

Chapter 30

Legal Regulation of the Development of Renewable Energy Sources in Russia, the BRICS, and EAEU Countries



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Abstract This chapter notes that in the modern world, there is a gradual greening of industrial, agricultural, and other products, which is manifested in a gradual reduction in the negative impact on the environment. Such work is being carried out to achieve several goals and objectives related to reducing greenhouse gas emissions (which will slow down the processes of global climate change), switching to sustainable development standards, and reducing the volume of production and consumption waste. One of the leading directions of this work is the greening of energy, which is manifested in the transition to environmentally friendly technologies. The world practice of recent years speaks of a rapid growth in electricity production from renewable sources, which raises the question of the role of law and legal science in understanding and stimulating this trend. The study showed that all natural resources can be classified according to different criteria. It is possible according to the criterion of origin—for biological (forests, plants, animals), mineral (minerals), and energy (solar energy, wind energy, etc.). It is possible according to the ecological content for exhaustible (renewable and non-renewable) and inexhaustible (solar, wind, tidal energy). It is possible according to the degree of actual use—real and potential, according to the criterion of substitutability of some by others—replaceable and irreplaceable. Currently, all the BRICS and EAEU countries have adopted special laws on the development of renewable energy sources. The Russian legislator went the other way, including provisions on RES in the basic Federal law “On Electric Power Industry”. The authors note that all laws provide for comparable economic and organizational measures aimed at creating conditions for the development of renewable energy sources. The existing practice of developing the renewable energy system in all the BRICS and EAEU countries leaves some issues unresolved that require further discussion and resolution. Among them are questions about the role of the state in increasing the competitiveness of renewable energy sources; measures to be taken to reduce the environmental danger of renewable energy sources; measures in the field of neighborhood law aimed at guaranteeing the rights of owners of renewable energy sources, etc. A comprehensive legal solution to the issue of further development of

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renewable energy is cross-sectoral and will require amendments and additions to civil, environmental, energy, and other legislation.

Keywords Legal regulation · Renewable energy sources · Environmental problems · Inexhaustible natural resources · Environmentally friendly technologies

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30.1 Introduction

In the modern world, there is a gradual greening of industrial, agricultural, and other products, which is manifested in a gradual reduction in the negative impact on the environment. Such work is being carried out to achieve several goals and objectives related to reducing greenhouse gas emissions (which will slow down the processes of global climate change), switching to sustainable development standards, and reducing the volume of production and consumption waste. One of the leading directions of this work is the greening of energy, which is manifested in the transition to environmentally friendly technologies (Inshakova et al., 2019). At the same time, different countries use their national approaches to achieve their goals, which require study and doctrinal generalization.

For the BRICS and EEU countries, these trends are of particular interest. The transition of the EU countries to new environmental standards by 2050, their gradual abandonment of the use of hydrocarbons, poses new challenges for them (and especially for Russia), which, in addition to technical aspects, have the most important economic and legal characteristics. At the moment, much has already been done in Russia for the development of renewable energy sources (hereinafter-RES) (certification of renewable energy sources, criteria for allocating subsidies for technological connection of renewable energy generating facilities, promotion of the use of renewable energy sources in the wholesale electricity market, etc.). However, the dynamic development of the events of 2020 (the decline in production due to the corona-virus) in the hydrocarbon market requires an early adjustment of the existing course of state policy, its adaptation to new challenges and threats to national security, among which an important place is given to their solution by economic and legal means.

The need to form a long-term state energy policy in the field of renewable energy sources and to create favorable conditions for the development of innovative activities in this sector is due to the exhaustion of opportunities for economic growth in Russia. This growth was based on the extensive exploitation of raw materials, against the background of the formation of the digital economy and the emergence of a limited group of leading countries with new production technologies and focused on the use of renewable resources, such a policy is necessary. A gradual transition to “green growth”, in particular, in the field of renewable energy, can be achieved only through the implementation of a set of legislative and institutional measures that ensure the growth of energy efficiency and the development of renewable energy sources, the

introduction of economic incentives to reduce emissions, discharges, waste generation and disposal. These are the global trends. In recent years, there has been a qualitative and structural change in the development of renewable energy sources in the world. Over the past decade of investment, RES capacity has quadrupled from 414 to 1650 GW; since 2009, solar power alone has grown more than 26-fold—from 25 GW to approximately 663 GW. In 2018, the volume of investments in the creation of new renewable energy capacity reached \$272.9 billion (which is three times higher than the corresponding indicator of energy generation capacity from fossil fuels); in 2018, RES provided 12.9% of the world's electricity generation, preventing emissions of 2 billion tons of carbon dioxide (UN, 2019). Today, the search for policies that best enable a country to move from fossil fuels to renewable energy is an international competition for technological leadership in one of the fastest-growing sectors of the global economy.

