифровий друк.
Умовно-друк. арк. 14,65. Тираж 100. Замовлення № 1024-68.
Ціна договірна. Віддруковано з готового оригінал-макета.

Українсько-польське наукове видавництво “Liha-Pres”
79000, м. Львів, вул. Технічна, 1
87-100, м. Торунь, вул. Лубіцка, 44
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Свідоцтво суб’єкта видавничої справи
ДК № 6423 від 04.10.2018 р.