International law has not yet formulated universal norms on the obligations of States to develop RES as a means of solving global energy and environmental problems, but such norms are contained in several bilateral and multilateral treaties (although as dispositive or recommendatory ones). The corresponding call is also contained in some advisory decisions of universal (UN) and regional (OAS, EU, APEC, etc.) international organizations. Thus, in paragraph 127 of the Declaration of the UN International Conference “Rio + 20”, we see a call for greater use of renewable energy sources and other technologies that reduce emissions, increase energy efficiency, and increase the use of advanced energy technologies, including more environmentally friendly technologies for the use of fossil fuels. But what are the reasons for the fact that the norms of international legal regulation of renewable energy sources in the framework of international treaty law are still quite fragmented? It seems that there are several reasons for this.

As noted by Belotsky (2016), the use of solar, wind, geothermal, and tidal energy occurs mainly within the framework of sovereign state territory. At the same time, the use of such sources does not technically have a significant transboundary impact on the territories of other States. Therefore, there is no special universal international legal regime in the field of renewable energy within the framework of a single treaty, but there are some harmonized norms within the regional European legal system—in the EU legal order. The use of the recommendations of international bodies in EU law is the most obvious example of the UN's influence on the development of regional international organizations. Back in 2009, the EU adopted Directive No. 2009/28/EC on the development of the use of energy derived from renewable energy sources, which repealed the previous Directive No. 2001/77/EC on the promotion of electricity produced from renewable sources in the domestic market. The Directive established separately for each Member State the share of total energy consumption to be derived from renewable energy sources by 2020. This percentage ranged from a minimum of 10% for Malta to a maximum of 49% for Sweden and was the basis for calculating the amount of energy produced from renewable sources in 2005. To achieve this goal, each Member State was obliged to develop an appropriate development plan. The issues of calculating the energy produced and proving that it was obtained from renewable sources were specifically regulated. Special attention was paid to the

problem of reducing greenhouse gas emissions, and the reporting procedure for the Member States was fixed. The 2009 Directive was revised in December 2018, when the Renewable Energy Directive 2018/2001/EC, part of the Clean Energy for All Europeans package, came into force. The Directive aims to make the EU a global leader in renewable energy and, more broadly, to help the EU meet its emissions reduction commitments under the 2015 Paris Climate Agreement.

The Directive sets a new mandatory target for renewable energy for the EU for 2030 of at least 32%, with a possible upward revision by 2023.

This experience of developing the legal regulation of renewable energy at the level of regional international organizations is of great interest to the BRICS and EAEU countries interested in the gradual transition to clean energy standards to implement their international obligations. For example, Russia, like the EU, has made several commitments to reduce greenhouse gases by signing the Paris Climate Agreement in 2015; other members of these associations have their commitments.

30.2 Materials and Methods

The legislative base of the study was made up of international and national legal acts dedicated to the development of the renewable energy system. The chapter examined the Paris Climate Agreement, adopted under the United Nations Framework Convention on Climate Change (signed in New York on April 22, 2016). As well as the EU directives (in particular, the Directive of the European Parliament and the Council of the European Union “On the promotion of the use of energy from renewable sources” (signed in Strasbourg on 11 December 2018, No. 2018/2001/EC). The authors paid special attention to the analysis of the national legislation of the BRICS and EAEU countries, in particular, the following documents were considered. The Law of the Republic of Armenia “On Energy Saving and Renewable Energy” (adopted on December 4, 2004, No. ZR-122). The Law of the Republic of Belarus “On Renewable Energy Sources” (adopted on December 27, 2010, No. 204-Z). The Law of the Republic of Kazakhstan “On Support for the use of Renewable Energy Sources” (adopted on July 4, 2009, No. 165-IV). The Law of the People’s Republic of China “On Renewable Energy Sources” (adopted on December 26, 2009). Law of the Kyrgyz Republic “On Renewable Energy Sources” (adopted on December 31, 2008, No. 283). The Law of the Russian Federation “On Electric Power Industry” (adopted on 26.03.2003 No. 35-FZ). As well as some by-laws (e.g., the Order of the Government of the Russian Federation of 08.01.2009 No. 1-p (as amended), of October 24, 2020 “On the main directions of the state policy in the field of improving the energy efficiency of the electric power industry based on the use of renewable energy sources for the period up to 2035”).

In the course of the study, the works of some scientists were considered. Among them are Barretto (2020), Belotsky (2016), Vankovich (2017), Vasilyeva (2011), Deynega (2020), Dmitrieva (2012), Dladla (2020), Klass (2011), Luneva (2018), Mormann (2011), Rastogi (2019), Ryzhenkov (2020), Fontana (2020), Shchepansky

(2013), Inshakova et al. (2019), Matytsin and Rusakova (2021), which allowed the authors to draw some proposed conclusions and judgments.

In the course of the research, general scientific methods were used, including formal-logical, dialectical, system-structural, and critical cognition. Methods of synthesis, classification, and generalization were used to interpret the results of the study. In the course of the work, the authors also used some private scientific methods: formal-legal, the principle of evaluating legal processes, and the method of comparative analysis.

30.3 Results

30.3.1 The Concept of Renewable Natural Resources and Their Place in the General Classification of Natural Resources

To study the legal regime of RES, it is necessary to initially formulate their definition and place it in the system of other resources.

In this regard, the scientific schools of the post-Soviet countries express several divergent points of view. Thus, in the Ukrainian ecological and legal science, it is proposed to classify natural resources into exhaustible (non-renewable natural resources). Those that are not completely restored or are restored much more slowly than they are used, for example, subsurface resources, minerals, soil resources, and renewable natural resources that are capable of full or partial self-restoration and reproduction under the influence of human activities, for example, land resources, forest resources, animal and plant life. It also offers inexhaustible natural resources—water, climate (energy, heat, moisture resources in the atmosphere and soil, light, gas), and space resources (marine energy) (Deynega, 2020).

Representatives of Russian scientific schools generally agree with this approach. Thus, I.S. Shchepansky believes that natural resources should be divided into exhaustible and inexhaustible (the latter mainly include water and climate resources). Exhaustible, in turn, must be divided into renewable (plant and animal products) and non-renewable (mineral resources of the subsurface). Renewable resources are natural resources that are capable of self-recovery after being partially withdrawn for consumption. Traditional sources of energy should include oil, natural gas, and coal, which currently dominate the global energy balance (Shchepansky, 2013).

Vasilyeva (2011) refers to alternative sources of renewable energy—the sun, wind, heat of the earth, the natural movement of water flows, the energy of biomass, which includes specially grown plants for energy production. It also includes production and consumption waste, biogas, gas released from production and consumption waste in landfills, gas generated in coal mines, and other free environmental energy. Their inexhaustibility and environmental cleanliness make it necessary to use them intensively.

Luneva (2018) believes that the rational use of renewable natural resources should necessarily lead to an increase in the sustainability of natural ecological systems, natural and natural-anthropogenic objects. Of course, this assumes such a volume of the negative impact that the environment can independently process. Under renewable natural resources, it means a part of natural resources in the redistribution of the cycle of substances in the biosphere, capable of self-recovery in terms commensurate with the terms of human economic activity (vegetation, wildlife, atmospheric oxygen, etc.). The most important characteristic of renewable resources is their self-restoration and self-purification, which should be taken into account when determining the method of their rational use.

Finally, the representative of the Belarusian scientific school Vankovich (2017) understands renewable energy sources as constantly existing or periodically appearing in the environment material objects or processes that can be continuously restored in appropriate quantities and contain or emit primary energy that can be used. Among renewable resources, it includes geothermal resources of the subsurface, which contain the energy of the earth's heat; surface water bodies, which emit the energy of the natural movement of water flows; atmospheric air, which emits wind energy; objects of the animal and plant world, which contain the energy of biomass.

Summarizing the above points of view, we note that the basic division of natural resources into exhaustible and inexhaustible is not in doubt. Concerning the goals and objectives of the use of renewable energy sources, the following should be noted. Among them, as a variety of inexhaustible natural resources, are solar energy, atmospheric air that releases wind energy; geothermal resources of the subsurface (containing the energy of the Earth's heat); the energy of the natural movement of water flows, objects of the animal and plant world that contain biomass energy.

As a temporary form of such energy, we can consider waste from production and consumption (as proposed by M. I. Vasilyeva), but with the caveat that with the development of modern technologies within the framework of the concept of circular economy, this type of resource for energy in the long term will lose its current significance.

Speaking of terminology, it should be noted that renewable energy should not be confused with clean energy. The term "clean energy" usually refers to the process of generating energy that does not pollute the environment, especially in terms of emissions of carbon dioxide and other gases. Therefore, "clean energy" has a broader meaning than "renewable energy". So, nuclear energy is a kind of environmentally friendly energy source, because it emits very little carbon dioxide. Similarly, natural gas is generally classified as a source of clean energy, provided that technologies for its extraction, transportation, and use significantly reduce or eliminate emissions of greenhouse gases and other pollutants from exhaustible energy sources (oil, coal) that are not renewable (Mormann, 2011).

So, all natural resources can be classified according to different criteria. It is possible according to the criterion of origin—for biological (forests, plants, animals), mineral (minerals), and energy (solar energy, wind energy, etc.). It is possible according to the ecological content for exhaustible (renewable and non-renewable)

and inexhaustible (solar, wind, tidal energy). It is possible according to the degree of actual use—real and potential, according to the criterion of substitutability of some by others-replaceable and irreplaceable. It seems that it is also necessary to distinguish between the generic category “natural resource” and its variety “energy natural resource”. The latter should be understood as a variety of natural resources that are directly used or can potentially be used by humans in the future as a source of energy.

30.3.2 Legal Regulation of the Development of Renewable Energy Sources in the BRICS and EAEU Countries: Trends and Prospects

International declarations and appeals of the UN, as well as the experience of the development of the renewable energy system in the EU countries and other regional international organizations, have had a different impact on the development of renewable energy in the BRICS and EAEU countries.

1. The Law of the People’s Republic of China “On Renewable Energy Sources” of December 26, 2009, was adopted to promote the development and use of renewable energy, increase the supply of energy, improve the structure of energy, ensure energy security, protect the environment and achieve sustainable economic and social development. The term “renewable energy” is used in the law concerning non-renewable types of energy (wind and solar energy, hydropower, bio-energy, ocean energy, etc.). The Department of Energy of the State Council of the People’s Republic of China, together with other departments, is developing a national plan for the development and use of renewable energy resources. The plan should contain development goals, main objectives, regional plans, key projects, the progress of work, construction of related energy networks, service systems, etc. China guarantees the purchase of electricity produced using renewable energy sources in full and supports the construction of independent electricity supply systems generated using renewable energy sources to provide electricity to local production and people in areas not covered by any networks (Ryzhenkov, 2020).
2. there is no special law on renewable energy sources in Russia, but their legal regime is defined by Federal Law No. 35-FZ of 26.03.2003 (as amended on 30.12.2020) “On Electric Power Industry”. According to Article 21 of this law, the Government of the Russian Federation determines the mechanism for stimulating the use of renewable energy sources by selling electric energy produced by qualified generating facilities operating on their basis on the wholesale market at the equilibrium prices of the wholesale market, taking into account the surcharge. Such an allowance is determined following the procedure established by the Government of the Russian Federation or is stimulated by selling

the capacity of qualified generating facilities in the volume of electricity production based on the use of renewable energy sources using the capacity trading mechanism. This is provided for by the rules of the wholesale market for the sale of the capacity of these generating facilities. At the same time, the Government of the Russian Federation also establishes a mandatory volume for buyers of electric energy in the wholesale market for the purchase of electric energy produced at qualified generating facilities operating based on the use of renewable energy.

This system of incentives is regulated in detail both in separate articles of the law itself and in the by-laws that specify its provisions. For example, according to Article 23.1 of the Federal Law “On Electric Power Industry”, state regulation of prices (tariffs) in the wholesale and retail markets is manifested, in particular, in the following. A surcharge is established that is added to the equilibrium price of the wholesale market to determine the price of electric energy produced at qualified generating facilities operating based on renewable energy sources (in cases and accordance with the procedure provided by the Government).

The Order of the Government of the Russian Federation of 08.01.2009 No. 1-r (ed. of October 24, 2020) “On the main directions of state policy in the field of improving the energy efficiency of the electric power industry based on the use of renewable energy sources for the period up to 2035” notes the following. For the period up to 2024, the following target values are set for the volume of production and consumption of electric energy using renewable energy sources (except for hydroelectric power plants with an installed capacity of more than 25 MW): in 2010—1.5%; in 2015—2.5%; in 2024—4.5%.

The Order of the Government of the Russian Federation also states that no more than 8.5 billion kW is produced annually using renewable energy sources of electric energy (excluding hydroelectric power plants with an installed capacity of more than 25 MW), which is less than 1% of the total electricity production in the Russian Federation.

The main reasons for the low rate of development of electric energy based on the use of renewable energy sources are also indicated. This is the lack of competitiveness of renewable energy projects in the existing market environment compared to projects based on the use of fossil fuels. This is the presence of institutional barriers associated with the lack of necessary regulatory legal acts that encourage the use of renewable energy sources in the electric power industry, the lack of federal and regional programs to support the large-scale use of renewable energy sources. This is the lack of infrastructure required for the successful development of the electricity industry based on renewable energy sources, including the lack of the level and quality of scientific services for its development. This is a lack of human resources and the lack of mechanisms for using public resources to support the development of the electric power industry based on the use of renewable energy sources.

A similar approach to understanding the reasons for the weak level of RES development is proposed in the scientific literature. In particular, Mormann (2011) notes that any attempt to promote renewable energy sources requires a deep understanding of the obstacles that stand in the way of a timely transition to renewable energy.

The cost competitiveness of RES compared to fossil fuels may be the most obvious obstacle to their large-scale deployment. But that's not the only reason. A comparison between France and Germany demonstrates that governance structures and financial subsidies alone do not guarantee the successful promotion of renewable energy sources. Even though the promotional policies of both countries offer equally high subsidized rates for electricity from renewable energy sources, their deployment in Germany is several times greater than in France, which indicates that there are more complex reasons affecting these processes.

To correct the situation, in 2018, the Ministry of Energy of the Russian Federation selected 39 investment projects for the construction of generating facilities operating based on renewable energy sources. Projects with a capacity of 1041.5 MW of capacity, including 853.3 MW of solar generation, 148.5 MW of wind generation, and 39.7 MW of small hydro generation (Report, 2019). It follows from this that, despite the low rate of RES development, the Russian Government is making the necessary efforts to correct this situation.

3. In India, the Electricity Act (2003), the National Electricity Policy (2005), and the Tariff Policy (2016) encourage private sector participation in renewable energy development by establishing obligations to purchase renewable energy for certain organizations. Private sector organizations are present in the entire value chain in the electricity sector, including the production, transmission and distribution of electricity. The Electricity Act provides a framework for the production, transmission, distribution, trade and use of electricity. Private sector entities, including foreign investors, create renewable energy projects and supply electricity to distribution utilities, private consumers, or domestic consumption. They account for 94.92% of the installed capacity of network interactive energy in renewable energy sources (as of 31.03.2018) (Dibyanshu et al., 2019).
4. In the Republic of South Africa, the Integrated Resource Plan (IRP) was approved in October 2019, which provides that the energy balance by 2030 will consist of coal (46%), 1860 MW of nuclear energy (2%), 4696 MW of hydropower (6%), 2912 MW of pumped storage (4%), 7958 MW of solar photovoltaic (PV) energy (10%), 11,442 MW of wind (15%), 11,930 MW of gas (16%) and 600 MW of concentrated solar energy consumption (CSP) (1%). The market for "rooftop solar panels" is growing rapidly. The Mall of Africa solar photovoltaic system is the largest rooftop solar photovoltaic system in the Southern Hemisphere and the 10th largest in the world, covering an area of about 45,000 m². Although South African law currently does not allow the sale of excess energy back to the grid (as is the case in some parts of the USA), the sponsors, together with the national energy regulator of South Africa, are successfully conducting a lengthy legal process to ensure legal compliance and successful synchronization of the RES system with the national grid. In recent years, the Ministry of Energy of South Africa has issued regulations that establish activities that are exempt from the requirement to obtain a license to produce electricity, and activities that require registration with the Ministry of Energy. According to them, any generating facility that does not have a connection point

should not receive a license to generate regardless of the generating capacity (in megawatts). At the same time, any object that has a generating capacity of no more than 100 kW with an existing connection point must keep a register of this object, but must not receive a license for a generation. Currently, South Africa does not have significant tax incentives or other government programs similar to those in the US or the EU that would equally contribute to the growth of renewable energy in these markets (Fontana et al., 2020).

5. In Brazil, electricity production is already predominantly from renewable sources. Hydropower accounts for 60% of the country's installed capacity (a total of 105 GW is currently in operation). When measuring actual energy production, the share of hydroelectric power is even greater: almost 90% of the electricity consumed in Brazil comes from hydroelectric sources. This scenario creates a need for diversification of energy sources, since the level of dominance of hydroelectric power plants, unfortunately, also has its drawbacks. Droughts, combined with a lack of sufficient alternative energy sources, have led to spikes in spot energy prices in the recent past. Therefore, renewable sources have become more representative in recent years, with wind accounting for 11% and solar accounting for 9.7% of the installed capacity under construction, while traditional hydroelectric plants under construction account for 7%. This trend will continue in Brazil in the future (Barretto et al., 2020).

The EAEU countries have their own rather unique situation and dynamics of the development of state regulation of the renewable energy system.

1. In Kazakhstan has adopted the Law of the Republic of Kazakhstan dated July 4, 2009, No. 165-IV "On support for the use of renewable energy sources". As follows from Article 4 of this law, the following are among the main directions of state regulation in the field of support for the use of renewable energy sources. This is the creation of favorable conditions for the construction and operation of facilities for the use of renewable energy sources. This is the promotion of the production of electric and (or) thermal energy using renewable energy sources. This is the provision of investment preferences to legal entities engaged in the design, construction, and operation of facilities for the use of renewable energy sources in accordance with the Business Code of the Republic of Kazakhstan. This is the creation of favorable conditions for the effective integration of facilities for the use of renewable energy sources into a single electric power, heat system, and the market of electric and thermal energy. This is a contribution to the implementation of the international obligations of the Republic of Kazakhstan to reduce greenhouse gas emissions.
2. The Republic of Belarus has adopted the Law of the Republic of Belarus "On Renewable Energy Sources" of December 27, 2010, No. 204-Z. According to Article 18 of this law, the Republic of Belarus provides state support in the use of renewable energy sources, including through the formation of a pricing policy aimed at stimulating the use of renewable energy sources, as well as energy produced from renewable energy sources. Promotion of investment activities,

including the creation of favorable conditions for national and foreign investors. Promote the creation and application of efficient technologies in the field of renewable energy sources, as well as the production of installations for the use of renewable energy sources. Ensuring the guaranteed connection of installations for the use of renewable energy sources to the state energy networks. Establishment of tax and other benefits in accordance with legislative acts.

3. The Kyrgyz Republic has adopted the Law of the Kyrgyz Republic No. 283 of December 31, 2008 (as amended on July 24, 2019) "On Renewable Energy Sources". According to Article 7 of this Law, the Government of the Kyrgyz Republic promotes the use of renewable energy through the following measures. For example, the definition of priorities in the development of RES; guaranteed functioning of economic mechanisms and incentive measures provided for by legislation for the development and implementation of environmentally friendly technologies or technologies with low and safe waste levels in the process of RES development. And this includes wells, the evacuation of substances that pollute the environment in the production process, and the use of renewable fuels. It also supports the construction of independent renewable energy systems in cities, as well as in rural areas to provide energy services and the functioning of local production, life support for the population. It also encourages the installation and use of solar energy systems for hot water, heating, cooling, and electricity generation. The promotion of activities for the installation and establishment of a network of biogas plants for the rational use of organic waste from the agricultural production and processing industry is applied. Support is provided for the creation of service centers that ensure the stable production of renewable energy installations, repair, and maintenance of the systems being created.
4. The Republic of Armenia has adopted the Law of the Republic of Armenia No. ZR-122 of December 4, 2004 (as amended on 08.04.2020) "On Energy Saving and Renewable Energy". According to Article 1 of this law, its purpose is to establish the principles of implementation of energy conservation and state policy on the development of renewable energy and mechanisms for their implementation, aimed at the following goals. To strengthen the economic and energy independence of the Republic of Armenia, to increase the economic and energy security of the Republic of Armenia, and the reliability of the energy system. As well as the creation of new industries which promote energy conservation and the development of renewable energy and the organization of services, to reduce the man-made impact on the environment, human health. The law should create mechanisms for implementing the state policy in the field of energy conservation and promote the development of renewable energy. In particular, this law provides for the creation of a new institute of energy expertise, the activities of which will ensure the implementation of the provisions of the document.

So, all the EAEU countries have adopted special laws on the development of renewable energy sources. The Russian legislator went the other way, including provisions on RES in the basic Federal law "On Electric Power Industry". All laws provide

for comparable economic and organizational measures aimed at creating conditions for the development of renewable energy sources (Inshakova and Goncharov, 2019).

30.3.3 Environmental Consequences of the Development of Renewable Energy Sources and Ways to Solve Them

Contrary to popular belief, any energy facilities always pose a certain environmental threat. Undoubtedly, such a threat from RES is incomparably less than from nuclear or thermal power plants (Matytsin & Rusakova, 2021). Nevertheless, the experience of European countries and the USA, which are massively introducing wind turbines and solar panels into practice, indicates the presence of side effects that need to be reduced. The fact is that solar panels cause shading of the land, which leads to the deterioration of the soil and the death of vegetation. A negative environmental consequence is the heating of the air as a result of the operation of such an energy facility, which leads to a change in the thermal balance of the area, humidity, and wind direction. Possible overheating and ignition of systems that use solar energy, with all the ensuing consequences.

In turn, the mass accumulation of wind turbines can affect the climate, impairing the ventilation of the area. A very important factor in the influence of wind generators on nature is the acoustic effect.

Noise effects from wind power plants are different and are divided into mechanical (noise from gearboxes, bearings, and generators) and aerodynamic effects. Noise can affect wildlife, including marine life in the area where wind farms are located. The probability of birds being affected by wind turbines is estimated at 10% if the migration routes pass through the wind park. The location of wind parks also affects the choice of bird migration routes. Interference caused by the reflection of electromagnetic waves by wind turbine blades can affect the quality of television and microwave radio broadcasts, as well as various navigation systems in the area where the wind park is located. Along with this, many citizens consider the appearance of windmills not aesthetic (it is worth noting that more and more design agencies are working on overcoming aesthetic inconveniences every year, and progress in this matter is evident). Improvements in the design of the blades and the establishment of noise limits for wind turbines by EU directives are gradually reducing the relevance of this problem. Finally, increasing the size of the wind generator and reducing the frequency of its rotation begins to reduce the number of dead birds. And although the zero levels of losses are still far away, the number of dead birds from collisions with vehicles is now definitely higher in number (Dmitrieva & Pozmogova, 2012).

A separate problem is that the construction of a wind generator or solar battery by one neighbor may violate the rights of another neighbor. This is a difficult problem for Russia and other EAEU countries because these countries have poorly developed legislation on neighborhood rights, which dates back to the times of Ancient Rome. The experience of other countries (e.g., the USA) shows that the solution to this

problem should be sought in the development of a system of permits and zoning. So, in some US states (e.g., in New Mexico and Wyoming), the owner of a solar battery gets the right to access sunlight, and the right to protect his interests before neighbors or other persons who create obstacles to such access and make it unprofitable. The US state of California has passed the Solar Rights Act and the Solar Control Act. These legal acts prohibit unjustified restrictions on the installation of solar generators, provide for the creation of “solar amenities”, for example, limiting the impact of vegetation on solar energy systems (in other words, the law prohibits the planting of trees that would give shade to solar panels). In some municipalities in the state of Colorado, a real “solar zoning” has been carried out, in which places are allocated where it is prohibited to build or plant trees that would violate the “solar rights” of neighbors (Klass, 2011).

Similarly, some state laws provide for “wind rights” that create conditions for the use of wind turbines and limit the possibility of creating obstacles to this. The existence of such a practice requires representatives of legal science to conduct new scientific research on the rights to the natural resources of wind and sun.

The lack of clear rules and interaction between public authorities in the post-Soviet space makes it difficult to effectively develop energy based on renewable sources. It is necessary to establish new administrative procedures for issuing permits for the construction and commissioning of wind turbines and other similar facilities. It is also necessary to adapt urban planning standards to the challenges of developing renewable energy sources and to create conditions for cost-effective and environmentally friendly heating and energy supply to cities through them.

30.4 Conclusion

The world practice of recent years speaks about the rapid growth of electricity production from renewable sources, which raises the question of the role of law and legal science in understanding and stimulating this trend. The study showed that all natural resources can be classified according to different criteria. According to the criterion of origin, for biological (forests, plants, and animals), mineral (minerals), and energy (solar, wind, etc.). According to the ecological content, for exhaustible (renewable and non-renewable) and inexhaustible (solar, wind, tidal energy). According to the degree of actual use, real and potential. According to the criterion of substitutability of some by others, replaceable and irreplaceable. Currently, all the BRICS and EAEU countries have adopted special laws on the development of renewable energy sources.

The Russian legislator went the other way, including provisions on RES in the basic Federal law “On Electric Power Industry”. At the same time, all laws provide for comparable economic and organizational measures aimed at creating conditions for the development of renewable energy sources.

The existing practice of developing the renewable energy system in all the BRICS and EAEU countries leaves some issues unresolved that require further discussion and resolution. Among them are questions about the role of the state in increasing

the competitiveness of renewable energy sources, as well as measures to be taken to reduce the environmental risk of renewable energy sources. As well as measures in the field of neighborhood law aimed at guaranteeing the rights of owners of renewable energy sources, etc.

A comprehensive legal solution to the issue of further development of renewable energy is cross-sectoral and will require amendments and additions to civil, environmental, energy, and other legislation.

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References

- 2015 Agreement, the Paris Agreement under the United Nations Framework Convention on Climate Change (Signed in New York on April 22, 2016).
- Barretto, A. C., Figueiro, T. K., & Brasil, A. L. (2020). Brazil. In K. B. Wong (Ed.), *The renewable energy law review* (3rd ed.). Law Reviews.
- Belotsky, S. D. (2016). *International legal, regulation in the field of environmentally oriented energy: Abstract of the dissertation of the Doctor of Law*. Taras Shevchenko National University of Kyiv.
- Deynega, M. A. (2020). *The subject and system of natural resource law: Abstract of the dissertation of the Doctor of Law*. National University of Bioresources and Nature Management of Ukraine.
- Dibyanshu, Rastogi, S., & Bhandari, P. (2019). *Renewable energy in India*. <https://www.lexology.com/library/detail.aspx?g=6efdf930-f5f5-44c8-a4b3-54cf1de07b94>. Accessed January 12, 2021.
- Directive of the European Parliament and of the Council of the European Union 2018 on the Promotion of the Use of Energy from Renewable Sources (Signed in Strasbourg on 11 December 2018 no. 2018/2001/EC) (European).
- Dmitrieva, Yu. Yu., & Pozmogova, S. B. (2012). Prospects for the use of wind power in the Ulyanovsk region. *Bulletin of the Ulyanovsk State Technical University*, 2, 37–41.
- Federal Law. (2003). *On electric power industry* (Adopted on 26.03.2003 No. 35-FZ).
- Fontana, L., & Dladla, Y. (2020). South Africa. In K. B. Wong (Ed.), *The renewable energy law review* (3rd ed.). Law Reviews.
- Inshakova, A. O., & Goncharov, A. I. (2019). Innovation as an integral condition for the development of modern foreign trade turnover of energy resources and its legal regulation. In O. V. Inshakov, A. O. Inshakova, & E. G. Popkova (Eds.), *Energy sector: A systemic analysis of economy, foreign trade and legal regulations* (pp. 67–78). Springer Science + Business Media. https://doi.org/10.1007/978-3-319-90966-0_5
- Inshakova, A. O., Goncharov, A. I., & Marchukov, I. P. (2019). Common energy policy and development paths legal regulation of foreign trade turnover of energy resources in the CIS and the EEU. In O. V. Inshakov, A. O. Inshakova, & E. G. Popkova (Eds.), *Energy sector: A systemic analysis of economy, foreign trade, and legal regulations* (pp. 207–225). Springer Science + Business Media. https://doi.org/10.1007/978-3-319-90966-0_14
- Klass, A. B. (2011). Property rights on the new frontier: Climate change, natural resource development, and renewable energy. *Ecology Law Quarterly*, 38, 95–104.
- Law of the Kyrgyz Republic. (2008). *On renewable energy sources* (Adopted on December 31, 2008, No. 283) (Kyrgyzstan).
- Law of the People's Republic of China. (2009). *On renewable energy sources* (Adopted on December 26, 2009) (China).

- Law of the Republic of Armenia. (2004). *On energy saving and renewable energy* (Adopted on December 4, 2004, No. ZR-122) (Armenia).
- Law of the Republic of Belarus. (2010). *On renewable energy sources* (Adopted on December 27, 2010, No. 204-Z) (Belarus).
- Law of the Republic of Kazakhstan. (2009). *On support for the use of renewable energy sources* (Adopted on July 4, 2009, No. 165-IV) (Kazakhstan).
- Luneva, E. V. (2018). Legal criteria for the rational use of renewable and non-renewable natural resources. In: *Greening-the main-task of sustainable development of society: A collection of articles based on the materials of the International Scientific and Practical Conference*. Saratov State Law Academy.
- Matytsin, D. E., & Rusakova, E. P. (2021). The strategy of quality management in industry 4.0 and formation of the cognitive economy based on industrial and manufacturing engineering in the Russian Federation and countries of the EU. *International Journal for Quality Research*, 15(4). <https://doi.org/10.24874/IJQR15.04-03>
- Mormann, F. (2011). Requirements for a renewables revolution. *Ecology Law Quarterly*, 38, 903–965.
- Order of the Government of the Russian Federation. (2009). On the main directions of state policy in the field of improving the energy efficiency of the electric power industry based on the use of renewable energy sources for the period up to 2035 (Adopted by the Government of the Russian Federation on 08.01.2009 No. 1-r in the ed. from October 24, 2020).
- Progress report on the implementation in 2018 of the comprehensive plan for the implementation of the Climate Doctrine of the Russian Federation for the period up to 2020, 2019, Moscow. https://www.mnr.gov.ru/docs/o_vypolnenii_kompleksnogo_plana_realizatsii_klimaticheskoy_doktriny/doklad_o_khode_vypolneniya_v_2018_godu_kompleksnogo_plana_realizatsii_klimaticheskoy_doktriny_rossiy/ Accessed January 12, 2021.
- Ryzhenkov, A. Y. (2020). Legal protection of the environment in China and Russia: Comparative legal aspect. *Modern Law*, 7, 123–127.
- Shchepansky, I. S. (2013). *Ecological and legal problems of ensuring energy security in Russia: Abstract of the dissertation of the candidate of Legal Sciences*. Kutafin Moscow State Law University.
- The UN. (2019). *Environmental program*. Official website. <https://www.unenvironment.org/ru/novosti-i-istorii/press-release/desyatiletie-investitsiy-v-vie-vo-glave-s-solnechnoy-energetikoy>. Accessed January 12, 2021.
- Vankovich, E. E. (2017). *Legal support of environmental safety in the use of renewable energy sources*. Ph. D. in Law thesis. National Center for Legislation and Legal Research, Minsk.
- Vasilyeva, M. I. (2011). *Legal support of the environmental policy*. Priority areas. Institute of Sustainable Development of the Public Chamber of the Russian Federation.